World Family Medicine Journal

incorporating the Middle East Journal of Family Medicine

ISSN 1839-0188

November 2017 - Volume 15, Issue 9

Prevalence and risk factors of obesity in children aged 2-12 years in the Abu Dhabi Islands -- page 61

From the Editor

Chief Editor:
A. Abyad
MD, MPH, AGSF, AFCHSE
Email: aabyad@cyberia.net.lb

Ethics Editor and Publisher
Lesley Pocock
medi+WORLD International
AUSTRALIA

Email:
lesleypocock@mediworld.com.au

This issue is rich with good number of research, reviews and community studies from the region. Al-Shehhi, E et al did a questionnaire to measure the prevalence and risk factors of obesity in children aged 2–12 years in the Abu Dhabi Islands, United Arab Emirates. The prevalence of overweight and obesity among the study population was found to be 32.8%. The prevalence of overweight and obesity among children is increasing in the UAE, especially among UAE nationals.

Ijaz Anwer, I et al; conducted a cross-sectional study in outpatient clinics of Faisalabad Pakistan. A total of 691 diabetic patients (verified from physician, medical records) were consecutively approached. The objective of this study was to assess the knowledge of diabetic patients about their disease, its complications and management. The authors concluded that the overall level of awareness in diabetics was found to be low and there is a need to educate the population on this topic.

Ardestani-Samani, N et al studied the difference in psychiatric disorders between students with multiple sclerosis (MS) and healthy students. The mean scores on psychological disorders and their dimensions were significantly higher in patient group than healthy group (p<0.05). They studied the difference in self-concept, physical self-concept, and time perspective between the students with multiple sclerosis (MS) and healthy students. Findings indicated that overall, the people with MS, compared to healthy people, have negative self-concept and self-concept as well as negative attitudes toward their own social relationships and moods.

Choheili, H et al did a study on 1005 students to create and validate the adjustment inventory. The adjustment inventory consisting of 100 items was employed to measure their adjustment. In the second study they validate the Faith Inventory for Students. Gilavand, A & Fatahias, J assessed the quality of educational services from the viewpoints of radiology students of the School of Paramedicine based on the SERVQUAL evaluation model. Students' expectations were beyond their perception of the status quo, and none of the five dimensions of the quality of educational services met their expectations. Therefore, it is necessary for the university to narrow the existing gap according to its type and severity.

Sahar Zandi ,S et al; compared anti-inflammatory properties of two soft tissue injections of dexamethasone sodium phosphate 1/6 mg, using topical tissue glue containing ginger extract. Based on the statistical data obtained from this study, it seems that topical administration of tissue glue containing ginger extract (20%) and soft tissue injection of dexamethasone sodium phosphate (1/6 mg) after surgery both reduced Trismus after surgery. Babadi, E et al ; compared the antibacterial effects chlorhexidine mouth wash (CHX) with jaftex mouth wash. The finding concluded that Jaftex mouth wash were less potent than the CHX in inhibiting growth on oral micro-organisms and it's recommended to be used for plaque chemical inhibition.

Several studies dealt with various issues in nursing. Jafarizadeh, H et al determined the effect of a resilience-based intervention on occupational stress in nurses. There was a significant difference in the level of occupational stress and its components between the pre-test and post-test of the studied subjects after the intervention. Elhami, S et al did a descriptive cross-sectional study, viewpoints of 180 nurses and nursing students regarding to the barriers of observance of professional ethics standards in clinical environment. Observance of the professional ethics standards in nursing practice, can play an important role in improving and restoring the health of patients. Ghaderi, A et al cross-sectional study was conducted to determine cognitive factors related to doing regular physical activity among a sample of Iranian nurses based on the integrative model of behavior prediction (IMBP). it seems that designing and implementation of educational programs to increase attitude and skills regarding the doing physical activity may promote physical activity. Boozaripour, M et al did a cross-sectional study that assessed undergraduate nursing students (n=313) perceptions of their clinical learning environment. The study indicated that there is still work to be done to provide a healthy clinical learning environment for nursing students and this task belongs to nursing researchers, educators, and health care organization preceptors.

Shokoh Varaei, S et al; evaluated the effect of education on self-care behaviors of gastrointestinal side effects in patients undergoing chemotherapy. The results showed that the use of self-care training alongside drug regimen reduces the side effects of chemotherapy in patients.

Gilavand, A conducted a study to determine how the salaries and benefits of faculty members are calculated in the Ministry of Health and Medical Education of Iran. The author concluded that faculty members expect their salaries to be calculated and paid equitably and to increase each year in proportion to the inflation rate, so that they do not have to carry out unrelated and non-academic activities outside the university in order to solve their livelihood problems.

Afrasibi, S& Fattahi, Z review the concept of self-actualization in psychology and Islam. they stressed that the concept of self-actualization and perfection in Islam has a special state compared to the view in psychology, and involves all aspects of life. Helvaci, M.R et al; took consecutive patients below the age of 70 years to avoid debility induced weight loss in elders. Patients were divided into three groups as normal weight, overweight, and obesity. The authors concluded that higher Alanine aminotransferase (ALT) value in serum may indicate excess weight and dyslipidemia.

Abbasian, E.G et al; studied the effect of plasma jet on Fusarium isolates with ability to produce DON toxins. This study has confirmed that argon plasma jet system has destructive effects on mycotoxins such as DON and also on the micro-organisms which produce mycotoxins. Daneshvar, H et al; did a Comparative Analysis of Antimicrobial Peptides Gene Expression in Susceptible/Resistant Mice Macrophages to Leishmania major Infection. The authors concluded that due to higher expression and release of AMPs by BALB/c derived macrophages, the L. major infection ultimately occurs in BALB/c mice.

Razmjooei, F et al did study to evaluate the effect of patient's socioeconomic status on clinical outcomes in CABG surgery. The authors concluded that, socioeconomic status had a significant effect on: Hospital stay, wound infection, first, second and third day bleeding after surgery, Reoperation need, blood transfusion in first, second and third day after surgery. ValiPour, A.A et al; did an epidemiological study on the prevalence of Tuberculosis in Abadan, Iran. In this study, 720 patients with tuberculosis were studied, of which 62.9% were male. 73.6% of patients live in urban areas. Considering the fact that tuberculosis is a life-limiting disease and is most prevalent in the young age group of society that is considered as the main capital and workforce, training people who are at risk can significantly contribute to the prevention of disease.

Pourmovahed, Z et al ; did a qualitative with the purpose of exploring the experiences of family and marriage experts and also Yazdi couples' experiences with religious beliefs and superstitions running in families. Families could be trained to find some correct and suitable solutions along with reinforcement of spiritual beliefs to cope with the use of superstitions in solving familial life problems and increase family health and stability.

Farshchian, N et al carried a study to compare the uterine artery Doppler indices (resistance index (RI), plasticity index (PI), and peak systolic velocity (PSV)) among pregnant women with diabetes mellitus and gestational diabetes with healthy pregnant women. There was a difference regarding PI between mothers with diabetes mellitus and gestational diabetes with healthy mothers.

Rahmanian , E et al; conducted a randomized clinical performed on 64 children to evaluate treatment of UTI with single dose of gentamicin first as 3 mg / kg daily IV and after urine culture became negative in the second day of treatment 1mg / kg daily IM in children with range of 1 month to the 13 years old in Jahrom during 1394. Data showed no significant differences of responding to the treatment and its complications between the two studied groups.

Rajput , M.Y compared the use of traditional and usual medical treatment for constipation. The general approach to dealing with constipation in traditional medicine sources is somewhat similar to that of the medical findings, but the details of the recommendations in these sources do not have the required level of evidence.

Rahmanian, E et al; in a cross-sectional descriptive study aimed to determine the immunity level of Jahrom's young girls and women against measles and rubella 7 years after the public vaccination. The results showed that although the national vaccination in 2003 has been effective in immunizing the women of gestational age to measles and rubella, it seems that due to the gradual reduction of this immunity, all women, before pregnancy, should undergo a test to determine their immunity to these two diseases and if necessary, booster vaccine should be inoculated.

Ali Reza Yousefi A.R & Inaloo, R carried cross sectional study Evaluation of control of bleeding by electro cauterization of bleeding points of amplatzsheet tract after percutaneous nephrolithotomy (PCNL). The authors concluded that Electro cauterization of bleeding points with an electrode probe after percutaneous surgery decreased morbidity. The authors in their second study reviewed percutaneous nephrolithotomy in children below 12 years old in Jahrom hospital. Percutaneous stone therapy-related hemorrhage requires a blood transfusion (11%-14%), and an increased risk of kidney loss. In this study, the stones were removed completely with minimal injury to renal tissue. PCNL has a better stone clearance rate and is cost-effective. PCNL has clearance rate of 100% when it was combined with ESWL.

Maleki, A et al ; evaluated the accuracy and error rate of the three-finger tracheal palpation technique and compare it with triple ID formulae technique in children age of 2-8 years. Overall, this study showed that the use of the three-finger tracheal palpation technique was acceptable as a standard method and compared with the three-pipe formula, the percentage of success was greater (100% versus 96%).

Behnaz, F et al; investigated the effect of sevoflurane and propofol on pulmonary arterial pressure during cardiac catheterization in children with congenital heart diseases. The authors concluded that propofol is considered more appropriate than Sevoflurane for cardiac catheterization in children with congenital heart disease and anesthesiologists can use Propofol as a suitable alternative for sevoflurane.

Nasim Dastras, N et al ; investigate the relationship between coping styles and religious orientation with mental health among students of Nursing Midwifery Faculty of Zabol.. The results of the research show that there is a significant relationship between coping styles and religious orientation. There is also a significant relationship between coping styles and mental health.

Salamat,S et al did a a quasi-experimental study investigating the effectiveness of cognitive - behavioral therapy in reducing the post-traumatic stress symptoms in male students survivors of earthquake in the central district of Varzeghan. In general, it can be concluded that this therapeutic intervention is effective and it can be used at health centers as well as schools in order to reduce the symptoms of post-traumatic stress.

Mehraki, B & Gholami, A Physical and mental health is one of the most important and fundamental issues of life in every society. The teachings of Islam consider physical and mental health as one of the most important features of Muslims, and as the promoter of the development of good traits and peace and comfort of mankind. The findings of this study highlight the role of faith, marriage, and observance of individual and social health principles in the physical and mental balance and stability of humans.

Helalat, L et al ; looked at the the effect of curcumin on growth and adherence of major microorganisms causing tooth decay. The authors concluded that adhesion is the most important factor in tooth decay and its reduction is an effective solution in preventing the disease. Considering the inhibitory role of curcumin on growth and binding of bacterial strains, this curcuminoid agent is considered as a potent anti-decay agent.

Copyright

While all efforts have been made to ensure the accuracy of the information in this journal, opinions expressed are those of the authors and do not necessarily reflect the views of The Publishers, Editor or the Editorial Board. The publishers, Editor and Editorial Board cannot be held responsible for errors or any consequences arising from the use of information contained in this journal; or the views and opinions expressed.
p-ISSN: 1839-0188; e-ISSN : 1839-0196

2 **Editorial**

Original Contribution/Clinical Investigation

7 **Diabetes Mellitus – Knowledge, Management and Complications: Survey report from Faisalabad-Pakistan**
DOI: 10.5742/MEWFM.2017.93094
Ijaz Anwer, Ahmad Shahzad, Kashmira Nanji, Farah Haider, Muhammad Masood Ahmad

13 **Alanine aminotransferase indicates excess weight and dyslipidemia**
DOI: 10.5742/MEWFM.2017.93095
Mehmet Rami Helvaci, Orhan Ayyildiz Mustafa Cem Algin, Yusuf Aydin, Abdulrazak Abyad, Lesley Pocock*

18 **Comparative Analysis of Antimicrobial Peptides Gene Expression in Susceptible/Resistant Mice Macrophages to Leishmania major Infection**
DOI: 10.5742/MEWFM.2017.93096
Hamid Daneshvar, Iraj Sharifi, Alireza Kyhani, Amir Tavakoli Kareshk, Arash Asadi

25 **Does socio-economic status of the patients have effect on clinical outcomes after coronary artery bypass grafting surgery?**
DOI: 10.5742/MEWFM.2017.93097
Forough Razmjooei, Afshin Mansourian, Saeed Kouhpyma

32 **Comparison of the uterine artery Doppler indices during pregnancy between gestational diabetes and diabetes mellitus and healthy pregnant women**
DOI: 10.5742/MEWFM.2017.93098
Nazanin Farshchian, Farhad Naleini, Amir Masoud Jaafarnejhad, Parisa Bahrami Kamangar

36 **Survey single dose Gentamicin in treatment of UTI in children with range of 1 month to 13 years old in Jahrom during 2015**
DOI: 10.5742/MEWFM.2017.93099
Ehsan Rahmanian, Farideh Mogharab, Vahid Mogharab

43 **Evaluation of control of bleeding by electro cauterization of bleeding points of amplatz sheath tract after percutaneous nephrolithotomy (PCNL) in Jahrom Peymanieh hospital during year 2015-2016**
DOI: 10.5742/MEWFM.2017.93100
Ali Reza Yousefi , Reza Inaloo

48 **Comparison of the three-finger tracheal palpation technique with triple ID formula to determine endotracheal tube depth in children 2-8 years in 2016-2017**
DOI: 10.5742/MEWFM.2017.93101
Anahid Maleki, Alireza Ebrahim Soltani , Alireza Takzare, Ebrahim Espahbodi , Mehrdad Goodarzi, Roya Noori

54 **Effect of Sevoflurane and Propofol on pulmonary arterial pressure during cardiac catheterization in children with congenital heart diseases**
DOI: 10.5742/MEWFM.2017.93102
Faranak Behnaz, Mahshid Ghasemi , Gholamreza Mohseni, Azim Zaraki

Population and Community Studies

61 **Prevalence and risk factors of obesity in children aged 2–12 years in the Abu Dhabi Islands**
DOI: 10.5742/MEWFM.2017.93103
Eideh Al-Shehhi, Hessa Al-Dhefairi, Kholoud Abuasi, Noora Al Ali, Mona Al Tunaiji, Ebtihal Darwish

75 **Study and comparison of psychological disorders in normal students and students with multiple sclerosis in Shahrekord**
DOI: 10.5742/MEWFM.2017.93106
Neda Ardestani-Samani, Mohammad Rabiei, Mohammad Ghasemi-Pirbalooti, Asghar Bayati, Saeid Heidari-Soureshjani

80 Comparative study of self-concept, physical self-concept, and time perspective between the students with multiple sclerosis and healthy students in Shahrekord
DOI: 10.5742/MEWFM.2017.93105
Neda Ardestani-Samani, Mohammad Rabiei, Mohammad Ghasemi-Pirbalooti, Asghar Bayati, Saeid Heidari-Soureshjani

85 **Relationship between Coping Styles and Religious Orientation with Mental Health in the Students of the Nursing-Midwifery Faculty of Zabol**
DOI: 10.5742/MEWFM.2017.93109
Nasim Dastras, Mohsen Heidari Mokarrar, Majid Dastras, Shirzad Arianmehr

91 **Tuberculosis in Abadan, Iran (2012-2016): An Epidemiological Study**
DOI: 10.5742/MEWFM.2017.93107
Ali-Asghar ValiPour, Azimeh Karimyan, Mahmood Banarimehr, Marzieh Ghassemi, Maryam Robeyhavi, Rahil Hojjati, Parvin Gholizadeh

97 **Family Stability and Conflict of Spiritual Beliefs and Superstitions among Yazdi People in Iran: A Qualitative Study**
DOI: 10.5742/MEWFM.2017.93108
Zahra Pourmovahed, Seyed Saied Mazloomy Mahmoodabad, Hassan Zareei Mahmoodabadi, Hossein Tavangar, Seyed Mojtaba Yassini Ardekani, Ali Akbar Vaezi

104 **A comparative study of the self-actualization in psychology and Islam**
DOI: 10.5742/MEWFM.2017.93104
Simin Afrasibi, Zakieh Fattahi

112 **The effectiveness of cognitive - behavioral therapy in reducing the post-traumatic stress symptoms in male students survivors of earthquake in the central district of Varzeghan**
DOI: 10.5742/MEWFM.2017.93110
Sakineh Salamat, Dr.Ahad Ahangar, Robab Farajzadeh

Reviews

117 **Effects and mechanisms of medicinal plants on stress hormone (cortisol): A systematic review**
DOI: 10.5742/MEWFM.2017.93115
Kamal Solati, Saeid Heidari-Soureshjani, Lesley Pocock

124 **Comparing Traditional and medical treatments for constipation : A Review Article**
DOI: 10.5742/MEWFM.2017.93111
Mohammad Yaqub Rajput

128 **A review of anti-measles and anti-rubella antibodies in 15- 25 year old women in Jahrom City in 2011**
DOI: 10.5742/MEWFM.2017.93111
Ehsan Rahmania, Farideh Mogharab, Vahid Mogharab

135 **Review of percutaneous nephrolithotomy in children below 12 years old in Jahrom hospital, during 2010-2014**
DOI: 10.5742/MEWFM.2017.93113
Ali Reza Yousefi , Reza Inaloo

142 **Physical and mental health in Islam**
DOI: 10.5742/MEWFM.2017.93114
Bahador Mehraki, Abdollah Gholami

International Health Affairs

149 **The Challenges of Implementation of Professional Ethics Standards in Clinical Care from the viewpoint of Nursing Students and Nurses**
DOI: 10.5742/MEWFM.2017.93117
Saeedeh Elhami, Kambiz Saberi, Maryam Ban, Sajedeh Mousaviasl, Nasim Hatefi Moadab, Marzieh Ghassemi

154 **Cognitive Determinants of Physical Activity Intention among Iranian Nurses: An Application of Integrative Model of Behavior Prediction**
DOI: 10.5742/MEWFM.2017.93118
Arsalan Ghaderi, Firoozeh Mostafavi, Behzad Mahaki, Abdorrahim Afkhamzadeh, Yadolah Zarezadeh , Erfan Sadeghi

159 **Effect of resilience-based intervention on occupational stress among nurses**
DOI: 10.5742/MEWFM.2017.93116
Hossein Jafarizadeh, Ebrahim Zhiyani, Nader Aghakhani, Vahid Alinejad, Yaser Moradi

Education and Training

164 **Calculation of Salaries and Benefits of Faculty Members in the Ministry of Health and Medical Education of Iran**
DOI: 10.5742/MEWFM.2017.93119
Abdolreza Gilavand

170 **The effect of education on self-care behaviors of gastrointestinal side effects on patients undergoing chemotherapy**
DOI: 10.5742/MEWFM.2017.93120
Shokoh Varaei, Ehsan Abadi Pishe, Shadan Pedram Razie, Lila Nezam Abadi Farahani

176 **Creating and Validating the Faith Inventory for Students at Islamic Azad University of Ahvaz**
DOI: 10.5742/MEWFM.2017.93122
Solmaz Choheili, Reza Pasha, Gholam Hossein Maktabi, Ehsan Moheb

181 **Creating and Validating the Adjustment Inventory for the Students of Islamic Azad University of Ahvaz**
DOI: 10.5742/MEWFM.2017.93121
Homa Choheili, Reza Pasha, Gholam Hossein Maktabi, Ehsan Moheb

187 **Evaluating the Quality of Educational Services from the Viewpoints of Radiology Students of Ahvaz Jundishapur University of Medical Sciences**
DOI: 10.5742/MEWFM.2017.93123
Abdolreza Gilavand, Jafar Fatahiasl

193 **An Investigation of Psychosocial aspect of Iranian Nursing Students' Clinical Setting**
DOI: 10.5742/MEWFM.2017.93124
Mahsa Boozaripour , Zanyar Karimi, Sima Zohari Anbohi, Amir Almasi-Hashiani, Fariba Borhani

Clinical Research and Methods

200 **Comparison of the Antibacterial Effects of Chlorhexidine Mouth washes with Jaftex Mouth wash on Some Common Oral Microorganisms (An in Vitro Study)**
DOI: 10.5742/MEWFM.2017.93125
Ebrahim Babadi, Zahra Bamzadeh, Fatemeh Babadi

204 **Study of the effect of plasma jet on Fusarium isolates with ability to produce DON toxins**
DOI: 10.5742/MEWFM.2017.93126
Elham Galin Abbasian, Mansour Bayat, Arash chaichi Nosrati, Seyed Jamal Hashemi, Mahmood Ghoranneviss

208 **The comparison of anti-inflammatory effect in two methods of topical dexamethasone injection and topical application of ginger alcoholic extract after removing mandibular wisdom teeth**
DOI: 10.5742/MEWFM.2017.93127
Sahar Zandi, Seyyed Muhammadreza Alavi, Kamran Mirzaie, Ramin Seyedian, Narges Aria, Saman Jokar

214 **The effect of curcumin on growth and adherence of major microorganisms causing tooth decay**
DOI: 10.5742/MEWFM.2017.93128
Leila Helalat, Ahmad Zarejavid, Alireza Ekrami, Mohammd Hosein Haghighizadeh, Mehdi Shiri Nasab

Diabetes Mellitus – Knowledge, Management and Complications: Survey report from Faisalabad-Pakistan

Ijaz Anwer (1)
Ahmad Shahzad (2)
Kashmira Nanji (3)
Farah Haider (4)
Muhammad Masood Ahmad (5)

(1) Anwer Clinic, Peoples Colony Faisalabad;
(2) Al Raheem Clinics, GM Abad, Faisalabad;
(3) Department of Family Medicine, The Aga Khan University, Karachi;
(4) Jinnah Medical and Dental College, Karachi;
(5) Masood Medicare, Mian Colony, Faisalabad

Corresponding author:
Dr. Kashmira Nanji
Department of Family Medicine,
The Aga Khan University, Karachi
Pakistan
Email: Kashmira.nanji@aku.edu

Abstract

Introduction: Diabetes mellitus is a major health problem worldwide that increases morbidity and mortality rates due to its complications. The objective of this study was to assess the knowledge of diabetic patients about their disease, its complications and management.

Methods: A cross-sectional study was conducted in outpatient clinics of Faisalabad, Pakistan during March to May 2017. A total of 691 diabetic patients (verified from physician, medical records) were consecutively approached and a pretested, structured questionnaire was used to collect their information. SPSS version 19.0 was employed for entering and analysis of the data.

Results:: Out of the total 691 patients 43.3% were male and 56.7% female. About 49.1% of the patients were below 50 and 50.9% were above 50 years of age. One third of patients (33.4%) think that diabetes is a communicable disease. The majority of the patients (90%) responded that in diabetes sugar and sweets have to be cut down and 82.6% knew that exercise is important for the management of diabetes. Approximately 58% patients responded that they exercise, while 60.7% replied that they monitor and control their blood pressure.

Conclusion: The overall level of awareness in diabetics was found to be low and there is a need to educate the population on this topic. Public and private health sectors need to offer holistic services and training programs for health care professionals. These programs should focus on improving communication with patients, addressing misconceptions and sharing culturally sound strategies with patients for improvement in diabetes management.

Key words: Diabetes mellitus, Knowledge, Awareness, Complications, Pakistan

Please cite this article as: Anwer I. et al. Diabetes Mellitus – Knowledge, Management and Complications: Survey report from Faisalabad-Pakistan. World Family Medicine. 2017; 15(9):7-12. DOI 10.5742/MEWFM.2017.93094

Introduction

Diabetes mellitus is a major public health problem that accounts for increased morbidity and mortality rates worldwide because of its various complications mostly related to the cardiovascular system(1). According to the International Diabetes Federation (IDF) 415 million adults are currently living with diabetes and this figure is expected to increase to 642 million by the year 2040(2). It is also reported that 41.7% of adults with diabetes are undiagnosed(3). Diabetes in Pakistan is increasing at an alarming rate. Currently, in Pakistan there are about 7 million people with diabetes and this number is predicted to rise to 14.4 million by the year 2040. With this, Pakistan will rank 8th in the world in terms of prevalence(4, 5) of this disease.

The risk of diabetes is determined by several factors. Ethnicity, family history of diabetes, and history of gestational diabetes, increasing age, obesity, unhealthy diet, physical inactivity and smoking increase the odds of developing diabetes (6-8). Obesity and physical inactivity are estimated to contribute largely towards the global diabetes burden (9-11).

Studies suggest that diabetes related complications can result in 10 to 30% decrease in life expectancy (1, 12). There is a high burden of diabetes-related complications in Pakistani patients. A study conducted by Chavan et al concluded that there is a lack of knowledge among diabetic patients regarding complications and importance of compliance to diabetic medications(13). Different studies have documented a positive association between patient's knowledge about diabetes and treatment compliance(1, 14). However, such studies in Pakistan are limited and are mainly focused around major cities.

Diabetes mellitus (DM) requires multifaceted interventions where patients can make decisions about exercise, weight control, blood glucose monitoring, and compliance to treatment and prevention of complications. Awareness about diabetes and its complications will enable the patients to cope and adjust to their illness. Therefore, the objective of this study was to assess the knowledge of diabetic patients about their disease and its management. It may assist physicians and patients to design strategies to delay the progression of DM complications with proper management and patient education.

Methodology

This cross-sectional study was conducted in the outpatient clinics of Faisalabad Pakistan during March to May 2017. Faisalabad is the third-most-populous city in Pakistan and its residents are comprised of a diverse population belonging to different ethnicities and socio-economic groups. Diabetics patients (verified from physician and the medical record) visiting the outpatient's clinics of more than 18 years of age and who gave consent to participate were included in the study. However patients suffering from serious co-morbid conditions such as cancer were excluded. A total of 691 patients were consecutively interviewed for this study.

A structured pre-tested questionnaire was formulated after extensive literature search and consensus by study investigators. The final questionnaire was comprised of three sections; the first section included the socio-demographic profile of the participants, the second part had questions about knowledge of diabetes and the third part dealt with questions about patients' compliance to various management strategies for diabetes. The English version of the questionnaire was translated into Urdu and was then back translated into English to check for consistency between the two versions.

Written informed consent was obtained from all the participants. The data collectors were trained for maintaining confidentiality of the participant. Personal identifiers were removed from study documents. The study was conducted in accordance with the 'Ethical principles for medical research involving human subjects' of the Helsinki Declaration. Data was entered and analyzed using the Statistical Package for Social Sciences (SPSS version 19). Frequencies and proportion were reported for all variables of interest. A p- value of less than 0.05 was considered statistically significant throughout the analysis.

Results

A total of 720 patients were approached out of which 691 agreed to participate in the study yielding a response rate of 95% (691/720). Demographic characteristics of the participants are presented in Table 1. Out of the total 691 patients, 43.3% were male and 56.7% female. An almost equal proportion of patients were below 50 (49.1%) and above 50 (50.9%) years of age. Three quarters of the patients had education level below matriculation. The majority (91%) of the patients, were married and 47.8% of the patients were employed. Almost half of the patients (50.1%) responded that they have comorbidities other than diabetes.

Table 2 describes the knowledge of patients regarding diabetes. Over one quarter (26%) think that diabetes is not a curable disease and 68% believe that it runs in families. Interestingly, about one third of the participants (33.4%) think that diabetes is a communicable disease. The majority of the patients (90%) responded that in diabetes sugar and sweets have to be cut down and 82.6% knew that exercise is important for its management. Approximately 63.7% of the patients knew that it is important to maintain a healthy weight among diabetics. About 69.6% patients thought that an individual can become dependent on oral tablets for control of sugar. Upon asking about the risk factors of diabetes the patients responded with the following factors: heart disease (63.4%), stroke (54.6%), blindness (78.4%), amputation (63.4%), impotence (35.3%) and infections (63.5%).

Table 1: Socio-demographic characteristics of study participants n=691

Variables	n	%
Gender		
Male	299	43.3%
Female	392	56.7%
Age		
Less than or equal to 50 years	339	49.1%
More than 50 years	352	50.9%
Level of Education		
Below Matriculation	519	75.1%
Above Matriculation	172	24.9%
Marital Status		
Never Married/Widow/Widower	62	9.0%
Married	629	91.0%
Occupational Status		
Employed	330	47.8%
Unemployed/Student/Homemaker	361	52.2%
Co-morbidities		
Yes	346	50.1%
No	345	49.9%

Table 2: Knowledge about diabetes among study participants (n=691)

Questions	Yes %	No %	Don't know %
Is Diabetes Mellitus a curable disease	54.1%	26.3%	19.5%
Diabetes Mellitus runs in families	68.0%	27.4%	4.6%
Diabetes is a communicable disease	33.4%	45.9%	20.7%
Do you have any other disease	50.1%	49.9%	-
Management of Diabetes Mellitus requires cutting down on sweets and refined sugar	90.2%	5.2%	4.6%
Management of Diabetes Mellitus requires physical exercise on a regular basis	82.6%	10.4%	6.9%
Management of Diabetes Mellitus requires reduction in body weight in overweight and obese patients	63.7%	14.3%	22.0%
Smoking and tobacco use is more harmful in a diabetic patient	47.9%	18.2%	33.9%
Does one become dependent on oral tablets used for control of blood sugar	69.6%	19.1%	11.3%
Does one become dependent on Insulin used for control of blood sugar	54.3%	28.8%	16.9%
Diabetes Mellitus is a risk factor for:			
Heart Disease	63.4%	18.1%	18.5%
Stroke	54.6%	28.1%	17.4%
Blindness	78.0%	16.9%	5.1%
Amputation	63.8%	18.8%	17.4%
Impotence	35.3%	11.3%	53.4%
Infections	63.5%	16.4%	20.1%

Table 3: Management of Diabetes among study participants (n=691)

Questions	Less than 7 years	More than 7 years	P-value
Do you exercise to control your blood sugar?	58.4%	53.6%	0.18
Do you restrict intake of sweets, sugar and oily foods?	81.7%	80.6%	0.19
Do you attempt to reduce weight?	42.4%	44.4%	0.46
Do you take tablets to control Diabetes?	80.1%	71.4%	0.02
Do you take Insulin to control Diabetes?	41.1%	50.7%	0.01
Do you visit your Doctor regularly for control of Diabetes?	71.8%	68.4%	0.55
Do you self-monitor your blood sugar?	58.7%	59.9%	0.24
Do you monitor and control serum cholesterol as part of Diabetes management?	42.1%	38.5%	0.61
Do you monitor and control blood pressure as part of Diabetes management?	60.7%	60.2%	0.13
Do you smoke?	13.4%	23.4%	0.002
If you smoke then have you tried to stop?	6.5%	12.2%	0.009
Did you give up smoking as part of Diabetes management?	5.2%	9.2%	0.08
What type of treatment were you taking for Diabetes?			
Allopathic	97.7%	96.1%	0.21
Homeopathic	2.3%	3.9%	
Have you suffered from complications of Diabetes?	43.9%	51.0%	0.15
If yes then state which ones?			
Blood pressure	4.9%	12.2%	
Body pain?/weakness	5.9%	2.3%	
Burning feet	.8%	2.3%	
Chest infection	1.6%	1.0%	
Diabetic foot	2.1%	4.3%	<0.001
HCV?/Hepatitis	3.1%	.7%	
Impotence	2.3%	4.9%	
Neuropathy	14.2%	15.8%	
Nephropathy	1.3%	2.6%	
Others	3.4%	3.0%	
Retinopathy	3.6%	2.0%	
None	56.8%	49.0%	

Table 3 describes management strategies of diabetics. Approximately 58% of the patients responded that they exercise and 81% restrict sweets, sugar and oily foods to manage their blood sugar levels. About 80% patients use tablets to control their blood sugar. Slightly over two fifths of the patients (42.4%) attempted to reduce their weight and a similar proportion were monitoring their cholesterol levels. Approximately 58.7% self-monitored their blood glucose (p-0.24). Three fifths (60.7%) of the patients replied that they monitor and control their blood pressure. The majority of the patients (97.7%) were using allopathic medications to manage diabetes. As far as complications of diabetes is concerned most of the patients responded that they are suffering from nephropathy (14%).

Discussion

The results of the study reveal that the level of awareness of patients about diabetes mellitus, its complications and management is low. There is a need to formally educate the diabetics about the proper management of this disease in order to reduce the mortality and morbidity rates associated with it.

Several studies have concluded that there is significant association between knowledge of diabetes and the adherence to treatment (15-18). Previous studies have found that patients with adequate knowledge level were less likely to be non-adherent (15-19). These observations are consistent with the results obtained in the current study, wherein, the participants having better knowledge about complications of diabetes resulted in a compliance rate of oral hypoglycemics to 80%. This suggests the significance of providing formal knowledge regarding diabetes for better compliance, as chronic diseases such as diabetes require proper education and counseling to prevent long term complications and also to decrease the financial burden of these diseases(20).

A systematic review of 21 studies on barriers and promoters of management of diabetes among South Asians concluded that communication with the healthcare provider was a significant barrier in understanding diabetes education(21). The review further elaborated that for exercise, there is lack of resources in the South Asian countries. Lack of parks and affordable sports clubs are barriers to exercise(21). Moreover, there are some misconceptions about exercise such as fear of injury or worsening health due to lack of proper formal education. In the current study, more than half of the participants responded that they do exercise to manage their blood sugar levels.

A study conducted in 2012 in Ethiopia found that the majority of patients (67%) had good knowledge about reasons for developing acute complications(17). In the present study we also found that the participants had a good knowledge about the complications of diabetes, whereby, 78% of the patients responded that blindness can occur as a complication of diabetes. Though cardiovascular diseases (CVDs) are common complication of diabetes however, in this study 63% patients labeled CVDs to be a complication, and only 35% thought that impotence is also a complication. Therefore, sound education is needed in this regard.

A study conducted by Rahman et al (22) in Peshawar, Pakistan on 561 diabetics reported that the level of awareness regarding diabetes and its management was inadequate among studied participants. Only 13% of the female diabetics were aware of why glycemic control is important, and 32.4% were aware of the complications. Only 10% of respondents knew about blood glucose monitoring(22). This is inconsistent with our study findings as in the current study 58% of the patients were doing self-blood glucose monitoring. Though, in our study we have not stratified the results based on gender, nonetheless the proportions still show a better knowledge of the study participants.

Interestingly, in the current study the patients had better knowledge of diabetes complications as compared to the other studies conducted in Pakistan(22, 23). However, almost half of the participants didn't reply or said that diabetes is a communicable disease. This shows that the general knowledge regarding diabetes among the population is poor. Some studies have shown that the knowledge level of some health care professionals is also inadequate or outdated (24-27). Therefore, there is a genuine need to update the health care professionals' knowledge about latest interventions that can assist the diabetics in management of their disease.

Recommendations:

Patient Education: It is imperative that a therapeutic patient education program should be planned which is comprehensive and fulfills individual's clinical and psychological needs, according to the patients' educational level and cultural background.

Person Centered Approach: It is important that clinicians should follow a person centered approach and should not only focus on the disease but to the patient, asking about their responsibilities, work and also their self-management strategies.

Limitations:

This study had several potential limitations. In this study we did not focus on psychological wellbeing of the patients which is an important aspect and a major factor for non-adherence to treatment. The chance of reporting bias cannot be eliminated as this may have resulted in over estimation of the compliance rate of oral hypoglycemic, exercise and doctors' visit among the study patients. Moreover, since this study was conducted in an urban city therefore, the results may differ when generalized to a rural population.

Conclusion

The overall level of awareness in diabetics was found to be low and there is a need to educate the population about this disease. Due to low literacy levels and diverse sociocultural backgrounds, it is necessary to design a comprehensive education support program for the patients, which will result in better treatment adherence and positive health outcomes. The public and private health sector needs to offer holistic services and training programs for health care professionals. These programs should focus on addressing misconceptions, improving communication, and sharing culturally sound strategies with patients for improvement in diabetes management.

References

1. Choby B. Diabetes Update: Prevention and Management of Diabetes Complications. Fp essentials. 2017;456:36.
2. Gan D. International Diabetes Federation. Diabetes Atlas. 2017.
3. Mahan N, Jha S, Swanson R. Employing Visual Analytics to Understand Worldwide Prevalence and Impact of Diabetes Epidemic. 2017.
4. Akhtar S, Khan Z, Rafiq M, Khan A. Prevalence of Type II diabetes in District Dir Lower in Pakistan. Pakistan journal of medical sciences. 2016;32(3):622.
5. Ogurtsova K, da Rocha Fernandes JD, Huang Y, Linnenkamp U, Guariguata L, Cho NH, et al. IDF Diabetes Atlas: Global estimates for the prevalence of diabetes for 2015 and 2040. Diabetes Research and Clinical Practice. 2017;128:40-50.
6. Arshad S, Tahir S, Tahir B, Tahir N, Rasool T, Munir S, et al. Risk Factors Associated with Diabetes Mellitus in Local Population of Lahore, Pakistan. Global Journal of Health Science. 2017;9(9):42.
7. Nanditha A, Ma RCW, Ramachandran A, Snehalatha C, Chan JCN, Chia KS, et al. Diabetes in Asia and the Pacific: implications for the global epidemic. Diabetes Care. 2016;39(3):472-85.
8. Zia A, Wang X, Bhatti A, Demirci FY, Zhao W, Rasheed A, et al. A replication study of 49 Type 2 diabetes risk variants in a Punjabi Pakistani population. Diabetic Medicine. 2016;33(8):1112-7.
9. Balk EM, Earley A, Raman G, Avendano EA, Pittas AG, Remington PL. Combined Diet and Physical Activity Promotion Programs to Prevent Type 2 Diabetes Among Persons at Increased Risk: A Systematic Review for the Community Preventive Services Task Force Combined Diet and Physical Activity Promotion Programs to Prevent Diabetes. Annals of internal medicine. 2015;163(6):437-51.
10. Hjerkind KV, Stenehjem JS, Nilsen TIL. Adiposity, physical activity and risk of diabetes mellitus: prospective data from the population-based HUNT study, Norway. BMJ open. 2017;7(1):e013142.
11. Niroomand M, Ghasemi SN, Karimi-Sari H, Kazempour-Ardebili S, Amiri P, Khosravi MH. Diabetes knowledge, attitude and practice (KAP) study among Iranian n-patients with type-2 diabetes: a cross-sectional study. Diabetes & Metabolic Syndrome: Clinical Research & Reviews. 2016;10(1):S114-S9.
12. Kisozi T, Mutebi E, Kisekka M, Lhatoo S, Sajatovic M, Kaddumukasa M, et al. Prevalence, severity and factors associated with peripheral neuropathy among newly diagnosed diabetic patients attending Mulago hospital: a cross-sectional study. African Health Sciences. 2017;17(2):463-73.
13. Chavan GM, Waghachavare VB, Gore AD, Chavan VM, Dhobale RV, Dhumale GB. Knowledge about diabetes and relationship between compliance to the management among the diabetic patients from rural Area of Sangli District, Maharashtra, India. Journal of family medicine and primary care. 2015;4(3):439.
14. Nazir SUR, Hassali MA, Saleem F, Bashir S, Aljadhey H. Association Between Diabetes-related Knowledge and Medication Adherence: Results From Cross-sectional Analysis. Alternative therapies in health and medicine. 2016;22(6):8-13.
15. Rossi MC, Lucisano G, Funnell M, Pintaudi B, Bulotta A, Gentile S, et al. Interplay among patient empowerment and clinical and person-centered outcomes in type 2 diabetes. The BENCH-D study. Patient education and counseling. 2015;98(9):1142-9.
16. Santhanakrishnan I, Lakshminarayanan S, Kar SS. Factors affecting compliance to management of diabetes in Urban Health Center of a tertiary care teaching hospital of south India. Journal of natural science, biology, and medicine. 2014;5(2):365.
17. Abdella SH, Mohammed MA. Awareness of diabetic patients about their illness and associated complications in Ethiopia. Medicine Science. 2013;2(2).
18. Sweileh WM, Sa'ed HZ, Nab'a RJA, Deleq MI, Enaia MI, Sana'a MN, et al. Influence of patients' disease knowledge and beliefs about medicines on medication adherence: findings from a cross-sectional survey among patients with type 2 diabetes mellitus in Palestine. BMC Public Health. 2014;14(1):94.
19. Mumu SJ, Saleh F, Ara F, Haque MR, Ali L. Awareness regarding risk factors of type 2 diabetes among individuals attending a tertiary-care hospital in Bangladesh: a cross-sectional study. BMC research notes. 2014;7(1):599.
20. Powers MA, Bardsley J, Cypress M, Duker P, Funnell MM, Fischl AH, et al. Diabetes self-management education and support in type 2 diabetes: a joint position statement of the American Diabetes Association, the American Association of Diabetes Educators, and the Academy of Nutrition and Dietetics. The Diabetes Educator. 2017;43(1):40-53.
21. Sohal T, Sohal P, King-Shier KM, Khan NA. Barriers and facilitators for type-2 diabetes management in South Asians: a systematic review. PloS one. 2015;10(9):e0136202.
22. Irshad M, Khan I, Khan FA, Baig A, Gaohar QY. A Survey of awareness regarding diabetes and its management among patients with diabetes in Peshawar, Pakistan. Journal of Postgraduate Medical Institute (Peshawar-Pakistan). 2015;28(4).
23. Ansari RM, Hosseinzadeh H, Zwar NA. Application of chronic care model for self-management of type 2 diabetes: focus on the middle-aged population of Pakistan. 2016.
24. Alotaibi A, Al-Ganmi A, Gholizadeh L, Perry L. Diabetes knowledge of nurses in different countries: An integrative review. Nurse education today. 2016;39:32-49.
25. Ung A, Salamonson Y, Hu W, Gallego G. Assessing knowledge, perceptions and attitudes to pain management among medical and nursing students: a review of the literature. British journal of pain. 2016;10(1):8-21.
26. Larkin A, Healy C, Le A. Type 2 Diabetes Quality Improvement CME: Impact on Physician Knowledge. Endocrine Healthcare Delivery and Education (posters): Endocrine Society; 2016. p. SUN-757-SUN-.
27. Bhalla S, Unnikrishnan R, Srivastava R, Tandon N, Mohan V, Prabhakaran D. Innovation in capacity building of primary-care physicians in diabetes management in India: a new slant in medical education. The Lancet Diabetes & Endocrinology. 2016;4(3):200-2.

Alanine aminotransferase indicates excess weight and dyslipidemia

Mehmet Rami Helvaci (1)
Orhan Ayyildiz (1)
Mustafa Cem Algin (2)
Yusuf Aydin (1)
Abdulrazak Abyad (3)
Lesley Pocock (4)

(1) Specialist of Internal Medicine, MD
(2) Specialist of General Surgery, MD
(3) Middle-East Academy for Medicine of Aging, MD
(4) medi+WORLD International

Corresponding author:
Mehmet Rami Helvaci, MD
07400, Alanya,
Turkey
Phone: 00-90-506-4708759
Email: mramihelvaci@hotmail.com

Abstract

Background: There may be some hepatic indicators of metabolic syndrome. We tried to understand whether or not there is an association between alanine aminotransferase (ALT) value and excess weight.

Methods: We took consecutive patients below the age of 70 years to avoid debility induced weight loss in elders. Patients were divided into three groups as normal weight, overweight, and obesity.

Results: The study included 47 females and 82 males, totally. Although the nonsignificant differences according to the mean age between the three groups ($p>0.05$ for all), female ratio showed significant increases from the overweight towards the obesity groups (28.3% versus 50.0%, $p<0.001$). Although the presence of significant differences according to the body mass index and body weight between the three groups ($p<0.000$ for all), there was a significant increase according to the mean ALT value only from the normal weight towards the overweight groups (39.7 versus 53.5 U/L, $p<0.001$), but not from the overweight towards the obesity groups (53.5 versus 53.5 U/L, $p>0.05$). Interestingly, the same trend was also present for dyslipidemia, and prevalence of dyslipidemia was higher in the overweight than the normal weight groups (45.2% versus 25.0%, $p<0.001$), but there was a nonsignificant difference between the overweight and obesity groups (45.2% versus 37.5%, respectively, $p>0.05$).

Conclusion: Higher ALT value in serum may indicate excess weight and dyslipidemia. On the other hand, there were nonsignificant differences according to mean ALT value and prevalence of dyslipidemia between the overweight and obesity groups.

Key words: Alanine aminotransferase, overweight, obesity, hepatosteatosis, dyslipidemia, metabolic syndrome

Please cite this article as: Helvaci M. et al. Alanine aminotransferase indicates excess weight and dyslipidemia. World Family Medicine. 2017; 15(9):13-17. DOI: 10.5742/MEWFM.2017.93095

Introduction

Excess weight is becoming a major health problem all over the world, particularly in developed countries. For example, almost one third of adults in the United States can be classified as obese (1). Obesity is a disorder characterized by increased mass of adipose tissue that results from a systemic imbalance between food intake and energy expenditure. Excess weight comes with significant health problems (2-14), and the risk of death from all causes increases with an increasing body mass index (BMI) (4). For example, blood pressure (BP) pattern was changed from the sustained normotension (NT) towards white coat hypertension (WCH) and hypertension (HT) parallel to the increasing BMI in the same direction (15). In addition to the WCH and HT, type 2 diabetes mellitus (DM), hyperbetalipoproteinemia, dyslipidemia, and coronary artery disease (CAD) also showed significant increases parallel to the increasing BMI (15). Additionally, obesity is highly correlated with dietary intake of increased calories and fat, both of which were linked to various cancers (16). For instance, a recent study of 900,000 people found that obese patients are more likely die from a number of cancers (17). Similarly, there may also be some hepatic consequences of excess weight. Nonalcoholic fatty liver disease (NAFLD) is a term used to define a spectrum of disorders characterized by macrovesicular steatosis which occurs in the absence of consumption of alcohol in amounts considered to be harmful to liver. Because the chance of NAFLD is directly proportional to body weight and presence of a higher prevalence of excess weight in society, NAFLD is also becoming an important health problem all over the world. According to the literature, sustained liver injury will lead to progressive fibrosis and cirrhosis in 10% to 25% of affected patients (18). We tried to understand whether or not there is an association between alanine aminotransferase (ALT) value and excess weight in the present study.

Material and methods

The study was performed on routine check up patients in the Internal Medicine Polyclinic of the Dumlupinar University between August 2005 and March 2007. We took consecutive patients below the age of 70 years to avoid debility induced weight loss in elders. Their medical histories including smoking habit and alcohol and already used medications were learnt, and a routine check up procedure including serum ALT, aspartate aminotransferase, gamma glutamyl transpeptidase (GGT), alkaline phosphatase (ALP), direct and indirect bilirubins, low density lipoprotein cholesterol (LDL-C), triglyceride (TG), and high density lipoprotein cholesterol (HDL-C) values, hepatitis B surface antigen (HBsAg), anti-hepatitis C virus antibody (anti-HCV Ab), and anti-human immunodeficiency antibody (anti-HIV Ab) was performed. In HBsAg or anti-HCV Ab positive individuals, HBV DNA and HCV RNA were studied by quantitative polymerase chain reaction (PCR) methods, respectively. PCR positive cases were excluded from the study. Current daily smokers at least for the last 12-months and cases with a history of five pack-years were accepted as smokers. Regular daily drinkers without any limitation in amount and social drinkers with a drink in the last week, patients with anti-HIV Ab positivity or prominent GGT and ALP elevations, and multi-drug users with any cause were excluded from the study. BMI of each case was calculated by the measurements of the Same Physician instead of verbal expressions. Weight in kilograms is divided by height in meters squared, and obesity is defined as a BMI of 30 or greater, overweight between 25–29.9, normal weight between 18.5-24.9, and underweight as lower than 18.5 kg/m2 (19). Insulin using diabetics, and patients with devastating illnesses including malignancies, acute or chronic renal failure, hyper- or hypothyroidism, and heart failure were excluded to avoid their possible effects on weight. Additionally patients with dyslipidemia were detected by using the National Cholesterol Education Program Expert Panel's recommendations for defining dyslipidemic subgroups (19). Dyslipidemia is diagnosed with the LDL-C value of 160 or greater or TG value of 200 or greater or the HDL-C value of lower than 40 mg/dL. Eventually, mean age, female ratio, BMI, body weight, and ALT values and prevalences of smoking and dyslipidemia were detected in the underweight, normal weight, overweight, and obesity groups and the results were compared in between. Mann-Whitney U test, Independent-Samples T test, and comparison of proportions were used as the methods of statistical analyses.

Results

The study included 47 females and 82 males, totally. There were 20 patients (20.0% female) in the normal weight, 53 patients (28.3% female) in the overweight, and 56 patients (50.0% female) in the obesity groups without any detected case in the underweight group. So 84.4% of the study cases were either overweight or obese with a mean age of 44.2 years. Although the nonsignificant differences according to the mean age between the three groups ($p>0.05$ for all), female ratio showed significant increases from the overweight towards the obesity groups (28.3% versus 50.0%, $p<0.001$) (Table 1). Although the presence of significant differences between the three groups according to the BMI and body weight ($p<0.000$ for all), there was a significant increase according to the mean ALT value only from the normal weight towards the overweight groups (39.7 versus 53.5 U/L, $p<0.001$), but not from the overweight towards the obesity groups (53.5 versus 53.5 U/L, $p>0.05$). As a similar trend, prevalence of dyslipidemia was significantly lower in the normal weight than the overweight groups (25.0% versus 45.2%, $p<0.001$), but there was a nonsignificant difference between the overweight and obesity groups (45.2% versus 37.5%, $p>0.05$). On the other hand, prevalence of smoking increased from the normal weight (25.0%) towards the overweight (35.8%) and obesity groups (33.9%), but the differences were nonsignificant ($p>0.05$ for both) probably due to the small sample sizes of the groups.

Table 1: Characteristic features of the study cases

Variables	Normal weight	p-value	Overweight	p-value	Obesity
Number	20		53		56
Mean age (year)	42.7 ± 17.7 (20-69)	Ns*	43.3 ± 12.1 (18-67)	Ns	45.6 ± 10.0 (18-65)
Female ratio	20.0% (4)	Ns	28.3% (15)	<0.001	50.0% (28)
Mean BMI†	22.5 ± 1.3 (20-24)	<0.000	27.2 ± 1.4 (25-29)	<0.000	33.7 ± 4.0 (30-49)
Mean body weight (kg)	66.2 ± 8.0 (52-77)	<0.000	78.1 ± 9.2 (62-95)	<0.000	90.4 ± 14.4 (61-124)
Mean ALT‡ value (U/L)	39.7 ± 13.4 (15-66)	<0.000	53.5 ± 14.1 (14-88)	Ns	53.5 ± 11.9 (20-87)
Prevalence of dyslipidemia	25.0% (5)	<0.001	45.2% (24)	Ns	37.5% (21)
Prevalence of smoking	25.0% (5)	Ns	35.8% (19)	Ns	33.9% (19)

*Nonsignificant (p>0.05) †Body mass index ‡Alanine aminotransferase

Discussion

Excess weight, smoking, alcohol, and chronic infections and inflammations are related with an increased BP, dyslipidemia, HT, DM, CAD, cirrhosis, chronic renal disease (CRD), chronic obstructive pulmonary disease (COPD), peripheric artery disease (PAD), stroke, and an increased all-cause mortality rate, and this relationship has been known for many years under the title of metabolic syndrome (20-22). The syndrome can be reversed with appropriate non-pharmaceutical approaches including lifestyle changes, diet, and exercise before the development of irreversible fibrotic changes on vascular endothelium (23). Excessive fat accumulation in hepatocytes is called hepatosteatosis. It progresses to NAFLD, steatohepatitis, fibrosis, cirrhosis, hepatocellular carcinoma, and hepatic failure. There are two histologic patterns of NAFLD including fatty liver alone and nonalcoholic steatohepatitis (NASH). NASH represents a shift from simple steatosis to an inflammatory component. Excess weight may be the main factor in exacerbating hepatic inflammation and fibrogenesis in NASH. NAFLD affects up to a third of the world population, and it has become the most common cause of chronic liver disease even in children and adolescents (24, 25). The recent rise in the prevalence of excess weight likely explains the NAFLD epidemic, worldwide (26). NAFLD is a marker of pathological fat deposition combined with a low-grade chronic inflammatory state, which results with hypercoagulability, endothelial dysfunction, and an accelerated atherosclerotic process (26). NAFLD shares many features of the metabolic syndrome as a highly atherogenic condition, and may cause hepatic inflammation and cellular injury especially at the endothelial level. Beside terminating with cirrhosis, NAFLD is associated with a significantly greater overall mortality as well as with an increased prevalence of cardiovascular diseases (25). Authors reported independent associations between NAFLD and impaired flow-mediated vasodilation and increased carotid artery intimal medial thickness as the reliable markers of subclinical atherosclerosis (25), so NAFLD may also be a predictor of cardiovascular disease (27, 28). NAFLD may be considered as the common hepatic component of the metabolic syndrome since hepatic fat is highly correlated with all components the syndrome (29). Interestingly, although the presence of significant progressions according to the BMI and body weight (p<0.000 for all) from the normal weight towards the overweight and obesity groups and although the presence of a highly significant difference according to the ALT values between the normal weight and overweight groups (39.7 versus 53.5 U/L, p<0.001), the difference between the overweight and obesity groups was nonsignificant according to the mean ALT values in serum (53.5 versus 53.5 U/L, p>0.05). As a similar trend, prevalence of dyslipidemia was significantly lower in the normal weight than the overweight groups (25.0% versus 45.2%, p<0.001), but there was a nonsignificant difference between the overweight and obesity groups, too (45.2% versus 37.5%, p>0.05). These findings may be explained with the idea that excess weight, either overweight or obesity, probably causes similar risks for hepatosteatosis.

Smoking has major effects on systemic atherosclerotic processes including COPD, digital clubbing, cirrhosis, CRD, PAD, CAD, stroke, and cancers (30). Its atherosclerotic effects are the most obvious in COPD and Buerger's disease. Buerger's disease has never been reported in the absence of smoking in the literature. Smoking induced endothelial damage is probably seen in pulmonary vasculature much more than the other organs due to the higher concentration of its products in lungs. But smoking may even cause cirrhosis, CRD, PAD, CAD, stroke, and cancers by the transport of toxic products within the blood. On the other hand, beside the strong atherosclerotic effects, smoking in human beings and nicotine in animals may be associated with some weight loss (31). There may be an increased energy expenditure during smoking (32), and nicotine may decrease caloric intake in a dose-related manner (33). Nicotine may lengthen intermeal time, and decrease amount of meal eaten (34). Similarly, BMI seems to be the highest in the former and the lowest in the current smokers (35). Probably toxic substances of tobacco smoke cause a diffuse inflammation on vascular endothelium all

over the body, and it is the major cause of loss of appetite during circulation of the substances within the blood, since the body does not want to eat during fighting. So regular smoking causes a prominent weight loss, clinically. On the other hand, as a pleasure in life, smoking may also show the weakness of volition to control eating. For example, prevalences of HT, DM, and smoking were the highest in the highest TG having group as another significant parameter of the metabolic syndrome (12). Additionally, although CAD was detected with similar prevalences in both sexes, smoking and COPD were higher in males against the higher prevalences of BMI and its consequences including dyslipidemia, HT, and DM in females (13). The proportion of smokers is consistently higher in men in the literature (36). Although the decreased male prevalences from the normal weight towards the overweight and obesity groups, prevalence of smoking increased from the normal weight (25.0%) towards the overweight (35.8%) and obesity groups (33.9%) but the differences were nonsignificant ($p>0.05$ for both) probably due to the small sample sizes of the groups in the present study.

As a conclusion, higher ALT value in serum may indicate excess weight and dyslipidemia. On the other hand, there were nonsignificant differences according to ALT value and prevalence of dyslipidemia between the overweight and obesity groups.

References

1. Ogden CL, Carroll MD, Curtin LR, McDowell MA, Tabak CJ, Flegal KM. Prevalence of overweight and obesity in the United States, 1999 – 2004. JAMA 2006; 295: 1549-1555.
2. Alpert MA, Lambert CR, Terry BE, Cohen MV, Mukerji V, Massey CV, et al. Influence of left ventricular mass on left ventricular diastolic filling in normotensive morbid obesity. Am Heart J 1995; 130: 1068–1073.
3. Kuchta KF. Pathophysiologic changes of obesity. Anesthesiology Clin N Am 2005; 23: 421–429.
4. Calle EE, Thun MJ, Petrelli JM, Rodriguez C, Heath CW Jr. Body-mass index and mortality in a prospective cohort of U.S. adults. N Engl J Med 1999; 341: 1097-1105.
5. Helvaci MR, Seyhanli M. What a high prevalence of white coat hypertension in society! Intern Med 2006; 45: 671-674.
6. Helvaci MR, Kaya H, Seyhanli M, Cosar E. White coat hypertension is associated with a greater all-cause mortality. J Health Sci 2007; 53: 156-160.
7. Helvaci MR, Kaya H, Yalcin A, Kuvandik G. Prevalence of white coat hypertension in underweight and overweight subjects. Int Heart J 2007; 48: 605-613.
8. Helvaci MR, Kaya H, Borazan A, Ozer C, Seyhanli M, Yalcin A. Metformin and parameters of physical health. Intern Med 2008; 47: 697-703.
9. Helvaci MR, Kaya H, Seyhanli M, Yalcin A. White coat hypertension in definition of metabolic syndrome. Int Heart J 2008; 49: 449-457.
10. Helvaci MR, Sevinc A, Camci C, Yalcin A. Treatment of white coat hypertension with metformin. Int Heart J 2008; 49: 671-679.
11. Helvaci MR, Kaya H, Sevinc A, Camci C. Body weight and white coat hypertension. Pak J Med Sci 2009; 25: 6: 916-921.
12. Helvaci MR, Kaya H, Gundogdu M. Association of increased triglyceride levels in metabolic syndrome with coronary artery disease. Pak J Med Sci 2010; 26: 667-672.
13. Helvaci MR, Kaya H, Gundogdu M. Gender differences in coronary heart disease in Turkey. Pak J Med Sci 2012; 28: 40-44.
14. Mokdad AH, Ford ES, Bowman BA, et al. Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001. JAMA 2003; 289: 76–79.
15. Helvaci MR, Kaya H, Duru M, Yalcin A. What is the relationship between white coat hypertension and dyslipidemia? Int Heart J 2008; 49: 87-93.
16. Satia-Abouta J, Patterson RE, Schiller RN, Kristal AR. Energy from fat is associated with obesity in US men: results from the Prostate Cancer Prevention Trial. Prev Med 2002; 34: 493–501.
17. Calle EE, Rodriguez C, Walker-Thurmond K, Thun MJ. Overweight, obesity, and mortality from cancer in a prospectively studied cohort of US adults. N Engl J Med 2003; 348: 1625–1638.
18. Sanyal AJ, American Gastroenterological Association. AGA technical review on nonalcoholic fatty liver disease. Gastroenterology 2002; 123: 1705-1725.
19. Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) final report. Circulation 2002; 17:106: 3143-3421.
20. Eckel RH, Grundy SM, Zimmet PZ. The metabolic syndrome. Lancet 2005; 365: 1415-1428.
21. Grundy SM, Brewer HB Jr, Cleeman JI, Smith SC Jr, Lenfant C. Definition of metabolic syndrome: Report of the National Heart, Lung, and Blood Institute/American Heart Association conference on scientific issues related to definition. Circulation 2004; 109: 433-438.
22. Tonkin AM. The metabolic syndrome(s)? Curr Atheroscler Rep 2004; 6: 165-166.
23. Franklin SS, Barboza MG, Pio JR, Wong ND. Blood pressure categories, hypertensive subtypes, and the metabolic syndrome. J Hypertens 2006; 24: 2009-2016.
24. Bhatia LS, Curzen NP, Calder PC, Byrne CD. Non-alcoholic fatty liver disease: a new and important cardiovascular risk factor? Eur Heart J 2012; 33: 1190-1200.
25. Pacifico L, Nobili V, Anania C, Verdecchia P, Chiesa C. Pediatric nonalcoholic fatty liver disease, metabolic syndrome and cardiovascular risk. World J Gastroenterol 2011; 17: 3082-3091.
26. Bonora E, Targher G. Increased risk of cardiovascular disease and chronic kidney disease in NAFLD. Nat Rev Gastroenterol Hepatol 2012; 9: 372-381.
27. Maurantonio M, Ballestri S, Odoardi MR, Lonardo A, Loria P. Treatment of atherogenic liver based on the pathogenesis of nonalcoholic fatty liver disease: a novel approach to reduce cardiovascular risk? Arch Med Res 2011; 42: 337-353.

28. Mawatari S, Uto H, Tsubouchi H. Chronic liver disease and arteriosclerosis. Nihon Rinsho 2011; 69: 153-157.
29. Bugianesi E, Moscatiello S, Ciaravella MF, Marchesini G. Insulin resistance in nonalcoholic fatty liver disease. Curr Pharm Des 2010; 16: 1941-1951.
30. Helvaci MR, Aydin Y, Gundogdu M. Smoking induced atherosclerosis in cancers. HealthMED 2012; 6: 3744-3749.
31. Grunberg NE, Greenwood MR, Collins F, Epstein LH, Hatsukami D, Niaura R, et al. National working conference on smoking and body weight. Task Force 1: Mechanisms relevant to the relations between cigarette smoking and body weight. Health Psychol 1992; 11: 4-9.
32. Walker JF, Collins LC, Rowell PP, Goldsmith LJ, Moffatt RJ, Stamford BA. The effect of smoking on energy expenditure and plasma catecholamine and nicotine levels during light physical activity. Nicotine Tob Res 1999; 1: 365-370.
33. Hughes JR, Hatsukami DK. Effects of three doses of transdermal nicotine on post-cessation eating, hunger and weight. J Subst Abuse 1997; 9: 151-159.
34. Miyata G, Meguid MM, Varma M, Fetissov SO, Kim HJ. Nicotine alters the usual reciprocity between meal size and meal number in female rat. Physiol Behav 2001; 74: 169-176.
35. Laaksonen M, Rahkonen O, Prattala R. Smoking status and relative weight by educational level in Finland, 1978-1995. Prev Med 1998; 27: 431-437.
36. Fodor JG, Tzerovska R, Dorner T, Rieder A. Do we diagnose and treat coronary heart disease differently in men and women? Wien Med Wochenschr 2004; 154: 423-425.

Comparative Analysis of Antimicrobial Peptides Gene Expression in Susceptible/Resistant Mice Macrophages to Leishmania major Infection

Hamid Daneshvar (1)
Iraj Sharifi (2,3)
Alireza Kyhani (3)
Amir Tavakoli Kareshk (2)
Arash Asadi (2)

(1) Department of Immunology, School of Medicine, Kerman University of Medical Sciences, Kerman, Iran
(2) Department of Parasitology and Mycology, School of Medicine, Kerman University of Medical Sciences, Kerman, Iran
(3) Leishmaniasis Research Center, Kerman University of Medical Sciences, Kerman, Iran

Corresponding author:
Arash Asadi
Department of Parasitology and Mycology,
School of Medicine, Kerman University of Medical Sciences,
Kerman, Iran
Email: asadiarash209@yahoo.com

Abstract

Introduction and Objective: BALB/c and C57BL/6 mouse strains represent immunologically different responses to *Leishmania* major infection. Antimicrobial peptides (AMPs) for example, cathelicidins and defensins, are unique compounds of innate immunity system with multifunctional effects against invasive pathogens. Nevertheless, they have been less studied in parasitic fields. The aim of the present study was to evaluate the role of AMPs in susceptibility or resistance to *L.major* infection.

Methodology: Macrophages derived from peritoneal cavity of BALB/c and C57BL/6 mouse strains were exposed to the stationary phase of *L. major* promastigotes for 3 hours, 24 hours and 7 days. Cell sediments and supernatants from infected (test) and uninfected groups (control) at 3 hours, 24 hours and on 7 days were used for the assessment of infection severity, gene expression of various mouse beta defensins (mBD), Cathelin-related antimicrobial peptide (CRAMP), interleukin (IL)-10, IL-12 and protein assay under standard methods, respectively.

Findings: Based on cytokine profiles evaluated in BALB/c (↑IL-10, ↓IL-12) and C57BL/6 derived macrophages (↓IL-10, ↑IL-12), the immunity system was stimulated differently during infection. The inter assay analysis revealed that the test group of BALB/c derived macrophages significantly expressed an up-regulation of CRAMP, mBD1 genes and their related proteins, when they are challenged with *L. major* parasites. Nevertheless, they also showed infection severity more than those in other strains.

Conclusion: Due to higher expression and release of AMPs by BALB/c derived macrophages, the *L. major* infection ultimately occurs in BALB/c mice. On the other hand, the release of AMPs is important, but cannot create an absolute protection against leishmania infection.

Key words: Antimicrobial Peptides, Cathelin-Related Antimicrobial Peptide, Murine b-Defensin, *Leishmania major*, Cytokine

Please cite this article as: Asadi, A, et al. Comparative Analysis of Antimicrobial Peptides Gene Expression in Susceptible/Resistant Mice Macrophages to Leishmania major Infection . *World Family Medicine*. 2017; 15(9):18-24. DOI 10.5742/MEWFM.2017.93096

Introduction

Leishmaniasis is an arthropod-borne disease created by intracellular protozoan parasites of the *Leishmania* genus (Vega-López, 2012). It is a very important health problem of the recent century in 98 countries and territories (Alvar et al., 2012). The endemic areas of human infections are present mainly in tropics, subtropics, southern Europe and western Asia (Ashford, 1997, Desjeux, 1996). Depending on species and host immunity, several complications such as cutaneous (CL), muccocutaeous (MCL) and visceral leishmaniasis (VL) have been recognized (Herwaldt, 1999). *L. major* is an ethological agent of CL in different countries such as Iran (Le Blancq et al., 1986, Azizi et al., 2016). Infection is caused, when a female sand-fly inoculates the metacyclic phase of *L. major* promastigotes into the dermis of a suitable vertebrate host (Dostálová and Volf, 2012). The parasites are engulfed by macrophages for further development (Handman and Bullen, 2002). More interestingly, macrophages involve in both development and killing of parasites. Previous studies have shown that susceptible (BALB/c) and resistant (C57BL/6) mouse strains represent different immune responses to *L. major* infection (Hejazi et al., 2012, Lazarski et al., 2013, Park et al., 2000). Based on the important role of macrophages, it is necessary to know if new mechanisms such as antimicrobial peptides (AMPs) are employed by them following *L. major* infection. Historically, the first AMPs was isolated from a soil Bacillus strain and named gramicidin (Dubos, 1939). More than 5,000 AMPs have been identified so far (Zhao et al., 2013). Cathilicidins and defensins are two main groups of AMPs (Ganz, 2003, Lehrer and Ganz, 2002a). Cathelin-related antimicrobial peptide (CRAMP) is the only cathelicidin found in mouse strains and expressed by different kinds of cells or tissues, while a variety of mouse beta defensins (mBD) have been identified (Dorschner et al., 2003, Nizet and Gallo, 2003, Bardan et al., 2004). They kill or inhibit invasion pathogens through direct effects or modulation of inflammatory responses (Deng et al., 2016, Hemshekhar et al., 2016, Chromek et al., 2012, Kovach et al., 2012). Despite being remarkable cases of CL, little study is found about AMPs role in Leishmania infections. The present study aimed to show whether AMPs can affect susceptibility or resistance to *L. major* infection.

Materials and Methods

Ethics approval and consent to participate: To work on animals, we obtained permission number ir.kmu.rec.1394.208 from the ethical board of Kerman University of Medical Science (Kerman, Iran).

Parasite: *L. major* (strain MRHO/IR/75/ER, Iranian type collection) was purchased from Razi Institute (Karj, Iran) and cultured in 50 ml flask containing RPMI 1640 enriched with 10% heated-inactivated fetal bovine serum (HFBS) and 1% penicillin/streptomycin (pen/strep) antibiotics.

Macrophages Isolation: Macrophages were isolated from BALB/c (n=5) and C57BL/6 (n=5) mouse strains from peritoneal cavity like the previous study (Ray and Dittel, 2010), and cultured in Dulbecco's Modified Eagle's Medium (DMEM) enriched with 10% HFBS and 1% pen/strep antibiotics. The cells were incubated at 37oC in 5% CO2 in humid conditions. For the experiments, the macrophages derived from each strain were separately placed in two sub groups: non-infected (control) and challenged by *L. major* (test).

Co-incubation of Macrophages with parasite: Macrophage (10^6 /well) from both strains were separately transferred into 24-wells cell culture plates. Each cell culture plate was designated for one defined time and selected group (5 well for test groups and 5 well for controls). The cells were incubated at 37°C for 6 hours and non adherent cells removed. The stationary phase of *L. major* promastigotes (10:1) was added only to test groups and incubated at 37°C for 3 hours. The free promastigotes were removed and the cells were incubated at 37°C for an additional 24 hours and 7 days.

Microscopic observation: To measure parasite burden, the test groups were stained using routine Giemsa staining method 3 hours post infection according to a previous study (Faber et al., 2003). Parasite burden (number of parasites per macrophage) and infection rate (% infected macrophages) were obtained by counting the intracellular amastigotes using a light microscope (Nikon, Japan).

Quantitative Real-Time PCR: For analysis of cytokines and AMPs gene expression, whole macrophages from test and control groups were separately harvested at 24 hours post infection with parasites. Total RNA was extracted using RNA Purification kit (Jena Bioscience, Germany) and quantified by a NanoDrop 2000 spectrophotometer (Thermo Scientific, Wilmington, DE). Three mg was transcribed to complementary DNA (cDNA) using AccuPower®RT PreMix random hexaprimer (Bioneer, Korea). Briefly, 3 µg of RNA was adjusted in 20 µl DEPCI-DW and totally added to each lyophilized tube. Thermal profile was performed as following: 12 cycles (20ºC for 30 seconds, 42ºC for 4 minutes, 55ºC for 30 seconds) and 95ºC for 5 minutes. Quantitative Real-time PCR was utilized using a Rotor GENE Q (Qiagen, Germany). RPII was used to amplify house-keeping cDNA. Other primers were applied to amplify desirable amount of cDNA (Table 1). Briefly, The 15µl of each reaction mixture (1ml cDNA, 7 ml SYBR Green, 5ml DW, 1mL primer forward 2.5 Pmol, 1mL primer reverse 2.5 Pmol) was prepared using SYBR Premix EX Taq2 Master Mix (Takara, Japan). Thermal profile was performed as following: 95°C for 1 minute, 40 cycles (94°C for 15 seconds, 58°C for 30 seconds, 72°C for 20 seconds).

ELISA for protein assay: Macrophages were exposed with the stationary phase of *L. major* promastigotes and kept for 7 days. Due the fact that CRAMP is secreted into cell culture media by macrophages, supernatants were collected for CRAMP assessment by enzyme-linked immunosorbent assay (ELISA). CRAMP assay was accessed using direct ELISA. In this method, the concentration of CRAMP is equal with the absorbance of optical density (OD), and

mean of the final OD was calculated as final results. Briefly, a 96-well plate was coated with 5 µg of each supernatant in 50 µl of 0.1M carbonate buffer PH 9.6 and incubated at 4°C FOR 18h. After 3 washes with 300µl of PBS, pH 7.2, 0.1% Tween-20, the plate was then blocked with 100 µl of blocking buffer (PBS, FBS 10%) and incubated at 37°C for 1 hour. Following 3 washes, 100 µl of 1:200 (in PBS, Ph 7.2, 0.1% Tween-20) of horse radish peroxidase conjugated CRAMP antibody (Santacruz, California) was added and incubated for 1 hour at 37º C and washed 3 times at the end of incubation. The plate was incubated with 100 µl of substrate solution for 30 minutes. In the final step, 50µl of stop solution was added and optical density (OD_{492}) detected using ELx800 micro plate reader (BioTek, USA).

Findings

Parasite burden: Initially, we assessed infectivity rate and parasite burden of test groups 3 hours post co-incubation. C57BL/6 derived macrophages had a significant reduction of infection rate (24.5±0.31) as compared to (45±0.73) for BALB/C derived macrophages (Figure 1. A). In the next step, we characterized the parasite burden by counting the number of intracellular amastigotes per macrophage. We saw a significant reduction of parasite burden (2.78±0.10 parasite/macrophage) for C57BL/6 derived macrophages as compared to (8.68±0.22) for other strain (Figure 1. B).

Antimicrobial peptides expression: Real-time PCR was applied to measure the mRNA of defined AMPs following L. major infection. The results were analyzed under ΔΔCT method. In BALB/c derived macrophages, the test groups expressed all aforementioned genes more than their controls except mBD2, but significantly up-regulation was documented only for CRAMP and mBD1 (Figure 2. A). Unlike the BALB/c macrophages, the test groups of C57BL/6 derived macrophages slightly expressed all mentioned genes except mBD6 more than their controls, but there wasn't observed any significant differences between them (Figure 2. B). Inter assay analysis showed that the test groups of BALB/c derived macrophages significantly expressed a high level of CRAMP (3.2507±0.0499) and mBD1 (3.0362±0.0701) compared to (0.9852±0.0267) and (1.2074±0.0418) in C57BL/6 derived macrophages, respectively (Figure 2. C - page 22).

Cytokines expression: Cytokines expression was assessed using real-time PCR method, and the findings analyzed under ΔΔCT method. In BALB/C derived macrophages, the test groups expressed a low level of IL-12 (0.96 ± 0.04) and a significant level of IL-10 (1.91± 0.02) in comparison to (1.005±0.0134) and (1.0016±0.0231) for their controls, respectively (Figure 3. A - page 22). Instead, the test groups of C57BL/6 derived macrophages showed significant expression levels of IL-12 (2.19± 0.05) and a low level of IL-10 (0.85 ± 0.01) versus (1.0036±0.0347) and (1.0021±0.0260) for their controls (Figure 3. B).

Protein assay: Based on AMPs genes expression, the test groups of BALB/c derived macrophages expressed the mRNA levels of CRAMP and mBD1 more than those in C57BL/6. Owing to higher expression of CRAMP compared to mBD1, protein assay was performed only for CRAMP 7 days post infection. Attention to data detected by ELISA method, the test groups of BALB/c derived macrophages released a high level of CRAMP (1.3447±0.010497) in comparison to their controls (0.4706±0.002537) and to (0.4862±0.0021) and (0.4803±0.0022) for the other strain according to the absorbance of optical density assessment (Figure 4 - page 23).

Discussion and Conclusion

Leishmaniasis is a public health problem in many countries (Stefaniak et al., 2002) and there are an estimated 700,000–1 million new cases each year (WHO. Fact sheet. April 2017). It takes a huge economic burden annually. *L. major* infection is an appropriate model to determine the necessity of immune responses to infection outcome. It has been proven that the increase of some immune effectors, such as IL-12, cause naive lymphocytes differentiate to Th2, which can produce IFNγ cytokine (Park et al., 2000). This cytokine plays a very important role in activating of macrophage cells. IFNγ-activated macrophages can destroy the intracellular parasites through a variety of well known mechanisms and induce resistance in C57BL/6 mouse strain (Assreuy et al., 1994). Instead the polarization of Th2 can ultimately predispose BALB/c mice to infection (Chatelain et al., 1992). Similarly to in vivo model, BALB/c and C57BL/6 derived macrophages represent different responses, when they are challenged with L. major parasites (Rabhi et al., 2013). It is possible for genetically different cell types to exhibit an unlike response to the same pathogen like *L. major*. There is a number of infections referred to as AMPs imbalance, in which they influence susceptibility or resistance to infections (Rivas-Santiago et al., 2009). Surprisingly, these peptides classified in the innate immunity of living organisms, can kill or inhibit pathogens in each category (Lehrer and Ganz, 2002a, Lehrer and Ganz, 2002b, Zasloff, 2002, Bardan et al., 2004, Cavalcante et al., 2017, Kao et al., 2016, Mello et al., 2017, Vieira-Girao et al., 2017). They can be used as new drugs or applied as vaccine and resistance to them is rare (Dabirian et al., 2013, Diamond, 2001, Hancock and Sahl, 2006). The present study aimed to show if these peptides can affect susceptibility or resistance to *L. major* infection. We designed an in vitro model for studying of AMPs in parasitic infection for the first time. The increased level of infection severity in BALB/c derived macrophages indicates that this type is more sensitive to *leishmania* infection (Fig1.A-B). According to Sunderkotter et al. (Sunderkötter et al., 1993), C57BL/6 derived macrophages infected by *L. major* parasites mature faster, which results in the reduction of their infection severity and susceptibility. The results derived from this survey revealed that BALB/c derived macrophages use AMPs especially CRAMP and mBD1more to reduce clinical symptoms (Figure 2. A). It seems that their susceptibility to infection is the immense criteria for the increase of AMPs. There are less in vitro

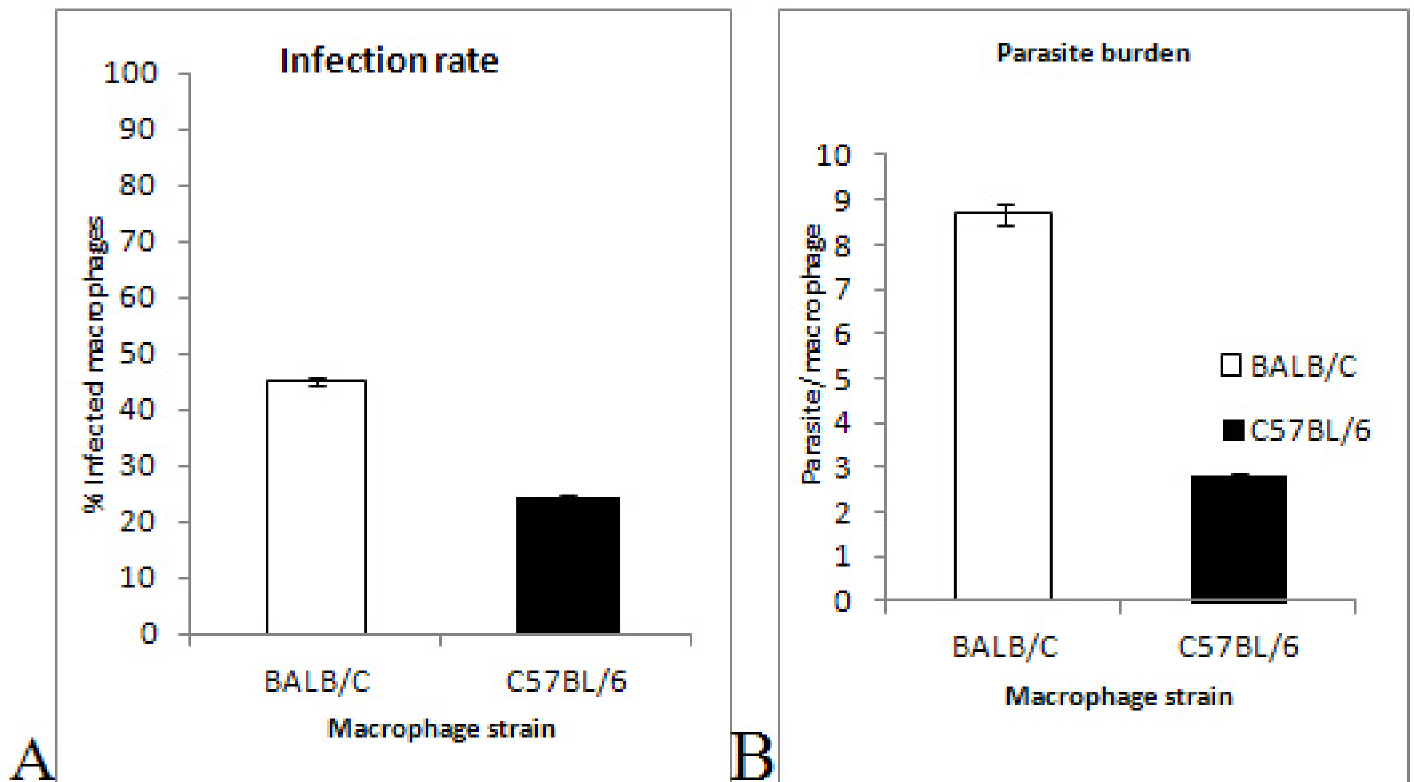


Figure 1: Determination of infection severity: BALB/C and C57BL/6 derived macrophages were challenged with the stationary phase of promastigotes. Smears were taken and stained by Giemsa method from BALB/c (white bar) and C57BL/6 derived macrophages (black bar) for infection severity. (A) Infection rate as the percentage of infected macrophage cells. (B) Parasite burden as the mean number of parasites/ macrophage. Data was shown as mean ± SEM and P£0.05 defined as significant level.

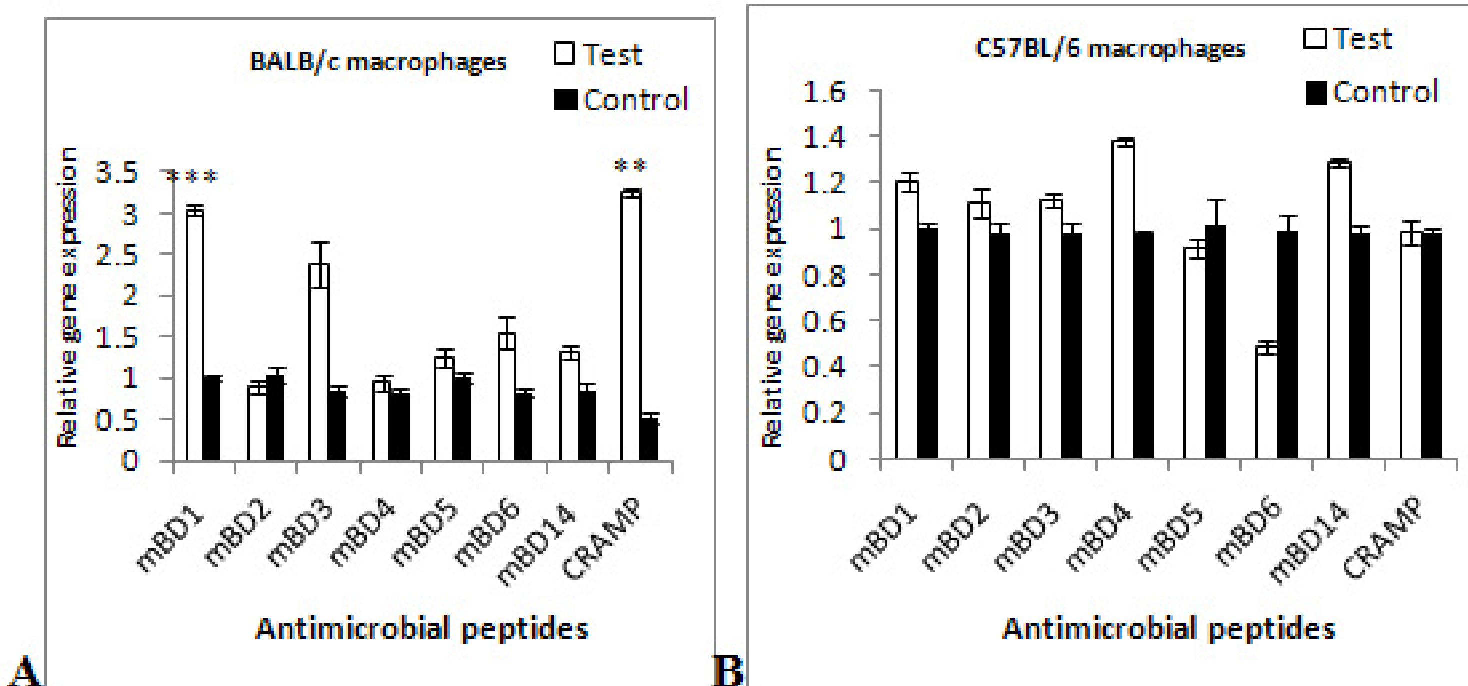
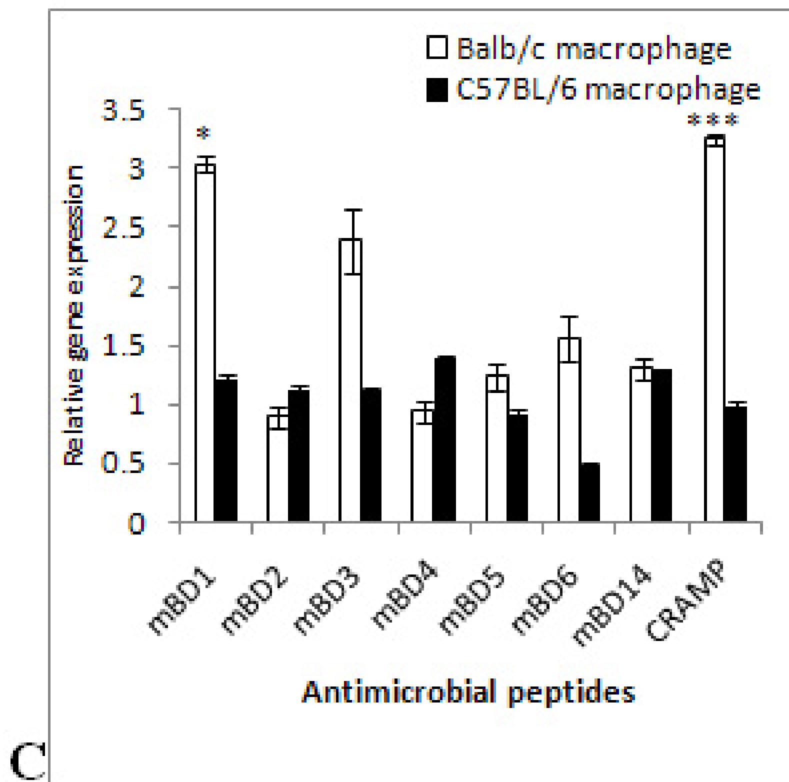


Figure 2. Expression levels of AMPs. BALB/c and C57BL/6 derived macrophages were infected with the stationary phase of *L. major* promastigotes as test groups. Cell sediments were collected 24 hours post infection from test groups (white bar) and controls (black bar) for the expression of selected AMPs. (A) AMPs expression in BALB/c derived macrophages (B) AMPs expression in C57BL/6 derived macrophages. (C) - Next page - Comparison of AMPs expression in both strains. Data are exhibited as means ± SEM and (p< 0.05) was defined as significant level.



Fiigure 2C

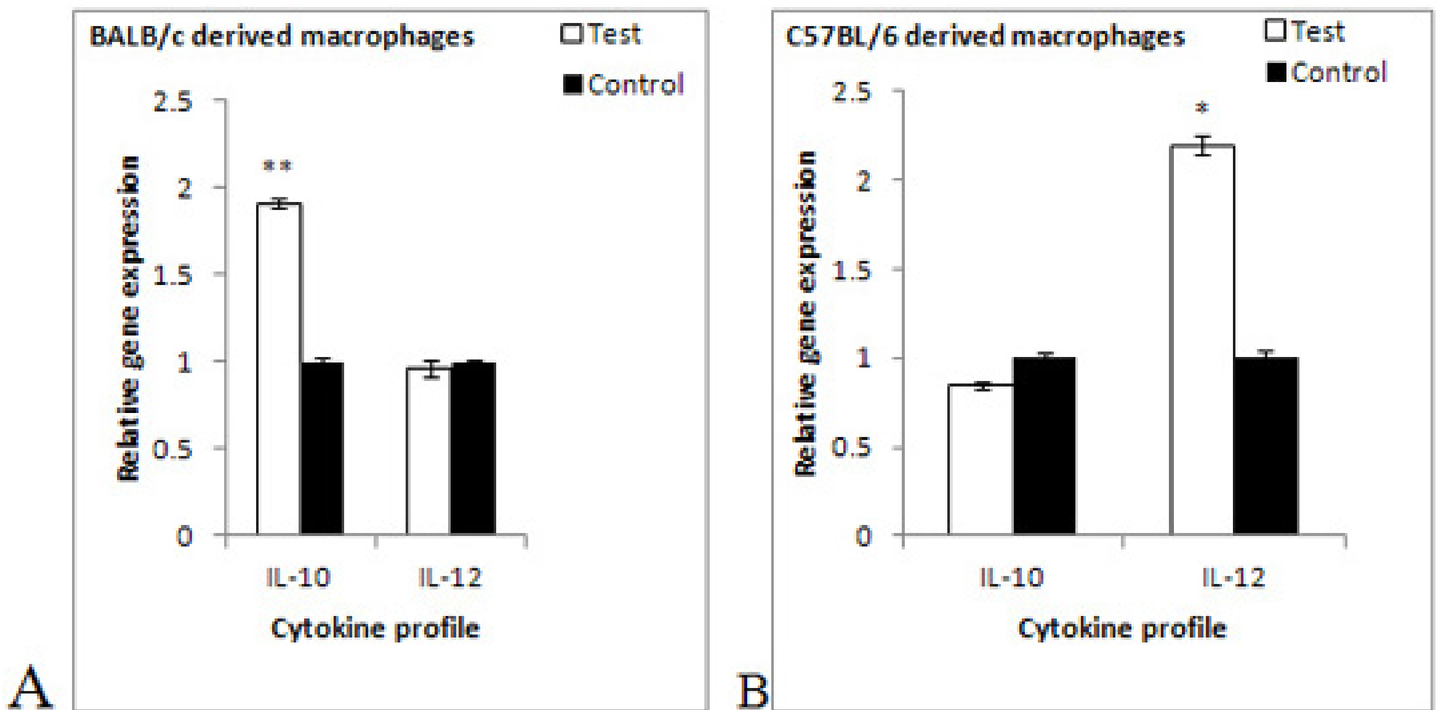


Figure 3. Expression level of cytokines: BALB/c and C57BL/6 derived macrophages were infected with the stationary phase of promastigotes as test groups. Cell sediments were collected 24 hours post infection from test groups (white bar) and controls (black bar) for IL-10 and IL-12 expression. (A) The expression levels of IL-10 and IL-12 in BALB/c derived macrophages. (B) The mRNA levels of IL-10 and IL-12 in C57BL/6 derived macrophages.

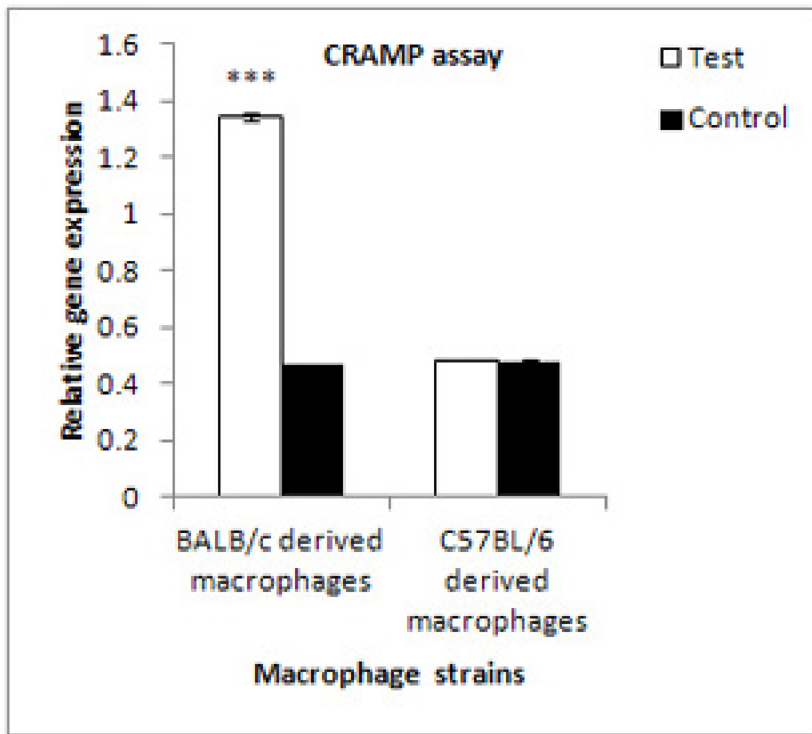


Figure 4

documented studies in this background in the parasitic field. In a described study, human macrophages type I expressed a significant up-regulation of CRAMP between the macrophages types (Bank, 2012). Other research has been generally focused on in vivo models. Radzishevsky et al. (Radzishevsky et al., 2005) showed that CRAMP knock-out gene mice represent a severe infectivity rate of *L. amozonensis* infection in their tissues than wild type. Another aim of this survey was the study of cytokine profiles. Based on the findings related to cytokine profiles, BALB/c derived macrophages expressed a significant up-regulation of IL-10 and a low level of IL-12, while the other type showed completely reverse reaction (Figure 3. A-B). Data from a previous study demonstrated that human derived macrophages type 1 with less sensitivity to *L. major* infection expressed IL-12 more against other types (Bank, 2012). Finally, the information contained in mRNA molecule must be converted to the synthesis of a new protein. Due to higher expression, the newly synthesized peptide of CRAMP was more measured for BALB/c derived macrophages than the other type (Figure 4). Taken together, AMPs consists of a defense barrier against *L. major* infection especially in susceptible macrophages, but cannot create an absolute protection following *L. major* infection.

Acknowledgment
We are grateful from Kerman medical university owing to finance supportive burden of this project and appreciatively the leishmaniasis research center due to use of experience and their requirements.

References

Alvar, J., Velez, I. D., Bern, C., Herrero, M., Desjeux, P., Cano, J., Jannin, J., Den Boer, M. & Team, W. L. C. 2012. Leishmaniasis worldwide and global estimates of its incidence. PLoS One, 7, e35671.

Ashford, R. 1997. The leishmaniases as model zoonoses. Annals of tropical medicine and parasitology, 91, 693-702.

Assreuy, J., Cunha, F. Q., Epperlein, M., Noronha□Dutra, A., O'donnell, C. A., Liew, F. Y. & MoncadA, S. 1994. Production of nitric oxide and superoxide by activated macrophages and killing of Leishmania major. European journal of immunology, 24, 672-676.

Azizi, M. H., Bahadori, M., Dabiri, S., Shamsi Meymandi, S. & Azizi, F. 2016. A History of Leishmaniasis in Iran from 19th Century Onward. Arch Iran Med, 19, 153-62.

Bank, E. 2012. Leishmania major parasites and their interaction with human macrophages. Universitätsbibliothek Mainz.

Bardan, A., Nizet, V. & Gallo, R. L. 2004. Antimicrobial peptides and the skin. Expert opinion on biological therapy, 4, 543-549.

Cavalcante, C. S., Falcao, C. B., Fontenelle, R. O., Andreu, D. & Radis-Baptista, G. 2017. Anti-fungal activity of Ctn[15-34], the C-terminal peptide fragment of crotalicidin, a rattlesnake venom gland cathelicidin. J Antibiot, 70, 231-237.

Chatelain, R., Varkila, K. & Coffman, R. L. 1992. IL-4 induces a Th2 response in Leishmania major-infected mice. The Journal of Immunology, 148, 1182-1187.

Chromek, M., Arvidsson, I. & Karpman, D. 2012. The antimicrobial peptide cathelicidin protects mice from Escherichia coli O157:H7-mediated disease. PLoS One, 7, 15.

Dabirian, S., Taslimi, Y., Zahedifard, F., Gholami, E., Doustdari, F., Motamedirad, M., Khatami, S., Azadmanesh, K., Nylen, S. & Rafati, S. 2013. Human neutrophil peptide-1 (HNP-1): a new anti-leishmanial drug candidate. PLoS Negl Trop Dis, 7.

Deng, Y. Y., Shamoon, M., He, Y., Bhatia, M. & Sun, J. 2016. Cathelicidin-related antimicrobial peptide modulates the severity of acute pancreatitis in mice. Mol Med Rep, 13, 3881-5.

Deng, Y. Y., Shamoon, M., He, Y., Bhatia, M. & Sun, J. 2016. Cathelicidin-related antimicrobial peptide modulates the severity of acute pancreatitis in mice. Mol Med Rep, 13, 3881-5.
Desjeux, P. 1996. Leishmaniasis: public health aspects and control. Clinics in dermatology, 14, 417-423.
Diamond, G. 2001. Natures antibiotics: the potential of antimicrobial peptides as new drugs. Biologist (London, England), 48, 209.
Dorschner, R. A., Lin, K. H., Murakami, M. & Gallo, R. L. 2003. Neonatal skin in mice and humans expresses increased levels of antimicrobial peptides: innate immunity during development of the adaptive response. Pediatric research, 53, 566-572.
Dostálová, A. & Volf, P. 2012. Leishmania development in sand flies: parasite-vector interactions overview. Parasites & vectors, 5, 1.
Dubos, R. J. 1939. Studies on a bactericidal agent extracted from a soil bacillus: I. Preparation of the agent. Its activity in vitro. The Journal of experimental medicine, 70, 1.
Faber, W. R., Oskam, L., Van Gool, T., Kroong, N. C., Knegt-Junk, K. J., Hofwegenf, H., Van Der Wal, A. C. & Kager, P. A. 2003. Value of diagnostic techniques for cutaneous leishmaniasis. Journal of the American Academy of Dermatology, 49, 70-74.
Ganz, T. 2003. Defensins: antimicrobial peptides of innate immunity. Nature Reviews Immunology, 3, 710-720.
Hancock, R. E. & Sahl, H.-G. 2006. Antimicrobial and host-defense peptides as new anti-infective therapeutic strategies. Nature biotechnology, 24, 1551-1557.
HANDMAN, E. & BULLEN, D. V. 2002. Interaction of Leishmania with the host macrophage. Trends in parasitology, 18, 332-334.
Hejazi, S., Hoseini, S., Javanmard, S., Zarkesh, S. & Khamesipour, A. 2012. Interleukin-10 and Transforming Growth Factor-beta in Early and Late Lesions of Patients with Leishmania major Induced Cutaneous Leishmaniasis. Iran J Parasitol, 7, 16-23.
Hemshekhar, M., Anaparti, V. & Mookherjee, N. 2016. Functions of Cationic Host Defense Peptides in Immunity. Pharmaceuticals, 9.
Herwaldt, B. L. 1999. Leishmaniasis. The Lancet, 354, 1191-1199.
KAO, C., LIN, X., YI, G., ZHANG, Y., ROWE-MAGNUS, D. A. & BUSH, K. 2016. Cathelicidin Antimicrobial Peptides with Reduced Activation of Toll-Like Receptor Signaling Have Potent Bactericidal Activity against Colistin-Resistant Bacteria. MBio, 7, 01418-16.
Kovach, M. A., Ballinger, M. N., Newstead, M. W., Zeng, X., Bhan, U., Yu, F. S., Moore, B. B., Gallo, R. L. & Standiford, T. J. 2012. Cathelicidin-related antimicrobial peptide is required for effective lung mucosal immunity in Gram-negative bacterial pneumonia. J Immunol, 189, 304-11.
Lazarski, C. A., Ford, J., Katzman, S. D., Rosenberg, A. F. & Fowell, D. J. 2013. IL-4 attenuates Th1-associated chemokine expression and Th1 trafficking to inflamed tissues and limits pathogen clearance. PLoS One, 8.
Le Blancq, S., Schnur, L. & Peters, W. 1986. Leishmania in the Old World: 1. The geographical and hostal distribution of L. major zymodemes. Transactions of the Royal Society of Tropical Medicine and Hygiene, 80, 99-112.
Lehrer, R. I. & Ganz, T. 2002a. Cathelicidins: a family of endogenous antimicrobial peptides. Current opinion in hematology, 9, 18-22.
Lehrer, R. I. & GANZ, T. 2002b. Defensins of vertebrate animals. Current opinion in immunology, 14, 96-102.
Mello, C. P., Lima, D. B., Menezes, R. R., Bandeira, I. C., Tessarolo, L. D., Sampaio, T. L., Falcao, C. B., Radis-Baptista, G. & Martins, A. M. 2017. Evaluation of the antichagasic activity of batroxicidin, a cathelicidin-related antimicrobial peptide found in Bothrops atrox venom gland. Toxicon, 130, 56-62.
Nizet, V. & Gallo, R. L. 2003. Cathelicidins and innate defense against invasive bacterial infection. Scandinavian journal of infectious diseases, 35, 670-676.
Park, A. Y., Hondowicz, B. D. & Scott, P. 2000. IL-12 is required to maintain a Th1 response during Leishmania major infection. The Journal of Immunology, 165, 896-902.
Rabhi, I., Rabhi, S., Ben-Othman, R., Aniba, M. R., Trentin, B., Piquemal, D., Regnault, B. & Guizani-Tabbane, L. 2013. Comparative analysis of resistant and susceptible macrophage gene expression response to Leishmania major parasite. BMC Genomics, 14, 1471-2164.
Radzishevsky, I. S., Rotem, S., Zaknoon, F., Gaidukov, L., Dagan, A. & Mor, A. 2005. Effects of acyl versus aminoacyl conjugation on the properties of antimicrobial peptides. Antimicrobial agents and chemotherapy, 49, 2412-2420.
Ray, A. & Dittel, B. N. 2010. Isolation of mouse peritoneal cavity cells. JoVE (Journal of Visualized Experiments), e1488-e1488.
Rivas-Santiago, B., Serrano, C. J. & Enciso-Moreno, J. A. 2009. Susceptibility to infectious diseases based on antimicrobial peptide production. Infection and immunity, 77, 4690-4695.
Stefaniak, J., Paul, M., Kacprzak, E. & Skoryna-Karcz, B. 2002. [Visceral leishmaniasis]. Przeglad epidemiologiczny, 57, 341-348.
Sunderkötter, C., Kunz, M., Steinbrink, K., Meinardus-Hager, G., Goebeler, M., Bildau, H. & Sorg, C. 1993. Resistance of mice to experimental leishmaniasis is associated with more rapid appearance of mature macrophages in vitro and in vivo. The Journal of Immunology, 151, 4891-4901.
Vega□López, F. 2012. Leishmaniasis: old world. Imported Skin Diseases, 189.
Vieira-Girao, P. R., Falcao, C. B., Rocha, I. R., Lucena, H. M., Costa, F. H. & Radis-Baptista, G. 2017. Antiviral Activity of Ctn[15-34], A Cathelicidin-Derived Eicosapeptide, Against Infectious Myonecrosis Virus in Litopenaeus vannamei Primary Hemocyte Cultures. Food Environ Virol, 16, 017-9285.
WHO. Fact sheet Updated April 2017. http://www.who.int/mediacentre/factsheets/fs375/en/ accessed October16, 2017
Zasloff, M. 2002. Antimicrobial peptides in health and disease. New England Journal of Medicine, 347, 1199-1199.
Zhao, X., Wu, H., Lu, H., Li, G. & Huang, Q. 2013. LAMP: a database linking antimicrobial peptides. PLoS One, 8, e66557.

Does socio-economic status of patients have an effect on clinical outcomes after coronary artery bypass grafting surgery

Forough Razmjooei (1)
Afshin Mansourian (2)
Saeed Kouhpyma (3)

(1) Department of General Surgery, Shiraz University of Medical Sciences, Shiraz, Iran
(2) Department of Anesthesiology, Yasuj University of Medical Sciences, Yasuj, Iran
(3) Department of cardiovascular surgery, Shiraz University of Medical Sciences, Shiraz, Iran

Corresponding author:
Afshin Mansourian,
Department of Anesthesiology,
Yasuj University of Medical Sciences, Iran,
Email: Afshin.mansourian@yahoo.com

Abstract

Background: Socioeconomic status (SES) is defined as an individual's social and financial position in comparison with that of other people. Cardiovascular disease is more common in people with low SES. This inverse relation between SES and Cardiovascular disease risk in countries with high-income is associated with some of the behavior and psychology status in people with low SES, such as smoking, malnutrition, and stresses.

Objectives: The purpose of our study was to evaluate the effect of patient's socioeconomic status on clinical outcomes in CABG surgery.

Patients and Methods: Since March 2014 to August 2015, 201 of 412 patients undergoing CABG surgery had operations in private hospitals who were categorized as patients with good socioeconomic status because of their financial position, life situation, and the ability to afford a high price for their operation. And 211 patients who had operation in university hospitals were named low socioeconomic status. Data were compared using Kolmogorov-Smirnov, Chi-square, Student T test and Mann-Whitney U test, regarding structural differences between groups. To determine factors influencing Post-operative outcomes, methods of logistic regression were used.

Results: At the end of the study, The 30-day mortality (p: 0.11), hospital mortality (p: 0.16), dialysis need (p: 0.09), neurologic events (CVA, LOC, Seizure) (p: 0.36), post-operative arrhythmia (AF, PVC, PAC and other) (p: 0.81) of patients with good socioeconomic status were not significantly different from the patients having low socioeconomic status. Hospital stay ($p<0.01$), wound infection (p: 0.004), first day bleeding (p:<0.0001), second day bleeding (p:<0.001), third day bleeding (p:<0.001), Reoperation need (p: 0.02) blood transfusion in first day after surgery ($p < 0.01$), second day after surgery ($p < 0.0001$), and third day after surgery ($p<0.001$) were significantly different in patients having good socioeconomic status and patients with low socioeconomic status.

Conclusions: In our study, socioeconomic status had a significant effect on: Hospital stay, wound infection, first, second and third day bleeding after surgery, Reoperation need, blood transfusion in first, second and third day after surgery. But it had no effect on 30-day mortality and hospital mortality, dialysis need, neurologic events and post-operative arrhythmia.

Key words: CABG surgery, cardiopulmonary bypass, clinical outcomes, socioeconomic status

Please cite this article as: Razmjooei F, et al. Does socio-economic status of patients have an effect on clinical outcomes after coronary artery bypass grafting surgery. *World Family Medicine.* 2017; 15(8=9):25-31. DOI 10.5742/MEWFM.2017.93097

Background

Socioeconomic status (SES) refers to various aspects of social stratification and situation, such as income, education, social class and occupation. These aspects are somehow correlated with each other but often used interchangeably [1]. The cardiovascular disease (CVD) risk in both genders is more common in patients with low SES than patients with higher SES. This inverse relation between SES and Cardiovascular disease risk in rich-countries has interrelation with some behaviors and psychology status in people with low SES, such as smoking, malnutrition and stresses. [2] Socioeconomic status (SES) also has an effect on prognosis and survival from disease, because it can provide special conditions for patients. For many years this relationship between social class and getting better in the functional status of the heart, after myocardial infarction has been reported [3]. Various socio-economic factors can effect on dietary status which influences anemia and maybe it is a contributing cause in patients [4]. In patients undergoing surgery, poor nutrition significantly affects outcomes, and patients with poor nutrition have poor outcomes after surgery [5]. Seltzer after assessment of 500 medical-surgical patients found there is a fourfold association between increasing complications and a six fold increasing in mortality in patients who have serum albumin level less than 35 g/L [6]. Immune status and nutritional condition are associated factors that could effect on surgical outcomes in the patients [7]. Nutrition can also affect mortality rate by (50%) in malnourished old patients and (11%) in well-nourished old patients [8]. In patients with stroke, low pre-stroke SES had significant interrelation with post stroke outcomes such as: 3-months mortality, disability and dependence [9].

Objectives

Because of the differences in clinical outcomes in our two groups, socioeconomic status of patients is important. So we designed this study to investigate the role of economy on post-operative outcomes in patients with CABG surgery.

Patients and Methods

In an attempt to clarify effect of socioeconomic status on clinical outcomes in patients with CABG surgery, we retrospectively analyzed the surgical database of three institutions since March 2014 to August 2015. 412 patients who had conditions to include in our study, with a similar surgery team (common surgeon and perfusionist) were divided into two groups. The first 201 patients who had their operation in a private hospital and who had higher socioeconomic status were our first group. The second group were categorized as having low socioeconomic status were 211 other patients who had their operation done in university hospitals. Patients in private hospitals were capable of affording a high charge for their operation and in university hospital there was no charge. For safety of this study local authority's approval was received. Clinical outcomes which we aimed to compare in our two groups were defined as; hospital length of stay, hospital death, wound infection, dialysis need, neurologic events, re -exploration need, bleeding volume in ICU, arrhythmia (AF, PVC, PAC) during hospitalization, blood volumes transfusion during first three day after operation in ICU and 30-day mortality. For ensuring equality in the two groups we excluded patients with: renal insufficiency (Cr>1.5), liver dysfunction (SGPT& SGOT>twofold more than normal), heart insufficiency (EF<30%), patients with previous neurologic events, immune deficiency (WBC<2500), anti-coagulopathy (platelet<100000), preoperative infection (WBC>10000), autoimmune disorders, REDO operations, patients with specific behavior from the study. Pre-operative variables are shown in (Table 1). Significant statistical difference was defined as p values smaller than 0.05. There were several significant statistical differences in pre-operative and intra-operative variables between patients with higher socioeconomic status (private hospital) and patients with low socioeconomic status (university hospitals) when we use the Mann-Whitney estimator to determine group differences (Table 1 and Table 2). Myocardial revascularization by surgeons in all patients was done through median sternotomy. For anticoagulation throughout surgery a heparin dose was administered to keep activated coagulation time greater than 400 s. Protamine dose 1:1 was selected to antagonize heparin effect. In both groups, all patients' (100%) operation was done with on pump surgery and using extracorporeal circulation with mild hypothermia (32° to 34°C). Ascending aorta and venous two-stage cannulation were used for bypassing and tepid crystalloid cardioplegia (22-24°C) in two group was administered to paralyise the heart. Generally, hematocrits below 22 (Hb<7) on extracorporeal circulation and Hb<10 after surgery in ICU was avoided, and aggressively treated by blood transfusion if it occurred. Internal mammary artery use was high in the two groups (83.9% in private hospital and 76% in university hospitals).

Results

Patients having low socioeconomic status, had some risk profile before surgery (Table 1) such as: lesser BSA, height and weight, higher urgent or emergent surgery required and acute myocardial infarction in comparison with higher socioeconomic status patients. Although they were better in some other risk factors before surgery such as: number of grafts, Medical history, DM, HLP and Smoking. Analyzing the pre-operative laboratory data between the two groups showed that patients with higher Socioeconomic status had more kidney and liver problems (SGPT, SGOT, BUN and Cr were higher) and higher hemoglobin levels (patients with low SES (53.4%) tend to be more anemic (p<0.0001) than patients with higher SES (35.3%)), and platelet count was higher too. Hypertension was the most frequent post medical history disease in both groups with no difference in prevalence comparison (p= 0.13) (Table 2). During the CPB and surgery we had some differences between the two groups, such as: use of internal mammary artery (76%) in higher SES group and (83.9%) in low SES group. Also lowest hemoglobin during CPB was lower (p<0.001) in higher SES group patients. Blood transfusion (246.5±228

Table 1. Demographic Data before Surgery

Variable	low socioeconomic status patients	higher socioeconomic status patients	P-Value
Age(y)	61±10.4*	61± 8.8	0.75
Weight(kg)	68.1 ± 12.4	71.3 ± 11.3	0.01
Height(cm)	163.9±9	166.±9.6	0.002
BSA(m²)	1.73 ± 0.18	1.79 ± 0.18	0.002
EF (%)	50.8±8.8	51.5±8.2	0.50
Number of grafts	3.41 ± .75	4.2± .71	<0.001
Sex (males/females %)	62.6 / 37.4	68.2 / 31.8	0.23
Medical history	90	96	0.01
MI (%)	22.3	0.5	<0.0001
DM (%)	33.2	42.8	0.04
HTN (%)	64.5	57.2	0.13
HLP (%)	46.4	57.2	0.02
COPD (%)	11.4	10.4	0.76
Smoking (%)	23.7	32.8	0.03
Other problems (%)	10.4	33.3	<0.001
Medication (%)	71.6	69.7	0.67
Aspirin (%)	68.7	67.2	0.73
Plavix (%)	14.7	24.4	0.01
Warfarin (%)	.5	.0	0.32
Elective/Emergent (%)	74.9 / 25.1	97 / 3	<0.001

*Mean± Standard Deviation
Abbreviation: BSA, body surface area; EF, ejection fraction; MI, myocardial infarction; DM, diabetes mellitus; HTN, hypertension; HLP, hyper lypidemia; COPD, chronic obstructive pulmonary disease

Table 2. Laboratory Data before Surgery

Variable	low socioeconomic status patients	higher socioeconomic status patients	P-Value
ANEMIA (%)	53.4	35.3	<0.0001
Hemoglobin(g/dl)	12.8±1.9*	13.7±1.7	<0.001
platelet	237189 ± 79446	275044 ± 68929	<0.0001
WBC	7530 ±1724	7281 ± 1602	0.112
Cr	1.07±0.21	1.01 ± 0.18	0.002
BUN	17.15±5.86	20.2±5.8	<0.001
SGPT	26.3± 11.5	30.9±11.9	<0.001
SGOT	25.8±10.2	29.3±9.5	<0.001

*Mean± Standard Deviation
Abbreviation: WBC, white blood cell; BUN, blood urea nitrogen; CR, creatinine; SGPT, serum glutamate-pyruvate transaminase; SGOT, serum glutamic oxaloacetic transaminase.

Table 3: Intra operative information

Variable	low socioeconomic status patients	higher socioeconomic status patients	P-Value
LIMA (%)	83.9	76	0.04
Lowest temperature(Č)	33.4± 1*	33.8±0.61	<0.001
Lowest HB(g/d)	7.3±1.3	7.04±1.44	<0.001
Aortic clamp time(min)	32.9±8	30.1±7.25	0.007
Pumping time(min)	56±13.1	53.3±10.5	<0.01
Surgery time(min)	203±29.3	226.3±46.7	<0.001
Urine output(cc)	262.7±212	386±302	<0.0001
Hemofiltration(cc)	2105±616	2460±588.6	<0.001
Blood transfusion(cc)	246.5±228	109.5±151	<0.0001

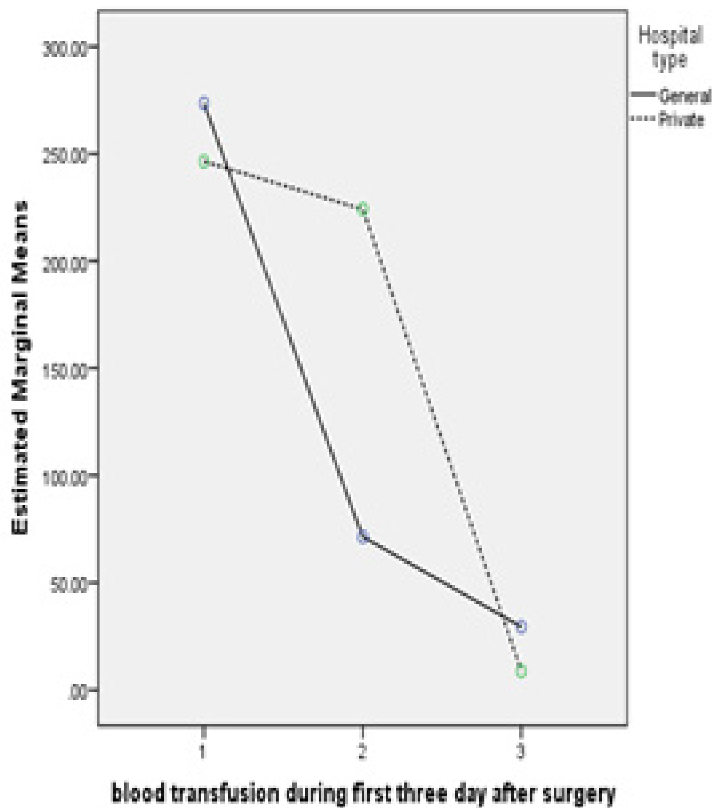
*Mean± Standard Deviation
Abbreviation: LIMA, left internal mammary artery; HB, hemoglobin

Table 4. Post-operative clinical outcomes Analysis in the two groups

Variable	low socioeconomic status patients	higher socioeconomic status patients	P-Value
Hospital stay(day)	5.03 ± 2.7*	4.1 ±0.73	0.01
1st day bleeding(cc)	534.8±396.8	434.8±286.4	<0.0001
2nd day bleeding(cc)	240.6±190	301.2±176.4	<0.001
3rd day bleeding(cc)	41±109.4	10.8±41.8	<0.001
Hospital mortality (%)	2(0.9%)	.0	0.16
Infection (%)	10	3	0.004
Dialysis need (%)	4.3	1.5	0.09
Neurologic events (%)	5.7	8	0.36
CVA (%)	0.9	3	0.13
LOC (%)	3.3	5.5	0.28
Seizure (%)	.5	0	0.32
30-day mortality (%)	2.4	0.5	0.11
Reoperation need (%)	2.4	0	0.02
Arrhythmia (%)	14.2	13.4	0.81
AF (%)	10	5	0.05
PVC (%)	1.9	6	0.03
PAC (%)	3.3	6	0.19
1st day transfusion(cc)	273.5± 263.5	246.5± 173	0.01
2nd day transfusion(cc)	71.4± 146.7	224.2± 189.4	<0.0001
3rd day transfusion(cc)	29.4± 91	8.7± 43.7	<0.001

*Mean± Standard Deviation
Abbreviation: CVA, Cerebra vascular accident; LOC, low of conscious; AF, atrial fibrillation; PVC, premature ventricular contraction; PAC, premature atrial contraction

Figure 1: blood transfusion volume during the first three days after surgery



vs. 109.5±151 and p<0.0001), Aortic clamp time (p<0.007) and pumping time (p<0.01) were lower in the higher SES group in comparison with the low SES group. But surgery time (p<0.001), lowest temperature (p<0.001), urine output (p<0.0001) and hemofiltration (p<0.001) were higher in the higher SES group (Table 3). Analyzing the post-operative clinical outcomes between the two groups showed that: Hospital mortality (p: 0.16), Dialysis need (p: 0.09), Neurologic events (p: 0.36), CVA (p: 0.13), LOC (p: 0.28), Seizure (p: 0.32), 30-day mortality (p: 0.11), total Arrhythmias (p: 0.81) and post-operative PAC (p: 0.19) were not significantly different in the higher SES and low SES groups. But Hospital stay (4.1 ±0.73 vs. 5.03 ± 2.7, p<0.01), wound infection (p<0.004), first-day bleeding after surgery (p<0.0001), third-day bleeding (p<0.001), first-day blood transfusion (p<0.01), third-day blood transfusion (p<0.001), Reoperation need (p: 0.02), post-operative AF (p: 0.05) and PVC (p: 0.03), were significantly lower in the higher SES group patients in comparison with the low SES group. But bleeding volume (p<0.001) and blood transfusion volume (p<0.0001) during second day after surgery were significantly higher in the higher SES group patients (Table 4). Figure 1 shows blood transfusion volume during the third day after surgery.

Discussion

The effect of patients' socio-economic status (SES) on nutrition and health is important. SES is interrelated with the health base on lifestyles which is the circumstances of cardiovascular disease. It means that low SES is associated with some risky behaviors like smoking or less physical activity and poor dietary adaption in patients which makes them feel hopeless and depressed [11]. Yu, Zhijie, et al found the reverse relationship between SES and cardiovascular disease risk factor [12]. Lynch, et al. showed the developmental, behavioral and psychological effect of SES in the childhood period in that it was reinforced and maintained during the life time[13]. Because we didn't have similar research in this area, there was an uncertain gap between our knowledge and this influence on outcomes. For this study we used survey data in two university hospitals and one private hospital to examine the degree of patient socio-economic status effect on post-operative result in patients undergoing coronary artery bypass grafting surgery. Clinical outcomes were defined as: hospital stay, hospital mortality, dialysis need, wound infection, blood transfusion, bleeding, 30 day mortality, re-exploration need, neurologic events and arrhythmia that was gathered from a cluster of the patients and phone calls to the patients or their visitors and compared with each other to clarify this effect. Our result showed that preoperative socio-economic status of the patients who had CABG surgery affected clinical outcomes in many aspects. Similar to our result, some studies have concluded that socioeconomic status and operative status has been associated with outcomes [14-16]. Yu, Tsung-Hsien et al, reached the result that poorer quality of services were associated with worse outcomes in patients with low-income who had CABG surgery. In fact there was less tendency in individuals with low income toward high-quality healthcare despite Health Insurance programs an this was the cause of worse clinical outcome after surgery [17]. But in some other aspects there were no differences. Some studies had been done on a few aspects of our study. Results in our study did not show any significant

1. Some patients don't like to be infused by other people's blood in any situation because of their religions.

difference between hospital mortality and 30-day mortality after surgery between low SES and higher SES patients (p>0.05). Unlike our study Dzayee, et al showed in their cohort study that Mortality Rate after CABG surgery in patients with lower socioeconomic position was higher during their study period[18]. Also Yong, et al. found that with increase in patients' income, mortality rate was decreased slightly (10.8% mortality in patients with lowest income versus 9.4% in highest-income patients). Re-admission after thirty days in higher socioeconomic status patients were higher (9.9% in lower-income patients versus 10.4% in higher-income) [19]. And Abbasi, et al's result showed that Hospital mortality in patients with low socioeconomic status was higher in comparison with high socioeconomic status patients due to the acute coronary syndrome [20]. But similar to our study Shi, William Y, et al. found that patients from remote areas undergoing CABG surgery experienced poorer long-term survival. But thirty-day mortality was not different in the different groups (1.6% vs. 1.6%, p>0.99) [21].

We found that Hospital length of stay has been affected by patients SES ((4.1 ±0.73 vs. 5.03 ± 2.7, p<0.01). As in our conclusion Poole, et al. showed in their study that Hospital Length of stay after CABG in patients with depression had a relationship with socioeconomic status [22]. SES also has an important role in access to cardiac care services and significant effects on one-year mortality after MI [23].
We concluded that patients SES had a significant role in choosing hospital type (private hospital or university hospitals), and pre-operative health status such as: BSA, Weight and height, acute MI, emergency operation, hemoglobin level (anemia), platelet count, and Cr level and also had significant effect on need for blood products during surgery, length of hospital stay, wound infection, re-exploration need for bleeding, bleeding volume and blood transfusion volume after surgery in patients who had CABG surgery. But it had no effect on hospital and 30-day mortality, dialysis need, neurologic events and arrhythmia.

Acknowledgments; this paper is a part of research towards an MSc degree at School of Medicine, Shiraz University of medical sciences. There was no conflict of interest. We would like to thank the department of anesthesiology, general and cardiovascular surgery and also perfusion department at Shiraz University of medical sciences for helping us in collecting the data.

References

1. Ostrove, J.M. and N.E. Adler, The relationship of socio-economic status, labor force participation, and health among men and women. Journal of Health Psychology, 1998. 3(4): p. 451-463.
2. Clark, A.M., et al., Socioeconomic status and cardiovascular disease: risks and implications for care. Nature Reviews Cardiology, 2009. 6(11): p. 712-722.
3. Ickovics, J.R., C.M. Viscoli, and R.I. Horwitz, Functional recovery after myocardial infarction in men: the independent effects of social class. Annals of Internal Medicine, 1997. 127(7): p. 518-525.
4. Ahmed, F., et al., Anaemia and vitamin A deficiency in poor urban pregnant women of Bangladesh. Asia Pacific journal of clinical nutrition, 2003. 12(4): p. 460-466.
5. Dempsey, D., J. Mullen, and G. Buzby, The link between nutritional status and clinical outcome: can nutritional intervention modify it? The American journal of clinical nutrition, 1988. 47(2): p. 352-356.
6. Seltzer, M.H., et al., Instant nutritional assessment. Journal of Parenteral and Enteral Nutrition, 1979. 3(3): p. 157-159.
7. Buzby, G.P., et al., Prognostic nutritional index in gastrointestinal surgery. The American Journal of Surgery, 1980. 139(1): p. 160-167.
8. Linn, B.S., D.S. Robinson, and N.G. Klimas, Effects of age and nutritional status on surgical outcomes in head and neck cancer. Annals of surgery, 1988. 207(3): p. 267.
9. Bettger, J.P., et al., The association between socioeconomic status and disability after stroke: Findings from the Adherence eValuation After Ischemic stroke Longitudinal (AVAIL) registry. BMC public health, 2014. 14(1): p. 281.
10. Dragano, N., et al., Neighbourhood socioeconomic status and cardiovascular risk factors: a multilevel analysis of nine cities in the Czech Republic and Germany. BMC public health, 2007. 7(1): p. 255.
11. Lynch, J., et al., Socioeconomic Status and progression of carotid atherosclerosis prospective evidence from the kuopio ischemic heart disease risk factor study. Arteriosclerosis, thrombosis, and vascular biology, 1997. 17(3): p. 513-519.
12. Yu, Z., et al., Associations between socioeconomic status and cardiovascular risk factors in an urban population in China. Bulletin of the World Health Organization, 2000. 78(11): p. 1296-1305.
13. Lynch, J.W., et al. Do cardiovascular risk factors explain the relation between socioeconomic status, risk of all-cause mortality, cardiovascular mortality, and acute myocardial infarction? American journal of epidemiology, 1996. 144(10): p. 934-942.
14. Bradshaw, P.J., et al., Outcomes after first percutaneous coronary intervention for acute myocardial infarction according to patient funding source. BMC health services research, 2014. 14(1): p. 405.
15. Efird, J.T., et al. Operative status and survival after coronary artery bypass grafting. in Heart Surg Forum. 2014.
16. Tang, X., et al., Neighborhood socioeconomic status and the prevalence of stroke and coronary heart disease in rural China: A population□based study. International Journal of Stroke, 2015. 10(3): p. 388-395.
17. Yu, T.-H., Y.-C. Hou, and K.-P. Chung, Do low-income coronary artery bypass surgery patients have equal opportunity to access excellent quality of care and enjoy good outcome in Taiwan? International journal for equity in health, 2014. 13(1): p. 64.
18. Dzayee, D.A.M., et al., Short and Long Term Mortality after Coronary Artery Bypass Grafting (CABG) Is Influenced by Socioeconomic Position but Not by Migration Status in Sweden, 1995–2007. PloS one, 2013. 8(5): p. e63877.
19. Yong, C.M., et al., Socioeconomic Inequalities in Quality of Care and Outcomes Among Patients With Acute

Coronary Syndrome in the Modern Era of Drug Eluting Stents. Journal of the American Heart Association, 2014. 3(6): p. e001029.
20. Abbasi, S.H., et al., Socioeconomic status and in-hospital mortality of acute coronary syndrome: Can education and occupation serve as preventive measures? International journal of preventive medicine, 2015. 6.
21. Shi, W.Y., et al., Impact of socioeconomic status and rurality on early outcomes and mid-term survival after CABG: insights from a multicentre registry. Heart, Lung and Circulation, 2014. 23(8): p. 726-736.
22. Poole, L., et al., The combined association of depression and socioeconomic status with length of post-operative hospital stay following coronary artery bypass graft surgery: Data from a prospective cohort study. Journal of psychosomatic research, 2014. 76(1): p. 34-40.
23. Alter, D.A., et al., Effects of socioeconomic status on access to invasive cardiac procedures and on mortality after acute myocardial infarction. New England Journal of Medicine, 1999. 341(18): p. 1359-1367.

Comparison of the uterine artery Doppler indices during pregnancy between gestational diabetes and diabetes mellitus and healthy pregnant women

Nazanin Farshchian
Farhad Naleini
Amir Masoud Jaafarnejhad
Parisa Bahrami Kamangar

Department of Radiology, Faculty of Medicine, Kermanshah University of Medical Sciences, Kermanshah, Iran

Corresponding Author:
Nazanin Farshchian,
Department of Radiology, Faculty of Medicine,
Kermanshah University of Medical Sciences, Kermanshah, Iran
Tel: 09123757729
Email: Nfarshchian@kums.ac.ir

Abstract

Introduction: Diabetes can adversely affect the feto-placental circulation. This can cause complications such as congenital malformations of the fetus, fetal demise, fetal growth abnormalities, pre-eclampsia, and preterm labor. The objective of this study was to compare the uterine artery Doppler indices (resistance index (RI), plasticity index (PI), and peak systolic velocity (PSV)) among pregnant women with diabetes mellitus and gestational diabetes, with healthy pregnant women.

Methodology: In this study, 60 pregnant women within gestational age of 20 to 40 weeks were consecutively selected. They were in three groups: diabetes mellitus, gestational diabetes, and healthy mothers. They were examined by Doppler ultrasound of the uterine artery and the RI, PI, and PSV were recorded. The data were analyzed using analysis of variance (ANOVA and Kruskal-Wallis tests.

Results: There was no significant difference in terms of the uterine artery RI among the three studied groups (P> 0.05). There was a significant difference regarding PI among the three groups (P< 0.05). No significant difference existed with regard to PSV among the three studied groups (P> 0.05).

Conclusion: There was a difference regarding PI between mothers with diabetes mellitus and gestational diabetes, and healthy mothers.

Key words: Diabetes mellitus; gestational diabetes; uterine artery; Doppler ultrasound

Please cite this article as:. Farshchian N. et al. Comparison of the uterine artery Doppler indices during pregnancy between gestational diabetes and diabetes mellitus and healthy pregnant women. *World Family Medicine.* 2017; 15(9):32-35. DOI: 10.5742/MEWFM.2017.93098

Introduction

Diabetes mellitus (DM) is not a single disease; rather it is a group of metabolic derangements characterized by hyperglycemia. It is the result of defect in insulin secretion, insulin function, or a combination of these. Chronic hyperglycemia causes damage to various organs including eyes, kidneys, nervous system, and cardiovascular system. According to the latest guidelines of the American Diabetes Association (ADA), the diagnosis of DM is made by any of the following: one time glucose level of more than 200 mg/dL associated with classic symptoms (polydipsia, polyuria, and polyphagia); fasting plasma glucose of > 126 mg/dL (fasting is defined as not taking calories for at least 8 hours previously); hemoglobin A1C (HbA1C) of > 6.5%, or 2-hour 75-g oral glucose tolerance test (OGTT) of > 200 mg (1). Gestational diabetes is defined when hyperglycemia is detected for the first time during pregnancy (2). It occurs in about 3 to 10% of pregnancies and its cause is not well understood (3). In gestational diabetes, if fasting plasma glucose is more than 126 mg/dL or random plasma glucose is > 200 mg/dL, the diagnosis is made and no challenge test is required. In cases where that plasma glucose is lower than the mentioned thresholds, glucose challenge test is done (4, 5).

Early in pregnancy, diabetes can cause congenital malformations and raises the risk of abortion. It also has adverse effects on the fetal organs such as brain and heart (6-8). Plus, maternal diabetes can cause excessive growth of the fetus and macrosomia (9). Macrosomia can result in difficult labor and raises the likelihood of cesarean section requirement. In case of natural delivery, the risks of neonates' shoulder injury, hypoxia, and brain injury are increased (10-12).

Considering the risks of diabetes during pregnancy, this study was intended to examine the effect of diabetes on uterine artery circulation and compare this among three groups of mothers: DM, gestational diabetes, and normal healthy mothers. Here, we used Doppler ultrasound which is a non-aggressive method to study the uterine artery. This method has been shown to be able to predict pregnancy loss, increased rate of complications, and uterine perfusion disturbances (13). This study aimed to compare the uterine artery Doppler ultrasound indices among the three groups of mothers: DM, gestational diabetes, and normal healthy mothers.

Materials and Methods

In this analytic case-control study, 60 pregnant women were selected and included consecutively. They were within gestational age of 20 to 40 weeks. These presented to our medical center in 2016. According to laboratory tests performed, they were categorized as having DM, gestational diabetes, or being normal healthy mothers without hyperglycemia. The inclusion criteria were gestational age from 20 to 40 weeks, no intrauterine growth retardation, singleton pregnancy, no systemic background diseases such as hypertension, and not taking medications such as insulin. The gestational age was calculated according to the LMP. If the LMP was unreliable, the first ultrasound examination (in the first trimester) of the fetus was used to calculate the gestational age. Mothers in the DM group had the condition for less than 5 years, without vascular diseases, and their blood glucose was under control.

The uterine artery color Doppler ultrasound was done using Xmatrix iu22 (Philips) with CONVEX 3.5 to 5-MHz probe for the three groups. The location of the uterine artery after separating from the hypogastric artery and passing over external iliac vessels was marked and RI, PI, and PSV were measured. The three groups were matched regarding maternal as well as gestational age. In cases where the placenta was located right-hand or left-hand of the uterus, the nearest uterine artery was used for measurement of the indices. In cases where the uterus was located at the midline, the average of two measurements made at the right and left uterine arteries was recorded.

Data were expressed using descriptive indices including mean and SD (standard deviation). The data were analyzed using analysis of variance (ANOVA) and Kruskal-Wallis tests. All analyses were done using SPSS software (ver. 22.0, IBM, US). A P value of less than 0.05 was considered as statistically significant.

Results

There were 60 pregnant women. Each group contained 20 subjects. Table 1 presents demographic characteristics of the sample.

Table 1: Demographic characteristics of 60 pregnant women

	Diabetes mellitus	Gestational diabetes	Control healthy
Age, year	37.85 (±4.99)	35.55 (±3.63)	35.55 (±6.01)
Gestational age, week	31.7 (±3.64)	31.9 (±4.41)	32.45 (±3.34)

Data are presented as mean (±SD).

A significant difference was observed regarding the uterine artery PI among the three studied groups (P< 0.05). No difference was observed between DM and gestational diabetes regarding the uterine artery PI. However, uterine artery PI in the healthy control group was significantly lower compared to the DM and gestational diabetes groups (Table 2).

Table 2: Comparison of uterine artery PI (pulsatility index), RI (resistance index), and PSV (peak systolic velocity) among diabetes mellitus, gestational diabetes, and control groups

	Diabetes mellitus	Gestational diabetes	Control healthy	P value
RI	0.611 (±0.078)	0.591 (±0.087)	0.558 (±0.177)	0.4
PI	0.999 (±0.27)	0.975 (±0.3)	0.772 (±0.237)	0.03
PSV	85.45 (±24.17)	74.68 (±28.69)	96.49 (±39.95)	0.085

Data are presented as mean (±SD).

As seen in Table 2, the uterine artery RI did not reach a significant difference among the three groups. Likewise, PSV was comparable among the three groups (Table 2).

Discussion

During the first trimester, trophoblasts penetrate into the uterine arteries and cause dilation of the spiral vessels and increased uterine blood flow. In fact, the uterine blood flow increased from 50 cc per minute in non-pregnant women to 700 cc per min in pregnant mothers towards the end of the pregnancy. In addition, in a normal pregnancy, the uterine artery RI reduces in placental-fetal circulation (14). In a previous study, no difference was noted regarding Doppler ultrasound indices of the fetal spiral vessels and umbilical artery among DM, gestational diabetes, and healthy mothers (15). In agreement with what we observed here, a former study noted that 3D Doppler ultrasound did not show any difference between DM and gestational diabetes. However, all indices in diabetic mothers showed decreased values when compared to healthy mothers and fetal and uterine blood flow had significant associations with 3D Doppler indices (16). In contrast to our results, a previous study reported that although no difference was noted regarding mean values of PI of the uterine artery between pre-eclampsia and gestational diabetes, with worsening of gestational diabetes, the uterine artery PI values were higher in mothers whose pre-eclampsia became worse compared to those whose pre-eclampsia did not worsen. This discrepancy can be due to difference in study designs (17). In another study, PI of fetuses with macrosomia was significantly compared to normal fetuses (18). It has been shown that increased uterine artery impedance had significant association with vascular disorders before pregnancy. In women who delivered their neonates at earlier gestational ages, the uterine artery PI had increased significantly which is compatible with our study (19). The uterine artery waveforms and the systolic to diastolic blood pressure ratio did not show difference between the two groups (20). Although the mentioned studies have used the uterine artery Doppler indices in early diagnosis of uterine artery disturbances due to diabetes and have found it useful, the discrepancy in the results can be due to the number of patients studied and the examined vessel. For example, in a previous study, placental spiral arteries and umbilical artery were examined. However, here we examined the uterine artery. Based on the obtained findings, in absence of vascular disorders and control of hyperglycemia, uterine artery Doppler indices of mothers with DM and gestational diabetes are close to healthy mothers. Only uterine artery PI had a difference among the groups. But, RI and PSV were comparable among the three groups.

One of the limitations we had was the low sample size. Therefore, we recommend performing further studies with larger sample sizes. So far, no study has examined the uterine artery Doppler ultrasound of mothers with DM and gestational diabetes.

Conclusion

Mothers with DM and gestational diabetes have uterine artery RI and PSV values close to healthy mothers and no significant difference was observed. The only significant difference was PI of the uterine artery among the three groups.

Acknowledgement
This article is based on a thesis submitted to the graduate studies office in partial fulfillment of requirements for the degree of Radiology by Amir Masoud Jaafarnejhad in Kermanshah University of Medical Sciences, Faculty of Medicine. Financial support by the Research Council of Kermanshah University of Medical Sciences (Grant Number: 94211)

References

1. Kim JY, Farmer P, Mark DB, Martin GJ, Roden DM, Dunaif AE, Barbieri RL, Repke JT, Lau WC. Harrison's principles of internal medicine. Women's Health. 2008;39(5):24-39.
2. Fauci AS, Braunwald E, Kasper DL, Hauser SL, Longo DL, Jameson JL, et al. Harrisons principles of internal medicine, 17th ed. USA : McGraw-Hill Professional; 2008
3. Buchanan TA, Xiang A, Kjos SL, Watanabe R. What is gestational diabetes? Diabetes Care. 2007;30(12):105-111.
4. Delavary AR, Mahdavihazaveh AR, Norozinejad A, Aziziy F, Goya MM. Physician and diabetes. Ministry of Health and Medical Education: MarkazNashre Seda;2004.
5. Dornhorst A, Beard RW. Gestational diabetes: a challenge for the future. Diabetic medicine: a journal of the British Diabetic Association. 1993;10 (10):897-905.
6. De Veciana M, Major CA, Morgan MA, Asrat T, Toohey JS, Lien JM, et al. Postprandial versus preprandial blood glucose monitoring in women with gestational diabetes mellitus requiring insulin therapy. The New England Journal

of 1995;333(19):1237-41.
7. Schwartz R, Teramo KA. Effects of diabetic pregnancy on the fetus and newborn. Seminars in Perinatology.2000;24(2):120-35 Pedersen Jr. The pregnant diabetic and her newborn: problems and management: Archives of Disease in Childhood. 1968;43(229):391.
8. Haddad B, Uzan M, Tchobroutsky C, Uzan S, Papiernik-Berkhauer E. Predictive value of uterine Doppler waveform during pregnancies complicated by diabetes. Fetal diagnosis and therapy.1993;8(2):119-25.
9. Joffe GM, Esterlitz JR, Clemens JD, Ewell MG, SibaiBM,Catalano PM. The relationship between abnormal glucose tolerance and hypertensive disorders of pregnancy in healthy nulliparous women. Calcium for Preeclampsia Prevention (CPEP) Study Group. Am J Obstet Gynecol 1998;179:1032-1037.
10. Bryson CL, Ioannou GN, Rulyak SJ, Critchlow C. Association between gestational diabetes and pregnancy –induced hypertension. Am J Epidemiol 2003; 158: 1148-1153.
11. E Brashy A, Ibrahim M, Marzook A, Yousef D. Usefulness of aspirin therapy in high-risk pregnant women with abnormal uterine artery Doppler ultrasound at 14-16 weeks pregnancy: randomized controlled clinical trial. Croat Med J 2005;46(5):826-31.
12. Pilalis A, Souka AP, Antsaklis P, Basayiannis K, Benardis P, Haidopoulos D, et al. Screening for pre-eclampsia and small for gestational age fetuses at the 11-14 weeks scan by uterine artery Dopplers. ActaObstetGynecolScand 2007;86(5):530-4.
13. Bower S, Bewley S, Campbell S, Improved prediction of preeclampsia by two-stage screening of uterine arteries using the early diastolic notch and color Doppler imaging. ObstetGynecol 1993;82(1):78-83.
14. Rumack C.M.DIAGNOSTIC ULTRASOUND.4TH ed. Philadelphia, U.S.A; 2011,1475.
15. Rahmani Z , Borna1 S. A Study of Doppler ultrasound indices of spiral placental and umbilical arteries in pregnant women with singleton Pregnancy suffering type -1 diabetes mellitus, gestational diabetes and normal pregnant women., J. Appl. Environ. Biol. Sci.2015;5(10S)436-440.
16. Suranyi A, Kozinszky Z, Molnar A, Nyari T, Bito T, Pal A. Placental three-dimensional power Doppler indices in mid-pregnancy and late pregnancy complicated by gestational diabetes mellitus. Prenatal diagnosis.2013;33(10):952-8.
17. Savvidou M, Syngelaki A, Balakitsas N, Panaiotova E, Nicolaides K. First-trimester uterine artery Doppler examination in pregnancies complicated by gestational diabetes mellitus with or without pre-eclampsia. Ultrasound in Obstetrics and Gynecology.2013;42(5):525-9
Pietryga M, Brazert J, Wender-Ozegowska E, Dubiel M, Gudmundsson S. Placental Doppler velocimetry in gestational diabetes mellitus. JPerinatMed 2006;34:108-110.
19. Pietryga M, Brazert J, Wender-Ozegowska E, Biczysko R, Dubiel M, Gudmundsson S. Abnormal uterine Doppler is related to vasculopathy in pregestational diabetes mellitus. Circulation.2005; 112(16):2496-500.
20. Gao M, Doppler velocimetry measurement in pregnancy complicated with diabetes mellitus. Zhonghua fu Chan ke za zhi. 1992; 27(6):362-4, 80-1.

Survey on single dose Gentamicin in treatment of UTI in children from 1 month to 13 years in Jahrom during 2015

Ehsan Rahmanian (1)
Farideh Mogharab (2)
Vahid Mogharab (1)

(1) Department of Pediatrics, Jahrom University of Medical Sciences, Jahrom, Iran
(2) Research Center, Department of Obstetrics and Gynecology, Jahrom University of Medical Sciences, Jahrom, Iran.

Corresponding author:
Vahid Mogharab,
Department of Pediatrics, Jahrom University of medical sciences,
Jahrom, Iran
Tel: +989171912400
Email: mogharabvahid@yahoo.com

Abstract

Introduction: After upper respiratory tract infection (URTI), the second cause of infections in children is urinary tract infections (UTI). About 3 to 5 percent of girls and 1 percent of boys have suffered from UTI. Gentamicin injection, three times a day is the treatment for UTI. One of the most serious problems of treatment with gentamicin is its multiple use and its associated complications. The aim of this study was evaluation of treatment of UTI with a single dose of gentamicin first as 3 mg / kg daily IV and after urine culture becomes negative on the second day of treatment 1mg / kg daily IM in children with from 1 month to 13 years in Jahrom during 2015.

Methods: This was a randomized clinical trial study performed on 64 children aged 1 month to 13 years who were randomly divided to case and control groups. All of the children had suffered from UTI. Urine culture was used for detection of pathogens. Data such as sex, age, fever, leukocytosis and treatment complications were gathered and analyzed. After treatment the patient was followed up for 6 weeks for detection of recurrence.

Results: Age: 78.12% of control of the case group and 87.5% of case group were under 6 years old. 68.75% of the control group and 75% of the case group were female. The prevalence of E.coli in the control group was 71.87% and in the case group was 75% which had the most prevalence in both groups. Response to the treatment in the control group was 93.75% and in the case group was 96.87%. Recurrence of disease in the control group was 28.14% and in the case group was 25%. Ototoxicity (decrease 15 db-) was not observed in patients, but data showed that 3.12% of control group suffered from nephrotoxicity(increased Cr twice) , although this percent was 0 in the case group. In regard to response to the treatment, recurrence of disease, and complications of treatment, no significant differences were observed ($P>0.05$).

Conclusions: Data showed no significant differences in response to the treatment and its complications between the two studied groups. Because of pain tolerance of injection and use of low dose, cost beneficence for parents and hospital, low use of syringe, lack of personnel and nurses, prevention of hospital admissions, and decreasing of complications associated with multiple use of gentamicin injection, it is recommended to use of single dose a gentamicin for treating UTI.

Key words: Urinary tract infection, Single dose treatment, Gentamicin, E.coli.

Please cite this article as:. Rahmanian E. et al. Survey on single dose Gentamicin in treatment of UTI in children from 1 month to 13 years in Jahrom during 2015. *World Family Medicine*. 2017; 15(9):36-42. DOI: 10.5742/MEWFM.2017.93099

Introduction

Urinary tract infection (UTI) is the second most common cause of infection in children after upper respiratory tract infections [1], as it affects 3-5% of girls and 1% of boys [2]. The most common age of UTI is under 5 in girls and under 1 in uncircumcised boys [2]. The ratio of afflicted boys to afflicted girls is 2.5-8.4:1 in the first year of life and 10:1 after the age of one [2]. Its most prevalent pathogen in girls is E. coli (75-90%), followed by klesiella and then proteus, whereas proteus may be as common as E. coli in boys aged over 1 [2]. The key point in most cases of UTIs is timely diagnosis and proper treatment. In the current situation were resistant species of gram-negative bacteria are expanding, aminoglycosides, including gentamicin, are still considered among the strong and effective drugs for the treatment of UTIs [3]. It is noteworthy that the use of aminoglycosides can lead to nephrotoxicity and also auto toxicity (renal and hearing poisoning). Therefore, doctors try to reduce the odds of these poisonings by prescribing the right amount of medicines. Accordingly, they either increase the intervals between drug administrations or decrease their dosage [4]. Aminoglycosides are usually administered to children and infants two or three times a day. One of the major problems with taking these drugs is the frequency of injections which may cause problems such as pain tolerance (for children and infants) and a waste of time and money (for their parents) [5]. On the other hand, the reluctance of the patient or their parents to be hospitalized and lack of access to facilities make doctors apply outpatient treatments. In this case, fewer injections definitely further satisfy the patient and their parents. Recent studies in adults have shown that taking aminoglycosides once a day maximizes antibacterial activity and minimizes their toxicity [6, 7, 8]. However, a few studies have been conducted on children and infants in this regard and most of them have recommended further studies to be conducted on this population [9]. In a review of 24 studies about different aminoglycosides, it was concluded that although the use of aminoglycosides in a single dose is recommended in children, more studies are needed to prove its usefulness [10]. In another study on three comprehensive studies, it was recommended that although a single dose of aminoglycosides is useful in the treatment of UTIs, more studies should be conducted on children because patients are genetically different, they respond to the drug differently, and the dosage of medications varies from 3 to 7 mg per kilogram of body weight [11]. In other research conducted by Chong et al. in Singapore, 210 patients were studied in a randomized controlled trial. The patients, whose age ranged between one month and 13 years, were randomly divided into two groups. The first group received 5 mg of gentamicin per kilogram of body weight in a single dose and the second group was treated with 6 mg of gentamicin per kilogram of body weight in three days. Their results showed that there is no significant difference between the two groups in terms of treatment duration, medicine discontinuation at night, age, nephrotoxicity, and auto toxicity [6]. In a cohort study in 2011, 79 patients aged between one month and 16 years were divided into two groups and treated with 7 mg per kg of gentamicin in a single dose over three days. The results indicated that the single dose administration led to the non-prevalent and reversible nephrotoxicity and affliction of only one patient, and more prevalence of auto toxicity (2 patients were afflicted) [12]. In another study conducted in 2011 in Australia, 179 children aged between one month and 12 years were divided into two groups and treated with 5-7 mg per kg of gentamicin in a single dose and in three days. At the end of the trial, both groups responded to the treatment and no case of nephrotoxicity or auto toxicity was observed [5]. In another study, 49 children aged between 6 months and 12 years were randomly divided into two groups and treated with 4.5 mg per kg of gentamicin in a single dose and three doses. In the single dose group, the fever of patients was discontinued earlier and the result of the urine culture test was negative in patients of both groups in the first 48 hours. In the three doses group, nephrotoxicity was more prevalent and it was concluded that the single-dose administration of gentamicin is safer, more useful, and more economical [13]. Although UTI is the second most common cause of infection in children after upper respiratory tract infections [1], its prevalence is higher in children aged under 5 [2]. Multiple injections in a day may cause problems such as pain tolerance (for children and infants) and waste of time and money (for their parents) [5], and the single-dose administration is more appropriate in most cases. The effectiveness of this method should be proven by conducting more studies [11, 12, 13]. Several important differences were the trigger for the conducting of this study: a) genetic differences between patients [11], b) differences of patients in response to gentamicin in numerous studies [11], c) difference in the dose of gentamicin in various studies (4-7 mg per kg of body weight) [10, 11, 14], d) scarcity of studies on children unlike those conducted on adults [10, 11, 14], and e) gentamicin is usually administered to patients of the control and test groups at a concentration of 4-7 mg per kg of body weight in a single or multiple doses. In the present study, subjects of the control group intravenously (IV) received gentamicin at 3 mg per kg of body weight three times a day [2]. In the test group, the subjects were firstly treated with 3 mg gentamicin per kg of body weight in a single dose (IV) and then received it intramuscularly (IM) after a negative urine culture on the second or third day of treatment at 1 mg per kg of body weight. This indicates a significant difference between the present study and other previous ones in terms of dosage and injection method, because the subjects were studied in an outpatient manner rather than the inpatient manner after a negative urine culture.

Methods

This study was a clinical-controlled trial and according to previous studies, the sample size of 64 pediatric patients with UTIs admitted in the pediatric ward at Motahhari Hospital, selected by pediatric specialist diagnosis, were entered into the study. In the implementation of the project, the consent of the parents of the child was taken and the plan was implemented in compliance with all the ethical

regulations required in the research. The name and identity of the individuals remained confidential. No costs were received for urinalysis, audiometry and sonography examination. The criteria for entering the study included: children aged 1 month to 13 years with UTIs and exit criteria from the study included: age less than one month and over 13 years, renal failure before treatment, hearing impairment before starting treatment, taking Aminoglycoside before the onset of treatment, allergy to aminoglycosides, co-administration of another nephrotoxic drug, and urinary obstruction. Children admitted to the pediatric ward of Motahhari Hospital, who were admitted with UTI diagnosis of the pediatrician, were randomly divided into two groups of test and control, after permission from the parents of the patients. The criterion for diagnosis of UTI is positive urine culture which in case of using a urine bag, at least two positive identical urine culture with an organism of more than 105 colonies and, if using mid-urine culture sample, at least one positive cultures with an organism more than 105 and if using a catheter, the existence of at least 103 colonies of an organism was considered a UTI. At the time of sampling, all the necessary notes were given to the patient companion for a safe and sterile sampling (such as cleaning the urethra before sampling, closing the door of the sample vessels and quickly transferring to the laboratory, etc.). Samples were cultured in EMB and blood agar environments, and TSI, Citrate tests were used for diagnosis of bacteria.

The results of the samples were in three forms:
A. Examples which were negative and excluded.
B. Samples which were mixed growth, and were mixed growth after the repeat testing again, were discarded from the study.
C. Samples that were positive after 2 times urine culture, were included in the study.

Urine culture was also repeated 48 hours after treatment, and in the absence of negative culture after 48 hours of treatment, were considered as not responding to treatment and were excluded, and the treatment continued on the basis of standard treatment. At the end of the treatment, urine culture was repeated as well.

Before the start of the treatment, PTA auditory tests and kidney function tests (Bun, Cr) and electrolytes (Na, K) and CBC and sonography of the urinary tract were performed for all patients. In the case of abnormal kidney function tests and abnormal urinary tract sonography or the presence of abnormalities in the auditory system, the patients were excluded from the study. During and after treatment, renal function tests were performed which, when doubling, serum creatinine was considered as nephrotoxicity. At the end of the treatment, once again, the patient was tested for auditory examination, which was considered as an auto-toxicity in the case of a reduction of 15 dB S.N.HL. After the treatment, patients were followed up for 6 weeks, and again in case of having urine symptoms or any fever or illness, the urine culture was sent, and if the culture was positive, the same type of bacterium was considered as a relapse of the disease. The samples were collected and cultivated from the beginning of the year 2015 to the end of the year (March) and the type of bacterium causing infection was determined by microbiological methods. The data was analyzed by SPSS software version 11 after entering Excel.

Results

According to the results, 25 (78.12%) of the control group and 28 (87.5%) of the case group were in the age group of below than 6 years. In terms of diagnosis of UTI, E. coli formed the majority of responsible organisms in both groups (71.77% in the control group and 75% in the case group), and Proteus in the control group and Klebsiella in the case group were in the next order (Table 1). The most common finding in both groups was an increase in the number of white blood cells. Para clinical results showed that in the control group, 14 people (43.75%) in the case group, and 16 (50%) in the control group had leukocytosis more than 10000 (Table 2). In terms of the bacteriological response, 2 cases from the control group and 1 patient from the case group were resistant to treatment. In all 3 cases, the urinary culture was not negative after 48 hours. Comparison of the data showed that the response to treatment is more in the case group (OR = 0.48, P = 0.036) (Table 3). In both groups, 3 patients had creatinine increase, were this value exceeded basal levels only in one person (3.12%) from the control group, which was considered as nephrotoxicity. However, the post-treatment retest showed creatinine return to basal counts in all 6 cases, and none of the subjects in the case and control groups had a hearing loss greater than 15db, therefore auto toxicity was observed in none of the two groups (Table 4). Of the control group, 9 (28.12%) and 8 subjects (25%) from the case group experienced bacteriological recurrences in a 6-week follow-up (Table 5). Chi-square and Fisher exact tests did not show a significant difference between the two groups in terms of response to treatment and complications from treatment and illness relapse (p> 0.05).

Discussion

Several studies have been carried out on the use of gentamicin in the treatment of UTIs and other infections. Gentamicin is one of the bactericide antibiotics from the aminoglycoside group. This antibiotic is condensed in the kidney parenchyma, and its effects remain in the kidney and urine long after it is cleared from the serum. More than 25 different studies have been conducted on the use of effective values of gentamicin and the modification of how to use 3 times a day (15-16). These studies are both in adult UTIs and in UTIs in children, infants, hospitals, and others (17-19). It is very difficult to compare the results of studies with each other regarding single-dose therapy since the selection of patients in different studies has been carried out in different ways (20-21). Some studies have investigated the effect of single-dose therapy on the first UTI and some on frequent UTIs (22-25). Others have considered both upper and lower infections (26),

Table 1: Frequency distribution of urine culture results in case and control groups

P-value	Case		Control		
	Relative	Absolute	Relative	Absolute	Frequency / Bacterium
0.316	75%	24	71.87%	23	Escherichia coli
	9.37%	3	15.62%	5	Proteus
	12.5%	4	6.25%	2	Klebsiella
	3.12%	1	6.25%	2	Other cases
	100%	32	100%	32	Total

Table 2: Frequency distribution of leukocytosis in both case and control groups

OR	P-value	Case		Control			
		Relative	Absolute	Relative	Absolute	Frequency / Bacterium	
1.28	0.616	50%	16	43.75%	14	Yes	Leukocytosis WBC > 10000
		50%	16	56.25%	18	No	

Table 3: Frequency distribution of response and non-response to treatment (negative urine culture after 48 hours of treatment)

OR	P-value	Case		Control			
		Relative	Absolute	Relative	Absolute	Frequency / Measured variable	
0.48	0.036	3.12%	1	6.25%	2	No	Response to treatment
		96.87%	31	93.75%	30	Yes	

Table 4: Frequency distribution of treatment-related complications

OR	P-value	Case		Control			
		Relative	Absolute	Relative	Absolute	Frequency / Treatment complications	
0.32	0.494	0	0	3.12%	1	Yes	Nephrotoxicity
		100%	32	96.88%	31	No	
1	0.506	0	0	0	0	Yes	Auto toxicity
		100%	32	100%	32	No	

Table 5: Frequency distribution of disease recurrence after 6 weeks

OR	P-value	Case		Control			
		Relative	Absolute	Relative	Absolute	Frequency / Measured variable	
0.851	0.042	3.12%	8	28.12%	9	Yes	Disease recurrence
		96.87%	24	71.88%	23	No	

and in some other studies, the first infection and recurrent infections have been studied together (27-28). In one study, the radiological examination of the urinary system was part of the protocol, but people with an abnormal urinary system were not excluded (26). The results of this study and other studies have shown the good and successful effect of daily infusion, along with less renal and ear toxic effects. Due to the prolonged effects of gentamicin in urine and kidneys, and its bactericidal effects depending on concentration, some studies have shown that low and sequential concentrations produce adaptive resistance in germs and the use of higher concentrations at longer intervals produce higher concentrations in the urine and kidneys, and have better effects in eliminating the organism and reducing the chances of resistance (29, 16, and 30-31). Another important effect of this prescription is the reduction of patient and personnel costs (32). The results of this study showed that single-dose gentamicin treatment did not differ in terms of response to treatment and the complications of treatment and relapse of the disease by repeated dose therapy and could be used as a safe and cost-effective treatment. The response to treatment, which was defined as a culture being negative after 48 hours of onset of treatment, was found in 93.55% of the control group and 96.87% of the case group. Chi-square test did not show any significant difference (P = 0.5). These results are comparable to the results of Wigano, which has observed 100% and 99% in the two groups of treatment responses (33). The results of Caraptise also showed a 97% response in the case group and 98% in the control group (34). Keren's studies also showed a 100% improvement in microbiology in the daily single-dose group and 92% in the multiple daily dosing groups (35). Complications due to treatment including nephrotoxicity (duplication of creatinine) and auto toxicity (more than 15 dB of hearing loss) also did not show any difference between the case and control groups. Studies have shown that there are many consequences for treatment complications. One of the problems found in these patients was a 30% increase in baseline creatinine, which included 3 cases in each group, but only in one case in the control group of these 6 cases, the creatinine had a doubling in increase compared to baseline creatinine, and creatinine test repeat in each of the six cases reported returned to baseline values. Wigano reported creatinine increase in 3% of patients in both groups, and reported no auditory toxicity in patients of both groups, both of the results were consistent with the above study (33). Caraptise also observed this in less than 2% of patients (34). Other studies also had similar results (27 and 37). In a study by Chong on 210 patients aged between one month and 13 years, there was no difference in response to treatment and complications from treatment. The difference between the study by Chong and the above study was that in this study, auto toxicity was defined as a hearing loss of more than 30db. However, the results of this study did not differ from the present study and other studies that considered auto toxicity as a reduction of 15-20 db (37-41). In the Emma study, the results such as response to treatment and recurrence of disease and nephrotoxicity, were in agreement with the present study, but in the Emma study, the auto toxicity rate was higher in single dose patients, which was different from the above study (42). Another variable that was studied in the present study was the measurement of recurrence rate in a 6-week follow-up, which was defined as urine culture being positive again in this 6-week period and observed in 28.12% of the control group and in 25% of the case group. According to Kallenius studies, the success rate of single-dose treatment was 100% and the probability of returning in the follow-up of 8 weeks was 52%, which was not significantly different from the present study in terms of response to treatment, but in terms of relapse, the results of these two studies are different (23). According to Khan studies, the success rate of single-dose treatment was 100% and the likelihood of returning infection in a 12-week follow-up was 67%, which was consistent with the response to the treatment of above study. However, it was different with the above study in terms of illness return, which, of course, the reason for the difference could be explained by the fact that the cause of a large reversal of the disease in the Khan study was the examination of patients with recurrent UTIs (24). In a study by Wallen, which assessed a single-dose of aminoglycoside called amikacin on UTIs, the probability of success of a single-dose treatment was 92.3% and the infection return probability was 26%, which is far closer to the results of the above-mentioned study (43). The meta-analysis study carried out by Barza et al. in 1996 also confirms the results of the above study, and even this study indicates a low nephrotoxicity in the single-dose group, and therefore recommends single-dose treatment (44). In a study by Labovitz in 1972 with the aim of investigating the effect of a single dose of gentamicin on UTI, it was also stated that there was no statistically significant difference between the two treatment groups in terms of response to treatment. This study also confirms the results of the above study in terms of auto toxicity but the difference is that in this study, Gentamicin auditory complication has been investigated with vestibular function through clinical examination, which does not seem to be accurate (45). A study by Dr. Hossein Fallahzadeh et al. confirmed the above study in terms of response to treatment and relapse of the disease and nephrotoxicity, because there was no difference between the two treatment groups in this study (P <0.36). The difference between the two studies were that in the study of Dr. Fallahzadeh, the effects on hearing of gentamicin were not investigated (25). In a study conducted by Dr. Shams Vazirian et al., there was no significant difference between the two groups in terms of response to treatment, recurrence and Oscars (P<0.5). This study also agreed with the results of the study. The difference between the two studies were that in the above study, patients were not evaluated for Oscar creation, and Gentamicin's hearing impairment was not evaluated in Dr. Vazirian's study (46). In a study done by Dr. Shakiba et al. in 2000 on 82 patients, there was no difference in response to treatment and the complications of treatment between the two treatment groups. The difference was that in this study, the auto-toxicity was investigated only based on clinical symptoms indicating auditory complications, which were not sufficient (47). The results of the study done by Dr. Honarpisheh et al. in 2006 on 30 patients also agreed with the results of

the above studies regarding the response to treatment and nephrotoxicity, but the objection in this study was that the response to treatment was considered as the cessation of fever which did not seem to be adequate, and the other difference that this study had with the present study was that the hearing impairment of gentamicin was not studied (48). This study was in agreement with the study by Dr. Emam Ghoreishi et al regarding the response to treatment, but it was opposed for nephrotoxicity, because in the study of Emam Ghoreishi, the rate of nephrotoxicity was higher in the single dose group (49).

Conclusion

The final result is that there are no significant differences between the two standard treatment groups and once daily gentamicin treatment in terms of therapeutic response, renal and auditory complications, and recurrence of the disease, and this method can be used as a cost-effective, effective and low complication method.

Recommendations

It is suggested that interventional factors such as demographic information, mother's education, the economic, social and family background and the underlying illnesses of child and the status of the children immune system should be taken into account when conducting research on the treatment of UTIs in children.

References

1. Bonadio W.Evauluation and management of scion huctvid in infection in the febrile young infant 1990, 12:905 -12.
2. Nelson text book of ped. 19th Edition 2011; 1829-34.
3. Charnbers H.F, the aminoglycosides, in : Goodmans and Gilman's textbook of pharmacology : 2001: 198-205.
4. Keren E,Leonards Raul R. Gentamicin once – daily versus three-daily in children. J Antimicrob chemotherapy 1995; 35: 327-32.
5. Carapetis JR, Annel, Randomized controlled trial comparing once- daily and three times daily gentamicin in children with UTI. Pediatric infect.nis J 2001;20:240-6
6. Chong Cy Tan ASL treatment of urinary tract infection with gentamicin once or three times daily . Alta pediatric 2003; 92:291-6.

Were WM.Nathoo KJ. Once versus three daily intramuscular gentamicin in children with systemic infection central AGr J med 1991;43:63-7.

8. Nespina G. Nikos N. Extended – Interval aminoglycoside - adminstration for children ; A meta- analysis ; 2004; 114: e111-e117.
9. Nespina G.Jahn PA-Extended Interval aminoglycoside in children" More guidance is needed . Pediatric 2005; 115(3): 827-8.
10. Contopoulos – Ioannidis DG, Giotis ND, Balisatsa DV. et al. Extended-interval aminoglycoside administration for children: a meta-analysis. Pediatrics 2004; 114: 111-18.
11. Freeman CD, Nicolau DP, Belliveau PP, Nightingale CH.. Once-daily dosing of aminoglycosides: review and recommendations for clinical practice. Journal of Antimicrobial chemotherapy. 1997;39:677-686.
12. Emma J., Gazarian, Madlen, Cohn, Richard Wilkinson, Monica. Once-daily gentamicin in infants and children: a prospective cohort study evaluating safety and the role of therapeutic drug monitoring in minimizing toxicity. Ped infect Diseases J. 2011; 30 (10): 827-832.
13. Tapaneya-Olarn C, Tapaneya-Olarn W, Pitayamornwong V, Petchthong T, Tangnararatchakit K.. Single daily dose of gentamicin in the treatment of pediatric urinary tract infection. J Med Assoc. Thai. 1999 Nov; 82 Suppl 2:5 93-1.
14. M Shahid . R Cooke .is a once daily dose of gentamicin safe and effective in the treatment of UTI in infants and children. Arch Disease child. Sep 2007; 92(9):823-824.
15. Puljevic D, Gasparovic V. Effectiveness and adverse effects of single dose gentamicin versus twice daily administration. Lijec Vjesn.1995; 117(1-2): 33-38.
16. Kasper GJ, Teunissen PC, Holl H. Gentamicin administration in newborn: once daily. Ned Tijdsahr Geneeskd. 1998; 142(11): 583-586.
17. Nordstrom L, Ringber GH, Cronberg S. Dose administration of an aminoglycoside in a single daily affect its efficacy and toxicity? J Antimicrob Chemother. 1990; 25(1): 159-173.
18. Kaye D. The effect of water diuresis on spread of bacteria through the urinary tract. J Infect. Dis. 1971; 124: 297-305.
19. LeBrun M, Grenier L, Gourde P. Effectiveness and toxicity of gentamicin in an experimental model of pyelonephritis: Effect of the time of administration. Antimicrob Agents Chemother. 1999; 43(5): 1020-1026.
20. Ronald AR , Boutros P , Mourtada H : Bacteria localization and response to single dose therapy in women. JAMA 1976 ; 235(17) : 1854 – 6
21. Shapiro AR , Wald ER : single dose amoxicillin treatment of urinary tract infections J pediatr 1981 ; 99(6) : 989 – 92
22. Patti J, Pamela D. Once versus twice-daily gentamicin dosing in neonates ³ 34 weeks' gestation: cost–effectiveness analyses. Pediatrics 1999; 103: 594-8
23. Kallenius G . Winberg J : Urinary tract infections treated with single dose therapy in woman. JAMA 1976 ; 235(17) : 1854 – 6
24. Khan AJ , Kumar K , Evans HE : Single dose gentamicin therapy of recurrent urinary tract infection in patients with normal urinary tract . J peditr. 1987 ; 110(1) : 131 – 5
25. Falahzadeh H, Asadollah H. Single-treatment treatment of recurrent urinary tract infections with gentamicin in patients with normal urinary tract. Iranian journal of pediatric.2003;13(49): 22-28.
26. Avner ED , Ingelfinger JT , Herrin JT et al : Single dose amoxicillin therapy of uncomplicated pediatric urinary tract infections. J pediatr . 1983; 102(4) : 623 – 7
27. Calvo RC, Gracia DB. Once daily gentamicin dosing versus thrice-daily dosing in infant with a pyelonephritis. An Pediatric (Bex) 2003; 58:228-31.
28. Nolan T, Lubiz L : Single dose trimethoprim for urinary tract infection . Arch dis child , 1989 ; 64(4) : 581 – 6

29. Deamer RL, Dial LK. The evolution of aminoglycoside therapy: a single daily dose. Am Fam Phys 1996; 45 111-8
30. Despina G. Nikos D. Extended-interval aminoglycoside administration for children: A meta- analysis 2004: 114: e111-e117.
31. Despina G. John PA. Extended-interval aminoglycosides in children: More guidance is needed. Pediatric 2005; 115 (3): 827-8.
32. Thureen PJ, Reiter PD, Greores A, Once versus twice daily gentamicin dosing in newborn > 34weeks gestation: cost- effectiveness analysis. Pediatrics. 1999; 103(3): 594-8.
33. Vigano A, Pricipi N. Comparison of 5mg/kg of gentamicin of BW once daily VS 2 mg/kg thrice daily for treatment of gram-negative pyelonephritis in children. Antimicrob Agents Chemother 1992; 36 (7): 1499-503.
34. Charnbers HF. The aminoglycosides. In: Goodmen Guilman's Textbook of Pharmacology 2001:198-205.
35. Keren E, Leonard S, Raul R. Gentamicin once-daily versus thrice-daily in children. J Antimicrob Chemother 1995; 35: 327-32.
36. Chong CY, Tan ASL. Treatment of urinary tract infection with gentamicin once or three times daily. Acta Pediator 2003; 92:291-6.
37. Bass KD, Larkin SE, Paap C, Hasse GM. Pharmacokinetics of once-daily gentamicin dosing in pediatric patients. J Pediatr Surg 7-1104:33:1998
38. Miron D. Once daily dosing of gentamicin in infants and children. Pediatr Infect Dis J. 2001; 10: 1169–73
39. Elhanan K, Siplovich L, Raz R. Gentamicin once-daily versus thrice-daily in children. Antimicrob Agents Chemother 1995; 35: 32-327.
40. Tomlinson RJ, Ronghe M, Goodbourne C, Price C, Lilleyman JS,Das S, et al. Once daily ceftriaxone and gentamicin for the treatment of febrile neutropenia. Arch Dis Child 1999; 80: 125–31
41. Carapetis J, Annel, Randomized trial comparing once–daily and three times daily gentamicin in children with UTI. Pediatr Infect Dis J 2001; 20:240-6.
42. Best , Emma J , et al. Once-daily gentamicin in infants and children: a prospective cohort study evaluating safety and the role of therapeutic drug monitoring in minimizing toxicity Ped. Inf Disease jJ . 2011 ; 30 (10) : 827 – 832
43. Wallen L , Zeller P : Single dose amikacin treatment of first childhood E.Coli lower urinary tract infection. J pediatr 1983 ; 103(2) : 316 – 9
44. Lobovitz E, Matthew E, Single dose daily gentamicin therapy in urinary tract infection . Antimicrobial agents and chemotherapy 1974; 6:465-470
45. Barza M , Pa lannidis J , et al., Single or multiple daily doses of aminoglycosides: a meta-analysis. BMJ. 1996 Feb 10; 312(7027): 338–345.
46. Vazirian SH, Mohammad Jafari H, Mohammad Nezhad M, Nikibakhsh AL. The effect of intravenous gentamicin once daily administration on the treatment of urinary tract infections in children. Jundishapur Sci Med J. 1999;7(1):119-120.
47. Shakiba M. Treatment of pediatric febrile urinary tract infection by single daily dose of gentamicin. JSSU. 2000; 8 (2) :31-35
48. Honarpisheh A, Sharif M R, Sharif A R, Mousavi S G A. A comparison of gentamycin effect administered in divided and single doses in treatment of urinary tract infections. Feyz. 2009; 12 (4) :34-37
49. Emam Ghoreishi F, Oji M, Kohan Teb J, Tanideh N. Effect of gentamicin injection in one day in treating urinary tract infections in rats. HMJ. 2005; 9 (2) :12-30

Evaluation of control of bleeding by electro cauterization of bleeding points of amplatz-sheath tract after percutaneous nephrolithotomy (PCNL) in Jahrom Peymanieh hospital during year 2015-2016

Ali Reza Yousefi
Reza Inaloo

Department of Urology, Jahrom University of Medical Sciences, Jahrom, Iran

Corresponding author:
Reza Inaloo,
Department of Urology, Jahrom University of medical sciences,
Jahrom, Iran
Tel: +989173130056
Email: rezainaloo@yahoo.com

Abstract

Introduction: Complications frequently related to percutaneous renal surgery include renal hemorrhage, perforation of the collecting system, urinary tract infection, and injury to adjacent organs. Renal hemorrhage is the most common and worrisome complication after PCNL. In an effort to reduce postoperative hemorrhage after completion of percutaneous renal surgery, we cauterized the bleeding points over the access tract.

Material & Methods: This cross sectional study was carried out on the 85 patients who underwent PCNL between March 2015 and March 2016 in Jahrom Peymanie hospital using census sampling method. Electro cauterization of bleeding points after operation was performed for the participants. Patient's data was collected with a research made questionnaire including clinical and diagnosis characteristics. Data was recorded by Statistics Software (SPSS, Edition14) using chi-square test and Student's t-test.

Results: From 85 patients 58 patients (68.2%) were male and 27 patients (31.8%) were female. The patients age ranged from 20 to 82 years old. The stone size range was from 10 to 35mm. 15 patients had stones located in upper pole, 20 patients had stones located in pelvis and midpole of the kidney, 13 patients had stones located in the lower pole and 37 patients had multiple staghorn stone. The mean hemoglobin (Hb) concentration before operation was 14±0.5 mg/dL while it was 14±0.2 mg/dL after operation. There was no statistically significant correlation between hemoglobin level before and after operation (P>0.05).

Conclusion: Electro cauterization of bleeding points with an electrode probe after percutaneous surgery decreased morbidity. It is an effective and safe procedure and should be considered an option in percutaneous renal surgery.

Key words: bleeding, electro cauterization, percutaneous nephrolithotomy

Please cite this article as: Ali Reza Yousefi, Reza Inaloo. Evaluation of control of bleeding by electro cauterization of bleeding points of amplatz-sheath tract after percutaneous nephrolithotomy (PCNL) in Jahrom Peymanieh hospital during year 2015-2016. *World Family Medicine*. 2017; 15(9):43-47. DOI 10.5742/MEWFM.2017.93100

Introduction

Nephrolithiasis is a common clinical disorder affecting up to 5% of the general population in the USA (l). The prevalence of renal stone disease has been rising in both sexes, being estimated that about 5% of American women and l2% of men will develop a kidney stone at some time in their life (2). Nevertheless, in certain areas of the world, as in the Middle East, the lifetime risk appears to be even higher (3). There has been heightened awareness of renal stone disease in children as well (4). Recurrence rates of 50% after l0 years and 75% after 20 years have been reported (5, 6). Clinical manifestations are characterized by lumbar pain of sudden onset (the location of pain depends on the location of stone in the urinary tract) that may be accompanied by nausea and vomiting, gross or microscopic hematuria Diagnosis of renal stone in the acute setting is beyond the scope of the present update but in brief, is represented by urinalysis and imaging. Urinalysis often reveals hematuria but the latter is absent in approximately 9% of cases (7). Crystal Luria is occasional and the presence of leucocyturia may suggest associated urinary tract infection. Unenhanced helical computed tomography (CT) scan, the most sensitive and specific radiographic test (8, 9), is becoming the diagnostic procedure of choice to confirm the presence of kidney stone and especially of ureteral stones (10). However, high doses of radiation and elevated costs must be considered (11). Since renal ultrasound (US) provides information about obstruction (12) but may miss ureteral stones, the association of US with conventional abdominal X-ray may help (13). Renal colic must be differentiated from musculoskeletal pain, herpes zoster, pyelonephritis, appendicitis, diverticulitis, acute cholecystitis, gynecologic disease, ureteral stricture or obstruction due to blood clot, polycystic kidney disease. Stone formation usually results from an imbalance between factors that promote urinary crystallization, and those that inhibit crystal formation and growth (14). The main determinants of calcium oxalate (CaOx) super saturation are oxalate and calcium concentration, while the latter associated to urinary pH determines calcium phosphate super saturation. Urinary pH itself is the main determinant of uric acid super saturation (l4).

Material and Methods

Sampling & data collection & statistical analysis:
In a cross sectional study we reviewed the old charts of all patients in whom cauterization of bleeding points of access tract was performed after percutaneous nephrolithotomy (PCNL). We prepared a questionnaire including questions about age, sex, size and location of stone, mean hemoglobin level before and after operation, hemoglobin drop after operation, stone free rate, operating time, length of postoperative hospital stay, postoperative urinary tract infection rate, and blood transfusion rate, presence of per renal hematoma or urinoma. Per renal hematoma or urinoma was detected by KUB sonography the day after PCNL. Stone free patient was defined as those who had no stone or stone smaller than 4mm one week after PCNL. All patients who underwent PCNL between March 2015 and March 2016 in Jahrom Peymanie hospital and who had Electro cauterization of bleeding points after operation was performed participated in this study using census sampling method. Finally 85 patients were elected to participate in this study. Data was recorded by SPSS program using chi-square test and Student's t-test. The most important difficulty in this study especially in data collection is that sometimes the charts of the patients were not complete and we needed to call them.

Operation method:
All the patients underwent regional spinal anesthesia. Renal access was obtained under Fluoroscope guidance with an 18-guage needle and a 0.038 J-tip guide wire after retrograde placement of a SF or 6F ureteral occlusion balloon catheter cystoscopically. The access tract was dilated with metal coaxial dilators to allow for the passage of a 30F-working sheath. The pneumatic lithotripter was used for lithotripsy. After completion of stone extraction, a 6F double-J catheter was inserted in ante grade fashion after withdrawal of the occlusion balloon catheter. The bleeding points were cauterized with an elongated electrode probe connected to the hand piece of a conventional electric cauterizing device. The probe touched the bleeding points gently and cauterized them for a few seconds, as one would in transurethral surgery.

The bleeding points were usually located just beneath the collecting system torn by manipulation of instruments and beneath the urothelium where the access tract entered the collecting system. Most bleeding ceased after cauterization but some did not. To avoid adjacent organ or renal pedicle injury, we never cauterized the bleeding point for too long or too deep, especially for those located over the renal pelvis or ureter.

Results

Totally 85 patients who underwent PCNL and Electro cauterization of bleeding points after their operation participated in this study. From 85 patients, 58 patients (68.2%) were male and 27 patients (31.8%) were female. The patients age ranged from 20 to 82 years old. The stone size ranged from 10 to 35mm.

All the patients underwent regional (spinal or epidural) anesthesia for the operation. From 85 patients; l5 patients (17.6%) had stones located in upper pole, 20 patients (23.5%) had stones located in pelvis of the kidney, l3 patients (15.2%) had stones located in lower pole and 37 patients (43.5%) had multiple staghorn stone.

The mean hemoglobin (Hb) concentration before operation was 14±0.5 mg/dL while it was 14± 0.2 mg/dL after operation. There was no statistically significant correlation between hemoglobin level before and after operation (P>0.05).

Figure 1: Percentage of patients with renal stone in each sex

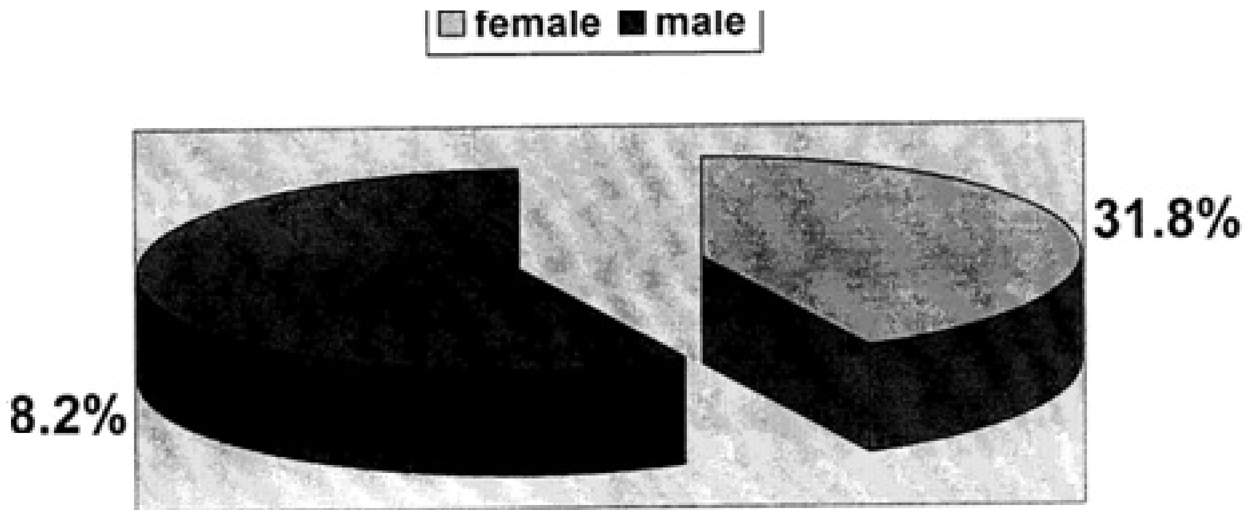


Figure 2: Stone location

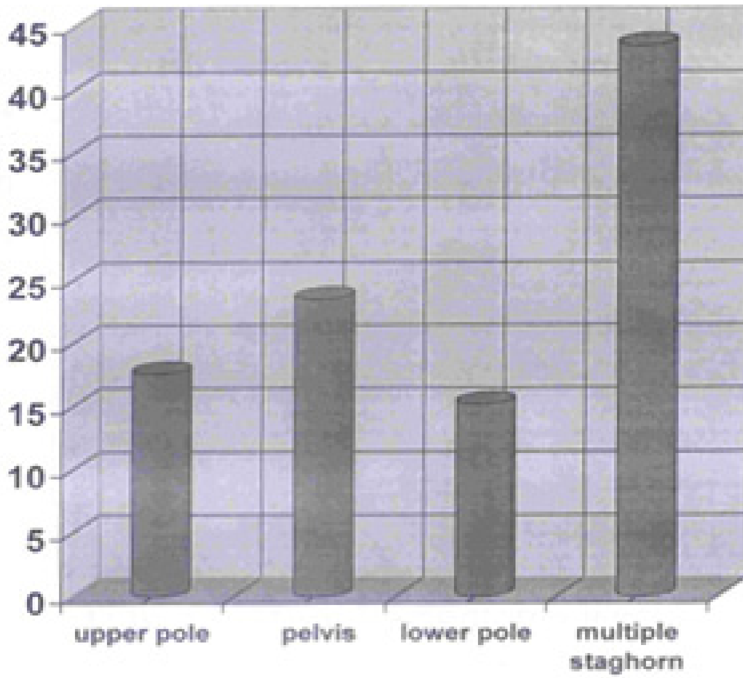
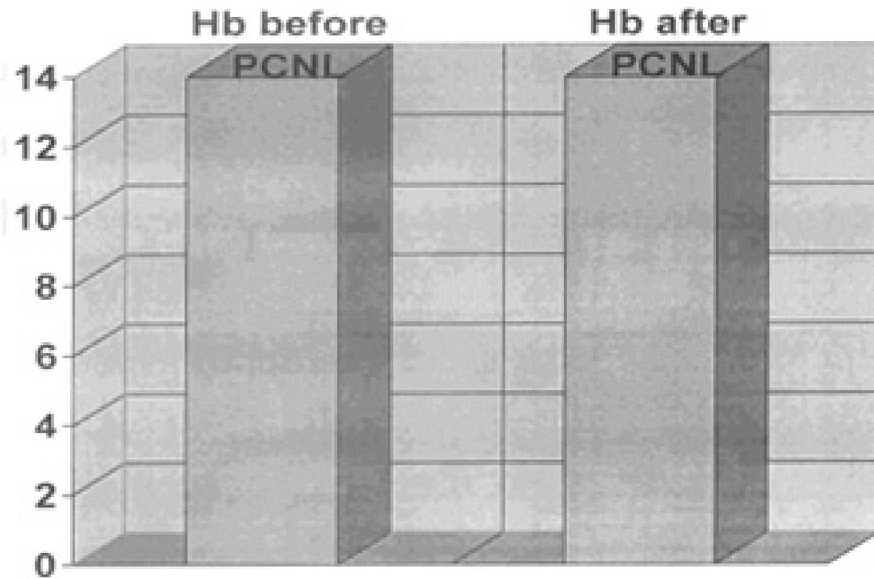


Figure 3: Mean hemoglobin level before and after PCNL



Discussion

Percutaneous renal surgery is a common urologic procedure. It has been widely used for the removal of renal and upper ureteral stones and also for the treatment of pelvi-ureteral stricture and management of tumor of the upper urinary tract. Improvements in instrumentation and technology in recent years have decreased the complication rate of percutaneous renal surgery dramatically. However, complications do occur. Renal hemorrhage after percutaneous renal surgery is one of the most common complications. Bleeding may occur during any point of theprocedure. Venous bleeding is the most common type and can be controlled by clamping the nephrostomy tube. Excessive bleeding during percutaneous renal surgery may result from renal vessel injury, such as to a segmental branch. For excessive bleeding during percutaneous renal surgery, in addition to nephrostomy tube clamping, several techniques can be used to minimize bleeding Intravenous administration of mannitol with hydration leads to forced diuresis, dilation of renal tubules, swelling of the renal capsule, and increased intra renal pressure, which may enhance the effect of tamponed. Application of the Kaye tamponade balloon catheter is an alternative to minimize postoperative hemorrhage, and the device can be placed and inflated to control bleeding in the access tract (4). Angiography and embolization is required in persistent and active bleeding, in addition to the above-mentioned conservative treatment. Despite these efforts, percutaneous renal surgery still has a greater transfusion rate than other common urologic procedures. Because of the potential risks associated with blood transfusion, including transfusion reactions and transmission of the human immunodeficiency virus, hepatitis, and other infectious diseases, it is important to develop a procedure to minimize renal hemorrhage after percutaneous renal surgery.

Serial reports about tubeless percutaneous renal surgery for selected patients have recently been published. After draining with a double-J catheter or externalized ureteral catheter on removal of the nephroscope with a Working sheath and completion of the percutaneous renal procedure, the guidewire over the nephrostomy site was still in place. The guidewire was removed, and the wound was closed if no bleeding was evident at the nephrostomy site. The advantages of tubeless percutaneous renal surgery include earlier discharge, lower analgesic requirement, faster recovery to resume normal activities, and greater cost benefits. In literature and Medline there is only one article performed by Yeong-Chin J Ou et al in Chiayi Christian Hospital, Chiayi, Taiwan (1). In their study Electro cauterization of bleeding points with an elongated electrode probe was performed in 249 patients. The age, height, weight, preoperative hemoglobin level, stone burden, operating time, stone free rate, length of postoperative hospital stay, postoperative urinary tract infection rate, and blood transfusion rate were recorded by retrospective chart review. There was no statistically significant differences in age, height, weight, stone burden, operating time, stone free rate, or length of postoperative hospital stay found between patients with or without Electro cauterization. No increase occurred in the postoperative urinary tract infection rate in patients who received Electro cauterization, and these patients had a statistically significant decrease in the transfusion rate. No nephrostomy tube was inserted at the completion of surgery in 84 (33.7%) of the 249 operations in which Electro cauterization was performed. They finally concluded that Electro cauterization of the bleeding points at the end of percutaneous renal surgery decreases the blood transfusion rate without causing an increase in morbidity. This procedure is safe and effective and may make more patients suitable for tubeless modification (1). Encouraged by the positive results, many institutions have expanded the use of tubeless modification for percutaneous renal surgery. After cauterization of the bleeding points in percutaneous renal surgery, 84 (33.7%) of 249 PCNLs were performed with a tubeless modification without any sequelae. In 2002, Limb and Bellman (12) reported that of 398 patients undergoing percutaneous renal surgery, 112 (28.1%, 86 undergoing PCNL and undergoing ante grade endopyelotomy) underwent a tubeless modification. The stone burden of their patients who underwent tubeless PCNL was 330-279 mm2. In our study, after cauterization of bleeding points, the percentage of patients undergoing tubeless modification was greater (33.7% versus 28.1%), even though the stone burden was large in our patients.

Conclusions

Electro cauterization of bleeding points with an elongated electrode probe after percutaneous surgery decreased the transfusion rate without causing any increase in surgical morbidity. The procedure also made more patients undergoing percutaneous renal surgery suitable for a tubeless modification. It is an effective and safe procedure and should be considered an option in percutaneous renal surgery.

References

1. Jou YC, Cheng MC, Sheen JH, Lin CT, Chen PC. Cauterization of access tract for nephrostomy tube-free percutaneous nephrolithotomy. J Endourol. 2004 Aug;18(6):547-9.
2. Stamatelou KK, Francis ME, Jones CA, Nyberg LM, Curhan GC. Time trends in reported prevalence of kidney stones in the United States: 1976-1994. Kidney Int 2003;63(5):1817-23.
3. Moe OW. Kidney stones: Pathophysiology and medical management. Lancet 2006;367:333-44.
4. Pak CYC, Resnick MI, Preminger GM. Ethnic and geographic diversity of stone disease. Urology 1997; 50(4):504-7.
5. Heilberg IP, Boim MA, Schor N. Biochemical differences between stone formers and normal subjects. In: Segura J, Conort P, Khoury S, Pak C, Preminger GM, Tolley D (eds). Stone Disease (1 st International Consultation on Stone Disease). Editions 21. France: Health Publications, 2003; pp. 61-4.

6. Trinchieri A, Ostini F, Nespoli R, Rovera F, Montanari E, Zanetti G. A prospective study of recurrence rate and risk factors for recurrence after a first renal stone. J Urol l999;162(1):27-30.
7. Sutherland J W, Parks JH, Coe FL. Recurrence after a single renal stone in a community practice. Miner Electrolyte Metab l985;l l(4):267-9.
8. Li J, Kennedy D, Levine M, Kumar A, Mullen J. Absent hematuria and expensive computerized tomography: case characteristics of emergency urolithiasis. J Urol 200l;l65(3):782-4.
9. Abramson S, Walders N, Applegate KE, Gilkeson RC, Robbin MR. Impact in the emergency department of unenhanced CT on diagnostic confidence and therapeutic efficacy in patients with suspected renal colic: a prospective survey. Am J Roentgenol 2000;175:1689-95.
10. Shokeir AA, Abdulmaaboud M. Prospective comparison of unenhanced helical computerized tomography and doppler ultrasonography for the diagnosis of renal colic. J Urol 2001;165:1082-4.
11. Teichman JM. Clinical practice. Acute renal colic from ureteral calculus. N Engl J Med 2004;50(7):684-93.
12. Grisi G, Satcul F, Cuttin R, Rimondidi A, Meduri A, Dalla Palma L. Cost analysis of different protocols for imaging a patient with acute flank pain. Eur Radiol 2000; 1011620-7.
13. Gandolpho L, Sevillano M, Barbieri A, Ajzen S, Schor N. Ortiz V, et al. Scintigraphy and doppler ultrasonography for the evaluation of obstructive urinary calculi. Braz J Med Biol Res 200l;34(6):745-5l.
14. Catalano O, Nunziata A, Altei F, Siani A. Suspected ureteral colic: primary helical CT versus selective helical CT after unenhanced radiography and sonography. Am J Roentgenol 2002; l 78:3 79-86.

Comparison of the three-finger tracheal palpation technique with triple ID formula to determine endotracheal tube depth in children 2-8 years in 2016-2017

Anahid Maleki (1)
Alireza Ebrahim Soltani (2)
Alireza Takzare (1)
Ebrahim Espahbodi (1)
Mehrdad Goodarzi (1)
Roya Noori (3)

(1) Assistant Professor of Medicine, Faculty of Medicine, Tehran University of Medical Sciences
(2) Associated Professor… of Medicine, Faculty of Medicine, Tehran University of Medical Sciences
(3) General physician, Tehran University of Medical Sciences

Corresponding author:
Anahid Maleki
Assistant Professor of Medicine, Faculty of Medicine,
Tehran University of Medical Sciences, Tehran, Iran
Email: A-maleki@tums.ac.ir

Abstract

Background and objective: Correct placement of the endotracheal tube is an important part of anesthesia and special care, and it is especially important in pediatric patients. The common methods and tools used to determine the proper depth of the tube trachea have significant limitations. The aims of the present study were to evaluate accuracy and error rate of the three-finger tracheal palpation technique and compare it with triple ID formulae technique in children aged 2-8 years in 2016-2017.

Methods: In this study, 100 children aged 2 to 8 years who were nominated for elective surgery with general anesthesia requiring intubation, were selected after receiving written consent from their parents about their satisfaction with the study. Patients were excluded from the study by exclusion criteria including abnormal anatomy of airways, or chest surface anatomy, history of active respiratory or cold infection in the past 3 weeks, history of chronic respiratory disease, asthma, and allergy. Each group consisted of 50 children and in both groups of children with premedication with metidazolam 0.5 mg / kg and ketamine 5 mg / kg orally. After entering the operating room, the installation of standard monitoring equipment, pulse oximetry, ECG, noninvasive blood pressure, induction of anesthesia in the operating room with sevoflurane (8%) was instituted, and continued with 2 liters per minute of anesthesia. After adequate anesthetic depth, venous thrombosis was performed with angioquate 22, and after thiopental injection of sodium 5 mg / kg, tracheal intubation began. In the first group, an anesthetist tested the tube with a formula of three times the diameter of the tube and compared with the auxiliary auscultation of the tube. Also, the duration of intubation was measured and recorded. In the second group, an experienced anesthetist experienced three-finger touch procedure, the endotracheal tube was exposed from the chip and after tubing passed through the supra sternal, the tube was fixed. Then, the tube was controlled by bilateral anesthetic tube and the duration of intubation was measured and recorded. The tube was transmitted by an experienced anesthetist and was touched by an anesthetist technician in the supra-standard. Finally, the accuracy and error rates of the two methods were compared. The obtained data and probable complications were recorded and analyzed statistically.

Results: Comparison of two methods in terms of success rate (correct insertion of the tube confirmed by bilateral lumbar auscultation) showed that there was no significant difference in determining the depth of the tracheal tube between the two groups ($p = 0.15$). The depth of the tube in the three-finger touch procedure was significantly different from the three-fold method ($p = 0.00$). Also, the duration of intubation between the two groups was significantly

different (p = 0.00). The two methods were similar in the course of intubation, and no complications occurred during intubation.

Discussion and conclusion: Overall, this study showed that the use of the three-finger tracheal palpation technique was acceptable as a standard method and compared with the three-pipe formula, the percentage of success was greater (100% versus 96%). Also, this method has a lower error rate than the three-fold method, but the rate of intubation is three times greater than that of a three-finger touch. Of course, considering the low volume of the sample, studies with a higher sample size seem to be necessary to investigate the possible complications and confirm the results of this study.

Key words: Endotracheal Tube Intubation, Three-finger Tracheal Palpation, Laryngoscopy

Please cite this article as:. Maleki A. et al. Comparison of the three-finger tracheal palpation technique with triple ID formula to determine endotracheal tube depth in children 2-8 years in 2016-2017. *World Family Medicine.* 2017; 15(9):48-53. DOI: 10.5742/MEWFM.2017.93101

Introduction

Correct placement of the endotracheal tube is an important part of anesthesia and special care, but incorrect placement is a common mistake that can lead to major morbidity and mortality (1-4). The correct placement occurs when the distal end of the tube is placed in the middle of the chip. If the tube is very superficial, it will lead to its accidental outflow, and if it is too deep, it will increase the risk of barotraumas and pneumothorax (3, 4). The placement of the tubes, especially in children, is vital and more difficult, because the chip is shorter in children and more susceptible to hypoxemia (5).

Conventional instruments used to determine the proper depth of the chip tube have considerable limitations (6). Chest radiography is the gold standard for the proper location of the chip tube. Bronchoscopy of optic fiber is also useful, but both are time-consuming, expensive and invasive and are not always available (1, 2, 4, 7). Other techniques, such as lung echo, chest movement, capnography, the observation of the vapor in the endotracheal tube and the tube placement based on tube length are calculations that are used (3, 8-10).

Of these, one of the methods used to correct placement of chip tube is three-finger tracheal palpation technique chip tube in the suprasternal area, which has fewer restrictions, including the fact that it does not require the equipment, is cost-effective and available. Various studies have compared this method with other methods (10, 11). For example, in a 2014 study by Jonathan J Gamble et al., which was conducted on 50 children, it was concluded that using the chip touch technique to guide the endotracheal tube has excellent clinical results and the proper depth of the endotracheal tube relative to formula PALS is better (12). Accordingly, the aim of the present study was to examine the accuracy and error rate of a three-finger tracheal palpation technique of chip in the suprasternal area and compare it with the depth determination method using triple ID formula.

Method

Research method, population and sample

This study is a survey type. The population of this study was 100 patients aged 2 to 8 years old who referred to the operating room of the children's Hospital for elective surgery in year 2016. According to the statistical formula (α = 0.5), β =20, P0= 0%, P1 =14% and n1 / n2=1). The sample size was calculated for each group of 50 patients. These patients had inclusion criteria (grade 1 patients, ages 2 to 8 years, patients undergoing elective surgery requiring general anesthesia and intubation, parental consent for participation in the plan), and any patient who had exclusion criteria (abnormal anatomy of airways, history of active respiratory infections or colds within 3 weeks), history of chronic respiratory diseases, asthma and allergies, lack of parental consent to participate in the program, patients grade 2 and above) were excluded.

Data collection method

Data collection form including patient's age, patient's weight, sex, patient group (group 1: a group in which the triple ID method was used to determine endotracheal tube depth, and group 2: the group in which three-finger tracheal palpation technique is used to determine the depth of the endotracheal tube), length of intubation, tube size, tube depth (in the first group, the number on the side of the lip based on triple ID formula, and in the second group, the number on the lips based on the three-finger tracheal palpation technique of the chip), and complications (expiratory sounds, exhaustion, nausea and vomiting, loss of oxygen saturation, bronchospasm or laryngospasm, coughing and respiratory failure). Depending on the type of data, data were recorded by direct observation, hearing, and use of patient files.

Procedure

Each group consisted of 50 children. Oral medication with midazolam 0.5 mg / kg of vitamin 5 mg / kg was used in both groups of children. After entering the operating room and after the installation of standard monitoring equipment, pulse oximetry, ECG, noninvasive blood pressure, anesthetic induction in the operating room with

Sevoflurane (8%) was done and anesthesia continued in the gas flow of 2 liters per minute. After adequate anesthetic depth, venepuncture was performed with Angiocate No 22 and after the injection of thiopental sodium 5 mg/kg, the tube placement was begun. In groups, an anesthetist fixed the tube using triple ID formula and it was compared with the auxiliary auscultation of the tube. Also, the duration of intubation was measured and recorded. In the second group, an experienced anesthetist using three-finger tracheal palpation technique touched endotracheal tube from the chip, and after the sense of the tube passing through the supra-district, the tube was fixed. The tube was then controlled by auscultation of the chip tube and the duration of the intubation was measured and recorded. The tube was transmitted by an experienced anesthetist and was touched by an anesthetist technician in the supra-standard. Finally, the accuracy and error rates of the two methods were compared. The collected data and probable complications were recorded and analyzed statistically.
The collected data were analyzed by SPSS software 22 and the significance level of 0.05. In order to analyze the variables in independent groups for quantitative data without normal distribution, Mann- U - Whitney test and for qualitative data, Chi-square test was used.

Findings

In the first group, out of 50 patients, 33 (72%) were male and 14 (28%) were female, and in the second group, out of 50 patients, 38 were male (76%) and 12 female (24%). The mean age in the first group (triple ID formula) was 3.88 and in the second group (three-finger tracheal palpation technique) was 4.9. Also, the mean weight in the first group was 16.07 with a standard deviation of 6.38 and in the second group 17.77 with a standard deviation of 5.53. The findings of Chi-square and Mann-Whitney tests indicated no significant difference between the two groups in terms of age (p = 0.64, Mann-Whitney U = 1183), gender (p = 0.41, = Pearson Chi-Square) and weight (p = 0.38 Mann-Whitney U = 1125.50).

A total of 100 patients were examined. Two cases of unilateral chest echo (auscultation) were observed, both of which occurred in the first group, using triple ID formula to determine the depth of the endotracheal tube. In the second group, the pulmonary auscultation was bilateral in all cases (Table 1).

Chi-square test (P = 0.15, P = 0.24 = Pearson Chi-Square) indicates that there is no significant difference between the two groups in terms of bilateral pulmonary auscultation (Table 2). That is, it can be said that the two groups are the same in terms of bilateral pulmonary auscultation to control the location of the tube.

The mean of tube depth in the first group was 14.79 with a standard deviation of 1.24 and in the second group it was 94.9 with a standard deviation of 1.94 (Table 3).

Mann-Whitney U- test (p = 0.005, Mann-Whitney U-431.50, P=0.00) showed a significant difference between the two groups in terms of tube depth, so that in the first group the depth of the tube was higher than the second group (Table 4).

The mean of duration of intubation in the first group was 17.37 with a standard deviation of 23.3 and in the second group it was 21.82 with a standard deviation of 3.77 (Table 5).

Mann-Whitney test (Mann-Whitney U=487, p = 0.00) indicates a significant difference between the two groups in terms of the duration of intubation, so that the duration in the first group is less than that of the second group (Table 6 - page 52).

In this study, complications such as bronchospasm or laryngospasm, coughing, nausea and vomiting, dementia or exhalation and respiratory depression were investigated in both groups. As shown in Table 7, the incidence of these complications did not occur in the two groups and the two groups were the same for the incidence of these complications.

Discussion

In this study, which was done in a survey of methods, 100 patients were randomly divided into two groups and were evaluated. The first group included the use of triple ID formula for determining the depth of the tracheal tube, and the second group included the use of a three-finger tracheal palpation technique of chip tube in the suprastanchal touch site to determine the depth of the tube. The main objective of this study was to compare the appropriate placement in these two methods. For this, in both groups, after the tubing (tube placement), the pulmonary auscultation was used to confirm the correct placement.

The findings showed that there was no significant difference between the two groups in terms of age, gender and weight, and the two groups were similar in terms of these factors. Therefore, it would be possible to judge the results of other factors without considering these variables. The unwanted side effects that we were expecting such as nausea and vomiting, coughing, respiratory failure, inspiratory and expiratory wheezing, and bronchospasm or laryngospasm did not differ significantly between the two groups and the incidence of these complications in either of the two groups was not observed. Among other important issues examined in this study, was the correct placement of the endotracheal tube confirmed by the bilateral pulmonary auscultation, and as it was observed, its success rate was 100% in the three-finger tracheal palpation technique and in the triple ID formula was 96%, but in triple ID formula the tubing (tube placement) was more rapid than the three-finger touching group. In the case of examining the depth of the endotracheal tube (the distance from the lips), which was one of the main factors in this study, it was also found that the depth of the three-finger tracheal palpation group was clearly less than that of the triple ID formula group.

In the studies, touch technique has been shown to be superior to some methods. For example, in the study of Mckay WP et al., the chip touch technique was compared

Table 1: The pulmonary auscultation indices between the two groups

			Group		Total
			1	2	
Tube Location	bilateral	Count	48	50	98
		% within Tube Location	49.0%	51.0%	100.0%
		% within 1	96.0%	100.0%	98.0%
	unilateral	Count	2	0	2
		% within Tube Location	100.0%	.0%	100.0%
		% within 1	4.0%	.0%	2.0%
Total		Count	50	50	100
		% within Tube Location	50.0%	50.0%	100.0%
		% within 1	100.0%	100.0%	100.0%

Table 2: Chi-square test between two groups in terms of bilateral pulmonary auscultation

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.041[a]	1	.153		
Continuity Correction [b]	.510	1	.475		
Likelihood Ratio	2.813	1	.093		
Fisher's Exact Test				.495	.247
Linear-by-Linear Association	2.020	1	.155		
N of Valid Cases [b]	100				

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 1.00.
b. Computed only for a 2x2 table

Table 3: Indices related to mean of tube depth between two groups

	group	N	Mean	Std. Deviation	Std. Error Mean
Tube Depth	1	50	14.7900	1.24986	.17676
	2	50	12.9400	1.49024	.21075

Table 4: Mann-Whitney test between two groups in terms of mean of tube depth

	Tube Depth
Mann-Whitney U	431.500
Wilcoxon W	1706.500
Z	-5.780
Asymp. Sig. (2-tailed)	.000

Table 5: Indices related to the mean of duration of intubation between the two groups

Complications	Group 1	Group 2	Total
Bronchospasm/Laryngospasm	0	0	0
Cough	0	0	0
Nausea/Vomiting	0	0	0
Inspiratory/Expiratory Wheezing	0	0	0
Decrease Of O2 Saturation	0	0	0
Apnea	0	0	0

Table 6: Mann-Whitney test between two groups in terms of mean of tube depth

	Intubation Time
Mann-Whitney U	487.000
Wilcoxon W	1762.000
Z	-5.641
Asymp. Sig. (2-tailed)	.000

Table 7: Incidence of complications between the two groups

Complications	Group 1	Group 2	Total
Bronchospasm/Laryngospasm	0	0	0
Cough	0	0	0
Nausea/Vomiting	0	0	0
Inspiratory/Expiratory Wheezing	0	0	0
Decrease Of O2 Saturation	0	0	0
Apnea	0	0	0

with the method of using the patient's teeth to determine the depth of the endotracheal tube, which touch method with a 77% success rate (compared to 57%), led to proper placement (11). Also, in the study of Jenes Moll et al., by comparing the two methods of touching the cuff and the method of using the tube markers, it was concluded that in the touch method, the tip of the tube to the carina is shorter and this distance is more predictable than the method of using markers (10). A study by Okoyama M et al. showed that the cuff touch technique was a reliable, simple, and fast technique to ensure proper position of the endotracheal tube in children (13).

As you can see in this study, the touch method has a lower error rate than the triple ID formula. In addition, in the touch method, the depth of the tube was less than triple ID formula. In the studies, the auscultation method was also used to ensure proper tube placement, but the chest radiography as a gold standard was introduced to ensure proper tube placement (tubing) (1, 2, 4). For example, in a study, Koshy S et al., found that using chest radiography with 98.5% success is introduced as the preferred method for confirming the appropriate placement of the tracheal tube at the top of the other methods. In contrast, Anderson KH introduces the autistic method as a routine method for controlling the placement of an endotracheal tube in a review article after introducing reliable methods for confirmation of appropriate placement (15).

Finally, it should be noted that among the advantages found in this study was the measurement of factors including the length of tubing, the depth of the tube and the correct placement of the tube and complications such as nausea and vomiting, coughing, respiratory failure, bronchospasm and laryngospasm. In the mentioned studies, these factors were not studied simultaneously. Therefore, it is suggested that this should be considered in future studies and perhaps by more accurate studies, with higher sample sizes, we can get more accurate results. Other suggestions of this study for future research include doing studies with higher sample size to achieve more accurate results, in the age group of less than 2 years and over 8 years, and comparing the results with the present study, comparing the three-finger tracheal palpation technique with other methods and studies in patients with non-active surgery and in patients with ASA class higher than 1.

Conclusion

Overall, this study showed that the use of the three-finger tracheal palpation technique is acceptable as a standard method, and has a higher success rate (100% versus 96%) compared to the triple ID formula. Also, this method has a lower error rate than the triple ID formula, but the rate of intubation in triple ID formula is more than the three-finger tracheal palpation technique. Of course, to confirm these results, it seems necessary to repeat them in studies with a higher sample size.

References

1. Bekemeyer WB, Crapo RO, Calhoon S et al.Efficacy of chest radiography in a respiratory intensive care unit. A prospective study. Chest. 1985 88(5):691-696.
2. Dronen S, Chadwick O, Nowak R. et al. Endotracheal tip position in the arrested patient. Ann Emerg Med. 1982 11(2):116-117.
3. McCoy EP, Russell WJ, Webb RK et al. Accidental bronchial intubation. An analysis of AIMS incident reports from 1988 to 1994 inclusive. Anaesthesia. 1997 52(1):24-31.
4. Owen RL, Cheney FW. Endobronchial intubation: a preventable complication. Anesthesiology 1987 67(2):255-257.
5. Morgan GA, Steward DJ. Linear airway dimensions in children: including those from cleft palate. Can Anaesth Soc J. 1982 29(1):1-8.
6. Marciniak B, Fayoux P, Hebrard A et al. Airway management in children: ultrasonography assessment of tracheal intubation in real time. Anesth Analg 2009 108:461-465.
7. Schmölzer GM, O'Reilly M, Davis PG et al. Confirmation of correct tracheal tube placement in newborn infants. Resuscitation 2013 84(6):731-737.
8. Betbesé AJ, Pérez M, Bak E et al.A prospective study of unplanned endotracheal extubation in intensive care unit patients. Crit Care Med. 1998 26(7):1180-1186.
9. Miller D. R. Miller's Anesthesia, eighth edition, 3. Elsevier, Philadelphia, 2015 1670-1671.
10. Moll J, Erb TO, Frei FJ. Assessment of three placement techniques for individualized positioning of the tip of the tracheal tube in children under the age of 4 years. Paediatr Anaesth 2015 25:379-385.
11. McKay WP, Klonarakis J, Pelivanov V et al. Tracheal palpation to assess endotracheal tube depth: an exploratory study. Can J Anaesth 2014 61(3):229-234.
12. Gamble JJ, McKay WP, Wang AF et al. Three-finger tracheal palpation to guide endotracheal tube depth in children. Paediatr Anaesth 2014 24(10):1050-1055.
13. Okuyama M, Imai M, Sugawara K et al. Finding appropriate tube position by the cuff palpation method in children. Masui 1995 44(6):845-848.
14. Koshy T, Misra S, Chatterjee N et al. Accuracy of a Chest X-Ray-Based Method for Predicting the Depth of Insertion of Endotracheal Tubes in Pediatric Patients Undergoing Cardiac Surgery. J Cardiothorac Vasc Anesth 2016 30(4):947-53.
15. Anderson KH. Methods for ensuring correct tracheal intubation. a review. Ugeskr Laeger 1991 153(4):267-269.

Effect of Sevoflurane and Propofol on pulmonary arterial pressure during cardiac catheterization in children with congenital heart diseases

Faranak Behnaz (1)
Mahshid Ghasemi (2)
Gholamreza Mohseni (3)
Azim Zaraki (4)

(1) Assistant Professor of Anesthesiology Shohada Tajrish Hospital, Shahid Beheshti University of Medical Science,Tehran, Iran
(2) Assistant Professor of Anesthesiology, Shahid Beheshti University of medical sciences, Tehran, Iran
(3) Associate Professor of Anesthesiology, Shohada Hospital, Shahid Beheshti Medical science University, Tehran, Iran
(4) Resident of Anesthesiology, Modarres hospital, Shahid Beheshti Medical Science University, Tehran, Iran

Corresponding author:
Gholamreza Mohseni
Associate professor of anesthesiology, Shohada Hospital,
Shahid Beheshti Medical Science University,
Tehran, Iran
Email: mohsen85ir@yahoo.com

Abstract

Background: The aim of this study was to investigate the effect of sevoflurane and propofol on pulmonary arterial pressure during cardiac catheterization in children with congenital heart diseases.

Methods: In order to reach the research goals, 80 patients with congenital heart disease who had referred to Modarres Hospital, Iran for cardiac catheterization were selected as sample. They were divided into two groups for treatment with propofol or sevoflurane. In children in the sevoflurane group, anesthesia began initially with higher concentrations of sevoflurane (4-6%) and spontaneous respiration by face mask with suitable size and gradually the concentration of gas was reduced by increasing the anesthetic depth and anesthesia was continued with 1 MAC inhaled Sevoflurane based on age and individual characteristics of each patient and spontaneous respiration. In the other group, propofol drug (50-70 μg/ kg/min) was injected by perfusion pump. Cardiac catheterization was performed by injection of lidocaine into the catheter entrance i.e. the femoral vessel when the anesthetic depth reached to Ramsay Sedation Score = 3 and BIS = 65-85. Meanwhile, in the groups of sevoflurane and Propofol, systolic and diastolic blood pressure in pulmonary patients was recorded before andduring catheterization. T-test was used to analyze the data.

Results: The findings showed that there was no significant reduction in systolic and diastolic pulmonary arterial pressure in the sevoflurane group in the pretest or posttest, while in the propofol group, systolic and diastolic blood pressure were significantly reduced in the pulmonary artery.

Conclusion: According to the results, it can be concluded that Propofol is considered more appropriate than Sevoflurane for cardiac catheterization in children with congenital heart disease and anesthesiologists can use Propofol as a suitable alternative for sevoflurane.

Key words: Congenital heart disease, Anesthesia, Pulmonary artery pressure, Clinical symptoms

Please cite this article as:. Behnaz F.. et al. Effect of Sevoflurane and Propofol on pulmonary arterial pressure during cardiac catheterization in children with congenital heart diseases *World Family Medicine.* 2017; 15(9):54-59.
DOI: 10.5742/MEWFM.2017.93102

Introduction

One of the most common congenital diseases of children is abortion of the heart. Among the congenital anomalies in infants, the cardiovascular system causes most deaths. The incidence of congenital heart disease is approximately 8% in 1,000 live births, and if one of the first-degree relatives is afflicted with CHD, the incidence reaches 2-6% (Bernstein, 2,000). Pulmonary artery pressure (PHT) occurs in many congenital heart diseases, and the status of the pulmonary vascular system is often the key to clinical manifestations, period of illness, and curative treatment with surgical methods (Barst, 2001; Qureshi, 2002). By definition, the increase of 25 mm Hg in average pulmonary arterial pressure at rest time and more than 30 mm Hg during activity is said to be pulmonary arterial pressure, whether it is due to increased blood flow or increased vascular resistance (Barst, 2001). The increase in pulmonary vascular resistance leads to double-sided or right-to-left shunting through a congenital communication defect that occurs between the systemic and pulmonary blood stream, which is defined as the Isenmenger syndrome, which is proven by cardiac catheterization (Bernstein, 2000). Patients with PHT may be resistant to medical treatment and ultimately progress to cardiac dysfunction and death, so assessing the severity of illness and the ability to predict the likelihood of death is an important factor in decision-making in these patients.

The goal of sedation during cardiac catheterization in sick children is immobilization, numbness and stability in the respiratory and cardiac system (Lebovic et al., 1992). Induction of anesthesia, intubation and respiration through the device during cardiac catheterization may result in severe changes in respiratory and cardiac indices. For this reason, the use of relaxation method for cardiac catheterization while conscious is preferable to the general anesthetic method. The anesthesiologist plays an important role in this regard (Reich et al., 1989). Regarding the inhalation anesthetics, although halothane was thought to be a mild inhaler inducing good intubation for many years, however, since the introduction of sevoflurane in the early 90's, sevoflurane has been widely used instead of halothane (Jellish Et al., 2005). Now, this question is discussed as to whether sevoflurane can create conditions for an effective and rapid intubation such as thiopental and succinylcholine alone. There are many studies suggesting the successful use of sevoflurane in the intubation condition (Woods, 2005).

Thwaites et al. (1999) showed that sevoflurane can be a satisfactory alternative to the standard method of Succinylcholine chloride and Propofol when children are under non-emergency conditions. Still, studies in this area seem to be inadequate (Woods, 2005).

Propofol is a relatively new intravenous anesthetic. This drug is very useful for calming, relaxation, and at higher doses, it is a great general anaesthetic. Propofol is a sleeping drug with an unknown mechanism and is responsible for impaired cardiovascular and is respiratory system dependent on dose. It also has direct antinociceptive effect, and does not have analgesic effects like benzodiazepines (Greff, 1999).
Propofol is used to make calm and conscientious sleepiness to induce and to maintain conscious calmness. The pharmacokinetics of this drug have made it an effective agent for Conscious calmness (Liberman et al., 1985). Its mechanism of action is to increase gamma aminobutyric acid, activating chlorine canals as a result of the activity of inhibitory neurons in the hippocampus. In addition, it prevents the release of acetylcholine in the hippocampus and prefrontal cortex.

The main benefits of this drug include the onset of fast effects, the lack of active metabolites, and rapid liver cleansing after intravenous injection (Patterson et al., 1991). This medication in elderly patients may be associated with a reduction in high blood pressure and, consequently, a decrease in tissue hemorrhage and oxygenation (Kirkpatrick et al., 1988). Other studies have reported hemodynamic impairment of Propofol injection in children (Short, 1991). The reduction in hypoproteinemia caused by Propofol injection in children at the onset of anesthesia may be between 28- 31% (Goh et al., 2005), and the reduction in blood pressure induced by Propofol injection in cardiovascular patients may be very severe (Patrick et al., 1985).

In a study, the effects of anesthesia with ketamine and Propofol in children with congenital heart disease were investigated for cardiac catheterization (Zeynep Tosun et al., 2006). In this study, the amount of intraoperative movement in the second group receiving less ketamine was slightly higher than the first group, but this difference was not statistically significant, while the duration of waking patients in the same group was shorter with a lower dose of ketamine. In other items, the hemodynamic changes, respiratory conditions, and arterial blood gas were the same in both groups. The researchers concluded that a combination of both doses of ketamine and Propofol for cardiac catheterization was effective in these children, although children who received more ketamine were statistically significantly later awake and conscious, but this was acceptable to the researchers.

In another study, the effects of Propofol and ketamine were investigated on systemic blood and pulmonary flow in children undergoing cardiac catheterization. In this study, patients were divided into three groups without intra-cardiac shunt, with left to right shunt and right to left shunt. The findings showed that in all patients, all of the three groups who were under continuous infusion of Propofol had a significant decrease in the mean systemic arterial pressure. In two groups of patients who had cardiac shunt, Propofol infusion resulted in a clear reduction of systemic vascular resistance and a significant increase in systemic blood flow, while the resistance of pulmonary vessels and blood flow did not change significantly.

These changes significantly and statistically reduced the ratio of pulmonary blood flow to the systemic, resulting in

a decrease of left-to-right shunt and an increase of right-to-left shunt. After infusion of ketamine, the mean systemic arterial pressure was increased significantly in all groups of patients, while the median pulmonary arterial pressure, resistance to pulmonary and systemic arteries remained unchanged (Zeynep Tosun et al., 2006).

The effects of sevoflurane on pulmonary arterial pressure or pulmonary vascular resistance, as well as the possible effects on the pulmonary blood flow have been highlighted in studies that have mainly been focused on reducing pulmonary arterial pressure and reducing pulmonary arterial pressure, but these effects on the pulmonary artery that has been damaged previously, or pulmonary arterial pressure has been increased, it is not so noticeable. In the initial studies to evaluate the effects of sevoflurane, 21 individuals who were healthy and without need for surgery were voluntarily subjected to anesthesia with sevoflurane, isoflurane or combination of sevoflurane and 60% nitrous oxide. Studies and performed tests in these subjects showed that sevoflurane did not change much on heart rate, reduced the resistance of arterial vessels and systemic vessels, and decreased the resistance of the pulmonary artery and increased blood flow (Hala et al., 2016). Alawi Tabatabaei (2016) compared the effects of two anesthetic methods with combination of ketamine/sevoflurane and ketamine/Propofol combination on cardiovascular variables in children with diagnostic cardiac angiography. They concluded that the use of ketamine and Propofol or ketamine and sevoflurane did not significantly differ in hemodynamic indexes of patients. However, it should be emphasized that patients receiving sevoflurane had higher systolic blood pressure and shorter recovery time. Regarding the relatively high use of sevoflurane and Propofol and the lack of studies in this field, this study aimed to investigate the effect of sevoflurane and Propofol on pulmonary arterial pressure during cardiac catheterization in children with congenital heart disease.

Materials and Methods

The study was a single-blind clinical trial. The research population was all patients with congenital heart disease in the age range of three months to 12 years and 80 patients with congenital heart disease were selected by available sampling method who were referred to Modarres Hospital, Iran for diagnostic and therapeutic measures under cardiac catheterization. The samples were divided into two groups: Propofol and sevoflurane.

The sample size was 80 individuals based on similar research ($p \leq 0.05$) and a test power of 80%. The criteria for entering the study included: the age of patients between 3 months and 12 years old, congenital heart disease, stable hemodynamic symptoms, absence of pulmonary, renal, hepatic, and co-abnormalities, etc., no history of drug allergy or allergies to food, ASA class 2-3, lack of infectious diseases and withdrawal criteria included: respiratory distress, apnea or a clear drop in arterial oxygen saturation, severe hemodynamic impairment and need for treatment during catheterization, stable cardiac arrhythmia requiring interventional therapy, ventilation disorder requiring interventional and respiratory support and seizure during prognosis. Ethical Criteria in this study was approved by the ethics committee of Shahid Beheshti University of Medical Sciences.

After diagnosis of the patient as an appropriate case, the necessary explanations were given to the parents of the patient about the method of implementation and the benefits and possible complications of participating in the project, and written consent was obtained from them. Intervention was performed without cost to the patient. Before the intervention, parents were asked to fill out a demographic questionnaire including gender, age, and history of previous treatments, background history of the disease and the duration of the symptoms.

Regarding moral considerations, the patient's parents were assured that their lack of cooperation with the doctor and the hospital would not affect their treatment and all patient information would be kept confidential. After entering the heart catheterization department, details of the followed cases were recorded comprising hemodynamic baseline values, such as heart rate, and respiratory rate per minute, cystic and diastolic blood pressures, arterial pulse oxygen saturation in the room, the presence or absence of cyanotype of the child, as well as tests, blood, biochemistry and electrolyte and liver enzymes, thyroid and renal function tests, as well as those observed in scans and grafts.

The use of any medication or nutritional supplement, a history of drug allergy or allergy to food, and other cases was also noted and recorded in the patient records. All patients were to be NPO according to the age and specific characteristics of the period before lung catheterization, in which case their parents were provided with explanations and warnings. One hour before catheterization, 0.5 mg/kg oral midazolam was prescribed as a premedication. Peripheral venous catheter was embedded before the start of the procedure. In children in the sevoflurane group, anesthesia initially began with higher concentrations of sevoflurane (4-6%) and spontaneous respiration by face mask and gradually reduced the concentration of gas by increasing the anesthetic depth, and continuous anesthesia with 1 MAC of inhalant sevoflurane based on age and individual characteristics of each patient and spontaneous breathing.

In the other group, Propofol 50-70 μg/kg/min was injected through a perfusion pump, and when the depth of anesthesia reached the appropriate level (Ramsay Sedation Score = 3 and BIS = 65-85), the cardiac catheterization was performed with lidocaine injection at the catheter entrance i.e. femoral vessels. Systemic hemodynamic symptoms, systolic and diastolic blood pressure of the pulmonary artery were recorded after catheter entrance into the pulmonary artery. In analyzing data, mean, standard deviations, frequency, tables and charts were used to categorize and summarize the collected data. In the study of statistical pre-requisites, considering the number of observations in each distribution, the Kolmogorov-Smirnov test was used to verify the distribution of data. According to statistical hypotheses, paired t- test was used ($p<0.05$) using statistical package version 22. In all analyses, the significance level was considered as $p <0.05$.

Results

The participants in this study consisted of 35 females (43%) and 45 males (57%). The mean age for sevoflurane was 0.24 ± 2.1 years and in the Propofol group was 7.4 ± 0.54 years. Table 1 shows the changes in systolic and diastolic blood pressure from pre-test to post-test.

Table 1: Descriptive statistics of the research

Variables	Sevoflurane group		Propofol group	
	Pre-test	Post-test	Pre-test	Post-test
Systolic pressure of pulmonary artery	22.37± 7.7	224.37± 7.2	261.51± 6.9	232.37± 6.4
Diastolic pressure of pulmonary artery	92.37± 2.31	91.87± 2.46	99.77± 2.05	88.87± 1.94

Pulmonary artery systolic blood pressure

The results of Kolmogorov-Smirnov test showed that the distribution of data was normal (P>0.05). In this study, systolic blood pressure in patients with pulmonary artery was measured. Then, two anesthetic drugs, sevoflurane and Propofol, was imposed on patients under cardiac catheterization depending on the type of group.

Then, the systolic blood pressure of the pulmonary artery was re-recorded. In the next step, the blood pressure of post-test was compared with pre-test using paired t-test to determine whether a change has been established in pulmonary artery systolic blood pressure after anesthetic drugs or not (Table 2).

As can be seen in the table, pulmonary artery systolic blood pressure in the Sevoflurane group in pre-test group was 227, which was decreased to 224 in the post-test, but this decrease was not statistically significant (Fig. 1, p = 0.725). While in the Propofol group, the pulmonary artery systolic blood pressure was 261 in the pretest, which was decreased to 232 in the post-test and this decrease was statistically significant (Figure 1, p = 0.008).

Table 2: Paired t-test for evaluating pre-test and post-test of systolic blood pressure in patients with pulmonary artery disease

Groups	Level	Average	df	t	p-value
Sevoflurane group	Pre-test	227.37± 7.7	39	0.354	0.725
	Post-test	224.37± 7.2			
Propofol group	Pre-test	261.51± 6.9	39	2.81	0.008
	Post-test	232.37± 6.4			

Pulmonary artery diastolic blood pressure

The results of Kolmogorov-Smirnov test showed that the distribution of data was normal (P> 0.05). The paired t-test results are presented in Table 3. As seen in the table, the diastolic blood pressure of the pulmonary artery was 92 in the sevoflurane group in the pre-test, which was decreased to 91 in the posttest, but this decrease was not statistically significant (Fig. 2, p=0.887). While in the Propofol group, the diastolic blood pressure of the pulmonary artery was 99 in pre-test, which was decreased to 88 in the post-test and this decrease was statistically significant (Figure 2, p = 0.001).

Table 3: Paired t-test for evaluating pre-test and post-test of diastolic blood pressure in patients with pulmonary artery disease

Groups	Level	Average	df	t	p-value
Sevoflurane group	Pre-test	92.37± 2.31	39	0.143	0.887
	Post-test	91.87± 2.46			
Propofol group	Pre-test	99.77± 2.05	39	3.442	0.001
	Post-test	88.87± 1.94			

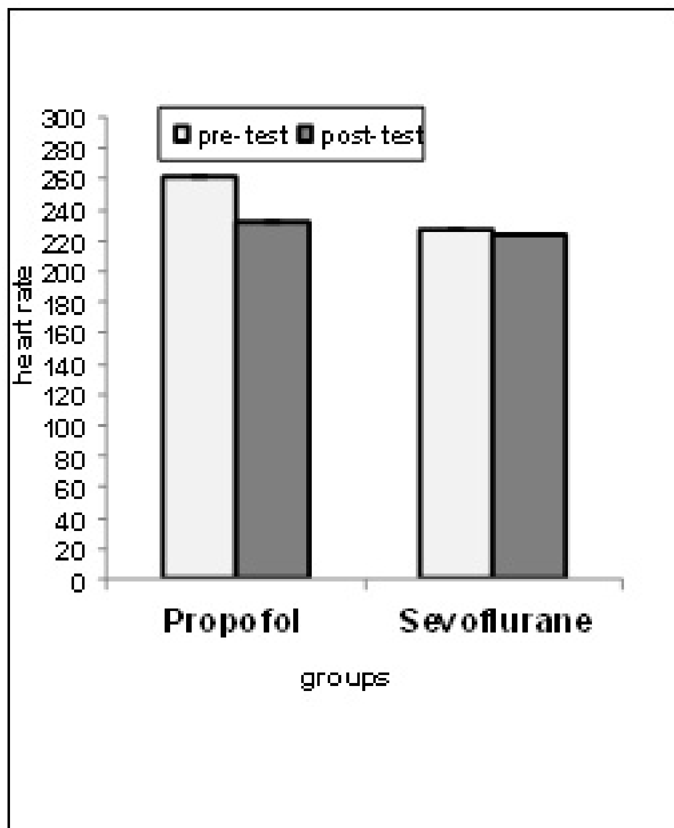


Figure 1: Changes of systolic blood pressure in patients with pulmonary artery disease from pre-test to post-test in two groups

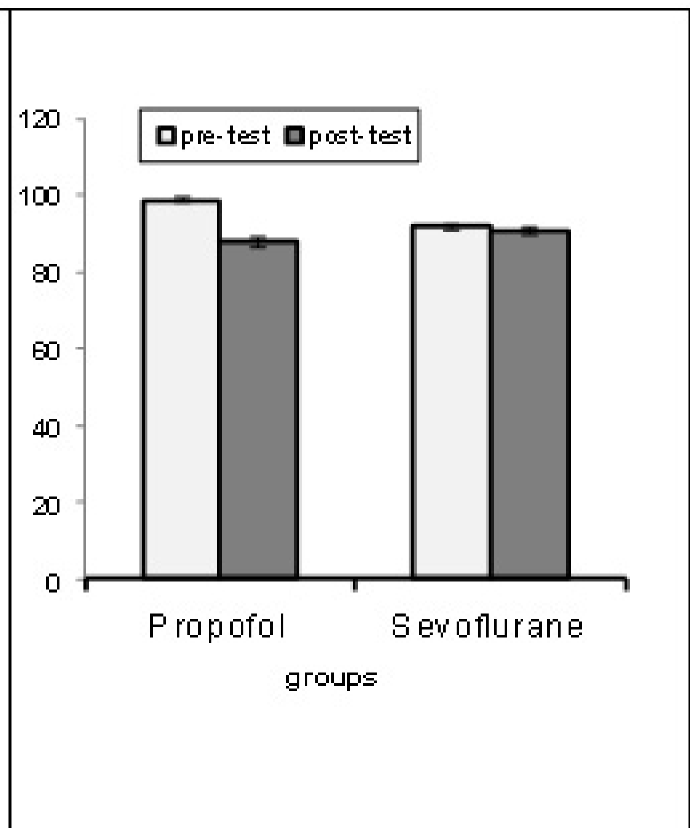


Figure 2: Changes of diastolic blood pressure in patients with pulmonary artery disease from pre-test to post-test in two groups

Discussion and Conclusion

The aim of this study was to evaluate the effect of sevoflurane and Propofol on pulmonary arterial pressure during cardiac catheterization in children with congenital heart disease. The results showed that the effect of Propofol was statistically significant on the reduction of systolic and diastolic pulmonary arterial pressure during cardiac catheterization while the effect of Sevoflurane was not significant. The comparison of the mean values showed that pulmonary artery systolic blood pressure was decreased from 261 mmHg to 232 mmHg and the pulmonary artery diastolic blood pressure ranged from 99 to 88 mmHg. Propofol leads to a greater reduction in blood pressure than Sevoflurane (Peishun et al., 2016). The findings of this study were in line with the results of previous studies. For example, Kariman Majd et al. (2006) examined the effect of various proportions of Propofol and ketamine on hemodynamic changes in patients. Their findings showed that the Propofol group experienced a greater reduction in pulmonary artery systolic and diastolic blood pressure in comparison to the ketamine group. Kirkpatrick et al. (1988) also found that blood pressure reduction is very intense in the elderly after induction with Propofol, and the drop in pressure is lower in the younger group. In other studies, the effects of Sevoflurane and Propofol have been compared.

For example, Inh et al. (2009) investigated and compared inhaled inductive anesthetics and preservation of anesthesia (VIMA) with sevoflurane with complete intravenous anesthesia (TIVA) with Propofol and remifentanil for adrenalin, norepinephrine, cortisol, and Glucose and IL-6 plasma in four levels of basal level, induction of anesthesia, secretion and separation of the device. The findings showed that the levels of glucose, cortisol, adrenaline and noradrenaline in the TIVA group were significantly lower than the VIMA group. But there was no difference between the two groups at IL-6 level. Weale et al. (2003) found that in a clinical trial on 49 children under the age of 5 years, remifentanil infusion (1 μg/kg/min and further) can prevent glucose increase associated with phase before heart surgery bypass.

There are many hypotheses about the effect of these drugs on hyperglycemia during surgery. Studies in pigs and humans have shown that sevoflurane reduces insulin secretion and, as a result, reduces the use of glucose (Tanaka et al., 2005).

Also, anesthesia with sevoflurane in comparison with Propofol provides better glycolysis in skeletal muscle cells in induction of ischemia with tourniquet (Carles et al., 2008). In contrast, Propofol decreases the activity of sympathetic nerves (Ebert et al., 1992). Apparently, the mechanism of glucose metabolism is different in anesthesia with Propofol with anesthesia surgery with sevoflurane (Kitamura et al., 2009). The probable mechanism of Propofol effect can be expressed in such a way that it can inhibit the activity of the sympathetic nervous system more than parasympathetic. In fact, bradycardia and ascites have been observed after induction of anesthesia, which sometimes leads to

recommend prescribing anticholinergic drugs at a time when there is a potential for vagus stimulation with Propofol prescription. Propofol reduces the resistance of peripheral arteries and blood pressure, which is most commonly observed with the same thiopental value. Vessel smooth muscle relaxation by Propofol is essentially related to the activity of vascular spasm nerves in the sympathetic nervous system. The effect of the negative inotropy of Propofol may be the result of inhibition of intracellular calcium intake. The effect of Propofol on blood pressure may be worse in patients with hypovolemic, elderly, and left ventricular dysfunctional patients with coronary artery disease. Despite the decrease in blood pressure, heart rate often remains fast and unchanged (Reves et al., 2000). Some studies concluded that cognitive function in the sevoflurane group was better than the Propofol group in elderly subjects after general surgery (Kheirkhah, 2014). According to the results of this study, it can be concluded that for cardiac catheterization in children with congenital heart disease, Propofol is more appropriate than sevoflurane. Anesthesiologists can use Propofol as a good alternative to sevoflurane.

References

1- Alavi Tabatabai, Maryam (2016). Comparing the effect of two methods of anesthesia with combination of ketamine / sevoflurane and ketamine / Propofol on cardiovascular-respiratory variables in diagnostic cardiac angiography patients of Pediatric Medical Center Hospital in 2014, Medical Ph.D., School of Medicine, Tehran University of Medical Sciences, Tehran, Iran.
2- Kheirkhah, Parviz. (2014). Comparison of Anesthetic Effects with Sevoflurane and Propofol on Early Cognitive Function in Elderly (55-65) Years, PhD, thesis of Anesthesiology, Kashan University of Medical Sciences.
3- Bernstein, D. (2000). The cardiovascular system: in: Behrman RE, Kliegman RM, Jenson HB, editors. Nelson textbook of pediatrics. 16th. Philadelphia; WB sunders, pp 1367-1455
4- Barst. Rj. (2001). Clinical management of patients with pulmonary hypertension; in: Allen Hd, Gutgesell Hp, Clark Eb, Driscoll DJ, editors. Moss and Adams heart disease in infants, children, and adolescents. 6th ed. Philadelphia; Lippincot Williams & Wilkins, 1347-1361
5- Carles M, Dellamonica J, Roux J, Lena D, Levraut J, Pittet JF, Boileau P, Raucoules-Aime M. Sevoflurane but not propofol increases interstitial glycolysis metabolites availability during tourniquet-induced ischaemia reperfusion. Br J Anaesth 2008; 100:29–35.
6- Ebert TJ, Muzi M, Berens R, Goff D, Kampine JP. Sympathetic responses to induction of anesthesia in humans with propofol or etomidate. Anesthesiology 1992; 76:725–33
7- Goh PK, Chiu CL, Wang CY, et al. Randomized double blind comparison of ketamine-propofol, fentanyl mask airway insertion conditions. Anaesth intensive care, 2005; 33(2): 223-8.
8- Greff M. Colorectal cancer screening in France: guidelines and professional reality. Endoscopy 1999; 31:471.
9- Liberman DA, Wuerker CK, Katon RM. Cardiopulmonary risk of esophagogasteroduodenoscopy: role of endoscope diameter and systemic sedation. Gastroentology, 1985; 88:468-72.
10- Jellish WS, Owen K, Edelstein S, Fleuder E, Leoneti JP. Standard anesthetic technique for middle ear surgical Procedures: A comparison of desflurane and sevoflurane. Otolaryngeal Head Neck Surgery, 2005; 133(2): 269-74
11- Hala M.S. Eldeen MD , Medhat M Messeha, Comparative study between the effect of sevoflurane and ketamine-midazolam on the cardiac troponin I level and hemodynamic variables in pediatric therapeutic cardiac catheterization for pulmonic stenosis, Ains Shams journal of anesthesiology, 2016, 9(1), 12-17
12- Kariman Majd MH, Emadi A, Nasiri E, et al. Comparative effects of Propofol and Ketamine in different dosage on patients hemodynamic changes under anesthesia. J Mazandaran Univ Med Sci, 2006; 16(54):7-13
13- Kitamura T, Ogawa M, Kawamura G et al. The effects of sevoflurane and propofol on glucose metabolism under aerobic conditions in fed rats. Anesth Analg 2009; 109: 1479–85.
14- Kirkpatrick T, cockshott ID, Douglas EJ, et al. Pharmacokinetics of Propofol (diprivan) in elderly patients. Br J Anaesth 1988;60(2):14650.
15- Lebovic S, Reich DL, Steinberg LG, et al. Comparison of Propofol Versus Ketamine for Anesthesia in Pediatric Patients Undergoing Cardiac Catheterization. Anesth Analg, 1992; 74:490-4
16- Patterson KW, Casey PB, Murray JP, et al. Propofol sedation for outpatient upper gastrointestinal endoscopy: comparison with Midazolam. Br J Anesth, 1991;67:108-11.
17- Patrick MR, Blair IJ, Feneck RO, et al. A comparison of the haemodynamic effects of propofol and thiopentone in patients with coronary artery disease. Postgrade Med J, 1985;61:23-7.
18- Peishun Qin, Dingxin Kang, Xiaowei Qian, Lexiao Jin. Propofol versus sevoflurane anesthesia in adults: a systematic review and meta-analysis, Int J Clin Exp Med 2016;9(7):13634-13641
19- Qureshi, SA. (2002). Catheterization and angiocardiography: in: Anderson RH, Baker EJ, Macartney RF, Rigby ML, Shinebourne EA, Tynn M, editors. Pediatric cardiology. Vol a, 2nd ed. London: Churchill Livingston, pp 567-618.
20- Reves JG, Glass PSA, Lubarsky DA. Nonbarbiturate intravenous anesthetics. In: Miller RD (ed). Anesthesia. Philadelphia. Churchill Livingstone, 2000; 228-272.
21- Reich DL, Silvay G. Ketamine: an update on the first 25 years of clinical experience. Can J Anaesth, 1989; 36:186-97
22- Short SM, Aun CS. Haemodynamic effects of propofol in children. Anaesthesia, 1991; 46(9):783-50.
23- Tanaka T, Nabatame H, Tanifuji Y. Insulin secretion and glucose utilization are impaired under general anesthesia with sevoflurane as well as isoflurane in a concentration-independent manner. J Anesth, 2005; 19:277– 81.
24- Thwaites AJ , Edmends S, Tomlinson AA, Kendall JB, Smith I. Double-blind comparison of sevoflurane vs propofol and succinylcholine for tracheal intubation in

in children. Br J Anaesth, 1999; 83: 410–4
25- Woods AW, Allam S. Tracheal intubation without the use of neuromuscular blocking agents. Br J Anaesth, 2005; 94: 150-158.
26- Weale N.K, Rogers C.A, Cooper R et al. Effect of remifentanil infusion rate on stress response to the prebypass phase of paediatric cardiac surgery. British Journal of Anaesthesia, 2004; 92(2): 187-94.
27- Zeynep Tosun, MD , Aynur Akin, MD, Gulen Guler, MD, Aliye Esmaoglu, MD, Adem Boyaci, MD. Dexmedetomidine-Ketamine and PropofolKetamine Combinations for Anesthesia in Spontaneously Breathing Pediatric Patients Undergoing Cardiac Catheterization, Journal of Cardiothoracic and Vascular Anesthesia, 2006; 20(4), 515–519.

Prevalence and risk factors of obesity in children aged 2–12 years in the Abu Dhabi Islands

Eideh Al-Shehhi (1)
Hessa Al-Dhefairi (1)
Kholoud Abuasi (1)
Noora Al Ali (1)
Mona Al Tunaiji (2)
Ebtihal Darwish (2)

(1) Family Medicine Residents
(2) Supervisors

Corresponding author:
Eideh Al-Shehhi
Family Medicine Resident
Family Medicine Residency Program
Sheikh Khalifa Medical City
Email: ealshehhi@seha.ae

Abstract

Background: The prevalence of childhood obesity has grown at an alarming rate worldwide over the last few decades. The negative health outcomes of obesity, including the increased risk of non-communicable disease, morbidity, mortality, and the cost of health services, make this condition a major public health problem.

Aim: To measure the prevalence and risk factors of obesity in children aged 2–12 years in the Abu Dhabi Islands, United Arab Emirates.

Methods: A questionnaire was submitted to 274 mothers with children aged 2–12 years at 2 governmental ambulatory health care centers in Abu Dhabi. This cross-sectional study was conducted between February 2014 and January 2015.

Results: The prevalence of overweight and obesity among the study population was found to be 32.8% overall (15.3% and 17.5%, respectively). In the study population, 59.1% were of normal weight and 8% were underweight. The prevalence of childhood obesity was found to be higher among UAE nationals than non-UAE-nationals (22.2% vs. 10.4%; $p = 0.016$). We observed a statistically significant relationship between obesity and child age ($p = 0.001$), with 6.2% of children aged 2–4 years being obese compared to 29.2% of children aged 11–12 years. Parents of the obese children underestimated the problem. We found that in 84% of normal weight children, their parents perceived them as having a normal weight. By comparison, only 16% of obese children were perceived by their parents as obese. This difference is statistically significant ($p < 0.001$).

Conclusion: The prevalence of overweight and obesity among children is increasing in the UAE, especially among UAE nationals. Moreover, obesity increases with age, and children who are obese in the first years of their life will stay obese in their late childhood. Most parents of obese children fail to perceive their children as obese.

Key words: obesity, children, Abu Dhabi

Please cite this article as:. Al-Shehhi E.. et al. Prevalence and risk factors of obesity in children aged 2–12 years in the Abu Dhabi Islands *World Family Medicine.* 2017; 15(9):61-74. DOI: 10.5742/MEWFM.2017.93103

Introduction

The prevalence of obesity is rapidly growing worldwide. The World Health Organization estimates that 42 million children under the age of five are obese (WHO, 2015). Based on available data, overweight and obese children are more likely to remain obese into adulthood. With the increased incidence of obesity in children, more health problems are expected in the next generation of adults. Cardiovascular diseases, diabetes, joint diseases, endocrine disorders, respiratory problems, several types of cancer, psychological stresses, and other obesity-related conditions will be found in the next young adult populations. The negative impact of obesity on morbidity, mortality, and healthcare costs make this condition a major public health problem.

High rates of childhood overweight have been reported in many developing countries, including the Middle Eastern countries. The UAE is one of the developing countries that has gone through a rapid socioeconomic transition over the past four decades, leading to fundamental changes in the population's lifestyle, dietary habits, and physical activities.

A genetic predisposition is a significant risk factor for childhood obesity and overweight, but the global rise in the prevalence of childhood obesity suggests that factors other than genes are involved. Changes in the world food economy and the trend toward a sedentary lifestyle are considered the main reasons for this public health problem (T. Lobstein, 2004). Increased energy-dense diets that are high in fat, particularly saturated fat, and low in unrefined carbohydrates, in addition to motorized transport, labor saving devices at home, and physically undemanding leisure activities are examples of obesity risk factors today.

Many people believe that dealing with overweight and obesity is a personal responsibility. To some degree they are right, but it is also a community responsibility. The community has a responsibility to provide safe, accessible places for children to play or ride a bike. Schools should have daily physical education and provide healthy food choices. Mothers should be educated by their doctors about the benefits of breast-feeding and how to prevent childhood obesity. All these measures are examples of how the community can assume some responsibility in addressing the problem of childhood obesity.

For children aged 2–19 years, the WHO defines overweight as a BMI at or above the 85th percentile and lower than the 95th percentile and obesity as a BMI at or above the 95th percentile for children of the same age and sex. The calculated BMI can be plotted on a BMI-for-age growth chart to obtain a percentile ranking. These percentiles are the most commonly used indicators for assessing the size and growth patterns of individual children (WHO, 2015). This study aims to determine the prevalence and risk factors for obesity in children aged 2–12 years in the Abu Dhabi Islands, UAE.

Limitations

The percentage of children aged 6–11 years in the United States who were obese increased from 7% in 1980 to nearly 18% in 2012. Similarly, the percentage of adolescents aged 12–19 years who were obese increased from 5% to nearly 21% over the same period (CDC, 2015). In 2012, more than one-third of children and adolescents in the US were overweight or obese (CDC, 2015).

Significant changes in UAE society over the last 30 years have brought about profound increases in the number of overweight individuals (Al-Hourani HM, 2003). The prevalence of childhood obesity in the UAE is surpassing the international standards of obesity among children and adolescents (A.A. Bin Zaal, 2011). A sample of UAE school children found 1.8 times more obese children than in the US (Al-Haddad FH, 2000). In the year 2000, obesity and overweight among UAE children was estimated at 8.3% using data from a UAE National Survey of school-aged individuals (Cole TJ, 2000). Another study published in 2012 specifically in the Emirate of Abu Dhabi showed that 14.7% of school-aged children are overweight and 18.9% are obese. Further analysis restricted to UAE nationals showed that 14.2% were overweight and 19.8% were obese (A Al Junaibi, 2012).

Comparing the UAE to other Gulf countries, the prevalence of overweight was found to be nearly 2–3 times higher in both sexes compared to their Bahraini counterparts; compared to their Kuwaiti counterparts aged 12–14 years, the prevalence of obesity amongst Dubai adolescents was 1.5–2 times higher (A.A. Bin Zaal, 2011).

Overweight children are at increased risk of being obese in adolescence. A study conducted by Al Haddad in 2005 showed that overweight UAE males increased in frequency from 16.4% at age 10 to more than 29% at age 18, and obesity increased from 6.1% at age 10 to 18% at age 18. UAE female children exhibited a different pattern: 22.8% were overweight at age 10 years, and more than 27% were overweight at 18 years. Obesity among UAE females increased from 7.8% at 10 years of age to 9.6% at 18 years of age (Al-Haddad FH, 2005).

Al Junaibi identified several independent determinants of obesity, including older age, male sex, lack of dairy consumption, and higher parental BMI. The same study showed no associations with exercise, perhaps due to the inaccurate self-reported nature of this variable (AAl Junaibi, 2012). Another study by Al-Junaibi found that 33.8% of the parents of overweight/obese children misclassified their child's weight status, either by underestimation (27.4%) or overestimation (6.3%). Misclassification was highest among parents of overweight/obese children (63.5%) and underweight (55.1%) children (Abdulla Aljunaibi, 2013).

Multiple factors underlie childhood obesity, including diet and lack of exercise. Nepper and Chai showed that 40% of the food consumed by children and adolescents is high in calories and fat, including sugar-sweetened beverages,

junk food, and desserts. In a study in which students, parents, and teachers were interviewed, all subjects confirmed that there are barriers to accessing healthy foods in the school and community (Kelly Stott, 2012).

A study of children in the UAE cited cultural and weather restrictions as the main reasons for their lack of physical activity (Al-Hourani HM, 2003). The study found that although there was less watching of television on school days (less than 2 hours a day) compared to weekends (3 hours), there was no significant difference in energy expenditure between school days and weekends. Al-Hourani attributed this observation to the high temperatures during daylight hours. In addition, Al-Hourani stated that female children find it difficult to wear clothes suitable for exercise, which may impede their interest in physical activity (Al-Hourani HM, 2003). As children grow older, they tend to spend less time sleeping and more time doing physical activities. However, the same study found that this general trend is not true for adolescent females living in the UAE, as the time spent sleeping and engaging in physical activity were similar between girls aged 11–13 years and 14–16 years. In fact, the number of hours spent sleeping was high in both groups (Al-Hourani HM, 2003)

Methodology

Study design

This cross-sectional, questionnaire-based study was conducted at 2 randomly-chosen ambulatory health care centers on the Abu Dhabi Islands: the Al Bateen clinic and the Zaafarana clinic.

Study participants

Children aged 2–12 years (n = 274) and their parents were recruited from February 2014 to January 2015. Children with chronic diseases, children of parents who were non-Arabic and non-English speakers, and children not accompanied by their parents were excluded from the study. The total study population size was estimated to be 1,253 based on clinic visits the same months of the previous year. The sample size of 291 was calculated using a sample size calculator with 95% CI and 5% margin of error. The final sample size was 274 after the exclusion of 17 subjects because of missing medical records.

Questionnaire

The questionnaire was developed based on those used in previously reported studies. The questionnaire was divided into three parts: 1) Questions regarding family socio-demographic factors and parental factors contributing to the development of childhood obesity (8 questions); 2) Questions regarding the child's lifestyle, including dietary practices, physical activities, and sleeping hours (11 questions); 3) Questions regarding physical parameters, including the child's weight, height, and BMI. The questionnaire was prepared in 2 versions, Arabic and English.

Part 1 of the questionnaire included the ages of the parents (20–30 years, 31–40 years, 41–50 years, or above 50 years), nationality (UAE national or non-UAE national), level of education (illiterate, primary school, secondary school, or university), family income (very low, not sufficient, sufficient, more than sufficient), whether either parent was overweight or obese (yes or no), the number of children in the family (1–2, 3–4, 5–6, or more than 7), and age of the child subject (2–4, 5–7, 8–10, or 11–12 years). Part 2 included questions regarding the consumption of healthy food and junk food (never, rare, sometimes, or always), activities including watching TV, video games, iPad use (never, 1–3, 4–6, or more than 6 h), exercise (never, 1–2, 3–4, or 5 or more times/week), and sleeping hours (less than 4, 4–6, 7–10, or more than 10 hours/day), and parent's impression of their child's weight (thin, normal, overweight, or obese). Part 3 asked about the child's weight (kg), height (cm), and BMI (number and percentile). A pilot study was conducted before finalizing the questionnaire, and modifications were made accordingly.

Data collection

All children aged 2–12 years who were accompanied by a parent, were approached by a staff nurse to request their participation in the study until the sample size was achieved. The BMIs were obtained from the medical records of all selected participants. Trained, qualified nurses working in the ambulatory health service assessed the growth characteristics of the children as part of routine health care at each clinic visit. They measured the height and weight using an electronic scale and height meter. The height was measured with the subject in a standing position without shoes, and the weight was measured while the subject wore light clothing. Growth charts and parameters, including BMIs, were recorded by the nurses using a computerized system.

Statistical analysis

The data were organized using the Excel software program and analyzed using the Statistical Package for Social Sciences (SPSS) version 18. The total and sub-category scores were compared with each other and with socio-demographic factors using the Pearson correlation coefficient (r) and chi-square coefficient (X2). A p-value <0.05 was considered indicative of statistical significance.

Ethics approval

The National Institute of Health (NIH) web-based training course "Protecting Human Research Participants," was completed to meet the ethics requirements. Approval was obtained from the SKMC Institutional Review Board/ Research Ethics Committee (IRB/REC) in February 2014.

Results

Demographic characteristics of participants

This study enrolled 274 participants, 71.9% of whom were accompanied by their mothers and 28.1% by their fathers. The majority of the parent participants were 31–40 years old (62.7% of mothers, 56.3% of fathers). The cohort comprised 61.2% UAE nationals and 38.8% non-UAE-nationals. The majority of the respondents (54.4%) were university graduates, while 1.1% were illiterate. The perceived family income was sufficient in 73.5%, sufficient

with savings in 19.8%, and insufficient in 6.7%. Most of the participants had 3–4 children (53.3%), while 17.6% had 1–2, 22.4% had 5–6, and only 6.6% had 7 or more. The age distribution of the child participants was almost uniform, with 26.6% age 2–4, 28.1% 5–7, 25.9% 8–10, and 19.3% 11–12 years. The socio-demographics of the study population are presented in Table 1.

Table 1. Socio-demographic data

Characteristic	n (%)
Child age	
2–4 years	73 (26.6)
5--7 years	77 (28.1)
8--10 years	71 (25.9)
11--12 years	53 (19.3)
Mother age	
20--30 years	50 (18.7)
31--40 years	168 (62.7)
41--50 years	47 (17.5)
> 50 years	3 (1.1)
Father age	
20–30 years	11 (4.1)
31–40 years	151 (56.3)
41–50 years	93 (34.7)
> 50 years	13 (4.9)
Nationality	
UAE National	167 (61.2)
Non-UAE National	106 (38.8)
Education	
Illiterate	3 (1.1)
Primary school	16 (5.8)
Secondary school	88 (32.1)
University	149 (54.4)
Above university	18 (6.6)
Income	
Not sufficient	18 (6.7)
Sufficient	197 (73.5)
Sufficient and saving	53 (19.8)
Number of children	
1–2	48 (17.6)
3–4	145 (53.3)
5–6	61 (22.4)
≥7	18 (6.6)

Prevalence of overweight and obesity

The prevalence of overweight and obesity in the study population was found to be 32.8% (15.3% and 17.5%, respectively), with 59.1% of normal weight and 8% underweight (Figure 1).

Parent perception of weight

When asked about their own weight, 52.4 % of the parents perceived themselves as normal weight, while 43.6% saw themselves as overweight and 2.9% saw themselves as obese (Figure 2).

When asked about their spouse's weight, 4.1% of the parents perceived their spouse as underweight, 64.9% as normal, 28% as overweight, and 3% as obese (Figure 3). The majority of the respondents perceived their child's weight as normal (71.8%), while only 15% perceived their children as overweight and 2.9% as obese (Figure 4).

Child lifestyle

Of the child participants, 0.4 % slept less than 4 hours/day, 11% slept 4–6 hours/day, 83% slept 7–10 hours/day, and 5.5 % slept more than 10 hours/day. The majority of children spent 1–3 hours/day watching TV (60.1%), while a minority (2.9%) watched TV for more than 6 hours/day. Most of the children exercised 1–2 times/week (45.5%), while only 11.9% exercised rarely or never (Table 2).

The prevalence of childhood obesity was found to be higher among UAE nationals than non–UAE-nationals (22.2% vs. 10.4%; $p = 0.016$) (Figure 5).
Obesity and child age correlated significantly ($p = 0.001$), with obesity in 6.2% of children aged 2–4 years compared to 33.3% of children aged 8–10 years (Figure 6). The parents of 84% of normal weight children perceived their child as having a normal weight, while 16% of the parents of obese children perceived their child as obese. This finding was statistically significant ($p < 0.001$) (Figure 7).

Most of the children slept 7–10 hours, regardless of their weight (normal weight, 81% of participants; overweight, 90%; obese, 85.4%) (Figure 8). The majority of children spent 1–3 hours/day watching TV (normal weight, 63%; obese, 54.2%) (Figure 9). Most of the obese children exercised 3–4 times/week (37.5%), while the majority of overweight and normal weight children exercised 1–2 times per week (47.5% and 50%, respectively) (Figure 10).

Eating habits

Most children reported a good appetite (44.3%), while 11.4% reported never having a good appetite. Of the obese children, 39% always had good appetite compared to only 15.7% of normal weight and 9.1% of underweight children. This difference is statistically significant ($p < 0.001$) (Figure 11). The majority of children always ate home-cooked food (49.3%), while only 1.5% never ate home-cooked food. The majority of children (55%) always ate breakfast, while a minority (4.1%) never did. Fruits and vegetables were sometimes eaten by 42.3% of the children and never eaten by 1.5%. The majority of obese children always ate home-cooked food, breakfast, and vegetables and fruits (Figure 12, 13, and 14, respectively). Fast food was eaten by 53.3% of the children; only 3.7 % never ate fast food. Chocolate, chips, and soft drinks were sometimes eaten by 49.3% of the children and never eaten by 0.7% (Table 3) The majority of the overweight and obese children sometimes eat these foods (Figures 15, 16, respectively).

Figure 1. Prevalence of childhood obesity (2–12-year-olds) in the Abu Dhabi Islands (n = 274)

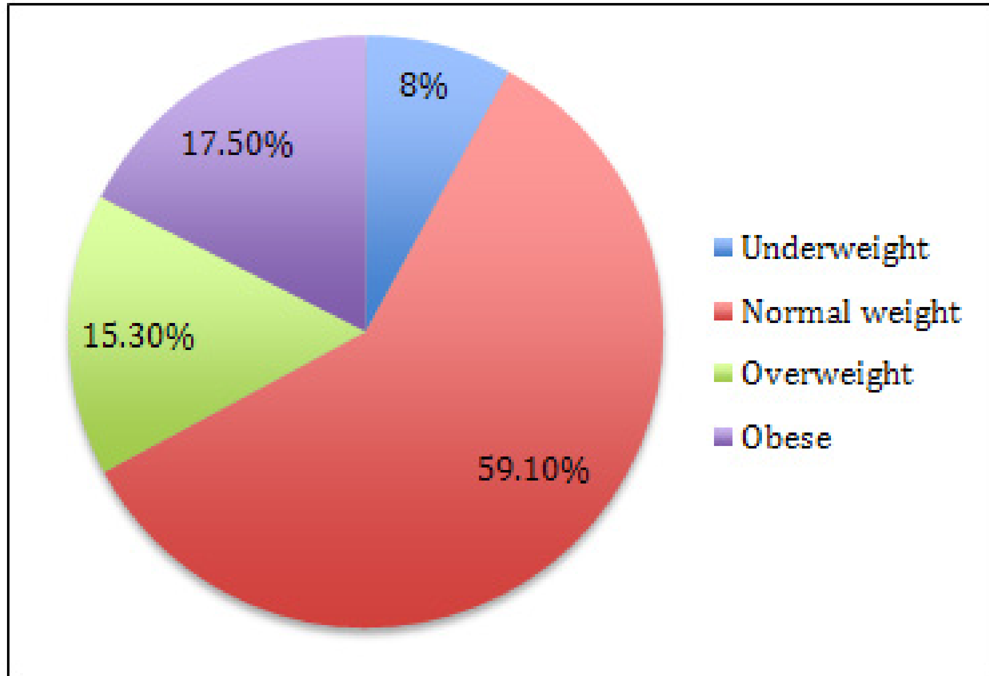


Figure 2. Parent perception of their own weight

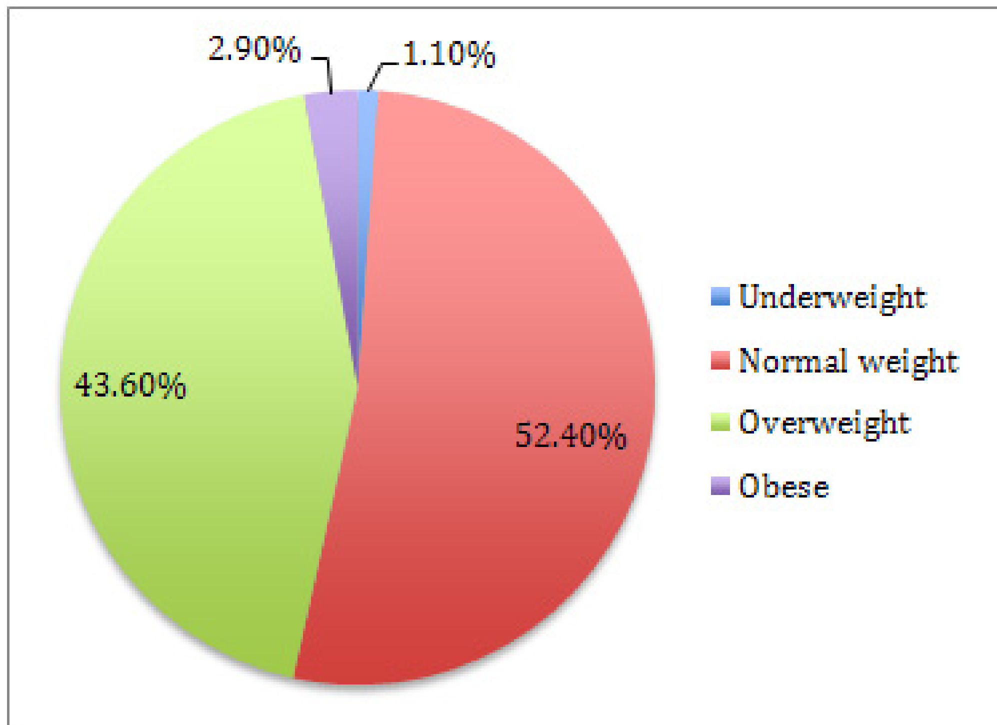


Figure 3: Parent perception of spouse's weight

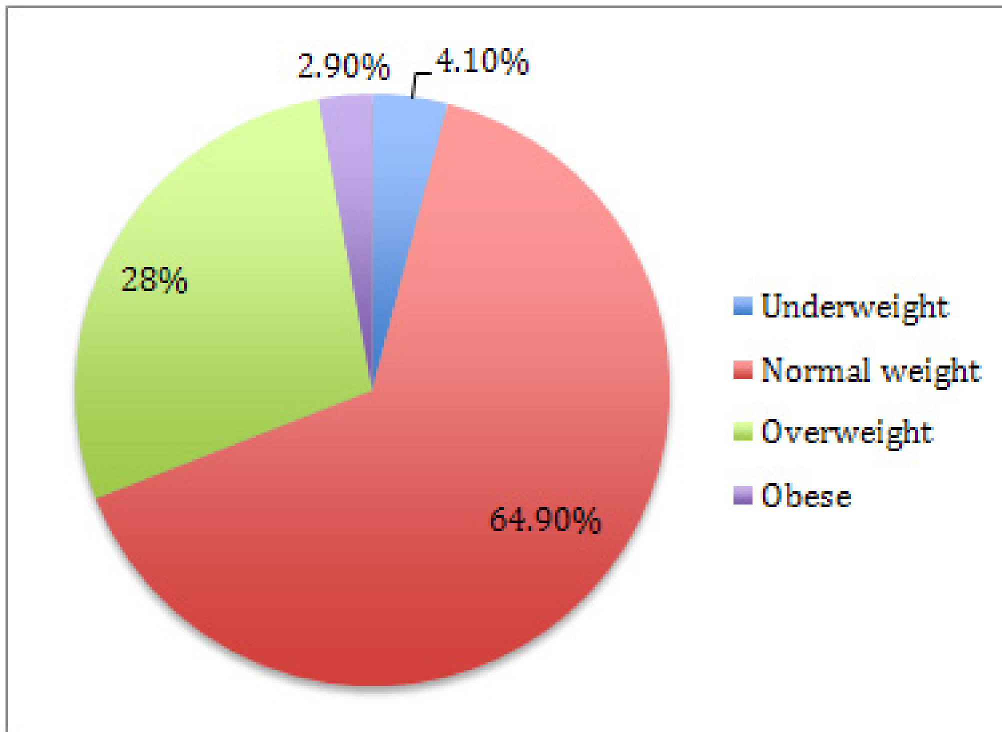


Figure 4: Parent perception of child's weight

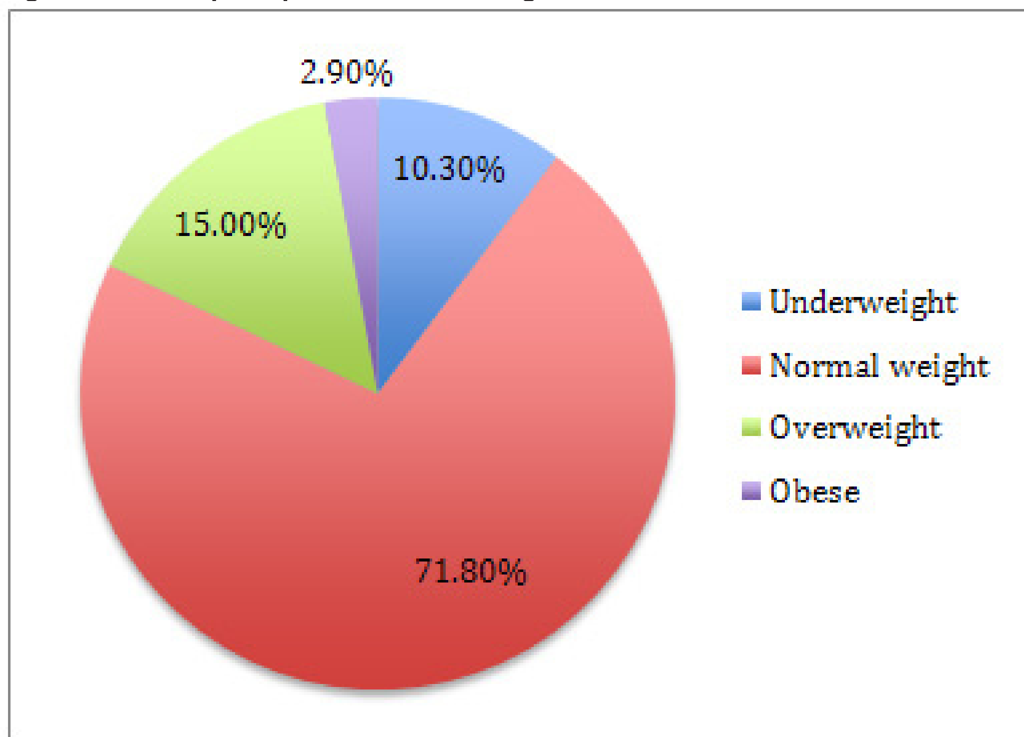


Table 2: Child lifestyle

Hours spent sleeping/day	
<4 hours	0.4%
4–6 hours	11%
7–10 hours	83%
> 10 hours	5.5%
Hours/day spent watching TV	
Never or < 1 hour	14.7 %
1–3 hours	60.1%
4–6 hours	22.3 %
>6 hours	2.9 %
Exercise per week	
Never, rarely	11.9 %
1–2 times	45.5%
3–4 times	29.5%
5 times or more	13.1%

Figure 5. Obesity prevalence among UAE nationals vs. non-nationals (n = 274)

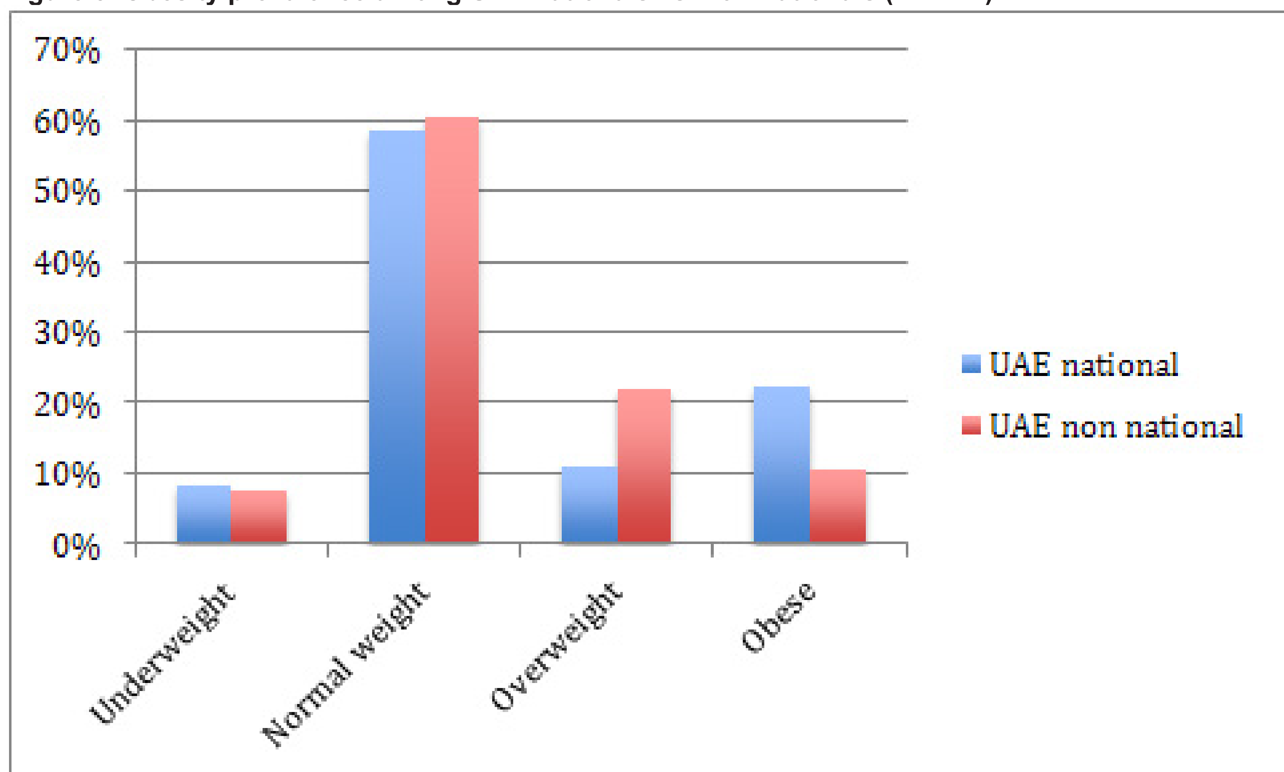


Figure 6: Association between child age and obesity

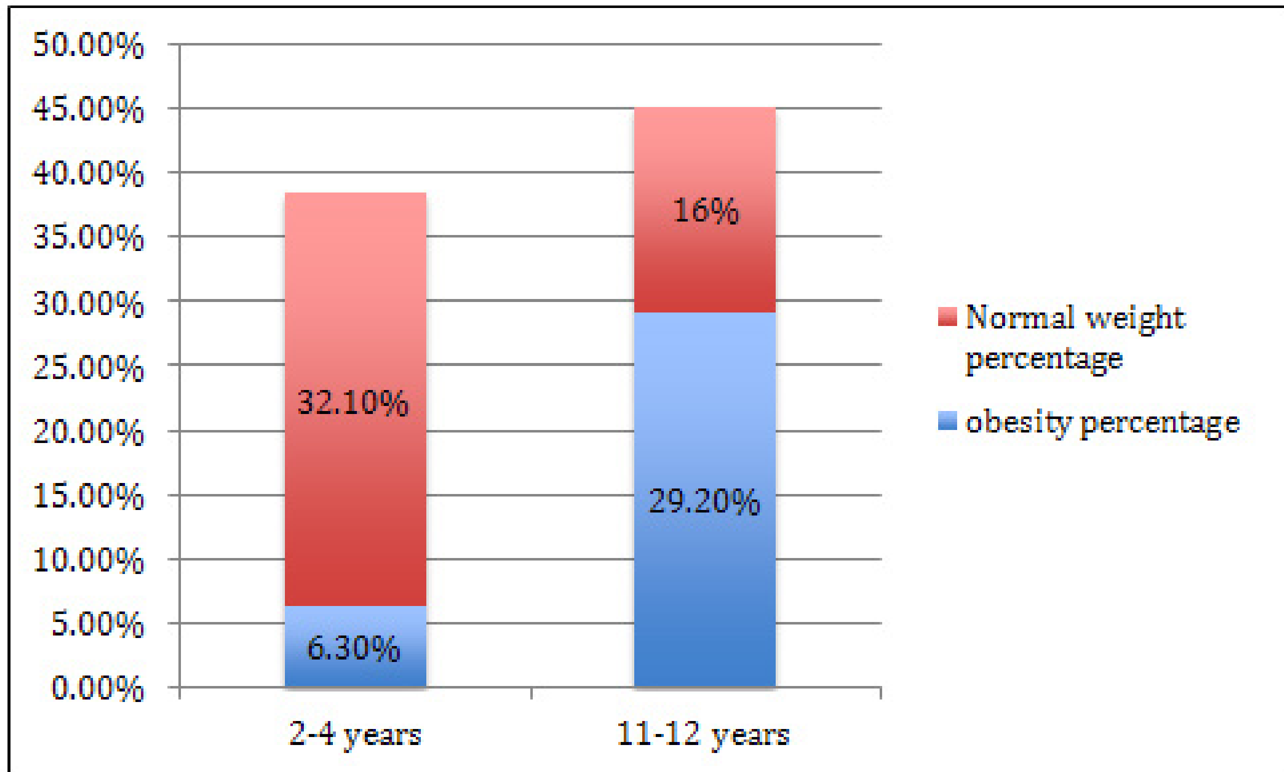


Figure 7: Parent perception of their obese child's weight status

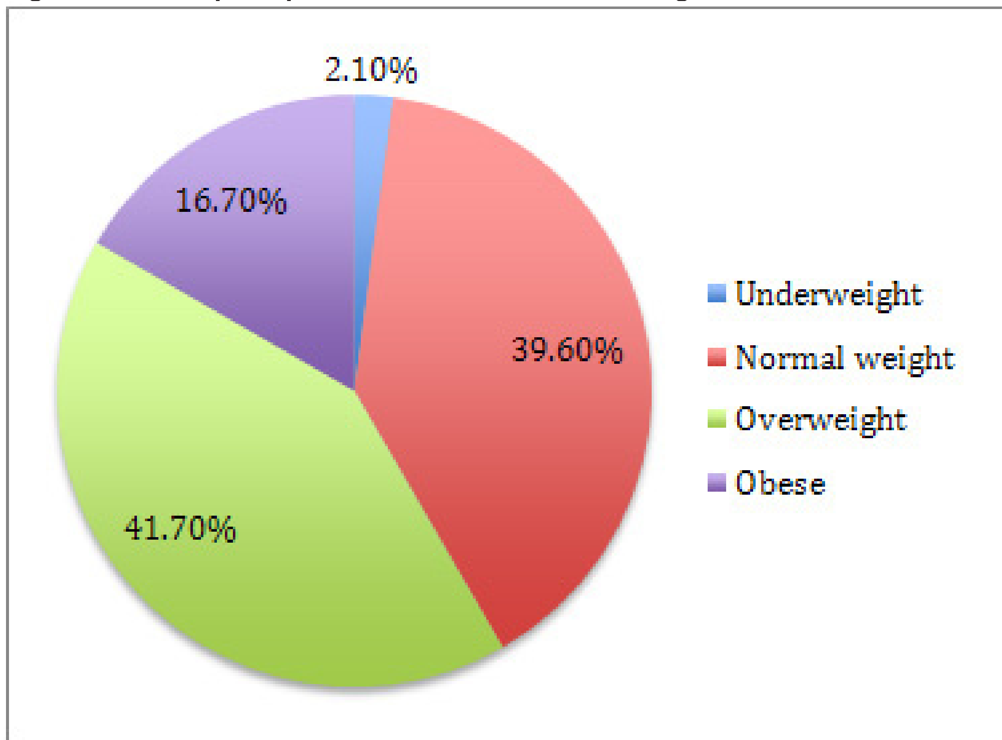


Figure 8: Association between hours slept/day and child weight

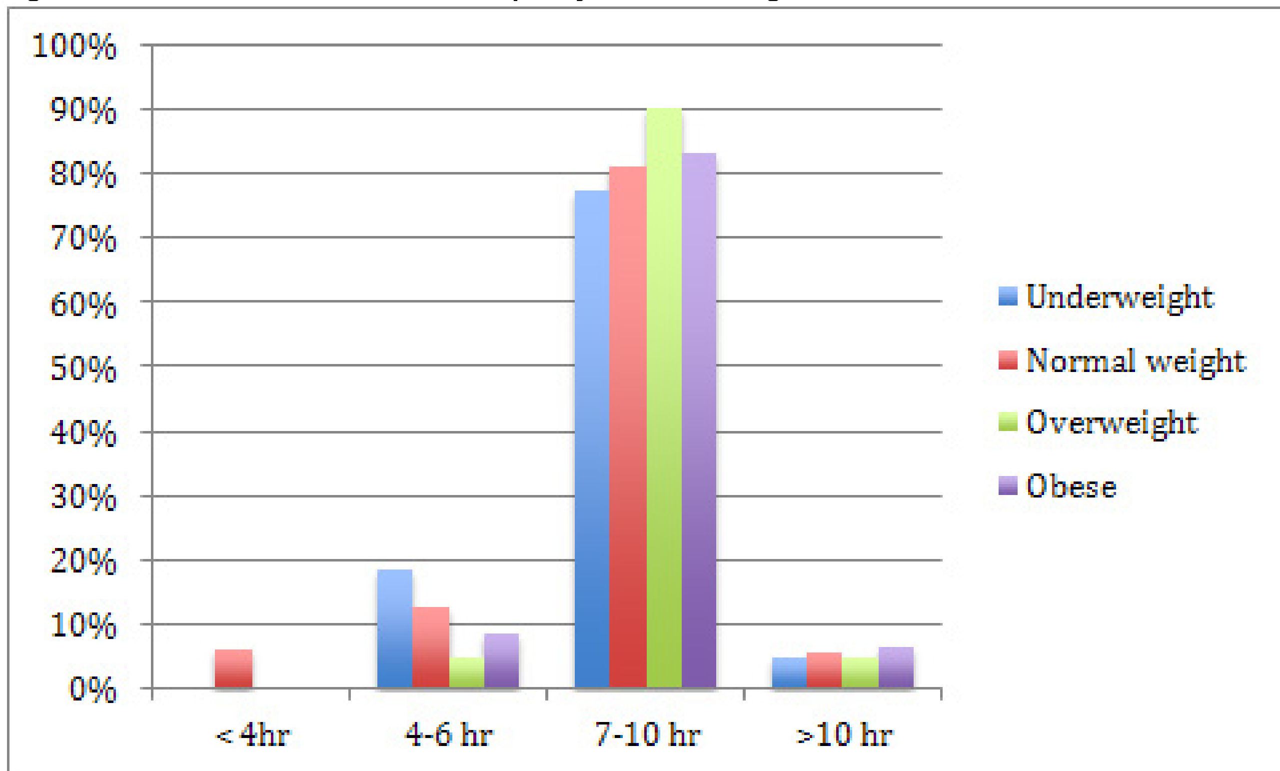


Figure 9: Association between hours/day spent watching TV and child weight

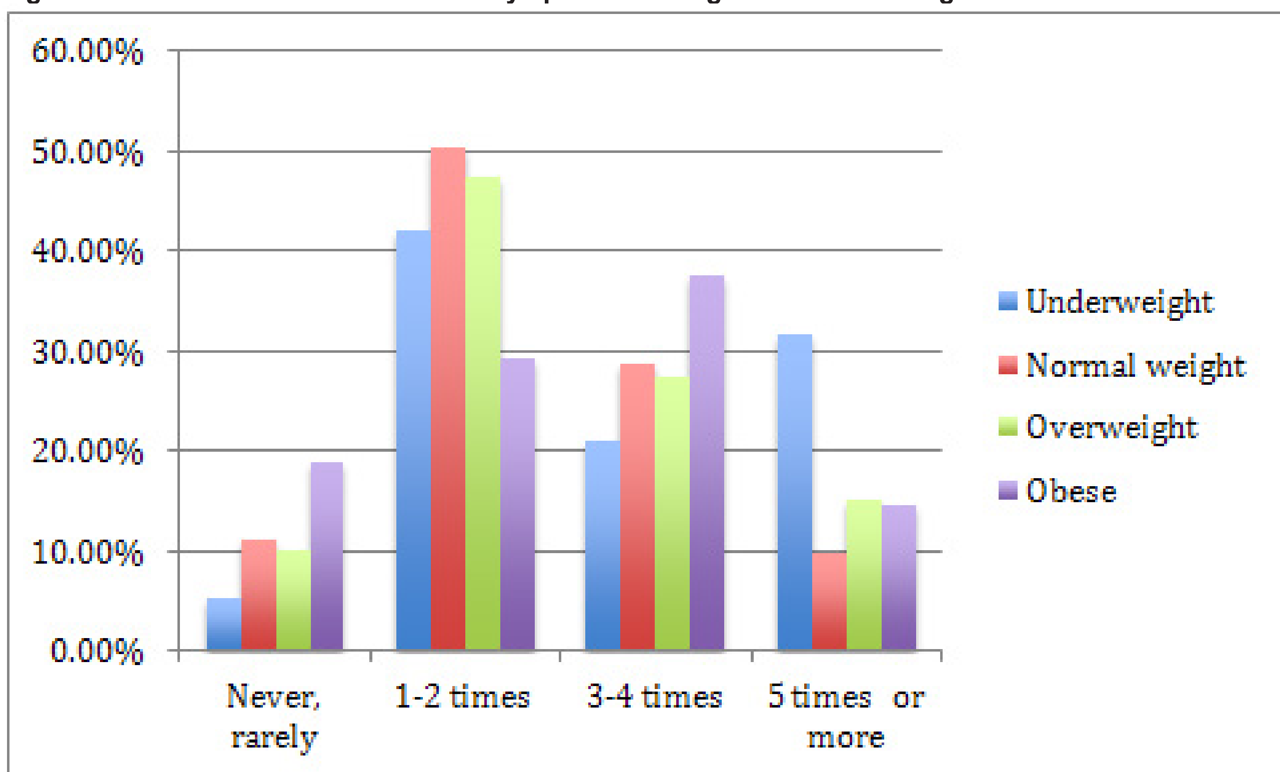


Figure 10. Association between exercise hours/week and child weight

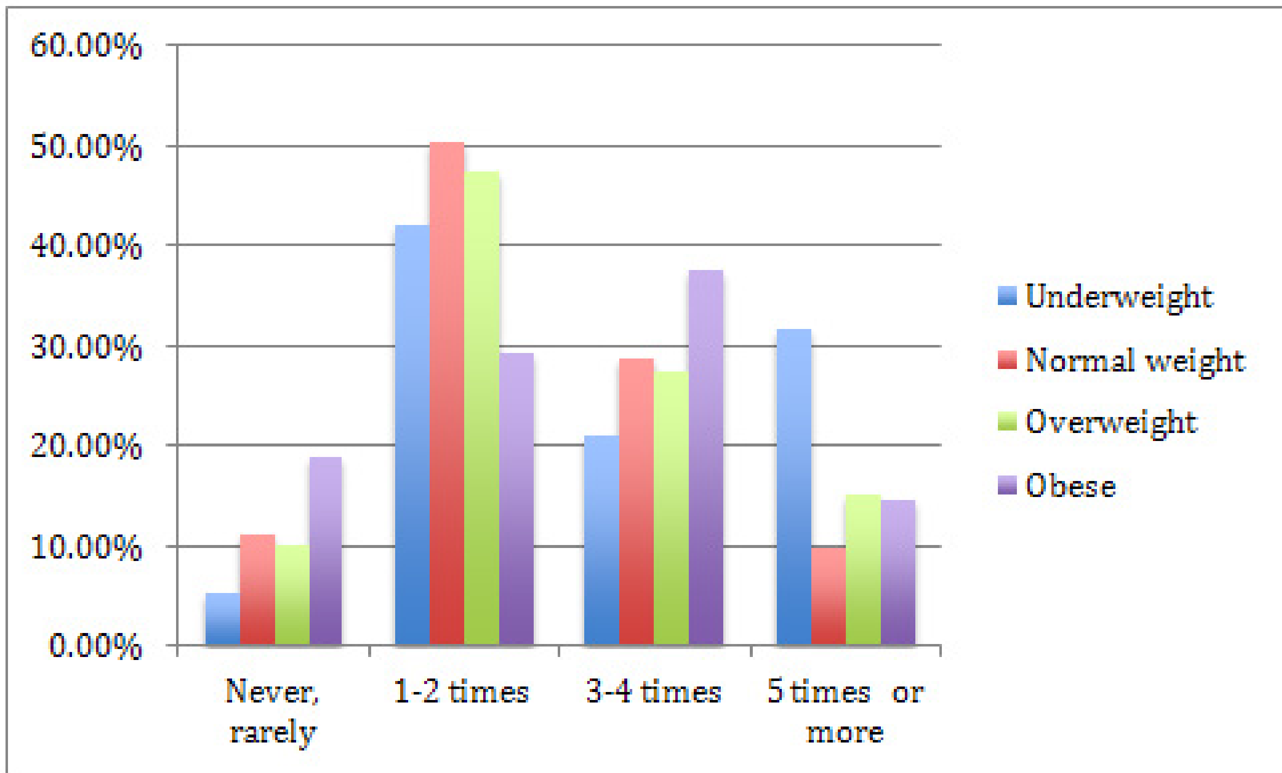


Figure 11: Association between appetite and child weight

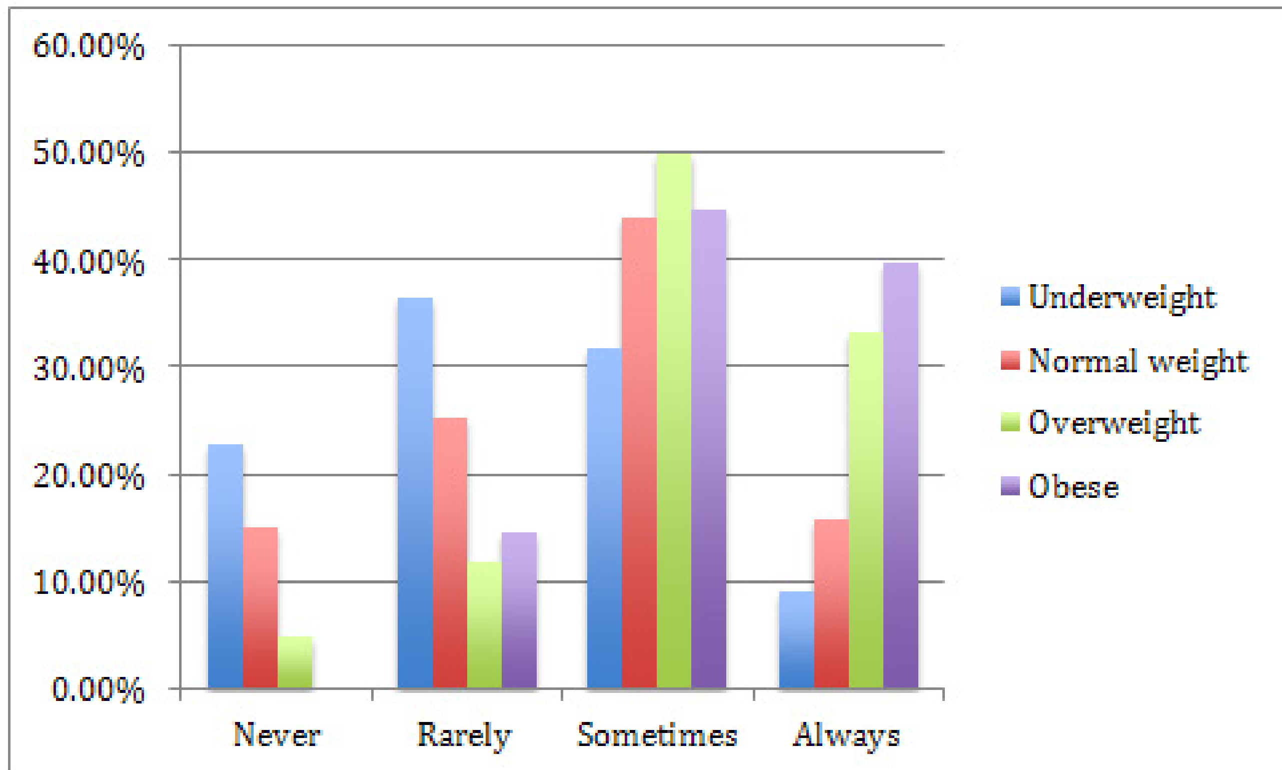


Figure 12: Association between eating home-cooked food and child weight

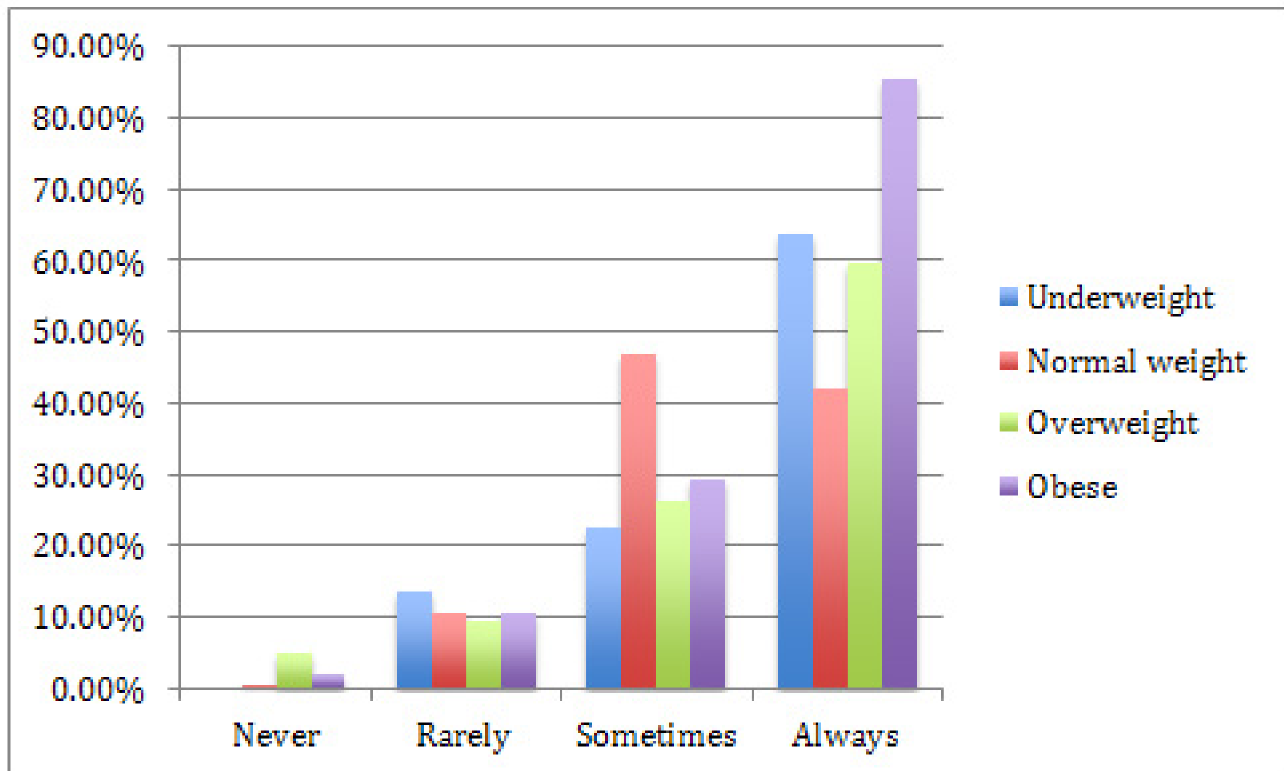


Figure 13: Association between eating breakfast and child weight

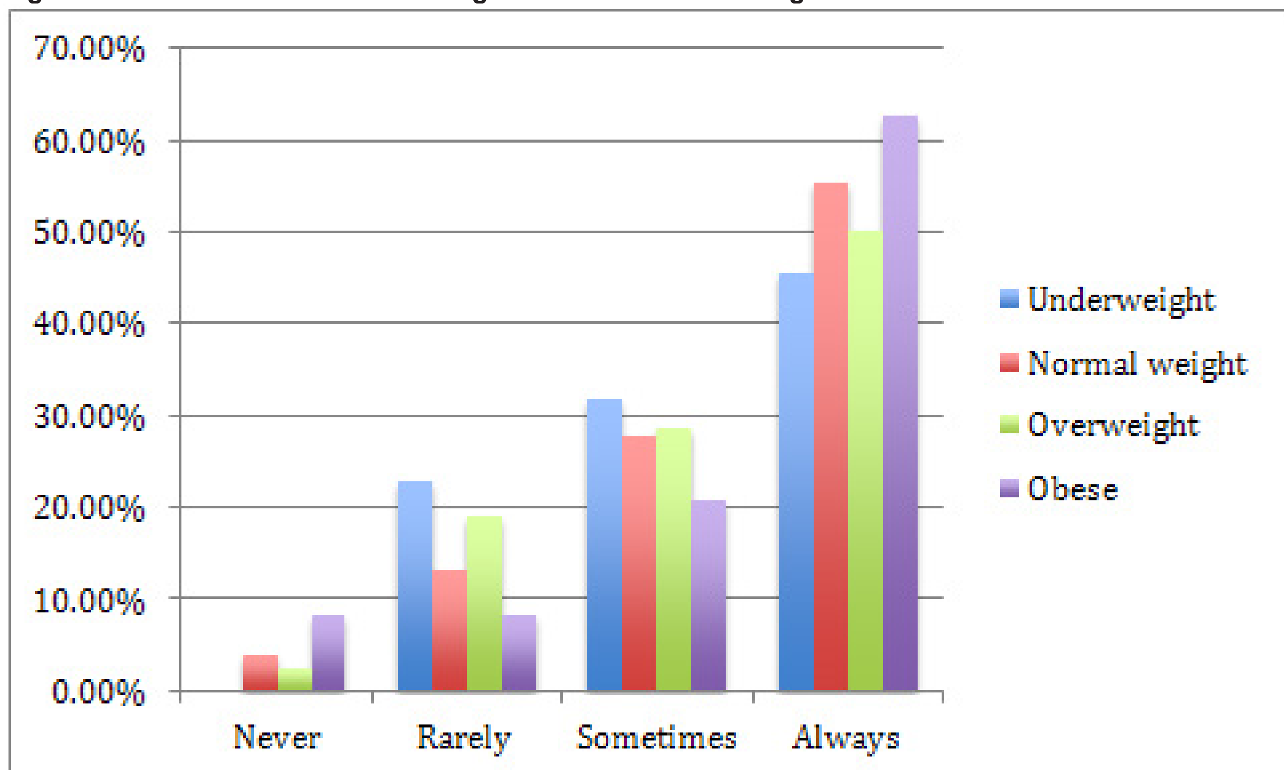


Figure 14. Association between eating vegetables and fruits and child weight

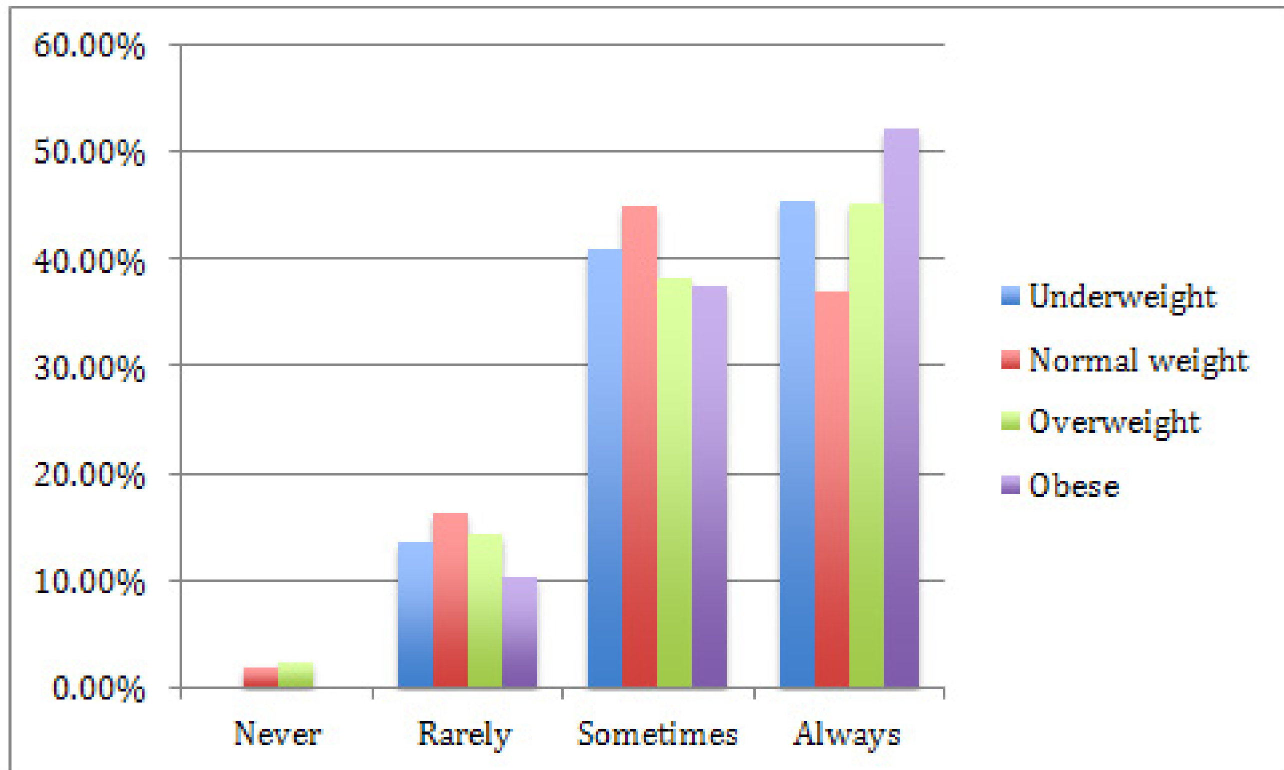


Table 3: Child eating habits

	Never	Rarely	Sometimes	Always
Does your child have a big appetite?	11.4%	22.1%	44.3%	22.1%
Does your child like home-cooked food?	1.5%	10.6%	38.7%	49.3%
Does your child eat breakfast?	4.1%	14%	26.9%	55%
Does your child eat vegetables and fruits?	1.5%	14.7%	42.3%	41.5%
Does your child eat fast food?	3.7%	33.3%	53.3%	9.6%
Does your child eat chocolate, chips, or soft drinks?	0.7%	23.9%	49.3%	26.1%

Figure 15. Association between eating fast food and child weight

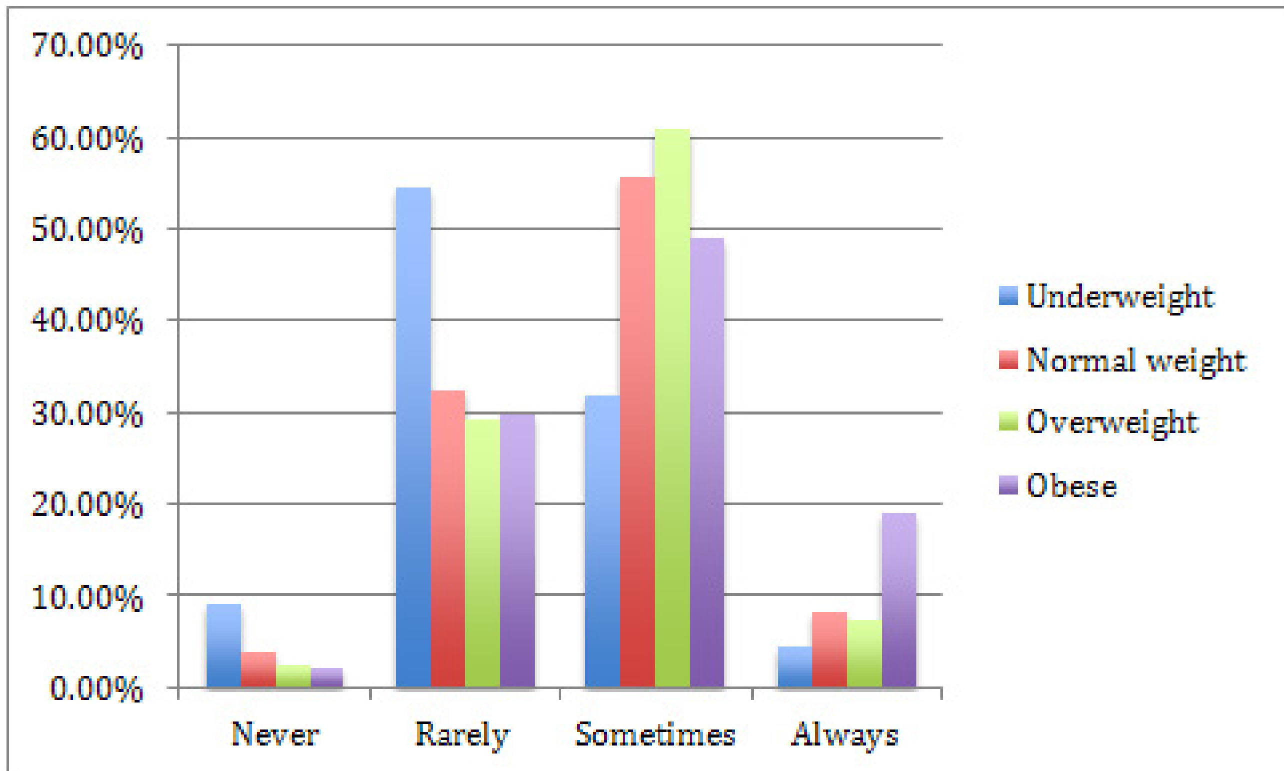
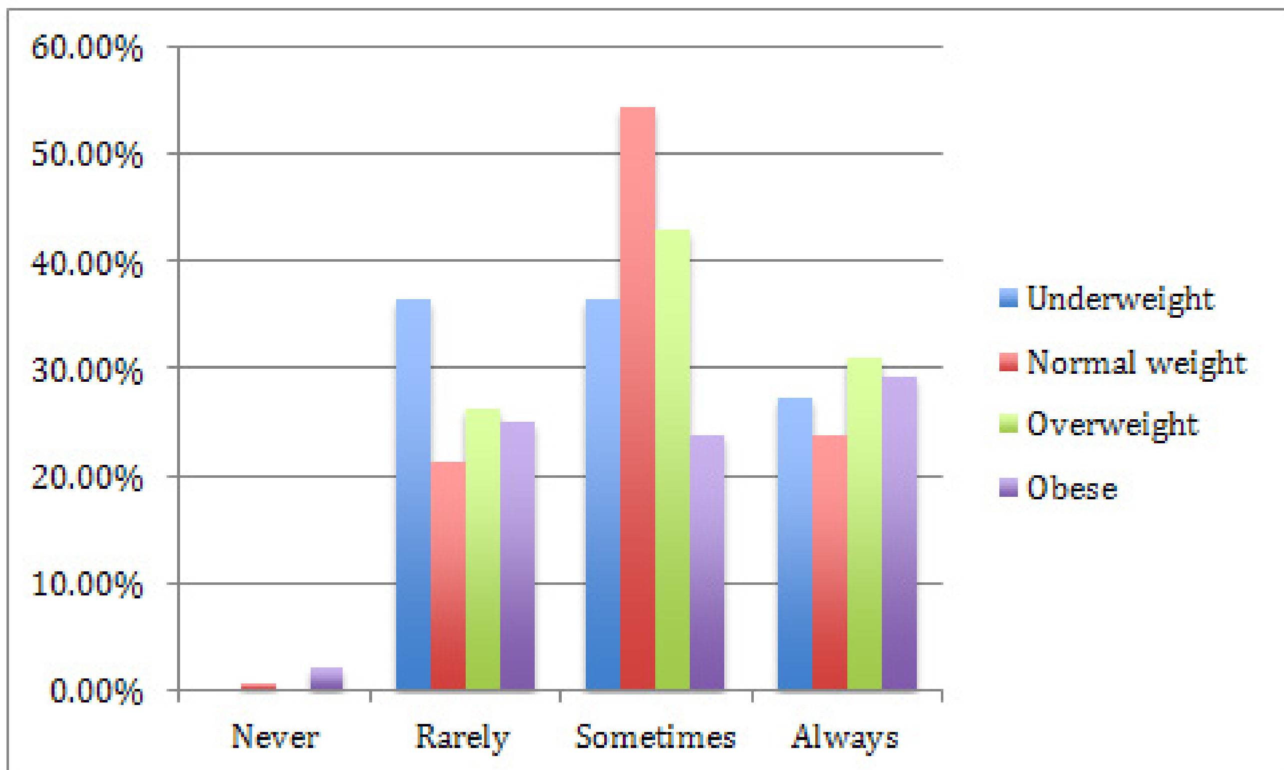


Figure 16. Association between eating chocolate, chips, and soft drinks and child weight



Discussion

Our results show that the prevalence of overweight and obesity among children in the Abu Dhabi Islands is 15.3% and 17.5%, respectively. Similar results were found in another Abu Dhabi study published in 2012, reporting that 14.7% of children were overweight and 18.9% were obese. That study reported that obesity among UAE nationals was 19.8% compared to 22.2% in this study, conducted 3 years later. This indicates that the problem is increasing.

We observed a statistically significant relationship between obesity and child age in our study ($p = 0.001$). The same conclusion was reached by Al-Haddad, as discussed in the literature review. A similar finding was seen in a CDC report that showed the prevalence of obesity in children (6–12 years old) in the United States was 18% in 2012, indicating that obesity is a global public health issue.

Parental participation is a key factor in the prevention and management of childhood obesity. Parental perception of their children's weight status was measured in our study, and the majority of parents of overweight/obese children (84%) underestimated their child's weight status. In 2013, Al-Junaibi found that 63% of parents of overweight/obese children underestimated their weight and perceived their child as having a normal weight.

Previous studies have shown that the level of education, income, sedentary lifestyle, less physical activity, and a tendency toward high-calorie diets are factors contributing to obesity. These factors were not identified as significant in our study, limiting our ability to formulate clear intervention guidelines. However, differences between our study and other studies, including methodology, sample selection, sample size, and design, may limit their comparability.

Our findings provide a warning signal that obesity in children has become a major health problem in our country and may have further negative consequences in the future. Further research is needed to understand the underlying causes of this problem and to devise appropriate recommendations for its prevention.

Limitations

The questionnaire used in this study was not validated, which may be a limitation of this study. In addition, the lack of previous similar research limits the scope of our analysis. Furthermore, the study population we chose (children aged 2–12 years) is younger than that of most previous studies, making comparisons difficult.

Conclusion and Recommendations

The prevalence of overweight and obesity among children is increasing in the UAE, especially among UAE nationals and in late childhood. Most parents of obese children fail to perceive their children as obese. Parents should understand the huge problem of obesity and its impact on society. Our recommendation is to focus more attention on UAE nationals and children during early childhood by means of a robust awareness campaign and a health education program to prevent obesity. In addition, schools and health authorities should work together to improve the sports curriculum and find a solution to this problem.

Acknowledgments

This research was supported by the Family Medicine Residency Program at Sheikh Khalifa Medical City. We thank our colleagues, the charge nurses, and nurses from Bateen and Zafarana clinic who helped us in distributing and collecting the questionnaires. We would also like to show our gratitude to Dr. Ebtihal Darwish for sharing her experience and knowledge that greatly assisted the research.

References

A Al Junaibi, A. A.-A. (2012, August). The prevalence and potential determinants of §obesity among school children and adolescents in Abu Dhabi, United Arab Emirates. International Journal of Obesity, 68–74.

A.A. Bin Zaal, J. B. (2011). Anthropometric characteristics and obesity among adolescents in the United Arab Emirates. Eastern Mediterranean Health Journal, 17, 382-386.

Abdulla Aljunaibi, A. A. (2013). Parental Weight Perceptions: A Cause for Concern in the Prevention and Management of Childhood Obesity in the United Arab Emirates. Plos One, 1-4.

Al-Haddad FH, A.-N. Y. (2000). The prevalence of obesity among school children in the United Arab Emirates: Serious public health implications. J Hum Biol 12, 498–502.

Al-Haddad FH, L. B. (2005). Childhood obesity in United Arab Emirates schoolchildren: a national study. Annals of Human Biology, 72-79.

Al-Hourani HM, H. C. (2003). Prevalence of overweight among adolescent females in the United Arab Emirates. AMERICAN JOURNAL OF HUMAN BIOLOGY, 15, 758–764.

Blössner, M. d. (2000). Prevalence and trends of overweight among preschool children in developing countries. American Society for Clinical Nutrition.

CDC. (2015, April 24). Adolescent and School Health: Childhood Obesity Facts. Retrieved July 2, 2015, from Centers for Disease Control and Prevention: http://www.cdc.gov/healthyyouth/obesity/facts.htm

Cole TJ, B. M. (2000). Establishing a standard definition for child overweight and obesity worldwide international survey, 1-6.

Kelly Stott, T. C. (2012). Teachers', Parents' and Children's Perceptions of Childhood Obesity in Ras Al Khaimah. Policy Paper.

Malik, M. B. (2007). National prevalence of overweight and obesity among children in the United Arab Emirates. Obesity Reviews,. Obesity Reviews, 15-20.

T. Lobstein, L. B. (2004). Obesity in children and young people: a crisis in public health. The International Association for the Study of Obesity. obesity reviews 5, 4-85.

Wagner, C., & Greer, F. (2008). Prevention of Rickets and Vitamin D Deficiency in Infants, Children, and Adolescents. Journal of the American Academy of Pediatrics, 122 (5), 1142-1152.

WHO. (2015). dietphysicalactivity/childhood. Retrieved July 2, 2015, from http://www.who.int: http://www.who.int/dietphysicalactivity/childhood/en/

Study and comparison of psychological disorders in normal students and students with multiple sclerosis in Shahrekord

Neda Ardestani-Samani (1)
Mohammad Rabiei (2)
Mohammad Ghasemi-Pirbalooti(1)
Asghar Bayati (3)
Saeid Heidari-Soureshjani (3)

(1) Islamic Azad University, Shahrekord Branch, Shahrekord, Iran;
(2) University of Shahrekord, Shahrekord, Iran;
(3) Shahrekord University of Medical Sciences, Shahrekord, Iran.

Corresponding author:
Saeid Heidari-Soureshjani
Shahrekord University of Medical Sciences,
Kashani Blvd,
Shahrekord, Iran
Email: heidari_1983@yahoo.com

Abstract

Because various diseases could predispose people to psychiatric disorders that lead to numerous individual and therefore social problems, the aim of the present study was to study the difference in psychiatric disorders between students with multiple sclerosis (MS) and healthy students. In this prospective, causal-comparative type, samples were students living in Shahrekord. The number of participants, both male and female, was 200 (100 patients with MS and 100 healthy people); healthy participants were enrolled by two-stage cluster sampling and the people with MS by non-random convenience sampling. Symptom Check-list-90-2 was used to collect data and data analysis conducted by SPSS 20. The mean scores on psychological disorders and their dimensions were significantly higher in patient group than healthy group ($p<0.05$). In healthy group, psychological disorders and their subscales were significantly higher in women ($P<0.05$), and in patient group, phobia was significantly higher in women than men ($P<0.05$), but no significant difference in the scores on psychological disorders and theirsubscales was seen between women and men in patient group ($P<0.05$). MS could lead to psychiatric disorders and morbidity in both women and men.

Key words: Multiple sclerosis, Psychological disorders, Students, Shahrekord.

Please cite this article as: Ardestani-Samani N. et al. Study and comparison of psychological disorders in normal students and students with multiple sclerosis in Shahrekord. *World Family Medicine.* 2017; 15(9):75-79. DOI: 10.5742/MEWFM.2017.93106

Introduction

Multiple sclerosis (MS) is a chronic and progressive disease of the central nervous system in which the immune system demyelinates the nerves of the brain and spinal cord and therefore nerve signaling is slowed down. MS causes blurred vision, dysplasia, muscle weakness, loss of balance and coordination, sensation disturbance, depression, moderate to severe pain, cognitive impairment, forgetfulness, lack of concentration, fatigue, tremor, dizziness, and bowel, bladder, and sexual dysfunction. There is no definite treatment for this disease (1,2). The exact cause of MS is unknown but the most likely ones are genetic, immunologic, and viral (3).

Obviously, mental health plays a significant role in all life aspects including physical health; because MS affects physical, psychological, and social aspects of life adversely, it may lead to several psychiatric disorders including depression, anxiety, and high levels of stress (4). However, this issue remains insufficiently studied and the potentially involved factors should be further investigated (4,5). Given the significance of mental health and because psychiatric disorders lead to declined individual and family functioning and achievements, and therefore disequilibrium of individual status, illness, and dysfunction of the community (6,7), we investigated the difference in psychiatric disorders between students with MS and healthy students.

Materials and Methods

The study population of this prospective, causal-comparative study consisted of the students living in Shahrekord. A total of 200 people, both male and female, were enrolled. One hundred of participants had MS and the rest were healthy. Healthy participants were selected by convenience, two-stage cluster sampling. For this purpose, city was divided into 36 districts of which 12 were randomly selected. Then, systematic sampling was conducted in each district. More specifically speaking, every 10th house was chosen after a house was randomly selected as starting point (no. 1), and then the following selected houses were 11, 21, 31, 41, etc. Questionnaires were completed by one of the household members who were studying at university. Besides that, the samples with MS were selected by nonrandom convenience sampling. Briefly, we referred to the the Multiple Sclerosis Association of Shahrekord, and asked the eligible patients who were present there to complete questionnaires. Symptom Checklist (SCL)-90-2 was used to measure psychiatric disorders. SCL-90-2 is one of the most frequently used scales for diagnosing psychiatric disorders in the USA.

This scale, first developed to investigate the psychological aspects of physical and mental patients, consists of 90 items to evaluate psychological problems. This scale can also be used to differentiate healthy people from patients (8). The subscales of the SCL-90-2 are physical complaint, obsessive-compulsive disorder (OCD), sensitivity to interactions, depression, anxiety, aggression, anxiety, paranoid thoughts, and psychosocialism collectively representing the score on psychiatric disorders. The items are rated on a 5-point (0-4) Likert scale. To calculate the score on psychiatric disorder and each subscale, each subscale is first summed and then divided by its respective number of items to obtain a mean score. The mean scores ≥ 1 represent morbidity and those > 3 do psychosocialism. A study to investigate the validity and reliability of the SCL-90-2 for Iranian population, has reported that both the subscales and the global severity index of this scale have high internal consistency (Cronbach's alpha coefficients: 0.75-0.92 and 0.98, respectively) (9).

Data were analyzed by descriptive statistics (mean, standard deviation, maximum, and minimum) and analytical statistics (independent t-test) in SPSS 20.

Results

Overall, 59% of the participants were female. The mean age of the participants was approximately 25 years (standard deviation: 3.750, range: 19-35 years). Eighty one percent of the participants were associate's and bachelor's degree students and the rest master's degree students.

Table 1 shows the descriptive data on psychiatric disorders and their subscales. In patient group, the mean scores on physical complaint and phobia were the highest and lowest scores, respectively; in healthy group, the mean scores on paranoid thoughts and phobia were the highest and lowest scores, respectively. The mean scores on psychiatric disorders and all of their subscales were higher in the participants with MS than healthy participants, and therefore, the morbidity associated with psychiatric disorders and all of subscales was seen in patient group. Besides that, in healthy group paranoid thoughts and OCD were seen but psychiatric disorders, their subscales, and associated morbidity were not seen (Table 1).

Independent t-test was used to investigate the difference in psychiatric disorders and their subscales between patient group and healthy group. There were significant differences in the mean scores on psychiatric disorders and their subscales between patient and healthy groups ($p<0.05$) (Table 2). Therefore, psychiatric disorders and their subscales (physical complaint, OCD, sensitivity to interactions, depression, anxiety, aggression, anxiety, paranoid thoughts, and psychosocialism) were higher in patient group than healthy group (Table 1).

In addition, t-test was used to investigate differences in psychiatric disorders and their subscales between males and females. Results demonstrated that in patient group, the mean scores on psychiatric disorders and the subscales OCD, depression, anxiety, and psychosocialism were higher in females than males; and the mean scores on the subscales physical complaint, sensitivity to interactions, aggression, and paranoid thoughts were insignificantly higher in males than females ($p>0.05$). But mean phobia score was significantly higher in females than males

Table 1. Central indices and distribution of the scores on psychiatric disorders and their subscales in healthy people and patients with multiple sclerosis

Psychiatric Disorders and Their Subscales	Groups	Min.	Max.	Mean	SD
Psychiatric Disorders	Patient	14	246	179.62	58.5
	Control	6	214	72.22	54.26
Physical complaint	Patient	2	46	28.23	11.8
	Control	0	27	7.58	7.16
OCD	Patient	4	32	23.09	7.707
	Control	1	31	10.94	6.31
Sensitivity to interactions	Patient	3	34	19.26	6.18
	Control	1	28	8.50	6.26
Depression	Patient	1	41	24.89	9.671
	Control	0	38	10.44	9.89
Anxiety	Patient	0	33	19.05	7.6
	Control	0	24	6.64	5.68
Aggression	Patient	1	21	11.22	5.47
	Control	1	22	5.70	5.38
Phobia	Patient	0	25	10.09	7.6
	Control	0	13	3.14	3.47
Paranoid thoughts	Patient	1	22	13.83	5.18
	Control	0	23	7.82	5.69
Psychosocialism	Patient	0	29	15.36	6.76
	Control	0	23	5.70	6.45

Table 2. T-test results on the differences in psychiatric disorders and their subscales between healthy people and patients with multiple sclerosis

Psychiatric Disorders and Their Subscales	Mean difference		f	*t*-test	P value
	Patient	Control			
Psychiatric Disorders	179.62	72.22	198	13.452	<0.001
Physical complaint	28.23	7.58	163.249	14.948	<0.001
OCD	23.09	10.94	190.611	12.196	<0.001
Sensitivity to interactions	19.26	8.50	198	12.231	<0.001
Depression	24.89	10.44	198	10.444	<0.001
Anxiety	19.05	6.64	182.273	12.981	<0.001
Aggression	11.22	5.70	198	7.188	<0.001
Phobia	10.09	3.14	138.040	8.256	<0.001
Paranoid thoughts	13.83	7.82	198	7.803	<0.001
Psychosocialism	15.36	5.70	198	10.331	<0.001

Table 3. T-test results on the differences in psychiatric disorders and their subscales between males and females in patient group

Psychiatric Disorders and Their Subscales	Mean in patient group		f	t-test	P value
	Male	Female			
Psychiatric Disorders	173.60	183.63	98	0.838	0.404
Physical complaint	29.30	27.52	98	-0.799	0.426
OCD	21.65	24.05	98	1.536	0.128
Sensitivity to interactions	20.60	18.37	98	-1.790	0.077
Depression	22.95	26.18	97.673	1.805	0.074
Anxiety	17.40	20.15	97.989	1.919	0.058
Aggression	11.60	10.97	91.945	-0.582	0.562
Phobia	6.70	12.35	90.362	4.377	<0.001
Paranoid thoughts	14.05	13.68	98	-0.345	0.731
Psychosocialism	14.0	16	95.855	1.288	0.201

Table 4. T-test results on the difference in psychiatric disorders and their subscales between males and females in healthy group

Psychiatric Disorders and Their Subscales	Mean in healthy group		f	t-test	P value
	Male	Female			
Psychiatric Disorders	49.10	88.97	98	3.87	<0.001
Physical complaint	4.52	9.79	96.664	4.007	<0.001
OCD	8.29	12.86	98	3.815	<0.001
Sensitivity to interactions	6.14	10.21	98	3.367	0.001
Depression	5.95	13.69	98	4.166	<0.001
Anxiety	4.76	8	98	2.918	0.004
Aggression	3.52	7.28	97.459	3.880	<0.001
Phobia	1.81	4.10	97.82	3.661	<0.001
Paranoid thoughts	5.71	9.34	98	-3/302	0.001
Psychosocialism	4.10	6.86	98	2.154	0.034

(Table 3). In healthy group, the mean scores on psychiatric disorders and all of their subscales were significantly higher in females than males (p>0.05) (Table 4).

Discussion

This study was conducted to comparatively investigate psychiatric disorders and all of their subscales (physical complaint, OCD, sensitivity to interactions, depression, anxiety, aggression, phobia, paranoid thoughts, and psychosocialism) in the students with MS and healthy students in Shahrekord,

Results showed the morbidity associated with psychiatric disorders and all of its subscales were present in MS patients. In healthy group, paranoid thoughts and OCD were seen but psychiatric disorders and other subscales of them were not seen.

Results also indicated that the mean scores on psychiatric disorders and all of their subscales were significantly higher in the participants with MS than healthy participants. This finding indicates that psychiatric disorders and their subscales (physical complaint, OCD, sensitivity to interactions, depression, anxiety, aggression, phobia, paranoid thoughts, and psychosocialism) are higher in the people with MS than healthy people. A study has shown that patients with MS are likely to develop certain disorders such as depression, anxiety, neuroticism, and impaired memory and concentration (10). Feinstein reported that only 28% of the patients were not diagnosed with psychiatric disorders, and these disorders were associated with neurological disorders and other aspects of MS (11). A study showed that MS patients' quality of life was significantly and directly correlated with neurological disability and SCL-90-R score, and mental distress significantly declined quality of life (12).

Hall et al. studied the relationship between cognitive functions, somatization, and behavioural coping in patients with multiple functional somatic symptoms, and observed that the physical symptoms influenced memory and psychological and behavioral symptoms. Therefore, our study is consistent with the findings of Hall et al. regarding higher psychiatric disorders in the people with physical diseases and problems. Evidence on the comparison of psychiatric disorders between MS patients and healthy people is scant, which highlights a strength of the current study. Another study has shown that the psychiatric disorders are predictors of other psychiatric disorders and even influence treatment course in the MS patients (14).

Certain psychiatric disorders in MS patients may be disregarded and be influenced by the main treatment. They may, therefore, be left untreated (11). This issue should be taken into special consideration.

In addition, in patient group, phobia was significantly higher in females than males. Studies have shown that psychiatric disorders including anxiety are higher in women (15-17). It can be argued that if the women with MS are left unsupported by men, their socioeconomic status is jeopardized, and they are therefore more predisposed to phobia. However, the scores on psychiatric disorders and other subscales were not significantly different between males and females. In healthy group, psychiatric disorders and all of their subscales were significantly higher in females than males, which is consistent with other findings (15-17)

Conclusion

Development of MS can lead to psychiatric disorders, and because MS causes psychiatric disorders and their subscales, as morbidity, to increase, then organizations such as the Ministry of Health, media, and the Multiple Sclerosis Association should take appropriate measures to decrease the psychiatric disorders in MS patients to help them cope better with MS.

Acknowledgment
This study has been found by Islamic Azad University, Shahrekord Branch, Iran. The authors thank to all whom cooperate in fulfilling this study.

References

1. Johnston Jr RB, Joy JE. Multiple sclerosis: current status and strategies for the future: National Academies Press; 2001.
2. Goldenberg MM. Multiple Sclerosis Review. Pharmacy and Therapeutics. 2012;37(3):175-84.
3. Libbey JE, Fujinami RS. Potential Triggers of MS. Results and problems in cell differentiation. 2010;51:21-42.
4. Chwastiak LA, Ehde DM. Psychiatric Issues in Multiple Sclerosis. The Psychiatric clinics of North America. 2007;30(4):803-17.
5. Haussleiter IS, Brüne M, Juckel G. Psychopathology in Multiple Sclerosis: Diagnosis, Prevalence and Treatment. Therapeutic Advances in Neurological Disorders. 2009;2(1):13-29.
6. Health NIo. NIH Curriculum Supplement Series [Internet]. Understanding Emerging and Re-emerging Infectious Diseases. 2007.
7. Sartorius N. Stigmatized Illnesses and Health Care. Croatian medical journal. 2007;48(3):396-7.
8. Dag I. Reliability and validity of Symptom Check List-90-Revised among university students. Türk Psikiyatri Derg. 1991;2(1):5-12.
9. Anisi J, Eskandari M, Bahmanabadi S, Noohi S, Tavalayi A. Standardization of Symptom Checklist 90 Revised (SCL-90 -R) of a military Unit. Journal of military Psychology. 2014;5(17):57-67.
10. Bruce JM, Hancock LM, Arnett P, Lynch S. Treatment adherence in multiple sclerosis: association with emotional status, personality, and cognition. Journal of Behavioral Medicine. 2010;33(3):219-27.
11. Feinstein A. Multiple sclerosis and depression. Multiple Sclerosis Journal. 2011;17(11):1276-81.
12. Kern S, Schrempf W, Schneider H, Schultheiss T, Reichmann H, Ziemssen T. Neurological disability, psychological distress, and health-related quality of life in MS patients within the first three years after diagnosis. Multiple Sclerosis Journal. 2009;15(6):752-8.
13. Hall NM, Kuzminskyte R, Pedersen AD, Ørnbøl E, Fink P. The relationship between cognitive functions, somatization and behavioural coping in patients with multiple functional somatic symptoms. Nordic journal of psychiatry. 2011;65(3):216-24.
14. Brown R, Valpiani EM, Tennant C, Dunn SM, Sharrock M, Hodgkinson S, et al. Longitudinal assessment of anxiety, depression, and fatigue in people with multiple sclerosis. Psychology and Psychotherapy: Theory, Research and Practice. 2009;82(1):41-56.
15. Giordano A, Granella F, Lugaresi A, Martinelli V, Trojano M, Confalonieri P, et al. Anxiety and depression in multiple sclerosis patients around diagnosis. Journal of the Neurological Sciences. 2011;307(1):86-91.
16. Nguyen C, Bérezné A, Baubet T, Mestre-Stanislas C, Rannou F, Papelard A, et al. Association of gender with clinical expression, quality of life, disability, and depression and anxiety in patients with systemic sclerosis. PLoS One. 2011;6(3):e17551.
17. Dahl O-P, Stordal E, Lydersen S, Midgard R. Anxiety and depression in multiple sclerosis. A comparative population-based study in Nord-Trøndelag County, Norway. Multiple Sclerosis Journal. 2009;15(12):1495-501.

Comparative study of self-concept, physical self-concept, and time perspective between the students with multiple sclerosis and healthy students in Shahrekord

Neda Ardestani-Samani (1)
Mohammad Rabiei (2)
Mohammad Ghasemi-Pirbalooti(1)
Asghar Bayati (3)
Saeid Heidari-Soureshjani (3)

(1) Islamic Azad University, Shahrekord Branch, Shahrekord, Iran;
(2) University of Shahrekord, Shahrekord, Iran;
(3) Shahrekord University of Medical Sciences, Shahrekord, Iran.

Corresponding author:
Saeid Heidari-Soureshjani
Shahrekord University of Medical Sciences,
Kashani Blvd,
Shahrekord, Iran
Email: heidari_1983@yahoo.com

Abstract

Aim: To study difference in self-concept, physical self-concept, and time perspective between the students with multiple sclerosis (MS) and healthy students.

Material and Methods: The study population of this descriptive-correlational study consisted of the students living in Shahrekord of whom 200 people (100 males and 100 females) were selected by multistage cluster sampling. Data were collected by Sarasota's Self-concept Scale, Zimbardo Time Perspective Inventory, and a researcher-developed physical self-concept questionnaire.

Results: Patients' average scores on the subscales negative past, deterministic current, purposeful future, and transcendental future of the variable time perspective were higher than healthy students'. The average scores on the variable self-concept, the subscales physical, social, mood, academic, and rational of the variable physical self-concept, and the subscale positive past from the variable time perspective were significantly higher in healthy students than patients. Overall, there were significant and inverse correlations between self-concept, physical self-concept, and positive past, between self-concept and negative past, deterministic current, and hedonistic current as well as between physical self-concept and negative past, deterministic current, and transcendental future. There were also significant and direct correlations between negative past, deterministic current, and hedonistic current as well as between self-concept and positive past, purposeful future, and transcendental future. In the patients, the females' scores on self-concept, purposeful future, and transcendental future were significantly higher than males', and males' scores on physical self-concept were significantly higher than females'. In healthy students, the average scores on self-concept, positive past, hedonistic current, and purposeful future were significantly higher in females than males.

Conclusion: Findings indicated that overall, the people with MS, compared to healthy people, have negative self-concept and self-concept as well as negative attitudes toward their own social relationships and moods. They also consider their intelligence and talent to be lower and more negative compared to those of healthy people, have negative attitudes toward their past, and consider their lives to be deterministic.

Key words: Multiple sclerosis, self-concept, physical self-concept, time perspective, Shahrekord students

Please cite this article as:. Ardestani-Samani N. et al. Comparative study of self-concept, physical self-concept, and time perspective between the students with multiple sclerosis and healthy students in Shahrekord *World Family Medicine*. 2017; 15(9):80-84. DOI: 10.5742/MEWFM.2017.93105

Introduction

Multiple sclerosis (MS) is a debilitating neurological disorder that is presented with certain symptoms such as anxiety, weakness, and declined ability of solving problems, and leads to physical and mental disorders as well as neuromotor disorders. It is also a chronic and debilitating disorder of the nervous system that leads to the degeneration of the myelin of the central nervous system (brain and spinal cord) and subsequently the gradual loss of muscular strength (1,2). MS has many adverse physical, mental, and functional consequences and leads to different types of deprivation and change in lifestyle including dependency on others, sexual problems, lack of adjustment to new conditions and social attitudes, unemployment, change in familial duties and roles, and declined ability to achieve long-term purposes in life, anger, depression, anxiety, denial, lack of cooperation, stress due to physical complications, feeling of inefficiency and insufficiency, and fear of death (3-5). Besides that, MS has adverse economic consequences (6). Psychologists argue that the most common and important behavioral disorders are related to self (7). Self-concept includes coherence and unity between feelings, self-conscious and unconscious tendencies, understanding and recognition of identity, individual values and roles, physical existence, and how to understand one's self, mainly through social contacts with other people and experiences (8). Physical self-concept is a dimension of self and is considered a constituent of self-concept. This dimension consists of different aspects and is mainly concerned with one's perceptions of his/her own physical conditions or fitness (9). Studies have demonstrated that, if the people with chronic diseases have a positive self-concept, they adjust more efficiently, and if they are uncertain about their new identities, their self-esteem declines, which leads to nothing but negative self-concept (10,11). Time perspective is the "result of a process by which continuous currents of personal and social experiences are decomposed or assigned to time periods." (12). This can be influenced by chronic disease and lead to certain disorders in the affected individual (13).

Given the significance of MS and the effects of psychological factors on MS patients' physical and psychological conditions, we conducted this study to investigate difference in self-concept, physical self-concept, and time perspective between the students with MS and healthy students.

Materials and Methods

The study population of this correlational study consisted all patients with MS in Shahrekord in 2014-2015. Sample size was determined to be 200 (100 healthy students and 100 students with MS that had been filed by Shahrekord Multiple Sclerosis Association). Healthy samples were selected by multistage cluster random sampling and patient samples by nonrandom, convenience sampling. Questionnaires were given to the 200 participants, the significance of the study was explained to them, and they were asked to fill out the questionnaires as accurately as possible. Data were collected by Sarasota's Self-concept Scale, Zimbardo Time Perspective Inventory, and a researcher-developed physical self-concept questionnaire.

Sarasota's Self-concept Scale consists of 48 items to investigate six subscales: Physical, social, mood, academic, moral, and rational (each with eight items). The total score on self-concept is derived by summing the scores on the six subscales (14). The physical self-concept questionnaire used in the present study consisted of 10 four-choice items rated on a 4-point Likert scale (Never representing 4, a little representing 3, almost representing 2, and very much representing 1). The only exception is the item number 9 that is rated inversely. It is worth mentioning that the score on physical self-concept is derived by summing the items; the lower the respondent's score is, the lower level of physical self-concept he/she has and vice versa (15).

The validity of this questionnaire was investigated by content validity. For this purpose, the items were confirmed by a number of professors and psychologists after they were developed. For this questionnaire, Cronbach's alpha was derived 0.904 which is highly acceptable, in addition to wording the items accurately and giving necessary explanations to both questionnaire administrators and respondents.

Zimbardo Time Perspective Inventory, developed by Zimbardo and Boyd in 1999, consists of 66 items rated on a 5-point Likert scale ranging from Absolutely disagree to Absolutely agree. The items 9, 24, 25, 41, and 56 are rated inversely (12). After inversing the scores on these items, the scores on the items of each subscale are summed and then divided by the number of the respective items of that subscale. This inventory measures five time subscales, i.e. negative past, positive negative, deterministic current, hedonistic current and purposeful future.

Data analysis was conducted by descriptive statistics (mean, standard deviation, minimum, and maximum) and analytical statistics (t-test) in SPSS 16.

Results

Overall, 59% of the participants were female. Out of women, 60% had MS and 58% were healthy. Out of men, 40% had MS and 42% did not have. The mean age of the participants was approximately 25 years (standard deviation: 3.750, range: 19-35 years). Overall, 37.6% of the participants were studying in humanities, 28.4% in empirical sciences, 8.6% in mathematics and accounting, 6.1% in foreign languages, 6.1% in fine arts, and 13.2% in engineering courses. t-test was used to investigate the difference in self-concept and its subscales between the participants with MS and healthy ones (Table 1).

The average scores on self-concept and the subscales physical, social, mood, academic, and rational were significantly higher in healthy participants than the

Table 1. The results of independent t-test regarding difference in self-concept and its subscales between multiple sclerosis group and healthy group

Variables	Average scores		df	t-test	P value
	Control	Patient			
Self-concept	168.24	155.84	179.694	-4.671	<0.001
Physical subscale	30.10	26.32	198	-5.793	<0.001
Social subscale	28.88	26.06	192.948	-4.483	<0.001
Mood subscale	29.14	27.14	198	-3.430	0.001
Academic subscale	27.04	25.36	198	-2.229	0.027
Ethical subscale	29.60	29.17	198	-0.842	0.401
Rational subscale	23.48	21.79	173.829	-3.556	<0.001

Table 2. The results of independent t-test regarding difference in physical self-concept between multiple sclerosis group and healthy group

Variables	Average scores		df	t-test	P value
	Control	Patient			
Physical self-concept	37.02	31.25	174.570	-7.571	<0.001

Table 3. The results of independent t-test regarding difference in time perspective and its subscales between multiple sclerosis group and healthy group

Variables and their subscales	Average scores		df	t-test	P value
	Control	Patient			
Time perspective	211.76	228.35	174.774	6.075	<0.001
Negative past	29.40	36.73	182.189	7.019	<0.001
Positive past	30.24	27.85	198	-3.620	<0.001
Compulsivitism	26.42	31.52	198	6.053	<0.001
Epicureanism	50.54	51.04	198	0.484	0.629
Purposeful future	43.86	46.03	165.183	2.888	0.004
transcendental future	31.30	35.18	181.695	4.431	<0.001

participants with MS, indicating that healthy participants had better self-concept especially in terms of the above subscales. Because the significance level of t-test result on self-concept and its subscales was considered less than 0.05, this difference could not be accidental and was considered significant. In addition, there was not any significant difference in the moral subscale of self-concept between healthy participants and those with MS. This may indicate that the two groups had relatively similar concepts of moral values, and good and bad deeds (Table 1).

Independent t-test was used to investigate the difference in physical self-concept between the participants with MS and healthy ones (Table 2).

The average score on physical self-concept was higher in healthy group than the MS group. This finding indicated that healthy participants had better concepts of their appearances and bodies. Because this difference was significant at $p<0.001$, it was considered significant rather than accidental or by chance (Table 2). Independent t-test was used to investigate the difference in time perspective and its subscales between the participants with MS and healthy ones (Table 3).

The average score on total time perspective was significantly higher in MS group than healthy group ($p<0.001$). In addition, the average scores on the subscales negative past, deterministic current, purposeful future, and transcendental future were significantly higher in MS group than healthy group ($p<0.05$). This finding indicated that the participants with MS had more negative attitudes toward their past, had deterministic attitudes toward life, and made greater effort to achieve success.

In addition, the average score on the subscale positive past was significantly higher in healthy participants ($p<0.001$). This finding indicated that healthy participants were more optimist about their past. There was no significant difference in hedonistic current between the two groups.

Besides that, negative past and transcendental future were significantly and inversely correlated with physical self-concept in MS group, i.e. the more negative attitude toward the past one had, the more positive and optimist attitude toward his/her own body he/she had; and the more transcendental attitude toward the future one had, the more negative attitude toward his/her own body he/she had. The subscales positive past, deterministic current, hedonistic current, and purposeful future were not significantly correlated. In healthy group, negative past and hedonistic current were significantly and inversely correlated with physical self-concept. This indicated that the more negative attitude toward the past one had and the more he/she enjoyed the current time (risk taking, not considering the consequences of an action, etc.), the less positive attitude toward his/her own body he/she had.

Discussion

Overall, self-concept and all of its subscales were significantly and inversely correlated with negative past in MS group and all participants. This indicates that the higher and more positive self-concept and its subscales (physical, social, mood, academic, moral, and rational) one has, the less negative attitudes toward the past he/she has. In addition, in healthy group, the subscales academic and rational were not significantly correlated with negative past but were significantly correlated with the variable self-concept; and the subscales physical, social, mood, and moral were significantly and inversely correlated with negative past, i.e. the more positive attitudes toward one's own appearance, social relationships, mood, and moral values one has, the less negative attitude toward the past he/she has. In addition, self-concept and its subscales physical, mood, academic, moral, and rational were significantly and directly correlated with positive past in MS group. In other words, in this group, the higher the self-concept and its subscales were, the more positive the attitudes toward the past were. Besides that, self-concept and its subscales physical, mood, academic, moral, and rational were significantly and inversely correlated in MS group.

Results showed that self concept and the subscales mood, academic, moral, and rational were significantly and directly correlated with transcendental future in MS group. More clearly, the higher self-concept one has and the more aware of his/her own mood, moral values, intelligence, and talent he/she is, the more transcendental future he/she assumes for himself/herself.

In our study, the scores on variable self-concept and its subscales physical, social, mood, academic, and rational, the variable physical self-concept, and the positive past subscale of time perspective variable were significantly higher in healthy group than MS group.

Overall, MS challenges the cognitive structure and certain psychological domains in the patients (16), and declines many self-related domains such as self-esteem and self-acceptance (17). It is worth mentioning that self-related domains are interrelated in MS and change in one of them influences other domains as well (18). It has been reported that relationship quality and self-concept are significantly and directly correlated with illness acceptance (19). Regarding physical self-concept, the study of Barak et al. showed that lack of appropriate understanding of the body in MS patients can be seen even in remission (20). The study of Pfaffenberger et al. showed that physical self-concept in MS patients declined, which was influenced by gender (21).

The findings on MS group showed that the average scores on total time perspective and the subscales positive past, deterministic current, hedonistic current, purposeful future, and transcendental future were higher in females than males. In addition, in healthy group, the average scores on total time perspective and the subscales negative past, positive past, hedonistic current, purposeful future, and transcendental future were higher in females than males.
Findings on MS group also showed that the variable self-concept and physical self-concept were significantly and inversely correlated with age. More clearly, positive self-concept and physical self-concept declined with increasing age. In addition, positive past was significantly and directly correlated with age; therefore, attitudes toward the past became more negative with increasing age. Time perspective is considered one of the important psychosocial factors that are effective on psychological distress in MS patients (13). A study with MS patients showed that they were ready to assess and to prepare for possible adverse outcomes of the illness. They also made attempt to use available resources for their own and loved ones' future in the most efficient manner (22). Any change in one's physical self-concept seriously disrupts his/her equilibrium. Such changes can be due to illness, accidents, or developmental changes in the structures and functions of the body's organs. Psychological self or personal identity is composed of perceptual, cognitive, and emotional perceptions that one has about himself/herself, and sexual identity is also a part of the overall sense of a person's identity and a picture that one perceives of himself/herself as a man or woman. Social self is defined by the roles that one agrees to do.

Conclusion

Findings indicated the average scores on self-concept and its subscales physical, social, mood, academic, and rational, the variable physical self-concept, and the subscale positive past of the variable time perspective were higher in healthy group than control group. Besides that, self-concept was significantly and inversely correlated with physical self-concept and positive past, self-concept was significantly and inversely correlated with negative past, deterministic current, and hedonistic current, and physical self-concept was significantly and inversely correlated with negative past, deterministic current, purposeful future, and transcendental future. In MS group, self-concept, purposeful future, and transcendental future were significantly higher in females than males; and physical self-concept was significantly higher in males than females.

Acknowledgment
This study has been found by Islamic Azad University, Shahrekord Branch, Iran. The authors thank to all whom cooperate in fulfilling this study.

References

1. Stüve O, Oksenberg J. GeneReviews: Multiple sclerosis overview. Washington: University of Washington; 2010.
2. O'Gorman C, Lucas R, Taylor B. Environmental Risk Factors for Multiple Sclerosis: A Review with a Focus on Molecular Mechanisms. International Journal of Molecular Sciences. 2012;13(9):11718-52.
3. Chwastiak LA, Ehde DM. Psychiatric Issues in Multiple Sclerosis. The Psychiatric clinics of North America. 2007;30(4):803-17.
4. Skerrett TN, Moss-Morris R. Fatigue and social impairment in multiple sclerosis: the role of patients' cognitive and behavioral responses to their symptoms. J Psychosom Res. 2006;61(5):587-93.
5. Bol Y, Duits AA, Lousberg R, Hupperts RMM, Lacroix MHP, Verhey FRJ, et al. Fatigue and physical disability in patients with multiple sclerosis: a structural equation modeling approach. Journal of Behavioral Medicine. 2010;33(5):355-63.
6. Owens GM. Economic burden of multiple sclerosis and the role of managed sare organizations in multiple sclerosis management. Am J Manag Care. 2016;22(6 Suppl):s151-8.
7. Sandler J, Fonagy P, Person ES. Freud's" On narcissism--an introduction": Karnac Books; 2012.
8. Kahn JS, Meier ST. Children's definitions of family power and cohesion affect scores on the family system test. American Journal of Family Therapy. 2001;29(2):141-54.
9. Marsh H. Construct Validity of Physical Self-Description Questionnaire Responses: Relations to External Criteria1996. 111-31 p.
10. Ho J, Lee A, Kaminsky L, Wirrell E. Self-concept, attitude toward illness and family functioning in adolescents with type 1 diabetes. Paediatrics & Child Health. 2008;13(7):600-4.
11. Ferro MA, Boyle MH. Self-concept among youth with a chronic illness: a meta-analytic review. Health Psychol. 2013;32(8):839-48.
12. Zimbardo PG, Boyd JN. Putting time in perspective: A valid, reliable individual-differences metric. Time perspective theory; review, research and application: Springer; 2015. p. 17-55.
13. Dany L, Roussel P, Laguette V, Lagouanelle-Simeoni MC, Apostolidis T. Time perspective, socioeconomic status, and psychological distress in chronic pain patients. Psychol Health Med. 2016;21(3):295-308.
14. Ghaderi A. Psychometric properties of the self-concept questionnaire. European Journal of Psychological Assessment. 2005;21(2):139-46.
15. Marsh HW. Physical Self Description Questionnaire: stability and discriminant validity. Research quarterly for exercise and sport. 1996;67(3):249-64.
16. Dennison L, Moss-Morris R, Chalder T. A review of psychological correlates of adjustment in patients with multiple sclerosis. Clinical Psychology Review. 2009;29(2):141-53.
17. Karolina Korwin-Piotrowska, Teresa Korwin-Piotrowska, Samochowiec J. Self perception among patients with multiple sclerosis. Archives of Psychiatry and Psychotherapy. 2010;10:63–8.
18. Wilski M, Tasiemski T. Illness perception, treatment beliefs, self-esteem, and self-efficacy as correlates of self-management in multiple sclerosis. Acta Neurologica Scandinavica. 2016;133(5):338-45.
19. Wright TM, Kiropoulos LA. Intimate relationship quality, self-concept and illness acceptance in those with multiple sclerosis. Psychology, health & medicine. 2017;22(2):212-26.
20. Barak Y, Lampl Y, Sarova-Pinchas I, Achiron A. Self and Body Esteem Perception in Multiple Sclerosis1998. 159-61 p.
21. Pfaffenberger N, Gutweniger S, Kopp M, Seeber B, Stürz K, Berger T, et al. Impaired body image in patients with multiple sclerosis. Acta Neurologica Scandinavica. 2011;124(3):165-70.
22. Nikolaev E, Vasil'eva N. Time perspective in multiple sclerosis patients: Looking for clinical targets for psychological interventions. European Psychiatry. 2017;41:S780.

Relationship between Coping Styles and Religious Orientation with Mental Health in the Students of the Nursing-Midwifery Faculty of Zabol

Nasim Dastras (1)
Mohsen Heidari Mokarrar (2)
Majid Dastras (3)
Shirzad Arianmehr (4)

(1) MSc Student, Clinical Psychology, Islamic Azad University, Zahedan Branch, Zahedan, Iran
(2) Zabol University of medical science, Zabol,Iran
(3) Faculty member of Zahedan University of Medical Sciences, Zahedan, Iran
(4) MSc in Health Care Management, Zahedan University of Medical Sciences, Zahedan, Iran

Corresponding author:
Mohsen Heidari Mokarrar
Zabol University of medical science,
Zabol,Iran
Email: ps.heydri@gmail.com

Abstract

The purpose of this study was to investigate the relationship between coping styles and religious orientation with mental health among students of Nursing Midwifery Faculty of Zabol. The method of doing a descriptive-survey research is a correlation approach. The population consisted of 320 students in the Nursing and Midwifery Faculty of Zabol. The statistical sample of this study is 175 people. This number is determined by referring to the Morgan table. Sampling method is also simple random method. The instrument for measuring the data was Lazarus' coping strategies questionnaire (1988), Alport and Ross religious orientation questionnaire (1967) and Goldberg and Hiller's mental health questionnaire (1979). The Cronbach's alpha coefficient was 0.89, 0.78 And 0.83. Data analysis was performed using SPSS software. The results of the research show that there is a significant relationship between coping styles and religious orientation. There is also a significant relationship between coping styles and mental health.

Key words: coping styles, religious orientation, mental health

Please cite this article as: Dastra N. et al. Relationship between Coping Styles and Religious Orientation with Mental Health in the Students of the Nursing-Midwifery Faculty of Zabol *World Family Medicine*. 2017; 15(9):85-90. DOI: 10.5742/MEWFM.2017.93109

Introduction

In the present century, the issue of stress and stress management has been one of the most important fields of research in various sciences, and its impact on human life is one of the broadest research fields in the present age. Stress, anxiety and coping are the permanent components of everyday life. All of us at any moment encounter issues that may be stressful. These cases include daily disturbances to major events and the degree of stressfulness of each item varies from person to person (Villada,Hidalgo, Almela, & Salvador,2016).

The methods or strategies that a person uses in dealing with stressful situations play an essential role in his/her physical and mental health. Evaluation and coping processes and cognitive efforts of people and their ability to interpret and overcome life problems are effective (Thomas, Cassady & Heller, 2017). In the initial evaluation, an individual may assess the situation as threatening or vice versa. In the second stage, or secondary assessment, the type of action that a person must take in relation to that position, and the forces and facilities that he / she feels for resolution and counteraction. The sense of danger and its extent depends on the possibilities that one feels to have, and this is related to the information that the environment, life's business and personal characteristics have created for him or her. New information may be effective in assessing the individual's situation and re-evaluating it (Vu,2017).

A personality or environmental variable can act as a stress regulator by influencing the individual's dependence on specific confrontational strategies. First, it can influence the assessment of the meaning of events (threats or lacking), and secondly, it can affect the assessment of coping resources (Jaser, Patel, Xu, Tamborlane & Grey,2017). Coping is a process through which individuals control the stress associated with stressors and control the negative emotions created by these factors.

In other words, coping with the cognitive, emotional and behavioral effort of a person is to control the external and internal factors that threaten the person. The concept of coping from the past decades has been formally discussed in the field of psychology, and over the past years, many studies have been conducted on the coping process and a variety of coping styles. Adaptive coping allows one to grow in a challenging world. The ability to detect appropriate emotional responses when confronted with stressful events in everyday life creates a positive attitude about life events (Skinner & Zimmer-Gembeck,2016). People with low emotional intelligence are weaker in problem-solving ability and do not have the ability to use coping skills in dealing with psychological stresses in life. Recent research has shown that the type of coping strategies used by an individual affects not only his mental health but also his physical well-being (Yeung, Lu, Wong & Huynh,2016).

In general, religion has a significant impact on the adaptability of individuals and can be used in clinical work with clients who seek spiritual psychotherapy (Reynolds,2017). The psychology of religion, as we observe today, owes its existence to the comparative studies of religions in the nineteenth century in Europe. It is said that the emergence of psychology studies of religion begins with two disciplines of psychoanalytic psychology and psychology. The development of religious studies in the field of scientific psychology can be considered a product of the studies of Freud and Jung as psychoanalytic in this regard, each having a different view of religion. In most of his work, Freud considers religion as illusion. Jung believes that all phenomena, including dreams and illusions, are reality, and he believes that religious concepts are the best explanation of man, and that psychology would not be realized except by religion (Koenig, Boucher, Oliver, Youssef, Mooney, Currier & Pearce,2017).

In recent years, numerous studies have been conducted on the relationship between religion and mental health. These studies have generally shown that there is a positive relationship between religion and health (Speed, ,2017). But in some studies, vague and inaudible connection has been reported between various aspects of religiosity and psychological compilation. It seems that religious beliefs can have positive and negative effects on mental health, and depending on the religious views of a person some religions (e.g. worshipping of inanimate objects(e. g. crystals) may be quite detrimental to mental health, similar events in a person's life can be considered in a completely different way.

Studies and theorizing in various religious fields have a long history, but the study of religion began psychologically about 100 years ago. The psychology of religion, as we observe today, owes its existence to the comparative studies of religions in the nineteenth century in Europe. It is said that the emergence of religious psychology studies begins with two disciplines of psychological analysis and physiological psychology (Kato, 2016). Mental health is related to emotions, attitudes and human behavior in such a way that when a person has good mental health, they can usually cope with increasing incidents and daily social problems and pursue their goals in life in order to have a more effective social function. In fact, mental health provides the basis for the development of intellectual and communication skills, and promotes emotional growth, flexibility, and self-esteem. With the successful performance of mental functions and as a result of constructive activities, having the right relationships with others, the ability to adapt to the changes and dreams that are effective with the disastrous events of life, all are consequences of good mental health (Ramakrishnan, Baccari, , Ramachandran, Ahmed & Koenig,2017). Despite the old beliefs of religions, the experts in the field of psychology of religion at the theoretical level have discussed the effects of religious beliefs on the happiness of contradictory views. For example, Freud and Ellis have a negative evaluation of the role and effect of religion on mental health. They consider health as the axis of social economic development. If the goal of all social policies is the welfare of society, the key to entry into society's welfare is firstly the hope of a healthy and decent life,

and that it is not possible without health. Development without a healthy human is not understandable. According to Muller, World Health Organization former chairman, “Health, if not everything, is nothing without health.” In public health, increasing acceptance and confirmation have been made such that health is determined not only by behavioral, biological and genetic factors, but also by a range of determinants of economic, environmental and social determinants such as safe environment, adequate income, having meaningful roles in the community, secure custodians, higher education and social support, which result in better health and well-being in the neighborhoods. The above factors are called “social determinants” (Jain, van Hoek, Boccia & Thomas,2017). Considering the issues that arose in this study, is there a significant relationship between coping styles and religious orientation with mental health?

Method

The method of this research is survey.

Statistical population and sampling
The population consisted of students from the Nursing and Midwifery Faculty of Zabol; 320 people. The statistical sample of this study is 175 people. This number is determined by referring to the Morgan table. Sampling method is simple random method.

Tools
The Lazarus Coping Strategies Questionnaire (WOCQ): It is a 66-item test that was developed by Lazarus and Fulkman (1980) on the basis of a coping strategies log (Lazarus and Fulkman, 1980), and the wide range of thoughts and actions individuals have when evaluating the internal or external pressure conditions, are evaluated. The test has 8 sub-scales: direct coping, distance, self-control, social support, acceptance of responsibility, escape-avoidance, scheduled problem solving and positive re-evaluation. The 16 words of this test are divergent, and the other 50 are evaluating the individual’s coping style. Copywriting strategies revised with copywriting logs differ in a number of cases. Firstly, how to respond in the original version is yes / no, in the revised version, each statement is answered on a 4-point Likert scale (from 0: I have not used at all until 3: a lot of it And secondly, extra and inaudible phrases have been replaced by other terms, and some phrases like worship have been added to the questionnaire.

Religious Orientation Scale: According to the Allport theory, internal religion, religious, and institutionalized are internal. While external religion is an external instrument and a tool that is used to meet individual needs such as authority and security. The goal of Allport from the inner religious orientation is: a comprehensive motivational commitment that is ultimate goal and not a means for Achieving Individual Goals (Big John 1999). In 1950, Allport and Ross produced this scale to measure the inner and outer orientations of religion. In the early studies on this basis, it was observed that the correlation of the external orientation with the inner is 0.21 (Allport and Ross, 1967). This scale is graded based on Likert scores, the range of which totally disagrees, to totally agrees, and gives the answers a score of 1 to 5. Reputation Points 1 to 12 determine the extent of the exterior orientation of the subject and the total score of phrases 13 to 21 of his/her internal religious orientation score.

General Health Scale (GHQ): The original form of the questionnaire was developed by Goldberg and Hiller in 1970, and its validity and validity are reviewed several times. Chen in the simultaneous evaluation of this questionnaire with the Minnesota-Border-Associated Questionnaire-Boundary Questionnaire was 54.4. In the study of this questionnaire, Beck’s disapproval questionnaire, the Coefficient of Factor Coefficient of 0.99, reported a mean of 0.96, the mean sensitivity of the GHQ28 questionnaire was 0.84 and the mean of it was 0.82. Goldberg and Williams scored the total score of 0.95 for the whole questionnaire. It has 4 sub-scales that include:

1) Scale of physical symptoms: Includes items about people’s feelings about their health, their fatigue feeling with physical symptoms, 28 questions in GHQ 1 to 7.

2) Anxiety and Depression Symptoms: Includes those related to insomnia and anxiety, in GHQ 28 Questions 8 to 14

3) Social Function: Means the ability of individuals to meet the demands of professional and daily routines. Revealing the feelings of people in coping with the commonplace items of life, in GHQ28 Questions 15 to 21

4) Depression syndrome: Includes severe depression and suicidal tendencies, and in GHQ28 Question 22 to 28.

There is a score for each scale and a score is related to the overall score of the individual. This questionnaire is used in Iran, and its internal consistency is verified using the Cronbach’s alpha of 87. 87. The GHQ28 form was tested on a sample of 80 in 7-10 days that reported a subscale score of between 0.50 and 0.81. The sensitivity of this test is 0.86 and its specificity is 0.82.

Pearson correlation coefficient and regression were used to analyze the data.

Findings

To investigate the relationship between coping styles and religious orientation, multiple regressions is used. Results are shown on the next page:

Results

Table 1. Summary of regression model

Model	The correlation coefficient	The coefficient of determination
regression	0.932	0.868

Table 2. Analysis of variance

Source of change	Sum of square	Df	mean of squares	F statistics	Sig.
regression	20.018	7	2.502	136.562	0.001
residual	3.042	166	0.018		
Total	23.059	174			

Table 3. Coefficients of regression model variables

Variables	Non-standard coefficients		Standard coefficients	T Statistics	Sig.
	B	Standard error	Beta		
Constant factor	-1.62	0.189		-6.156	0.001
Counter system	-0.08	0.040	-0.088	-2.046	0.042
To take some distance	0.045	0.034	0.042	0.298	0.196
Self-control	0.486	0.046	0.406	10.298	0.001
Demanding social support	0.316	0.046	0.344	6.824	0.001
Acceptance of responsibility	0.319	0.029	0.210	4.301	0.004
Escape - Avoid	0.121	0.035	0.126	3.467	0.001
Scheduled issue solved	0.248	0.039	0.229	6.334	0.001
Positive reassessment	0.190	0.036	0.202	5.321	0.511

Table 4. Summary of regression model

Model	The correlation coefficient	The coefficient of determination
Regression	0.897	0.805

Table 5. Analysis of variance

Source of change	Sum of square	Df	mean of squares	F statistics	Sig.
regression	16.971	8	2.121	85.556	0.001
residual	4.116	166	0.025		
Total	21.087	174			

Table 6. Coefficients of regression model variables

Variables	Non-standard coefficients		Standard coefficients	T Statistics	Sig.
	B	standard error	Beta		
Constant factor	-0.706	0.200		-3.213	0.002
Counter system	-0.013	0.047	-0.014	-0.276	0.783
to take some distance	0.053	0.40	0.052	1.339	0.182
Self-control	0.322	0.053	0.281	6.074	0.001
Demanding social support	0.460	0.054	0.523	8.527	0.001
Acceptance of responsibility	0.244	0.34	0.453	3.291	0.019
Escape - Avoid	0.006	0.041	0.006	0.140	0.889
Scheduled issue solved	0.207	0.46	0.200	4.544	0.001
Positive reassessment	0.106	0.042	0.188	2.555	0.012

As shown in the summary table of the model, the coefficient of determination is equal to 0.805. So, it can be said that about 81% of variations of dependent variable (mental health) are expressed by dimensions of coping styles. In the analysis table of variance, the significance level is equal to 0.001 and less than 0.05. Therefore, the regression is significant. In the table of coefficients of regression model variables, it is observed that the significant values for system coping, distance and escape-avoidance variables are greater than 0.05. Therefore, with 95% confidence, it can be said that the coefficient of effect of these variables is not significant in the regression model. Also, meaningful values for self-control variables, social support seeking, problem-solving, and positive re-evaluation are less than 0.05. As a result, there is a meaningful relationship with mental health with self-control, social support, acceptance of responsibility, problem-solving, and positive.

Discussion and Conclusion

The purpose of this study was to investigate the relationship between coping styles and religious orientation with mental health in students of the nursing midwifery faculty of Zabol. Results show that about 87% of changes in dependent variable (religious orientation) are expressed by dimensions of coping styles. To be significant values for distance and re-evaluation are greater than 0.05. Therefore, with 95% confidence, it can be said that the coefficient of effect of these variables is not significant in the regression model. Also, meaningful values for system coping, self-control, social support, acceptance of responsibility, escape-avoidance and planned problem solving are less than 0.05. As a result, we can say that between self-control, social support, escape-avoidance and problem-solving there is a meaningful relationship with religious orientation. Also, about 81% of variations in dependent variable (mental health) are expressed by dimensions of coping styles. Significant values for system coping, distance, and escape-avoidance variables are greater than 0.05. Therefore, with 95% confidence, it can be said that the coefficient of effect of these variables is not significant in the regression model. Also, meaningful values for self-control variables, social support seeking, problem-solving, and positive re-evaluation are less than 0.05. As a result, self-control, social support, acceptance of responsibility, problem-solving, and positive revaluation there is meaningful relationship between good mental health and religious orientation. The results of this research are related to results of research of Zeidner & Zevulun (2017) as dimensions of the relationship between religious orientation and mental health and the assessment of religious orientation scale which showed that religious orientation has a relationship with better mental health and reducing psychiatric disorders and is able to to positively predict a positive religious confrontation. Also, the relationship between self-esteem and religious orientation is positive. The results showed that, in addition to the convergence between religious orientation and religious coping scale, the religious orientation scale can differentiate and distinguish groups with different religious orientations. A subject that can be cited as evidence for discriminatory validity of this test is conformance.

The current research, like most research in behavioral sciences, has been accompanied by limitations and problems that identify them for further research and attempt to reduce or eliminate these limitations and logical problems. Meanwhile, the research results highlighted some issues that would be the key to new and upcoming research. Here are some of the limitations and issues raised in this research:

• Due to the fact that the information gathering tool was a questionnaire in this research, all research constraints have a questionnaire.

• Some respondents did not respond to the questions for some reason, such as secrecy, lack of time, lack of sufficient information and other reasons.

• The lack of research culture and low motivation of individuals and organizations in conducting research projects and lack of cooperation with researchers.

It is proposed to: Raise the religious interests of students in increasing the tolerance of people against the pressures and hardships by congresses, councils of guidance and counseling and religious programs by the university, creating a climate of faith and belief in the university environment and supporting students as well as encouraging students to establish and participate in religious associations.

References

Jain, A., van Hoek, A. J., Boccia, D., & Thomas, S. L. (2017). Lower vaccine uptake amongst older individuals living alone: A systematic review and meta-analysis of social determinants of vaccine uptake. Vaccine.

Jaser, S. S., Patel, N., Xu, M., Tamborlane, W. V., & Grey, M. (2017). Stress and Coping Predicts Adjustment and Glycemic Control in Adolescents with Type 1 Diabetes. Annals of Behavioral Medicine, 51(1), 30-38.

Kato, H. (2016). The Relationship between the Psychology of Religion and Buddhist Psychology. Japanese Psychological Research, 58(S1), 70-84.

Koenig, H. G., Boucher, N. A., Oliver, R. J. P., Youssef, N., Mooney, S. R., Currier, J. M., & Pearce, M. (2017). Rationale for spiritually oriented cognitive processing therapy for moral injury in active duty military and veterans with posttraumatic stress disorder. The Journal of nervous and mental disease, 205(2), 147-153.

Ramakrishnan, P., Baccari, A., Ramachandran, U., Ahmed, S. F., & Koenig, H. G. (2017). Teachers' and Parents' Perspectives on a Curricular Subject of "Religion and Spirituality" for Indian Schools: A Pilot Study Toward School Mental Health Program. Journal of Religion and Health, 1-20.

Reynolds, D. (2017). Spirituality As a Coping Mechanism for Individuals with Parkinson's Disease. Journal of Christian Nursing, 34(3), 190-194.

Speed, D. (2017). Unbelievable?! Theistic/Epistemological Viewpoint Affects Religion–Health Relationship. Journal of religion and health, 56(1), 238-257.

Skinner, E. A., & Zimmer-Gembeck, M. J. (2016). Development of Coping during Early Childhood: Inferential Appraisals, Voluntary Action Regulation, and Individual Coping Systems. In The Development of Coping (pp. 143-161). Springer International Publishing.

Thomas, C. L., Cassady, J. C., & Heller, M. L. (2017). The influence of emotional intelligence, cognitive test anxiety, and coping strategies on undergraduate academic performance. Learning and Individual Differences, 55, 40-48.

Vu, T. A. (2017). Influence of coping style on life satisfaction among Vietnamese undergraduates of psychology, mediated by stress, anxiety, and depression.

Villada, C., Hidalgo, V., Almela, M., & Salvador, A. (2016). Individual differences in the psychobiological response to psychosocial stress (trier social stress test): the relevance of trait anxiety and coping styles. Stress and Health, 32(2), 90-99.

Yeung, N. C., Lu, Q., Wong, C. C., & Huynh, H. C. (2016). The roles of needs satisfaction, cognitive appraisals, and coping strategies in promoting posttraumatic growth: A stress and coping perspective. Psychological Trauma: Theory, Research, Practice, and Policy, 8(3), 284.

Zeidner, M., & Zevulun, A. (2017). Mental Health and Coping Patterns in Jewish Gay Men in Israel: The Role of Dual Identity Conflict, Religious Identity, and Partnership Status. Journal of Homosexuality, (just-accepted).

Tuberculosis in Abadan, Iran (2012-2016): An Epidemiological Study

Ali-Asghar ValiPour
Azimeh Karimyan
Mahmood Banarimehr
Marzieh Ghassemi
Maryam Robeyhavi
Rahil Hojjati
Parvin Gholizadeh

Student Research Committee, Abadan School of Medical Sciences, Abadan, Iran

Corresponding author:
Marzieh Ghassemi
Student Research Committee,
Abadan School of Medical Sciences,
Abadan, Iran

Abstract

Determining the course of the disease and its changes over time can be of great importance in assessing the rate and manner of access to the strategies used to control illnesses.

This retrospective descriptive-analytic study was carried out with a survey of patients with tuberculosis in the affiliated cities of the Abadan School of Medical Sciences during a period of 5 years. The required data were collected from the "TB Register" software as well as information registered by TB health experts. The Kolmogorov Smirnov, Independent-T, Mann Whitney U and Wilcoxon tests were used for analysis of data using SPSS 22- software.

In this study, 720 patients with tuberculosis were studied, of whom 62.9% were male. 73.6% of patients lived in urban areas. The prevalence of tuberculosis is 22.34 per 100,000 population, of which 15.36 per 100,000 is pulmonary tuberculosis. Mean age of patients was 41.39 (SD±17.69) years with a range of 4-92 years.

Considering the fact that tuberculosis is a life-limiting disease and is most prevalent in the young age group of society, who are considered as the main capital and workforce, educating people who are at risk can significantly contribute to the prevention of disease.

Key words: Epidemiology, Tuberculosis, Abadan

Please cite this article as: Valipour A. et al. Tuberculosis in Abadan, Iran (2012-2016): An Epidemiological Study *World Family Medicine*. 2017; 15(9):91-96. DOI: 10.5742/MEWFM.2017.93107

Introduction

Today, tuberculosis is one of the biggest health problems in the world. The disease burden of Tuberculosis (TB), the major cause of death from single-agent infectious diseases in the world (even more than AIDS, malaria and measles), ranks tenth in terms of the global burden of disease (1, 2) . One in three people in the world is suspected to have been infected with TB, and one person is added every second (1, 3). In 2015, 10.4 million people worldwide have been infected with TB, with an estimated 1.8 million deaths. Also, more than 95% of deaths from TB occur in low-to-middle-income countries where 75% of the cases are seen in the economically active age group (15-54 years) (3-5).

In the last few decades, TB prevalence has decreased sharply in Iran; that is to say the prevalence rate decreased from 142 cases per 100,000 populations in 1964 to 12.59 per 100,000 populations in 2015, which indicates a decrease of more than tenfold. Further, the highest TB incidence rate belonged to the population aged 65 and above (3, 6). Since Iran is a neighbor of Afghanistan and Pakistan, which are among the countries with the highest burden, as well as Iraq (due to its crisis in recent years) and the newly independent countries of northern Iran, which suffer from a high prevalence of multi-drug resistant TB, there is need to pay more attention to the disease (1, 3, 7).

Considering the emphasis of the national program of TB control of case finding and treatment of patients, it seems necessary to identify the distribution pattern of the disease and determine its associated factors; thus considering this necessity and considering that the city of Abadan is adjacent to Iraq, the need for this study is highlighted more than before.

Material and Methods

The present study is a retrospective descriptive-analytic study that was carried out with a survey of people with tuberculosis in the affiliated cities of the Abadan Faculty of Medical Sciences during a period of 5 years from 2012 to 2016. The study was conducted in the cities of Abadan (30° 20’21”N 48°18’15” E), Shadegan and Khorramshahr respectively with a population of 298,090, 138,480 and 170,976 that are located in Khuzestan province, southwest of Iran. In this study, patients’ information was collected by referring to the health department of Abadan Faculty of Medical Sciences and using special software for registering patients with TB (TB Register) as well as information registered by TB health experts. Individuals included in the study were all patients with TB who were identified and treated according to the Ministry of Health’s protocol. Data collected including age, gender, place of residence, type of TB, successful or unsuccessful treatment, death etc. were analyzed using SPSS ver. 22. Statistical analysis was performed using descriptive statistics (frequency, mean, minimum and maximum, number of data and standard deviation) to obtain preliminary information. With regard to inferential statistics, Kolmogorov Smirnov test was used to determine the normality of variables and the Independent-T, Mann Whitney U and Wilcoxon tests were used for further analysis. To reject or accept the assumptions, P-value = 0.05 was used and the results were considered significant at ($P < 0.05$).

Results and Discussion

Over a 5-year period of research, a total of 720 TB patients were identified in 3 of the surveyed cities, of which 18.9%, 25.3%, 17.5%, 18.1% and 20.3% of TB cases related to 2012, 2013, 2014, 2015 and 2016 (Figure 1). Figure 2 shows the number of TB cases in the selected cities. Of these, 89.7%, 4.2%, 4.3%, 1.3% and 0.4% included, respectively, new TB cases, relapsed TB cases, other cases, transmitted cases and treatment after absenteeism cases, and there was a significant difference between them.

The mean age of patients with TB was 41.39±17.69 with an age range of 4 to 92 years, of which 453 (62.9%) and 267 (37.1%) were male and female respectively, which shows a statistically significant difference. The mean age of men and women is 40.31 ± 16.29 and 43.21±19.73 respectively, which is not statistically significant. The results are calculated separately for urban and rural areas that show 530 (73.6%) and 190 (26.4%) of them lived in the urban and rural areas respectively, which shows a statistically significant difference. Table 1 provides a summary of the demographic data of TB patients based on information obtained from the Department of Health of Abadan Faculty of Medical Sciences.

The results of data analysis show that 33.9%, 17.6%, 3.9% and 0.7% of the patients were married, single, divorced and patients with deceased spouses, and there was a significant difference among them pairwise from this point of view; i.e. the number of married people is more than single, more than divorced and more than a patient with a dead spouse. The data show that the literacy level of TB patients is significantly different, with 16.3% of illiterate patients, 17.4% of elementary education, 14.3% of secondary education, 6.1% of secondary education and diploma and 2.1% university degree. The following results were obtained with regard to the total number of individuals identified: completed the treatment period: 39.4%, recovery rate: 34.2%, death rate: 7.5%, wrong diagnosis: 3.2%, absence from the treatment period: 4.2%, were treatment failure: 2.8%, transmitted cases: 0.8% and ongoing treatment process: 7.9%. The results of TB treatment shows a significant difference. Of the total population, 54 deaths were reported from TB patients, of which 70.4%, 20.4%, 9.3% and 9.3% died due to other cases, unknown reasons and tuberculosis. There death causes differ significantly (Figure 3). In this study, a total of 720 TB cases were investigated in Abadan city over the past 5 years. The prevalence of TB and pulmonary TB was 22.34 and 36.15 per 100,000 people, respectively. The same prevalence rate was 22.34 and 17.52 per 100,000 inhabitants in the urban and rural areas, respectively.

Figure 1: Frequency of TB Patients Referred to Abadan Health Center (2012-2016)

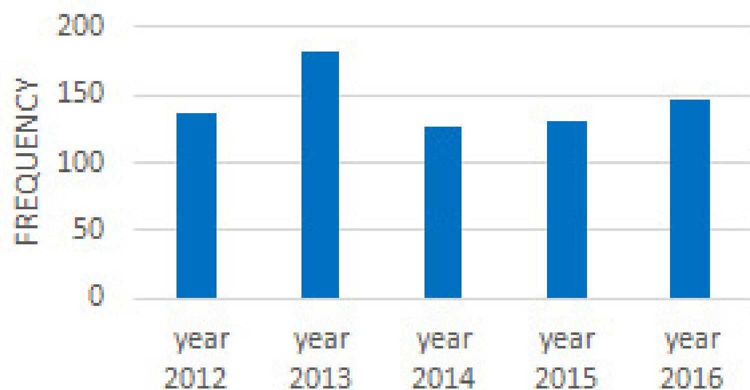


Figure 2: Frequency of TB Patients according to Cities

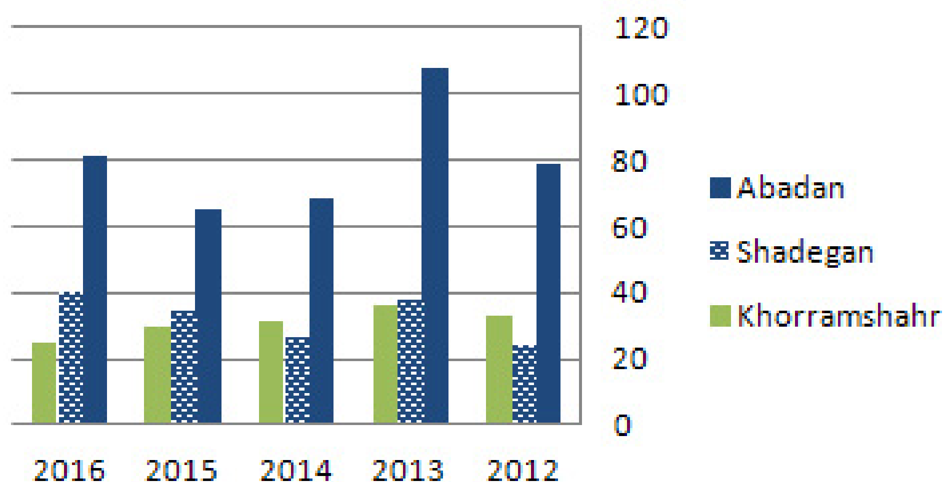


Figure 3: Percentage of Treatment results in TB Patients Referred to Abadan Health Centers (2012-2016)

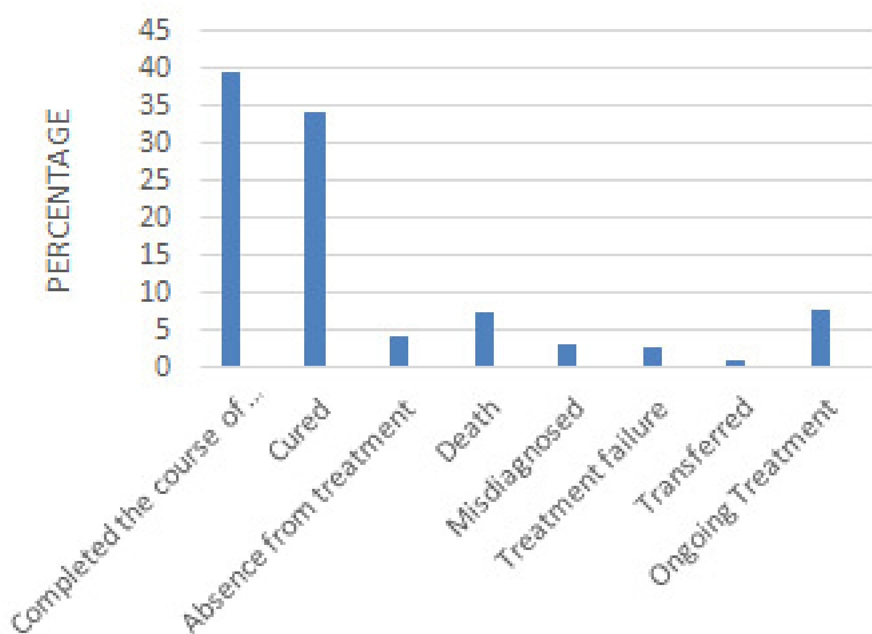


Table 1: The details of demographic characteristics of TB patients referred to Abadan Health Centers

		Frequency	Percent	Significance level
Gender	Male	453	62.9	P-Value=0.000
	Female	267	37.1	
Living place	Urban	530	73.6	P-Value=0.000
	Rural	190	26.4	
Marital status	Married	244	33.9	P-Value=0.000
	Single	127	17.6	
	Divorced	28	3.9	
	Others	5	.7	
	Total	404	56.1	
Prison	Yes	18	2.5	P-Value=0.000
	No	702	97.5	
Age groups	<9	11	1.5	P-Value=0.000
	10-19	39	5.4	
	20-29	143	19.9	
	30-39	192	26.7	
	40-49	113	15.7	
	50-59	103	14.3	
	60-69	59	8.2	
	70-79	36	5.0	
	+80	24	3.3	
Education	Illiterate	117	16.3	P-Value=0.000
	Primary school	125	17.4	
	Under high school	103	14.3	
	High school	44	6.1	
	Academic	15	2.1	
	Total	404	56.1	
TB type	Extra-pulmonary TB	189	26.3	P-Value=0.000
	Pulmonary TB	531	73.8	
Type	New	646	89.7	P-Value=0.000
	Relapse	31	4.3	
	Others	31	4.3	
	Imported	9	1.3	
	Treating after absence	3	.4	

Figure 4 shows that the prevalence of tuberculosis in men and women living in the urban and rural areas was 27.11, 17.28 and 22.23 12.69 per 100,000 people, respectively. The prevalence of pulmonary tuberculosis was 15.36 per 100,000 people during the last 5 years. The same prevalence rate was 22.34 and 17.52 per 100,000 people, respectively. Figure 5 shows the frequency of TB patients per 100,000 people based on their place of residence for different age groups.

The findings of this study revealed that the highest number of TB patients is seen in the age group of 30-39 years, which is true in both the urban and rural groups, and then the age group of 20-29 years is placed in the next ranking. Nikbakht et al. in their study in Babol city reported the age group of 18-38 years as the group with highest number of tuberculosis patients (7). Gholami et al. in a study in Urmia found that the highest number of people with tuberculosis was seen in the age group of 40 -31 years (8). Noeske et al. also reported that most of the TB patients belonged to the age group of 25-34 years in Cameroon(5). In a study in Hamedan province, Khazaei et al. (6) reported that the largest TB cases occur in the age group over 60 years old, which is more consistent with the TB pattern of the whole country (7). It seems that the high number of affected people in the age group of 20-39 years old is due to the high population of this age group and the high prevalence of addiction among them. In the present study, the mean age of the patients studied was 41.39 ± 17.79 years with an age range of 4 to 92 years. Also, men accounted for the largest number of patients. In a study in northern Iran (9), Babamahmoodi et al. reported that the mean age

Figure 4: Tuberculosis incidence rate in Abadan Health Centers (2012-2016)

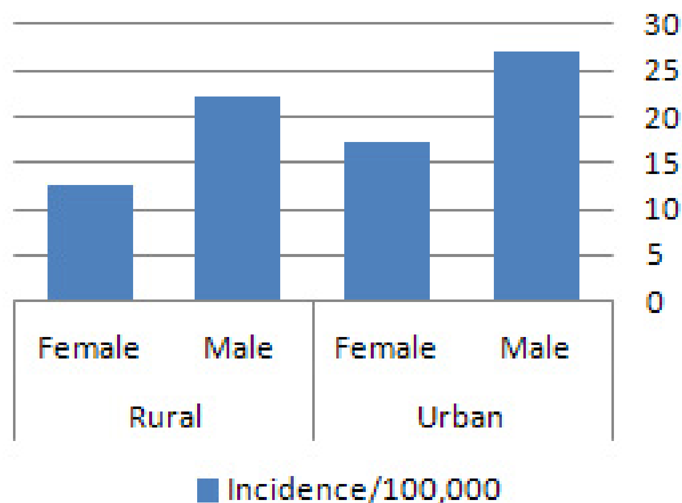
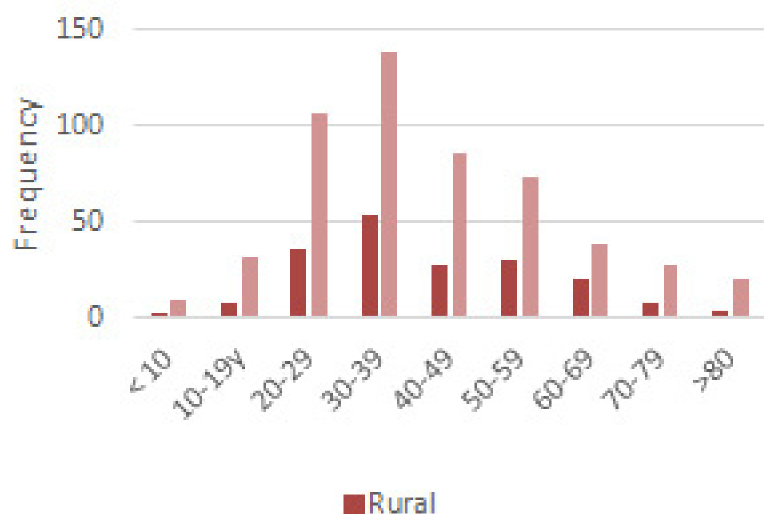


Figure 5: Tuberculosis incidence rate in Abadan Health Centers (2012-2016) according to living place



for women and men was 50.57 and 51.14 respectively, and the majority of patients were male. Fronti and Hoa have also reported a higher incidence of the disease among men in their studies (10, 11). In a study in France, Cavalli reported a mean age of 40 years for patients (12). According to World Health Statistics, men were affected by the disease more than women(4). In a study, the most patients were affected by new cases of disease (89.8%). Hoa et al. (11) also reported the highest incidence of new cases. In general, the prevalence of the disease and pulmonary tuberculosis in this study was 22.34 and 15.36 per 100,000 people respectively, which was higher than the average prevalence of tuberculosis in the whole of Iran(3), which is 12.6 per 100,000 people for all TB cases and 8.57 per 100,000 for pulmonary tuberculosis. The prevalence rate reported in Cavalli et al.'s study (France) (12) and Fronti's study (Italy) is 8.7 and 7.42 per 100,000 people, respectively.

Conclusions

Considering the fact that tuberculosis is a life-limiting disease and is most prevalent in the younger age group of society that is considered as the main capital and workforce, educating people who at risk can significantly contribute to the prevention and spread of disease.

Acknowledgements
This research was financially supported by student research committee of Abadan school of medical sciences under grant No: 95ST-0072 with ethical code of:
IR.ABADANUMS.REC.1396-198

References

1. World Health Organization. factsheet no. 104-Tuberculosis. Available at: http://www.who.int/mediacentre/factsheets/fs104/en/ (Accessed august 2017)
2. Arsang SH , Kazemnejad A , Amani F Epidemiology of Tuberculosis in Iran (2001-08). Journal of Gorgan University of Medical Sciences. 2011;13(3):78-86.
3. Tuberculosis status, Center of Disease Control and Prevention (Division of TB and Leprosy Elimination), ministry of health and medical education, Iran, available at: http://tb-lep.behdasht.gov.ir/ (Accessed august 2017).
4. World Health Organization. Global Tuberculosis report, 2015. Available at: http://www.who.int/tb/publications/factsheet_global.pdf?ua=1.
5. Noeske J, Nana Yakam A, Abena Foe JL. Epidemiology of tuberculosis in Cameroon as mirrored in notification data, 2006-2014. The international journal of tuberculosis and lung disease : the official journal of the International Union against Tuberculosis and Lung Disease. 2016;20(11):1489-94.
6. Khazaei S, Roshanaei G, Saatchi M, Zahiri A, Bathaei S, Salehynia H, et al. Epidemiology of pulmonary tuberculosis in the Hamadan province during 2005-11. 2. 2015;3(6):12-9.
7. Nikbakht HA, Hosseini SR, Sharifi-fathabad H, Habibzade R, Daemi A, Ghaffari-fam S. Clinical epidemiology and treatment findings of acute tuberculosis patients in Babol City (2009–2013). Journal of Acute Disease. 2016;5(3):216-21.
8. Gholami A, Gharehaghaji R, Moosavi-Jahromi L, Ali Sadaghiyanifar A. Epidemiologic Survey of Pulmonary Tuberculosis in Urmia city during 2004-2007. Knowledge & Health 2009;4(3):19-23.
9. Babamahmoodi F, Alikhani A, Yazdani Charati J, Ghovvati A, Ahangarkani F, Delavarian L, et al. Clinical epidemiology and paraclinical findings in tuberculosis patients in north of Iran. BioMed research international. 2015;2015:381572.
10. Fronti E, Vecchia M, Scudeller L, Pratico L, Marone P, Muzzi A, et al. Epidemiology of Mycobacterium tuberculosis infection in Pavia province, Lombardy, Northern Italy, 1998-2013. New Microbiol. 2016;39(4):264-8.
11. Hoa NB, Wei C, Sokun C, Lauritsen JM, Rieder HL. Characteristics of tuberculosis patients at intake in Cambodia, two provinces in China, and Vietnam. BMC public health. 2011;11:367.
12. Cavalli Z, Ader F, Valour F, Saison J, Boussel L, Dumitrescu O, et al. Clinical Presentation, Diagnosis, and Bacterial Epidemiology of Peritoneal Tuberculosis in Two University Hospitals in France. Infect Dis Ther. 2016;5(2):193-9.

Family Stability and Conflict of Spiritual Beliefs and Superstitions among Yazdi People in Iran: A Qualitative Study

Zahra Pourmovahed (1)
Seyed Saied Mazloomy Mahmoodabad (1)
Hassan Zareei Mahmoodabadi (2)
Hossein Tavangar (3)
Seyed Mojtaba Yassini Ardekani (4)
Ali Akbar Vaezi (3)

(1) Department of Health Education and Promotion, Social Determinants of Health Research Center, School of Public Health, Shahid Sadoughi University of Medical sciences, Yazd, Iran.
(2) Department of Education and Psychology, Yazd University, Yazd, Iran
(3) Department of Nursing Education, Research Center for Nursing and Midwifery Care, Shahid Sadoughi Yazd University of Medical Sciences, Yazd, Iran
(4) Department of Psychology, Research Center of Addiction and Behavioral Sciences, Shahid Sadoughi University of Medical Sciences,Yazd , Iran

Corresponding author:
Hassan Zareei Mahmoodabadi
Yazd University, Safaeeye, Yazd, Iran.
Mobile Phone: +98 9132571279
Email: zareei_h@yahoo.com

Abstract

Background: The people of Yazd living in central Iran are well-known as a religious society with powerful spiritual beliefs while some of them also believe in several superstitions which affect their interactions, decision-making, loyalty to familial life, tolerating life problems, and finally, family health and stability.

Objectives: This qualitative study was conducted with the purpose of exploring the experiences of family and marriage experts and also couples' experiences with religious beliefs and superstitions running in families.

Materials and Methods: Data were collected via digitally audio-recorded deep semi-structured interviews with 9 experts of family and marriage and 4 couples living in Yazd (Iran). The participants were selected using purposive sampling. The analysis was interpreted through directed content analysis methods.

Results: Using the data obtained from 17 participants, two themes with 7 subthemes emerged. The main theme of "spiritual beliefs" including the categories of praying, spiritual mediation, effective spirituality and spiritual forgiving and also the main theme of "superstition" including the categories of wrong beliefs, resorting to superstitions for fleeing from life problems, and imposed traditional marriage were conceptualized.

Spiritual beliefs and superstitions are among the major factors affecting the stability or instability of families. In the case of reduced control on life affairs, some families resort to spiritual beliefs while some others turn to superstitions.

Conclusions: Families could be trained to find some correct and suitable solutions along with reinforcement of spiritual beliefs to cope with the use of superstitions in solving familial life problems and increase family health and stability.

Key words: Family; Health; Stability; Spirituality; Beliefs; Superstitions

Please cite this article as: Pourmovahed. Z.. et al., Family Stability and Conflict of Spiritual Beliefs and Superstitions among Yazdi People in Iran: A Qualitative Study. 2017; 15(9):97-103.

Background

Family is a social institution with various biological, economical, legal, psychological, and sociological aspects which forms the most fundamental social foundation reflecting social orders or disorders (1). Indeed, the family unit is one of the most important factors affecting community health of which underpins society (2). The increased rate of divorce in the present community of Iran and Yazd, central Iran, necessitates the investigation of the factors influencing couples' compatibility and family stability. One of the factors affecting family stability is spiritual beliefs which may affect familial interactions, decision-making, and loyalty or adherence to familial life. The role of these beliefs is of utmost importance in the incidence and resolving of marital disputes and disparities (3). Family stability is related to several factors one of which is spiritual well-being (4). Spirituality is used as a compatibility mechanism in reaction to life pressures and other daily difficulties such as familial disaster, disease, and mourning (5). Adherence to spirituality and religion is an important factor in marital stability and satisfaction. On the contrary, the greater the disparity in the couples' spiritual beliefs, the greater their discrepancies (6).

Moreover, adherence to spirituality in couples can produce reciprocal respect and confidence while lack of adherence to spirituality leads to irresponsibility in the couple's behavior, thereby resulting in reduced marital satisfaction (7). Unfortunately, parallel to deep spiritual beliefs, some superstitions with a tinge of spirituality have imposed themselves on families. The Iranian territory has been invaded by many different nations, specially the Mongols, over past history. One notorious gift of these invasions has been the prevalence of superstitious beliefs specifically in the cultural domain which have been transmitted to the succeeding generations as well. Superstition is an attitude or behavior striking the mind of an individual on the basis of fear, threat, habit, and some unknown causes to prevent unfavorable events. This behavior is not founded on the basis of logical action and cause-and-effect relationships. Although increased education and the public culture of the community leads to decreased superstitious beliefs, it must be emphasized that even modern humans cannot reject superstition entirely or free themselves from it practically (8). Given that the Iranian nation, specifically the people of Yazd, are a well-known religious community with powerful spiritual beliefs and values and at the same time some of them hold superstitious beliefs, these two factors affect the intra-familial relationships influencing significantly the stability or instability of the family. Consequently, it is mandatory to note the effect of spirituality and superstition on their performance in studies on family. The concepts related to this field should be analyzed carefully and this is only possible via qualitative studies since these types of studies enable the researchers to enter the internal world of the participants and determine the concepts formed in a culture, and their related variables, and explain them (9).

Objectives

The present study aims to identify and describe the spiritual beliefs and superstitions among the families in Yazd to pave the way for future studies aimed at stabilizing and empowering the family foundation. To do so, this study was conducted using directed content analysis on the basis of the constructs of McMaster's model.

Materials and Methods

This local study was conducted as part of a multi-centered larger study on determining the experiences of experts in family and marriage and also the practical experiences of couples in Yazd, Iran. It tried to identify and describe the spiritual beliefs and superstitions among the families on the basis of McMaster's model using directed content analysis in 2016. Sometimes, there are the results of previous studies on a phenomenon that are not complete or require more refinement or description. In this case, the researcher decided on directed content analysis (10) . The goal of directed content analysis is to validate and develop the conceptual framework of the theory or to expand the theory itself. The directed content analysis enjoys a more structured process than other content analysis methods (11,12).

Since McMaster's model is one of the effective and suitable models for investigating the performance of families in Iran which can be used to prevent familial and marital problems round the country (13) , it was applied in this study.

The participants of the study included 9 family experts with a mean work experience of 14.2 years and 8 espouses in Yazd, Iran, selected on the basis of purposive sampling method.

In this method, the researcher selects individuals who are equipped with a rich experience in the subject under study. The participants were chosen from among the family and marriage experts on the basis of three inclusion criteria: holding a PhD or MSc degree, having at least 5 years of work experience as consultant and treatment of the couples and families, and inclination for participation. The couples were, furthermore, selected on the basis of the following criteria: enjoying complete awareness, negative history of affliction with major psychological disorders, and inclination for participation.

The data were collected using semi-structured and deep interview on the basis of McMaster's model. At the beginning of the speech, we prepared a general question such as "Please relay your experiences of one day in your routine daily activities" .Then there were some questions to cover criteria in attitude, for example: "Which problem have you faced recently and how did you approach it in your family? "or "what is the role of spirituality in your life?". Of course, the sentences were not previously defined, and we tried to use their own words. Next questions were asked during the interview process. Having obtained the

required permission, all the interviews were recorded and then completely transcribed at the end of each interview and analyzed using directed content analysis. The average duration of the interviews was between 45 to 60 min which were performed with appointments made beforehand in the locations at the experts' workplace or in the center determined by the couples which the participants felt were convenient and in a quiet and pleasing atmosphere. The criteria for stopping data collection from the samples was data saturation when no new data could be extracted from the participants any more.

This study used descriptive content analysis which included the following:
Transcription of the whole interview immediately after its completion, reviewing the whole text for arriving at a general understanding of its content, determining the semantic units and the primary codes, classification of the similar primary codes in more comprehensive categories and determining the main theme of the categories (14).

1. Data Analysis
The analysis process was repeated with the addition of each interview and the codes and categories were refined and improved. The reliability and validity of the data was established using sufficient participation, close interaction with the participants, variety in the participants regarding age, gender, work experience, etc., data integration, repeated review of data, data review by the participants, and ethical perspectives of outsider observers. Also we selected couples from different socioeconomic areas. Besides an individual analysis, we did a total analysis by combining interviews. This was difficult and time consuming, but increased external validity.

2. Ethical Issues
This study was approved by the ethics committee of Health School of Shahid Sadoughi University of Medical Sciences, Yazd, Iran (approval code::IR.SSU.SPH.REC.1395.52). All participants in the study were assured of the confidentiality of their personal information and absence of any constraint to participate in the study. Because our study was qualitative and conducted based on interview with the participants, they entered the study with their consent and desire. Our interviews did not contain any individuals, name.

Results

We analyzed 17 semi-structured interviews that were conducted with 9 family experts (FE) and 8 espouses (E) in Yazd, Iran (Table 1). With the use of purposive sampling method, we identified 2 main themes and 7 subthemes (Table 2).

The results of the themes of "spiritual beliefs" are as follows:
1. Praying
…I say my prayers and cry whenever I face difficulties, I pray to God to make me patient so that I can tolerate the disasters…" (woman 1).

2. Spiritual Mediation
…my daughter says: why does not daddy say his prayers? When I reach the age of religious puberty, I should say my prayers. I say you can ask it from your Quran teacher when you go there…" (woman 2).

3. Effective Spirituality
One of the experts said:"…religious beliefs prevent people from retaliating. Even if they do not do a good thing to you, they do not do a bad thing against you, either. This reduces the marital tensions. Spiritual beliefs affect the whole life, breeding of children, and relations with the spouse's family or with our own family…" (expert doctor 9) .

4. Spiritual Forgiving
…but when matters of faith play a role, she says: though my husband is not that generous, he has other good features which overcome this weakness. Or when she sees that her husband commits a mistake, if she says you did this wrong thing, so I do the same to you, they put themselves in a pickle….religious beliefs hinder these types of affairs…" (expert 8) .

Moreover, the results of the theme of "superstition" were as the following:

5. Wrong Beliefs
…we have different types of couples; in many cases the educated wife wants to work outside
home, but the husband opposes her and prevents her working outside due to his own wrong
beliefs. He insists that she should just do the housework and be a housekeeper…" (expert doctor 5).

6. Writing Talisman, Doing Black Magic, and Seeing the Fortune-teller
…some families are not at all familiar with the new psychological approaches; they use the local therapists superstitiously like fortune-telling, performing black magic, going to the soothsayer, augur, …they follow hundreds of incorrect treatments and finally after failure, they turn to us when it is too late…" (expert doctor, 5).

…many attendances in recent years have been related to sexual disorders which, as they are taboo, they turn to the specialists less frequently and seek treatment from traditional therapies and talisman writing…" (expert 2) .

7. Traditional Imposed Marriage
One of the experts asserts in this regard: "…this morning a young boy and girl came to me to have a pre-marriage consultation. To me, they were not a suitable couple to get married as they had opposite personality poles. The girl's family told their daughter that the boy is not an addict and says his prayers regularly as a Muslim and you must accept to marry him. The girl says that she does not like him for his job and education. She says that her family do not allow her to express her heart-felt beliefs and feelings…" (expert 8) .

Table 1: Participants Characteristics

Code	Gender	Age	Education	Work Experience (year)
Family Experts				
FE_1	Male	56	Specialist	21
FE_2	Male	48	Specialist	17
FE_3	Male	53	MSc	18
FE_4	Male	36	Specialist	9
FE_5	Male	43	Specialist	11
FE_6	Female	49	MSc	15
FE_7	Female	52	Specialist	17
FE_8	Female	38	Specialist	8
FE_9	Female	40	MSc	12
Espouses				
E_1	Male	51	Diploma	
E_2	Female	47	Diploma	
E_3	Male	35	PhD	
E_4	Female	28	Bachelor	
E_5	Male	58	Diploma	
E_6	Female	53	Diploma	
E_7	Male	47	Bachelor	
E_8	Female	40	Diploma	

Table 2: Identified Themes, Subthemes and Subcategories

Themes	Subthemes	Subcategories	Frequency (%)
Spiritual beliefs	Praying	Resorting to spirituality to relieve pains	11(64.7)
	Spiritual mediation	Asking others for help in matters of faith	3(17.6)
	Effective spirituality	Family management on the basis of adherence to spiritual beliefs	6(35.3)
	Spiritual forgiving	The couple's better understanding with spiritual forgiving	4(23.5)
Superstitions	Wrong beliefs	Writing talisman	5(29.4)
	Resorting to superstition to free oneself from life problems	Black magic	2(11.8)
		Turning to soothsayer, augur, and fortune-teller	4(23.5)
	Traditional imposed marriage	Obligation to continue relations with the opposite sex held before marriage	1(5.9)
		Obligatory adherence to marital relations after marriage	5(29.4)

Regarding obligatory adherence and loyalty to marital relations, one of the experts said:

"…extramarital relations means that a man or a woman who has formal ethical commitment and is obligatorily bound to their marital life, is attracted to an alien person for some reasons and forms an emotional relation with that individual, so they form a cold feeling towards their spouses…" (expert doctor , 7).

Discussion

On the basis of the findings of this study, it seems that families seek resort to several solutions to resolve their familial disputes and disparities. In this respect, some families resort to spiritual beliefs while others resort to superstition. The presence of spirituality exerts a significant effect on family stability. Faith in God makes the individuals' attitude toward the whole existence meaningful and purposeful. On the other hand, it causes people to acquire internal consistency and equilibrium. This is the origin of many disputes and discrepancies in families. Also, adherence to spirituality plays a pivotal role in marriage stability and marital satisfaction. The greater the spiritual discrepancy of the couples, the greater their disputes (6). Numerous studies have emphasized the efficacy of spirituality in marital satisfaction and reinforcing the relations between couples (15-18). Demaris et al. (2010) stated that religion is the most important parameter in understanding between the couples and lack of spiritual homogeneity makes the wives depressed and anxious indicating that women are more deeply affected by this religious inequality (19).

This study showed that the family members, specifically women, resort to praying to relieve their mental pain. Praying is a spiritual activity and for many it is a religious activity (20). The families in Yazd, especially women, pray to God to solve their problems and ask Him to bestow patience on them. They also pray to God to promote their resistance against disastrous difficulties. It is not a new phenomenon to believe that spiritual beliefs and praying can be effective in individuals' psychosomatic improvement. The pure heart-felt faith in God may even cure a fatal disease and save the patient's life in a miraculous manner. The history of praying, its intrinsic origin, and an analysis of the jargon of praying displays the fact that the language of praying is an international one and is shared by all human beings. It needs no training and the intelligence for it is equally latent in all races of humans in all places and at all times (21). In this study, asking for others' help in matters of faith (asking faith-related questions) was a manifestation of spiritual mediation. The mother advised her offspring to ask her faith question from her divinities teacher since she was not able to answer her daughter's question. In this regard, Morse (2009) declares that asking faith questions from a clergyman is an art since listening to the speeches of a person who is talking about sacred spiritual matters requires creative attention to the subject. The spiritual individuals have no expectations to compensate for this spiritual guidance because they believe that God is there. Humans are not seeking the philosophy of these questions when they ask it, rather, they want to know the position of God in their life. Ultimately, when the internal emotions and spiritual doubts of a person are deeply discovered, their life environment becomes safe and full of mercy (22).

Another subcategory of the theme of "spiritual beliefs" in this study was "effective spirituality" (adherence to spirituality is manifested as better management of familial life). Being concerned with spirituality and religion increases individuals' resistance against life problems. Several studies indicate the significant effect of spirituality on increased marital stability and satisfaction (23-26). Given that the Iranian nation, especially the people of Yazd, are particularly religious, so, spirituality plays a major role in the relations among the family members.

Another a subcategory of the theme of "spiritual beliefs" is "spiritual forgiving". In the present study, forgiving the spouse's faults and weaknesses due to adherence to spirituality and avoiding retaliation are manifestations of spiritual forgiving. The religious beliefs and actions enable the person to internally control themselves physiologically, cognitively, and emotionally to be able to accept the responsibility of their actions in conflicts. From the inter-personal point of view, spirituality creates conditions that make the person attend to God at times of anger and avoid opposition to their spouse and, thus, ignore their faults and weakness. Relation with God plays an interactional and compensatory role in marital relations. Of course, the marital satisfaction could be promoted and disputes could be resolved with self-knowledge. It can change the deficient attitude towards existence and give a new meaning to life. It further creates intuition towards one's behavior, corrects the thoughts and illogical expectations, and increases compatibility and forgiving between the couple (27).

A further concept discovered in this study was superstition and unwise beliefs running in families. According to Bidney (1953) superstition is defined as a kind of fear based on illogical or mythological beliefs which usually originate from some taboos (28). Wagner (1928) also refers to superstition as illogical or unwise beliefs (29). Thalbourne (1977) defines superstition as a belief which if enacted, brings up either happiness or misery, while there is no generally accepted or logical basis for such a belief (30).

Moreover, Peltzer (2003) states in this regard that although the logical method is emphasized for preventing the incidence of events, sometimes the illogical method is adopted in the literature of every nation (31). In fact, superstition is a wide range of beliefs and behaviors that occur on the basis of the property of establishment of some incorrect cause-effect processes due to ignorance, fear of the unknown, belief in black magic or fortune or an inaccurate perception. This behavior has acquired a high position in the folkloric culture and psychology (32).

Additionally, in this study, with respect to incorrect beliefs, manifestations such as the incorrect beliefs of the husband towards the wife's working outside home and lack of social activity of women due to the superiority of the traditional

attitudes specially in low-educated families were achieved. Also, the manifestations of “imposed marriage” included “disliking the husband due to traditional marriage, continuation of relations with another person for pro-marriage emotional relations, and obligatory adherence to marital relations after marriage”. Other superstitious beliefs of people included: seeing the soothsayer and fortune-teller to create love and remove the marital disputes, believing in the detrimental effect of the evil eye in creating marital dispute, burning wild rue seeds in fire to counteract the evil eye, and believing that the girl should enter the husband’s house with a white veil and leave it in a white shroud.

It appears that in conditions that families’ ability for controlling life affairs and reducing life problems is decreased, some of them resort to spiritual beliefs to reach internal tranquility and to increase their tolerance against difficulties while some other superstitious individuals seek treatment in actions like writing talisman, black magic, and seeing soothsayers and fortune-tellers.

Conclusion

Spiritual beliefs and superstitions are among the major factors affecting the stability or instability of families. In the case of reduced control on life affairs, some families resort to spiritual beliefs while some others turn to superstitions. So, families could be trained to find some correct and suitable solutions along with reinforcement of spiritual beliefs to cope with the use of superstitions in solving familial life problems and increase family stability.

Limitations

The participating couples were selected based on the goals of our study, therefore, may not represent all of couples’ experiences of family health and stability. Also, the experts within the study were selected due to their willingness and availability to participate in the study. Therefore, it is possible that those who chose to participate in the study are those who are more enthusiastic and committed to the study.

Acknowledgements

This article is distilled from part of a PhD dissertation concerned with social determinants of health. Our special thanks should go to the School of Public Health in Shahid Sadoughi University of Medical Sciences. We should also thank all the experts, couples, Psychiatrists, psychologists, etc. who supported us patiently.

References

1. Mazaheri MA, Sadegh MS , Heidari M. A comparative study on perceived & ideal family structures in 5 Iranian cities. J PSYCHOL .2009; 13(2): 118-137. (Persian) http://www.sid.ir/fa/VEWSSID/J_pdf/61513885001.pdf
2. Saroukhani B, Sedaghatifard M. Generation Gap in Iranian Family; Approaches and Theories. Social Sciences Bulletin.2010; 3(4): 7-31.(Persian) http://en.journals.sid.ir/ViewPaper.aspx?ID=190136
3. Seddighi A, Jaberi S, Khoshdani Farahani P, Shahsiah M. The relationship between religious orientation and marital satisfaction among couples of Qom City. Health, Spirituality and Medical Ethics.2014;1(3):10-15.(Persian) http://jhsme.muq.ac.ir/article-1-8-en.pdf
4. Defrain J, Asay SM. Strong families around the world. Marriage and Family Review.2007; 41(1-2):1-10. DOI: 10.1300/J002v41n01_01
5. Ribaudo A, Takahashi M. Temporal trends in spirituality research: a meta- analysis of journal abstracts between 1944 and 2003. J Relig Spiritual Aging.2008; 20(1-2):16-28. http://dx.doi.org/10.1080/15528030801921972
6. Ghafouri Varnoosfarani MR, Golparvar M, Mahdi Zadegan I.A study Attachment styles and religious attitudes as predictors of success of failure of Marital relationship. Journal of Research in Behavioural Sciences.2009; 7(2): 143-54.(Persian) http://jrms.mui.ac.ir/index.php/rbs1/article/view/5022
7. Monjezi F, Shafiabad A, Sodani M. The effects of Islamic communication style and religious attitudes on marital satisfaction improvement. Journal Of Research In Behavioral Sciences.2011; 10(1): 30-37.(persian) http://en.journals.sid.ir/ViewPaper.aspx?ID=242570
8. Jahanshahi Afshar A , Shamsodini Motlagh MH . The superstition origins and its function in people’s life (The studied sample: Kerman people’s beliefs).Culture and Folk Literature.2014; 2(3):49-78.(Persian) http://cfl.modares.ac.ir/article_11256_en.html
9. Juniper EF, Guyott GH, Strriner DL. Clinical impact versus factor analysis for quality of life questionnaire construction. J Clin Epidemiol .1997; 59: 233-238. DOI: http://dx.doi.org/10.1016/S0895-4356(96)00377-0
10. Potter WJ, Levine-Donnerstein D. Rethinking validity and reliability in content analysis. J. Appl. Commun. Res.1999; 27:258-284. http://dx.doi.org/10.1080/00909889909365539
11. Mayring P. Qualitative content analysis. Forum, Qualitative Social Research.2005; 1(2). http://www.qualitative-research.net/index.php/fqs/article/view/1089
12. Hickey G, Kipping C. Issues in research. A multi- stage approach to the coding of data form opened questions. Nurse Res .1996; 4: 81-91. DOI:10.7748/nr.4.1.81.s9
13. Yoosefi N, Ghader Marzi H, Nazaripoor M. The prediction of family functioning based on spirituality. Teb va Tazkiyeh.2014; 22(4): 59-66.(Persian) http://www.magiran.com/view.asp?Type=pdf&ID=1267276&l=en
14. Graneheim UH, Lundman B. (2004). Qualitative content analysis in nursing research: Concepts, procedures and measures to achieve trustworthiness. Nurse Educ Today.2004;24(2): 105-12. DOI:10.1016/j.nedt.2003.10.001
15. Orathinkal J, Vansteewegen A. Religiosity and marital satisfaction. Contemp Fam Ther. 2006;28: 497-504. DOI: 10.1007/s10591-006-9020-0
16. Call VRA , Heaton TB. Religious influence on family stability. J. Sci. Stud. Relig. 1997; 36: 382-392. DOI: 10.2307/1387856
17. Mahoney, A. Religion and conflict in marital and parent child relationship. J. Soc. Issues.2005; 61(4): 689-706. DOI: 10.1111/j.1540-4560.2005.00427.x

18. Hunler OS, Gencoz TI. The effect of religiousness on marital satisfaction: Testing the mediator role of marital problem solving between religiousness and marital satisfaction. Contemp Fam Ther .2005; 27(1): 123-136. DOI:10.1007/s10591-004-1974-1
19. Demaris A, Mahoney A, Pargament KI. Sanctification of marriage and general religiousness as buffers of the effects of marital inequity. J. Fam. Issues.2010; 31(10): 1255-78. PMC3187559
20. Taylor EJ, Hopkins O. Use of prayer among persons with cancer. Holist Nurs Pract.2002; 16(3):46-60. PMID:11913227
21. Taghizadeh Karati K, Asadzandi M, Tadrisi SD, Ebadi A. Effect of prayer on severity of patients illness in intensive care units. IJCCN.2011; 4(1): 1-6. http://inhc.ir/article-A-10-147-4-1-en.html
22. Morse, M.K. Noticing the duck: the art of asking spiritual questions . Faculty Publications - George Fox Evangelical Seminary.2009;Paper22.http://digitalcommons.georgefox.edu/gfes/22
23. Cutrona CE, Russell DW, Burzette RG, Wesner KA, Bryan CM. Predicting relationship stability among midlife African American couples. J. Consult. Clin. Psychol.2011; 79(6): 814-825. doi: 10.1037/a0025874
24. DiBlasio F, Benda B.Forgiveness intervention with married couples: Two empirical analyses. J. Psychol. Christ.2008; 5: 511-23. https://www.questia.com/library/journal/1P3-1492493581/forgiveness-intervention-with-married-couples-two
25. Schramm DG, Marshal JP, Harris VW, Lee TR. Religiosity, homogamy and marital adjustment. J. Fam. Issues .2012; 33(2):246-268. http://journals.sagepub.com/doi/pdf/10.1177/0192513X11420370
26. Orathinkal J , Vansteenwegen A. The effect of forgiveness on Marital satisfaction in relation to marital stability. Contemp Fam Ther 2006; 28: 251-60. DOI: 10.1007/s10591-006-9006-y
27. Danesh, E. The Impact of islamic self-knowledge on marital improvement adjustment.Counseling Research and Developments.2004; 3(11): 8-30.(Persian) http://en.journals.sid.ir/ViewPaper.aspx?ID=22573
28. Dean, F. Superstitions in an urban contemporary community. The Student Researcher.2013; 2(2): 59–77. http://www.tsd.ac.uk/en/media/uniweb/content/documents/departments/lrc/thestudentresearcher/vol2no2journalarticles/FenellaDean_StudentResV2N2.pdf
29. Wagner ME. Superstitions and their social and psychological correlatives among college students. Journal of Educational Sociology.1928;2(1): 26–36. DOI: 10.2307/2961760
30. Thalbourne MA. Paranormal belief and superstition: how large is the association? Journal of the American Society for Psychical Research.1997; 91: 221–226. https://www.researchgate.net/publication/288282337_Paranormal_belief_and_superstition_How_large_is_the_association
31. Peltzer K,Renner W. Superstition, risk-taking and risk perception of accidents among South African taxi drivers. Accid Anal Prev.2003; 35: 619–623. https://doi.org/10.1016/S0001-4575(02)00035-0
32. Foster KR, Hanna K. The evolution of superstitious and superstition-like behavior. Proc Biol Sci .2009; 276: 31–37. DOI: 10.1098/rspb.2008.0981

A comparative study of self-actualization in psychology and Islam

Simin Afrasibi (1)
Zakieh Fattahi (2)

(1) Department of Psychology and Education, Marvdasht Branch, Islamic Azad university, Marvdasht, Iran
(2) Assistant Professor, Department of Islamic mysticism, Marvdasht Branch, Islamic Azad University, Marvdasht, Iran.

Corresponding author:
Zakieh Fattahi
Assistant Professor, Department of Islamic Mysticism,
Marvdasht Branch, Islamic Azad University,
Marvdasht, Iran
Email: submit.hna2@gmail.com

Abstract

Self-actualization is the basic tendency of any person to realize their abilities more and more, and toseek perfection, and to realize all their talents and comprehensive mental growth in a coordinated and uniform form, as well as a desire to be creative in all means. In the present study, we have attempted to examine the concept of self-actualization from the perspective of Islam (Quran and Hadith) and psychology with an emphasis on (Maslow, Rogers) using a library (descriptive-comparative) method. For Islam, self-actualization means to achieve perfection and divine revelation. Based on the verses and hadiths, this growth does not have boundaries and the human can progress with will and effort. From the perspective of humanist psychologists, humanists are those who seek to be strong and successful in private life, to be creative persons in the community and to support others, and these people seek perfection and are self-made humans called self-actualized people in humanistic psychology. The result of this research is that there are differences and similarities between the two views. Both psychology and Islam consider meeting the needs of human progress, but Islam sees perfection dependent on divine revelation and is basically different from psychology in this respect. Another difference is that in Islam, Allah (God) is the base and axis of all things and the only way to achieve self-actualization is getting close to God. However, from the perspective of psychology, the human being is considered an independent and unique creation that pays attention to himself and his own demands, and does whatever he deems good. Therefore, psychology defines human as his goal and end, and that achieving self-actualization and perfection is exclusive only to the human area, while according to Islam, perfection is possible only in the light of God. Similarities such as humility, tolerance, respect for other human beings and a sense of responsibility towards others can be noted in the two views. Finally, regarding the similar characteristics of the self-actualized people in the two approaches it can be said that Islam is more comprehensive than the view of Humanists . Then the concept of self-actualization and perfection in Islam has a special state compared to the view in psychology, and involves all aspects of life.

Key words: Islam, psychology, self-actualization

Please cite this article as: Simin Afrasibi, Zakieh Fattahi. A comparative study of self-actualization perspective in psychology and Islam. *World Family Medicine.* 2017; 15(9):104-111. DOI: 10.5742/MEWFM.2017.93104

Introduction

The concept of self-actualization has been considered in its own way since the ancients (by the ancient Greek philosophers). The concept "eudaimonic" refers to a type of well-being that is beyond human efforts to get pleasure and to avoid of pain, that is hedonistic well-being. During the formation of modern psychology in the late eighteenth century, self-actualization was conceptualized as an expression of "eudaimonic". In this view, people are ready to undergo stress in order to achieve their growth and development. For example, consider a person who tolerates light smoke for hours, but does not miss a moment of study, or a person who tolerates hunger for fasting. The term self-actualization is everyone's fundamental tendency to realize their abilities. Self-actualization in its main and classic concept was first discussed and examined by "Kurt Goldstein" (German psychiatrist, 1965). Goldstein introduced a dynamic view of humans, and by suggesting the organismic theory and the emphasis on unity, harmony and balance, considered a healthy human personality as an organized, harmonious and entire unit (Tilier and Alberta, 2008). Goldstein calls the fundamental motivation of a person as "self-actualization" that is a general and prevailing motivation, and believes that man attempts constantly and in every possible way to discover, realize and actualize his natural capacities and talents, and shapes his life with this specific purpose (Shamloo, 2003). He defined self-actualization as a strong innate ability available in any person that causes prosperity of his positive talents. Goldstein believed that man has to be fully consistent with the surrounding environment and his life to achieve great success, and where the environment and life hits humans heavily every day (e.g., it causes disease), people should try to improve their methods of coping with such problems, so that they could get closer to the boundaries of self-actualization (perception and activation of all personal talents) (Kaplan, 1986: 545). Psychologists have different definitions for this concept. Maslow and Rogers continued discussions on self-actualization. They did not have much belief in scientific method and for this reason, the concept of self-actualization made by them was so subjective that it has been criticized by most scientists in this respect. Religion is essentially dealing with the non-objective symbols, and expresses the feelings, values and hopes of the faithful people, or organizes and gives order to the interactive flows between humans and external objects, or gathers the collection of minds and objectives, or shows the context of this total (Hamilton, 1999, 15). Religiosity is to accept all or part of the ideas, ethics and all religious orders in a way that a religious person sees him/herself committed to comply with and respect this collection. (Yagmaei, 2001:190). Religious is a person who follows a religion both in theory and action, with knowledge of its principles and rituals, so that such following affects his/her religious and non-religious life (Anavari, 1994). The ultimate goal of humans is achieving happiness and perfection, and that perfection is nothing but the realization of the real needs of man and his abilities and real talents. In other hands, the real perfection of man is a result of his conscious and voluntary movements, and definitely doesn't have a compulsive and unconscious aspect. In this context, man has to move through the determined way called "ways of peace" (Surah Al-Maidah, verse 16) and "the right path" (Surah Al-e-Imaran, verse 101) to reach his creator. These ways have been introduced in religious orders, ethics, and Islamic tenets. Then, the main goal of Islam is the perfection of humans, which can be realized in line with obedience to Allah (God). From this perspective, the self-actualization that is called "perfection" in Islam, has an important state. Perfection has the same meaning as self-actualization in that both have similarities in changing the potential to actual in human existence. Islam has many material and spiritual achievements, and all of them are called "Islamic civilization". The perfection is manifested in the different dimensions of the Islamic civilization, whether in the theoretical aspects and whether in the remaining works of this civilization. In this context, there are many matters on the perfection and its levels in the holy Quran and the Hadith resources, and by the philosophers, mystics, and litterateur and so on. So in order to understand the different dimensions of perfection in the Islamic culture, one should consider its various cases in the Islamic civilization that the aim is the examination of self-actualization in Islam and psychology. Maslow believed that the pattern of the way of personal behavior for achieving happiness, health and functioning depends on its self-actualization (Heylighten, 1992). On the other hand, Frankel's interpretation of self-actualization is that this state is along with the ability to understand the meaningful and positive aspects of life events (Petr, 1996). So self-actualization is as a process of development in the potential powers of each individual to the fullest degree. A self-actualized person is a full person whose functioning and life is in the fullest level (perfection), and his life has been realized and enriched more than an average person (Dahl, 1983). From the Islamic perspective, the desire for perfection and growth and self-actualization underlies human nature. Parents must provide the context for this growth in childhood, and must take a method in which a person's talents in various physical and mental aspects can flourish one after another (you are responsible for the good training of a person who is under your guardianship…) (Tabarsi, 1414 AH). Further, the holy Quran speaks of another dimension of the human soul: "That the human soul is aware and knows, doesn't mean that he is innocent of evil, and if a man violates the orders and accepts the soul's invitation to the ugliness and wickedness, the mercy of God will help him and dissuade him from evil and will lead him to do good job" (Yusef: 53, Tabatabai, Bita, Volume 11, 269). To know the perfect man or a simple man from the Islamic point of view is necessary for Muslims, because this sentence has a model and pattern and example. The subject of perfect human is not a mere philosophical or scientific discussion that has just scientific effect. If one cannot know the perfect man through expressions in Quran and Sunnah and through the way of recognition of Quran's perfect nourished examples, we will not be able to pass the way determined in Islam and to be a true Muslim, and that our society will not be an Islamic society. So it is necessary to know the perfect and transcendent man from the Islamic point of view (Motahari,

1993: 17). Since psychology has great links with the local culture of each region, use of psychological theories should be adjusted based on the culture and civilization of each region to provide better solutions. In Islamic culture, " to be" or move toward God will certainly lead to actualization of talents. The explanation of similarities and differences of self-actualization in Islam and psychology helps psychology to have a better understanding of self-actualization issues, and to choose better techniques in accordance with its local and genuine culture. This study is a new work because it seeks to compare self-actualization from the perspective of two psychologists i.e. Maslow and Rogers with Islam in four parts including the holy Quran, Hadith, mysticism and philosophy of Sadra.

Research Purposes

1- Explaining self-actualization from the perspective of psychologists with an emphasis on the views of Maslow and Rogers;
2- Explaining the concepts of self-actualization in the teachings of Islam according to the Quran and Hadith;
3-The comparison between Islam and psychology about self-actualization.

Research Methodology
According to the subject of the research, which is based on theoretical discussions and qualitative nature, the method chosen for reviewing the concerned subject matter is a qualitative method (descriptive- comparative) and that by relying on the first class and second class resources in library form, we tried to respond to the research questions and to specify the accuracy of the hypotheses. In fact gathering the information we needed to use in this study was conducted by the library method. First, the researcher will attempt to reach a complete description of self-actualization in the view of psychologists, especially Maslow and Rogers, and then to search and note the concept of self-actualization in the Islamic sources i.e. the Qur'an and Hadith. Finally, the concept of self-actualization will be compared in this approach. In each section, based on the resources accessible for the researcher, the case by case comparison has been done. Since the research method in this study is descriptive, and finally the researcher will compare the two ideasand in doing so , more resources were needed that can provide an exact and precise description of the variables. In the psychology resources, many books have been written on the theories of personality that present the views of Maslow and Rogers. In addition, numerous articles have been written about these two theorists. The Quran and the hadith are the two main sources in Islam. In the present research, the researcher has referred to the main Islamic knowledge resources for the authenticity of the used sources, of which we can refer to the holy Quran, four Shiite hadith books and other earlier sources of hadith. Then using these resources, we will examine self-actualization in psychology and the Islamic approach to identify the differences and similarities between these two views, and the opinions presented.

Literature of Research

- Azar Fatemeh in an article entitled "Study of perfect human from the perspective of Quran in the book Nahjul-Balaghah and from psychological perspectives" (2013), (Psychology and Educational Sciences) states: the Almighty God has sent the prophets and especially Prophet Muhammad (peace be upon him and his progeny) and Imams (peace be upon them) to us as a complete pattern of the perfect man for guidance of mankind, so that we can find the right path through following them, and achieve the real perfection that is the worship of God. This article has tried to examine the perfect man from the perspective of Islam relying on the words of Imam Ali (peace be upon him) and some psychological perspectives.

- Bagheri, Ali Akbar has an article entitled "examine the perception of reality and self-adoption in ghazals of Hafez," according to Maslow's self-actualization", published in 2011 in Isfahan University.

- Bakhshayesh, Alireza in an article entitled "A comparative study of the aspects of self-actualization in Quran and psychology" published in the Journal of Comparative Theology (2012), believes that people in the community are different and some people are very pious and strong and yet successful in personal life and have actualized their existential talents. These are the complete and self-made men who are the perfect men according to Islam and the self-actualized men in the view of psychology.

-Hosseini Seyed Ali Asghar in an article titled "Evolution of the concept of self-actualization, beyond the self-actualization, importance of the strategies toward self-actualization" published in 1999 at the University of Tarbiyat Moallem believes that almost all people have the self-actualization talent, but few people achieve self-actualization.

- Abdolmaleki Said in an article titled "A Comparative Study of Rumi and Rogers about self-actualization" in 2000 has tried to examine the ways to achieve self-actualization from the perspective of two eastern and western anthropology schools, i.e. the eastern school of Rumi a Muslim poet, mystic and anthropologist of seventh century AH, and the western humanistic psychology school of Carl Rogers as the theorist of the self-actualization and psychology in the twentieth century USA.

- In the research of scholars such as Ramaniah, Heerboth, and Jinkerson (1985), self-actualization is similar to agreeableness personality, and they believe that the self-actualized people have sensitive thought and are tenderhearted and straightway.

The study of self-actualized people in psychology
Humanists have acted clearly about the principles underlying their approach to human personality. In their view, man is basically a good creation that tries to grow or achieve self-actualization and is flexible and proactive. Humanistic psychologists give importance especially to

mental health. Only self-control or being consistent with environment is not enough. Only a person who takes steps toward self-actualization can be considered a healthy man. Theories of Rogers and Maslow emphasise on the perfect and complete man more than other theories, and take a positive and optimistic approach to human personality. For humanist psychologists, it is necessary to fight against any factor that prevents a person's potential for self-actualization and deprives him of what could be (Atkinson L, 2010: 472). Now we take a look at two important psychological schools that have spoken more about self-actualization:

Abraham H. Maslow

Although sometimes Maslow is known as the father of the third force in psychology (the first force was psychoanalysis and its modified forms and the second force was behaviorism), he did not believe being an anti-Freud or anti-behaviorism . He believes that humans have a nature higher than what psychoanalysis and behaviorism assumes. Maslow in the last years of his life tried to find that which looks like the the peak of mental health (Jess Feist, 2013: 586). The base of Maslow's theory of motivation is that human needs can be organized in five categories. Maslow believed that the arrangement of these needs can be better transmitted in a hierarchal form. The first need is physiological needs. All other needs in this hierarchy are psychological needs (safety, affection, belongingness, respect, and self-actualization). This hierarchical display states three matters about the nature of human needs: the needs have been arranged in hierarchy in compliance with their power or strangeness. Whatever the need is in the lower hierarchy, it is felt stronger and more necessary, and appears earlier in the sustainable growth process. Young people only experience the lower needs in the hierarchy, while older people are more likely to experience all the needs in the hierarchy. The needs available in the hierarchy are met respectively, from lowest to highest, and from the base to the tip of the pyramid (Marshall Rio, 2012: 448). In responding to the question that why all people don't achieve the self- actualization, Maslow believes that in some cases, people cannot flourish their talents because of not supporting of the internal conditions (e.g. chronic back pain) or external environment (e.g. chronic deprivation of food and shelter). In other cases, the person himself is responsible for their lack of his growth, i.e. each of us are fearing its talents, which Maslow called the "Jonah complex" by deriving from the Biblical character who tried to escape from his destiny (Marshall Rio, 2012: 452). Health and growth exist only when the tendency toward growth and self-actualization are coordinated, and all experiences are evaluated internally within the organismic valuation (Marshall Rio, 2012: 457). In relation to self-actualization, those people who seek to grow, are more likely to feel themselves in the present time and to behave in accordance with their own principles (Marshall Rio, 2012: 46). Self-actualized people are autonomous and independent and eventually see themselves free. These people resist the social and cultural pressures, and are guided by their own inner nature, and not by the cultural nature of the society (Karimi, 2009: 159). Self-esteem is based on real merit and not on others' views. If people met their respective needs, they would be on the verge of self-actualization, i.e. the greatest need identified by Maslow (Jess Feist, 2013: 595). The last criterion to achieve self-actualization and at the same time, Maslow's definition of self-actualization is that the self-actualized individuals use "all their talents, capabilities, abilities, and so on" (Maslow, 1979: 150). Higher needs are found later in life. The psychological and safety needs are found in childhood; belongingness and respect needs are created in the juvenile stage , and the needs of self-actualization don't appear until adolescence (Shults, 2000: 343). For Maslow, each person has an inherent tendency towards achieving self-actualization (Shults, 1996: 353). Maslow knows humans as inherently good natured and honorable and believes that there is no badness in his nature. Hence this good nature and potentials in it should be allowed to flourish (Siyasi, 1998: 169). Maslow listed fifteen features that the self-actualized people have= at least partially.

They are as follows:

- more efficient understanding of the reality, acceptance (of self, others, nature), (spontaneity, simplicity, naturalness), focusing on other problems, need to be alone, self-governance, freshness of continuous understanding, experience of the peak, interest in social affairs, interpersonal deep relationships, democratic character structure, differentiation of tool and target, philosophical wittiness, creativity, and resistance against acculturation. Maslow used the positive and negative criteria to identify the self-actualized individuals. Firstly, these people should be released from trauma. They should not be neurotic or psychotic or with tendency toward these mental disorders. This is an important negative criterion, because some neurotic and psychotic people have similar features to self-actualized individuals, characteristics such as increasing perception of reality, mystical experiences, creativity, and separation of others. Secondly, the self-actualized Individuals have passed the hierarchy of needs, because the low level needs of the self-actualized people are met and then they are better able to tolerate the failure of these needs. The self-actualized individuals, even when they are hungry, will not =panic if food is not available immediately. They have not severe need for money and safety, while those who act at the level of physiological needs, are in dire need of them. The third criterion for self-actualization is having values of the creation. The self-actualized individuals are looking for truth, beauty, justice, simplicity, humor, and other needs.

Carl Rogers' theory

Carl Rogers is of the humanistic psychologists who introduced an optimistic picture of human nature and considered being valuable, rationality, pragmatism and self-actualization as the most important features of human. According to Rogers, humans can actualize their underlying talents and that tendency toward self-actualization is the motivatign force of humans. According to Rogers, the perfect man is one who can flourish with his potential talents. Human perfection lies in realizing man's unique hidden features and does never end. Human perfection is not the goal, but the direction and process. The Perfect

man in different positions acts based on his inner voice, and the pre-established rules and regulations cannot guide people to achieve perfection (Rogers, 1951). According to Shults, (1996) Rogers, like Maslow believed that the tendencies toward actualization are innate and gradually guide people to the talents that have been determined as hereditary (Marshall Rio, 2012: 453-454). In Rogers' Humanism, man has been defined as his own goal and end, and all paths of perfection are only located in the human realm. In the path of perfection and its concept, Rogers assumes a hypothetical person that with complete action, is an ideal concept. This hypothetical person represents the full actualization of man (Shokrkon Hossein, Gholam Reza Nafisi, Ali Mohammad Baradaran, Rafii, Farhad, 1993: 447). Rogers considers the congruence, unconditional positive regard, and empathy as the necessary and the sufficient conditions for the self-actualization. Although humans share with plants and animals the tendency toward flourishing, only humans have self-concept and, therefore, have the ability to achieve self-actualization (Jess Feist, 2013: 556). Healthy and perfect human characteristics from the perspective of Carl Rogers are as follows: Self-esteem, self-evaluation, self-coordination, being emotional, lack of the defensive state, openness to experience, having a life with existence, relying on organisms, freedom of choice, decision-making and responsibility, sociability, creativity, dynamic and meaningful life, and self-actualization.

Self-actualization in Islam

In the religious teachings, self-actualization has a wider moral sense as is in a verse in the Quran, which sees the self-actualized people and those who have flourished as their soul through refining, the successful persons in the world and states, "He indeed truly prospers who purifies it" (Surah Al-Shams, verse 9).

Features of the perfect human in the holy Quran

1- The first characteristic for the servants of Allah is their humility that is obvious even in their most inconsiderable behaviors, such as walking. The first part of verse 63 of Surah Al-Furqan states that: And the servants of the Gracious God are those who walk on the earth in a dignified manner," Imam Sadiq (peace be upon him) in explanation of this verse states, "it refers to one who moves on his/her nature and refrains from arrogance." Others say that it means that they are moving with patience and knowledge and don't lose their calmness against ignorance and obstinacy of others (Tabarsi, 1995: 222).

2- The next feature stated in the other part of verse 63 of Surah Al-Furqan is their patience and persistence: "and when the ignorant address them, they say, 'Peace!'" In addition to this verse, one can refer to the verse 56 of Surah Al-Qasas in which almighty God in the description of believers states: "And when they hear vain talk, they turn away from it and say, 'Unto us our works and unto you your works. Peace be to you. We seek not the ignorant.'

3- Another feature of the servants of Allah stated in verse 64 of the holy Quran is worship and nightlife: "And who spend the night before their Lord, prostrate and standing". Imam Ali (peace be upon him) states in the expression of image of the righteous that "at night are praying and in day are patient scholars and virtuous beneficent (Nahjul-Balagha, Sermon 193: 287).

4- The next feature is introduced in the verses 65 and 66 of Surah al-Furqan, and includes the fear of divine retribution, those who say: "And who spend the right before their lord, prostrate and standing, and who say, 'Our Lord, avert from us the punishment of Hell; for the punishment thereof is a lasting torment". Fear and hope are the two spiritual factors that have an effective role in human evolution, and no improvement and change is done without these two factors. Where the hope of forgiveness of God doesn't exist in the human soul, he never thinks to self-amendment, and not only continues to his corruption and distortions, but adds to his corruption and increases it (Sobhani, 2001: 270).

5- Another characteristic feature mentioned in verse 67, is moderation in charity: "And those who, when they spend, are neither extravagant nor niggardly but moderate between the two". Today it has been proven for all the world people that where capital and wealth are accumulated, in other parts of the world poverty will increase, and in each area the poor and needy are increased, in other regions richness will be created, and this vicious circle has been continued for centuries (Mahmudi, 2004: 28). The best way to reduce the gap between the classes is charity.

6- Another feature of the servants of Allah in verse 68 of Surah al-Furqan is monotheism: And those who call not any other God along with Allah…" Worship is a type of humble, praising and appreciative relationship that man makes with his God. This type of relationship can be established only by human with his God, and is true only in relation to God (Vaezi Nejad, 1995: 21). If humans' attention is attracted to God, in a way that they don't assume anyone adorable other than God, and if don't know any owner and authority for themselves except the almighty and able Allah (God), they will not commit many of sins and mental prejudices, while sin is only a result of chaos and mental illness, because it is incompatible with human nature (Parva, 2001: 77).

7- Another feature mentioned in verse 68 is respect for human life: "nor kill a person that Allah has forbidden except for just cause" (Such retribution).

8- The next feature of the servants of Allah stated in the rest of the mentioned verse is chastity and to avoid adultery: "nor commit adultery (or fornication), and he who does that shall meet with the punishment of sin".

9- The Ninth feature of the servants of Allah mentioned in verses 69, 70 and 71 of Surah al-Furqan is cleanness of the spirit. "Doubled to him will be the punishment on the Day of Resurrection, and he will abide therein disgraced, except those who repent, and believe and do good deeds; for as to these, Allah will change their evil deeds into good deeds; and Allah is Most Forgiving Merciful; and those who repent and do good deeds, indeed turn to Allah with true repentance" (Sobhani, 2001: 325).

10- The Tenth characteristic of the servants of Allah is not presenting in the guilty parties. Eleventh feature stated in the other part of verse 72 is avoiding useless work: "and when they pass by anything vain, they pass on with dignity". According to the above explanations, it can be said that the servants of Allah are those who use their own wisdom and prefer it over anything, unlike the ignorant who refer to

illusions in decision-making and are immediately affected by the others' words. The last feature of the servants of Allah is that they ask God to choose them as leader of the righteous. "...and make us a model for the righteous (Surah Al-Furqan: verse 74).

Self-actualization from the perspective of Hadith (sayings)

Of the best results of self-knowledge is its help to theology, and as is mentioned in Quran and Hadith, self-knowledge is the way of theology (Amadi, 1993: 194). Self-knowledge is the base of the human's real life in all material and spiritual aspects, because man with self-knowledge knows high capacity of his personality and his great value and status and prestige, and thereby becomes aware of his own internal, external, physical and spiritual needs, and discovers his underlying talents, powers and abilities, and flourishes them, and then by this way, becomes a theologian and identifies the factors that may lead him to perfection, and eventually by doing the duty, achieves the peak of perfection of humanity and true happiness, which is the ultimate cause of creation (Haeri Tehrani, 1999: 80). Of course, Nahjul-Balaghah is the most valuable cultural heritage of Islam after the holy Quran. This book is a collection as existentially wide as a perfect man after the Prophet (peace be upon him and his progeny), and a book for healing human emotional pain and a mystery of human social and political guidance. This book is a charter of human-making and a framework to the light and a way to the heaven. In Sermon 110 of Nahj al-Balagha Hazrat Imam Ali (peace be upon him) states: follow the way of your Prophet that is the best guidance. Match your behavior by the procedure of the Prophet (peace be upon him and his progeny), because it is the most guiding method (Dashti, 2001: 211). Imam Ali (peace be upon him) in the other part of the sermon 160 says, " Certainly in the Prophet of Allah was a perfect example for you and a proof concerning the vices of this world, its defects, the multitude of its disgraces and evils" (Dashti, 2001:300). For Ayatullah Motahari, one of the sources of knowledge in the view of Islam and the way of completion and correction of vision of any person is the tradition of the leaders of Islam, from the holy Prophet (peace be upon him and his progeny) to the infallible Imams (peace be upon them), and in other words the tradition of the infallibles (peace be upon them). Motahari in the book "perfect man" says: humans can be perfect and more perfect until they can reach the ultimate point above which there is no human, and we call such a person the perfect man that is the ultimate point of human (Nejadiyan, 2012: 302). A perfect man is not a just pure devotee or just pure noble or pure lover or a pure intellect, but he is a man who all values are completely and consistently grown in his nature. An example is Imam Ali (peace be upon him) who was the hero of all values. Therefore, we must not make mistakes to achieve the highest levels of human and perfection, and must not pay attention to only one value and forget the rest. Therefore, we must be a normal human in all values in our life to achieve the self-actualization (Nejadiyan, 2012: 304).

The comparison of the self-actualization between Islam and psychology

According to the holy Quran and the Hadith, and the theories of Maslow and Rogers, we will examine the similarities and the differences of the self-actualization in the view of Islam and psychology.

Similarities between the view of Islam and psychology

The first similarity between the views of Islam and psychology is the emphasis of both perspectives on human nature that leads him to perfection and self-actualization. The second similarity is the emphasis of both systems on the issue of the necessity of a balanced growth of man in all human dimensions, and the necessity of a consistent growth in all human values, and that it is necessary to consider all aspects of human life. The third similarity between these two views is their belief in the free will for humans. The fourth point emphasized by both perspectives is human's responsibility and obligation to his actions and others, while the self-actualized Individuals are free, but they feel themselves responsible toward others. These people have a compassionate attitude towards others. The fifth similarity between these views is their emphasis on considerable human capabilities. In both perspective human has a lot of capabilities. According to the almighty God, human is the most honorable of creatures and is able to achieve the human perfection and the state of being the most honorable creation. The sixth point is that according to both perspectives, the self-actualized people help others and are looking for the truth, justice, simplicity, humor and kindness, and feel the pain when seeing the suffering of others. Seventh common point is the attention of both views on the self and the self-knowledge. Islam recommends self-knowledge for achieving the perfection and theology. Another similarity between the two perspectives is the belief that only few people achieve perfection and self-actualization. In psychology according to Maslow's view, only one percent of the population achieves self-actualization.

The differences between the view of Islam and psychology

The major difference is that in the Islamic view, God is the center of affairs, and the base of all "to be" and "not to be" is the law issued by the God, and that the only way to achieve human perfection, dignity and self-actualization is getting close to God. However, from the psychological perspective, the human being is an independent and unique creature who considers only his own desires, and does everything that deems good. The second difference between the two views is on the type and amount of human freedom. For the psychologists , human freedom is infinite and one cannot impose any limitation for it (even divine law), but he is free and must decide and act as he wants. However, according to the Islamic view, freedom is a natural trend and every person on the path to perfection likes to be free from any obstacle and constraint, and wishes to cross the way of happiness in accordance with the rules and the laws of God. The third difference between the two views is that although relations

of a person with itself and other humans plays an essential role in the growth of self-concept and self-actualization, but these two types of relations are not decisive, and the relationship of man with God plays the fundamental role in this field. Also human's relationship with nature is effective in this respect (Ali Naghi Faghihi, Fatemeh Rafii Moghadam, 2019: 161). The fourth difference between the two views is that in Islam, a human needs guidance and needs to be aware of all aspects of his nature and the path of perfection to achieve perfection, and in this way, the Prophet is mentioned in the Quran as a guide. However, humanists believe that to achieve the highest level, person can achieve self-actualization only by passing some levels. The fifth difference between the two views is that, from the Islamic point of view, a human is not an egocentric identity, but criteria of its values are beyond his own demands, and his circle of changes must be his innate and natural ego, and not his achieved experiments. In contrast, humanists believe that the human himself is only responsible for all affairs. The last difference between the two views is that from the perspective of humanist psychologists, a human has a tendency toward self-actualization and this tendency has biological origin, although growth of this tendency is influenced by culture, parents, friends, teachers and others as well (Shafi Abadi and Naseri, 2001: 160-161). In the Islamic view, self-actualization has merely a mental aspect including cognitive aspects, beliefs, moral and spiritual and personality emotions, and actions of human beings that are enacted voluntarily or by choice, gradually grows in the path of excellence and thereby make life meaningful, and as Frankel (1962) says, the constant need of a human and his activity is not only for himself but also for the meaning that he gives to his human existence and life.

Discussion and Conclusion

Obviously, according to what has been mentioned, the amount of acceptance of any scientific view must be assessed on the basis of its anthropological approach that is the base of that view, and that its power and strength cannot be assessed except in the light of the anthropological criteria that has strength and integrity of attitude. So what was introduced as the similarity between the view of psychologists and the Islamic perspective, indicated only the strength of anthropological foundation of the perspective of psychology. Similarly, what was introduced as the differences between the Islamic and the psychological perspectives, is in fact known as the weaknesses of the anthropological foundation of the scientific approach. Due to the problems caused by giving originality to the self in life, thinkers are looking for a way to define human nature by it and to replace humanity with a machine-base look at humanity. having ben inspired by the philosophy of humanism , the humanist psychologists tried to assist in the improvement of the lives of people, but only the description of the limited persons who are seen as self-actualized cannot guarantee the effectiveness of these criteria for self-actualization for humanity in a general sense, because its resource is human, and we are not aware of human nature. Therefore the almighty God who is aware of all aspects of human personality and existence and considers humans and creation in relation with each other, has a very comprehensive and inclusive view . Given the similar characteristics of the self-actualized individuals from the perspective of Islam and humanist psychology it can be said that the Quran's view, due to the universality of its mission, is much more comprehensive and more perfect than the viewpoint of humanism, and that it has more rational discussions on the characteristics of perfect or self-actualized man and the ability of people to achieve self-actualization.

References

1- Aamadi, Abd-ol-Vahed (1993). "Ghorar-ol-Hekam and Dorar-ol-Kalem", translated by KHansari, Tehran: university publication.

2- Abd-ol-Karimi, Saeed (2000) "Human being from Raggers point of view and its difference with Islamic point of view" . scientific- expertism periodical Islamic studies and psychology", 2 &3. 143- 167.

3- Ali Naghi, Faghihi, Fateme Rabee (2008) "Training from Islamic point of view" Ghom, Payam Publication Office.

4- Anvari, Hamid Reza (1994) "a research about fatalism", M.A. thesis, university of Alame Tabatabee Tehran.

5- Azar, Fatimah & Taleghani Narges (2013) Karl Ransom Rajerz : " theory of individual- keeping "self" core theory of personality of Rajerz. Tehran. Danzhe.

6- Bagheri, Ali Akbar (2011) "psychological analysis of self-prosperity from Molana and Rodgers point of view". Tehran, Danghe.

7- Bakhshayesh, Ali Reza (2012) "comparative investigation of self- prosperity aspects in Quran and Psychology, comparative theology periodical (scientific research), 3, 57- 72.

8- Dashti, Mohammad (2001), translation of Nahj-ol-Balaghe. Ghom, Momenin Publication.

9- Doyle, J.S. (1983.) «Self actualization, neuroticism, and extroversion revisited», Psychological reports, 39: 1081-1082.

10- Haeeri, Tehrani, Mahdi (1999) "human personality from Quran and prophet family point of view". Tehran: Cultural institute publication of Imam Mahdi.

11- Hamilton Melkom (1998) socialism of religion" translated by Mohsen Slasi. Tehran. Nashr Sales.

12- Heshmat, Yaghmaii, Mohammad Taghi (2001) "Piety of teenager and effective factors, M.A thesis, Alame Tabatabaee university, Tehran.

13- Heylighten, F. (1992) «A cognitive- systematic reconstruction of Maslow's theory of self actualization», Behavioral Science, 37: 39-57

14- Jess Fist and Greggory .J Fist (2013) "personality theories" , translated by Yahya Seyyed Mohammadi, Tehran, Ravan Publication.

15- Karimi, Mortaza. (2009). "Human being in theosophy and eminent doctrine". Tabriz, Tabriz University.

16- Marshal ,Rio John (2012) "Provocation and thrill" translated by: Yahiya Seyed Mohammadi. Tehran. Virayesh publication.

17- Maslow, Abraham (1970). Motivation and Personality.

18- Mhamoodi, Mahmoud (2004).” Anthropology”. Ghom: educational and research center of Imam Khomeini publication.
19- Motahari, Morteza. (1994). “Training and education in Islam,” Tehran. Sadra.
20- Nezhadiyan, Mohammad Ali. (2012) “Science of success” Tehran. Mehr Amin Publication.
21- Parva, Mahdi (2001) “ Psychology of monotheism and the light of emancipation” Tehran, Enteshar Company
22- Petr, L.H (1996) Motivation: Theory , Research, and Applications , California : Wadsworth, Inc.
23- Raggers Karl (1990) “Review of being human, viewpoint of a therapist about psychotherapy”. Translated by Ghasem Ghazi, Tehran: scientific publication of Islamic Azad University of Tehran.
24- Reeve, John Marshall. (2005). Understanding motivation and emotion
25- Rita, L. Atkinson et al (2010) “Psychological field of Hildegard” translators: Mohammad Ngai Barahani and et al. Tehran. Roshd.
26- Rogers, C.R (1951) Client-centered therapy, Houghton Miffili: Boston.
27- Shafi Abadi, Abdullah and Naseri GHolam Reza (2001) “council theories and psychology” Tehran, university publication center.
28- Shamloo, Saeed (2003) “Schools and theories of personality psychology” Tehran, Roshd.
29- Shekarkan Hussein et al (1993). “Psychology schools and its criticism” Tehran. Samt publications.
30- Shultz Devan. P. (1996). Descriptive dictionary of social psychology” translated by Giti Khoshdel. Tehran. Peykan publication.
31- Shultz, Devan, Shultz, Sydnie Allen (2000) “Personality theories, translated by Yahiya Seyed Mohammadi. Tehran Nashr institute.
32- Siyasi, Ali Akbar. (1998) “Personality theories or psychological schools” Tehran. Tehran university publications.
33- Sobhani, Jafar (2001) “comments on Furghan Sura” Ghom Islamic propaganda office.
34- Tabarsi FazlEbn Hassan. Mokarem-ol-Akhlag. Research of Alaa Al Jafar. Ghom. Islamic publication Institiute.
35- Tabarsi, Fazl Ebn-Hassan (1995) MajmaolBayan fi Tafsir Quran. Tehran. Naser Khousrow.
36- Tabatabee, Seyyed Mohammad Hussein (1993) aAlimizan FI Tafsir Al- Quran” Tehran. Islamic Dar-ol-Mkatab.
37- The Holy Quran (1999). Translated by Mokarem Shirazi, Ghom: Dar-ol- Quran.
38- Vaeezi Nezhad, Hussein (1995). “Prayer in the works of Shafid Motahari” . Ghom, prayer allege office.

The effectiveness of cognitive - behavioral therapy in reducing the post-traumatic stress symptoms in male student survivors of the earthquake in the central district of Varzeghan

Sakineh Salamat (1)
Ahad Ahangar (2)
Robab Farajzadeh (3)

(1) Department of psychology, Payame Noor University,(PNU) PO BOX 19395-3697, Tehran, Iran
(2) Department of Counseling, Shabestar Branch, Islamic Azad University, Shabestar, Iran
(3) Graduate of Consultation (M.A).

Corresponding author:
Dr.Ahad Ahangar
Department of Counseling, Shabestar Branch,
Islamic Azad University,
Shabestar, Iran

Abstract

Background: The aim of this study is investigating the effectiveness of cognitive - behavioral therapy in reducing the post-traumatic stress symptoms in male student survivors of the earthquake in the central district of Varzeghan.

Methodology: This study is a quasi-experimental study with pretest – Posttest design with control group. The population included all Central district of Varzaghan city high school II students in 2015-2016 who were evaluated based on secondary trauma stress scale (STSS) of Bride. Individuals with the highest scores were selected as the study subjects and divided into two experimental and control groups (n 1 = n 2=25) randomly. The experimental group received 6 therapy sessions. The derived data from the groups were analyzed.

Findings: The results of covariance analysis showed that there is a significant difference between the experimental and control groups in intrusive thoughts scores and there was a significant difference in avoidance (P <0.05), but in arousal scale there was no significant difference (0.05>P).

Conclusion: In general, it can be concluded that this therapeutic intervention is effective and it can be used at health centers as well as schools in order to reduce the symptoms of post-traumatic stress.

Key words: Posttraumatic stress disorder, Cognitive - behavioral therapy, Students.

Please cite this article as: Sakineh Salamat, Ahad Ahangar, Robab Farajzadeh. The effectiveness of cognitive - behavioral therapy in reducing the post-traumatic stress symptoms in male student survivors of the earthquake in the central district of Varzeghan. *World Family Medicine.* 2017; 15(9):112-116. DOI: 10.5742/MEWFM.2017.93110 5

Introduction

In recent decades, the psychological effects of earthquakes have been taken into consideration more than before. Studies which have been addressed to survey the natural disasters outcomes show that many earthquake survivors after confronting the stressful event (such as lack of interested people, social structure chaos and social supports loss), show certain clinical responses (Livanuo, Bassoglu, Salcioglu, & Kalendar, 2003). Studies have shown that severe earthquakes can cause severe long-term disabilities. In studies which were conducted on 430 people who were Turkey's 1999 earthquake survivors, disability and mental disorders outbreaks such as post-traumatic stress disorder had a direct correlation with proximity and exposure to the earthquake (Kilic & Ulusoy, 2001). In another study which was conducted on 586 survivors of the earthquake in Turkey results in that severe and terrible earthquake lead to long-term psychological consequences, especially in people who had high exposure levels (Salcioglu, Basoglu & Livanou, 2003).

Typically, post-traumatic stress disorder is the first response of survivors to trauma, which is an important prediction of their subsequent mental and physical health status long-term outcome (March, Amaya-Jackson, Murray & Schulte, 1998). A study in Taiwan showed that 7.21 percent of the 323 earthquake survivors had PTSD symptoms, but in general, there are numerous reports that vary from 5.2 to 33 percent in adults and 28 to 70 percent in children (Hsu, Chong, Yang & Yen, 2002). Therefore, in order to reduce the disabilities, preventive and therapeutic interventions, such as supporting group psychotherapy and treatments based on cognitive-behavioral methods as well as other types of psychotherapy, have been paid attention (Livanuo, Bassoglu, Salcioglu & Kalendar, 2003). Many clinical studies have shown that cognitive behavioral programs are effective in controlling the symptoms of PTSD (Foa, 2006). In research performed by March et al (1998) showed that cognitive behavioral therapy intervention is effective in PTSD stress disorder.

Cognitive behavioral therapy is a way that helps people think differently about bad memories so that they will be less distressing and more manageable. Usually this type of treatment also involves several sessions of relaxation. Wessely, Rose and Bisson (2002) also conducted a study on 35 earthquake victims which suggested the high effectiveness of cognitive-behavioral treatments for PTSD and grief. In other research Ehlers (2000) studied 28 people with PTSD and reported that PTSD symptoms and anxiety in patients who had undergone cognitive-behavioral therapy was reduced compared to the control group. In another study the group psychotherapy effect using psychological recounting for 30 natural events survivors was investigated 6 months after the event, which indicated symptom reduction in both intervention and control groups (Chemtob, Tomas and Law, 1997).

Foa (2004) treated 117 PTSD affected victims of traumatic events through flooding and a combination of spate and cognitive restructuring treatment. He concluded that both treatments reduced the symptoms of PTSD and depression identically.

Regarding the effectiveness of cognitive behavioral therapy in reducing symptoms of post-traumatic stress in relation to disasters caused by war, floods, storms, earthquakes and so on, this paper seeks to determine whether cognitive behavioral therapy is effective to alleviate the symptoms of post-traumatic stress in earthquake survivor male students in the central district of Varzaghan.

Methodology

A quasi-experimental technique of pretest-posttest type with control group was used, through which a cluster of high school male students were selected randomly and the secondary trauma stress scale by Bride (STSS) was conducted on students. Among the students who gained high scores in each subscale in the Secondary Trauma Stress Bride questionnaire 50 students were selected randomly and 25 students were replaced in the experimental group and 25 in the control group.

Data Collection Tool

Secondary Trauma Stress Scale Bride (STSS) of Bride

This scale was established by Bride and his colleagues in 2003 and has 17 items summarized in three subscales;

1. Nuisance

2. Avoid

3. Arousal

At this scale, using a five degrees Likert scale from 1 (never) to 5 (always) the participants were asked to identify to what extent each of the items happened to themin the previous week. High scores on each subscale indicate lack of health and less score, simply a healthy student. Bride et.al studies results showed that the scale reliability is .93 which has an acceptable convergent and divergent and structure validity. In this study, the Cronbach's alpha coefficient for the disturbance, avoidance and arousal subscale were estimated as 0.878, 0.798 and 0.847, respectively.

Treatment Plan

The content of therapy sessions
First Session - communicate with patient, evaluation and education of patient
Second Session - relaxation training and familiarity with the therapeutic model
Third Session - Conceptual facing with the traumatic event education
Fourth Session - identify dysfunctional thoughts and to identify and challenge them
Fifth Session -Exposing and cognitive restructuring
Sixth Session - Conclusion, tutorials and assignments review, improvements identifying and encourage and reinforce the patient
Seventh Session - Questionnaire return

Findings

For data analysis, in addition to using descriptive statistics, multivariate analysis of covariance (MANCOVA) also used.

Descriptive Findings

Table 1. The mean and Standard deviation of pre-test, post-test scores of research variables in both experimental and control groups

variables	group	n	pre-test		post-test	
			mean	Standard deviation	mean	Standard deviation
Intrusive thoughts	experimental	25	11.88	3.51	10.00	2.81
	control	25	11.60	3.62	11.52	3.48
Avoid	experimental	25	17.68	4.74	14.32	2.62
	control	25	15.64	4.31	15.64	3.71
Arousal	experimental	25	12.96	4.15	13.00	3.27
	control	25	11.48	4.61	11.36	3.63

Table 1 results imply the improvement of variables in the experimental group in posttest stage compared to the control group, but no difference was observed in the control group.

In the present study, the covariance analysis was used for inferential results analysis. Therefore, prior to study the hypotheses, the normality of scores distribution assumption was examined.

To test the assumption the Shapiro-Wilk test was used. The test results for research variables pre-test scores are given in Table 2.

Table 2: Shapiro-Wilk test results for pre-assumption scores distribution normality

variables	group	n	Shapiro-Wilk test		
			Statistics	df	sig
Intrusive thoughts	experimental	25	0.972	25	0.835
	control	25	0.922	25	0./141
Avoid	experimental	25	0.922	25	0/.128
	control	25	0.961	25	0.625
Arousal	experimental	25	0.964	25	0.676
	control	25	0.934	25	0.325

As can be seen in Table 2, assuming zero for the scores distribution normality of two groups in research variables is confirmed, is that the scores distribution normality pre-assumption in pre-test and in both control and test tests groups were confirmed.

Inferential evaluation of data

Given that in each variable the post-test scores were the dependent variables and in order to control the effect of pre-test (as covariate and control variable) the ANCOVA was used on grades.

Cognitive-behavioral therapy is effective in reducing the symptoms of post-traumatic stress (intrusive thoughts, avoidance and arousal) of Varzaghan earthquake-stricken students.

Table 3:.The results of cognitive-behavioral therapy covariance analysis on intrusive thoughts - pre-test - group membership

variables	source of change	SS	df	MS	F	sig	eta
Intrusive thoughts	pre-test	218.51	1	51218	57.07	0.001	0.55
	Group memberships	28.35	1	28.35	7.40	0.009	0.14
Avoid	pre-test	214.55	1	214.55	60.69	0.001	0.57
	Group memberships	76.46	1	76.46	21.63	0.001	0.32
Arousal	pre-test	183.40	1	183.40	84.48	0.001	0.51
	Group memberships	429	1	9.42	2.40	0.128	0.05

As the Table 3 results show, after removing the effect of pre-test scores, except the arousal scale, given that a significant level obtained for both variables of intrusive thoughts and avoidance are less than Alpha 0.05, so the research hypothesis was confirmed. Thus, we can conclude with confidence of 95/0 that cognitive-behavioral therapy was effective in participant's intrusive thoughts and avoidance reduction but it had no significant effect on the participant's arousal reduction. Squared Eta was estimated as 0.14, 0.32 and 0.05 for intrusive thoughts, avoidance and arousal, respectively. Namely 0.14, 0.32 and 0.5 of intrusive thoughts, avoidance and arousal variances was explained by the cognitive-behavioral therapy independent variable.

Conclusion

Disasters have been an integral part of human life. Natural disasters cause death and disability to millions of people around the world every year and resulting financial damages. As various studies have shown, the confrontation with a damaging event can lead to various disorders, and PTSD stress and anxiety can be cited as the most important. To treat the post-PTSD stress disorder symptoms and associated disorders according to different perspectives of the etiology of this disorder, various therapies has been suggested which include cognitive behavioral therapy method. Thus, given that several researchers have confirmed the effectiveness of cognitive-behavioral treatment for post-traumatic stress disorder, the aim of this study was investigating the cognitive behavioral therapy effectiveness in symptoms of post-traumatic stress disorder reduction ,among the earthquake survivor male students of the central district of Varzaghan. The results showed that the cognitive-behavioral group therapy diminished the stress of earthquake survivor male students of the central district of Varzaghan PTSD shown in the posttest scores in the experimental group more than the control group.

The results obtained in this study are in good accordance with those of Foa (2004), Salcioglu, Basoglu & Livanou (2003), Wessely, Rose and Bisson (2002), March (1998), Ehlers (2000), Chemtob and et al (1997) .

In explaining how the cognitive behavioral therapy effects on PTSD symptoms of the earthquake survivor male students of the central district of Varzaghan it can be

due to the effective factors on PTSD symptoms continuation in and given the cognitive-behavioral therapy techniques

by using relaxation, conceptual facing with the traumatic event education, identifying dysfunctional thoughts and challenging them and exposing and cognitive restructuring could reduce the effects of PTSD in the control group. Given that the present study was performed on the earthquake survivor male students of the central district of Varzaghan and sampling was available and purposeful, we cannot generalize its results to other students' disorders of other age groups and this generalization should be done with caution.

Another limitation of the study was the lack of six-months' follow-up. It is recommended to conduct studies to assess the students' family situation and their well-being regarding the extent of this problem in Iran as well as conducting research about adjustment to the adverse effects of close relatives loss in various ages.

Regarding the effectiveness of cognitive - behavioral therapy in reducing the bereaved students PTSD symptoms it is suggested to use these services in other organizations and schools. Establishing organizations and centers in order to support and train to prevent post-traumatic stress symptoms and use of experts, in agencies, governmental and non-governmental organizations for reducing psychological problems in children and adolescents who are affected by injuries, and educating their families and adolescents and providing appropriate support to their school officials are among other proposals.

References

Bride, B.E., Robinson, M.M, & Figley, C.R. (2004). Development and validation of the Secondary Traumatic Stress Scale. Research on Social Work Practice, 14, pp 27-35. Google Scholar

Chemtob CM, Tomas S, Law W. (1997). Postdisaster psychosocial interventions: a field study of the impact of debriefing on psychological distress. The American Journal of Psychiatry; 154(3): pp 415-7.

Ehlers A, Clark DM. (2000). A cognitive model of posttraumatic stress disorder. Journal Behaviour Research and Therapy; 38(4): pp 319– 345.

Foa, E.B. (2004). Treating Psychological Trauma and PTSD, (Edited by), John, P. Wilson, Mathew, J, Frieman, Jacob, D , Lindy, Guilford Press, PP, 159-178 , Chapter 7.

Foa, EB. (2006). Psychosocial therapy for posttraumatic stress disorder. Journal of Clinical Psychiatry; 67(2): pp 40–45.

Hsu, C. C., Chong, M. Y., Yang, P., & Yen, C. F. (2002). Posttraumatic stress disorder among adolescent earthquake victims in Taiwan. Journal of American Academy for child and Adolescence Psychiatry; 41(7): pp 875-881.

Livanuo, M., Bassoglu, M., Salcioglu, E. B., & Kalendar, D.B. (2003). Traumatic stress responses in treatment seeking earthquake survivors n Turkey. The Journal of Nervous and Mental Disease Inc, 190(12): pp 816-823.

March, J. S., Amaya-Jackson, L., Murray, M. C., Schulte, A. (1998). Cognitive behavioral psychotherapy for children and adolescent with posttraumatic stress disorder after a single incident stressor. Journal of American Academy for child and Adolescence Psychiatry; 37(6): pp 585-593.

Kilic, C., & Ulusoy, M. (2001). Treatment strategies for posttraumatic stress disorder: need for brief and effective interventions. Acta psychiatrica scandinavica, 104(6): pp 409-410.

Wessely S, Rose S, Bisson J. (2002). A systematic review of brief psychological interventions ('debriefing') for the immediate trauma related symptoms and prevention of post-traumatic stress disorder. Cochrane Library, 4, 4. Google Scholar.

Salcioglu, E., Basoglu, M., & Livanou, M. (2003). Long-term psychological outcome for non–treatment seeking earthquake survivors in Turkey. The Journal of Nervous and Mental Disease, 191(3): pp 154-160.

Effects and mechanisms of medicinal plants on stress hormone (cortisol): A systematic review

Kamal Solati (1)
Saeid Heidari-Soureshjani (2)
Lesley Pocock (3)

(1) Social Determinants of Health Research Center, Shahrekord University of Medical Sciences, Shahrekord, Iran;
(2) Medical Plants Research Center, Basic Health Sciences Institute, Shahrekord University of Medical Sciences, Shahrekord, Iran;
(3) Director, Middle East Quality Improvement Program, Australia.

Corresponding Author:
Saeid Heidari-Soureshjani,
Circuit of Research and Technology,
Shahrekord University of Medical Sciences, Iran
Tel: +989131833509, Fax: +98383351031
E-mail: heidari_62@yahoo.com.

Abstract

Stress is a psychological and physiological state that leads to release of cortisol from the adrenal gland, and is associated with several complications if left untreated. This review was conducted to investigate the effects and action mechanisms of medicinal plants and their derivatives on cortisol. To conduct this systematic review, the key words of interest were used to retrieve relevant articles from databases the Information Sciences Institute and PubMed. Then, the plants and the plant-based products that were effective in corticotropin-releasing hormone, adrenocorticotropic hormone, and cortisol and therefore control stress, were selected. According to the inclusion and exclusion criteria, the results of 19 articles were analyzed. The plants and their derivatives help regulate the key mediators and cytokines effective in stress response via targeting the hypothalamic-pituitary-adrenal (HPA) axis. In addition, they can induce anti-stress properties via changing and modulating oxidative and nitrosative stress biomarkers. Regulation of certain stress hormones receptors and corticotropin releasing factor is another mechanism of the plants and their derivatives in reducing stress. The plants and their derivatives have exhibited their therapeutic effects on mild stress and they are also effective in treating more severe disorders such as chronic stress through affecting the HPA. They can be considered an independent or supplementary treatment alongside chemotherapies to decrease cortisol levels and to induce calmness.

Key words: Medicinal plant; Cortisol; Stress; Hypothalamo-pituitary-adrenal.

Please cite this article as: Solati K, Heidari-Soureshjani S, Pocock L.. Effects and mechanisms of medicinal plants on stress hormone (cortisol): A systematic review. *World Family Medicine.* 2017; 15(9):117-123. DOI: 10.5742/MEWFM.2017.93115

Introduction

Stress refers to a state in which the balance between the living organism and the environment is disrupted. This bothering condition can be due to heavy workload, educational pressure (examinations), trauma-induced physical and psychological stress, surgery, and other hard conditions of life (1). Stress can be influenced by certain factors such as age, gender, suffering from psychiatric disorders such as depression and anxiety (2) and external factors such as genetic characteristics (3). Inducing stressful conditions is dependent on biological changes in the body. Meanwhile, the hormonal balance of the body is disrupted. Certain hormones such as catecholamines, vasopressin, gonadotropins, thyroid hormones, prolactin, growth hormone, and insulin fluctuate in response to stressful conditions (1).

Activating the pituitary-adrenal axis is the most important neuroendocrine response to stress that leads to release of certain glucocorticosteroids such as cortisol from the cortical part of the adrenal gland that is essential for homeostasis and survival during stress (4). Imbalance of cortisol levels leads to different diseases such as cardiovascular diseases (5), gastrointestinal diseases, inflammation, immunodeficiency, and psychiatric disorders (6, 7). Different treatments are available for stress. Currently, despite the availability of several psychotherapies (8-13) and chemotherapies for chronic psychiatric disorders, treating stress remains relatively difficult (14).

Medicinal plants can represent effective treatments for different diseases including psychiatric disorders and have become increasingly popular due to being less expensive and causing fewer side effects (15-25). Moreover, phytotherapies have demonstrated positive effects in treating stress (26). With regards to the significant role of the endocrine system in stress induction and the several health-related complications due to stress in humans, this review was conducted to investigate the effects and action mechanisms of medicinal plants and their derivatives on cortisol.

Materials and methods

To conduct this systematic review, the key words of interest and Endnote software were used. The key words corticotropin-releasing hormone, adrenocorticotropic hormone, or cortisol in combination with herb, medicinal plant, and phyto were used to retrieve relevant articles from databases of the Information Sciences Institute and PubMed. Then, the plants and the plant-based products that were effective in corticotropin-releasing hormone, adrenocorticotropic hormone, and cortisol and therefore control stress, were selected. The articles included in this review were published between 2007 and 2017. The articles whose full texts were not accessible and were not related to the purpose of this study were excluded after the authors' agreement was achieved. Figure 1 is the flowchart to illustrate how the articles were selected for final analysis.

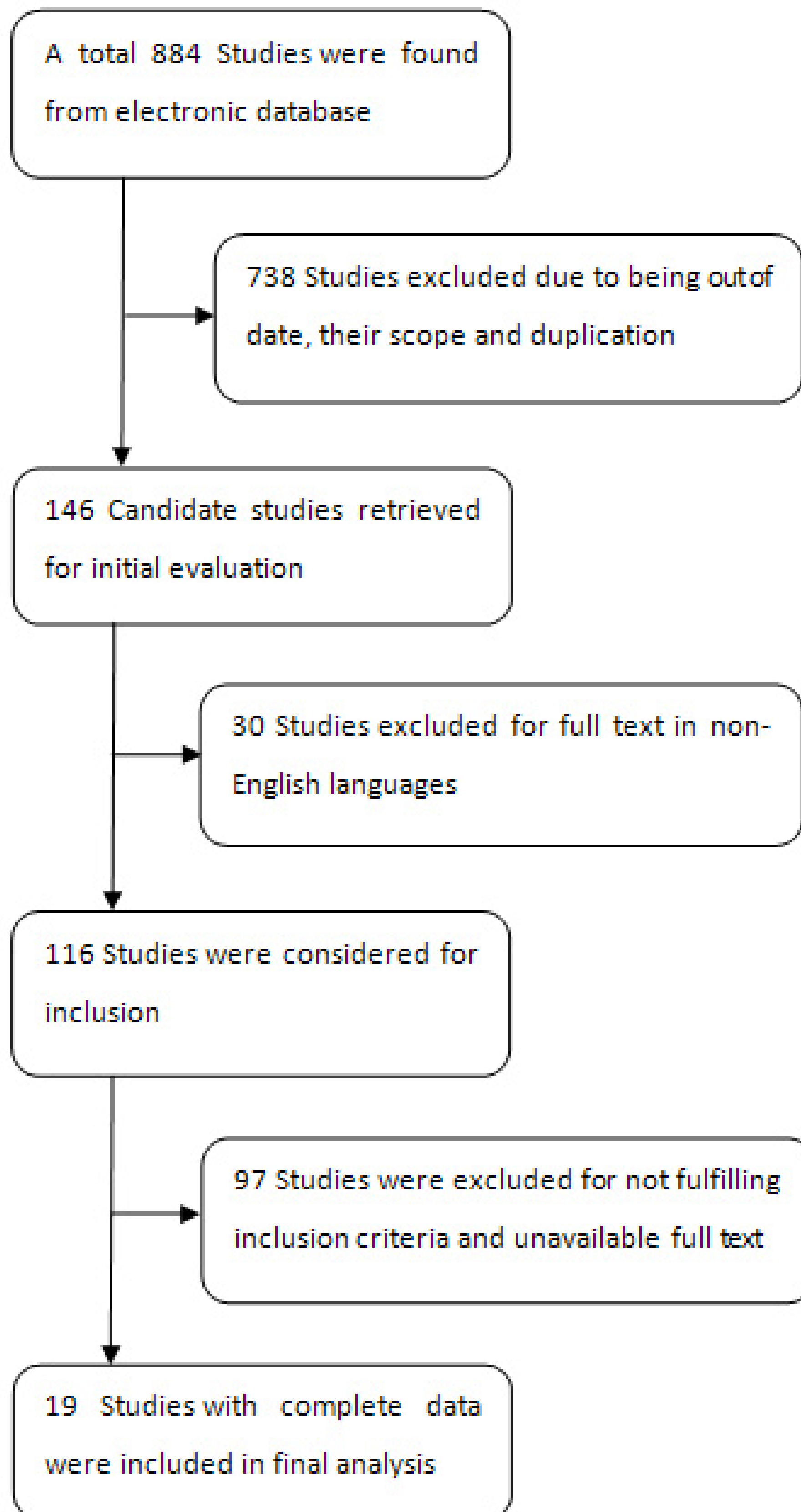
The plants regulate cortisol levels mainly through affecting the HPA axis. Several studies have been conducted on the plants (Table 1 - page 114) and the plant-based compounds (Table 2 - page 115) that are effective in modulating hormone.

Besides that, certain plants, as formulated or combined with other plants, have been approved and used in traditional medicine and experimental research. For example, Si Ni Tang is a Chinese herbal combination consisting of Glycyrrhiza uralensis, Zingiber officinale, and Aconitum carmichaeli. A study on a rat model of chronic unpredictable stress showed that Si Ni Tang modulated increase in corticosterone and therefore helped relieve stress (41). Another study demonstrated that Si Ni powder extract modulated serum levels of corticosterone and ACTH. In addition, this extract causes increase in mRNA expression of hippocampal glucocorticoid receptors (42). The use of combination of Magnolia officinalis and Phellodendron amurense for four weeks caused decrease in salivary cortisol levels in patients with stress (43). A study reported that Zhi-Zi-Hou-Po, consisting of Gardenia jasminoides Ellis fruit, Citrus aurantium L. fruit and Magnolia officinalis Rehd. et Wils. bark, caused normalization of ACTH and CORT levels in a rat model of unpredictable chronic mild stress (44).

Studies have shown that certain compounds in the plants lead to relief of stress through increasing resistance to mental exhaustion and increasing attention. However, several mechanisms can be considered in this regard such that they help regulate the key mediators that are effective on stress response consisting of molecular chaperons stress-activated c-Jun N-terminal protein kinase 1 (JNK1), (e.g., HSP70), Forkhead box O (FOXO) transcription factor DAF-16, cortisol, and nitric oxide (45) through targeting the HPA axis (27, 36, 45, 46). In addition, the plants decrease the expression of CRF and regulate the activities of certain receptors of stress hormones such as GRs (36, 37). On the other hand, some medicinal plants such as Hypericum perforatum, Melissa officinalis, Valeriana officinalis, and Passiflora incarnata can induce anti-stress properties through changing and modulating oxidative and nitrosative stress biomarkers (47). Also other studies have shown that medicinal plants and their extracted compounds can be effective via their antioxidant activities (48-54).

However, studies have not consistently confirmed usefulness of plant-based compounds to relieve stress. For example, a study reported that medicinal plants do not cause any change in ACTH or corticosterone (55). In addition, certain issues should be taken into account in using medicinal plants such as effective dose and associated drug-induced side effects, and interaction with chemical drugs. It is therefore recommended to use medicinal plants and their derivatives under physicians' supervision.

Figure 1. Flowchart of the process of analyzing the articles



Findings

The plants regulate cortisol levels mainly through affecting the HPA axis. Several studies have been conducted on the plants (Table 1) and the plant-based compounds (Table 2) that are effective in modulating hormone.

Table1: Medicinal plants effective on cortisol

Plants	Type of use	Main effects and mechanisms	References
Valeriana jatamansi Jones	Extract	Reducing blood levels of 3-endorphin and corticosterone and regulating HPA	**(27)**
Shuyusan (a Chinese herb)	Decoction	Reducing corticotropin-releasing factor (CRH), adrenocorticotropic hormone (ACTH), corticosterone (CORT) and decreasing activity levels of glucocorticoid	**(28)**
Laminaria japonica	Sulfated polysaccharide	Reducing plasma cortisol	(29)
Andrographis paniculata	Extract	Reducing plasma cortisol levels, and suppressing expressions of the cytokines TNF-alpha, IL-10 and IL-1beta in blood and brain	(30)
Hippophae rhamnoides L.	Oil	Suppressing cortisol, ACTH, IL-1beta, and TNF-alpha levels	(31, 32)
Sceletium tortuosum	Extract	Inhibiting forskolin-associated increases in cortisol levels and basal cortisol levels	(33)
Camellia sinensis L.	Extract	Reducing in serum cortisol	(34)

Table 2: Phytochemicals effective on cortisol

Phytocompound names	Origin	Main effects and mechanisms	References
YZ-50	Polygala tenuifolia Willd	Neutralization of the harmful effect in HPA and brain-derived neurotrophic factor (BDNF) system in the hippocampus	(35)
Icariin	Epimedium brevicornum	Reducing the expression of the corticotropin releasing factor (CRF) and modulating the glucocorticoid receptor (GR) and 5-hydroxytryptamine 1A receptor (5-HTR1A) in the hippocampus and frontal cortex	(36)
XBXT-2	Xiaobuxin-Tang	Reducing corticotropin-releasing factor (CRH), adrenocorticotropic hormone (ACTH), corticosterone (CORT)	(37)
Gastrodin	Tall gastrodia tuber	Reducing anxiety-like behavior, levels of IL-6 and IL-1 beta, and the expression of iNOS and the p38 MAPK phosphorylation	(38)
Tribulus terrestris saponins	Tribulus terrestris fruit	Reducing serum concentrations of CRH and cortisol	(39)
Andrographolide	*Andrographis paniculata*	Reducing plasma cortisol levels, and suppressing expressions of the cytokines TNF-alpha, IL-10 and IL-1beta in blood and brain	(30)
Cipadesin	*Xylocarpus granatum*	Inhibiting increase in serum levels of CORT and ACTH	(40)

Conclusion

Of the 19 articles included in this review, only one study was conducted on humans as a clinical trial. Therefore, because studies on humans are more vigorous to determine the mechanism process of medicinal plants, further studies should be conducted on human subjects under controlled conditions to investigate this issue. However, it is obvious that the plants and their derivatives have exhibited their therapeutic effects on mild stress and they are also effective in treating more severe disorders such as chronic stress through affecting the HPA. They can therefore be considered as supplementary treatment alongside chemical drugs to decrease cortisol levels and to induce peace.

Acknowledgments
The authors would like to acknowledge Research and Technology Deputy of Shahrekord University of Medical Sciences for supporting this study.

References

1. Ranabir S, Reetu K. Stress and hormones. Indian Journal of Endocrinology and Metabolism. 2011;15(1):18-22.
2. Wiegner L, Hange D, Björkelund C, Ahlborg G. Prevalence of perceived stress and associations to symptoms of exhaustion, depression and anxiety in a working age population seeking primary care - an observational study. BMC Family Practice. 2015;16:38.
3. Wright RJ. Epidemiology of stress and asthma: From constricting communities and fragile families to epigenetics. Immunology and allergy clinics of North America. 2011;31(1):19-39.
4. Uchoa ET, Aguilera G, Herman JP, Fiedler JL, Deak T, Cordeiro de Sousa MB. Novel aspects of hypothalamic-pituitary-adrenal axis regulation and glucocorticoid actions. Journal of neuroendocrinology. 2014;26(9):557-72.
5. Whitworth JA, Williamson PM, Mangos G, Kelly JJ. Cardiovascular Consequences of Cortisol Excess. Vascular Health and Risk Management. 2005;1(4):291-9.
6. Downs CA, Faulkner MS. Toxic stress, inflammation and symptomatology of chronic complications in diabetes. World Journal of Diabetes. 2015;6(4):554-65.
7. Schneiderman N, Ironson G, Siegel SD. STRESS AND HEALTH: Psychological, Behavioral, and Biological Determinants. Annual review of clinical psychology. 2005;1:607-28.
8. Solati K. The Efficacy of Mindfulness-Based Cognitive Therapy on Resilience among the Wives of Patients with Schizophrenia. Journal of clinical and diagnostic research. 2017;11(4):VC01-VC3.
9. Dehkordi AH, Solati K. The effects of cognitive behavioral therapy and drug therapy on quality of life and symptoms of patients with irritable bowel syndrome. Journal of advanced pharmaceutical technology & research. 2017;8(2):67-72.
10. Shahbazi K, Solati K, Hasanpour-Dehkordi A. Comparison of Hypnotherapy and Standard Medical Treatment Alone on Quality of Life in Patients with Irritable Bowel Syndrome: A Randomized Control Trial. Journal of clinical and diagnostic research. 2016;10(5):OC01-4.
11. Solati K, Ja'Farzadeh L, Hasanpour-Dehkordi A. The Effect of Stress Management Based on Group Cognitive-Behavioural Therapy on Marital Satisfaction in Infertile Women. Journal of clinical and diagnostic research. 2016;10(7):VC01-VC3.
12. Hasanpour-Dehkordi A, Jivad N, Solati K. Effects of Yoga on Physiological Indices, Anxiety and Social Functioning in Multiple Sclerosis Patients: A Randomized Trial. Journal of clinical and diagnostic research. 2016;10(6):VC01-VC5.
13. Dehkordy SK, Gharamaleky SN. Effects of relaxation and citalopram on severity and frequency of the symptoms of irritable bowel syndrome with diarrhea predominance. Pakistan Journal of Medical Sciences. 2010;26(1):88-91.
14. Kahanov L, Eberman LE, Games KE, Wasik M. Diagnosis, treatment, and rehabilitation of stress fractures in the lower extremity in runners. Open Access Journal of Sports Medicine. 2015;6:87-95.
15. Shabanian S, Khalili S, Lorigooini Z, Malekpour A, Heidari-Soureshjani S. The effect of vaginal cream containing ginger in users of clotrimazole vaginal cream on vaginal candidiasis. Journal of advanced pharmaceutical technology & research. 2017;8(2):80-84.
16. Nikfarjam M, Bahmani M, Heidari-Soureshjani S. Phytotherapy for anxiety in Iran: A review of the most important Anti-anxiety medicinal plants Journal of Chemical and Pharmaceutical Sciences, 9 (3). pp. 1235-1241.
17. Nikfarjam M, Bahmani M, Heidari-Soureshjani S. Phytotherapy for depression: A review of the most important medicinal plants of flora of Iran effective on depression. Journal of Chemical and Pharmaceutical Sciences, 9 (3). pp. 1242-1247.
18. Heidari-Soreshjani S, Asadi-Samani M, Yang Q, Saeedi-Boroujeni A. Phytotherapy of nephrotoxicity-induced by cancer drugs: an updated review. J Nephropathol. 2017;6(3):254-63.
19. Shirani M, Raeisi R, Heidari-Soureshjani S, Asadi-Samani M. A review for discovering hepatoprotective herbal drugs with least side effects on kidney. Journal of Nephropharmacology. 2017;6(2):38–48.
20. Bahmani M, Sarrafchi A, Shirzad H, Rafieian-Kopaei M. Autism: Pathophysiology and promising herbal remedies. Current pharmaceutical design. 2016;22(3):277-85.
21. Shirani M, Shabanian S, Yavangi M. A systematic review of iranian medicinal plants effective on female infertility. Journal of Global Pharma Technology. 2016;10(8):44-9.
22. Shirani M, Heidari-Soureshjani S, Yavangi M. Use of Iranian medicinal plants effective on male fertility indices. Journal of Global Pharma Technology. 2016;10(8):36-43.
23. Kooti W, Hasanzadeh-Noohi Z, Sharafi-Ahvazi N, Asadi-Samani M, Ashtary-Larky D. Phytochemistry, pharmacology, and therapeutic uses of black seed (Nigella sativa). Chinese Journal of Natural Medicines. 2016;14(10):732-45.
24. Mansouri E, Asadi-Samani M, Kooti W, Ghasemiboroon M, Ashtary-Larky D, Alamiri F, et al. Anti-fertility effect of hydro-alcoholic extract of fennel (Foeniculum vulgare Mill) seed in male Wistar rats. Journal of Veterinary Research. 2016;60(3):357-63.
25. Mirhoseini M, Moradi MT, Asadi-Samani M. Traditionally used Medicinal Plants in the Treatment of Kidney Stone: a Review on Ethnobotanical Studies in Iran. Ambient Science. 2016;3(2):16-21.
26. Kumar A, Rinwa P, Kaur G, Machawal L. Stress: Neurobiology, consequences and management. Journal of Pharmacy & Bioallied Sciences. 2013;5(2):91-7.
27. Yan ZY, Zhang TE, Xiao T, Pan LZ, Qin JZ, Zhang ZP, et al. Anti-anxiety effect of Valeriana jatamansi Jones extract via regulation of the hypothalamus-pituitary-adrenal axis. Neural Regen Res. 2010;5(14):1071-5.
28. Chen L, Chen M, Wang F, Sun Z, Quanzhi H, Geng M, et al. Antidepressant-like effects of shuyusan in rats exposed to chronic stress: effects on hypothalamic-pituitary-adrenal function. Evidence-based complementary and alternative medicine. 2012;2012:940846.
29. Li J, Wang S, Yang X, Pang G, Zheng H, Shen B, et al. Effect of sulfated polysaccharides from Laminaria japonica on vascular endothelial cells in psychological stress rats. Journal of ethnopharmacology. 2014;151(1):601-8.
30. Thakur AK, Soni UK, Rai G, Chatterjee SS, Kumar V. Protective effects of Andrographis paniculata extract and pure andrographolide against chronic stress-triggered pathologies in rats. Cellular and molecular neurobiology. 2014;34(8):1111-21.

31. Diandong H, Feng G, Zaifu L, Helland T, Weixin F, Liping C. Sea buckthorn (Hippophae rhamnoides L.) oil protects against chronic stress-induced inhibitory function of natural killer cells in rats. International journal of immunopathology and pharmacology. 2016;29(1):76-83.
32. Hou DD, Gu F, Liang ZF, Helland T, Fu WX, Cai LP. Sea buckthorn (Hippophae rhamnoides L.) oil protects against chronic stress-induced inhibitory function of natural killer cells in rats. Int J Immunopath Ph. 2016;29(1):76-83.
33. Swart AC, Smith C. Modulation of glucocorticoid, mineralocorticoid and androgen production in H295 cells by Trimesemine, a mesembrine-rich Sceletium extract. Journal of ethnopharmacology. 2016;177:35-45.
34. Ebrahimi V, Salati AP, Azarm HM, Hasanpour S. Effects of dietary green tea (Camellia sinensis L) on acute stress responses in sturgeon hybrid (Huso huso male x Acipenser ruthenus female). Aquac Res. 2017;48(2):618-23.
35. Hu Y, Liu P, Guo DH, Rahman K, Wang DX, Xie TT. Antidepressant effects of the extract YZ-50 from Polygala tenuifolia in chronic mild stress treated rats and its possible mechanisms. Pharmaceutical biology. 2010;48(7):794-800.
36. Pan Y, Wang FM, Qiang LQ, Zhang DM, Kong LD. Icariin attenuates chronic mild stress-induced dysregulation of the LHPA stress circuit in rats. Psychoneuroendocrinology. 2010;35(2):272-83.
37. An L, Zhang YZ, Liu XM, Yu NJ, Chen HX, Zhao N, et al. Total flavonoids extracted from xiaobuxin-tang on the hyperactivity of hypothalamic-pituitary-adrenal axis in chronically stressed rats. Evidence-based complementary and alternative medicine. 2011;2011:367619.
38. Peng Z, Wang H, Zhang R, Chen Y, Xue F, Nie H, et al. Gastrodin Ameliorates Anxiety-Like Behaviors and Inhibits IL-1 beta Level and p38 MAPK Phosphorylation of Hippocampus in the Rat Model of Posttraumatic Stress Disorder. Physiol Res. 2013;62(5):537-45.
39. Wang Z, Zhang D, Hui S, Zhang Y, Hu S. Effect of tribulus terrestris saponins on behavior and neuroendocrine in chronic mild stress depression rats. Journal of traditional Chinese medicine = Chung i tsa chih ying wen pan. 2013;33(2):228-32.
40. Gao Q, Gao Y, Song H, Li JL, Wu YB, Shi XW, et al. Cipadesin A, a bioactive ingredient of Xylocarpus granatum, produces antidepressant-like effects in adult mice. Neurosci Lett. 2016;633:33-9.
41. Guo JY, Huo HR, Li LF, Guo SY, Jiang TL. Sini tang prevents depression-like behavior in rats exposed to chronic unpredictable stress. The American journal of Chinese medicine. 2009;37(2):261-72.
42. Wei SS, Yang HJ, Huang JW, Lu XP, Peng LF, Wang QG. Traditional herbal formula Sini Powder extract produces antidepressant-like effects through stress-related mechanisms in rats. Chinese journal of natural medicines. 2016;14(8):590-8.
43. Talbott SM, Talbott JA, Pugh M. Effect of Magnolia officinalis and Phellodendron amurense (Relora (R)) on cortisol and psychological mood state in moderately stressed subjects. J Int Soc Sport Nutr. 2013;10.
44. Xing H, Zhang K, Zhang R, Shi H, Bi K, Chen X. Antidepressant-like effect of the water extract of the fixed combination of Gardenia jasminoides, Citrus aurantium and Magnolia officinalis in a rat model of chronic unpredictable mild stress. Phytomedicine : international journal of phytotherapy and phytopharmacology. 2015;22(13):1178-85.
45. Panossian A, Wikman G. Effects of Adaptogens on the Central Nervous System and the Molecular Mechanisms Associated with Their Stress-Protective Activity. Pharmaceuticals. 2010;3(1):188-224.
46. Wang D, Lu CY, Teng LS, Guo ZH, Meng QF, Liu Y, et al. Therapeutic effects of Chinese herbal medicine against neuroendocrinological diseases especially related to hypothalamus-pituitary-adrenal and hypothalamus-pituitary-gonadal axis. Pakistan Journal of Pharmaceutical Sciences. 2014;27(3):741-54.
47. Ozkol H, Koyuncu I, Tuluce Y. Some medicinal plants counteract alterations of neuroendocrine stress response system, oxidative and nitrosative stress caused by repeated restraint in rats. Journal of Medicinal Plants Research. 2011;5(17):4360-8.
48. Moradi B, Heidari-Soureshjani S, Asadi-Samani M, Yang Q, Saeedi-Boroujeni A. Efficacy and mechanisms of medicinal plants as immunotherapy in treatment of allergic rhinitis: A systematic review. International Journal of Pharmaceutical Sciences and Research. 2017;8(5):1892-9.
49. Heidarian E, Rafieian-Kopaei M. Protective effect of artichoke (Cynara scolymus) leaf extract against lead toxicity in rat. Pharmaceutical biology. 2013;51(9):1104-9.
50. Rafieian-Kopaei M, Baradaran A, Rafieian M. Oxidative stress and the paradoxical effects of antioxidants. Journal of Research in Medical Sciences. 2013;18(7):628.
51. Bahmani M, Shirzad H, Mirhosseini M, Mesripour A, Rafieian-Kopaei M. A review on ethnobotanical and therapeutic uses of fenugreek (Trigonella foenum-graceum L). Journal of evidence-based complementary & alternative medicine. 2016;21(1):53-62.
52. Raeisi R, Heidari-Soureshjani S, Asadi-Samani M, Luther T. A systematic review of phytotherapies for newborn jaundice in Iran. International Journal of Pharmaceutical Sciences and Research. 2017;8(5):1953-8.
53. Asadi-Samani M, Bagheri N, Rafieian-Kopaei M, Shirzad H. Inhibition of Th1 and Th17 cells by medicinal plants and their derivatives: A systematic review. Phytotherapy Research. 2017;http://onlinelibrary.wiley.com/doi/10.1002/ptr.5837/abstract.
54. Ghatreh-Samani M, Esmaeili N, Soleimani M, Asadi-Samani M, Ghatreh-Samani K, Shirzad H. Oxidative stress and age-related changes in T cells: is thalassemia a model of accelerated immune system aging? Central-European journal of immunology. 2016;41(1):116-24.
55. Amat N, Hoxur P, Ming D, Matsidik A, Kijjoa A, Upur H. Behavioral, neurochemical and neuroendocrine effects of abnormal savda munziq in the chronic stress mice. Evidence-based complementary and alternative medicine. 2012;2012:426757.

Comparing traditional and medical treatments for constipation : A Review Article

Mohammad Yaqub Rajput*

Assistant Professor of Internal Medicine, Gastroenterology and Hepatology

Corresponding author:
Mohammad Yaqub Rajput,
Assistant professor of internal medicine,
Gastroenterology and Hepatology
Jahrom University of Medical Sciences,
Jahrom, Iran
Tel: +989171912400
Email: mogharabvahid@yahoo.com

Abstract

Constipation is one of the complaints raised by various age groups. More than one-seventh of the adult population in the world are suffering from chronic constipation. In addition to adverse effects on lifestyle and physical complications, this disease costs a lot to the patient and the health system. In this study, the recommendations for the removal of constipation from traditional medicine and modern medicine were extracted and compared. The general approach to dealing with constipation in traditional medicine sources is somewhat similar to that of the medical findings, but the details of the recommendations in these sources do not have the required level of evidence. Also, the importance of paying attention to constipation has been emphasized in reducing the number of complications in traditional medicine sources, which deserves further consideration.

Key words: constipation, traditional medicine, modern medicine, laxative

Please cite this article as: Mohammad Yaqub Rajput. Comparing traditional and medical treatments for constipation : A Review Article. *World Family Medicine.* 2017; 15(9):124-127. DOI: 10.5742/MEWFM.2017.93111

Introduction

Constipation is one of the most common complications of the digestive tract in modern and traditional medicine. Constipation is one of the complaints raised by various age groups. (1) More than one-seventh of the adult population in the world are suffering from chronic constipation (2 and 3). Chronic constipation with a prevalence of 15-30% in adults and between 3% and 28% in children is one of the priorities of the World Health Organization (1, 4-6). In addition to the negative effects it affects the patient and the health system on lifestyle and physical side effects. Constipation, in addition to being unpleasant, can be associated with complications such as mega colon, general weakness, hemorrhoids, and sustained complications such as pudendal nerve damage and impaired pelvic floor muscle function due to excessive pressure for excision and even uteroinjection prolapse (5, 7). Studies have shown that women with severe constipation are more likely to be exposed to gynecologic surgery (5). The high prevalence of constipation in all age groups, the imposition of financial burdens on health care systems at $ 7,522 per year for each patient in the United States, the impact on quality of life of people and the lack of satisfaction with current drugs, the tendency of patients and researchers to use other methods, including herbal remedies and explain other methods of complementary and alternative medicine (8 and 9)

In this study, the recommendations for the removal of constipation from traditional medicine sources and traditional medicine databases were extracted and compared.

Definition of constipation in modern medicine: severe stool discharging or incomplete emptying after bowel movements or bowel movements less than three times a week (10)

Probable side effects	Example	Effect mechanism	Type of laxative
Ineffective in some patients, bloating, cramp, increased intake of bad gas for rapid removal of symptoms	Bran peslium	Hold the water in the colon by connecting it with it and increase the volume and facilitate the disposal of faeces	**Stool volumetric**
Possibility of hypomagnesemia in the baby with prolonged use	Sodium dodecosate or Calcium dicosates	Stimulating the secretion of water, sodium, chlorine and potassium and inhibiting the absorption of glucose and bicarbonate in the jejunum	**Stool softeners**
I The place of impairment in the absorption of fat-soluble vitamins such as vitamin K, followed by an increased risk of bleeding. (There is no observation in this area)	Mineral oils	Reducing the intestinal fluid surface tension and thus maintaining more fluid in the intestines and facilitating the elimination and reduction of pressure for excretion	**Lubricant laxatives**
Bloating, possibility of electrolyte imbalance with prolonged use	Salt (such as sodium chloride or potassium chloride) Magnesium sulfate or citrate, sorbitol, Lactulose, polyethylene glycol	Increased osmolar stress results in increased water absorption into the intestinal tract, dilatation and increased intestinal movements and excretion	**Osmotic laxatives**
Cramp, the possibility of electrolyte imbalance	Sena Bisacodile	Stimulate colon movements and reduce water absorption from the large intestine	**Stimulant laxatives**

Definition of Constipation in Traditional Medicine: In traditional medicine, constipation is characterized by titles such as hasr, abdominal cavity and ventricular vein, and colic is a specific type of constipation associated with pain (11).

Constipation Therapy in Modern Medicine: In modern medicine, constipation is initiated by providing non-pharmacological advice such as increasing physical activity and fluid intake, regulating bowel habits, and increasing fiber consumption. If necessary, laxative drugs are prescribed, and in the absence of response, Surgical methods are used. (12 and 13) In new studies, laxatives are classified into five groups based on their mechanism of action (4, 5 and 14)

The treatment of constipation in traditional medicine: The first step in the treatment of traditional medicine in Iran is the diagnosis of the disease pattern. Considering the characteristics of stool in terms of consistency, shape, color, smell and accompanying symptoms, along with the examination of language and pulse, is one of the important issues of this school. The principles of treatment in Iranian medicine are based on lifestyle modification and nutrition, the establishment of the balance and the strengthening of the organ. Several studies have shown the effectiveness of some Iranian herbs on constipation. Hypnosis (ENMA) is also indicated as an effective treatment for constipation (15) Dr. Ahmadieh writes in the secret of treatment that "It should be noted that most diseases cause disruption of the stomach and laziness of the intestine. In addition, each illness also causes forms of digestive system impairment. He cleared it and launched it, then, as if he returned to a permanent illness, he went to special treatment." He says elsewhere: "The predecessors of treating illnesses, emptying the intestines and treating the diseases were important, and they insisted on doing so, and putting the rest of the treatments at a later stage. I also chose the same procedure, because of constipation and digestive disorders The cause of any illness or partner is the disease "(16)

Treatment for constipation is primarily focused on removing constipation-inducing substances such as consuming dry foods or opiates, and continues to focus on treating constipation-related gastrointestinal and non-gastrointestinal malformations.

Food Recommendations in Traditional Medicine:

- Avoid consuming dessert foods (17) and grilled and fried foods (18)
- Avoid flaccid foods (17) such as legumes, apples, cucumbers, yogurt (18)

- Increased meals: Increasing the number of meals in addition to reducing complications, such as reflux, also affects the lining of the heart; however, the volume of the serving should be reduced proportionately with the increase in the number of snacks (19 and 20)
- Having a regular diet (16 and 17)
- The use of soft and early digested foods (17, 21 and 22), due to poor digestion of the gastrointestinal tract, prolongs the digestive process, which will result in constipation (23).
- Fatty porridges (19 and 24-26)
- Use laxatives foods such as spinach, lettuce, turkey, cabbage leaves (17 and 27)
- Sufficient water: (17) In new guidelines, adequate water intake, especially constipation is considered to be effective (5). Of course, in traditional medicine sources, it is not recommended to increase water use in the elimination of all types of constipation (17).
- Snacks like dried figs, pistachios, almonds, currants, dried figs, cooked fruits, sweet ripe melons before meals (17)

Therapeutic methods of traditional medicine:
- Stretching during a mild walk (23)
- Creating order in defecation and bowel movements when feeling off (17)
- Keep body warm in very cold environments (17)
- Keep your stomach warm, especially in cold weather (17 and 21)
- Non-use of very cold and bitter foods (19-21 and 25)
- Avoid overeating (23)
- Avoiding Drugs (17)
- Avoiding Severe Psychological Stress (16 and 19)
- **Ginger:** In addition to laxative, it is also effective in relieving nausea (17, 28)
- **Golghand alone or sour with Golghand (27):** The method of making "griffin" is to combine the flowers with the weight of that honey or sugar and put it under appropriate temperature conditions for a while until the process is completed. Golghand also plays an important role in reducing bloating and gastrointestinal uplift (23, 28)
- **"Torangebine" with rose water:** In the Alhekmatelkholase book, the best combination of laxatives is mentioned, which are usable in most temperaments, times and cities, and it is easy to eat and, of course, those who are prone to diarrhea should be careful with it. 19 and 25)
- **"Mubarak" laxative:** The author of the Altebelmizan, expressed combinational Mubarak laxative in this book, based on his experiences, is useful in most of the esophagus and outbreaks, and agrees with most temperaments and can be used by pregnant women and children and the elderly. It can also be useful in treating fever and inflammation of the digestive tract. (29)
- Sweet Almond Oil (22)
- rose petals (22)

Discussion and Conclusion

Constipation is one of the most common problems in the new life style. In Germany, about 25% of women and 10% of men (30) and in the United States between 20% and 28% of the population face this problem. (31) Iran reported a prevalence of 3.5%. (32 and 33). Lipid medications along with homeopathic remedies are the most commonly used non-prescription drugs in the world. In Germany, 39 million units of laxative drugs are sold annually, and 600 million are sold in the United States. (34) The annual constipation in the United States leads to 2.5 million physician visits. The economic value of care for each patient with constipation is estimated at an average of $ US 2,752. (35) Many of the molecular structures of modern drugs are based on the effects of medicinal plants used in traditional medicine systems. (36) So searching in traditional medicine texts is a good way to find new drugs. The use of modern therapy has many problems. Therefore, new strategies are aimed at shortening processes to reduce costs and making it easier to get effective medications. (37) One of these strategies is the use of therapies and medicinal plants and medications used in traditional medicine for centuries. This study was a review study in which we tried to compare the treatment of constipation in modern medicine with traditional Iranian medicine. According to the studies, the main method of treatment in modern medicine is the use of laxatives that can have many complications, but traditional medicine methods are related to the correcting of life and food practices and treatments by medicinal plants that have the least complications. However, the low risk or safety of pharmaceutical treatments in traditional medicine requires several clinical trials so far researchers have not focused on researching these topics. Due to the prevalence of constipation and the existence of several herbal remedies in traditional Iranian medicine, it is suggested that more clinical trials should be conducted to prove the low risk and even the effectiveness of these medicinal plants, in order for them to achieve the role of chemical treatments with low complications.

References

1- Sanchez MI, Bercik P. Epidemiology and burden of chronic constipation. Can J Gastroenterol 2011; 25(Suppl B):11B-5.
2- Kim N. Chronic Constipation- the Causes, Symptoms and treatments. European Society of hemato-centric medicine 2010.
3- Fateh R, Iravani S, Frootan M, Rasouli MR, Saadat S. Synbiotic preparation in men suffering from functional constipation: a randomised controlled trial. Swiss Med Wkly 2011;141:w13239.
4- Vazquez JC. Constipation, haemorrhoids, and heartburn in pregnancy. BMJ Clin Evid 2010; 2010:1411.
5- Cullen G, O'Donoghue D. Constipation and pregnancy. Best Pract Res Clin Gastroenterol 2007; 21(5):807-18.
6- Keller J, Frederking D, Layer P. The spectrum and treatment of gastrointestinal disorders during pregnancy. Nat Clin Pract Gastroenterol Hepatol 2008; 5(8):430-43.
7- Changavi F, Delfan B, Akbari S, Janani F. Evaluation of The effect of Cotoneaster on constipation during pregnancy. Aflak J 2008; 1(1):5-9. (Persian).
8- Folden S. Practice guidelines for the management of constipation in adults. Rehabilitation Nursing 2002;27(5):169-175.

9- Bove A, Pucciani F, Bellini M, Battaglia E, Bocchini R, Altomare DF, et al. Consensus statement AIGO/ SICCR: Diagnosis and treatment of chronic constipation and obstructed defecation (part Diagnosis). World J Gastroenterol 2012;18(14):1555-64.
10- Ibn-e-sina AH. Al-Qanun fit-tib. The Canon of Medicine. Beirut: Beirut Alaalami Beirut library Press; 2005.
11- Xu X, Zheng C, Zhang M, Wang W, Huang G. A randomized controlled trial of acupuncture to treat functional constipation: design and protocol. BMC Complement Altern Med 2014; 14: 423.
12- Cook IJ, Talley NJ, Benninga MA, Rao SS, Scott SM. Chronic constipation: overview and challenges. Neurogastroenterology and Motility 2009; 21(Suppl 2): 1-8.
13- Krassioukov A, Eng JJ, Claxton G, Sakakibara BM, Shum S. Neurogenic bowel management after spinal cord injury: a systematic review of the evidence. Spinal Cord 2010; 48(10): 718-733.
14- Body C, Christie JA. Gastrointestinal diseases in pregnancy: nausea, vomiting, hyperemesis gravidarum, gastroesophageal reflux disease, constipation, and diarrhea. Gastroenterol Clin North Am 2016; 45(2):267-83.
15- Wald A. Chronic constipation: advances in management. Neurogastroenterology & Motility 2007; 19: 4–10
16- Ahmadieh A. Raz-e-darman. Tehran, Iran: Eghbal Press; 2007.
17- Elsagh M, Hadizadeh F, Mazaheri M, Yavari M, Babaeian M, Sharifi Olounabadi AR, et al. Constipation in traditional Iranian medicine. J Islam Iran Tradit Med 2012; 2(4):361-71.
18- Nejatbakhsh F. The rules of nutrition in disease based on Iranian traditional medicine. Tehran, Iran: Choogan; 2013. P. 767.
19- Aqili khorasani S. Kholasa-al-Hikmat. Qom, Iran: Esmaeilian; 2006.
20- Ahvazi AA. Kamel-al-Sanaat-al-tebbieh. Qom, Iran: Jalaleddin; 2008.
21- Mokaberinejad R, Tansaz M, Bioos S, Jafari Dehkordi E, Akhtari E, Yousefi S, et al. Healthy pregnancy in perspective of iranian traditional medicine and its brief comparison with modern medicine. Iran J Obstet Gynecol Infertil 2014; 17(121):1-9. (Persian).
22- Dabaghian FH, Siahpoosh M, Shirazi MT. Iranian traditional medicine views about prenatal care. Hist Med J 2016; 4(12):139-59.
23- Arzani MA. Tebb-e-Akbari. Tehran, Iran: Institute of Medical History, Islamic and Complementary Medicine, Iran University of Medical Sciences; 2005.
24- Avicenna A. The Canon of Medicine. Beirut, Lebanon: Alaalami Beirut Library Press; 2005.
25- Arzani MA. Mofarreh Al-Gholob. 1st ed. Tehran: Almaee; 2012.
26- Dehestani Ardakani M, Jamali F, Momeni F, Rezayat A, Yavari M. Nutrition in pregnancy: from viewpoint of traditional medicine to new medicine. J Islam Iran Tradit Med 2013; 4(4):344-59.
27- Azam Khan M. Exir Azam [Great Elixir]. Lucknow, India: Monshi Nou; 2008.
28- Khorasani Shirazi MH. Makhzan-al-Advieh. Tehran, Iran: Bavardaran; 2001.
29- Arzani MA. Mizan-al-Tib. Qom, Iran: Sama Cultural Institue; 2001.
30- H. Knopf, M. Braemer-Hauth, H. U. Melchert, and W.Thefeld, “Ergebnisse der nationalen untersuchungs-surveys zum laxantiengebrauch,” Bundesgesundhbl, vol. 38, pp. 459–467, 1995.
31- Stewart WF, Liberman JN, Sandler RS, et al. Epidemiology of constipation (EPOC) study in the United States:Relation of clinical subtypes to socioemographic features. Am J Gastroenterol 1999;94:3530-40
32- khoshbaten, Manoochehr, Ghasemi, Hamzeh, Hekmatdost, Azita; Entezari, Masoud, (2004), Prevalence of gastrointestinal signs and symptoms in the northwestern region of Tabriz, Iran, Fourth International Congress on Gastroenterology and Hepatology, 1715 December 2004, TehranMassarrat S, Saberi-Firoozi M, Soleimani A, Himmelmann GW, Hitzges Met al.Peptic ulcer disease, irritable bowel syndrome and constipation in two populations in Iran. Eur J Gastroenterol Hepatol. 1995 May; 7(5):427-33
33- M. Sweeney, “Constipation diagnosis and treatment,” HomeCare Provider, vol. 2, no. 5, pp. 250–255, 1997.
34- Sonnenberg A, Koch TR. Physician visits in the United States for constipation: 1958 to 1986. Dig Dis Sci 1989;34:606-11.
35- Patwardhan B, (2009, January 23). Drug Discovery and Development: Traditional Medicine and Ethnopharmacology Perspectives. SciTopics. Retrieved October 4, 2011, from http://www.scitopics.com/Drug_Discovery_and_Development_Tradition al_Medicine_and_Ethnopharmacolgy_ Perspectives.html.
36- Miyata T, Kikuchi K, Kiyomoto H, van Ypersele de Strihou C.New era for drug discovery and development in renal disease. Nat Rev Nephrol. 2011 Jul 5;7(8):469-77. doi: 10.1038/nrneph.2011.84

A review of anti-measles and anti-rubella antibodies in 15- 25 year old women in Jahrom City in 2011

Ehsan Rahmanian (1)
Farideh Mogharab (2)
Vahid Mogharab (1)

(1) Department of Pediatrics, Jahrom University of Medical Sciences, Jahrom, Iran
(2) Research Center, Department of Obstetrics and Gynecology, Jahrom University of Medical Sciences, Jahrom, Iran.

Corresponding author:
Vahid Mogharab,
Department of Pediatrics, Jahrom University of medical sciences,
Jahrom, Iran
Tel: +989171912400
Email: mogharabvahid@yahoo.com

Abstract

Introduction: Measles and rubella are acute viral diseases. Rubella often has mild clinical symptoms and cannot be diagnosed. Pregnant mother's infection with this disease causes serious complications, especially congenital rubella syndrome which is one of the causes of neonatal mortality, severe congenital defects and permanent disability in children. In contrast, measles often occurs with severe symptoms. This study aimed to determine the immunity level of Jahrom's young girls and women against measles and rubella 7 years after the public vaccination comparing to determine the percentage of infection with these two viruses, the effectiveness of the vaccine and an appropriate method to prevent the complications of these two diseases.

Methodology: This study was a cross-sectional descriptive study. According to the previous study conducted one year after the public vaccination in Jahrom City, 100% of the subjects were given immune anti-rubella antibody titer and 94% received immune anti-measles antibody titer. Now this study measured anti-measles and anti-rubella antibody titers (IgG) in 180 women and girls aged 15-25 in Jahrom City through ELISA assay.

Results: 165 subjects (91.7%) had positive rubella titer, 13 subjects (7.2%) had suspected rubella titer and 1 subject (0.6%) had negative rubella titer. Meanwhile, 170 subjects (94.4%) had positive, 6 subjects (13.3%) had suspected and 3 subjects (1.7%) had negative measles titer. Regarding suspected cases as positive for long-term maintenance of serums, a total of 98.5% of people were immunized measles and 97.5% were immunized rubella. With increase of age, antibody titer significantly increased ($p<0.05$). There was no significant relationship between taking or not taking steroids, immunity repressor and the subjects' immunity percentage ($p<0.05$).

Conclusion: The results showed that although the national vaccinationcomparing in 2003 has been effective in immunizing the women of gestational age to measles and rubella, it seems that due to the gradual reduction of this immunity, all women, before pregnancy, should undergo a test to determine their immunity to these two diseases and if necessary, booster vaccine should be inoculated.

Key words: Measles, Rubella, Congenital rubella, vaccination, IgG.

Please cite this article as: Rahmanian E. et al. A review of anti-measles and anti-rubella antibodies in 15- 25 year old women in Jahrom City in 2011. *World Family Medicine.* 2017; 15(9):128-134. DOI: 10.5742/MEWFM.2017.93112

Introduction

Measles is a highly contagious disease the incidence of which declined due to widespread vaccination. However, there are still outbreaks of the disease worldwide, which can be due to the primary vaccine failure in a small percentage of children and the lack of vaccination in some percentage of preschool children and, finally, because of the reduction in the anti-measles antibody levels in children born to the mothers with no history of wild virus infection [1]. Measles vaccine failure was reported in 5% of those who received only one dose of vaccine at 12 months of age. However, weaning immunity can be observed in some people after each vaccine [2]. Rubella is a mild disease with cutaneous rash that is more severe in children and infants than in adults, and the worst problem with rubella is its trans-placental transmission, fetal infection and congenital malformation which causes eye symptoms (cataract, glaucoma, etc.), microspheres, PDA, nerve deafness, etc. in the infants. Before vaccination, rubella epidemics were observed every 6 to 9 years. Now after vaccination, the incidence of the disease has reduced by 99% [1]. Infection with rubella was asymptomatic in 25-50% of cases, and immunity after infection with virus and with vaccine was prolonged. However, at the same time, some rare cases of infections were reported [2]. After the injection of MMR vaccine, sero conversion rate was different in children. In a study conducted in Korea, after MMR injection to 121 children 1-2 years old, sero conversion rate was reported to be 97-97% for rubella and 100% for measles. Regarding the children aged 4-6, who were sero negative, all 39 children had 100% sero conversion rate for measles and rubella after MMR injection [3]. In the study conducted by Dr. Zamani and Dr. Daneshjoo in Tehran in 2004 on 1,665 schoolchildren aged 6 to 12, 68.5% had no anti-rubella antibody titer. A year after the mass MR vaccination in Iran in 2004 and during that time all women under the age of 25 were vaccinated with MR. In a research project conducted in the city of Jahrom, IgG rate against measles and rubella was reviewed in girls of 15-25 year old by ELISA method and the seropositivity rate of the vaccinated subjects was reported to be 100%. The pregnant mother's infection with measles virus, and especially rubella virus in the first three months, can have harmful irreparable effects on the fetus. The goal of measles and rubella vaccine preparation and all its immunization programs was to avoid these complications, especially congenital rubella syndrome. Selection of the appropriate measles and rubella vaccination requires obtaining information about these diseases and their complications and performing community-based epidemiological studies, especially in pregnant women and women of reproductive age, to determine their level of immunity.

Given that in 2003, public vaccination against these two diseases was carried out for the age group of 25.5 years, and after that several similar studies in Iran and a similar study in Jahrom City were conducted, and the immunity level of the subjects after the vaccination was investigated. This study aimed to determine the immunity level against measles and rubella 9 years after the public vaccination of 15 to 25 year-old women in Jahrom City to determine the sensitivity of individuals, the efficacy of the vaccine and an appropriate immunization method to prevent these two diseases.

Methodology

It was a cross-sectional descriptive-analytic study conducted to determine the immunity level of 15-25 year-old girls and women in Jahrom City against measles and rubella virus a few years after the public vaccination. Through convenience sampling method, a blood sample was taken from 180 women aged 15-25 years who referred to the laboratory of Peymaniyeh Hospital in Jahrom City. Then, that was centrifuged and frozen at 4°C. Then, anti-measles and anti-rubella IgE titer were measured using ELISA method and Spectrophotometer. After taking blood samples from 180 volunteers aged 15 to 25, who referred to the laboratory of Peymanieh Hospital in Jahrom, and serum centrifugation and isolation, serums were stored at 4°C for several months. The research methodology was based on the use of ELISA method, which showed 97% sensitivity and 94% specificity for anti-measles IgG and 95.5% sensitivity and 97.1% specificity for anti-rubella IgG. The samples were first placed at room temperature for one hour and shaken at form 8. 100 diluted serum was added to 5 serum. Meanwhile, 5 positive controls were added to one sample and 5 negative controls and 5 cut off controls were added to one sample. Then, the samples were shaken with sugar for 2 minutes and left in a 37°C incubator for 45 minutes. Then, the samples were washed with 0.3 volumes of solution 5 times. Immediately after that, 100 volumes of IgG solution were added to all samples and they were placed in a 37°C incubator for 30 minutes. For the second time, the samples were washed with rinsing solution 5 times and immediately after that 100 substrate solution was added to all samples. After the samples were kept away from the sunlight at room temperature for 20 minutes, 50 of stop solution was added to all of them, and finally, the samples were read using spectrophotometer with a wavelength of 450/620 nm one hour after stopping the test. Samples with a specific anti-measles IgG and specific anti-rubella IgG of less than 9 IU/ml were considered negative, those with 9-11 were considered suspected and those above 11 were considered positive according to the Kite manufacturer's instruction (Vircell Spanish Company). In this method, the antigen-antibody complex was determined by ELISA method and was read by spectrophotometer. Data were analyzed by SPSS V11 software at the descriptive statistics level and the required charts were also designed by Excel XP software.

Results

In this study, serum samples of 180 girls and women of 15- to 25 years in Jahrom City who had a history of public vaccination inoculation were evaluated in terms of measles and rubella IgG. IgG levels were measured by ELISA method based on the international unit of (IU/ml). ELISA method showed sensitivity of 97% and specificity of 94% for anti-measles antibody and 95.5% sensitivity

and 97.1% specificity for anti-rubella antibody. The kits used belonged to Vircell Spanish company. Samples with an antibody level below 9 IU/ml were negative, those with a level of 9-11 were suspected and those with a level of more than 11 were considered positive (according to the kit manufacturer's instructions). The results showed that 165 out of 180 subjects (91.7%) were positive for anti-measles antibody, 1 subject (5.6%) was negative and 13 subjects (17.2%) were suspected. Moreover, 170 subjects (94.4%) had positive anti-rubella antibody, 3 subjects (1.7%) had negative and 6 subjects (3.3%) were suspected. Since suspected cases were considered positive, eventually 98.5% of subjects are still immune against measles and approximately 97.5% are still immune against rubella. Meanwhile, this study reviewed the relationship between the individuals' immunity, steroid use, the incidence of autoimmune diseases, the use of specific drugs and vaccination, and no significant relationship was observed between the individuals' immunity or non-immunity and the use of steroids and self-immune drugs ($p<0.05$). In this study, 174 (96.7%) patients did not take steroids and 6 (13.3%) patients used steroids. Moreover, 97% of those who had positive anti-measles antibody and 96.5% of those with anti-rubella antibody had used no steroids. Meanwhile, 92% of those who did not take steroids had anti-measles antibody and 94.3% of those who did not take steroids had anti-rubella antibody (Table 1).

Out of those who had positive anti-measles antibody, 98.2% and 97.6% of those with positive anti-rubella antibodies did not use the autoimmune disease drugs. Moreover, 92% of those who did not take the autoimmune disease drugs had anti-measles antibody and 94.3% of those who did not use steroids had positive anti-rubella antibody (Table 2).

There was a significant relationship between age and anti-measles and anti-rubella antibody titer (P<0/05). That is, the antibody titer increases with age increase, so that, regarding the suspected cases as immune, in the age group of 20-25 years, 99.2% are immune against measles and 97.8% are immune against rubella. However, in the age group of 15-19 years, 15-19, these figures are 92.6% and 97.5%, respectively. You can observe this comparison in Tables 3 and 4, respectively.

In general, the results showed that public vaccination was quite effective and an acceptable result was achieved after 9 years.

Discussion

To be able to judge the efficacy of public measles-rubella vaccination system, we needed to collect data about the immunity of people in society, especially young women of reproductive age before and after vaccination. For this purpose, various studies were conducted in Iran. In a study in Shahrekord, 150 students were examined 4 weeks before and 8 weeks after the public vaccination, 86% of whom were immunized against rubella before vaccination and 14% who were sensitive to virus. After vaccination, these figures changed to 96.9% of immune cases and only 3.1% of non-immune cases. In this study, the effectiveness of vaccination was reported to be 80.95% (5). This information was consistent with the findings from the previous study in which 100% of the subjects were immunized against rubella after a national vaccination (6). In Mashhad, the vaccination responsiveness in women aged 15 to 23 was studied. At first, 1698 subjects were examined before vaccination out of which 67.19% were immune against measles and 70.38% were immune against rubella. After vaccination, these figures reached 77.37% and 89.5%, respectively (7). In comparison with our findings from the previous study in which these figures were 94% and 100% respectively (6 - 8), the responsiveness rate was less in Mashhad due to the exclusion of some subjects from the study and the difference between the type of kit used. In Tehran, 390 women were investigated whose immunity against rubella virus was 80.59% before vaccination, and reached 96.8% during vaccination and 100% at the end of the program (9). The results of this study were quite similar to our previous research findings. In 2011 in Shiraz, Professor Alborzi examined 909 women aged 6 to 26 years in the Research Center for Microbiology and divided them into five groups to detect antibody. Measles was reported to be 80.6% for the age group of 10 to 6 years, 72.7% for the age group of 11-15 year, 84.9% for the 16-20 year old group and 87.5% for the 20-29 year old group before vaccination. After vaccination, these figures reached 91%, 99.6%, 99.6% and 97%. The immunity against rubella was reported to be 98.9%, and generalized to immunity against congenital rubella syndrome (10). In our recent study, the immunity rate against measles was reported as 97.5% for 9-15 year old subjects and 93.4% for 20-25 year old subjects, and the immunity rate against rubella was reported 97.5% and 93.4%, respectively. Therefore, our present study as well as the study conducted in Shiraz showed that women's immunity decreases a little with increased age. In Kerman, 4 weeks before and after the public vaccination, the antibody titer was studied in 1089 women. Before the program, 46% of the subjects aged between 5 and 14, 41.7% of the age group of 15-19 years, and 34.1% of the subjects aged 20-25 were immune against the measles virus. After vaccination, 100% of the vaccinated subjects were immunized against measles (11). The study results were consistent with our previous research and the immunity percentage of the individuals was 6% higher than our results, which contributed to the success of vaccination in Kerman, the lack of sampling error and follow ups of the subjects. Our previous study was conducted in Jahrom City on 15-25-year-old urban and rural women. Before the national vaccination, 84.35% of subjects were immune and 14.95% were non-immune against rubella. One year after the public vaccination, the subjects were re-examined and 100% of them were immune against rubella. Moreover, 84.3% of the subjects were immune against measles and 15.7% were sensitive before the vaccination. One year after the vaccination, 94.1% of vaccinated subjects were immunized against measles. In this study, there was no significant relationship between the antibody titers and the subjects' geographic status. However, the subjects' positivity percentage increased with increasing age (6 - 8). However, according

Table 1: A description of the relationship between the absolute and relative frequency of the volunteers' immunity against measles and rubella and taking or not taking steroids

Suspected		Non-immune to rubella		Immune against rubella		Suspected		Non-immune against measles		Immune against measles		
%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	
100	6	100	3	96.5	164	92.3	12	100	1	97	160	Not taking steroids
0	0	0	0	3.5	6	7.7	1	0	0	3	5	Taking steroids
100	6	100	3	100	170	100	13	100	1	100	165	Total

Table 2: A description of the relationship between the absolute and relative frequency of the volunteers' immunity against measles and rubella and taking or not taking autoimmune disease drugs

Suspected		Non-immune to rubella		Immune against rubella		Suspected		Non-immune against measles		Immune against measles		
%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	
100	6	100	3	97.6	166	92.3	12	100	1	98.2	162	Not taking autoimmune disease drugs
0	0	0	0	2.4	4	7.7	1	0	0	1.8	3	Taking autoimmune disease drugs
100	6	100	3	100	170	100	13	100	1	100	165	Total

Table 3: Absolute and relative frequency distribution of volunteers by age and anti-measles antibody titer

Total		Suspected		Positive		Negative		Anti-measles antibody titer / Age
%	Number	%	Number	%	Number	%	Number	
100	41	4.8	2	92.6	38	2.4	1	Age group of 15-19 years
100	137	8.8	12	90.5	124	0.7	1	Age group of 20-25 years

Table 4: Absolute and relative frequency distribution of volunteers by age and anti-rubella antibody titer

Total		Suspected		Positive		Negative		Anti-rubella antibody titer / Age
%	Number	%	Number	%	Number	%	Number	
100	41	2.5	1	97.5	40	0	0	Age group of 15-19 years
100	137	3.6	5	93.4	128	3	3	Age group of 20-25 years

to the present study results, the subjects' positivity percentage of antibody titers gradually decreases after several years. According to the data obtained in these studies, this public vaccination program had a significant role in creating immunity against these two viruses and a successful implementation and the results were close to the determined goals. Finally, according to the article released by Esteghamati, stating that cluster sampling results in Iran suggested a high immunity level of 97% of Iranian women aged 25-40 against rubella. After the national vaccination program in Iran, seven thousand blood samples were collected with the help of UNICEF and over 97.4% of samples were immune to rubella virus. It has also been suggested that the immunity of the children under 5 increased by 53% against rubella and by 93% against measles. Meanwhile, with an immunity of 97% to 99%, the National Vaccination Program for measles and rubella has been successfully evaluated and because of high immunity, women will no longer be vaccinated against rubella (12-13). In our previous study, all subjects were also immune to rubella one year after the vaccination (6). However, this study was designed to determine whether

or not the subjects' antibody titer remains immune after several years of vaccination and whether there is a need to repeat public vaccination. The study results showed the immunity level of 15-25-year-old women to be 98.5% against measles and 97.5% against rubella 9 years after the public vaccination. In the study, 91.7% of the subjects were immune to measles, 0.6% was negative and 7.2% were suspected. Meanwhile, 94.4% of the subjects were immune to rubella, 1.7% was non-immune and 3.3% of cases were suspected. Due to the fact that the samples were stored at 4°C for several months before the test kits arrived and the probability that suspected samples were positive; suspected samples were considered positive. This statistic was consistent with the above mentioned point.

In this study, there was no significant relationship between the use of immunosuppressive drugs. These factors were not investigated in other similar studies conducted inside or outside Iran. According to the results obtained from other studies, as the age increases, the antibody titer increases (14-18). Most likely there will be a risk of exposure to these viruses or infection with them with an increase in age. However, our study showed a slight decrease in antibody titers with age increase. Moreover, the immunity of women of reproductive age before public vaccination was 87% (19) in Kyrgyzstan, (76.3%) in Turkey, (70%) in Brazil (16), (65%) in China and Taiwan (17 and 21), 55% in India (22), (84.6%) in Hong Kong (23) to rubella and (74.1%) in South Korea to measles (24, (84.6%) in Italy against rubella (15), (46%) in Costa Rica against rubella (25), 90.8% in Nepal (26), 50% in Egypt against measles (27), 92.9% in Romania (28), 46% in the UK against rubella (29), and 79% in Madrid against measles and rubella (30) and in Jeddah 71% were reported immune to measles and 90% immune to rubella (31). Only in a few of the reported countries, the percentage of responsiveness to public vaccination was examined. For example, the figures reached 90% in Italy (15), 98% in Costa Rica (25), (97.3%) in China (17), 90% in Egypt (27), 93% in Taiwan (21), 94.4% in Romania (28), 88% in the UK (32), and 73.7% in Jeddah for measles and 91.7% for rubella (31). The point to be noted here is that in this study the antibody titers below 9 units per ml were considered negative, which was used in accordance with the kit manufacturer's instructions. The kit used in this study belonged to the Spanish company Vircell. The values of 11-9 units per ml were considered suspected and the values more than 11 units per ml were considered positive. However, due to the cases mentioned, suspected cases were contractually considered positive. The kit used in one case was not similar to the kits used in the other domestic and international studies. Therefore, if the samples were measured using other kits standards, the number of positive cases would be possibly reduced. Thus, a greater percentage of women in the society can be considered sensitive to these two diseases. In our study, the relationship between the socioeconomic level (urbanism and ruralism) and the antibody titer was not measured. That is because the similar study of Namjoo in 2004 showed no significant relationship between these two cases due to the wide association of urban and rural areas in Jahrom City (6 - 8). Whereas, the study of Majdzadeh in Tehran in 1997 showed a significant difference between the women living in the north of Tehran in terms of high socioeconomic status and the women living in the south of Tehran in terms of rubella antibody titers, so that Southern women had higher antibody titers (9). In a similar study in India in 1995, the same difference was observed between urban and rural residents. Rural women had higher antibody titers and immunity. That is because the risk of developing rubella in their childhood increases due to low hygiene (22). Moreover, in a study conducted in Italy in 2004, there was no significant relationship between the geographic region and the positive percentage of rubella antibody titers until the age of 14 years. However, during 15-19 years of age, it was more positive in the northern Italian population than those living in southern Italy. Meanwhile, between the ages of 20 and 39, it was lowest in the southern Italian population (a region with higher socioeconomic status) (15). The after vaccination results showed that most people have found an acceptable level of antibody, which indicates the ability of these vaccines and their immunogenicity to produce antibodies. The similar results observed in other countries were mentioned in the previous pages. Actually, the study on the vaccine effect survival over time was conducted only in a few countries, and the other countries have examined the positive rate of antibody titer in vaccine recipients. However, in those few countries mentioned, the research showed the subjects' acceptable immunity after several years (7 years in Iran). Therefore, the public vaccination program was satisfactory and there was no need to inject a booster dose, except for those who underwent serology test before marriage and if not immunized, booster dose should be inoculated. It is worth noting that during the implementation of the public vaccination plan, a large number of pregnant women were not aware of being vaccinated by this live attenuated vaccine (LAV) during their pregnancy. Thus, several studies were conducted in Tehran (33-34) and a study was conducted in Mazandaran (35) in order to investigate the probable infection of these mothers' infants with congenital rubella syndrome. Thankfully, the results of all studies showed that although the injection of a live virus vaccine is not recommended during pregnancy, its accidental injection in pregnant women did not have complications and even one case of congenital rubella syndrome after vaccination has not been reported.

Conclusion

According to what we obtained in this study, it appears that the public vaccination program was sometimes successful in starting a program for the elimination of measles, rubella and congenital rubella syndrome in the society. Meanwhile, the inclusion of a MMR vaccine in children's immunization program was also another effective step towards achieving this goal. However, as mentioned before, this program did not address the screening of women and women of reproductive age for the presence or absence of anti-measles and anti-rubella antibodies.

Research Limitations

Due to the randomized sampling method used in this study, it was not possible to compare the subjects' immunity level in different parts of the city in terms of different socioeconomic levels. However, the major problem was to provide kits, which was postponed several times due to the increased price. In addition, due to the limited availability of kits, we had to use 180 kits instead of 200 kits, because there were 89 kits in each package. Moreover, there was an interval of several months between the sampling time and the analysis of the data obtained from the test. Meanwhile, due to long-term maintenance of serums, a number of samples were reported suspected, which were considered to be positive in accordance with the instructions of the used kit and the recommendations of the lab specialists and the previous information.

References

1. Karen J, Karel D. Nelson's Pediatric Medicine Basics. Translated by: Soboti B, Keshavarz P, Khalili K. First Edition. Institute of Computer Science Publications with the assistance of Artin Teb.2011:479-485.
2. Beremen R, Kligman R, Jenesis H. Infectious Diseases of Children-Nelson. Translate by: Banifazl M, Ramezani M, Afhami SH, Talebi M. First Edition.;Teimorzadeh publication.2000:325-314
3. Ralph D. Feigi, James D. Cherry, Gail Y. Demmler, Sheldon L. Kaplan. Text book of pediatric Infection disease. 5th edition. Philadelphia: United States Saunders;2008: 2134-2298.
4. Maldonado Y, Behrman RE, Kliegman RM, Jenson HB. Nelson text boock of pediatrics. 17th edition. Philadelphia: United States Saunders;2004: 34-1032.
5. Shirzd H, Shahabi GH, Zaman Zad B, Rafeian M. Determination of the efficacy of rubella vaccine among students of Shahrekord University of Medical Sciences in the national vaccination program in winter 2003 by ELISA method. Research Institute: Shahrekord University of medical sciences;2005:8-12
6. Namjo S, Asadi H. Evaluation of anti-measles antibody titers in 15- to 25-year old girls in Jahrom before and after vaccination. Professional PhD thesis, Jahrom: Jahrom university of medical sciences,2008:70- 75
7. Mahmodi M, Vahedi A. Comparison of immunity against rubella virus before and after public measles-rubella vaccination in Mashhad women. Medical Journal of Mashhad University of Medical Science.2007; 50(96): 177 – 186
8. Namjo S, Asadi H. Evaluation of anti-measles antibody titers in 15- to 25-year old girls in Jahrom before and after vaccination. Professional PhD thesis, Jahrom: Jahrom university of medical sciences,2008:54- 69
9. Majdzadeh R, Mordi A, Zeraoti H, Sepanlou SG, Zamani G, Zonobi V. Evaluation of the measles –rubella mass vaccination campaign in the population covered by Tehran University Medical Sciences. East Mediterr Health J. 2008 Jul-Aug; 14(4):690-810.
10. Pourabbas B, Ziyaeyan M, Alborzi A, Mardaneh J. Efficacy of measles and rubella vaccination one year after the nationwide campaign in Shiraz,Iran. Int J Infect Dis. 2008-Jan;12(1):9-43. Available from: URL: http: /www .ijidonline. com / article/S/20197/2(07)00080X/fulltext.
11. Afalatonian M, Soltaninezhad M, Mahmodi A, Khaloei A, Arabzadeh M. Measuring the level of measles immunity in 5-25 year-olds before and after measles and rubella vaccination in the cities of Baft and Kahnuj in 2003. Journal of Kerman University of Medical Sciences.2006;13(2): 34-36
12. Esteghamati A, Gouga MM, Zahraei SM, Dadrus MN, Uashidi A, Mahoney F. Pediatric Infect Dis J. 2007 Dec; 26(12):1094-1137. Available from: URL: http: /www.journals.1ww.com/pidj/pages/articleviewer. aspx?year=2007 and issue=00012 and type=full text.
13. Zahraei SM, Gooya MM, Azad TM, Soltan Shahi R, Saboori A, Maouri B, Alexander JP Jr. Successful Control and impending elimination of measles in the Islamic Republic of Iran. J infect Dis. 2011 Jul; 204 Supp/1:11-305
14. Vahdani P, Mardani M, Gachkar L, Alimardani M. Journal of Shahid Beheshti University of Medical Sciences. 2007;50(2):47-54
15. Rota M C, Bella A, GobuHi G, Giambi C, filia A, Guido M, De Donno A, Crorari P, Ciofi degli affi M L. Rubella seroprofile of the Italian population: an 8-year comparison. Epidemio Infect Journal. May 2007; 135 (4): 362-555.
16. Menegoola I A, Bercini M A, Schermann M T, Nuner Z, Fegatto T S, Siqueira M M, Flannery B. Out break of rubella after mass vaccination of children and adult women: challenges for rubella elimination. Rev Panama Salud Publica. 2011 Apr; vol 29(no 4): 1020-4989. Available from: URL: http: /www.dx.doi.org/10.1590/s/020-49892011000400005.
17. Peng Z Q, chon W S, He Q, Peng G W, Wu C G, Xu N, Zhao Z J, Shu J,Tan Q, Zheng H Z, Lin L F, Deng H H, Lin J y, Zhang Y H. Int J Infect Dis. 2012 Feb; 16(2): 99-103.
18. Hinman A R, Hersh B S, de Quadros C A. Rational use of rubella vaccine for prevention of Conge nital rubella syndrome in America. Rev Panam Publica.1998 Sep; 4(3): 56-60.
19. Malakmadze N. Zimmerman L A, Uzicanin A, Shteinke L, Caceres U M. Development of rubella vaccine strategy: contribution of rubella susceptibility study of women of childbearing age in Kyrgyzstan,2001. Clin Infect Dis; 2004 Jun; 381(12): 3-1780.
20. Ki M, Kim M H, Choi B Y, Shin Y J, Park T. Rubella antibody loss routes in Tourky children. 2002 Dec;192(3): 64-557.
21. Wang I J, Huang L M, Chen H H, Hwang K C, Chen C Y. Seroprevalence of rubella infection after national immunization program in Taiwan: Vaccination status and immigration impact. J Med Virol.2007 Jan; 79 (1): 97-103.
22. Yadar S, Guptaj S, Kumari S. Seroepidemiology of rubella in women of reproductive age. Indian J Pathol Microbio. 1995 Apr; 38 (2): 42-139.
23. Chan P K, I1 cy, Tam J S, Cheng A F. Rubella immune status among health care workers in the department of obstetrics and gynecology of a regional hospital in Hong Kong:The need for a vaccination policy. J Hosp Infect.

1999 Jul;42(3):42-239.
24. Pechax M, Walia T, Lattio H, Nelson A. More than 16 million children and adults rapidly vaccinated against measles following major out break in DPRK. N infec J. Apr 2007; 79 (3): 204-301.
25. Moricce A, Depetris A, Castillo-Solorzano C. Nationwide campaign for vaccination of adults against rubella and measles in Costa Rica. Div of International health. 2001 November; 50 (44): 976-979.
26. Upreti S R, Thapa K, Pradham Y V, Shakya G, Sapkota Y D, Anand A, Taylor T, Mach O, Reef S, Pattamakilok S, Liyanage J, O'Connor P, Sedai T, Bhandary S R, Patridge J, Schluter W. Developing rubella vaccination policy in Nepal-result from rubella surveillance and seroprevalence and congenital rubella syndrome studies. J Infect Dis. 2011 Jul; 204 Suppl 1: 8-433.
27. El Sayed N, Kardeel N, Barakat I, Moussa I, Alexander Jp Jr, Novri B, Reef S E. Progress toward measles and rubella elimination in Egypt. J Infect Dis.2011 Jul;204:24-318.
28. Pistol A, Hennessey K, Pitigoi D, Ion-Nedelcu N, Lupulescu E, Walls L, Bellini W, Strebel P. Progress toward measles elimination in Romania after a mass Vaccination campaign and implementation of enhanced measles surveillance. J Infect Dis 2003 May; 187:22-217.
29. Post D. What kind of vaccines do adults need?. J of Health gather. 2007 June; 94 (3): 21-25.
30. Gil A, Gonzalez A, Dal-Re R, Aquilar L, Rey Calero J. Seroprotection against hepatitis A, measles, rubella and parotitis in an urban School Population. Med Clin (Barc). 1991 May; 96 (18): 624-681.
31. Soad M J. A Serological survey of measles, mumps and rubella immunity among school age children in western Saudi Arabia. Saudi Mod J. 2006; 27(1):43-119.
32. Steronson J, Murdoch B, Riley A, Duncan B, Mc Whirter M, Christie P. Implementation and evaluation of a measles rubella vaccination campaign in campus university in the UK following on out break of rubella. Epidemiol Infect.1998 Aug;121(1):64-157.
33. Monavari H, Kargar Kheirabadi A, Shamsi Shahrabadi M, Keyvani H, Asghaie M, Azizi M. Serological Status of Rubella Virus in Cord Blood Samples of Newborn in Hospitals Affiliated to Tehran University of Medical Sciences. Sci J Hamadan Univ Med Sci . 2012; 19 (1) :16-21
34. Hamkar R, Jalilvand S, Mokhtori-Azad T, Jelyani KN, Nategh R. Evaluation of immunity against rubella in Iranian after mass campaign for measles-rubella Vaccination on December 2003. Am J Infect Control. 2006 Nov; 34(9): 492-588.
35. Saffar MJ, Maghsoudlo AR, Ajami A, Khalilian AR, Qaheri A. The role of pre-gravidity measles–rubella immunization of mothers on the passive immunity and immunizing effect of MMR vaccine in their offspring. 2006. Iran J Pediatr; 16(4):427-432

Review of percutaneous nephrolithotomy in children below 12 years old in Jahrom hospital, during 2010-2014

Ali Reza Yousefi
Reza Inaloo

Department of Urology, Jahrom University of Medical Sciences, Jahrom, Iran.

Corresponding author:
Reza Inaloo,
Department of Urology,
Jahrom University of medical sciences,
Jahrom, Iran Tel: +989173130056
Email: rezainaloo@yahoo.com

Abstract

Introduction: Although, renal stone isn't frequent in children, but Percutaneous Nephrolithotomy can be used in children if indicated. Percutaneous Nephrolithotomy in children is different from adults, thus we review some children who underwent Percutaneous Nephrolithotomy and review them for complications and stone free rate.

Material and Methods: This study was done using descriptive cross-sectional method on 43 cases under 12 years old who had renal stone and were treated by Percutaneous Nephrolithotomy in Jahrom Peymanieh hospital. All cases had medical records. Having a renal stone larger than 2cm, multiple stone, no response to extra corporeal shock wave lithotripsy were a criteria for patients below 12 years old to be involved in the study and to be cured by Percutaneous Nephrolithotomy operation. Patient's data was collected with a research made questionnaire.Data was investigated in a level of descriptive statistics via statistics software (SPSS, Edition14) in which the average and deviation of criteria and qualitative variables from frequency percentage and frequency was used in quantitative variables of descriptive reports.

Results: From 43 patients 22 patients (51.1%) were male and 21 patients (48.8%) were female. The patients were aged from 7 months to 11 years old. The stone size ranged from 1cm to 2.5 cm. The number of stones in 42 patients had been recorded. Among these 45.2 percent of them had one stone and 33.3 percent had two. The stone free rate was 85%. The average of hospital stay was 31.11±12.56 hours. The longest time was 24 and 48 hour and that respectively included 33.3% and 26.2%. The complications were: (0%), Excessive bleeding which needed transfusion (0%), post op convulsion (9.5%), and organ injury (0%).

Discussion: Percutaneous stone therapy-related hemorrhage requires a blood transfusion (11%-14%), and an increased risk of kidney loss. In this study, the stones were removed completely with minimal injury to renal tissue. PCNL has a better stone clearance rate and is cost-effective. PCNL has a clearance rate of 100% when it was combined with ESWL.

Key words: Percutaneous Nephrolithotomy, Renal stone, Pediatrics

Please cite this article as: Ali Reza Yousefi , Reza Inaloo . Review of percutaneous nephrolithotomy in children below 12 years old in Jahrom hospital, during 2010-2014. *World Family Medicine.* 2017; 15(9):135-141. DOI: 10.5742/MEWFM.2017.93113

Introduction

Nephrolithiasis is a common clinical disorder affecting up to 5% of the general population in the USA [1]. The prevalence of renal stone disease has been rising in both sexes, being estimated that about 5% of American women and 12% of men will develop a kidney stone at some time in their life [2]. Nevertheless, in certain areas of the world, as in the Middle East, the lifetime risk appears to be even higher [3]. There has been heightened awareness of renal stone disease in children as well [4]. Recurrence rates of 50% after 10 years and 75% after 20 years have been reported [5‹6]. Clinical manifestations are characterized by lumbar pain of sudden onset [the location of pain depends on the location of the stone in the urinary tract] which may be accompanied by nausea and vomiting, and gross or microscopic hematuria Diagnosis of renal stone in the acute setting is beyond the scope of the present update but in brief, is represented by urinalysis and imaging. Urinalysis often reveals hematuria but the latter is absent in approximately 9% of cases [3]. Crystal Luria is occasional and the presence of leucocyturia may suggest associated urinary tract infection. Unenhanced helical computed tomography [CT] scan, the most sensitive and specific radiographic test, is becoming the diagnostic procedure of choice to confirm the presence of kidney and especially of ureteral stones [4].Renal colic must be differentiated from musculoskeletal pain, herpes zoster, pyelonephritis, appendicitis, diverticulitis, acute cholecystitis, gynecologic disease, ureteral stricture of obstruction due to blood clot, and polycystic kidney disease [5]. Stone formation usually results from an imbalance between factors that promote urinary crystallization, and those that inhibit crystal formation and growth [5]. Urinary tract stone disease is likely caused by 2 basic phenomena. The first phenomenon is supersaturating of the urine by stone forming constituents, including calcium, oxalate, and uric acid. Crystals or foreign bodies can act as nidi, upon which ions from the supersaturated urine form microscopic crystalline structures. The overwhelming majority of renal calculi contain calcium [6]. Other, less frequent stone types include cysteine, ammonium acid urate, xanthine, dihydroxyadenine, and various rare stones related to precipitation of medications in the urinary tract. Stones of the upper urinary tract are more common in the United Stated than in the rest of the world. Roughly 2 million patients present on an outpatient basis with stone disease each year in the United States, which is a 40% increase from 1994[12]. The incidence of urinary tract stone disease in developed countries is similar to that in the United States. Stone disease is rare in only a few areas, such as Greenland and the coastal areas of Japan. In developing countries, bladder calculi are more common than upper urinary tract calculi; the opposite is true in developed countries. These differences are believed to be diet-related [13]. The morbidity of urinary tract calculi is primarily due to obstruction with its associated pain, although non obstructing calculi can still produce considerable discomfort. Stone- induced hematuria is frightening to the patient but is rarely dangerous by itself. The most morbid and potentially dangerous aspect of stone disease is the combination of obstruction and upper urinary tract infection. Stones are more common in hot and dry areas and diet heredity also appears to be a factor. Stone disease is much more frequent in whites. In general, urolithiasis is more common in males. Stone due to discrete metabolic/hormonal defects, cystinuria, hyperparathyroidism and stone disease in children are equally prevalent between the sexes. Stones due to infection [struite calculi] are more common in women than in men. Most urinary calculi develop in patients aged 20-49 years. Patients in whom multiple recurrent stone forms usually develop their first stones while in their second or third decade of life. An initial stone attack after age 50 years is relatively uncommon [14]. Patients with urinary calculi may report pain, infection, or hematuria. Small non obstructing stones in the kidneys only occasionally cause symptoms. The passage of stones into the ureter with subsequent acute obstruction, proximal urinary tract dilation, and spasm is associated with classic renal colic. Renal colic is characterized by undulating cramps and severe pain and is often associated with nausea and vomiting. As the stone travels through the ureter, the pain moves from the flank to the upper abdomen, then to the lower abdomen, down to the groin, and eventually to the scrotal or labial areas. Associated bladder irritative symptoms are common when the stone is located in the distal or intramural ureter. Patients with large renal stones known as stag horn calculi are often relatively asymptomatic. Asymptomatic bilateral obstruction, which is uncommon, manifests as symptoms of renal failure. Approximately 80% of kidney stones contain calcium, and the majority of them are composed primarily of calcium oxalate. Although most calcium oxalate stones contain some calcium phosphate, only 5% have hydroxyapatite of brushite as their main constituent and 10% contain some uric acid [15]. Evaluation of a renal stone patient starts with a detailed history focusing on occupation, dietary and lifestyle habits, previous use of medications, family predisposition, and history of recurrent urinary tract infection and underlying disorders that predisposes to nephrolithiasis [16].

Material and Methods

This study was done using descriptive-cross-sectional method on 43 patients below age of 12, who had been suffering from renal stone and were treated by use of PCNL operation (percutaneous Nephrolithomy procedures) at Jahrom Paymanieh hospital. All the patients had medical records. The study was conducted using a form which had been provided and completed by the surgeon. The patients who under went PCNL had renal stone larger than >2cm or multiple stones or no response to ESWL. The criteria for exiting from the study were age above 12 years old and renal stone smaller than 2cm. (The information was collected by the use of a form which had been provided and completed by the physician).The mentioned information in the form included: gender (sex), age, place of stone, kind of stone, number of stones, operation’s side effects, the number of remained stones, number of hemoglobin after operation and time of hospitalization. (Admission in

hospital). This information was included in the questionnaire by observing the ethics and investigation committee's instructions of Iran's Ministry of Health. Names and details of participants were confident and each patient was given a numerical code. Finally the obtained information was investigated in a level of descriptive statistics via statistics software (SPSS, Edition14) in which the average and deviation of criteria and qualitative variables from frequency percentage and frequency was used in quantitative variables of descriptive reports.

Research Method:
At first, after general anesthesia, cystoscopy was done by (stortz 10F) in supine position. Then a urethral catheter (5F) was sent within involved kidney and fixed Foley catheter and then in prone position, nephrostomy needle was sent to inferior and posterior calyx by fluoroscopy.
After that, guidewire is sent into the kidney. Thus nephrostomy tract is dilated till 24F, and then Amplatz (24F) is sent into the kidney, and then nephroscopy was done (wolf 17F).Next lithotripsy was done by Swiss pneumatic lithoclast and stone fragments taken out from the kidney after checking for residual stones (by fluoroscopy), Nephrostomy (16F) was inserted and fixed and the operation was completed. If the operation was prolonged for prevention of hyponatremia, at the end Lasix (0.5 mg/kg) was prescribed. Because of using normal saline during the operation for irrigation, dilutional hyponatremia is produced, thus we check Na & K after the operation. Regarding the determined special objects, the results of the study are the following:

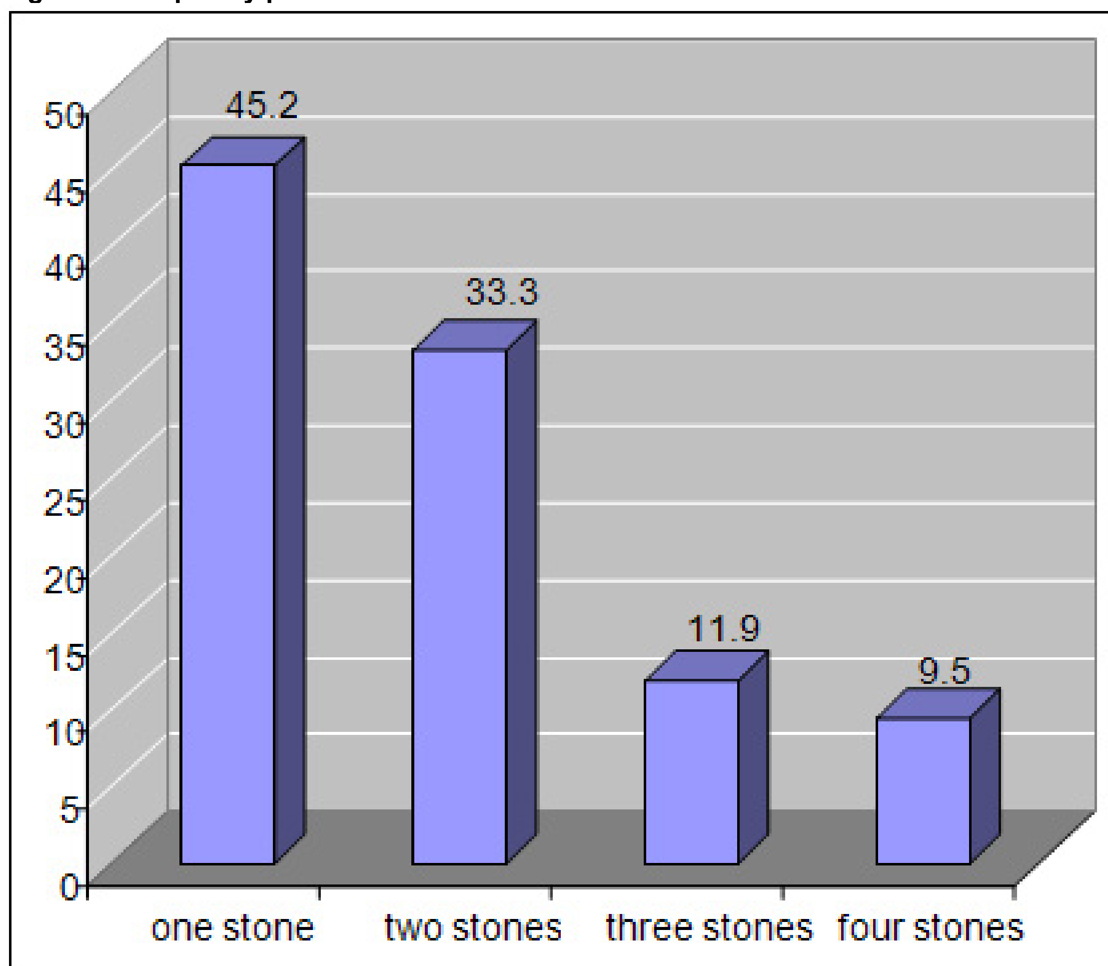
1. Number of stones: determining the number of stones in the kidney after PNCL operation in the children below 12 years old at Jahrom Paymanieh hospital's urology clinic, during 2010-2014.

Though the study was been done on 43 patients, the number of existent stones in 42 patients had been recorded. Among these people 44.2 percent of them had one stone and 33.6 percent had two. stones and 11.9 percent had three and 9.5 percent had 4. (Table 1, Figure 1)

Table 1: Frequency percent of number of stones

Number of stones	Frequency	Frequency percentage
1	19	45.2
2	14	33.3
3	5	11.9
4	4	9.5

Figure 1: Frequency percent of number of stones



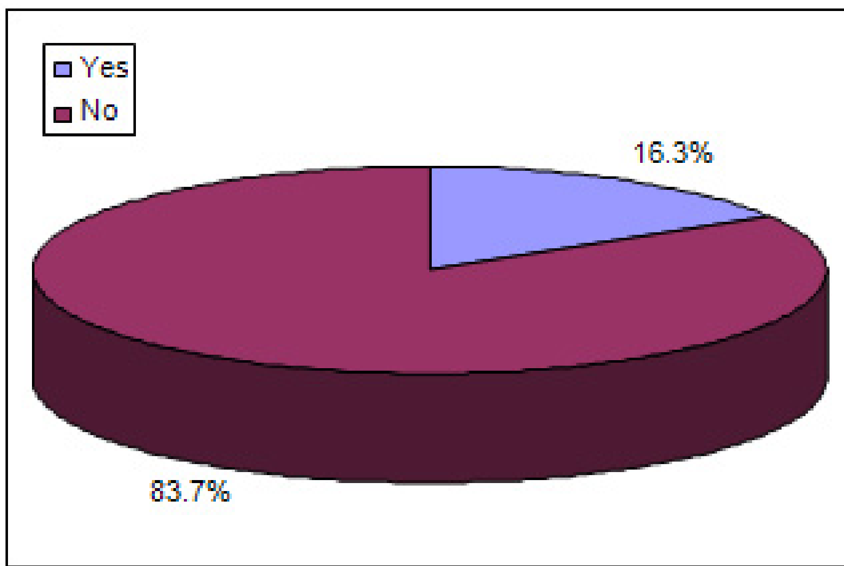
2. Residual stones: To determine the amount of remained stone after operation that was done in Jahrom Paymanieh hospital's urology clinic, during 2010-2014.

The stones were completely taken out from the kidney of 43 patients (85 percent of the population) and their operation was done successfully.

Table 2: Remained stones after operation

Remained stone after operation \ Distribution	Absolute frequency	Relative frequency
Yes	14	33.3
No	29	66.7
Total	43	100

Figure 2: Relative Frequency of Residual stones

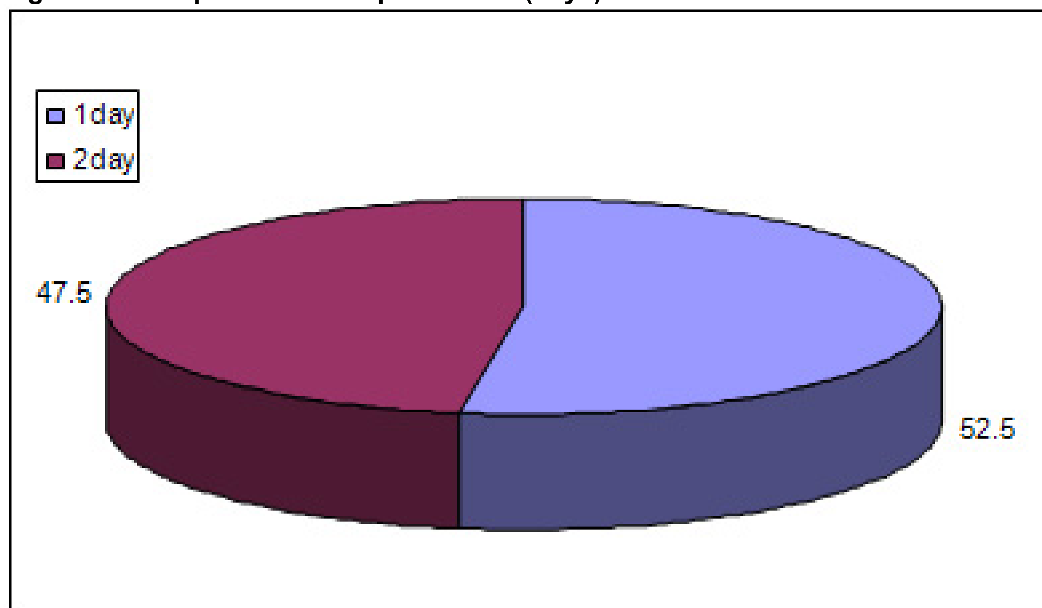


3. Hospital stay: determining the average time of hospitalization for children below 12 years old who were suffering from renal stone after PNCL operation at Jahrom Paymanieh hospital's urology clinic, during 2010-2014. The average time of hospitalization was 31.11±12.59 hours. The longest time was 24 and 48 hours that respectively included 33.3 and 26.2 percent.

Table 3: Hospital stay

Relative frequency	Absolute frequency	Hospitalization hours
1	1	2.4
12	1	2.4
14	1	2.4
15	1	2.4
16	1	2.4
18	1	2.4
20	1	2.4
23	1	2.4
24	14	33.3
36	9	21.4
48	11	26.2
Total:	43	100

Figure 3: Valid percent of hospitalization (days)



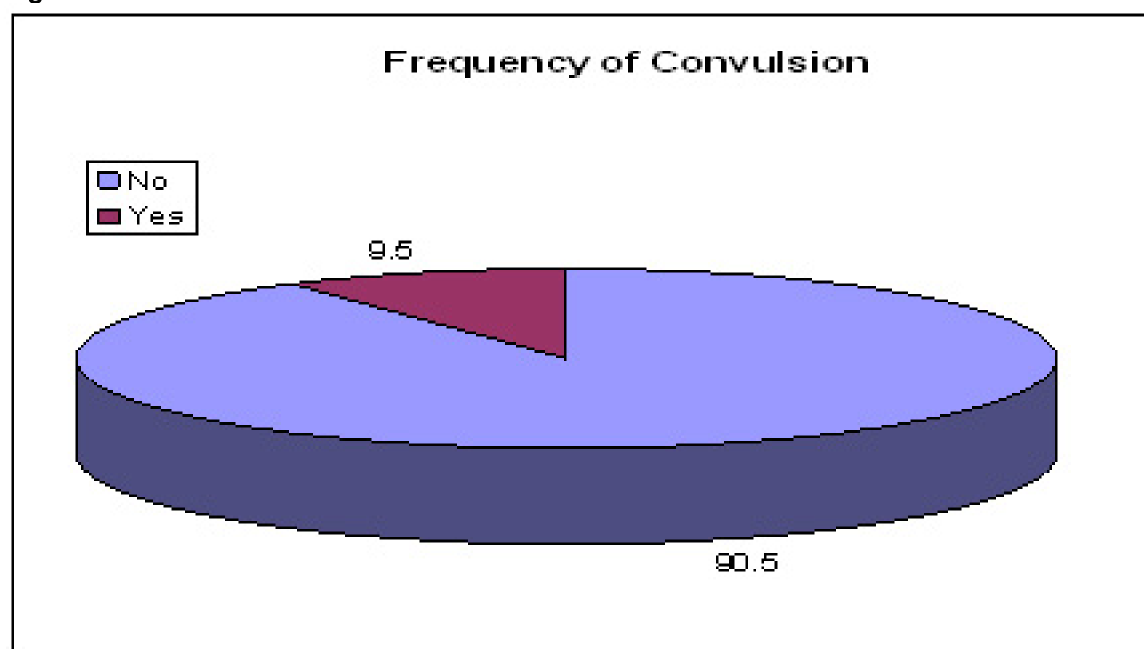
4. Side effects: To determine the PNCL operation's side effects in children below 12 years old at Jahrom Paymanieh hospital's urology clinic, during 2010-2014.

The PNCL operation's side effects were recorded for 42 of patients, infour patients this involved convulsion and 38 patients had no problems.

Table 4:

Distribution / Operation's stone effects	Absolute frequency	Relative frequency
No problem	38	90.5
Convulsion	4	9.5
Total	42	100

Figure 4



Discussion

Pediatric urolithiasis poses management challenges because of small kidney size, less knowledge about the long-term effects of newer modalities of treatment on kidneys and etiology of the stone. Shock wave lithotripsy is the treatment of choice for most small calculi, while PCNL or open surgery is reserved for larger stones or stones with anatomic abnormalities.Aim of treatment is complete clearance and treatment of the underlying cause. The first series on pediatric PCNL was published by Woodside et al claiming a100% stone free rate with no significant complications. They used standard dilatation technique. In series reported by Boddy et al" 90% stone free rate was achieved and after sequential dilatation 24 to 26 F sheath was used with no major complications. Segura has suggested the use of adult instruments in children. Desai et al (17),suggests limited tract dilatation < 21 F and use of pediatric instruments. The drawback with pediatric instruments is small instrument port, which necessitates use of small probes and forceps. This results in prolongation of operation time. Blood loss is a major complication of pediatric PCNL, which is directly related to tract size dilatation. Reduced incidence of major intra renal vessel injury using a pediatric nephroscope has been reported by Zanetti et al(6). It is believed that adult instruments may cause more bleeding and amplatz may be too big for the pediatric kidneys. We have been doing PCNL on pediatric patients since 1988 using adult instruments (Stortz) without any significant problem. Since 1994 this problem was taken care of in our series by using Wolf adult nephroscope inner sheath (20 F), which allowed placement of smaller amplatz sheath(2). More effective fragmentation of stone was achieved using adult size ultrasonic and pneumatic energy sources. The advantages of this technique are better visibility, quick, effective stone fragmentation and retrieval using adult size energy probes and stone graspers. One can avoid buying a separate pediatric set of instruments which may result in considerable cost saving for a department in a developing country. Since the advent of PCNL in 1976, the techniques have been greatly improved. Many medical centers have used adult-sized nephroscopes in children(11). But percutaneous stone therapy-related hemorrhage requires a blood transfusion (11%-14%), and an increased risk of kidney loss. Therefore, conventional percutaneous nephrolithotomy is not justified as the primary form of urinary stone treatment for smaller lower pole concernments, although it is recommended as an effective method in children. Percutaneous nephrolithotomy using ureter scope and pneumatic intra corporeal lithotripsy in children was introduced to our hospital in 2002(18). In this study, the stones were removed completely with minimal injury to renal tissue, while retrieving large fragments quickly. The duration of the procedure was 75 minutes. The level of hemoglobin decreased by 14 g/L on average. None of the patients received blood transfusion. To date, there has been only one recurrence of stone and no other complications have occurred. Traditional percutaneous nephrolithotomy uses a 30-Fr nephrostomy sheath for renal access. In order to reduce blood loss and absorption of irrigant, stone extraction may be performed when the established access tracts become mature. The recent development of smaller sheaths suggests that percutaneous nephrostomy tract formation can be performed with minimal injury to the involved renal parenchyma, thereby reducing the procedure-related morbidity. We used ureter scope and pneumatic intra corporeal lithotripsy in pediatric patients. The operating tract was small (12F-18F), therefore only 2 operations were discontinued because of greater blood loss in the process of dilatation, but the second operations were successful. During PCNL, the common mistake especially for stag horn in children is overdoing through a single tract, even when another tract is needed. Torqueing a rigid ureter scope against the pelvi-caliceal system to get to an inaccessible calix is the most important cause of bleeding during PCNL and is largely responsible for the increased rates of transfusion and extravasation. We believe that judiciously making multiple tracts does not significantly increase intraoperative complications and transfusion. Using multiple tracts when necessary avoids the excessive use of torque to gain entry into adjacent calices, which may cause infundibula tear and bleeding. In the present series, multiple tracts were used in 8 kidneys. As a result, better and faster clearance of large-volume stag horn calculi was achieved without significant increase in morbidity. PCNL has a better stone clearance rate and is cost-effective. It is characterized by convalescence compared with other modalities such as ESWL and open surgeries for removal of the stones. In our series, PCNL achieved a complete-clearance rate of 91%, and an overall clearance rate of 100% when it was combined with ESWL. In children with large renal stones (>3 cm), stag horn calculi (complete and partial), complex or multiple calculi, renal insufficiency, recurrent stones, and stones refractory to ESWL, PCNL is considered the treatment of choice. The use of a less traumatic 18-Fr access sheath is effective in children with large renal stones. A prerequisite for stone clearance is the establishment of optimal access to the collecting system of the kidney. Staging the procedure in selecting patients is very important to reduce the caliber of the percutaneous tract in children with non-dilated collecting system (19).

Conclusion

We can do PCNL in children if necessary. Doing and complications of PCNL in children is the same as in adults. But we assay convulsion after PCNL and do preventive methods before PCNL.

References

1. Jou YC, Cheng MC, Sheen JH, Lin CT, Chen PC. Cauterization of access tract for nephrostomy tube-free percutaneous nephrolithotomy. J Endourol. 2004 Aug;18(6):547-9.
2. Stamatelou KK, Francis ME, Jones CA, Nyberg LM, Urhan GC. Time trends in reported prevalence of kidney stones in the United States: 1976-1994. Kidney Int 2003;63(5):1817-23.
3. Moe OW. Kidney stones: Pathophysiology and medical management. Lancet 2006;367:333-44.
4. Pak CYC, Resnick MI, Preminger GM. Ethnic and geographic
diversity of stone disease. Urology 1997;50(4):504-7.
5. Heilberg IP, Boim MA, Schor N. Biochemical differences between stone formers and normal subjects. In: Segura J, Conort P, Khoury S, Pak C, Preminger GM, Tolley D (eds). Stone Disease (1st International Consultation on Stone Disease). Editions 21. France: Health Publications, 2003; pp. 61-4.
6. Trinchieri A, Ostini F, Nespoli R, Rovera F, Montanari E,
Zanetti G. A prospective study of recurrence rate and
risk factors for recurrence after a first renal stone. J Urol 1999;162(l):27-30.
7. Sutherland JW, Parks JH, Coe FL. Recurrence after a single renal stone in a community practice. Miner Electrolyte Metabl985;ll(4):267-9.
8. Li J, Kennedy D, Levine M, Kumar A, Mullen J. Absent hematuria and expensive computerized tomography:case characteristics of emergency urolithiasis. J Urol 2001; 165(3):782-4.
9. Abramson S, Walders N, Applegate KE, Gilkeson RC, Robbin MR. Impact in the emergency department of unenhanced CT on diagnostic confidence and herapeutic efficacy in patients with suspected renal colic: a prospective survey. Am J Roentgenol 2000;175:1689-95.
10. Shokeir AA, Abdulmaaboud M. Prospective comparison of unenhanced helical computerized tomography and Doppler ultrasonography for the diagnosis of renal colic. J Urol 2001;165:1082-4.
11. Catalano O, Nunziata A, Altei F, Siani A. Suspected ureteral colic: primary helical CT versus selective helical CT after unenhanced radiography and sonography. Am J Roentgenol 2002;178:379-86.
12. Coe FL, Evan A, Worcester E. Kidney stone disease. J Clin (jfnvest 2005;115:2598-608.
13. Pearle MS, Calhoun EA, Curhan GC; Urologic diseases in America project: urolithiasis. J Urol. Mar 2005;173(3):848-57.
14. Webber R, Tolley D, Lingeman J. Kidney stones. Clin Evid. Dec 2005;(14): 1048-56.
15. Cooper JT, Stack GM, Cooper TP. Intensive medical management of ureteral calculi. Urology. Oct 1 2000;56(4):575-8.
16. Parks JH, Coward M, Coe FL. Correspondence between stone composition and urine supersaturation in nephrolithiasis. Kidney Int 1997;51(3):894-900.
17. Desai MR, Kukreja RA, Patel SH, Bapat SD. Percutaneous nephrolithotomy for complex pediatric renal calculus disease. J Endourol 2004;18:23-7.
18. Schuster TG, Russel KY, Bloom DA, Koo HP, Faerber GJ. Ureteroscopy for the treatment of urolithiasis in children. J UROL 2002;167:1813-6.
19. http://www.indianjurol.com/printariticle.asp?issn=0970-1591;year=2001,volume=18;i…. 2007/04/19.

Physical and mental health in Islam

Bahador Mehraki
Abdollah Gholami

Assistant Professor of Islamic Education Department School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

Corresponding author:
Dr. Bahador Mehraki
Assistant Professor of Islamic Education Department School of Medicine,
Shiraz University of Medical Sciences,
Shiraz, Iran.
Tel:09173039902
Email: Dr.b.mehraki@gmail.com

Abstract

Physical and mental health is one of the most important and fundamental issues of life in every society. The teachings of Islam consider physical and mental health as one of the most important features of Muslims, and as the promoter of the development of good traits and peace and comfort of mankind. Scholars and practitioners of empirical sciences have also made great efforts throughout history to maintain and improve human health. The basic question is: What is the effect of Islamic teachings on Muslims' life? To what extent do these teachings correspond to the achievements of empirical thinkers, especially doctors and psychologists? Accordingly, the present paper tries to examine the impact of religious teachings on the behavior and actions of Muslims and their degree of consistency with the views of researchers in the field of empirical sciences. The findings of this study highlight the role of faith, marriage, and observance of individual and social health principles in the physical and mental balance and stability of humans.

Key words: health, peace, physical illnesses, mental disorders, religious doctrines

Please cite this article as: Bahador Mehraki, Abdollah Gholami . Physical and mental health in Islam. *World Family Medicine.* 2017; 15(9):142-148
DOI: 10.5742/MEWFM.2017.93114

Introduction

One of the most important discussions in Islam, like other divine religions, is human physical and mental health. According to the credible Islamic works and references, human physical and mental health has received serious attention in the words the Prophet of Islam (PBUH) and the Qur'anic verses, and the words of the infallible Imams (PBUH).

On the other hand, the issue of health in the history of mankind has attracted the attention of the scholars of empirical sciences, including both traditional medicine and modern medicine, in a way conceivable for human societies. For instance, in traditional medicine, scholars such as Avicenna, Zakaria Razi, and Seyed Esmael Jorjani were the first Iranian physicians at the Jundishapur University of Ahvaz who were involved in promoting human health even though they had access to limited facilities at that time.

However, since 1978, as many people in the world had no access to new medical services and given the efficacy of many techniques of traditional medicine, the World Health Organization (WHO) has been focusing on the development and promotion of traditional medicine (Nasseri, 2005: 44-45).

In modern medicine, practitioners in the field of empirical sciences have been able to take very effective steps to improve the health of human communities using the latest technology and the latest methods of surgical diagnosis and psychiatric procedures. But at the same time, it must be acknowledged that modern medicine has not yet been able to provide a complete and reliable answer to the demands and needs of mankind, so that today we are witnessing the increasing tendency of patients with mental and physical illnesses to use traditional medicine.

The question now is: To what extent are Muslims' religious teachings on health consistent with the views of physicians and psychologists? In addition to that, to what extent are the religious teachings effective in improving Muslims' health?,

Definition of health

The term health is defined in the WHO Statute as follows:

“The concept of health is not just the absence of disease and maim, but it means the complete physical, psychological, and social comfort” (last, 1989, 89-89).

Reflecting on the above definition, it can be said that although this definition considers the positive and negative aspects of health and its physical, psychological, and social dimensions, it does not make it explicit whether people with a mild ailment or those who live in a polluted and toxic environment are considered as healthy or sick people.
Now that we are familiar with the concept of health, we address two types of health, i.e. physical and mental health:

1. Physical health
The discussion of physical health and factors affecting it as an organic phenomenon and one of the important components of individual and social human identification has been one of the most important discussions of human societies in the past and present, so that experts consider physical health as the greatest divine blessing and the first prerequisite for human happiness.

Scientists have found that having a healthy body is not possible without complying with health rules., as people who do not pay much attention to health issues are less tolerant of diseases. Besides, scientists believe that having proper nutrition, doing physical exercises and activities, and the non-use of opiates and alcohol are among the most important factors affecting physical health.

Not having physical defects and having a healthy body is the aspiration of every human being. As a healthy person without any physical defect by taking care of this divine blessing can feel both happiness and make others feel happy.

Of course, in the twentieth century, the advancement of biological and medical sciences and the discovery of antibiotics and vaccination led to the domination of the mind-body dichotomy (1596-1650) of René Cardar, the famous French scientist, on medical science. According to this dichotomy, the human body is like a machine and its actions are merely mechanical and its mind is considered to be a spiritual thing that is different from body (Tabaraei, 2010: 9).

2. Mental health
It seems that is the issue of physical health will be incomplete and insufficient without taking into account other dimensions of health because usually a person can be called perfectly healthy who is both physically and mentally in a good state. Obviously, someone who does not enjoy mental health is not considered a perfectly healthy person, and a healthy community is the one whose members will endeavor to promote their mental and physical health and use this health to enhance the standards of their personal and social life. Physical and mental health, in addition to creating a sense of happiness and hope, can make a person friendly, sympathetic and tolerant in dealing with his fellowmen.

Of course, the environmental factors (cultural, economic, social, etc.), along with individual factors (genetics and physiology, beliefs, positive emotions, etc.) are effective in human mental health. But we do not discuss it here in large part with the volume of the article.

Medical practitioners and psychologists have provided various definitions for indicators of mental health such as the absence of mental illness, having emotional balance, social harmony, feeling of comfort and peace, personal integrity, and understanding oneself and the environment (Ibid., 10-11). The World Health Organization (WHO) has also defined mental health as the ability for having coherent and balanced relationships with others, modifying the individual and social environment, solving the potential problems, and fair personal desires (Ibid., 12).

Pondering the above definitions, one can say that the owners of these definitions emphasize chemical, microbial, and genetic aspects that account for material and physical aspects of mental health and do not pay much attention to the impact of other factors such as economic and political factors on mental health. This is due to the ideas proposed by Descartes, the French theorist. As suggested by Schultz, according to Descartes, human psyche interacts with only a part of the body that is pineal gland in the brain pectoral, and this interaction is based on mechanical principles (Devon B. Schultz, and Sidney Ellen Schultz, 1999, 58).

Health from the Islamic perspective

Now that the concept of physical and mental health has become somewhat clear, we need to get acquainted with the views of Islam in this regard.

1. Islam and physical health
The spiritual and social development of a human depends on his physical health and a physically ill person is less effective in advancing spiritual and general goals. The Islamic religion like other divine religions is not inattentive to people’s physical health and has frequently stressed the importance of the health of the body. For example, Islam considers sport as a necessary activity for the health and happiness of Muslims and emphasizes the strengthening of the body through sports in particular sports such as swimming and shooting-off. In addition, it is believed that spirituality and religiosity play a vital role in creating good traits in the human character and do not allow loneliness, absurdity, and depression to affect the human personality. A religious person, with the support of spirituality, contributes to the prosperity of a healthy and dynamic society.

In its health guidelines, Islam invites Muslims to improve their physical health. Virtue and piety have a significant effect on physical health and, consequently, on mental health. According to Imam Ali (AS): “Piety. . . heals the diseases of your body” (Imam Ali, 1380,658).

Islam has a special focus on the physical health of individuals and even prohibits religious practices when they are harmful for the body (Quran, Baghera: 184).

In excerpts of their valuable remarks, the Holy Prophet (PBUH) and the infallible Imams (AS) also emphasize the importance of maintaining physical health. A hadith about the divine rights and family rights quoted from the Prophet of Islam (PBUH) says: “Your body has a right to you” (Majlesi, 1998, 128).

In addition, in jurisprudential rulings that have been derived from religious sources, the Lazarar (No harm) law denounces actions that bring harm to oneself and others. Therefore, it can be said that the religion of Islam, which does not allow going to extremes and recommends balance in affairs, expects Muslims to value their physical health.

2. Islam and mental health
Mental health and comfort of the people in every society is one of the most important and vital issues of their lives. As was stated in the discussion of physical health, the concepts of physical and mental health are closely interconnected and based on the popularity among the Iranian athletes believed that a healthy mind is found in the healthy body.

The rulings of Islam with their worldly-afterlife approach that is based on balance and moderation play a fundamental role in promoting mental health among the faithful. In the religious culture, the world is considered as a farmland for the hereafter (Majlesi, 1998, 225).

Besides, a devout person, inspired by the sense of hope and life in the hereafter, does not feel lonely, depressed, and absurd, and interact with other people based on patience and affection. In the Holy Quran, “recommending others to observe rights” and “recommending others to be patient and tolerant” are considered as basic principles that need to be observed by all Muslims (Quran, Asr: 4).
According to the foregoing Islamic teachings, believers are considered as brothers for each other and do not suffer from loneliness, lethargy, and depression and their presence in the community results in the happiness and dynamism of the society. Monotheism, belief in the Hereafter and eternal life create self-esteem and a positive view of life and the spirit of good interactions with others, thereby creating a healthy and balanced society. Concerning affection and constructive engagement with others, the Holy Prophet (PBUH) says: People of my nation will always live in peace and welfare as long as they love each other (Tusi,1993, 647).

Research shows that prayer and worship can be one of the main ways of preventing and managing mental-psychological problems suffered by mankind, and religious people suffer from less mental, emotional, and moral disorders and feel more relaxed and happy than non-religious people. In addition, they commit less crimes, offences, and suicides.

A. Mental health in Islam
Mental health is a science for better living and social welfare that embraces all aspects of human life from embryonic life to death. Mental health helps individuals to adapt to their environment by using the right psychological and emotional techniques and choose better solutions to their problems. Therefore, mental health is defined as the provision of the context for individual and social development and growth, the prevention of mental disorders, and the provision of proper treatment and rehabilitation (Jalali, Rostaminezhad, 2011, 43). In a prophetic hadith, health and security are mentioned as two blessings that human beings will not appreciate unless they lose them (Ibn Babvieh, 1983, 34).

The study of the teachings of Islam like other divine religions shows that the concept of prevention is one of the important principles of religion in creating mental and physical health and the health of individuals depends on the prevention of the incidence of physical and mental illness. As the observance of the rules of individual and social health leads to physical health, the observance of mental health principles helps individuals to preserve their mental health and prevents the occurrence of mental disorders.

B. Ways to provide mental health from the viewpoint of Islam
Some psychologists believe that religiosity and having a strong belief in religion are important elements of mental health, and there is a long history of treating mental patients through heart faith among religious followers. Psychologists consider peace of mind and a sense of satisfaction in life as one of the essential characteristics of healthy people, and since believers have enough mental peace and confidence because of their reliance on God, they are less caught up with emotions and emotional anxieties. Here, we discuss a few cases that, according to Islam, lead to mental health and reduce anxiety and distress:

1. Islam, faith, and worship
According to the opinions of the Islamic leaders, Islam is a religion that grants peace of mind and mental health to believers. Accordingly, Imam Ali (AS) said: “Thanks God for founding the religion of Islam. He founded it to provide security for those who believe in Islam and those who converted to Islam (Imam Ali, 1380, 308). Therefore, those who believe in a unique and powerful God enjoy mental and psychological peace, and they feel strength and faith, while others who do not have strong faith will endure loss in their entire life. Divine religions have emphatically tried to establish the relationship between the believers and God through divine worship and remembrance. In Islam, the constant recitation of the Quran and saying the prayers of the infallibles (AS) have been recommended as the best way to communicate with the Creator. Having a permanent relationship with God enhances the spirit of trust, peace of mind, and sense of empowerment, and creates purposefulness and order in the human character that plays a direct role in ensuring people’s mental health.

2. Marriage and family
Family as the first social group is the manifestation of human emotions and serves as a basis for loyalty and a sense of cooperation and support. Creating a warm and intimate environment through family formation can play an essential role in creating mental health and peace. The Islamic religion, like other divine religions, has a special interest in the institution of family and considers it as decent and recommended action, and in some cases emphatically recommended and even obligatory (Meshkini, 1987, 10) As the Prophet of Islam says: Anyone who wants to follow my own nature (natural religion), he should follow my traditions, and one of my traditions is marriage (ibid., 21). He also considers marriage as the most venerable social institution that God has endorsed. He says: "In Islam, there is no institution that is more venerable and dear to God than marriage (Majlesi, 1998, 222). And about the importance of the prayer of the married person, he says: two Rak'ats of a married person's prayer is better and more valuable than seventy-one Rak'ats of a single person's prayer (Hor Ameli, 1977, 7), and also adds: "A person who is seeking to support his family from the divine grace, he will be rewarded more than a person who does jihad for the sake of Allah (Ibid., 7). The Prophet (PBUH) also says: "Choose a wife for a single person, so that God will make his mood decent and expand his sustenance/daily portion and his magnanimity (Meshkini, 1987, 14).

In the Holy Quran, marriage and the formation of the family are considered as divine signs, and choosing a spouse has been introduced as a source of mental peace and well-being and the a source of friendship and mercy (Quran, Rome: 21). Marriage, in addition to creating peace in the human body and mind, keeps him away from the illnesses caused by celibacy. A single person has less sense of responsibility and the formation of the family creates the responsibility and purpose for individuals and makes them more active in social and public affairs. Sometimes, being single results in doing things and actions that are not rationally justified and endangers a person's mental health.

Islamic texts and health

Islamic texts, such as the Quran, the words of the Prophet of Islam (PBUH) and the infallible Imams (AS) are full of health-related points, some of which are mentioned here as examples:

1. Health-centered points in the Quran
The Holy Quran, as a guidebook of life directly or indirectly addresses the issue of health in many instances, some of which referred to as follows:

"He is Allah, besides whom none is to be worshipped, the Sovereign, the most Holy, the Bestower of peace" (Quran, Hashr: 23). "And Allah invites to the Home of Peace and guides whom He wills to a straight path" (Quran , Yunus: 25).

"O mankind, there has to come to you instruction from your Lord and healing for what is in the breasts and guidance and mercy for the believers" (Quran, Yunus: 57).

In the first verse, God is described as the giver of health, which indicates the importance of health for God. In the second verse, Muslims are invited to the home of peace. The beautiful interpretation of "the home of peace" is the same as guiding humans to mental health and well-being. In the third verse, the Qur'an has been introduced as the source of purity of the soul and heart from mental perversions and moral devils. Therefore, it can be suggested that mental disorders are more difficult than physical illnesses and Quran is healing mental and psychological illnesses.

In another verse, the remembrance of God and his continuous recollection have been mentioned as a requirement to reach mental peace: "Unquestionably, by the remembrance of Allah hearts are assured" (Quran, R'ad: 28). Another verse, in addition to recommending the rules of health, describes the details and points out the way to health through the use of clean foods. And, of course, it does not allow to waste food when eating: "Who has forbidden the adornment of Allah which He has produced for His servants and the good [lawful] things of provision? Make not unlawful the Taiyibat [all that is good as regards foods, things, deeds, beliefs, persons, etc.] which Allah has made lawful to you. And eat of the things which Allah has provided for you, lawful and good" (Quran, A'araf: 32; Maedeh: 87 and 88). In other verses, Quran has mentioned what it means by clean foods and it has recommended eating foods such as meat, fish and fruits, and has considered them one of the most beautiful blessings of life (Qoran, Maedeh: 1 and 96; Nahl: 14; Momenun: 19). In the Holy Quran, even the choice of food type, relaxation, and sleep has also been taken into consideration (Quran, Abbs: 24. Rome: 23; Forghan: 47).

Based on what was mentioned, regarding the relationship between the Holy Quran and medicine, it can be suggested that that the subject and ultimate goal of the two are man and the attainment of physical and mental health. According to the Quran, mental health means a total balance in all aspects of human physical and emotional life. The Holy Quran considers peace and prevention of anxiety as the result of faith in God and also believes that adherence to divine piety leads to a balance in the beliefs and behavior of the believer. In addition, as it forbids extremism in satisfying instincts and desires, it warns that suppressing each of the forces would lead to going beyond moderation and the creation of a psychological crisis. Therefore, it can be said that the Quran, with the acceptance and attention to all human instincts and emotions, issues instructions that can be applied to achieve the personality balance.

2. Health-centered points in the prophetic tradition
The study of books on the Prophet's (PBUH) conducts and traditions shows that the Holy Prophet (PBUH) has frequently stressed the importance the purity, cleanliness, and physical and mental health. For instance, he says: "Islam is clean, so try to be clean, for none but those who are clean will enter the Paradise, and be clean as much you can. Indeed, God has founded Islam on purity and cleanliness and no will not enter the paradise except those who are clean (Payandeh, 2003, 998).

Based on the Prophetic traditions and the first Islamic writings, it can be inferred that the Holy Prophet (PBUH) used

to attach great importance to personal appearance and even the use of a sweet smell fragrance. It has also been mentioned that he considered the use of perfume as a basic affair of his personal life. This suggests that the leader of the Muslims of the world viewed health and appearance as essential principles and considered personal hygiene as an important factor for the maintenance of the health of his followers. The Prophet (PBUH) believed that saying the night prayers would result in the divine satisfaction and the comfort of bodies (Deylami, 1992, 1/191).

This point has been taken into consideration by psychologists in recent years is that holding spiritual and immaterial beliefs can help people with their physical and mental health. In the Islamic teachings, as the eating of some foods has been emphasized, going extreme in the use of worldly blessings have also been blamed, as it was stated in the Hadith of Ascension: "The world-seeking people are those who indulge in eating, laughing, sleeping, and anger, and are less pleased (Qomi, 1416, 4/108).

In religious narratives, the treatment of physical diseases has been recommended, and patients are given optimism that their diseases can be treated, so that in Islam all diseases are considered to be cured and treatable, except for death that is beyond human control. In Mostadrak Sahihain, AbūSa'id Khadri quoted the Prophet's (PBUH) statement that "God does not create any illness unless he sends its medicine, whether people know or do not know this, unless death that there is no medicine for treating it (Nasai, 1416, 4/270).

In these sections, we refer to some of the prophetic traditions that have implications for health:

˜ The Prophet (PBUH) recommended brushing the teeth because it cleans the mouth and promotes the health of the gums (Kolini, 2008, 6/376)

˜ Washing hands before a meal eliminates the poverty and washing them after a meal causes the disappearance of sadness and improves the eyesight (Tabrsi, 1991, 139).

˜ The best thing that can treat your illnesses is walking. (Namazi Shahroodi, 1996, 3/389).

˜ Wear white clothes because they are nicer and cleaner (Mohammadi Reyshahri, 1983-1984, 10/225)

˜ The Prophet (PBUH) blamed oversleeping and going to bed late and stated: "After me, there will be a group of people that refuse to sleep early in the night and sleep a lot at dawn (Ibid, 2/111).

˜ The Prophet (PBUH) said: "Anyone who eats less, his stomach will stay healthy and will find serenity in his hearth, and somebody who eats too much, his stomach is disturbed and becomes cold hearted" (Ibid, 1/184)

˜ Keep your body clean so that God will purify your soul (ibid., 12/236)

˜ Also, the Prophet has ordered the quarantine of individuals against the risk of public contagion (Bokhari, 1422,584)

3. Health-centered points in the statements of the infallible Imams (AS)

There are some narratives and hadiths from Imam Ali (AS) about physical and mental health, some of which are provided as follows:

˜ In interpreting the Quranic verse "Do not forget your share of the world", Imam Ali (AS) stated: "Do not forget your health, ability, opportunity, youth and happiness, so that you can gain the Hereafter with them" (Saduq, 1984, 299).

˜ Wash yourselves with water and clean it from the unpleasant odor that may annoy others. Keep your appearance clean and neat, because God hates those servants whom people do not like to sit down with" (Mohammadi Reyshahri, 1983-1984, 12/237).

˜ Imam Sadegh said: "If people knew the properties of apple, they would not treat their patients with anything other than it" (Ibid, 4/170).

˜ Concerning the benefits of sleep, Imam Reza (AS) said: "Sleeping is the sultan of the brain and is the source of consistency and strength of the body" (Ibid, 444/12).

Effects and benefits of religious teachings in the field of health

The Islamic teachings such as the teachings of other divine religions have recommended the observance of principle of personal and mental health to followers of religion and have promised positive material and spiritual effects for those who observe such principles, and this has encouraged people to observe hygiene rules. In the previous sections of this paper, were mentioned a number of Quranic verses and narratives from the Prophet of Islam (PBUH) and the infallible Imams (AS) about individual health outcomes and discussed the significance of physical and mental health from the viewpoint of Islamic religion. In this section, we address the role of social health in promoting community health and examine the position of religion which is of special importance in in this area.

A. Social support

Man is a social being, and without a doubt, he will not have a happy life without establishing relationships with friends, relatives, and acquaintances. Emotional relationships and awareness of other people's feeling and conditions reduce mental pressures, because an individualistic life without support from other fellowmen can weaken and severely impact a person in the face of events such as death, divorce, unemployment, and physical illnesses.

B. Relationship of believers in society:

The Islamic religion has called believers as the brothers of each other. Also, in the hadiths and Islamic narratives, the cooperation and the creation of affection and awareness

of each other have been repeatedly emphasized. It is clear that the growth of emotion and the persuasion of the faithful in observance of the common good and showing benevolence to others will empower people in the community and will keep them safe from weakness, hatred, abusive behavior, and oppression. One of the most valuable and worthwhile methods proposed by the religion to prevent social harms is the observation of relationships that keeps away the affected person from economic problems and mental and psychological pressures, and obviates the sense of loneliness and anxiety. The religious approach of the observation of relationships is so important that in the religious teachings, it has been referred to as one of goals of the Prophet's (PBUH) prophecy after the divine worship and the breaking of the idols of the unbelievers. Having close relations with relatives in addition to meeting the material needs can save a person from depression and feelings of loneliness and make him resistant and optimistic in the face of the problems of life.

C. Patience

Having patience and tolerating hardships are among the obvious signs of religiosity and have been emphasized in the divine verses addressed to the Prophet of Islam and Muslims. In the Qur'an, the Holy Prophet (PBUH) is advised: "Be patient as the Arch-Prophets were" (Majlesi, 1998, 74/277). And in another verse, he says: "So remain on a right course as you have been commanded, [you] and those who have turned back with you [to Allah], and do not transgress. Indeed, He is seeing of what you do." (Quran, Hud: 112). The Prophet himself also says: "I was sent as the messenger to be the center of tolerance, knowledge, and patience (Majlisi, 1998, 71/423).

A patient person knows that the world is changing, and conceives problems and misfortunes as passing and transient. Therefore, he exercises patience in the face of hardship and knows that, according to God, there would be ease and comfort following difficulties and the tolerance of unpleasantness and hardships is followed by success and achievement. Instead of hurrying in work and not resisting the problems, such a person exercises patience and endurance and achieve his goals with determination and awareness. Imam Ali (AS) says: "Patience for faith is like the head for a man. There is no benefit to the body that does not have a head, just as there is no benefit in faith without patience" (Imam Ali, 2001, 1004).

D. Work

One of the important factors for promoting the individuals and community health is work. A society whose members work hard to achieve their goals of life is a successful society, and the sense of effort and everyday activities will be followed by physical, mental, and social health. Unemployment leads to a sense of individual absurdity and, consequently, irresponsibility and depression. Unemployment will end up with inappropriate moral and psychological outcomes, and experience has proven that unemployed, negligent or lazy people are not safe from serious ethical harms, such as the seizure of other people's property, envy, jealousy, vanity and absurdity, drug addiction and divorce. In religious teachings, there are many recommendations for hard work and acting a useful member in the society. In condemning unemployment and laziness, Imam Baqir (AS) says: "Avoid laziness and depression, because these two are keys to all evils" (Ibn Sho'abeh, 1404. 295).

E. Supplication

A person who considers himself as the creature of his own creator never is needless of him and constantly maintains his own sincere relationship with his own lord. Saying prayers to God and his continuous remembrance strengthens the spirit of hope, joy and health in God's servants. Besides, saying prayers does away with anxiety, stress, and emotional excitement of the soul because the religious person knows that even if he is alone, there is again someone who supports and helps him in solving problems and dealing with hardships. In the Holy Quran and the hadiths narrated from the Prophet (PBUH) and the Imams (AS), saying prayers is constantly recommended. As it is written in the Quran, the Lord says: "Call upon Me; I will respond to you". Carl Jung (a psychologist and author) has defined psychological complexes as "a group or set of related thoughts and beliefs or impulses that share a common emotional state and have a strong unconscious influence on attitudes and behavior" (VandenBos,2013, 1/378).

Saying prayers prevents the formation of mental complexes and eliminates mental conflicts. Dale Carnegie, a prominent psychologist, in his book Lifestyle in the section on eliminating worry and anxiety, writes: "Today, the most recent science, psychiatry, teaches what the prophets taught, why? Because psychiatrists have found that prayer and having a firm faith in religion relieve concern, anxiety, excitement, and fear that cause many discomforts for us" (Carnegie, 2010, 279). Therefore, the best way to prevent mental anxiety, stress, and internal emotions is to take refuge in God and say prayers. Imam Baqir (AS) told Ibn Muslim: "Would I not tell you of something that is the healer of any pain even death?" He said: Sure. Imam said: "It is prayer" (Majlesi, 1998, 93/299).

The wordings and the language of prayer affect the reader and this effect has been confirmed by physicians and experts of the theosophical medicine. In addition, prayer is also effective in terms of content, and this effectiveness has been confirmed through psychophysiological observations and spiritual intelligence. Therefore, if the praying person harmonizes his pattern of thought, behavior and emotion with the themes of prayer, he will have a healthy body and mind. In addition, research shows that if the contents and teachings of prayer are used as patterns for human thought, behavior and affection, they will have a definite effect on human mental and physical health (Azhdar et al., 2011, 139).

Summary and Conclusion

According to global standards, the concept of health is not limited only to physical health and being free from physical defect and problems, but mental and social health that is conducive to peace and comfort of the individual and society is seen as one of the most important aspects of health that the modern psychology is taking many efforts to create and improve it. Islam, as an all-encompassing religion, has attached a high value to physical, psychological and social health of individuals, and has provided many recommendations on how to create and promote physical and mental health. According to religious teachings, a person who is not physically and mentally healthy cannot be effective in his own and his fellowmen's spiritual development and growth. Internal beliefs create sense of satisfaction and contentment among religious people, help them with friendly and emotional relationships, and create a sense of cooperation among them.

Islam invites its followers to observe moderation in doing things and avoid any kind of extremism, and the Prophet (PBUH) introduces his followers as the "middle nation", which experience has proven it to be the most excellent and desirable way of social life. In numerous passages quoted in his statements, people's physical, mental, and social health as well as personal and public health have been frequently emphasized.

The teachings of Islam have inspired the faithful to belief in God and prayers and consider the belief in a unique and powerful God as a factor that empowers the believers and enhances their sense of satisfaction and serenity. Having piety, doing good deeds, being nondependent to the world, having balance in the use of worldly blessings, paying zakat, doing benevolent things to others, avoiding oppression, studying past history, and night sleep are other things that have been considered useful for Muslims' mental and physical health in the Islamic teachings.

References

1. Azhdar, A., Ahmadi Faraz, M., Zare, H., Zamani, M. The position of prayers in physical and mental health, Faslnam-e Tazehay-e Ravan Darmani(Quarterly of Psychotherapy New Discoveries). 61-62, 2011,133-140.
2. Ibn Babvieh, Mohammad bin Ali (1983). Al-Khisal (Personality traits). Qom: Seminary Teachers Community.
3. Ibn Sho'abah, Hassan bin Ali, (1404). Tohf al-Oqul (Gifts of minds). Qom: Islamic Publishing Institute.
4. Imam Ali ibn Abi Talib (2001), Nahj al-Balaghah. Translated by Mohammad Taghi Jafari Tabrizi, Tehran, Institute for the Compilation and Publication of Allame Jafari's works.
5. Bokhari, Mohammd bin Esmaeil (1422). Sahih-e Bokhari. Researched by Mohammad bin Zohair bin Nasser. Beirut: Dartough al-Nejah.
6. Payandeh, A. (2003). Nahj al-Fasahah: A collection of Prophet's (pbuh) aphorisms. Tehran: The World of Knowledge.
7. Jalali, A. and Rostami Nezhad, M. A. Mental disorders. Journal of Eslah va Tarbiat (Correction and Rehabilitation), 10(112),2011, 42-53.
8. Devon B. Schultz and Sidney Ellen Schultz (1999). Tarikh-e Ravanshenasi-e Novin (The history of modern psychology). Translated by A. A. Seif and colleagues. Tehran: Dowran.
9. Hor Ameli, M. (1977), Wasā'il al-Shī-a. Tehran: Maktobeh al- Islamiah.
10. Daylami, Hassan bin Mohammad (1992). Irshad al-Qolub (Guidance of hearts). Qom: Sharif-e Ra'adi Press.
11. Sadouq, Abu Ja'far Muhammad ibn Ali (1984), Amali (Spellings). Qom: Islamiah Library.
12. Tabarsi, Hassan ibn Fadl, (1991). Makarim al-Akhlaq(Ethics). Qom, Sharif-e Ra'adi Press.
13. Tusi, Mohammed Hassan, (1993), Amali (Spellings). Qom: Dar al-Saqafeh Publisher.
14. Qomi, A. (1416). Safinah al-Bihar wa Manina al-Hokm wa al-Athar (Sphinx of the seas and city of judgment and works). Mashhad: Astan Qods Radavi.
15. Carnegie, D. (2010). Ayein-e Zendegi (Lifestyle). translated by R. Jafari and V. Ghaemi, Tehran: Peyman Publishing.
16. Kolini, Mohammad ibn Ya'qub, (2008). Osoul-e Kafi (Sufficient principles). Translated, explained, and edited by Mehdi Ayatollahi. Tehran: Jahanara Publishing.
17. Mohammadi Reyshahri, M. (1984). Mizan al-Hikamah (Scale of wisdom). Qom: Islamic Publicity Office.
18. Majlesi, Mohammad Bagher, (1998), Bahar al-Anwar (Seas of lights). Beirut: Al-Wafa Institute.
19. Nasaie, Ahmed bin Shuaib, (1995). Abu Abdul Rahman, Al-Sunan (Traditions). Beirut: Center of Scientific Books.
20. Namazi Shahroodi, A. (1996). Mostrdak Safineh Al-Bahar (Passenger of the ship of seas). Qom: Publications Office of the Islamic Publisher affiliated with the Society of Teachers of the Seminary of Qom.
21. Meshkini, A. (1987), Azdoaj dr Islam(Marriage in Islam). Qom: Al-Hadi Publishing
22. VandenBos, Gary R,(2013), APA Dictionary of Psychology, by Hassan Ahadi, Translated by Translators Group, Tehran: Aras Publisher.
23. Last, John M. (1988). Farhange-e epidemiology (Dictionary of epidemiology). Translated by K. Nasseri. Tehran: Tehran University Press.
24. Tabaraei, R. (2010). The position of spirituality in major models of mental health. Ravanshenasi va Dinn (Psychology and Religion). 9, 5-30.
25. Nasseri, M. (2005). Dehkade salamati (Health village). Tehran: Traditional and Supplemental Medicine Publisher.

The Challenges of Implementation of Professional Ethics Standards in Clinical Care from the viewpoint of Nursing Students and Nurses

Saeedeh Elhami (1)
Kambiz Saberi (1)
Maryam Ban (2)
Sajedeh Mousaviasl (2)
Nasim Hatefi Moadab (3)
Marzieh Ghassemi (2)

(1) Student research committee, Abadan school of medical sciences, Abadan, Iran
(2) Abadan school of medical sciences, Abadan, Iran
(3) Student research committee, Kermanshah university of medical sciences, Kermanshah, Iran

Corresponding author:
Marzieh Ghassemi
Abadan School of Medical Sciences,
Abadan, Iran

Abstract

Background and Objectives: Observing the professional ethics in providing nursing care is an inseparable part of this profession as overstepping it influences patient satisfaction and recovery, quality of care, standards of nursing care and promotion of occupation. Therefore, this study was conducted aiming to determine the barriers of observance of professional ethics standards in clinical care from the viewpoint of nursing students and nurses.

Methods: In this descriptive cross-sectional study, viewpoints of 180 nurses and nursing students of Abadan Faculty of Medical Sciences regarding the barriers of observance of professional ethics standards in clinical environment were collected using demographic information questionnaire and barriers of observance of professional ethics criteria in three domains including Managerial, environmental and individual care were collected and analyzed using SPSS software.

Results: In both groups of nursing students and nurses, the highest average of management, environmental, and personal care services area are related to the environmental domain ($p < 0.005$).

Conclusion: Observance of the professional ethics standards in nursing practice, especially factors related to environmental dimension which is one of the most important barriers to professional ethics, can play an important role in improving and restoring the health of patients. Therefore, the management system and health system managers can play effective roles in observance of the best criteria of professional ethics through accurate planning and providing human resources and improving the conditions of service for medical personnel, including improving the conditions of sectors and satisfying their expectations in different fields.

Key words: Nursing Ethics, Clinical Care, Nursing Students, Nurses

Please cite this article as: Elhami S. et al . The Challenges of Implementation of Professional Ethics Standards in Clinical Care from the viewpoint of Nursing Students and Nurses. *World Family Medicine.* 2017; 15(9):149-153.
DOI: 10.5742/MEWFM.2017.93117

Research Questions

Adherence to professional ethics in the provision of nursing care has always been emphasized. But it seems that due to the changing viewpoints on health and changes in the health system, the ethical approach in healthcare professions has changed from a request and recommendation to an undeniable necessity (1). Nursing ethics is the observance of professional ethics in the provision of nursing care and also the inseparable part of the nursing profession (2). Any nursing ethical impairment can affect the most scientific and best nursing care (3). Nurses are responsible for caring for the patients as members of the healthcare team. Members of this team spend a lot of time with the clients and have a lot of contact with them due to the nature of their work. Therefore, care involves human and moral relationships as the central concept of nursing. Caring for the clients in all its dimensions has an ethical nature, so that the subject of ethics and nursing are thought to be two basic elements, and historically, nursing is one of the first professions that have addressed ethical issues (4).

Many years have passed from establishment of the codes of ethics for the nursing profession, which shows the importance of ethics as one of the main elements of this field (4). However, the issue of ethics and ethical competence of nurses still maintains its importance in various educational, management and research dimensions. In other words, the establishment of codes of ethics alone cannot provide the necessary moral excellence in the various dimensions of nursing services. Many nurses consider ethical codes of professional ethics in regard to ethical issues, but do nothing about it.

In many cases, they do not have enough power and support to show their reaction, and sometimes they do not know what to do (6). The results of studies in the field of ethics indicate weakness in the ethical decision-making of nurses (7). Zirak et al. in their research stated that only about half of the students are at an acceptable level of moral development (8). According to the studies, the average score of moral reasoning in nurses abroad was 51.74 and in Iran was 42/16 (9). Sokhanvar states that “The rate of observance of ethical principles in clinical decision making is not desirable, and nurses have no ability to apply ethical knowledge in the real environment.” Therefore, it is necessary to monitor the rate of observance of nursing ethics codes from the source of nursing ethics education, that is, nursing schools, in order to determine the extent to which students have weaknesses so that nursing managers provide more complete education in that dimension. The importance of nursing schools in nursing ethics education is as extent as Kelly in his research concluded that colleges are the most influential force in shaping ethics in nursing students (10). The results of a study in 2007 on the study of nursing ethics training in Turkey revealed that inappropriateness of the trained teaching methods of ethics and ethical content is one of the most important barriers to the development of nursing students’ abilities to deal with ethical issues (11).

Borhani et al, reviewed the perception of nursing students about the barriers to professional ethics. In their results, they referred to eight themes: lack of motivation and interest in nursing profession, inadequate self-awareness, lack of ethics teachers, lack of curriculum, using inappropriate methods in ethics training, ethical evaluation problems, weakness of interpersonal communication, and constraints of clinical environment (12).

Most nurses agree with each other and their viewpoint is that they have some barriers to ethical performance in their work environment that disturbs their ability to provide competent and quality care [13]. Lack of observance of the professional ethics in the health system by nurses affects patient satisfaction and recovery, quality of care, nursing care standards and promotion of care (14). Researchers have also considered moral sensitivity to be influenced by the education, culture, religion, education, and life experiences of individuals (15). Naturally, cultural contexts influence the crucial issues of moral sensitivity. Accordingly, barriers are no exception to this rule. Therefore, multiple studies in different societies have led to the recognition of different aspects of moral sensitivity (16). However, due to the lack of studies on the barriers of professional ethics in nursing performance and since one of the important achievements of codes of ethics is the facilitation of the implementation of clinical governance, which involves taking actions to minimize the risk for employees and patients, paying attention to patient complaints and using the best evidence available in clinical decision making (17), and also, identification of ethical barriers and appropriate ethical decision making leads to positive psychological responses such as satisfaction, increased motivation and sense of competence in nurses and patients (18). The aim of this study was to determine the barriers of observance of professional ethics standards in clinical care from the viewpoint of nursing students and nurses. It seems that a comprehensive view of this important issue can be valuable.

Materials and Methods

The present study is a cross-sectional descriptive study. The research population includes full-time nurses occupied in Abadan Faculty of Medical Sciences and nursing students of Abadan Faculty of Medical Sciences who have inclusion criteria such as the baccalaureate degree in nursing, employment in one of the Internal surgical departments, at least six months of working experience, lack of responsibility at managerial posts, for nurses and students who have at least the first year of study. Sampling was conducted as a convenience sample from a total of 180 students and nurses participating in the study. After obtaining the necessary permission, the questionnaires were distributed by the researcher through the expression of the goals of the research and obtaining informed consent and frequent attendance at the appropriate time. It should be noted that the subjects completed the questionnaire freely and without direct supervision, and then the completed questionnaires were collected simultaneously by the researcher.

The questionnaire consisted of two sections: demographic information and barriers to observance of the professional ethics criteria in three areas of management, environment and personal care. Demographic data including age, gender, place name and work experience, and questionnaire of evaluation of the barriers of the observance of professional ethics criteria including 33 questions (14 questions related to the management domain, 5 questions related to environmental domain, 14 questions related to the field of care). Items were answered with a five-point scale. Selection of the options of "I totally agree" or "I agree" indicates that the raised item is a barrier to the observance of professional ethics standards. Selection of "I am opposite" option indicates that the raised item does not impede the observance of professional ethics standards from nurses' viewpoint. Selection of the "I have no idea" option indicates that the lack of knowledge of the effect of the variable (question) in question is inadequate to professional ethics. Cronbach's alpha coefficient for the reliability and internal consistency of the questionnaire has been calculated by Dehghani et al. (19) (89).

Results

The demographic variables included: age, gender, and work record, and the results are presented in Table 1. The average age was 377/4 227/24.

Table 1: Descriptive statistics of demographic variables

		Frequency	Frequency percentage
Gender	female	115	64/2
	male	64	35/8
Work experience	Less than 5 years	123	75/9
	5-10years	26	16/0
	11-15 years	6	3/7
	More than 15 years	7	4/3

Comparison of the barriers of the observance of the standards of professional ethics in clinical care from the viewpoint of nursing students with nurses of the Faculty of Medical Sciences of Abadan are presented in Table 2. Due to the normal or non-normal distribution of the sample, the appropriate test was used.

Table 2: Comparison of the barriers of observance of the Professional Ethics Standards in General and on the basis of the areas (Managerial, Environmental, Individual Behaviors) in Clinical Care from the viewpoint of nursing students of the Faculty of Medical Sciences of Abadan

Variable	Classification	Mean	Standard deviation	Statistics	Degrees of freedom	Significance level
** Total	Nurses	3/6454	0/62755	3035/500	-	0/019
	Nursing student	3/8128	0/60390			
** Managerial	Nurses	3/4511	0/81429	2732/000	-	0/001
	Nursing student	3/7976	0/66657			
Environmental **	Nurses	4/2848	0/64769	3053/500	-	0/022
	Nursing student	4/0486	0/73816			
Individual * Behaviors	Nurses	3/6110	0/70662	-1/338	178	0/183
	Nursing student	3/7432	0/56897			

* Both groups are normal and the use the independent T- test

** At least one group is not normal and the use of Mann-Whitney test

Comparison of the viewpoints of nursing students and nurses on three areas including managerial, environmental, and individual with regard to the non-normal distribution of managerial and environmental domains was conducted using Kruskal-Wallis test and the results are presented in Table 3.

Table 3: Comparison of Managerial, Environmental, and Individual Behaviors Barriers Observing Professional Ethics Standards in Clinical Care from the Viewpoint of nursing students and nurses of the Faculty of Medical Sciences of Abadan

Variable	Classification	Mean	Standard deviation	Statistics	Degrees of freedom	Significance level
Nurses	Managerial	3/4511	0/81429	47/197	2	0/000
	Environmental	4/2848	0/64769			
	Individual Behaviors	3/6110	0/70662			
Nursing student	Managerial	3/7976	0/66657	17/409	2	0/000
	Environmental	4/0486	0/73816			
	Individual Behaviors	3/7432	0/56897			

Discussion

The findings of this study provide a view of barriers of observance of the professional ethics standards from the viewpoint of nursing students and nurses in three areas of managerial, environmental and individual care.

In both groups of nursing students and nurses, the highest average was related to the environmental area. The lack of proper facilities and equipment in the department, biological changes in the body during night shift, crowding, shift work, unexpected expectations of patients and their companions from nursing staff are involved among the factors related to this area. Naturally, an environment organized in accordance with the standards of care provides the initial conditions for ethical work. Although, for most nurses, care for patients is not very important, sometimes clinical environments that do not have standards of care have a negative effect on their performance and their care of the patient (21, 20). Meanwhile, Schluter also emphasized the role of these factors as barriers of achievement of professional ethics standards (22). Bennet et al. (2008) point out crowding as the main barrier for nurses in applying research evidence and observance of the professional ethics in care (23). Dierckx in a study on the management of the American Nurses Association pointed to the environmental factors such as lack of nursing staff, high workload, insufficient time, and financial and organizational constraints from nurses' viewpoints as important barriers of the lack of observance of professional ethics.

One of the other important barriers of observance of professional ethics in this study is the lack of experience of educators in ethical and legal issues in nursing education, which is one of the management factors. Borhani et al in a qualitative study on the students revealed the role of these factors as the top barriers to achieving professional ethics standards (12). The results of a study in 2007 in nursing ethics in Turkey also suggest the inappropriateness of teaching methods of ethics and ethical content as one of the most important barriers to develop abilities of nursing students to deal with ethical issues (11) while Nasiriani and his colleagues have also confirmed this (22). Health care organizations can familiarize the nurses with the principles and standards of care, the importance of observance of professional ethics in improving patients' conditions and disadvantages of lack of observance of the ethics in therapeutic systems using appropriate and practical training. Applicable training and expressing concrete examples in this field as well as teaching time management, along with direct monitoring of clinical interventions, can help remove the barriers.

From the viewpoint of nurses, they have higher average score in terms of the importance of different areas in implementing environmental ethical standards. In the case of nurses participating in the present research, the role of a managerial area has been highlighted (19).

Based on the results of this study and considering the necessity of observance of professional ethics standards in nursing practice, which can play a significant role in improving and restoring health of patients, and that all factors, especially factors related to environmental dimensions, are the most important barriers to observance of ethics Professionals from the viewpoint of nurses were referred. The management system and managers of the health system can study the status quo and barriers to professional ethics through periodic reviews of professional ethics from the point of view of nurses and patients. Also, by carefully planning and providing human resources and improving the conditions of service for medical personnel, including improving the conditions of the departments and satisfying their expectations in various fields such as adequate rest, income adequacy, proper shifts, standard equipment, and emphasis on compliance Principles and standards of care by removing these barriers provide an effective step to better observe the standards of professional ethics.

Acknowledgments:
This article is based on the research project, approved by the Faculty of Medical Sciences Abadan with the code 95st-0088 .At the end, the authors appreciate all those who sincerely have collaborated with researchers in this research, particularly, the Vice Chancellor for Education and Research of Abadan Faculty of Medical Sciences as well as respected authorities in selected clinical departments in this study for their support.

References

1. Horton K, Taschudin V, Forget A. The value of nursing: A qualitative Review. Nurs Ethics 2007; 14(6): 716-40.
2. Breen KJ. Medical professionalism: is it really under threat? Med J Aust 2007;186(11):596.
3. Mohajjel Aghdam A, Hassankhani H, Zamanzadeh V, Khameneh.S, Moghaddam. S. The Knowledge and Practice Of Nurses To The Code Of Ethics For Iranian Nurses Of Tabriz Teaching Hospitals. Journal of Medical History. 2013; 17(5): 113-140[Persian]
4. Borhani F, Alhani F, Mohammadi I, Abbaszadeh A. Perception of nursing teachers about nursing students professional ethical competency: A qualitative study. Forensic Medicine. 2010; 16(3): 165-173[Persian]
5. Weaver K, Morse J, Mitcham C. Ethical sensitivity in professional practice: concept analysis. J Adv Nurs. 2008 Jun; 62(5): 607-18.
6. Woods M. Nursing Ethics Education: are we really delivering the good (s)? Nurs Ethics
2005;12(1):5-18.
7. Joulayi S, Bakhshandeh B, Mohammad Ebrahim M, et al. Nursing ethics codes in Iran, part of an action research report. Journal of Ethics and History of Medicine. 2010; 3(2): 45-53[Persian]
8. Zirak M, Moghadasian S, Abdolah Zadeh F, Rahmani A. The ethical development of nursing students of Tabriz University of Medical Sciences. Journal of Ethics and History of Medicine. 2011; 4(4): 45-55[Persian]
9. Borhani F, Abbas Zadeh A, Kohan M, Fazael M.A. Comparison Moral Reasoning Abilities Nurses And Nursing Students Dealing With Ethical Dilemmas In Kerman University Of Medical Sciences. Ijme. 2010; 3(4): 71-81[Persian]
10. Kelly B. The professional values of English nursing undergraduates. J Adv Nurs 1991;16(7):867-72.
11. Gorgulu R, Dinc L. Ethics in Turkish nursing education programs. Nurs Ethics
2007; 14(6): 741.
12. Borhani F, Alhani F, Mohammadi I, Abbaszadeh A. Nursing students' perceptions of barriers to obtaining professional ethics: a qualitative study. Strides in Development of Medical Education. 2011; 8(1): 67-80 [Persian]
13. Dierckx de Casterle B, Shigeko I, Godfrey NS, Denhaerynck K. Nurse's responses to ethical dilemmas in nursing practice: Meta – analysis. J of Advance Nurse. 2008; 63(6): 540 –49.
14. Saharkhiz H. [Effect group discussions about professional ethics with nursing student on promoting of them professional ethics] . [Dissertation]. Tehran: Tarbiat Modares University. Faculty of Medical
Sciences; 2008. [Persian]
15. Borhani F, Abbas Zadeh A, Mohsen Por M. Students' Perceptions Of Barriers To Professional Ethical Sensitivity: A Qualitative Study. Journal of Medical Ethics. 2011; 5(15): 84-104[Persian]
16. Weaver K, Morse A.M.. Pragmatic utility: using analytical questions to explore the concept of ethical sensitivity. Research and theory for nursing practice. 2006; 20(3): 191-214
17. Rashidian A. Adapting valid clinical guidelines for use in primary care in low and middle income countries. Primary Care Respiratory Journal. 2008; 3: 136-137. [Persian]
18. Ebrahimi H, et al. Stress major reaction of nurses to the context of ethical decision making. Journal of Iran University of Medical Sciences. 2007; 4: 7-13[Persian]
19. Dehghani A, Dastpak M, Gharib A. Barriers to Respect Professional Ethics Standards in Clinical Care; Viewpoints of Nurses. Iranian Journal of Medical Education 2013; 13(5): 430[Persian]
20. Brodie DA, Inoue A. Motivational interviewing to promote physical activity for people with chronic heart failure. J Adv Nurs 2005; 50(5): 518-27.
21. Levett-Jones T, Lathlean J, McMillan M, Higgins I. Belongingness: A montage of nursing students' stories of their clinical placement experiences. Contemp Nurse 2007; 24(2): 162-74.
22. Schluter J, Winch S, Holzhauser K, Henderson A. nurses' moral sensitivity and hospital ethical climate: a literature review. Nursing Ethics 2008; 15 (3), 304-21.
23. Bennett S, Tooth L, McKenna K, Rodger S, Strong J, Ziviani J, et al. Perceptions of evidence-based practice: A survey of Australian occupational therapists. Aust Occup Ther J 2003; 50(1): 13 -22.

Cognitive Determinants of Physical Activity Intention among Iranian Nurses: An Application of Integrative Model of Behavior Prediction

Arsalan Ghaderi (1)
Firoozeh Mostafavi (2)
Behzad Mahaki (3)
Abdorrahim Afkhamzadeh (4)
Yadolah Zarezadeh (5)
Erfan Sadeghi (6)

(1) Student Research center, school of health, Isfahan University of medical science, Isfahan, Iran
(2) Department of Health Education and Promotion, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran
(3) Department of Biostatistics, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran
(4) Department of Community Medicine, School of Medicine, Kurdistan University of Medical Sciences, Sanandaj, Iran
(5) Social Determinants of Health Research Center, Kurdistan University of Medical Sciences, Sanandaj, Iran
(6) Non-communicable Diseases Research Center, Fasa University of Medical Sciences, Fasa, Iran

Corresponding Author:
Firoozeh Mostafavi,
Department of Health Education and Promotion, School of Health,
Isfahan University of Medical Sciences, Isfahan, IR Iran.
Tel: +98-3137922710,
Email: f_mostafavi@yahoo.com

Abstract

Introduction: Sedentary lifestyle and physical inactivity is recognized as a risk factor for various diseases. Nurses have a special place among healthcare team members, and their numerous roles require nurses to have good physical fitness. The present study aimed to determine cognitive factors related to doing regular physical activity among a sample of Iranian nurses based on the integrative model of behavior prediction (IMBP).

Methods: This cross-sectional study was conducted in 2016 on a sample of 418 nurses who were working in medical teaching hospitals in Isfahan and Sanandaj in Iran. Participants were randomly selected proportionally to staff size among different hospitals. A structured questionnaire was applied for collecting data and data were analyzed by SPSS version 16 using correlations, linear and logistic regression statistical tests.

Results: Mean age of the subjects was 33.1 years (range, 21-53 years). 66.6%, 25.4%, and 8% had low, moderate, and severe physical activity, respectively. The best predictors for doing regular physical activity were skills with OR of 1.203 [95% CI: 1.093, 1.324], and attitude with OR of 1.023 [95% CI: 1.023, 1.034]. The IMBP variable, accounted for 34% of the variation in the outcome measure of the intention to do physical activity.

Conclusion: Based on our result, it seems that designing and implementation of educational programs to increase attitude and skills regarding doing physical activity may be useful in the promotion of physical activity.

Key words: Cognitive Determinants, Physical Activity, Intention, Nurses, IMBP

Please cite this article as: Please cite this article as: Ghaderi A. et al. Cognitive Determinants of Physical Activity Intention among Iranian Nurses: An Application of Integrative Model of Behavior Prediction. *World Family Medicine*. 2017; 15(9):154-158. DOI: 10.5742/MEWFM.2017.93118

Introduction

Nowadays one of the health problems is sedentary lifestyle. In this regard, studies have shown that more than 80 percent of people do not have enough regular physical activity (1). The prevalence of inactivity in urban and rural areas of Iran, with an emphasis on leisure physical activities between men and women in the age group of 15-64 years, was 76.3% and 55.8% respectively, with the overall percentage of 67.6 percent (2). Sedentary lifestyle and physical inactivity is recognized as a risk factor for various diseases. It is also raised as one of the main modifiable risk factors for cardiovascular diseases and plays an important role in the development of other diseases (3). Researchers have shown that adequate physical activity has a beneficial effect on blood pressure, obesity and serum lipids. So that, regular exercise is proven to reduce total cholesterol, increase high-density lipoprotein, reduce low-density lipoprotein, and improve the general health of the body (4). As a significant health promoting behavior, regular physical activity can prevent or delay the occurrence of chronic diseases and early mortality (5). Nurses have a special place among healthcare team members, and their numerous roles require nurses to have good physical activity (6). Nurses cannot meet the needs of patients unless they pay great attention to the ways of promoting their own lives and health (7). Therefore, paying more attention to their health condition and determining risk factors of nurses, is very important (8). Studies have shown that the most effective programs are theory-based, rooted in social psychology (9, 10). Previous research has also shown that psychological studies and social psychology theories play an important role in creating programs that impact on health promotion. (11-17). The theories that examine the role of these factors in predicting behavior include the theory of rational action and the theory of planned behavior (10). By developing the theory of rational action and the theory of planned behavior, Fishbein has proposed an integrative model of behavior prediction in which several factors such as attitude, subjective norms, self-efficacy or perceived behavior control, behavioral intention, skill, and environmental constraints have been considered effective (18). This research aims to find cognitive determinants of physical activity intention among Iranian nurses based on application of integrative model of behavior prediction.

Methods

Participants and procedure

This cross sectional study was a part of a project conducted among Iranian nurses during 2016, with the goal of providing knowledge for the promotion of physical activity. The sample size was calculated at 95% significant level according to the results of a study by Tofighi et al (19) which reported that about half of Iranian nurses were lower than the Average levels of physical activity and considering the 20% attrition rate (rate of drop-out among participants), a sample of 418 was estimated. The study population included all nurses working in teaching hospitals in Isfahan and Sanandaj. In this study, a major teaching hospital in the aforementioned cities was randomly selected and then specifically-designed questionnaires were distributed among nurses who volunteered for this research and the required information was collected. It is worth mentioning that all the participants were informed about the project and confidentiality of the information, as well as the purpose of the project, and entered the study with consent. All questionnaires were anonymous and incomplete questionnaires were excluded from the study. The study protocol was approved by the institutional review board and ethics committee of the Isfahan University of Medical Sciences, Isfahan, Iran.

Measures

The participants were instructed about how to fill out the designed self-report questionnaire before gathering the required information. The questionnaire used here included three sections including demographic information questions, integrative model of behavioral prediction constructs, and the short form of the international physical activity questionnaire (IPAQ).

A: Demographic Characteristics

Background data inquired about included age, gender, marital status, education, weight, height, waist circumference, record of membership in the sports club, duration of membership in the sports club, current sport club membership status, and job history.

B: IMBP Variables

IMBP items were designed based on standard questionnaires applied to physical activity (20, 21). Before data collection, its reliability was evaluated using the alpha coefficient method through a preliminary study on 30 cases in the control group. This questionnaire consisted of the constructs of attitude (10 questions), subjective norms (5 questions), and self-efficacy (18 questions - Bandura's standard physical activity self-efficacy questionnaire (22), environmental constraints (10 questions), skills (4 questions) and behavioral intention (4 questions). In order to measure the score of each construct, the mean of the total score of that construct was considered. Furthermore, at least 10 faculty members and qualified individuals were consulted to determine the validity of the questionnaire and face and content validity were determined. In order to determine content validity, CVR and CVI were calculated according to the opinion of experts.

C: Short form of the International Physical Activity Questionnaire (IPAQ)

This questionnaire asks questions about the amount of intense and moderate physical activity, walking, and the average duration of sitting over the last week (7 days). Questionnaire score is reported according to the IPAQ protocol. The total physical activity of an individual per week is measured in minute/week –MET format. The term MET refers to the expression metabolic equivalent. MET is a unit used to estimate the metabolic cost of physical activity. One MET is approximately equal to the amount of resting energy expenditure for an individual (23). All

physical activity can be classified with multiples of resting energy expenditure.

The questionnaire includes questions about the physical activity of participants. This section can be finally used to classify physical activity into three categories: Weak or low, moderate, and severe. This questionnaire has been used by the World Health Organization to evaluate the level of physical activity. It has also been used in several domestic studies and its validity and reliability have been confirmed. The intensity of energy expenditure for all of the activities during the past 7 days was calculated according to IPAQ instructions; if the total calculated energy during the week is 600 to 3000 Met/Cal/Week, the intensity of the activity of the relevant questionnaire is moderate and if more than 3000 Met/Cal/Week, the intensity of the activity of the relevant questionnaire is severe. Moreover, if the amount of consumed energy is less than 600, the person is classified as: with no regular physical activity (24).

Statistical Analysis

Data were analyzed by SPSS version 16 using appropriate statistical tests including bivariate correlations, linear and logistic regression statistical tests at 95% significant level.

Results

Mean age of the subjects was 33.1 years (range, 21-53 years). Among the participants, 73.2% were female, respectively, among whom 88 were single, 268 married, and 63 did not answer the marital status question. Regarding education, 90.9% had bachelor's degrees and 9.1% had master's degree. The results of the present study showed that 66.6%, 25.4%, and 8% had low, moderate, and severe physical activity, respectively.

Table 1 shows the Zero-order correlations. Statistical significance was calculated at 0.01 and 0.05. The results showed intention was correlated with the attitude (r=0.159), subjective norms (r=0.222), self-efficacy (r=0.198), skills (r=0.553), and environmental constraints (r=0.128). Environmental constraints was significantly correlated with self-efficacy (r=0.130), and skills (r=0.196). In addition, skills was correlated with the attitude (r=0.143), subjective norms (r=0.218), and self-efficacy (r=0.147). Furthermore, self-efficacy was significantly correlated with attitude (r=0.133). Finally, subjective norms was significantly correlated with attitude (r=0.136).

Table 1: Correlation between different components of IMBP

Component	Mean (SD)	X1	X2	X3	X4	X5	X6
X1. Attitude	58.86 (11.23)	1					
X2. Subjective norms	15.18 (3.75)	0.136**	1				
X3. Self-efficacy	84.52 (27.68)	0.133*	0.082	1			
X4. Skills	12.07 (2.95)	0.143**	0.218**	0.147**	1		
X5. Environmental constraints	27.41 (5.48)	0.048	0.101	0.130*	0.196*	1	
X6. Intention	12.01 (2.90)	0.159**	0.222**	0.198**	0.553**	0.128*	1

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Linear regression analysis was performed to explain the variation of physical activity intention. As can be seen in Table 2, Collectively, IMBP variables accounted for 34% of the variation of physical activity intention.

Table 2: Predictors of the intention to physical activity

Variable	B	SE B	Β	T	p-value
Final Model, Step 4					
Self-efficacy	0.021	0.011	0.086	1.503	0.068
Skills	0.530	0.043	0.575	12.186	< 0.001

Adjusted R squared = 0.34, F: 80.190, and P <0.001

However, in Table 3, by dividing physical activity behavior into two groups of people without physical activity (people with poor physical activity) and those with physical activity (people with moderate and severe physical activity) and using logistic regression, it was observed that the constructs of attitude and skill were more important regarding physical activity behavior.

Table 3: Multiple logistic regression analysis for IMBP components related to physical activity

Variables	Odds Ratio	95.0% CI Lower	95.0% CI Upper	P value
Final Model, Step 4				
Attitude	1.023	1.013	1.034	< 0.001
Skills	1.203	1.093	1.324	< 0.001

Discussion

The aim of this study was to determine the factors related to physical activity among a sample of Iranian nurses, based on integrative model of behavior prediction. Determined factors related to physical activity among nurses is important for implementing physical activity promotion programs. The results of the present study indicated that attitude and skill were the most effective predictors of regular physical activity.

According to the results, 66.6% of nurses had a sedentary life style. The results of a study by Jalilian et al. showed that about 65% of women working at Hamedan University did not have physical activity (25). A study of physical activity of employees living in Yazd, Mazloomi et al. also showed that about 73.6% of employees did not have physical activity (26). The results of a study by Skaal et al. on the employees of a public hospital in South Africa showed that about 75.5% of the employees in this hospital had no physical activity (27). These statistics are consistent with the results of this study. These results indicated that status of physical activity is low among nurses. This warns health policy makers in Iran that it requres special attention to design physical activity promotion programs.

Our findings indicated, IMBP variables accounted for 34% of the variation of physical activity intention. In this regards, Araújo-Soares et al., carried out research on adolescents and reported that behavioral intention was a strong predictor of physical activity (28). On the other hand, a review study carried out by Sheeran suggests that intention in 82,107 study samples can only be responsible for an average of 28% of behavior variance (29). Therefore, there is a gap between intention and action. Despite the importance of factors influencing behavioral intention, there are several important controlling factors which determine how intention to adopt the behavior is interpreted.

The findings revealed that among an integrative model of behavior prediction constructs, attitude and skills were the main factors predicting physical activity among nurses. In this regard many studies have shown that self-efficacy (or skills) is one of the main predictors of doing physical activity (22, 30) and this is consistent with the findings of the present study. Therefore, it seems that designing interventions for improving self-efficacy related to doing physical activity can lead to more useful results regarding the promotion of physical activity.

Our study investigated the attitude role in doing physical activity among Iranian nurses. Attitude is defined as a person's beliefs about the results of a behavior and his/her evaluation of it(10). Therefore, it seems that training courses should focus on improving positive attitude on physical activity such as improving body fitness and stress management.

This study had a few limitations. The main limitation of this study was self-reporting, which may have led to bias.

Conclusion

Comprehensive preventative health education programs need to emphasize on psychological factors that mediate and predict health-related behaviors. Based on our results, it seems that designing and implementation of educational programs to increase attitude and skills regarding doing physical activity may be usefulness of the results in order to promote physical activity.

Acknowledgments
This article is a part of the Ph.D. dissertation of health education and health promotion supported by Isfahan University of Medical Sciences. We would like to thank Deputy of Research of Isfahan University of Medical Sciences for financial support, we would like to thank all of the nurses who participated in this project.

References

1. Bin Mohamed Roshdin MA, Murad NA, Rahman NI, Haque M. Knowledge, attitude and practice regarding exercise among people exercising in gymnasium and recreational parks around Kuantan, Malaysia. Journal of Applied Pharmaceutical Science, 2016; 6(06): 47-54.
2. Hazavehei SM, Asadi Z, Hassanzadeh A, Shekarchizadeh P. Comparing the effect of two methods of presenting physical education Π course on the attitudes and practices of female Students towards regular physical activity in Isfahan University of Medical Sciences. Iranian Journal of Medical Education. 2008 Sep 15;8(1):121-31.
3. Burton NW, Pakenham KI, Brown WJ. Evaluating the effectiveness of psychosocial resilience training for heart health, and the added value of promoting physical activity: a cluster randomized trial of the READY program. BMC Public Health, 2009 23; 9(1):427.
4. Warburton DE, Nicol CW, Bredin SS. Health benefits of physical activity: the evidence. Canadian medical association journal. 2006 14; 174(6):801-9.
5. Janssen I, LeBlanc AG. Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. International journal of behavioral nutrition and physical activity. 2010 May 11; 7(1):40.

6. Kemppainen V, Tossavainen K, Turunen H. Nurses' roles in health promotion practice: an integrative review. Health Promotion International. 2013 Dec 1; 28(4):490-501.
7. Bandura A. Health promotion by social cognitive means. Health education & behavior. 2004; 31(2): 143-64.
8. Saeidi M. Assessment of physical activity pattern in Nurses of Esfahan Social Security organization hospitals. Journal of Research in Rehabilitation Sciences. 2008 25;3(2).
9. Kok G. A practical guide to effective behavior change: How to apply theory-and evidence-based behavior change methods in an intervention. European Health Psychologist. 2014 Oct 1; 16(5):156-70.
10. Eldredge LKB, Markham CM, Ruiter RA, Fernandez M, Kok G, Parcel GS. Planning health promotion programs: an intervention mapping approach. John Wiley & Sons, 2016
11. Ali Morowatishaifabad M, Sakhvidi MJ, Gholianavval M, Boroujeni DM, Alavijeh MM. Predictors of hepatitis B preventive behavioral intentions in healthcare workers. Safety and health at work. 2015; 6(2):139-42.
12. Jalilian F, Joulaei H, Mirzaei- Alavijeh M, Samannezhad B, Berimvandi P, Karami Matin B, and Mahboubi M. Cognitive Factors Related to Cigarettes Smoking among College Students: An Application of Theory of Planned Behavior. Social Sciences, 2016; 11(7): 1189-1193
13. Mirzaei Alavijeh M, Karami Matin B, Jalilian F, Hamzeh B, Haghighi M, Ahmadpanah M, and Mahboubi M. Relapse Preventative Intervention among Iranian Addicts Based on Theory of Planned Behavior Results. Research Journal of Applied Sciences. 2016; 11(4): 138-143
14. Karami Matin B, Jalilian F, Mirzaei Alavijeh M, Ashtaria H, Mahboubi M & Afsar A. Using the PRECEDE Model in Understanding Determinants of Quality of Life among Iranian Male Addicts. Global Journal of Health Science; 2014; 6(6): 19-27
15. Mirzaei-Alavijeh M, Kok G, Niknami S, Motlagh ME. Family-based cognitive factors effective on preventing the onset of substance use in Iranian society's children: applying the intervention mapping protocol. Acta Medica Mediterranea. 2016; 32:1015-20
16. BaghianiMoghadam M, MirzaeiAlavijeh M, Zolghadr R. Knowledge, risk perceptions and behavioral intentions among elementary school teachers of Yazd regarding hepatitis A. Govaresh. 2012; 17(2):84-90.
17. Jalilian F, Hazavehei SM, Vahidinia AA, Jalilian M, Moghimbeigi A. Prevalence and related factors for choosing self-medication among pharmacies visitors based on Health Belief Model in Hamadan Province, West of Iran. Journal of research in health sciences. 2013; 13(1):81-5.
18. Yzer M. The integrative model of behavioral prediction as a tool for designing health messages. Health communication message design: Theory and practice. 2012:21-40.
19. Tofighi A, Babaei S, Dastah S. The relationship between physical activity and mental health among nurses of Urmia hospitals. The Journal of Urmia Nursing and Midwifery Faculty, 2014; 12(1):71-8.
20. Mesters I, Wahl S, Van Keulen HM. Socio-demographic, medical and social-cognitive correlates of physical activity behavior among older adults (45–70 years): a cross-sectional study. BMC public health. 2014; 14(1):647.
21. Chung-Yan Chan J. Psychological determinants of exercise behavior of nursing students. Contemporary nurse. 2014; 49(1):60-7
22. Bandura A, Freeman WH, Lightsey R. Self-efficacy: The exercise of control. Journal of Cognitive Psychotherapy. 1999; 13(2):158-66.
23. Craig CL, Marshall AL, Sjöström M, Bauman AE, Booth ML, Ainsworth BE, Pratt M, Ekelund UL, Yngve A, Sallis JF, Oja P. International physical activity questionnaire: 12-country reliability and validity. Medicine & Science in Sports & Exercise. 2003; 35(8):1381-95.
24. IPAQ Research Committee. Guidelines for Data Processing and Analysis of the International Physical Activity Questionnaire (IPQA)-Short and long forms, November 2005. Available from: http://www.ipaq.ki.se/scoring.pdf
25. Jalilian F, Emdadi SH, Mirzaie M, Barati M. The survey physical activity status of employed women in Hamadan University of Medical Sciences: The relationship between the benefits, Barriers, self-efficacy and stages of change. 2011; 9(5):89-98.
26. Mazloomy S, Mohammadi M, MorovatiSharifabad MA, Falahzade H. A study of the decisional balance's role in exercise status among Yazd's staff on the basis process of change model. Zahedan Journal of Research in Medical Sciences. 2009; 11(2):0-0
27. Skaal L, Pengpid S. The predictive validity and effects of using the transtheoretical model to increase the physical activity of healthcare workers in a public hospital in South Africa. Translational behavioral medicine. 2012; 2(4):384-91.
28. Araújo-Soares V, McIntyre T, Sniehotta FF. Predicting changes in physical activity among adolescents: the role of self-efficacy, intention, action planning and coping planning. Health Education Research. 2008; 24(1):128-39.
29. Sheeran P. Intention—behavior relations: A conceptual and empirical review. European review of social psychology. 2002; 12(1):1-36.
30. Levy SS, Cardinal BJ. Factors associated with transitional shifts in college students' physical activity behavior. Research quarterly for exercise and sport. 2006; 77(4):476-85.

Effect of resilience-based intervention on occupational stress among nurses

Hossein Jafarizadeh (1)
Ebrahim Zhiyani (1)
Nader Aghakhani (2)
Vahid Alinejad (3)
Yaser Moradi (4)

(1) MSc in nursing, Patient safety research center, Urmia University of Medical Sciences, Urmia, Iran
(2) Ph.D. in nursing, assistant professor, Patient safety research center, Urmia University of Medical Sciences, Urmia, Iran
(3) Department of Biostatistics, Urmia University of Medical Sciences, Urmia, Iran
(4) Ph.D. Student in Nursing, Nursing and Midwifery school, Hamadan University of Medical Sciences, Hamadan, Iran

Corresponding author:
Yaser Moradi
Nursing and Midwifery school, Hamadan University of Medical Sciences,
Hamadan, Iran
Email: Yasermoradi1045@yahoo.com

Abstract

Background: Resilience is one of the most important factors that can affect nurses' occupational stress. The purpose of this study was to determine the effect of a resilience-based intervention on occupational stress in nurses at Tekab Shohada Hospital in 2016.

Materials & Methods: This research was quasi-experimental and implemented using pre-test/ post-test design. All nurses working in Shohada Hospital in Tekab city (n=60) were the subjects of this study. Firstly, by referring to the hospital, the occupational stress questionnaire was distributed to the study subjects and a pre-test was obtained from them. In the next step, the nurses were trained in 5 sessions of 1 hour, twice a week in groups of 30 people in two shifts of morning and evening at the conference hall of the hospital. After collecting post-test data, data were analyzed using SPSS / 16 software.

Results: There was a significant difference in the level of occupational stress and its components between the pre-test and post-test of the studied subjects after the intervention (P< 0/001).

Conclusion: Holding resilience training courses can help reduce nursing job stress and help to adapt individuals to existing changes.

Key words: Resilience-based Intervention, Occupational stress, Nurse

Please cite this article as: Moradi Y.. et al . Effect of resilience-based intervention on occupational stress among nurses. *World Family Medicine.* 2017; 15(9):159-163 DOI: 10.5742/MEWFM.2017.93116

Introduction

The phenomenon of occupational stress is one of the major problems that has been encountered by human societies over the last decades and with the gradual shift of societies towards modern life [1]. According to the National Institute of Occupational Safety and Health, a person faces a stressful job when there is no coordination between job needs and his/her abilities, and desires [2]. Job stress is a process that results from a person's encounter with the organization and the workplace. Occupational stress is of particular concern to people with mental health problems [3, 4]. In 1992, the United Nations recognized occupational stress as the 20th Century disease, and later the World Health Organization declared it to be the most epidemic in the world [5, 6]. The International Labor Organization has estimated labor costs for countries to be 1 to 3.5 percent of GDP due to occupational stress, indicating that this is rising [7]. Also, the American Academy of Family Physicians estimates that about two-thirds of those who have been visited and evaluated at work have symptoms of stress [8], and about 30% of the workforce in developed countries is occupational stressed [9]. Of the various occupational groups, health professionals, especially those working in the hospital environment, experience higher job stress [10]. Among the healthcare professions, nursing is also recognized as one of the high-risk occupations for physical and mental illness [11]. In our country, 80% of healthcare workers are nurses. According to the Nursing Organization, 75 percent of nurses suffer from some degree of stress and physical and mental illness [12, 13]. The National Professional Safety Association in the United States has identified nursing at the top of 43 professions with a high incidence of occupational stress-related diseases and believes nursing is likely to be at the head of tensed healthcare jobs [12]. The nursing profession is inherently tense and tension affects the quality of life and health of nurses, the burden of workload, close relationship with patients, responsibility for their lives and their lives ; technological advancements and increasing care dimensions are directly related to nursing job stress [14]. Long working hours, busy work, shift work, lack of freedom to act in decision-making, lack of support from managers and colleagues are among the factors that cause occupational stress in nurses [12, 15, 16].

Regarding the problems of job stress, recent attention has also been paid to resilience in the nursing profession [17, 18]. In this connection, McGee in the theory of limited scope of resilience in nursing, and a nursing pattern [19] sees resilience as the ability to change disaster and turn it into a growing and forward-looking experience, and in his view, he considers the four infrastructure patterns to be resilient. Each of these patterns plays a role in both empowering and empowering individuals. The four patterns are readiness patterns, relational patterns, situational patterns, and philosophical patterns [19-21].

For resiliency five dimensions proposed by Gitterman include: 1- Integration with the family 2- Consistency with the social environment 3- Consistency with the physical environment 4. Integration with the inner wisdom and 5. Supporting mentality. These dimensions enable individuals to develop appropriate coping skills in challenging situations [22].

In relation to the research background, Kutluturkan and et al, showed a significant negative correlation between resiliency and burnout [23]. In their analysis, Warelow and Edward (2011) stated that nurses should increase their resilience skills in the 21st century in order to cope with their professional problems and mental health [24]. Allister and Kinnon (2013) found that resiliency is one of the important and effective factors in nursing career success and resilient capacity is required for nursing careers' success [25]. Therefore, based on the importance of the above-mentioned cases, the present study aimed to determine the effect of resilience-based intervention on occupational stress in hospital nurses.

Materials and Methods

Study Design and Participants

This research was quasi-experimental and was implemented using pretest-posttest design. All nurses working in Shohada Hospital in Tekab city were the subjects of this study. Sampling was complete and all 60 nurses working in Shohada Hospital in Tekab entered the study. The criteria for entry to studying were having a bachelor's or master's degree, a lack of a second job, having constant shifts (in the morning, evening, and evening), did not attend the taught training courses associated with resilience in the past 3 months, and the exclusion criteria were the reluctance to continue in the study, the lack of willingness to complete a questionnaire or an irregular company and absence from more than two sessions of classes. Participation in this study was also voluntary.

Instruments

In this study, the occupational stress questionnaire of the British Occupational Safety and Health Organization was used. The questionnaire was compiled by the British Health and Safety Executive Agency (HSE) and was reviewed by free translation and its validity and reliability. The occupational stress questionnaire is designed to measure work-related stresses and has 35 items with seven subscales of Demands, Control, Managers' support, Peer support, Relationships, Role, and Change. In this scale, high scores indicate low occupational stress [26]. In this study, Cronbach's alpha coefficient for the total job stress scale 89.9 and each of dimensions of demand, control, support of authorities, support of colleagues, communication, role and changes 0/77, 0/70, 0/69, 0/77, 0/81, 0/70, 0/72 were obtained respectively.

Procedures

Following the informed consent, patients were assured of the secrecy and confidentiality of their information. Then, occupational stress questionnaire was distributed in the group and a pretest was obtained from them. In the next step, the nurses were trained in 5 sessions of 1 hour, twice a week in groups of 30 people in two shifts of morning

and evening at the conference hall of the hospital. The number of meetings held for all nurses was equal. Methods of training in interventional phase included lectures, discussion and participation of nurses in role play, group training and pamphlet presentations.

Ethical Considerations

The present study was approved by the Ethics Committee of Urmia University of Medical Sciences. Informed consent was obtained from all participants. Participants were briefed on the objectives and methods of the study and ensured about the voluntary nature of participation in, and withdrawal from, the study as well as the confidentiality of their data.

Data Analysis

SPSS 16 was utilized to analyze the data. Further to descriptive statistics, first, Kolmogorov-Smirnov test was used to assure the normal distribution of variables (Table 1), and then paired t-test, was utilized to study the mean of scores within groups. Normally distributed data were presented as the mean ± standard deviation (SD). The significance of data was set at a p-value of 0.05.

Table 1: Results of the Kolmogorov-Smirnov test to determine the normality of the data

Variable	n		K-S		P-value	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Demands	60	60	1/28	0/60	0/07	0/85
Control	60	60	1/04	0/63	0/22	0/81
Managers' support	60	60	1/33	1/18	0/06	0/12
Peer support	60	60	1/31	1/23	0/06	0/09
Relationships	60	60	0/78	0/76	0/57	0/60
Role	60	60	1/10	1/39	0/17	0/11
Change	60	60	1/20	1/53	0/10	0/13
Occupational stress	60	60	0/99	0/93	0/27	0/33

Findings

28.3% of the study subjects were male and 71.3% female. The mean scores of occupational stress in men and women were 123.29 ± 15.11 and 171.05 ± 19.97 respectively and there was no statistically significant difference in terms of the level of occupational stress between both groups (P=0. 33).

Based on the results of the paired t-test, there was a statistically significant difference in the level of occupational stress and its components between the pre-test and post-test of the studied subjects after the intervention. (Table 2)

Table 2: Comparing the mean scores of occupational stress and its subscales before and after the intervention

Item	Mean ± SD		T	P-value
	Before	After		
Demands	16/97± 3/78	22/67± 5/85	-6/26	< 0/001
Control	15/33± 3/86	19/53± 4/39	-5/56	< 0/001
Managers' support	13/73± 3/75	16/93± 3/98	-4/06	< 0/001
Peer support	11/8± 2/40	14/77± 3/56	-5/27	< 0/001
Relationships	11/5± 3/46	13/07± 4/14	-5/27	< 0/001
Role	18/2± 2/76	22/13± 2/72	-7/40	< 0/001
Change	8/8± 2/16	13/23± 2/63	-10/30	< 0/001
Occupational stress	97/77± 16/17	119/53± 18.75	-6/75	< 0/001

Discussion

The results of this study showed that the mean score of occupational stress in the group before and after intervention based on resilience is different. As a result, there is a significant difference in the amount of occupational stress in the two periods before and after the resilience training within the group. The results of this study were consistent with the results of studies by Kutluturkan et al, Warelow et al, McAllister et al and Shakernia et al [21, 23-25, 27]. In his analysis of results, Warelow et al stated that nurses in the 21st Century should increase their resilience skills in order to cope with their professional problems and improve their mental health because resilience and resilient behaviors potentially help people. To overcome negative experiences and turn these experiences into positive experiences [24]. In the present study, there was a significant difference between the mean demands scores of the samples before and after the intervention. Job pressure is desirable for a person who is in balance between the demand to be met and his ability to perform that balance. As economists say, prices fluctuate if demand or supply is not consistent [29]. The results of this study showed that the mean scores of Peer support and authorities are different before and after the intervention based on resilience. In explaining the hypothesis, it should be said that an individual can achieve resilience who is in an amicable environment and does an altruistic affair [28].

The results showed that the mean scores of the control subscale were varied before and after intervention based on resiliency. Having a program and a goal for life can predict the future and determine the path. It also reduces the number of failures due to planning, which as a results of these items, resilience will be increase [28].

The results of this study showed that the mean scores on the subscale of the relationship before and after the intervention based on resilience are different. As a result, there was a significant difference in the rate of communication between the two periods of before and after the resilience training, within the group. Among important factors that cause stress can be cited disturbing relationships between colleagues, distress, insecurity and unhealthy competition [12, 30, 31].

The results showed that the mean scores of the role subscale were varied before and after intervention based on resilience. Therefore there was a significant difference in the rate of role between the two periods of before and after the resilience training within the group. In explaining this hypothesis, life is somewhat boring without coping with difficulties and without the need to develop capabilities. One needs to make maximum use of the situation in which he or she is located, and in this regard, it is necessary to balance his/her abilities and the demands [32]. Also, there was a significant difference between the mean scores of subscales of changes before and after intervention based on resilience. A person with a high level of resilience can well adapt to changes in an organization and tolerate pressures at the workplace [33].

Conclusion

Resiliency training is one of the important indicators in the way nurses deal with work environment pressures and in relation to their colleagues. Nurses with high resilience are more flexible, compatible and collaborative in their work environment than their other colleagues. Therefore, holding educational classes based on resilience has a significant effect on the efficiency of nurses.

Acknowledgments
This article was derived from MSc thesis at Urmia medical university of science and was funded by the research and technology deputy of this university. The author wishes to thank the research and technology deputies of Urmia universities and all participants.

References

1. Hajiamini Z, Cheraghalipour Z, Marzabadi A, Ebadi A, Norouzi Koushali A. Comparison of job stress in military and non-military drivers in Tehran city. Journal Mil Med. 2011;13(1):25-30.
2. Kerr R, McHugh M, McCrory M. HSE Management Standards and stress-related work outcomes. Occupational Medicine. 2009;59(8):574-9.
3. Cooper CL, Marshall J. Occupational sources of stress: A review of the literature relating to coronary heart disease and mental ill health. From Stress to Wellbeing Volume 1: Springer; 2013. p. 3-23.
4. McVicar A. Scoping the common antecedents of job stress and job satisfaction for nurses (2000–2013) using the job demands–resources model of stress. Journal of nursing management. 2016;24(2).
5. Brun J-P. Work-related stress: scientific evidence-base of risk factors, prevention and costs. Skinuto s mreže. 2008;3:2008.
6. LaPorta LD. Occupational stress in oral and maxillofacial surgeons: tendencies, traits, and triggers. Oral and maxillofacial surgery clinics of North America. 2010;22(4):495-502.
7. Park S-G, Min K-B, Chang S-J, Kim H-C, Min J-Y. Job stress and depressive symptoms among Korean employees: the effects of culture on work. International archives of occupational and environmental health. 2009;82(3):397.
8. Duraisingam V, Pidd K, Roche AM. The impact of work stress and job satisfaction on turnover intentions: A study of Australian specialist alcohol and other drug workers. Drugs: education, prevention and policy. 2009;16(3):217-31.
9. Klein S, Alexander DA. Epidemiology and presentation of post-traumatic disorders. Psychiatry. 2009;8(8):282-7.
10. Magnago TSBdS, Lisboa MTL, Griep RH, Kirchhof ALC, Guido LDA. Psychosocial aspects of work and musculoskeletal disorders in nursing workers. Revista latino-americana de enfermagem. 2010;18(3):429-35.
11. Menzel NN. Psychosocial factors in musculoskeletal disorders. Critical care nursing clinics of North America. 2007;19(2):145-53.

12. Adib-Hajbaghery M, Khamechian M, Alavi NM. Nurses' perception of occupational stress and its influencing factors: A qualitative study. Iranian journal of nursing and midwifery research. 2012;17(5):352.
13. Rezaei J, Naderi S, Mahmoudi E, Rezaei S, Hashemian AH. Job Burnout Rate and Related Demographic Factors in Nursing Personnel Employed in Emergency Departments of Chosen Educational Hospitals by Kermanshah University of Medical Science in 2012. Advances in Biological Research. 2015;9(2):117-27.
14. Bianchi ERF. Stress and coping among cardiovascular nurses: a survey in Brazil. Issues in mental health nursing. 2004;25(7):737-45.
15. Perdikaris P, Kletsiou E, Gymnopoulou E, Matziou V. The relationship between workplace, job stress and nurses' tobacco use: a review of the literature. International journal of environmental research and public health. 2010;7(5):2362-75.
16. Roberts RK, Grubb PL. The Consequences of Nursing Stress and Need for Integrated Solutions. Rehabilitation nursing : the official journal of the Association of Rehabilitation Nurses. 2014;39(2):62-9.
17. Jackson D, Firtko A, Edenborough M. Personal resilience as a strategy for surviving and thriving in the face of workplace adversity: a literature review. Journal of advanced nursing. 2007;60(1):1-9.
18. Kim B-N, Oh H-S, Park Y-S. A study of nurses' resilience, occupational stress and satisfaction. Korean Journal of Occupational Health Nursing. 2011;20(1):14-23.
19. McGee EM. The healing circle: resiliency in nurses. Issues in mental health nursing. 2006;27(1):43-57.
20. Ahern NR, Norris AE. Examining factors that increase and decrease stress in adolescent community college students. Journal of pediatric nursing. 2011;26(6):530-40.
21. Shakerinia I, Mohammadpoor M, editors. Relationship between hardiness and resiliency with mental hygiene in male mountaineer in Rasht City. Proceeding of 1st congress of covert pathology Kurdistan: Kurdistan University and Jahad Daneshgahi; 2009.
22. Gitterman A, Germain CB. Social work practice: A life model. Social Service Review. 1976;50(4):601-10.
23. Kutluturkan S, Sozeri E, Uysal N, Bay F. Resilience and burnout status among nurses working in oncology. Annals of general psychiatry. 2016;15(1):33.
24. Warelow P, Edward KI. Caring as a resilient practice in mental health nursing. International Journal of Mental Health Nursing. 2007;16(2):132-5.
25. McAllister M, McKinnon J. The importance of teaching and learning resilience in the health disciplines: a critical review of the literature. Nurse education today. 2009;29(4):371-9.
26. AZAD ME, GHOLAMI FM. Reliability and validity assessment for the HSE job stress questionnaire. 2011.
27. Shakerynya I, Mohammadpoor M. The relationship between job stress and resiliency with burnout among woman nurses. Journal of Kermanshah University of Medical Sciences, Behbud. 2010;14(2):161-9.
28. Zakeri H, Jowkar B, Razmjoee M. Parenting styles and resilience. Procedia-Social and Behavioral Sciences. 2010;5:1067-70.
29. Wilks SE. Resilience amid academic stress: The moderating impact of social support among social work students. Advances in social work. 2008;9(2):106-25.
30. Adriaenssens J, De Gucht V, Maes S. Causes and consequences of occupational stress in emergency nurses, a longitudinal study. Journal of Nursing Management. 2015;23(3):346-58.
31. Happell B, Dwyer T, Reid-Searl K, Burke KJ, Caperchione CM, Gaskin CJ. Nurses and stress: recognizing causes and seeking solutions. Journal of nursing management. 2013;21(4):638-47.
32. Killian B. Risk and resilience. A generation at risk. 2004:33-63.
33. Fadardi JS, Azad H, Nemati A. The relationship between resilience, motivational structure, and substance use. Procedia-Social and Behavioral Sciences. 2010;5:1956-60.

Calculation of Salaries and Benefits of Faculty Members in the Ministry of Health and Medical Education of Iran

Abdolreza Gilavand

Correspondence:
Expert on Faculty Appointments,
Department of Education Development Center,
Ahvaz Jundishapur University of Medical Sciences,
Ahvaz, Iran.
Email: gilavanda@gmail.com

Abstract

Introduction: The suitability of the salaries and benefits of faculty members for their livelihoods is one of the most important factors in their job satisfaction. Therefore, this research was conducted to determine how the salaries and benefits of faculty members are calculated in the Ministry of Health and Medical Education of Iran.

Methods: This descriptive and analytical study was conducted to shed more light on the way the salaries and benefits of faculty members employed at the Ministry of Health and Medical Education of Iran are calculated. Research data were collected through searching published articles in Iranian and international reputable websites as well as the administrative and employment regulations of faculty members of universities and higher education institutions affiliated to the Ministry of Health and Medical Education of Iran, and further amendments and directives in this regard.

Results: The salaries of the faculty members in Iran are determined on the basis of the salary coefficient announced annually by the government of the Islamic Republic of Iran. In addition, their salaries will increase with regard to the type of service, the increase of the base level, promotion, lack of specific profit activities outside university, acquisition of managerial positions, marriage and having children for men.

Conclusion: Faculty members expect their salaries to be calculated and paid equitably and to increase each year in proportion to the inflation rate, so that they do not have to carry out unrelated and non-academic activities outside the university in order to solve their livelihood problems.

Key words: Salaries and Benefits, Faculty Members, Ministry of Health, Medical Education, Iran.

Please cite this article as: Abdolreza Gilavand. Calculation of Salaries and Benefits of Faculty Members in the Ministry of Health and Medical Education of Iran. *World Family Medicine.* 2017; 15(9):164-169. DOI: 10.5742/MEWFM.2017.93119

Introduction

One of the factors that plays an important role in the growth and development of any society is the human resources of that country. Therefore, nowadays, there are a great deal of investments in educating and providing these resources in developing and developed countries (1-2). Experienced and motivated manpower is the most important human capital in maintaining and developing a society, and its advancement and development would not be possible unless by attracting, cultivating, maintaining and exploiting the elite and educated human resources (3). One of the effective ways of attracting, retaining, and motivating human resources is to provide them with material rewards in the form of different payment systems and methods (4). Payroll is defined as a payment that is paid to compensate employees for their activities in any institution or firm. Salary costs represent the share of labor in the production of products or services, and as one of the factors contributing to the final cost, salary costs call for measurement, control and continuous analysis (5). Determining the amount of salary that an organization must pay to its employees is one of the most key aspects of human resource management (HRM). This is firstly because the payment system (of which the payroll is only a part) has a significant impact on the attraction and satisfaction of employees, and secondly, because paying employees is one of the heaviest financial burdens that each organization must come to terms with for advancement and fulfillment of their goals. Therefore, a system of wages and salaries that is carefully designed and implemented on the basis of correct policies will play a pivotal role in the economic health of the organization as well as the effective and efficient use of the human resources in the organization (4). The employment of faculty members in the Ministry of Health and Medical Education of Iran, involves different forms, including geographical full-time and conventional full-time in terms of the scope of activities, and permanent, temporary-to permanent, under-a-contract, under conscription law in terms of the permanency of employment. Geographical full-time faculty members must serve at least 54 hours a week, according to the program, and do not have the right to work outside the university for professional profits (including working at a personal office, pharmacy or laboratory, an educational and diagnostic center, private hospitals, charity centers, etc.). A conventional full-time (non-geographical full time) faculty member is a person who serves at least 40 hours a week according to the university's program. Under exceptional circumstances, if necessary, universities and higher education institutions will be able to employ non-geographical full-time faculty members with the approval of the Board of Trustees under the conditions determined by the University Council (6). There are currently 65 universities and independent medical science faculties in Iran. Presently, 200,000 students are studying for different degrees from associate degree to clinical specialties and clinical fellowships in different fields at Iran's medical universities. There are currently 18,000 faculty members in the Ministry of Health and Medical Education of Iran, of whom 4,000 are faculty members who work temporarily under conscription law due to their commitment to free studying at universities (7). The vital role of faculty members in the efficiency, productivity and performance of universities, institutes and research centers, has urged the authorities and academic directors to pay attention to their demands with the aim of enhancing their satisfaction in order to prevent undesirable effects on the educational and research system of the country (8-10). In Iran, in particular, with the recent state of higher education and the challenges it is facing due to the irrational and unusual expansion of universities, the issue of the quality of life of faculty members and their job satisfaction has gained currency and become one of the issues that should be considered more seriously (10). In the meantime, and based on the literature, the proportionality of the salaries and benefits of faculty members with their livelihoods is considered as one of the most important factors in their satisfaction (10-16). Therefore, this study was conducted to determine how the salaries and benefits of faculty members are calculated at the Ministry of Health and Medical Education of Iran.

Methods

This descriptive and analytical study was conducted in 2017 to investigate how the salaries and benefits of faculty members are calculated at the Ministry of Health and Medical Education of Iran. Research data were collected through searching published articles in Iranian reputable sites both national and international, including (SID, MAGIRAN, PubMed, Scopus, and ISI) as well as the administrative and employment regulations of faculty members of universities and higher education institutions affiliated to the Ministry of Health and Medical Education of Iran, and further amendments and directives in this regard.

Results

The salaries of faculty members in Iran are determined on the basis of the salary coefficient announced annually by the government of the Islamic Republic of Iran for all faculty members of universities, institutes of higher education and public research, and for judges of the Ministry of Justice (To the Iranian Rial Currency/ 1 US dollar = 41,000 Rials). In addition, the salaries of faculty members will increase with regard to the type of service, the increase of the base level, promotion, lack of specific profit activities outside university, acquisition of managerial positions, marriage and having children for men, which will be further explained in more detail below. Overall, salaries and benefits are paid to the faculty members in three general ways: firstly, it is included in their HR notification letters of all faculty members, regardless of the type of employment, gender, type of work, etc. In addition to the base salary, specific allowance, special allowance, attraction allowance, and retirement and insurance deductions are also included in the HR notification. Secondly, it is again included in the HR notification letter and is, according to the type of work, gender, executive position, allowances for children, management, radiation, full-time, etc. The third way, which is not included in the faculty member's HR notification letter, is according to the contract between the faculty members and the educational/medical center where they

are working. The most important cases in point are the office deprivation allowance, good performance allowance, tuition, etc. According to the formula in Table 1, the base salary is calculated.

Base salary = salary coefficient * {base number + (grade of the faculty member * 5)}

Table 1: Calculation of base salary

Base number				
Full professor	Associate professor	Assistant professor	Instructor	TA
170	145	125	100	90

In the HR notification letters of the faculty members of the universities and higher education institutions affiliated with the Ministry of Health and Medical Education of Iran, in addition to the base salary which is calculated according to the above formula, other benefits under name of dearness allowance, specific allowance, and attractions allowance are included, which are calculated according to the following formulas. In fact, all of these items included in the HR notification letter are a certain percentage of their base salary, which is calculated on the basis of their scientific level and base.

Specific allowance = Base salary * specific allowance coefficient

Table 2: Calculation of specific allowance

Specific allowance coefficient				
Full professor	Associate professor	Assistant professor	Instructor	TA
2.98	2.87	2.6	2.1	1.77

Attraction allowance = Base salary * Attraction coefficients approved by each university (for geographical members the coefficient of 1.6 also applies)

Table 3: Calculation of attraction allowance

Amendment of attraction allowance coefficients for faculty members with different positions at medical universities and schools					University
Full professor	Associate professor	Assistant professor	Instructor	TA	
2.72	2.67	2.54	2.30	2.14	

Special allowance = Base salary * Dearness allowance coefficient

Special allowance coefficient					
Full professor	Associate professor	Assistant professor	Instructor	TA	Effective Date
4.8	5.2	5.6	4	3.6	From January 31, 2005 to March 20, 2010
7.7	8.5	9	6.5	6.5	Since March 21, 2010

In addition to the above items, for some members of the faculty with special conditions, the following items are paid:

1-Office deprivation allowance or geographical full-time: To full-time faculty members of the university, the amount of this allowance is maximally equivalent to the total amount of the base salary and specific allowance and is paid based on the calculation of educational, research, and clinical activity of the faculty member. This allowance is not payable during education, scholarship, or sabbatical leaves.

2- Job difficulty allowance: faculty members of the Anatomy Department, who work with cadavers are paid 50% of the basic salary and the specific allowance combined as a job difficulty allowance determined by the University's Board of Directors.

3. Managerial allowance: The faculty members with executive and management positions in accordance with Table 4 are paid managerial allowance.

4. Allowance of bad weather and deprivation from facilities: The faculty members who serve in disadvantaged areas are paid a sum of money for the bad weather and deprivation from facilities.

5. Family allowance: Married men faculty members are paid an amount of money which is announced annually by the government.

6. Children's allowance: Married men faculty members who have children are paid an amount of money according to their number, and the amount of this allowance is announced annually by the government.

7. Radiation allowance: Faculty members exposed to radiation receive this allowance according to the type and percentage determined by the Atomic Energy Organization and paid by the experts of the physical health unit of the university (radiation experts)

8. Dearness allowance: The salary and benefits of faculty members who have annual promotion will also be increased.

The following table illustrates the calculation of the managerial allowance of independent medical university chancellors and faculty members having managerial positions.

Percentage of Managerial Allowance	Positions at a university or faculty or affiliated institutions of the Ministry of Health	Row
100%	The Chancellor	1
Up to 80%	Vice-chancellors	2
Up to 65%	Head of Faculty or Associated Facility	3
Up to 55%	Heads of hospitals with more than 400 beds	4
Up to 50%	Academic Staff Directors and Heads of Offices Subordinated to the University Chancellor, Managements Subordinated to the University Vice-chancelleries, Heads of Independent Research Centers (with a budget credit), Director of the Medical Education and Development Center, Advisors of the University Chancellor, Heads of Faculties or Independent Institutes, Heads of Hospitals with 200-400 beds, Health Network Administrators with a population of 200,000, Heads of the Health Centers of the provincial capital, Heads of the Secretariat of the Board of Trustees.	5
Up to 40%	Deputies of Academic Staff Directors of the University / Faculty / Institute, Deputies of Independent Research Centers, Head of the Emergency Center, Head of the Central Library, Head of the Central Laboratory, Directors and Deputies of Hospitals with fewer than 200 beds.	6
Up to 30%	Heads of offices subordinated to the vice-chancelleries of the University or Institute, Heads of hospital wards and Faculty Departments, those in charge of laboratories of hospitals, faculties and institutes, Heads and administrators of colleges	7

Discussion and Conclusion

Several studies on the satisfaction of faculty members in Iran have shown that there is a direct relationship between job satisfaction and the salaries and benefits of faculty members (10-14). This satisfaction has also been reported to be influenced by their age factor. In fact, the age variable has a significant relationship with the creation of job satisfaction. This relationship seems to be influenced by the faculty members' professional concerns such as the amount of salary, work stability and working environment conditions, which are all of specific importance at different ages (10). For example, many faculty members under the age of 30 are mainly concerned about the salary, while the main concern of faculty members aged 30-39 is occupational security, and those aged 40 and above consider the conditions of the workplace as a cause of job motivation. This result can also be attributed to the employment status and academic rank of the faculty members. That is, faculty members under 30, due to lower academic rank and lower salaries, are more concerned about obtaining salaries as a motive for satisfaction. It seems that their concern for having a stable job is not as much as that of faculty members between 30 - 39, which is apparently because their age conditions make it possible for them to earn other job opportunities. However, in the age group of 30-39, the concern for having a stable job is more important. Faculty members in this group usually have temporary-to-permanent or under-a-contract type of employment; therefore, the motivation to create job stability is higher for them, because their scientific life has begun many years ago and this situation needs to be consolidated to earn symbolic capital. Job stability is seen as a condition for obtaining mental well-being and a fixed salary and benefits consistent with the job position. However, faculty members aged 40 and over who mostly have a more stable position in terms of personal and professional life, are more likely to pursue a suitable environment for academic activities and express it as an incentive for job satisfaction. Of course, such generalizations are not exact given the moderate and low quality of working life of faculty members. In particular, earning a stable job position or a satisfying income, which is influenced by social, political, and economic conditions, leads some faculty members to feel insecure at any age and rank. However, a few studies also show that individuals with higher education, and full professors compared with associate professors, and associate professors compared with assistant professors, and those with executive responsibilities, have more satisfaction.

Faculty members expect their salary to be fairly calculated and paid every year and be in proportion to the inflation rate, so that they do not have to do unrelated and non-academic activities outside the university to solve their livelihood problems. .

In general, the salary and benefits system of any organization must be designed in such a way to have these features:

1. It should be sufficient for the employees to earn a living and meet their basic needs for food, clothing, housing and safety.
2. It should motivate staff to improve performance.
3. It should be economic and effective. That is, it should be compatible with the financial power of the organization in the first place, and with the employees' skills and capabilities, in order to achieve the maximum returns from the salary and benefits paid.
4. It should enable the organization to compete with other organizations. That is, the system of salaries and benefits, compared with other similar systems, needs to be better or at least have the same incentives. It goes without saying that this is effective in attracting and retaining forces.
5. It should be rational and the staff accept its rationality.
6. It should be fair. First, the salary and benefits should be in proportion to the specialty, skill, experience and work experience of individuals. Secondly, the terms and conditions for granting these benefits should be the same for all individuals. Obviously, the fairness of the system of salaries and benefits is an important factor in accepting it and also in creating job satisfaction.

This article has been extracted from a research project approved by the Office of Vice-chancellor for Research and Technology Development of Ahvaz Jundishapur University of Medical Sciences (U-95126).

References

1. Gilavand A. Quality Assessment of Staff in-service training from View Points of Employees Ahvaz Jundishapur University of Medical Sciences. Future Med Educ J. 2016; 6 (2): 42-46. doi: 10.22038/fmej.2016.7516
2. Mehralizadeh Y, Moghadaspour E, Joudzadeh N. Management and Strategic Planning. Tehran. Rahemoaser. 2013.
3. Gilavand A., Espidkar F. Investigating the Barriers to Women's Promotion to Managerial Positions in Iranian Universities and Higher Education Institutions: A Review. Indo Am. J. P. Sci, 2017; 4(08) 2574-2582. doi.org/10.5281/zenodo.853173.
4. Saadat E. Human Resource Management. Tehran. Samt. 2013.19 253-305.
5. Payroll. Wikipedia: https://en.wikipedia.org/wiki/Payroll
6. The Administrative and Employment Regulations of the Faculty Members of the Universities and Higher Education Institutes Affiliated with the Ministry of Health and Medical Education in Iran. 2011; 2-8
7. Gilavand A. Evaluating the Process of Recruiting Faculty Members in Universities and Higher Education and Research Institutes Affiliated to Ministry of Health and Medical Education in Iran. World Family Medicine. 2017; 15(8): 155-159. DOI: 10.5742/MEWFM.2017.93070
8. Gilavand A. Pathology of Faculty Members' rank Promotion in Universities and Higher Education Institutions Affiliated to the Ministry of Health and Medical Education of the Islamic Republic of Iran. Int J Med Res Health Sci. 2016; 5(9S): 25-30.

9. Hosseinpour M, Gilavand A. Analyzing Research Productivity of Humanities Faculty Members in Universities of Ahvaz, southwest of Iran. Indo Am. J. P. Sci, 2017; 4(09) 2949-2958. doi.org/10.5281/zenodo.892394.
10. Asghari F. Job Satisfaction of Faculty Members in Iran. Quarterly Journal of Welfare and Social Development Planning. 2014; 24 (3):195-230. URL: http://journals.atu.ac.ir/article_2005.html
11. Foroughi F, Kharrazi H, Iranfar S, Rezaei M. Job Satisfaction and its Affecting Factors from the Viewpoints of Faculty Members of Kermanshah University of Medical Sciences. Iranian Journal of Medical Education. 2008; 7 (2): 335-342. URL: http://ijme.mui.ac.ir/article-1-690-fa.html
12. Teymouri M, Tootoonchi M, Salehi M, Hassanzadeh A. Job Satisfaction among Faculty Members of Isfahan University of Medical Sciences. Iranian Journal of Medical Education. 2008; 7 (2):227-237
URL: http://ijme.mui.ac.ir/article-1-699-fa.html
13. Daneshmandi M, Habibi H, Sirati M, Zareian A, Pishgoei A H. Faculty Members' Job Satisfaction in Selected Military Universities. Iranian Journal of Medical Education. 2012; 12 (6): 458-466.
URL: http://ijme.mui.ac.ir/article-1-1661-fa.html
14. Ravari A, Mirzaei T, Vanaki Z. The nature of job satisfaction concept: an integrative review of literature. Quarterly Journal of Nursing Management. 3. 2013; 1 (4): 61-71. URL: http://ijnv.ir/article-1-116-fa.html
15. Chung KC, Song JW, Kim HM, Woolliscroft JO, Quint EH, Lukacs NW, Gyetko MR. Predictors of job satisfaction among academic faculty members: do instructional and clinical staff differ?
Med Educ. 2010; 44(10):985-95. doi: 10.1111/j.1365-2923.2010.03766.x.
16. Krueger P, White D, Meaney C, Kwong J, Antao V, Kim F. Predictors of job satisfaction among academic family medicine faculty: Findings from a faculty work-life and leadership survey. Can Fam Physician.

The effect of education on self-care behaviors of gastrointestinal side effects on patients undergoing chemotherapy

Shokoh Varaei (1)
Ehsan Abadi Pishe (2)
Shadan Pedram Razie (3)
Lila Nezam Abadi Farahani (4)

(1) Ph.D. in Nursing, Assistant Professor of Internal Medicine Nursing, Faculty of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran
(2) MSc Student, Internal- Surgery nursing, Faculty of Nursing and Midwifery, Tehran University of Medical Sciences, Iran
(3) Master of Science (MSc) in Nursing, Faculty Member, Department of Nursing and Midwifery, Faculty of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran
(4) Master of Science in Biomedical Science

Corresponding author:
Ehsan Abadi Pishe
MSc Student, Internal- Surgery nursing,
Faculty of Nursing and Midwifery,
Tehran University of Medical Sciences,
Iran
Email: ehsanabadipishe@yahoo.com

Abstract

Background and Objectives: Cancer is a deadly disease of humanity. One of the main curative options is the use of chemotherapy treatments. From 40 to 80 percent of chemotherapy treatment can cause complications such as nausea and vomiting, mouth sores and disorders of the bowel. The aim of this study was to evaluate the effect of education on self-care behaviors on gastrointestinal side effects in patients undergoing chemotherapy.

Methodology: This study is a randomized clinical trial of 60 women with breast cancer undergoing chemotherapy who were referred to Chamran hospital chemotherapy center. Prior to chemotherapy and after obtaining the consent for the random sampling method, patients were divided into two groups, intervention and controls. Patients in the intervention group received routine treatment to improve the side effects of chemotherapy, in the form of self-care training received from the researcher. Data was collected by a demographic questionnaire, a questionnaire on side effects of chemotherapy questionnaire and Morrow standard questionnaires were collected. Data using descriptive and inferential statistics were analysed by SPSS¬¬¬v21 software.

Results: The results showed that the use of self-care education to reduce mouth sores was statistically significant ($p < 0.05$). Self-care training also leads to a reduction in frequency and severity of nausea and vomiting in patients. This reduction was statistically significant ($p < 0.05$).

Conclusion: Findings of the study showed that the use of self-care training alongside drug regimen reduces the side effects of chemotherapy in patients. Therefore, it is recommended that nurses use this technique as a complementary method to reduce side effects of chemotherapy.

Key words: self-care, side effects of chemotherapy, chemotherapy, nurses

Please cite this article as: Please cite this article as: Varaei S. et al. The effect of education on self-care behaviors of gastrointestinal side effects on patients undergoing chemotherapy. *World Family Medicine.* 2017; 15(9):170-175
DOI: 10.5742/MEWFM.2017.93120

Introduction

Cancer can be considered as one of the most dangerous diseases that affects humanity. Cancer often can be considered on equal terms with death, disfigurement and dependency (1). Cancer is a global problem that affects people regardless of age, race, and socioeconomic status. Cancer annually kills about 552,200 people worldwide (2). Treatment of cancer is complex, and includes surgery, radiation and chemotherapy, which may be combined or used separately. The most common treatment is the use of chemotherapy (3). Today, with the increasing development of medical science and pharmacy and chemotherapy, drugs have been able to greatly reduce cancer mortality and increase life expectancy in patients (4). A variety of chemotherapy regimens that are moderate to severe, can cause complications such as nausea, vomiting, bowel disorders and mouth ulcers in patients. Generally, 40 to 80 percent of patients suffer from side effects of chemotherapy. These complications cause water and electrolyte disorders, weakness and fatigue, decreased immunity, and bacterial and fungal infections can occur throughout the body (5). The severity of side effects of chemotherapy varies from person to person. Side effects in some patients, may be so severe as to cause the withdrawal of the patients' treatment (6). Other patients also have disrupted social role, withdrawal from society, physical dysfunction and depression. Therefore, it is vital that the side effects of chemotherapy in cancer patients are reduced (7).

To reduce side effects of chemotherapy in patients serotonin receptor antagonist drugs, corticosteroids, metoclopramide, laxative and industrial mouthwash have been used (8). Research has shown that in 50% of cases complications arising from chemotherapy in patients with drug use has been observed (9, 10). On the other hand, these medications are associated with increased healthcare costs and side effects such as extrapyramidal side effects, fatigue, drowsiness, hypotension, headache, increased dry mouth, and restlessness and side effects may limit the medication (8). Studies have shown that drug treatment reduces side effects of chemotherapy in patients. But the full effects are not eliminated therefore the use of non-pharmacological methods with medical methods to reduce side effects of chemotherapy in patients has been proposed. A variety of non-pharmacological methods of traditional medicine, relaxation techniques such as yoga, hypnosis and acupuncture can be named (11).

One of the non-medicinal methods to reduce side effects of chemotherapy is the use of self-care. The self-care theory of Dorothea Orem, a famous theoretician is one of the most common theories in the field of clinical nurses and nursing students used by researchers (12). In his theory of self-care, the patient needs assessment is done and the needs of patients in order to reduce the side effects of chemotherapy are determined. Then oncologists and specialist nurses of chemotherapy are trained according to the latest guidelines published by the National Cancer Institute (13). The ability to find patient care in the absence of health centers and when there is no access to these centers to reduce the side effects of chemotherapy is a major concern. This incurs possible increased medical expenses and decreased access to health centers (14). In studies on self-care, especially its impact on chronic diseases, it has been shown that the effects of self-care in patients have been less reported (15, 16). Less studies about self-care and its impact on the reduction of side effects of chemotherapy is taken. Therefore, further research in this area appears evident. On the other hand, nurses as one of the most important health team members who are in direct contact with patients could be involved in teaching this as one of the most important tasks for such patients. Nurses with such training can be more effective and provide tips and a more sustainable model of care to patients (17). According to the above the purpose of this study was to evaluate the effect of self-care behaviors of gastrointestinal side effects in patients undergoing chemotherapy.

Materials and methods

This study is a randomized clinical trial (18) that was conducted in Chamran hospital chemotherapy centers between January 2016 to May 2017. A sample using the following formula and 95% confidence and 90% power and using the results of studies that had been done in this area (19) in each group of 30 was determined.

Sampling method was available and samples divided randomly into two groups of intervention and controls were allocated.

Inclusion criteria included in the study were over 18 years of age, a definite diagnosis of breast cancer by a physician, oncology, ability to read and to write and lack of medical and paramedical subjects in groups and not receiving formal training and previous self-care and for relieving the side effects of chemotherapy, a regimen of moderate to severe chemotherapy, the use of drugs other than drugs prescribed by a physician, lack of digestive diseases, kidney disease, liver failure, gastrointestinal tract obstruction. On the other hand, those who do not wish to continue participating in the study were excluded.

The instrument used in this two-part study of demographic and inventory side effects of chemotherapy by ten members of the university of Medical Sciences of Tehran board was examined for its validity and reliability and was confirmed was the standardized questionnaire of Morrow (1984), which has 18 questions about side effects of nausea and vomiting. We assessed the validity and reliability of the various studies and the correlation value of R = 0.72-0.96 was reported (20).

After obtaining confirmation from the ethics committee of Tehran University of Medical Sciences s permission was granted with 9311698006 code and IR.TUMS.FNM.REC.1395.1637 with reference to the above chemotherapy hospitals, among women with breast cancer who met the inclusion criteria after explaining the purpose of the study

and obtaining informed consent from patients to participate in the study sample.

The Morrow questionnaire and chemotherapy questionnaire were used before initiation of chemotherapy, and the side effects of chemotherapy patients in the intervention group and the control group were recorded. Patients in both groups were informed that Morrow questionnaire was to be completed in the first three days after discharge from the hospital every night and at a specified time and on the third day to complete the questionnaire on side effects of chemotherapy. After patients received chemotherapy in the first period when the questionnaires were taken then patients in the intervention group, at two sessions for 20 minuteswere taught face to face. It should be noted that both groups benefits from treatment were routine. The patients in both groups after the end of chemotherapy were re-assessed Morrow questionnaires and the side effects of chemotherapy were recorded and the patients were asked in the first three days after discharge to complete questionnaires every night. In the intervention group a pamphlet based on the most serious patients were put at the disposal of the National Cancer Institute guidelines. After collecting the questionnaires, the data using descriptive statistics such as mean and standard deviation and inferential statistics, including t-test and chi-square and software SPSS genes and were analyzed. A significance level of $P < 0.05$ was considered.

Findings

The sample participating in the study included 60 patients with breast cancer who met the inclusion criteria. Demographic and clinical characteristics of both groups included age, smoking history, alcohol, opium drug use, number of sessions of chemotherapy and mastectomy, which is presented in Table 1 and 2. In surveys conducted in terms of the numbers of patients in the control group and the experimental group in terms of demographic characteristics were homogeneous.

The results showed that patients in the intervention group who had undergone training in self-care behavior compared to the control group patients, complained less of stomatitis and mouth ulcers. That's why the intervention effect of the change in the mean indices before and after the intervention and control groups was used. In the intervention group it reduced on average by 6.63 units of stomatitis and in the control group increased by an average of 0.76 units. The changes were not statistically significantly different between the two groups (Table 3 - page 168).

The results showed that the patients are prepared for the effects of fecal excretion rate of complications in the intervention group increased at a rate of 2.36 units. This control declined by 1.03 unit. These results were also statistically significant (Table 3).

The results showed that patients in the intervention group had less occurrence and severity of nausea than patients in the control group. These results are statistically significant (Table 3).

The severity and vomiting in patients in the intervention group were less likely to complain of side effects and these results were also statistically significant (Table 3).

Discussion and Conclusion

This study aimed to investigate the effect of self-care education on complications of chemotherapy. The results showed that the effects of stomatitis and complications associated with nausea and vomiting in patients in the intervention group compared to the control group of patients decreased significantly. In this regard Karbaschi et al in their study reached the same conclusion that stated the patients who were under the self-care of the side effects of chemotherapy had a better quality of life (21). Masoudi et al's study results are consistent with results in 8 sessions of a self-care program based on the needs of patients for patients considered to be based on self-care training was conducted for patients. Patients before the study in terms of quality of life in the intervention group and the control group differed significantly but after the tasks involved, those in the intervention group scored better quality of life than patients in the control group reported (22). Golchin et al. achieved similar results. Demographic variables of patients were similar but regarding the presence of side effects of chemotherapy, there was no communication with each other. After training patients in the intervention group more than the control group patients, had better quality of life. The design and implementation of training programs was based on the training needs of patients as well as the extensive care-self program outlined in this study had been proposed (23).

The results of this study showed that nausea, and its frequency and severity in the intervention group after execution of training required receiving less care than patients in the control group. The results of the study were consistent with Karbaschi et al's results (21). Similar results were obtained in the study of Williams and Sherir. This means that education about self-care by nurses often reduces nausea in patients and patients who were admitted to this training had better quality of life (14). The results of this study showed that patients who had trained in self care had a lower rate of complications than patients in the control group and complained less of nausea and vomiting. These results were consistent with the Komatsu et al. Komatsu in his study suggested a self-care program by offering a package of educational and face-to-face performing of self-care training.

In the present study, the effects of too much intervention of patients in the intervention group had side effects of chemotherapy. Intervention on the side effects of nausea, vomiting and stomatitis had a direct effect and less side effects of chemotherapy where patients expressed complaint. On the other hand, patients can use the program without referring to self-care health centers to relieve their symptoms (24). The results of the study correspond with Williams self-care training that can improve physical and mental intensity of patients in the intervention group more than the control group (14). The study conducted by Sharif

Table 1: Compared and related demographic data of the sample of women with breast cancer who referred to Chamran Hospital in 2016-17

Chi-square test result to search homogeneous group		Total		Control		Case		GROUP Background information	
Test result	Significant level	Percent	Number	Percent	Number	Percent	Number		
Homogeneous	0.818	8.3	5	6.7%	2	100%	3	Single	Marital status
		83.3	50	83.3%	25	83.3%	25	Married	
		8.3	5	10.0%	3	6.7%	2	Died or divorced	
Homogeneous	0.904	8.3%	11	16.7%	5	16.7%	6	Middle school	Education
		15.0%	9	16.7%	5	13.3%	4	Diploma	
		66.7%	40	66.7%	20	66.7%	20	higher diploma	
Homogeneous	0.414	38.3%	13	46.7%	14	30.0%	9	Employee	Employment status
		11.7%	7	10.0%	3	13.3%	4	Retired	
		50.0%	30	43.3%	13	56.7%	17	Householder	
Homogeneous	0.584	66.7%	40	70.0%	21	63.3%	19	NO	History of smoking
		33.3%	20	30.0%	9	36.7%	11	Yes	
Homogeneous	0.237	95.0%	57	90.0%	27	100%	30	NO	History of Opium
		5.0%	3	10.0%	3	0.0%	0	Yes	

Table 2: Compared and related demographic data of the sample of women with breast cancer who referred to Chamran Hospital in 2016-17

Result of t-test to check the homogeneity of the two groups.				Control		Case		group
Test result	The significance level	Degrees of freedom	t-statistic	Standard deviation	Mean	Standard deviation	Mean	Demographic information
Homogeneous	0.533	58	1.992	6.668	40.53	6.682	37.10	Age
Homogeneous	0.089	58	1.964	1.690	7.80	2.219	6.80	Sessions

Table 3: Comparison of the mean and standard deviation of chemotherapy side effects in women with breast cancer undergoing chemotherapy in Chamran hospital 2016-17

T test result		The control group		The intervention group		Variable	
Significant level	Statistics	Standard deviation	Mean	Standard deviation	Mean		
.007	-2.796	3.58	31.46	3.237	33.93	Before intervention	Stomatitis
.000	4.408	4.082	32.23	4.572	27.30	After intervention	
.000	7.784	3.55	.7667	3.80	-6.63	Before-after difference	
.487	-.699	2.58	18.43	3.28	18.96	Before intervention	Bowel disorder
.001	3.571	3.048	19.46	3.168	16.60	After intervention	
.000	-4.738	2.870	-1.033	2.68435	2.36	Before-after difference	
.003	-3.11	.556	2.36	.430	2.766	Before intervention	Nausea
.000	7.249	.746	2.166	.365	1.066	After intervention	
.000	8.831	.761	-.200	.534	-1.70	Before-after difference	
.089	-1.727	1.582	5.66	1.235	6.30	Before intervention	The frequency of nausea
.000	7.611	1.77	4.93	.994	2.10	Before intervention	
.000	7.968	1.89	-.733	1.44	-4.20	Before-after difference	
.011	-2.617	1.455	5.46	1.302	6.40	Before intervention	Nausea severity
.000	7.916	2.046	5.13	1.063	1.80	After intervention	
.000	8.858	1.631	-.333	2.073	-4.60	Before-after difference	
.028	-2.257	.691	2.06	.681	2.46	Before intervention	Vomiting
.000	5.814	.691	2.26	.639	1.26	After intervention	
.000	5.640	1.030	0.20	.886	-1.20	Before-after difference	
.154	-1.444	1.423	5.200	1.436	5.73	Before intervention	The frequency of vomiting
.000	6.695	1.748	4.90	1.349	2.20	After intervention	
.000	6.923	1.822	-.300	1.79	-3.53	Before-after difference	
.057	-1.943	1.337	5.266	1.575	6.00	Before intervention	Vomiting severe at every turn
.000	6.680	1.743	5.166	1.129	2.63	After intervention	
.000	7.87	1.423	-0.11	1.77	-3.367	Before-after difference	

et al., indicated a significant difference between all physical and psychological side effects of chemotherapy in the experimental group after intervention (25). These results are quite consistent with the findings of Iconomou et al. that implemented education and intervention programs to increase the quality of life and reduce side effects of chemotherapy (26).

According to the results of this study it can be stated that the use of self-care training on the side effects of the therapy can be used to mitigate side effects of chemotherapy. Orem self-care program based on a non-drug, non-invasive and low cost can be used to control the side effects of chemotherapy patients. Learning self-care practices can be given by nurses to the patients families. Self-care unit nurses of chemotherapy should be based on Orem's comprehensive program that includes comprehensive training and support to clients including their main tasks considered and first by examining the educational needs of patients which is actually an essential component of the educational process to help clients achieve maximum health and learn to maintain it and side effects of chemotherapy. According to the results of this research it is essential, nurse managers should understand the importance of education and the concept of self-care in the field of chemotherapy to alleviate complications, as well as to be aware of the importance of self-care to improve quality of life and reduce side effects of chemotherapy and support the participation of patients in treatment. This knowledge enables nurses to understand these concepts in the care of cancer patients and instituting it and thus provide optimal care, taking into account ethical considerations, and provide support to patients and their families.

Acknowledgments
This study is the result of a master's thesis in the School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran University of Medical Sciences with the support and assistance of Chamran hospital, has been implemented. The authors hereby express their gratitude to the centers and all participants as well as personnel of the centers of chemotherapy.

References

1. Molassiotis A, Aapro M, Dicato M, Gascon P, Novoa SA, Isambert N, et al. Evaluation of risk factors predicting chemotherapy-related nausea and vomiting: results from a European prospective observational study. Journal of pain and symptom management. 2014;47(5):839-48. e4.
2. Coebergh JW, van den Hurk C, Rosso S, Comber H, Storm H, Zanetti R, et al. EUROCOURSE lessons learned from and for population-based cancer registries in Europe and their programme owners: improving performance by research programming for public health and clinical evaluation. European Journal of Cancer. 2015;51(9):997-1017.
3. Evans DB, Abbruzzese JL, Rich T. Cancer of the pancreas. Cancer: principles and practice of oncology. 1997;1:1126-61.
4. Liao G-S, Apaya MK, Shyur L-F. Herbal medicine and acupuncture for breast cancer palliative care and adjuvant therapy. Evidence-Based Complementary and Alternative Medicine. 2013;2013.
5. Aapro M, Molassiotis A, Dicato M, Peláez I, Rodríguez-Lescure Á, Pastorelli D, et al. The effect of guideline-consistent antiemetic therapy on chemotherapy-induced nausea and vomiting (CINV): the Pan European Emesis Registry (PEER). Annals of oncology. 2012:mds021.
6. Patel PA. Evolution of 5-fluorouracil-based chemoradiation in the management of rectal cancer. Anti-cancer drugs. 2011;22(4):311-6.
7. Taspinar A, Sirin A. Effect of acupressure on chemotherapy-induced nausea and vomiting in gynecologic cancer patients in Turkey. European Journal of Oncology Nursing. 2010;14(1):49-54.
8. Tipton JM, McDaniel RW, Barbour L, Johnston MP. Putting evidence into practice: evidence-based interventions to prevent, manage, and treat chemotherapy-induced nausea and vomiting. Clinical Journal of Oncology Nursing. 2007;11(1):69.
9. Parsa-Yekta Z, Ebrahimi SM, Hosseini M, Nasrabadi AN, Sedighi S, Salehi-Surmaghi M-H. Appeal of herbal plants as a mechanism for the relief of acute vomiting induced by chemotherapy. Razi Journal of Medical Sciences. 2012;18(93):33-9.
10. Grunberg SM. Chemotherapy-induced nausea and vomiting: prevention, detection, and treatment--how are we doing? The journal of supportive oncology. 2003;2(1 Suppl 1):1-10, inside back cover; quiz 1.
11. Molassiotis A, Helin A, Dabbour R, Hummerston S. The effects of P6 acupressure in the prophylaxis of chemotherapy-related nausea and vomiting in breast cancer patients. Complementary therapies in medicine. 2007;15(1):3-12.
12. Sadat Hoseini AS, Panah AK, Alhani F. The concept analysis of health based on Islamic sources: Intellectual health. International journal of nursing knowledge. 2015;26(3):113-20.
13. Fawcett J. Analysis and evaluation of conceptual models of nursing: FA Davis Philadelphia; 1989.
14. Williams SA, Schreier AM. The role of education in managing fatigue, anxiety, and sleep disorders in women undergoing chemotherapy for breast cancer. Applied Nursing Research. 2005;18(3):138-47.
15. Wagner EH. The role of patient care teams in chronic disease management. BMJ: British medical journal. 2000;320(7234):569.
16. Khandan M, Noohi E, Mirzazadeh A. Effect of electronic self-care education and applying continues care on practice in type 2 diabetic patients; a randomized clinical trial. Journal of Kermanshah University of Medical Sciences (J Kermanshah Univ Med Sci). 2012;15(6).
17. Ghanbari A, PARSA YZ, Faghihzadeh S, Hashemi S. Application In Self Care Model To Determine The Influencing Factors On QOL And Patient's Metabolic Condition. 2004.
18. Polit DF, Beck CT. Nursing research: Generating and assessing evidence for nursing practice: Lippincott Williams & Wilkins; 2008.
19. Yeh CH, Chien L-C, Chiang YC, Lin SW, Huang CK, Ren D. Reduction in nausea and vomiting in children undergoing cancer chemotherapy by either appropriate or sham auricular acupuncture points with standard care. The Journal of Alternative and Complementary Medicine. 2012;18(4):334-40.
20. Morrow G. A patient report measure for the quantification of chemotherapy induced nausea and emesis: psychometric properties of the Morrow assessment of nausea and emesis (MANE). The British journal of cancer Supplement. 1992;19:S72.
21. Karbaschi, Zareian, Armin, Dagar. The effect of Orem self-care program on quality of life of cancer patients undergoing chemotherapy military personnel. Journal of Military Care. 2015;2(2):69-77.
22. Masoudi R, Mohammadi I, Ahmadi F, Hasanpour-Dehkordi A. The effect of self-care program education based on Orem's theory on mental aspect of quality of life in multiple sclerosis patients. Iran Journal of Nursing. 2009;22(60):53-64.
23. Golchin M, Shabanloei R, Asvadi I, Eivazi Ziaei J, Nikanfar A, Dolatkhah R. Effects of self care program on quality of life in patients with acute leukemia receiving chemotherapy. Zahedan Journal of Research in Medical Sciences. 2008;10(3):0-.
24. Asuzu CC, Elumelu TN. Assessing cancer patients' quality of life and coping mechanisms in Radiotherapy Department of the University College Hospital, Ibadan. Psycho-Oncology. 2013;22(10):2306-12.
25. Sharif F MS, Tabatabaee HR, Saberi-Firoozi M, Gholamzadeh S. Effects of psycho-educational intervention on health-related quality of life [QOL] of patients with chronic liver disease referring to Shiraz University of Medical Sciences. Health Qual Life Outcomes. 2005;3(81):1-6.
26. Iconomou G, Viha A, Koutras A, Koukourikou I, Mega V, Makatsoris T, et al. Impact of providing booklets about chemotherapy to newly presenting patients with cancer: a randomized controlled trial. Annals of oncology. 2006;17(3):515-20.

Creating and Validating the Faith Inventory for Students at Islamic Azad University of Ahvaz

Solmaz Choheili (1)
Reza Pasha (2)
Gholam Hossein Maktabi (3)
Ehsan Moheb (4)

(1) MA in Educational Psychology, Department of Psychology, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran
(2) Department of Psychology, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran
(3) Department of Psychology, Shahid Chamran University of Ahvaz, Ahvaz, Iran
(4) Phd in Educational Psychology, Department of Educational Psychology, Shahre-kord Branch, Islamic Azad University, Shahre-kord, Iran

Corresponding author:
Reza Pasha
Department of Psychology,
Ahvaz Branch, Islamic Azad University,
Ahvaz, Iran
Email: g.rpasha@yahoo.com

Abstract

This study aimed to develop and validate the faith inventory. A sample of 736 students of Islamic Azad University of Ahvaz was selected by multi-stage random sampling method and a faith inventory with 100 items was used to measure their faith. Each item was based on the five-point Likert scale from Not fully used to Fully used. After collecting data, the correlation of each item with the total score was calculated. The Cronbach's Alpha coefficient for the 100-item set was 0.967; after eliminating 10 items for a set of 90 questions, it was 0.996. Factor analysis was used to verify the construct validity of the inventory; the KMO value as a measure of sampling adequacy was 0.958 and the significance of the Bartlett's sphere test indicated that there were suitable conditions for implementing factor analysis. After removal of inappropriate questions with a factor load of less than 0.3, based on the analysis of principal components and varimax rotation, according to the factor matrix, gradient diagram and the percentage of variance explained, four factors were extracted from a set of 90 questions, explaining 44.87% of the total variance among the variables. The first factor with 57 items and the special value of 30.97 covers about 69.02% of the total variance of the variables and is an indicator of belief/certainty; the second factor with 14 items indicates justice, the third factor with nine items, shows the Jihad and the fourth factor with 10 items measures the patience.

Key words: Faith, Validity, Inventory, Narration

Please cite this article as: Please cite this article as: Choheili S. et al. Creating and Validating the Faith Inventory for Students at Islamic Azad University of Ahvaz *World Family Medicine.* 2017; 15(9):176-180
DOI: 10.5742/MEWFM.2017.93122

Introduction

Faith and religious beliefs in Iranian society are considered as the main pillars of life and over the three last decades, religious teachings have been particularly emphasized (1). Faith refers to any type of principle, guidance, belief, certainty or tendency that makes life meaningful and purposeful (2). No decent psycho-inventoryist - even a non-religious one - can ignore the importance of religion, faith, and religious beliefs in the process of psychotherapy, mental health, meaningfulness of life, psycho-inventoryical well-being, and so on (3). The results of psychoinventoryical studies have shown that children who have been trained by strongly religious teachings before adolescence and adulthood, question their religious beliefs and nearby people in their adulthood. This is due to the fact that human thinking grows, and rapid cognitive development makes it easier for them to judge on matters of value and religion and to react more precisely and complicatedly to these issues (4, 5). Adults are at the highest risk of poverty and neglect of human values and diminished faith and should be placed as priority in psychological studies of value and religion. Considering that until now, research on recognition of the faith periods based on the stages of development have been less considered, conducting a study that can providea scientific basis for the design and examination of the concept of faith of people in a particular cultural area based on the process of transforming concepts, is seriously needed. This first and foremost requires the need for accurate, valid and reliable tools for obtaining strong results.

Fowler (6) does not present a comprehensive definition of faith and only summarizes some of the characteristics of faith: “Faith is an inclusive thing in all human beings. We have been equipped with the capacity of faith from birth”. He focuses on the two characteristics of faith: universality and fundamentality: “Faith is so fundamental that no human being can live well without having it for a long time, and it is so comprehensive, namely when we slowly present symbols, slogans, or moral patterns, we express our faith. Clear faith is the only common phenomenon in all religions, the Christians, Marxists, Hindus, and Dinka (Ekman, 1995). Fowler (6) regards faith as a general conception and states: “Faith is a puzzle that is not easy to understand.”

Man’s orientation or reaction to himself, others, and the universe is called belief (7). Faith reflects human talent in seeing and feeling; the transcendent dimension and corresponding behavior reflects its capacity in the perception of meaning beyond materiality. In other words, faith is any kind of principle and guidance, belief and certainty, which gives meaning to one’s life and directs it and as a way of life originates from human nature (Mohammadzadeh, 2005).

Fowler (6) presents theory of faith, with a perceptual model about the effects of faith. This theory has raised the concept of faith, its relation to life, the goals of humanity, and the sense of creating meaning in life. According to Fowler (8), the theory of faith shows the way people understand faith throughout life.

The development of measurement methods and new psychometric theories have led to the emergence of new scholarly methods for assessing the talents, abilities and other psychometric characteristics of individuals that have been considered by the instructors, consultants, psychologists and other behavioral science experts. Although a number of instruments have been developed for measurement of religious tendencies and similar subjects, limited research has been carried out on the measurement of faith due to its newness. Because this tool (inventory) is designed to measure students’ faith, it is necessary to measure its validity and reliability among the students. Considering that the subject under study has an exploratory aspect, it is also necessary to provide an answer to the following questions:

1. Is there enough internal consistency between the set of questions that are presented to assess the students’ faith?
2. Is the set of questions designed to measure the students’ faith sufficiently valid?
3. What are the underlying components of faith inventory for students and how much are they saturated?

Method

The statistical population in this study consists of all 736 students of Islamic Azad University of Ahvaz in the academic year of 2016-2017. A multi-stage sampling method was used to determine the sample size. To this end, the population of each faculty was determined and divided into four faculties (Faculty of Agriculture, Faculty of Midwifery and Nursing, Faculty of Engineering and Faculty of Humanities) and participants who were randomly selected by lot from all four faculties in proportion to the population of each district based on sex. The faith inventory is designed to be applicable to all meta-religious areas with visible faith and implications. Therefore, the questions are designed to show people’s faith beyond religious orientations.

The main collection consists of 100 items. Initially, the content validity of the questions was approved by a number of professors, psychologists and counselors to ensure that the items are understandable and applicable to the student groups. After this stage, the items was administered for a group of 736 students from Islamic Azad University of Ahvaz. The initial validity coefficient of the inventory for the set of 100 questions was rtt = 966.0. For the second time, the validity of the inventory was calculated after the removal of other questions with factor load less than 0.3. The validity coefficient after the elimination of questions 3-10-31-35-38-39-41-58-59-93 for the 90-item set was recalculated and was rtt = 0.969. In the present study, the KMO value is 0.958 and the Bartlett test was 30853.115, which is significant at 0.0001. Thus, in addition to the sampling adequacy, the implementation of the factor analysis based on the understudy matrix can also be justified.

Table 1: KMO size and results of Bartlett's test of faith inventory

KMO	Bartlett's test	Sig
0.958	30853.115	0.0001

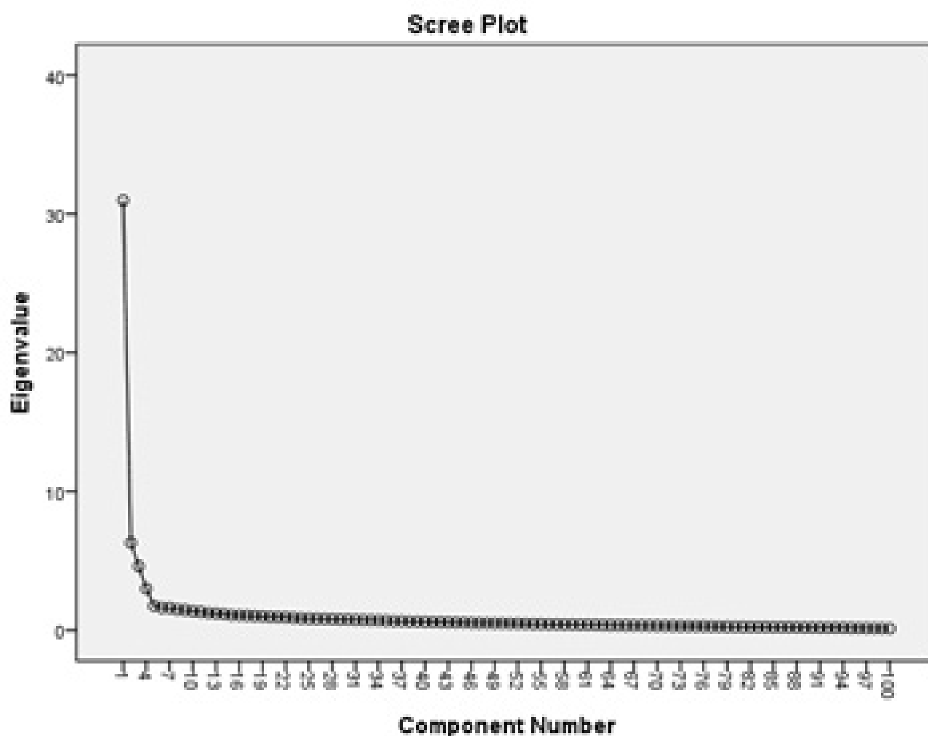
Table 2 shows the initial statistical characteristics that were obtained by the analysis of the main components, with a special value of 4 factors higher than 1, and the extent of explaining the common variance of variables for these four factors is equal to 44.887% of the total variance of variables.

Table 2: Primary statistical characteristics of a 100-question inventory

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	30.973	30.973	30.973	30.973	30.973	30.973	24.217	24.217	24.217
2	6.298	6.298	37.271	6.298	6.298	37.271	9.056	9.056	33.273
3	4.608	4.608	41.879	4.608	4.608	41.879	6.031	6.031	39.304
4	2.997	2.997	44.876	2.997	2.997	44.876	5.571	5.571	44.876

The slope design, which is a graph of the special values of a 100-item faith inventory, is shown in Figure (1).

Figure 1: Slope design



The slope design indicates that the contribution of the first factor in the variance of all variables is significant and differs from the contribution of other factors. In the next step, based on the special value, the percentage of variance and the slope design, four factors were considered as the basis for determining the final characteristics. Here, it is worth noting that some researchers in order to investigate the nature of relationships between variables and finding definitions of factors state that coefficients above 0.30 and coefficients higher than 0.40 are significant in the definition of factors and the coefficients below this limit are considered to be zero (random factor). For example, Jones (1954) used the lowest coefficient of 0.3, Houman (1988) used 0.35 and Reynold et al. (1981) used 0.4 values. In the present study, this coefficient is equal to 0.40.

Given that variables in factors 5 and 6 have a factor load, but the number of questions in these factors is less than 3, so according to the relevant theories, sometimes four questions and sometimes 10 questions are at least needed to form a factor. In this study, at least 4 questions were considered for the formation of the factor. Based on the results of factor analysis and the above-mentioned indicators, four factors were extracted from all questions and the special value of four factors/ fourth factor explain the value higher than 44.87. The first factor is a special value of 30.97 and

and ultimately the fourth factor justifies a special value of 2.99. After ensuring that the sampling is adequate and that the correlation matrix, which is the basis of the factor analysis, is not equal to zero in population, factor analysis was performed.

The special values of these four factors, the percentage of explanation of variance and the condensation percentage of the explained variance are shown in Table 3.

Table 3: Special value of the percentage of the explanation of the condensation variance of the four factors

Final Statistics			
Factor	Eigenvalue	Pct of Var	Cum Pct
1	30.97	30.97	30.97
2	6.29	6.29	37.27
3	4.60	4.60	41.87
4	2.99	2.99	44.87

The extracted factors were transferred to new axes using the varimax rotation method. The main matrix after the varimax rotation, which was obtained after 8 repetitions, is shown in Table 4 - next page

Discussion and Conclusion

To investigate the construct validity and answer the question that considers the number of the factors that saturate the faith inventory, the Principal Component Analysis (PC) method was used. Before performing factor analysis, sampling adequacy was proved using Kaisel Mager Olking (KMO) size, and also rejecting the null hypothesis by the Bartlett Sphericity test that the identity matrix is correct in the population; this shows that factor analysis is justifiable.

The factor matrix indicates that the first factor has the highest factor load and its contribution is also more significant than other factors. The results of factor analysis show that this scale has sufficient validity and is saturated with four factors. In order to simplify the extraction factors, the varimax rotation was used. After the interpretation and naming of the factors, the results are as follows: The largest factor load in the structure matrix is for question 36 (0. 797).

Questions 22-28-32-43-62-72-79-88-97-98-99 focus on two or three factors that are likely to be complicated questions.

The rest of the questions are very pure or their factor load in other factors other than the extracted clusters is negligible.

There is no question without factor load, and in each factor there are at least four variables.

A set of questions with a strong and meaningful correlation make up a piece of test that was extracted and named as follows.

1. From the 100 items of the faith inventory, 57 items are strongly correlated with the first factor marked as "certainty".
2. The second factor with 14 items was marked "justice".
3. The third factor with 9 items was marked as "jihad".
4. The fourth factor measures "patience" and consists of 10 items.

References

1. Dadsetan, P. (2002). Evolution of ethical concepts and loving others among secondary school students. 18 papers on Psychology. Tehran: Samt Publication.
2. Robbins, A. (1990). Towards Prosperity. Translated by Mehdi Mojardazadeh 1994. Tehran: Motarjem Publication, Sixth Edition.
3. Akbari, R. (2005). Group faith. Qom: Islamic Center of Science and Culture.
4. Lotf Abadi, H. (2002). Ethical, value and religious development in adolescence and youth. Tehran: ISBN Publications.
5. Kaviani, M. (2004). Psychology of Religious Beliefs. Seminary and University Journal, No. 19.
6. Fowler, J.W.(1981)."Stages of faith the psychology of human. Development and the quest for meaning". San Francisco: Harper & Row.
7. Smith, W.C. (1979). "Faith and belief. Princeton". N, Princeton University Press.
8. Fowler, J.W.(2004). "Faith development at 30: Naming. The challenges of faith in a new millennium."Religious Education. Vol. 99No.4.pp.405-421.

Table 4: Factor matrix after rotation

	Component			
	1	2	3	4
q36	.797			
q71	.787			
q60	.782			
q26	.776			
q8	.775			
q15	.761			
q69	.755			
q82	.752			
q11	.749			
q63	.744			
q77	.739			
q83	.734			
q84	.732			
q2	.729			
q52	.712			
q42	.698			
q34	.693			
q17	.689			
q56	.660			
q53	.650			
q7	.636			
q30	.622			
q81	.610			
q64	.609			
q37	.603			
q46	.603			
q5	.602			
q87	.590			
q90	.589			
q86	.587			
q47	.585			
q66	.581			
q49	.574			
q16	.573			
q57	.572			
q40	.570			
q54	.570			
q51	.560			
q28	.551	.424		
q61	.534			
q85	.533			
q98	.532	.435		
q97	.521	.437		
q13	.521			
q13	.521			
q1	.521			
q12	.517			
q4	.499			
q62	.498	.436		
q95	.490			
q6	.478			
q32	.469	.443		
q55	.466			
q67	.465			
q79	.459	.414		
q73	.428			
q22	.426		.403	
q14	.422			
q29		.685		
q23		.654		
q24		.641		
q76		.630		
q21		.607		
q25		.566		
q88	.418	.541		
q50		.539		
q43	.494	.528		
q91		.514		
q72	.472	.507		
q44		.502		
q75		.453		
q45		.411		
q33			.573	
q100			.573	
q78			.561	
q27			.501	
q94			.491	
q48			.487	
q70			.476	
q99		.405	.467	
q65			.453	
q80				.771
q20				.754
q96				.742
q74				.737
q19				.706
q89				.676
q9				.657
q18				.647
q68				.606
q92				.417

Creating and Validating the Adjustment Inventory for the Students of Islamic Azad University of Ahvaz

Homa Choheili (1)
Reza Pasha (2)
Gholam Hossein Maktabi (3)
Ehsan Moheb (4)

(1) MA in Educational Psychology, Department of Psychology, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran
(2) Department of Psychology, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran
(3) Department of Psychology, Shahid Chamran University of Ahvaz, Ahvaz, Iran
(4) Phd in Educational Psychology, Department of Educational Psychology, Shahre-kord Branch, Islamic Azad University, Shahre-kord, Iran

Corresponding author:
Reza Pasha
Department of Psychology,
Ahvaz Branch, Islamic Azad University,
Ahvaz, Iran
Email: g.rpasha@yahoo.com

Abstract

This study was conducted in order to create and validate the adjustment inventory. The sample consisted of 1005 students of Islamic Azad University of Ahvaz who were selected using the multi-stage random sampling method. The adjustment inventory consisting of 100 items was employed to measure their adjustment. Each item was scored on the five-point Likert scale from Not fully used to Fully used. After data collection, the correlation between each item and the total score was determined. The coefficients for 11 items were weak and statistically insignificant. The Cronbach's Alpha coefficient for the 100-item set was 0.758 and after eliminating 11 items for a set of 89 questions, it was 0.76. Factor analysis was conducted in order to verify the construct validity of the inventory; the KMO value was 0.915 and the significant Bartlett's sphere test indicated that there were suitable conditions for conducting factor analysis. After eliminating the inappropriate questions with a factor load of less than 0.3, using the Principal Component Analysis (PCA) and varimax rotation, with respect to the factor matrix, gradient diagram and the percentage of explained variance, four factors were extracted from a set of 90 items, explaining 44.87% of the total variance among the variables. The first factor with 29 items and the special value of 16.63 covers about 55.17% of the total variance of the variables and is an indicator of health adjustment; the second factor with 20 items indicates academic adjustment, the third factor with 21 items, shows the family adjustment and the fourth factor with 11 items measures the emotional adjustment and the fifth factor with eight items indicates the social adjustment.

Key words: Adjustment, Validity, Inventory, Narration

Please cite this article as: Please cite this article as: Choheili S. et al. Creating and Validating the Adjustment Inventory for the Students of Islamic Azad University of Ahvaz *World Family Medicine*. 2017; 15(9):181-186.
DOI: 10.5742/MEWFM.2017.93121

Introduction

Contemporary mankind lives in a world that requires more individual and social flexibility and adjustment (1). Individual adjustment occurs when a person can establish a healthy relationship between themself and the social environment. The social environment also includes the family, the educational setting, the business environment, and so on. If one fails to interact with the environment in a desirable manner, he/she is not considered adjustable (2).

Adjustment originates from biology. For the first time, Darwin suggested it in his theory of evolution, then this concept has been used in other sciences, such as psychology and sociology (3,4). This term refers, in biological terms, to biological structures that facilitate the survival of the species, and includes not only humans but also animals and plants (4). In psychology, adjustment is assumed to be more or less consciously based on if one adjusts to the social, natural or cultural environment. This adjustment requires that a person has to change themself or actively make changes in the environment, and as a result, the necessary coordination is established between the individual and the environment (4). Adjustment is a behavior that increases the individual's competence and average ability to improve their past and nearby people. Because the content of social learning is not genetic, the proper behavior of the individual is in response to and selected by social consequences. In other words, this behavior is strengthened and one learns that they will get a good result by repeating it (5).

Adjustment is a relative concept and differs in societies under the influence of cultures and beliefs. On the other hand, human behavior is affected by various factors, such as family, school, peer group and other social factors. Human personality will be perfect if a good balance and interaction are established between themself and the surrounding environment.

Social pressures clearly have a great influence on individual behavior. On the other hand, human beings are flexible. They adapt not only to the environment, but also change the environment according to their own needs (6). The human being is a social being, so for success it is necessary to achieve a good adjustment within the society. If the learner fails to achieve adjustment, misadjustment occurs and they distance themself from balanced behavior and show a kind of misadjustment including aggression, anxiety, anti-social personality, attention drawing, escape from school and habitual disorders. Therefore, it is vital to adjust and coordinate yourself with the surrounding environment. Daily struggles focus on this adjustment. Everybody consciously and unconsciously seeks to satisfy their various but conflicting needs in the environment where they live. Underlying factors such as educational methods, school factors, values and beliefs, peer group, family and education are effective in formation of adjustment. Recognition of the factors affecting the students' adjustment at the critical age and the sustainability effects that this period has on the formation of a teenage personality can predict and plan in helping them to provide good mental health (5).

Adjustment, to Sinha and Singh (1993), is the emotional stability and courage in social relationships, as well as the interest in education and school, which is seen as emotional adaptation, social adjustment and educational adaptation. Also, Sinha and Singh (1993) defined academic or educational adjustment as having positive attitudes toward the academic goals, the effective effort to achieve academic goals and the positive attitude to the educational environment, and considered social adjustment as the mechanisms by which a person finds the ability to belong to a group, and emotional adjustment as the mechanism by which the person finds emotional stability (7).

Social adjustment
Social adjustment involves the individual's adjustment to his or her social environment and refers to a process in which the relationships between individuals, groups and other elements are satisfactory, so that provides mutual satisfaction (8).

Emotional adjustment
Emotional adjustment is the mechanism by which a person achieves emotional stability. It includes good mental health, satisfaction with personal life, and coordination between feelings, thoughts and deeds (9).

Educational adjustment
Educational adjustment refers to the satisfaction and effective functioning in the educational environment (10).

Family adjustment
Family adjustment is the mechanism by which a person acquires a sense of security and trust towards family members, especially parents, thereby establishing a proper relationship with them (11).

Health adjustment
Health adjustment includes "a sense of responsibility towards oneself and the choice of a healthy lifestyle." The World Health Organization (1947) defines health as: "Health is the state of complete physical and psychological well-being, and not just the absence of illness or disability" (9).

The development of measurement methods and new psychometric theories have led to the emergence of new scholarly methods for assessing the talents, abilities and other psychometric characteristics of individuals that have been considered by the instructors, consultants, psychologists and other behavioral science experts. Although a number of instruments have been developed for measurement of religious tendencies and similar subjects, limited research has been carried out on the measurement of faith due to its newness. Because this tool (inventory) is designed to measure students' faith, it is necessary to measure its validity and reliability among the students. Considering that the subject under study has

an exploratory aspect, it is also necessary to provide an answer to the following questions:

1. Is there enough internal consistency between the set of questions that are presented to assess the students' adjustment?
2. Is the set of questions designed to measure the students' adjustment sufficiently valid?
3. What are the underlying components of adjustment inventory for students and how much are they saturated?

Method

The statistical population in this study consists of all 1,005 high school students of Ahvaz in the academic year of 2016-2017. A multi-stage sampling method was used to determine the sample size. To this end, the population of each school was determined by Ahvaz Education Administration and randomly divided into four districts (Districts 1, 2, 3 and 4) by lot, from all four districts in proportion to the population of each district based on sex. The adjustment inventory is designed to be applicable to all adjustment areas with visible adjustment and implications. Therefore, the questions are designed to show people's adjustment in social, emotional, educational, family and health adjustments.

The main collection consists of 100 items. Initially, the content validity of the questions was approved by a number of professors, psychologists and counselors to ensure that the items are understandable and applicable to the student groups. After this stage, the items were administered for a group of 1,005 high school students from Islamic Azad University of Ahwaz.

The initial validity coefficient of the inventory for the set of 100 questions was rtt = 0.756. For the second time, the validity of the inventory was calculated after the removal of other questions with factor load less than 0.3. The validity coefficient after the elimination of questions 2, 6, 12, 36, 37, 38, 57, 71, 77, 87, and 96 for the 90-item set was re-calculated and was rtt = 0.76.

In the present study, the KMO value is 0.915 and the Bartlett test was 23510.627 which is significant at 0.0001. Thus, in addition to the sampling adequacy, the implementation of the factor analysis based on the understudy matrix can also be justified.

627.23510, which is significant at 0.0001. In addition, = to the sampling adequacy, the implementation of the factor analysis based on the matrix under study can also be justified.

Table 2 shows the initial statistical characteristics that were obtained by the analysis of the main components, with a special value of 5 factors higher than 1, and the extent of explaining the common variance of variables for these five factors is equal to 29.826% of the total variance of variables.

The slope design, which is a graph of the special values of a 100-item faith inventory, is shown in Figure 1.

The slope design indicates that the contribution of the first factor in the variance of all variables is significant and differs from the contribution of other factors. In the next step, based on the special value, the percentage of variance and the slope design, five factors were considered as the basis for determining the final characteristics. Here, it is worth noting that some researchers in order to investigate the nature of relationships between variables and finding definitions of factors state that coefficients above 0.30 and coefficients higher than 0.40 are significant in the definition of factors and the coefficients below this limit are considered to be zero (random factor). For example, Jones (1954) used the lowest coefficient of 0.3, Houman (1988) used 0.35 and Reynold et al. (1981) used 0.4 values. In the present study, this coefficient is equal to 0.30.

Given that variables in factors 6 and 7 have a factor load, but the number of questions in these factors is less than 3, so according to the relevant theories, sometimes four questions and sometimes 10 questions are at least needed to form a factor. In this study, at least 4 questions were considered for the formation of the factor. Based on the results of factor analysis and the above-mentioned indicators, four factors were extracted from all questions and the special value of four factors/ fourth factor explain the value higher than 29.82. The first factor is a special value of 16.63 and ultimately the fifth factor justifies a special value of 2.11. After ensuring that the sampling is adequate and that the correlation matrix, which is the basis of the factor analysis, is not equal to zero in population, factor analysis was performed.

The special values of these four factors, the percentage of explanation of variance and the condensation percentage of the explained variance are shown in Table 3.

The extracted factors were transferred to new axes using the varimax rotation method. The main matrix after the varimax rotation, which was obtained after 8 repetitions, was shown in Table 4.

Table 1: KMO size and results of Bartlett's test of adjustment inventory

KMO	Bartlett's test	Sig
0.915	23510.627	0.0001

Table (2): Primary statistical characteristics of a 100-question inventory

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	16.633	16.633	16.633	16.633	16.633	16.633	9.400	9.400	9.400
2	5.035	5.035	21.668	5.035	5.035	21.668	6.658	6.658	16.058
3	3.071	3.071	24.739	3.071	3.071	24.739	6.441	6.441	22.499
4	2.975	2.975	27.714	2.975	2.975	27.714	4.445	4.445	26.944
5	2.112	2.112	29.826	2.112	2.112	29.826	2.882	2.882	29.826

The slope design, which is a graph of the special values of a 100-item faith inventory, is shown Figure 1.

Figure 1: Slope design

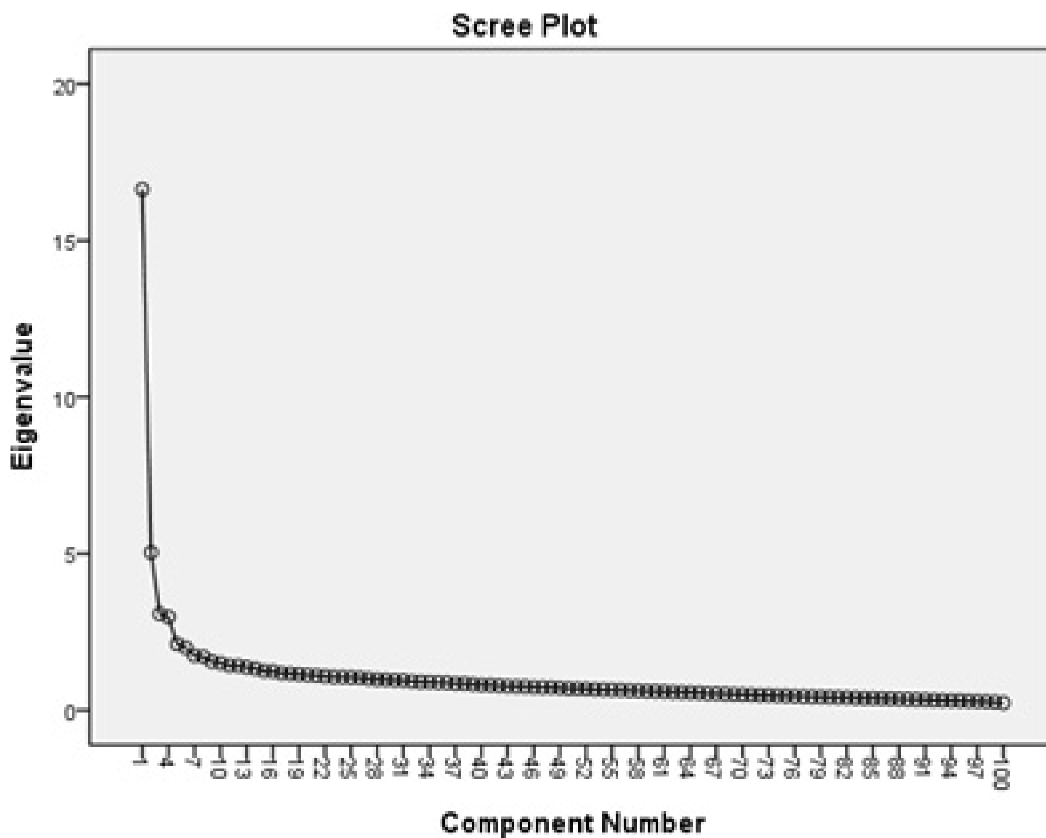


Table 3: Special value of the percentage of the explanation of the condensation variance of the five factors

Final Statistics			
Factor	Eigenvalue	Pct of Var	Cum Pct
1	16.63	16.63	16.63
2	5.03	5.03	21.66
3	3.07	3.07	24.73
4	2.97	2.97	27.71
5	2.11	2.11	29.82

Table 4: Factor matrix after rotation

	Component				
	1	2	3	4	5
q80	.579				
q45	.564				
q54	-.563				
q59	.556				
q34	-.554	.357			
q22	.544				
q68	-.541	.472			
q39	.539				
q9	.521				
q52	.519				
q60	.497		.312		
q65	.493				
q19	.482				
q50	.475				
q55	.464				
q3	.460				
q47	.455				
q33	.451			.411	
q94	.451		.360		
q84	.448				
q1	.414				
q15	-.382		-.333		
q100	.382				
q90	-.378				
q30	.373			.339	
q74	-.372	.303			
q78	.339	.319			
q10	.332				
q62	.317				
q83		.554			
q98		.538			
q43		.532			
q93		.508			
q63	-.335	.502			
q31	-.331	.499			
q18	-.398	.496			
q8		.489			
q53		.489			
q51		.485			
q91		.481			
q73	-.428	.475			
q27		.471			
q46	-.382	.438			
q64			.526		
q69			.522		
q95			.521		
q29			.498		
q75			.493		
q20			.467		
q70			-.462		
q44		.344	-.460		
q4		.308	-.451		
q5			.450		
q89			.440		
q17			.434		
q40	.375		.423		
q79	.326		.409		
q66			.388		
q42			.384		
q14			-.365		
q35			.350		
q99			.324		
q23				.574	
q24				.473	
q48				.465	
q67				.429	
q13				.409	
q7				.409	
q28				.403	
q58	.341			.385	
q82				.339	
q32				.335	
q92				.312	
q26					-.534
q21					-.494
q81					.455
q61					.433
q85				-.315	-.426
q76				.306	.402
q86				.338	.377
q97					-.374

Extraction Method: Principal Component Analysis.
Rotation Method with Kaiser Normalization.
a. Rotation converged in 13 iterations.

Discussion and Conclusion

To investigate the construct validity and answer the question that deals with the number of factors that saturate the faith inventory, the Principal Component Analysis (PC) method was used. Before performing factor analysis, sampling adequacy was proved using Kaisel Mager Olking (KMO) size, and also rejecting the null hypothesis by the Bartlett Spher icity test that the identity matrix is correct in the population; this shows that factor analysis is justifiable.

The factor matrix indicates that the first factor has the highest factor load and its contribution is also more significant than other factors. The results of factor analysis show that this scale has sufficient validity and is saturated with five factors. In order to simplify the extraction factors, the varimax rotation was used. After the interpretation and naming of the factors, the results are as follows:

The largest factor load in the structure matrix is for question 80 (0.579).

Questions 4-15-18-31-33-34-40-44-46-49-58-60-63-68-73-74-76-78-79-85-86-94 focus on two or three factors that are likely to be complicated questions.

The rest of the questions are very pure or their factor load in other factors other than the extracted clusters is negligible.

There is no question without factor load, and in each factor there are at least four variables.

A set of questions with a strong and meaningful correlation make up a piece of test that were extracted and named as follows.

1. There was 29 items in the first factor marked as "health".
2. There was 20 items in the second factor marked as "educational".
3. There was 21 items in the third factor marked as "family".
4. There was 11 items in the fourth factor marked as "emotional".
5. There was 8 items in the fifth factor marked as "society".

References

1. Sabeti, F. & and Shahani Yeylagh, M. (1998). The effect of social skills training on reducing socio-emotional misadjustment of adolescent male students in Ahwaz. Journal of Educational Sciences and Psychology, Shahid Chamran University of Ahwaz, Volume 3, Year 5, No. 3 and 4 pp. 1-16.
2. Pettus, K.R.(2006). "The relationship of parental monitoring to community college student adjustment and achievement, differences by gender, ethnicity, parental education level, and student residence Unpublished" .PhD. Thesis, Carolina University
3. Yalim, D.(2007). First year college adjustment. The role of coping, ego-resiliency, optimism and gender. [dissertation]. Turkey: Middle East Technical university.
4. Zarei, H. et al. (2012). The relationship between thinking styles and academic adjustment in nursing students. Iranian Journal of Educational Sciences in Medical Sciences. Number 4, p. 2.
5. Barber, N.(2010). Applying the concept of adaptation to societal differences in intelligence. Journal of Cross-Cultural Research, 44, 116-150.
6. Hajari, S (2011). The analysis of the effectiveness of problem-based group training on the social adjustment of women with bipolar disorder in Isfahan. Master's thesis. Isfahan University of Psychology.
7. Sinha, A. P., & Singh, R. P.(1993). The adjustment inventory for School Students (AISS). Agra. National Psychological Corporation
8. Azin, A. & Mousavi, S. M. (2011). The analysis of the role of school factors on social adjustment of high school students in Fereydoun Shahr City. Journal of Applied Sociology, Year 23, No. 41, Issue 1, pp. 183-200.
9. Pourfakari, N. (2006). Comprehensive Dictionary of Psychiatry and Psychology. Tehran: Farhang Moaser Publishing. p. 29
10. Lent, R. W. Taveira, M. Sheu, H. &Singley, D.(2009). Social cognitive predictors of academic adjustment and life satisfaction in Portuguese college students, A longitudinal analysis. Journal of Vocational Behavior, 74, 190–198.
11. Yamini Douzi Sorkhabi, M. (2012). An analysis of misadjustment of elementary students. Quarterly Journal of Education, No. 7, p. 77

Evaluating the Quality of Educational Services from the Viewpoints of Radiology Students of Ahvaz Jundishapur University of Medical Sciences, in Southwest of Iran

Abdolreza Gilavand (1)
Jafar Fatahiasl (2)
Razieh Mohamadi Majd (3)

(1) Expert on Faculty Appointments, Department of Education Development Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
(2) Assistant Professor, Department of Radiology Technology, School of Paramedicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
(3) Undergraduate Student, Department of Radiology Technology, School of Paramedicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

Corresponding Author:
Jafar Fatahiasl, Assistant Professor,
Department of Radiology Technology,
School of Paramedicine,
Ahvaz Jundishapur University of Medical Sciences,
Ahvaz, Iran.
Email: fatahi.j49@gmail.com

Abstract

Introduction: One of the important criteria for assessing the quality of educational services in any university is the students' opinions. In this regard, this study aimed to assess the quality of educational services from the viewpoints of radiology students of the School of Paramedicine of Ahvaz Jundishapur University of Medical Sciences based on the SERVQUAL evaluation model.

Method: The statistical population of this descriptive and analytical study was all the 120 undergraduate students of radiology in Ahvaz Jundishapur University of Medical Sciences in southwest of Iran, of whom 115 were selected by census method. A standard questionnaire was used to collect data which were analyzed by SPSS version 22.

Findings: This study showed that there was a negative gap in all dimensions of the model. The corresponding gaps for each dimension are as follows (from highest to lowest): the assurance dimension (mean = 1.26), empathy dimension (mean = 1.16), reliability dimension (mean = 1.0), responsiveness dimension (mean = 1.09) and tangibles dimension (mean = 0.98). Also, there was no statistically significant difference between age, sex and academic year of the students and the percentage of the gap.

Discussion and Conclusion: Students' expectations were beyond their perception of the status quo, and none of the five dimensions of the quality of educational services met their expectations. Therefore, it is necessary for the university to narrow the existing gap according to its type and severity.

Key words: Quality of Educational Services, Students, Radiology, Ahvaz, Iran.

Please cite this article as: Gilavand A, Fatahiasl J, Mohamadi Majd R. Evaluating the Quality of Educational Services from the Viewpoints of Radiology Students of Ahvaz Jundishapur University of Medical Sciences, in Southwest of Iran World Family Medicine. 2017; 15(9):187-192 DOI: 10.5742/MEWFM.2017.93123

Introduction

Universities are responsible for training specialized and committed forces of the community (1). It is said that the first world medical university, Gondi Shapur, was founded in Iran 1800 years ago (2-3). The quality of services is now recognized as the main explanation for the success of an organization in today's competitive environment, and any reduction in customer satisfaction due to poor service quality compromises its success. (4) In fact, the quality of services is the degree of compliance of services provided with customer expectations. Understanding and measuring customers' perceptions and expectations is an essential component that can be used to improve the quality of service-providing organizations (5). Over the past two decades, socioeconomic changes, rapid information development, and technological innovations and economic globalization on the one hand, and the disproportionate content of educational programs in relation to the needs of society and lack of knowledge and skills of college graduates on the other, have introduced higher education systems into a new era in which "competition" and "quality" are considered as the main determining factors (6). In the midst of the turmoil and competition of today's world, those organizations which care for meeting their customers' needs and wants will succeed and overcome other market competitors. In other words, according to the new philosophy of marketing, namely customer orientation, organizations align their individual and team objectives around satisfying and retaining customers. Today, customer satisfaction is one of the most commonly used terms in the workplace, and it undoubtedly involves creating quality products and services, in line with, or even beyond their expectations. Therefore, quality is the most important factor in global competition, and organizations have to offer high quality goods or services in order to survive successfully in the marketplace (7). Educational and research services, particularly those provided by universities and institutes of higher education, are one of the most important service areas in the community, which play an unparalleled role in the development of societies. Therefore, continuously paying attention to improving the quality of educational and research services is necessary (8). The higher education system of Iran has undergone various ups and downs in its history, and it has experienced tremendous changes during the last decade. A large number of new educational institutions have been established lately and the rate of their enrollment has increased accordingly, and with their overemphasis on the quantitative growth in the student population, they have obviously gone into extremes, resulting in a decline in the quality indices of higher education institutions in the country. Of course, the increasing rate of enrollment is not by itself a reason for the quality of higher education, but what counts as the main duties of a university is proper administration, retention and satisfaction of students (9). This is because in a competitive market, what creates distinction is service satisfaction, so student satisfaction is a decisive factor for the evaluation of higher education institutions (10). However, considering that many intangible factors affect customer service satisfaction, quality assessment remains a challenge (11). Studies conducted at some Iranian medical universities show that there is a gap between students' expectations and perceptions about the quality of educational services, and higher education institutions have not yet been able to meet the expectations of students (4-11), and this may reduce student motivation and increase their dissatisfaction. Now that in Iran, the expansion of universities is moving from a quantitative stage to a qualitative level, and medical and paramedical sciences are among the most popular fields of study in Iran, (12) the need for such research is felt more than ever. In this regard, this study aimed to assess the quality of educational services from the viewpoints of radiology students of the School of Paramedicine of Ahvaz Jundishapur University of Medical Sciences based on the SERVQUAL evaluation model.

Materials and Methods

In this cross-sectional descriptive-analytical study, a total of 105 radiology students at the School of Paramedicine of Ahvaz Jundishapur University of Medical Sciences in southwest of Iran, were evaluated based on the SERVQUAL evaluation model in 2017. The statistical population included all the 120 students studying radiology at the School of Paramedicine. Sampling was done by census method and by distributing questionnaires among all of the students. All students were enrolled in the study. Out of the 120 distributed questionnaires, 105 questionnaires were completed and returned (response rate was 87.5%). Data were collected using a standard SERVQUAL questionnaire. The questionnaire consisted of two parts: personal characteristics of students and five dimensions of the quality of educational services (i.e., tangibles, assurance, responsiveness, reliability, and empathy). The validity of the questionnaire was confirmed, and its reliability was confirmed by Cronbach's alpha of 88%. In the tangibles or physical dimension, the students were asked about the physical environment of the service delivery including facilities, equipment, staff and communication channels, while in the dimension of assurance, they were supposed to answer questions regarding the competence and ability of the staff to inspire confidence in the service recipient. Questions relating to the responsiveness dimension, dealt with the willingness to cooperate and help the customer, whereas those in the reliability dimension were about the ability to serve in a reliable manner. Finally in the empathy dimension, the sense of belonging and commitment of the university staff towards students was the main concern. The questionnaire consisted of 26 items which were evaluated based on a five-choice scale (very low, low, moderate, high and very high). The students were asked about the ideal or desirable situation in the expectation component, and in the perceptions component, they answered questions about the status quo or what was available. Introduced by Parasuman et al in the early 1930s, the SERVQUAL model measures customer satisfaction based on the quality of the services provided, and the gap between the customer's expectations of the service provided and their perceptions of those services is determined. According to Parasuraman et al, this framework covers all dimensions of service quality. Perceptions focus on "how it is" while expectations deal with "how it should be" (13). Also, in this research, all the necessary ethical considerations were observed.

Findings

Table 1 shows the demographic information of the students. According to this table, 30.1% were male, 69.9% female, 97.7% single, 2.7 % married, and 64.4% were satisfied with choosing radiology as their field of study while 35.6% were not satisfied. Also, 38.2% of the students were freshmen, 22.8% sophomores, 20.4% juniors and 18.6% last year. As regards their age, 55.2. % were under age 34.8% between 21 and 25, and 10 % over 26. Table 2 also shows the scores of expectations and perceptions and their gap. This study showed that the expectations of students were beyond their perception of the status quo, and none of the five dimensions of the quality of educational services met their expectations. The description of the dimensions are as follows: assurance (mean = 1.26), empathy (mean = 1.16), reliability (mean = 1.10), responsiveness (mean =1.119) and tangibles (mean =0.98) had respectively the widest gaps. Also, the difference between men and women in the average gap and quality gap in the five dimensions of educational services was not statistically significant. There was no significant difference in the average gap in the five dimensions of the quality of educational services in terms of age and academic year of the students. Table 3 shows the Cronbach's alpha coefficient of the questionnaire in terms of the five dimensions of the quality of educational services.

Table 1. The demographic information of the participants

Variables	Percentage of individuals
Gender	
Male	30.1%
Female	69.1%
Total	100%(105)
Marital status	
Single	97.3%
Married	2.7%
Total	100%(105)
School year	
1	38.2%
2	22.8%
3	20.4%
4	18.6%
Total	100%(105)
Age	
Under 20 years old	55.2%
21-25	34.8%
26-30	6.5%
31-35	3.5%
Total	100%(105)
Satisfied with choosing radiology as their field of study	
Yes	64.4%
No	35.6%

Table 2. Average scores of expectations, perceptions and quality gaps in each dimension of the quality of educational services

Quality gap	Perceptions	Expectations	Items	Quality dimension
−0.71	3.30	4.01	Modern equipment	Tangibles
−0.97	3.08	4.05	Decoration	
−0.62	3.23	3.85	Class capacity	
−1.1	2.99	4.00	Hygienic and catering services	
−1.45	2.60	4.05	Greenery and relaxing places	
−1.04	2.99	4.03	Location of the educational institution	
−0.98	3.03	4.01	Total	
−0.88	3.05	3.93	Timely offering of the program	Reliability
−1.32	2.73	4.05	Offering flawless services	
−1.38	2.92	4.03	Timely information	
−1.09	2.88	3.97	Presence of the staff and faculty members at the designated times	
−1.1	2.95	4.05	Sufficient and up-to-date information of the staff and faculty members	
−1.1	2.90	4.00	Total	
−1.31	2.77	4.08	Responding to the students' complaints	Responsiveness
−1.03	2.93	3.96	Meeting the students' needs	
−1.21	2.82	4.03	Offering consultation by experts	
−0.81	3.08	3.89	Sufficient personnel in each section	
−1.04	2.78	3.82	Automated information	
−1.09	2.87	3.96	Total	
−1.41	2.58	3.99	Instilling in the students the confidence to continue learning	Assurance
−1.3	2.74	4.04	Creating trust in the student	
−1.48	2.56	4.04	The importance of personal student demands	
−1.1	2.82	3.92	Having sufficient knowledge for solving the students' problems	
−1.26	2.75	4.01	Feeling secure in interacting with the university	
−1.31	2.69	4.00	Total	
−1.38	2.67	4.05	Perception of the students' needs and problems	Empathy
−1.15	2.86	4.01	Service delivery without creating any stress	
−0.97	2.88	3.85	Designing curricula according to the students' needs and problems	
−1.21	2.78	3.99	Feeling relaxed and comfortable in interacting with the university	
−1.15	2.77	3.92	Willingness in solving the students' problems	
−1.16	2.80	3.96	Total	

Table 3. Cronbach's alpha coefficient of the questionnaire according to five dimensions of service quality

Cronbach's alpha coefficient		Dimensions of service quality
Perceptions	Expectations	
0.83	0.90	Tangibles
0.83	0.85	Responsiveness
0.80	0.84	Reliability
0.88	0.93	Empathy
0.86	0.90	Assurance

Discussion and Conclusion

The results of this study showed that there is a gap in all dimensions of the SEVQUAL evaluation model, and the expectations of students are beyond their perception of the status quo; in other words, in none of the five dimensions of the quality of educational services, the students' expectations were met. In this study, the widest gaps were respectively related to assurance, empathy, reliability, responsiveness and tangibles. In the studies of Kavousi et al (9), Enayti et al (8), Haresabadi et al. (4), Changizi Ashtiani et al. (10) in Iran, as well as Barnes in China (14), Chu in Canada (15), and Richard and Adams in the United States (16), the assurance dimension had the highest negative gap, which is consistent with our study. Determining the quality service gap can be a good basis for planning, prioritizing and deciding on resource allocation (17). A look at the results of research carried out inside and outside Iran reveals a quality gap in all or some of the five dimensions of services. The results of the present study are similar to some of these studies, while inconsistent with some others. It seems that due to differences in the courses and level of education, facilities, equipment, staff and faculty members in universities, as well as cultural, social and other characteristics in different societies, the views of service recipients on the quality of services and their perceptions and expectations could be different. Therefore, the results of this study cannot be generalized to other universities. Therefore, it is recommended that such studies be conducted in each university so that a model with a higher degree of conformity for each university could be obtained and the quality of educational services in that university could be improved by a better and more basic planning.

The existence of a quality gap suggests that in terms of fulfilling commitments and satisfying students' expectations, no effective planning and implementation has taken place. Considering the fact that there is a quality gap in terms of all the five dimensions of educational services, it is suggested that all year long the staff could be provided with courses on effective ways of offering educational services and on effective communication with students. As far as faculty members are concerned, using new teaching methods, counseling skills, and student communication skills could also be held in the form of workshops. In addition, providing students with adequate information and proper planning for faculty classes, dedicating appropriate hours for the students to refer to their supervisors and advisors are other options that can be taken into account. Also, the managers and officials of the university should assign specific hours to answer the students' questions and try to solve their problems, and finally take advantage of the students' constructive views in educational planning.

Given that the expectations of the students were beyond their perception of the status quo, none of the dimensions of the educational services met their expectations. In order to improve the quality of educational services, all dimensions, especially the dimension of assurance and the dimension of empathy, should be taken into consideration.

This research was extracted from a research project approved by the Office of Vice-chancellor for Research and Technology Development of Ahvaz Jundishapur University of Medical Sciences.

Acknowledgements
This article is extracted from a research granted by Ahvaz Jundishapur University of Medical Sciences, Iran (Department of Education Development Center, AJUMS).

References

1. Gilavand A. Evaluating the Process of Recruiting Faculty Members in Universities and Higher Education and Research Institutes Affiliated to Ministry of Health and Medical Education in Iran. World Family Medicine. 2017; 15(8): 155-159. doi: 10.5742/MEWFM.2017.93070
2. Gilavand A. A Study of the Growth and Flourish of Ahvaz Jundishapur University of Medical Sciences; A Cultural History. International Journal of Medical Research& Health Sciences. 2016; 5(11): 83-86.
3. Gilavand A. Ahvaz Jundishapur University of Medical Sciences over Years; the History of AJUMS. Jentashapir Journal of Health Research. 2016; 7 (5) DOI 10.17795/jjhr-42677
4. Haresabadi M, Bibak B, abbasi Z. Quality Gap in Educational Services at North Khorasan University of Medical Sciences(2011): Students Viewpoints about Current and Optimal Condition. Journal of North Khorasan University of Medical Sciences. 2013; 5 (4):715-722. (Persian).

5. Ghavimi A, Rahbar M, Faraji Kalvanag A, Ghanizadeh M. Evaluation of the Quality of Educational Services of Tabriz University of Medical Sciences based on SERVQUAL Model. World Journal of Dentistry. 2017 8(2):114-118 doi: 10.5005/jp-journals-10015-1423
6. Yasbolagi B, Havas Beygi F, Mousavi Pour S. A Survey of the Quality of Educational Services Provided to Arak University Students Using the SERVQUAL Model. Instruction and Evaluation. 2015 8(30): 29-44. (Persian).
7. Gholami A, Gazerani A, Behfar K, Asghari A, Mohammadzadeh H, et al. Quality Evaluation of Educational Services Gap in Neyshabur Faculty of Medical Sciences Based on Service Quality Scale, Shiraz E-Med J. 2014 ;15(3):e21869. doi: 10.17795/semj21869.
8. Enayati T, Zameni F, Nasirpoor Deravi N. Assessing the quality of educational service in Mazandaran University of Medical Sciences using Servqual Model. JHPM. 2013; 2 (2): 32-39. (Persian).
9. Kavosi Z , Rahimi H, Qanbari P, Haidari L, Bahmaei J. Investigation of quality gap of educational services from the viewpoints of students of Shiraz University of Medical Sciences, 2012-2013 Sadra Med Sci J. 2014; 2(2): 161-172. (Persian).
10. Changyzi Ashtiyani S, Shamsi M. Students Viewpoints about Quality of Educational Health-Care at Arak University of Medical Sciences in 2009. Research in Medical Education. 2011; 3 (1): 17-26
11. Enayati T, Zameni F, Nasirpoor Deravi N. Assessing the quality of educational service in Mazandaran University of Medical Sciences using Servqual Model. JHPM. 2013; 2 (2): 32-39. (Persian).
12. Gilavand A. The Comparison of Iranian and Foreign Students' Motivations to Choose Dentistry Field of Study. International Journal of Pediatrics. 2016; 4 (6):1993-2010. doi: 10.22038/ijp.2016.6861
13. Gilavand A. Quality Assessment of Staff in-service training from View Points of Employees Ahvaz Jundishapur University of Medical Sciences. Future of Medical Education Journal. 2016; 6 (2): 42-46
doi: 10.22038/fmej.2016.7516
14. Barnes BR. Analyzing service quality: The case of postgraduate Chinese students. Total Qual Manag Bus Excell. 2007; 18 (3-4):313-31.
15. Chua C. Perception of quality in higher education Australia: AUQA Occasional Publication; 2004.
16. Richard E, Adams JN. Assessing college student perceptions of instructor customer service to student's questionnaire: Assessment in higher education. J Assess Evalu High Educ. 2006; 31 (5):535-49. doi.org/10.1080/02602930600679548
17. Peter S, Michael H, Debra H. Why do they leave, why do they stay? Perception of service quality at a new university. ANZMAC. 2000:1197-200.

An Investigation of Psychosocial aspect of Iranian Nursing Students' Clinical Setting

Mahsa Boozaripour (1)
Zanyar Karimi (2)
Sima zohariAnbohi (1)
Amir Almasi-Hashiani (3)
Fariba Borhani (4)

(1) Department of Medical Surgical Nursing, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran
(2) Student Research Committee, School of Nursing & Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran
(3) Department of Epidemiology and Reproductive Health, Reproductive Epidemiology Research Center, Royan Institute for Reproductive Biomedicine, ACECR
Tehran, Iran
(4) Medical Ethics and law research center, Department of Medical Surgical Nursing, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Corresponding Author:
Fariba Borhani
Medical Ethics and law research center,
Department of Medical Surgical Nursing, School of Nursing and Midwifery,
Shahid Beheshti University of Medical Sciences,
Tehran, Iran
Email: faribaborhani@msn.com

Abstract

The clinical experience prepares nursing students to become competent and professional practitioners. Therefore, it is important to identify the key characteristics of a positive and constructive clinical learning environment. This cross-sectional study assessed undergraduate nursing students' (n=313) perceptions of their clinical learning environment. The participants were freshman to fourth year nursing students enrolled in the Faculty of Nursing and Midwifery of Shahid Beheshti University of Medical Sciences.

Participants were invited to complete anonymously the actual versions of the Clinical Learning Environment Inventory (CLEI) (Chan, 2001). It was found that the participants gave a higher score to "Student Involvement" and a lower score to "Teaching Innovation".

The study indicated that there is still work to be done to provide a healthy clinical learning environment for nursing students and this task belongs to nursing researchers, educators, and health care organization preceptors. In this study, students' struggle to engage themselves in patients' affairs ranked first indicating that it had its roots in the cultural and religious context of Iran. Iran is a country where nursing and patient care are holy issues.

Key words: Clinical environment, Learning, Nursing students, Iran

Please cite this article as: Please cite this article as: Boozaripour M. et al. An Investigation of Psychosocial aspect of Iranian Nursing Students' Clinical Setting. *World Family Medicine*. 2017; 15(9):193-199
DOI: 10.5742/MEWFM.2017.93124

Introduction

Modern health care is provided within a dynamically evolving clinical environment, where new technologies and skills are applied. The learning environment plays a crucial role, especially during the clinical training of student nurses, as they come into contact with the realities of their function, and form opinions on their professional careers and the clinical area prospects (Egan and Jaye, 2009).

The clinical learning environment is important not just for clinical skill development, but for students to also learn about the 'norms' of practice, that is, processes in care delivery (Eraut, 2000).

Professional nursing is based on performance (Henderson and Tyler, 2011) while the most important part of the curriculum of this discipline is clinical training which serves as the bridge between theory and practice (Benner, 2012). In fact, the clinical setting is a suitable opportunity for practical application of the knowledge and skills provided to the students in the theoretical training (Elcigil and Sarı, 2007). It provides the suitable conditions for acquiring the necessary practical experience to prepare the students for working in the real world (Hickey, 2010). Since gaining experience in the clinical setting and working at the patients' bedside are much more useful than organizing scenarios in laboratory conditions and theoretical classes, clinical learning is of utmost significance.

The clinical training environment, which is the place for cultivating nursing students' clinical skills, entails all the elements that have surrounded them. The clinical ward, devices and equipment, personnel, patients, and nursing instructors (Papp et al., 2003) are among the key components accepted as the clinical setting for training nursing students (Salmani and Amirian, 2006).

The complexity of the clinical environments has led scholars to explore this setting from different viewpoints. Categories like noting learners' individual characteristics, satisfaction with clinical training, students' participation in clinical activities, maintenance of students' individuality, clarity of students' duties and responsibilities during the clinical program and the use of innovations in the students' clinical training are of great importance (Ip and Chan, 2005). Clarification of students' perceptions of clinical learning is one of the challenges of nursing education (White, 2003). Indeed, the nursing students who receive the nursing education are able to describe the complex aspects of clinical experiences more than any other individual. To tell the truth, enjoying an appropriate clinical setting is vital for acquiring a suitable clinical experience. Some studies introduce various factors including instructors (Shahsavari et al., 2013, Kelly, 2007), hospital staff (Dadgaran et al., 2013), and patients as influential in this experience. From the students' perspective, the relationship between the nursing school and teaching hospitals is very important so that the positive cooperation between nursing instructors and personnel has been reported as one of the impressive factors in promoting nursing students' clinical learning(Johnson, 2015).

The major mission of the university is the training of the required expert manpower, development and promotion of knowledge, expanding research activities, and preparing the suitable context for developing the country. Universities ought to make continuous efforts to recognize problems, develop and implement programs, and finally, refine those programs. Undoubtedly, the identification of problems is the first step in reducing them. Also, the students themselves are the most reliable and the best source for exploring the problems in clinical training as they are directly involved in this process (Changiz et al., 2012). A study conducted to determine the nursing students' perception of the present status of the clinical training environment demonstrated that the students were dissatisfied with communication errors and receiving feedback from their instructors at the patient's bedside so that they rendered the continuous attendance of the instructors in the ward as a source of stress and anxiety. On the contrary, they believed that classmate support and suitable relations with peers was a factor that promoted their clinical learning (Serçekuş and Başkale, 2016).

Some studies have been carried out in Iran on the important role of clinical training in nursing and the high importance of understanding the students' attitudes towards clinical training and its application in planning nursing programs. Another study, conducted to determine the clinical limitations perceived in nursing student-instructor interactions in Iran, revealed that the effective interactions between students and instructors greatly influenced the quality of clinical training in nursing so that the identification of these limitations would help nursing instructors to manage the clinical nursing situations in an effective manner. In this study, continuous control and being observed by the clients, their families, and ward personnel as outsiders' eyes, the disparities between theoretical teaching and clinical training, close contact, disputes in the clinical setting, instability, and unreliability are mentioned as the perceived limitations in student-instructor interactions (Shahsavari et al., 2013). Moreover, another study performed in Iran in 2009 showed that the students had no positive perception of the clinical training climate so that more comprehensive attempts must be made to enhance students' satisfaction (Peyman et al., 2011).

Iran is a country with a 98% population of Muslims in which the healthcare system and nursing performance originate from culture and religion. In Iranians' view, giving care to the patient is rendered as the best practices accepted by God, Almighty (Shahriari et al., 2012) and these systems of values and beliefs have entered the educational system (Joolaee et al., 2006).

Given the significance of clinical experience in forming the basic skills and nursing students' professional capabilities and also considering that recognition of clinical setting problems from students' perception as the clients of the teaching process serves as one of the first steps in fostering the quality of clinical training, and also noting the disparities in the Iranian community compared to other societies, this study aimed to determine BS nursing students' perception of the psychosocial aspects of the status of clinical training

setting in the teaching hospitals affiliated to one of state medical universities in Tehran, capital of Iran in 2016.

Methodology

This was a descriptive cross-sectional study conducted on all the nursing students studying in the first to sixth semester who had passed their clinical training in teaching hospitals affiliated to one of the medical universities in Tehran, capital of Iran, in the second semester of the academic year 2014-2015. Using student numbers, 52 nursing students were selected randomly from each semester so that, on the whole, 313 students entered the study. The inclusion criteria were: being a BS nursing student and signing an informed written consent. In this study, in addition to demographic information questionnaire including age, gender, and marital status, the "Clinical Training Environment Inventory" was used. This Inventory was first developed by Chan and assesses students' perception of psychosocial aspects of clinical training setting. Various studies have used this instrument and scholars have repeatedly approved its validity in different countries (Midgley, 2006, Newton et al., 2010, Chan, 2003). It has also been used in Iran in various studies and its reliability and validity have been confirmed (Manoochehri et al., Rahmani et al., 2011). It consists of 42 items with six 7-item categories including respecting students in the clinical setting, students' satisfaction with the clinical environment, students' participation in clinical activities, noting individual differences among the nursing students, clarity of students' clinical duties, and the application of educational innovations in students' clinical training. These categories are measured by a 4-item Likert scale ranging from completely agrees, agree, and disagree, to completely disagree. The positive phrases are scored as completely disagree=1, disagree=2, agree=3, and completely agree=4. On this basis, the negative phrases are scored reversely. The deleted responses are given 3 points. Although the validity of this checklist was previously confirmed by Chan (Newton et al., 2010) in Australia using correlations mean and by Pakpour et al. in Iran using content validity(Pakpour et al., 2015), its validity was investigated in this study using content validity on the basis of research goals. In so doing, first the original questionnaire developed by Chan was translated into Persian and then given to 10 expert scholars along with the English version. After exerting the experts' opinions, the corrected form was given to 2 experts for final use. After confirmation, it was given to the study units to be completed. Using Cronbach's α, the reliability of this questionnaire was estimated in previous studies as 0.73 and 0.84. Yet, it was estimated again in this study as Cronbach's α=0.85. To carry out the research, the researcher attended the students' clinical setting in the last days of their training according to the appointments made beforehand. The research goals and procedures were elucidated, informed written consent was obtained, and ethical considerations were explained and observed. Then, the questionnaire was handed to them and completed by them in 30 minutes. Subsequently, the questionnaires were collected and scored on the basis of the scoring procedure explained above. The gleaned data were analyzed using SPSS13. The data were described with frequencies for qualitative variables, and mean, SD, and 95% of CI for quantitative variables. Moreover, the data were analyzed using Chi-square test, Fisher's exact test, independent t-test, and ANOVA (analysis of variance) with $P<0.05$.

Ethical considerations

The formal research approval was obtained from ethics center of Shahid Beheshti University of Medical Sciences and nursing schools (Ethics code: SBMU2.REC.1394.101).

Results

A total of 313 questionnaires were collected. The total mean of perceived clinical training was 129.95±17.93 for BS students of nursing. Seeing that 35 points are devoted to each category, the maximum and minimum score obtained in this study pertained to the categories "students' participation in clinical activities" and "the use of educational innovations in clinical training". Our findings indicated that the nursing students ranked "clarity of students' clinical duties" as second, "respecting students" as third, "students' satisfaction" as fourth, and "noting individual differences among the students" as fifth (Table 1).

Table 1: Mean and SD of total score of perceived clinical setting and its categories in BS nursing students in 2016

Questions	Mean± S.D
Personalization	22/ 71±4/82
Satisfaction	5/ 40± 22/36
Student Involvement	23/50±3/07
Individualization	19/98±4/13
Task Orientation	23/19±4/06
Teaching Innovation	18/20±4/28
Total	129/95±17/93

In this study, most of the study units were female (55.59%), single (90.09%), and without a history of hospital work (73.48%). ANOVA showed that students' gender was significantly correlated with total score of perceived clinical environment so that the mean total score of perceived clinical setting was significantly greater in male students than in female students (P=0.024); however, students' gender (P=0.881) and a history of hospital work (P=0.916) were not significantly correlated with total score of clinical training setting (Table 2).

Table 2: Absolute and relative frequencies of students' demographic information and the correlation between this information and total score of perceived clinical setting in BS nursing students in 2016

Variables		Number	Percentage	P value
Sex	Female	174	55/59	0/024
	Male	140	44/70	
Marital status	Single	282	90/09	0/881
	Married	31	9/90	
Job history in health centers	Yes	83	26/51	0/916
	No	230	73/48	

Discussion

The results of this study demonstrated that the means of obtained scores for the status of clinical learning environment in various areas were different so that "Student Involvement" obtained the highest score. With this category, we mean students' struggle for engaging themselves in patients' affairs, creation of constructive relations between students and trainers and between students and personnel, and participation in ward reports and rounds. Austin's theory (1984) is one of the theories that emphasizes student's participation in training. He defines student's participation as the rate of mental and physical energy spent by a student on knowledge acquisition. He considers this participation as a spectrum which varies from one time to another and from student to student. In this theory, participation consists of three components: input, environment, and output while environment is defined as all the experiences acquired by a student during their education (Johnson, 2015). The findings of this study showed that the greatest score obtained for this category belonged to the item "I put effort into what I do" while the smallest score belonged to the item "The preceptor(s) talk rather than listen to me". On the basis of the studies conducted so far, instructors' performance is one of the most influential factors contributing to effective clinical education. This is because the instructors are those who transfer their knowledge and experience to students through applying effective communication strategies. So, it can be said that the instructors are the linking bridge between theory and clinical practice(Moosavi et al., 2017). Hence, in planning effective programs for improving clinical training, special attention should be given to trainers and their performance (Baraz Pordanjani et al., 2009). Moreover, our results indicated that the category "Task Orientation" ranked second among the six categories. This category indicates how far the ward activities have been clear and well-organized. Furthermore, our findings revealed that the highest score obtained in this study belonged to the item "Getting work done is important in this setting" while the lowest score belonged to the item "This is a disorganized clinical placement" in this category. Another study carried out in Iran, enumerated the strong points of clinical education from nursing and midwifery students' point of view as follows: clarity of students' duties in the ward, presentation of lesson objectives in the first day of clinical training, training in the line of achieving these goals, and students' awareness of assessment and evaluation method in the first day of clinical training (Delaram, 2006). Nonetheless, in another study, the Iranian nursing students reported lack of clarity of students' duties as the major problem in clinical training (JAHANMIRI et al., 2004).

In this study, the category "Personalization" ranked third. This category deals with the opportunities devoted to interactions between students and instructors and the importance of noting the individual differences among the students' learning styles (Serena and Anna, 2009). In the studies by (Pakpour et al., 2015) and (Ip and Chan, 2005), this category ranked first while it ranked second in (Moh'd Alraja, 2011)'s study. Additionally, the results demonstrated that the greatest score belonged to the item "The preceptor(s) try his/her very best to help me" while the smallest score belonged to the item "The preceptor(s) do not bother with my feelings". In fact, the students highlight the human relations in clinical education and emphasize the need for respect for students, support, and being perceived by trainers(Boozaripour et al., 2017, Masoumpoor et al., 2015). In Rosenkoter's study, respect for students and showing of this respect for students during education is considered as the ethical codes for nursing trainers (Rosenkoetter and Milstead, 2010).

Findings indicated that the category "Satisfaction" ranked fourth among the six categories. Studies show that satisfaction with the status of clinical education is very important and varies with respect to time and place (Salimi et al., 2012). This category is concerned with wasting of time in clinical training, the interest for coming to the clinical training, and on the contrary, boring clinical environment and dulling time of training. The results showed that the highest score was obtained by the item "I look forward to attending clinical placement" while the item "I enjoy coming to this clinical setting" scored lowest.

This finding can indicate that the students would have sufficient enthusiasm for clinical work provided that the clinical setting is promoted and attractive conditions are created such as fostering students' interest in working in a clinical climate. In Serena's study, the students expressed their satisfaction with clinical training and did not look at it as waste of time (Serena and Anna, 2009). Another study in Iran also reported satisfaction with training planning and goals to be at the moderate to good level (Fotoukian et al., 2013). In the study by (Vahabi et al., 2011), the students reported the quality of clinical training in the category of clinical trainers' performance at the relatively appropriate level. Moreover, in the study by (Manoochehri et al.), the mean score of satisfaction was significantly higher in females compared to males (P=0.002).

The category "Individualization" ranked fifth among six categories. This category deals with noting students' interests, individual differences among the students, and permitting independent decision-making by students. This category ranked fifth in the studies by Berntsen and Ip (Berntsen and Bjørk, 2010, Ip and Chan, 2005). The findings of this study showed that the item "I am allowed to negotiate my workload" scored highest while the item "I am expected to do the work in the same way as other students" scored lowest indicating that trainers and the clinical staff note individual differences among the students in the clinical environment. One of the factors that affect learning is the style of learning. People use different styles of learning dependent on their individual differences. The learning style may be defined as the method used by individuals to organize and process new knowledge and experiences in their minds. The point that some trainees do not learn well despite the teachings of good trainers may indicate that different learners have different priorities in learning (McLeod, 2006), that is, they acquire and process information in different ways proportional to their individual differences: seeing, hearing, reflection and practice, analysis, and imagination (Mills, 2002). Regarding the results of this study and the fifth rank among six categories of this Inventory, it appears that attention ought to be focused more on individual differences among the students. Students of nursing and midwifery, due to the nature of their discipline and professional importance, require a special type of practical training which demands trainers and instructors to use various methods of teaching. Consequently, an awareness of students' characteristics and needs in the teaching-learning process aids the trainer in the logical designing of training and teaching. Various studies have indicated a significant correlation between gender and learning styles. The dominant learning style among the girls is the reading-writing style while that of boys is the auditory style. A meta-analysis study that investigated the dominant learning style among the nursing students, reported that the dominant learning styles among the Iranian nursing students were convergent, attractive, divergent, and conformant, respectively (Mohammadi I, 2013).

The category "Teaching Innovation" ranked sixth, i.e., the last rank, from BS nursing students' perspective in our study of clinical learning environment. This category indicates the degree to which the trainer designs clinical experiences, teaching methods, and learning activities in an innovative, attractive, and productive manner. The results of this study demonstrated that the greatest score was obtained by the item "The preceptor(s) used different teaching methods to guide me" while the item "New ideas are seldom tried out" scored lowest. Presently, most famous universities around the world are seeking teaching methods that lead to promoted clinical decision-making and continual student-centered learning (Magnussen et al., 2000). The relationship between nursing education and nursing services is constantly increasing in nursing pedagogy (Jarvis, 1987). Nursing education can be a dynamic process if it violates the limitations in time and place and moves towards innovations, developments, and the use of innovative approaches and methods in teaching and learning (Shabani, 1995). In other words, the selection of a suitable teaching method is one of the most important measures in the implementation of educational curricula. This is because successful and efficient learning is mostly the result of effective teaching and training (Baghaie and ATRKAR, 2003). The results of our study and the last rank of this category may serve as a warning against lack of innovations in nursing education. The acquisition of the least score by this category indicated that students are less frequently exposed to interesting learning experiences and innovative creative teaching methods in the course of their clinical education.

Conclusion

The success of nursing educational programs depends on the efficacy and sufficiency of clinical experiences. The pedagogic programs at any level and rate, struggle to come close to the appropriate defined standards for any teaching-learning activity. The identification of the problems present in the clinical training and taking some measures to correct them would foster the quality of nursing services. This may enable the authorities and parties involved in education to gain a correct picture of the present situations in clinical settings and acquire a proper landscape of the future. Clinical training is a dynamic process in which the students apply their learned concepts in interaction with the clinical environment. Today, considering the rapid changes in the healthcare settings, if richer clinical training is provided, the nurses will be more efficient and skilled in the near future. To achieve efficient clinical training, it is mandatory to assess the present status of training continuously, identify the weak and strong points of the field, and evaluate the quality of training and education. In this way, the defined standards may be assessed and operationalized. One of the diagnostic tools in this regard is the investigation of the clinical setting. An acceptable clinical environment for professional preparation of nursing students for the future may be created by the cooperation between trainers and clinical staff. Better results of clinical training may be obtained by some attempts to make useful changes in the clinical environment to adjust it more to the students' preferences. Our findings showed that more work should be done to provide a healthy learning environment for nursing students. The burden of such a work is laid on the shoulders of scholars, trainers, and nurse managers.

The devotion of lower scores to the categories like "the use of innovation in education", "clarity of students' clinical duties", and "noting individual differences in learning among the students" showed that these were among the important issues noted by students. This demands more accuracy in decision-making by educational policy-makers. In this study, the category students' struggle to engage themselves in patients' affairs ranked first indicating that it had its roots in the cultural and religious context of Iran. Iran is a country where nursing and patient care are holy issues.

References

Baghaie, M. & Atrkar, R. Z. 2003. A Comparision Of Two Teaching Strategies: Lecture And Pbl, On Learning And Retaining In Nursing Students.

Baraz Pordanjani, S., Fereidooni Moghadam, M. & Loorizade, M. 2009. Clinical Education Status According To The Nursing And Midwifery Students' Point Of View, Tehran University Of Medical Sciences. Strides In Development Of Medical Education, 5, 102-112.

Benner, P. 2012. Educating Nurses: A Call For Radical Transformation—How Far Have We Come? Journal Of Nursing Education, 51, 183-184.

Berntsen, K. & Bjørk, I. T. 2010. Nursing Students' Perceptions Of The Clinical Learning Environment In Nursing Homes. Journal Of Nursing Education, 49, 17-22.

Boozaripour, M., Abbaszadeh, A., Shahriari, M. & Borhani, F. 2017. Ethical Values In Nurse Education Perceived By Students And Educators. Nursing Ethics, 0969733017707009.

Chan, D. S. 2003. Validation Of The Clinical Learning Environment Inventory. Western Journal Of Nursing Research, 25, 519-532.

Changiz, T., Malekpour, A. & Zargham-Boroujeni, A. 2012. Stressors In Clinical Nursing Education In Iran: A Systematic Review. Iranian Journal Of Nursing And Midwifery Research, 17, 399.

Dadgaran, I., Parvizy, S. & Peyrovi, H. 2013. Nursing Students' Views Of Sociocultural Factors In Clinical Learning: A Qualitative Content Analysis. Japan Journal Of Nursing Science, 10, 1-9.

Delaram, M. 2006. Clinical Education From The Viewpoints Of Nursing And Midwifery Students In Shahrekord University Of Medical Sciences. Iranian Journal Of Medical Education, 6, 129-135.

Egan, T. & Jaye, C. 2009. Communities Of Clinical Practice: The Social Organization Of Clinical Learning. Health:, 13, 107-125.

Elcigil, A. & Sarı, H. Y. 2007. Determining Problems Experienced By Student Nurses In Their Work With Clinical Educators In Turkey. Nurse Education Today, 27, 491-498.

Eraut, M. 2000. Non-Formal Learning And Tacit Knowledge In Professional Work. British Journal Of Educational Psychology, 70, 113-136.

Fotoukian, Z., Hosseini, S., Beheshti, Z., Zabihi, A., Aziznejad, P. & Ghaffari, F. 2013. Clinical Education Status According To The Nursing Students' Point Of View, Babol Medical Sciences University. Biannual Journal Of Medical Education Education Development Center, 1, 26-33.

Henderson, A. & Tyler, S. 2011. Facilitating Learning In Clinical Practice: Evaluation Of A Trial Of A Supervisor Of Clinical Education Role. Nurse Education In Practice, 11, 288-292.

Hickey, M. T. 2010. Baccalaureate Nursing Graduates' Perceptions Of Their Clinical Instructional Experiences And Preparation For Practice. Journal Of Professional Nursing, 26, 35-41.

Ip, W. Y. & Chan, D. S. K. 2005. Hong Kong Nursing Students' Perception Of The Clinical Environment: A Questionnaire Survey. International Journal Of Nursing Studies, 42, 665-672.

Jahanmiri, S., Ghodsbin, F., Faseleh, M. & Zaighami, R. 2004. Nursing Students'viewpoints About The Problems Of Clinical Teaching.

Jarvis, P. 1987. Lifelong Education And Its Relevance To Nursing. Nurse Education Today, 7, 49-55.

Johnson, K. 2015. Student Engagement In Nursing School: A Secondary Analysis Of The National Survey Of Student Engagement Data. University Of Kansas.

Joolaee, S., Nikbakht-Nasrabadi, A., Parsa-Yekta, Z., Tschudin, V. & Mansouri, I. 2006. An Iranian Perspective On Patients' Rights. Nursing Ethics, 13, 488-502.

Kelly, C. 2007. Student's Perceptions Of Effective Clinical Teaching Revisited. Nurse Education Today, 27, 885-892.

Magnussen, L., Ishida, D. & Itano, J. 2000. The Impact Of The Use Of Inquiry-Based Learning As A Teaching Methodology On The Development Of Critical Thinking. Journal Of Nursing Education, 39, 360-364.

Manoochehri, H., Pour, M. B., Hosseini, M., Habibi, G. H. & Karami, M. Available Online Through Research Article Www. Ijptonline. Com.

Masoumpoor, A., Borhani, F., Abbaszadeh, A. & Rassouli, M. 2015. Nursing Instructors' Perception Of Students' Uncivil Behaviors: A Qualitative Study. Nursing Ethics, 0969733015611071.

Mcleod, M. Year. They All Learn The Same… Don't They?: An Evaluation Of The Learning Style Preferences Of The Nz Dairy Industry. In: International Teamwork In Agricultural And Extension Education Conference Proceedings, 2006. 414-423.

Midgley, K. 2006. Pre-Registration Student Nurses Perception Of The Hospital-Learning Environment During Clinical Placements. Nurse Education Today, 26, 338-345.

Mills, D. W. 2002. Applying What We Know: Student Learning Styles. Retrieved April, 7, 2009.

Moh'd Alraja, A. A. 2011. Undergraduate Nursing Students' Perceptions Of The Psychosocial Characteristics Of The Clinical Learning Environment During Their Clinical Placements, University Of Manitoba (Canada).

Mohammadi I, S. K., Tavan H, Mohammadi E. 2013. Learning Styles Of Iranian Nursing Students Based On Kolb's Theory: A Systematic Review And Meta-Analysis Study. Iranian Journal Of Medical Education, 13, 741-752.

Moosavi, S., Borhani, F. & Mohsenpour, M. 2017. Ethical Attitudes Of Nursing Students At Shahid Beheshti University Of Medical Sciences, Iran. Indian Journal Of Medical Ethics, 2, 14-19.

Newton, J. M., Jolly, B. C., Ockerby, C. M. & Cross, W.

M. 2010. Clinical Learning Environment Inventory: Factor Analysis. Journal Of Advanced Nursing, 66, 1371-1381.
Pakpour, V., Mehrdad, N., Salimi, S. & Moqaddam, M. 2015. Nursing Student Satisfaction From Iran University Of Medical Sciences Clinical Learning Environment. Educational Developement Of Jundishapur, 6, 356-363.
Papp, I., Markkanen, M. & Von Bonsdorff, M. 2003. Clinical Environment As A Learning Environment: Student Nurses' Perceptions Concerning Clinical Learning Experiences. Nurse Education Today, 23, 262-268.
Peyman, H., Darash, M., Sadeghifar, J., Yaghoubi, M., Yamani, N. & Alizadeh, M. 2011. Evaluating The Viewpoints Of Nursing And Midwifery Students About Their Clinical Educational Status. Iranian Journal Of Medical Education, 10, 1121-1130.
Rahmani, A., Zamanzadeh, V., Abdullah-Zadeh, F., Lotfi, M., Bani, S. & Hassanpour, S. 2011. Clinical Learning Environment In Viewpoint Of Nursing Students In Tabriz University Of Medical Sciences. Iranian Journal Of Nursing And Midwifery Research, 16, 253.
Rosenkoetter, M. M. & Milstead, J. A. 2010. A Code Of Ethics For Nurse Educators: Revised. Nursing Ethics, 17, 137-139.
Salimi, T., Khodayarian, M., Rajabioun, H., Alimandegari, Z., Anticchi, M., Javadi, S. & Namjoo, Z. 2012. A Survey On Viewpoints Of Nursing And Midwifery Students And Their Clinical Instructors At Faculty Of Nursing And Midwifery Of Shahid Sadoughi University Of Medical Sciences Towards Clinical Education During 2009-2011. The Journal Of Medical Education And Development, 7, 67-78.
Salmani, N. & Amirian, H. 2006. Comparison Between Nursing Students And Trainers Viewpoints About Clinical Education Environment In Islamic Azad University Of Yazd, In The Year 2006. Strides In Development Of Medical Education, 3, 11-18.
Sercekuş, P. & Başkale, H. 2016. Nursing Students' Perceptions About Clinical Learning Environment In Turkey. Nurse Education In Practice, 17, 134-138.
Serena, P. & Anna, B. 2009. Italian Nursing Students' Perception Of Their Clinical Learning Environment As Measured With The Clei Tool. Nurse Education Today, 29, 886-890.
Shabani, H. 1995. Skills Education:(Methods And Teaching Techniques). Tehran: Organization Of Study And Compile Books Humanities Universities.
Shahriari, M., Mohammadi, E., Abbaszadeh, A., Bahrami, M. & Fooladi, M. M. 2012. Perceived Ethical Values By Iranian Nurses. Nursing Ethics, 19, 30-44.
Shahsavari, H., Yekta, Z. P., Houser, M. L. & Ghiyasvandian, S. 2013. Perceived Clinical Constraints In The Nurse Student–Instructor Interactions: A Qualitative Study. Nurse Education In Practice, 13, 546-552.
Vahabi, S., Ebadi, A., Rahmani, R., Tavallaei, A., Khatouni, A., Tadrisi, S., Tayyabi, A., Khaghhanizade, M. & Heydaranlou, E. 2011. Comparison Of The Status Of Clinical Education In The Views Of Nursing Educators And Students. Education Strategies In Medical Sciences, 3, 179-182.
White, A. H. 2003. Clinical Decision Making Among Fourth-Year Nursing Students: An Interpretive Study. Journal Of Nursing Education, 42, 113-120.

Comparison of the Antibacterial Effects of Chlorhexidine Mouth washes with Jaftex Mouth wash on Some Common Oral Microorganisms (An in Vitro Study)

Ebrahim Babadi (1)
Zahra Bamzadeh (2)
Fatemeh Babadi (3)

(1) Department of Microbiology, Faculty of Basic Sciences, Shahrekord Branch, Islamic Azad University, Sharekord, Iran.
(2) Department of Microbiology, Faculty of Basic Sciences, Shahrekord Branch, Islamic Azad University, Sharekord, Iran.
(3) Assistant Professor, Department of Oral and Maxillofacial Medicine, Faculty of Dentistry, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

Corresponding author:
Dr Fatemeh Babadi,
Assistant Professor, Department of Oral and Maxillofacial medicine,
Faculty of Dentistry, Ahvaz Jundishapur University of Medical Sciences,
Ahvaz, Iran
Email: Babadi.Fatemeh@yahoo.com

Abstract

Background and Objectives: Mouth washes with anti-inflammatory and anti-plaque properties are recommended to maintain good oral hygiene. Thus the aim of this study was to compare the antibacterial effects of chlorhexidine mouth wash (CHX) with Jaftex mouth wash.

Materials and Methods: In this in vitro study, the disc diffusion method was used to measure inhibition zone on tested mouth washes on streptococus mutans, s.sanguis, s. salivarius and lactobacillus casei. The tube dilution method was used for determining the minimum inhibitory concentrations (MIC) and minimum bactericidal concentrations (MBC). Results were analyzed by using ANOVA test. (P < 0/05 was considered significant).

Results: The CHX mouth wash significantly exhibited greater inhibition zone than Jaftex. The MICs for CHX and Jaftex were 2 and 20 micrograms/ml for S. mutans , respectively. The MBCs for the mentioned mouth washes were 20 and 200 micrograms/ml for S.mutans, respectively.

Discussion and Conclusion: Jaftex mouth wash was less potent than the CHX in inhibiting growth on oral microorganisms and it is recommended to be used for plaque inhibition.

Key words: Chlorhexidine; Jaftex; Mouth wash; Oral Microorganisms

Please cite this article as: Please cite this article as: Ebrahim Babadi, Zahra Bamzadeh, Fatemeh Babadi. Comparison of the Antibacterial Effects of Chlorhexidine Mouth washes with Jaftex Mouth wash on Some Common Oral Microorganisms (An in Vitro Study) *World Family Medicine.* 2017; 15(9):200-203
DOI: 10.5742/MEWFM.2017.93125

Background

Medicine in Iran has a history of thousands of years (1). Dentistry is one of the most favorite fields of study in Iran (2-3). There are about 500 species of bacteria in the mouth, some of which cause mouth infectious diseases. (4-6). The mouth is a perfect environment for colonization and growth of a wide range of microorganisms especially bacteria (7). The bacterial plaque is a predisposing factor in destruction of the teeth and periodontal tissue (8). Mouth rinses will reduce bacterial plaque. Chlorhexidine (CHX) has been known as a gold standard for controlling plaque (9-11). Long-term use of (CHX) causing complications such as dental stain, changes in taste and dry mouth (12). The use of herbal medicines in recent years due to antibacterial and antifungal effects and less side effects for oral health has been common (4,9,12). Herbal mouth washes, due to having natural compounds in terms of compatibility with the body's physiology and less poisoning, has a better condition than CHX and is recommended for people who do not have the possibility of using chemical mouth rinses (13-14). Persian oak is one of the medicinal plants and its many treatment effects are listed (15). Antimicrobial properties of various species of Persian oak in various studies have been mentioned (16). A thin membrane that covers the oak is called jaft. Jaft has a great effect in the treatment of bacterial and viral diseases such as oral aphthous lesions (15). Jaftex is a new herbal mouth wash that has been prepared in the pharmaceutical research center of Ahvaz Jundishapur University of medical sciences. Jaftex is a combination of extract of oak Jaft (Oak Fruit) as a basis, extracts of Zataria Multifiu and Saturej Bachtiarica.

Objectives

This study aimed to compare the antibacterial effects of Cholorhexidine mouth wash and Jaftex on some common oral microorganisms.

Materials and Methods

This study is an in vitro study. The mouth wash of CHX 2/0% (Iran Nazhvan) was used in this study. To prepare Jaftex aqueous extracts of oak, Zataria Multifiu and Saturej Bachtiarica were taken and after combining the extracts 9 grams of sodium chloride were added and with distilled water reached to one m/l. To prepare bacterial suspensions, bacterial vials were purchased from collection of fungi and bacteria Iran (Pasteur) which included: Streptococcus mutans (PTCC 1683), S. sanguinis (PTCC 1449), S. salivarius (PTCC 1448) and Lactobacillus casei (PTCC 1608). According to the manufacturer's instructions they were dissolved in sterile saline. Following that bacterial suspension was cultured on solid medium (blood agar, Merck Germany) and incubated at 37 ° C for 24 - 48 hours. A colony was isolated from fresh cultures of bacteria and was dissolved in saline until approximate concentration of 1.5 × 10^8 cfu (equal to n: 05 Mcfarland Standrd) was obtained. Suspension of any bacteria was cultured on medium (MHA). Using dilute method, 2 ml of each mouth wash was dissolved in 2 ml of distilled water until the first concentration reached 1 mg per ml. To obtain the second concentration (5.0 mg per ml), the amount of 1 cc of this solution was dissolved with 2 ml of distilled water, and so the next concentrations (0.25-0.125 - 0.0625) for both chlorhexidine mouth wash and Jaftex were obtained, respectively. The blank disks on each medium were placed in a row and mouth washes were cultured on the disks from the highest to the lowest concentration and were incubated at 37 ° C for 24 hours. After disks of bacteria Streptococcus mutans, Streptococcus sanguinis, Streptococcus salivarius and Lactobacillus casei were cultured, for each concentration of chlorhexidine and Jaftex and were evaluated, and inhibition zone was measured using Antibiogram ruler. Then the two mouth washes without dilution and with standardized dilutions (chlorhexidine 0/2% and Jaftex) were cultured on the above microorganisms similar to the above method. Then minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) of each mouth washes were determined. so that each tube, 8 ml of medium, 1 ml bacteria and 1 ml of mouth wash were added and then 1 ml removed from the first tube and was added to the second tube and so on until the fourth tube reached concentrations of 200-20-2-0.2) micrograms per milliliter, respectively. Then they were incubated at 37° C for 24 hours, then the transparency of the tubes was checked visually. Tubes without turbidity, indicated the inhibition of bacterial growth. The tube that showed the highest concentration of residual turbid mouth wash was MIC. The respective mouthwashes were transferred to a solid medium (blood agar, Merck Germany) and were evaluated in terms of microbial growth to determine the MBC of mouth washes. The last tube which was negative in terms of culture on solid medium, indicated the MBC of mouth washes. This procedure was performed for all bacterial strains. This test was performed for all four target bacteria. The data were analyzed with ANOVA test using SPSS software version 13.0. P value less than 0.05 was considered significant.

Results

The CHX mouth wash significantly exhibited greater inhibition zone than the Jaftex mouth wash (P = 0/010). CHX mouth wash at all dilutions showed antibacterial effects. But Jaftex mouth wash in concentrations of 0/0625 and 0/125 didn't have antibacterial effects on S.Salivarius and for Jaftex in 0/0625 dilution, its inhibition zone on L.casei was zero. The MICs of CHX and Jaftex for S.mutans were 2 and 20 micrograms/ ml, respectively (Tables 1 and 2). The differences between mouth washes were significant (P value = 0.005). The MBCs of CHX and Jaftex for S. mutans, were 20 and 200 micrograms /ml, respectively (Tables 1 and 2). The differences between mouth wash were significant (P value = 0.005). The MICs and MBCs against the other bacterial microorganisms are shown in (Table 1 and 2). The lowest level of MICs for all bacteria was related to CHX. Among the above microorganisms, S. mutans showed the highest resistance to CHX and Jaftex mouth wash. The MICs and MBCs of Jaftex for L.casei were zero (Table 2).

Table 1: Comparison of the Levels of MIC and MBC (micrograms per ml) of Chlorhexidine on Oral Microorganisms

MIC	MBC	Bacteria
2	20	S. mutans
0/2	2	S. sanguinis
0/2	2	S. salivarius

Table 2: Comparison of the Levels of MIC and MBC (micrograms per ml) of Jaftex on Oral Microorganisms

MIC	MBC	Bacteria
20	200	S. mutans
0/2	20	S. sanguinis
0/2	2	S. salivarius
0/2	0	L. casei

Discussion and Conclusion

The present study showed that CHX mouthwash and Jaftex inhibit bacterial growth, and also there were significant statistical differences between the two mouth washes. The findings of the present study are similar to other studies that have been done in this field. According to some studies, the CHX mouth wash has shown greatest antibacterial effects on oral microorganisms than the other mouth washes (17, 18). Based on inhibition zone, CHX mouth wash has most antibacterial effects on bacteria of S. mutans, S. sanguinis and S. salivarius. Sadeghi et al. reported that CHX 0.2% had most effects on S. sanguinis, S. sobrinos, S. mutans and S. salivarius and it had least effects on pseudomonas aeruginosa (19). In this study, according to the MICs and MBCs, S. mutans had most resistance to CHX and Jaftex mouth washes. Review of literature show conflicting results about the antibacterial effects of CHX on S. mutans. The results listed below are similar to our results. Jarvinen et al. in a study examined the effectiveness of CHX on S. mutans and reported that S. mutans was more resistant to antimicrobial agents (20). Yousefimanesh et al. also confirmed that S. mutans showed resistance to CHX (21). Salehi et al .reported that CHX mouth washes were more effective on S. mutans than Persica mouth washes (22). Lactobacilluses are microorganisms that play a role in the pathogenesis of dental caries and mechanical or chemical elimination of them is effective in prevention of dental decay (23). Kohler et al. examined the effects of CHX on streptococci and Lactobacillus, and concluded that CHX mouthwash may reduce dental plaque microorganisms and antibacterial effects on streptococci are more effective compared with Lactobacillus (24). Our study also confirmed results of Kohlre et al. The results of this study showed that the Jaftex mouth wash has antibacterial effects on microorganisms of S. mutans, s. anguis, salivarius, but not Lactobacillus casei. But the antibacterial effects of Jaftex are less than CHX mouth wash. The present study is the first research which surveys the antimicrobial effects of Jaftex (as a mouth wash) on common oral microorganisms. But antibacterial effects of oak and its fruit have been proven. Ebrahimi et al. conducted a study to evaluate the effects of antibacterial hydroxy extract of oak (Jaft) compared to a number of antibiotics on four bacteria: staphylococcus aureus, epidermidis, Escherichia coli and saprophyticus and reported the Persian oak has compounds with antibacterial properties and its inhibitory effects on bacteria is concentration-dependent (25). Ebraham et al. noted that Persian oak has antibacterial effects and antibacterial properties of it are due to tannins present in the extract (26). Hefaji et al. reported that herbal mouth washes have less antimicrobial effects on microorganisms than the CHX mouth wash. But the components of the herbal mouth wash are effective in preventing the growth of bacteria in the mouth and can be helpful in controlling dental plaque and inflammation (9). In this study two methods (Disc Diffusion and Tube dilution) simultaneously used to investigate antibacterial effects two mouth wash on oral microorganisms. The outstanding point in the present study was the above methods.

Acknowledgements
This project was conducted by financial support from the Vice-Chancellor for Research Affairs of Ahvaz Jundishapur University of Medical Sciences; thereby authors express thanks for the financial support. (No: GP95031)

References

1. Gilavand A. A Study of the Growth and Flourish of Ahvaz Jundishapur University of Medical Sciences; A Cultural History. Int J Med Res Health Sci. 2016; 5(11): 83-86.
2. Gilavand A. The Comparison of Iranian and Foreign Students' Motivations to Choose Dentistry Field of Study. Int J Pediatr. 2016; 4 (6):1993-2010. doi: 10.22038/ijp.2016.6861
3. Gilavand A, A Study of Ahvaz Jundishapur University of Medical Sciences Dental Students' Interest to Pursuing a Specialty according to their Demographic Information. Indo Am. J. P. Sci, 2017; 4(06) 1593-1598. doi.org/10.5281/zenodo.819543.
4. Mozaffari B, Mansouri SH, Rajabalian S, Alimardani A, Mohamadi M. [In vitro study between anti-bacterial and cytotoxic effects of Chlorhexidine and Persica mouthrinses]. J Dent School Shahid Beheshti Univ Med Sci 2005; 23(3):494-509. [In Persian]

5. Rajabalian S, Mohammadi M, Mozaffari B. Cytotoxicity evaluation of Persica mouthwash on cultured human and mouse cell lines in the presence and absence of fetal calf serum. Indian J Dent Res 2009; 20(2):169-73.
6. Noumi E, Snoussi M, Hajlaoui H, Valentin E, Bakhrouf A. Antifungal properties of Salvadora persica and Juglans regia L. extracts against oral Candida strains. Eue J Clin Micrbiol Infect Dis 2010; 29(1):81-8.
7. Marcotte H, Lavoie MC. Oral microbial ecology and the role of salivary immunoglobulin A. Microbiol Mol Biol Rev 1998;62 (1):71-109.
8. Zelic O, Cakic S, Lukovic N. [The effect of two different oral antiseptics on dental plaque formation (de novo biofilm) and on gingival inflammation]. Srp Arh Celok Lek 2009;137 (1-2):6-9. [In Serbian]
9. Haffajee AD, Yaskell T, Socransky SS. Antimicrobial effectiveness of an herbal mouthrinse compared with an essential oil and a chlorhexidine mouthrinse. J Am Dent Assoc 2008; 139(5):606-11.
10. Falahzadeh H, Moein Taghavi A, Foruzanmehr MJ. Clinical comparison of Persica and Chlorhexidine mouth rinses using Meta-analysis technique. J Islamic Dent Assoc 2006; 18(1):62-72.
11. Santos A. Evidence-based control of plaque and gingivitis. J Clin Periodontol 2003; 30(Suppl 5):13-6.
12. Malhotra R, Grover V, Kapoor A, Saxena D. Comparison of the effectiveness of a commercially available herbal mouthrinse with chlorhexidine gluconate at the clinical and patient level. J Indian Soc Periodontol 2011; 15(4):349-52.
13. Haghighati F, Jafari S, Beitollahi J. [Comparison of antimicrobial effects of ten herbal extracts with chlorhexidine on three different oral pathogens: An in vitro study]. Hakim Res J 2003;6 (3):71-6. [In Persian]
14. Paknejad M, Jafarzadeh TS, Shamloo AM. [Comparison of the efficacy of Matrica and 0.2% Chlorhexidine mouthwash in patients with chronic periodontitis]. J Islamic Dent Assoc 2006;18 (3):92-7. [In Persian]
15. Almas K, Skaug N, Ahmad I. An in vitro antimicrobial comparison of miswak extract with commercially available non-alcohol mouthrinses. Int J Dent Hyg 2005; 3 (1):18-24.
16. Sharifi A, Gorjipour R, Gorjipour AA, Sardsiri M, Mohammadi R, Jabarnejad A. [Antifungal effect of Quercus Infectoria Gall (Oak) on Saprolegnia Fungi]. Armaghane-Danesh 2013;17 (1):78-84. [In Persian]
17. Shen Y, Stojicic S, Haapasalo M. Antimicrobial efficacy of Chlorhexidine against bacteria in biofilms at different stages of development. J Endod 2011; 37 (5):657-61.
18. Rohrer N, Widmer AF, Waltimo T, Kulik EM, Weiger R, Filipuzzi-Jenny E, et al. Antimicrobial efficacy of 3 oral antiseptics containing octenidine, polyhexamethylene biguanide, or Citroxx: can chlorhexidine can be replaced? Infect Control Hosp Epidemiol. 2010; 31(7):733-9.
19. Sadeghi M, Bahramabadi R, Assar S. [Antibacterial effects of persica and matrica verbal mouthwashes on common oral microorganisms: An invitro study]. Dental J Mashhad Univ. 2012 ;25 (4):24-9. [In Persian]
20. Jarvinen H, Tenovuo J, Huovinen P. In vitro susceptibility of streptococcus mutans to chlorhexidine and six other antimicrobial agents. Antimicrob Agents Chemother 1993; 37(5):1158-9.
21. Yousefimanesh H, Amin M, Robati M, Goodarzi H, Otoufi M. Comparison of the antibacterial properties of three mouthwashes containing chlorhexidine against oral microbial plaques: An invitro study. Jundishapur J Microbiol 2015; 8(2):e17341.
22. Salehi P, Kohanteb G, Momeni Danaei SH, Vahedi R. Comparison of the antibacterial effects of Persica and Matrica, two herbal mouthwashes with chlohexidine mouthwash. J Dent shiraz Univ Med Sci. 2005; 6(1):63-72.
23. Badet C,Thebaud NB. Ecology of lactobacilli in the oral cavity: a review of literature. Open Microbiol J 2008;2: 38-48.
24. Kohler B, Andreen I, Jonsson B, Hultqvist E. Effect of caries preventive measures on streptococcus mutans and lactobacilli in selected mothers. Scand J Dent Res 1982; 90(2):102-8.
25. Ebrahimi A, Rezaei SA, Nejati V. The evaluation of the antibacterial activity of Persian oak hydroalcoholic extract in the disk diffusion method. J Med Plants 2009; 8:1-9.
26. Ebrahimi A, Khayami M, Nejati V.[Comparison of antimicrobial effect of different parts of Quercus persica against Escherichia coli O157:H7]. Horizon Med Sci 2012; 17(4):11-17. [In Persian]

Study of the effect of plasma jet on Fusarium isolates with ability to produce DON toxins

Elham Galin Abbasian (1)
Mansour Bayat (1)
Arash Chaichi Nosrati (2)
Seyed Jamal Hashemi (3)
Mahmood Ghoranneviss (4)

(1) Department of Microbiology, Science and Research Branch, Islamic Azad University, Tehran, Iran
(2) AssociatePprofessor ,Division microbiology, Department of molecular & cell biology , Faculty of basic sciences , Lahijan branch, Islamic Azad university (IAU), Lahijan,Gilan, Iran
(3) Professor of Tehran University of medical Sciences, Tehran, Iran
(4) Professor of physics, Plasma physics research center, Science and Research Branch, Islamic Azad University, Tehran, Iran

Corresponding author:
Mansour Bayat
Professor of physics, Plasma physics research center,
Science and Research Branch,Islamic Azad University,
Tehran, Iran
Email: dr_mansour_bayat@yahoo.com

Abstract

Introduction: *Fusarium* species cause a variety of infections in humans, such as superficial, invasive and disseminated infections. The aim of this research is to study the effects of argon cold double atmospheric pressure plasma (DAPACP) on deactivating the cells or *Fusarium* spores which can seriously damage food products in vitro conditions.

Materials and Methods: Samples were obtained from May 2015 to September 2016 during three cultivation periods of tea in Gilan and Mazandaran province. One sample was taken from each 50 square hectares of tea plantations prepared for harvesting and also from 60 tea manufacturers. At intervals of 3, 7 and 15 days, plates were studied and the colonies on each plate were identified and isolated and then their microscopic and also macroscopic properties were documented. Finally 150 colonies were selected. We prepared Czapek and liquid environments (Czpk), then the isolated samples were cultured using stab. Plasma system is a DAPACP system (AL2O3) which used a high voltage with 25KHZ frequency and is usually applied to a high voltage electrode.

Results: The amount and type of toxins in the environment with fixed toxicity vary . In the metabolic cycle, DON (deoxynivalenol) is first produced and then is metabolized in a few steps. Plasma jet treatment causes a relative reduction in concentration of DON per solvent volume or culture media; a statistically significant negative correlation is observed here. The negative correlation between DON, which has been measured in samples previously exposed to plasma jet for 60 seconds , is affected by plasma jet more than DON. Therefore, Z = -2 / 201, Sig = 0.028 is proven, and it occurs with more intensity compared to DON.

Conclusion: This study has confirmed that argon plasma jet system has destructive effects on mycotoxins such as DON and also on the microorganisms which produce mycotoxins. Although the physicochemical properties and structural changes of mycotoxins were not explained under plasma jet treatment, this study revealed that the plasma system needs certain conditions like time and toxin concentration of food, to remove and inactivate mycotoxins.

Key words: *Fusarium*, plasma jet, DON, toxins

Please cite this article as: Please cite this article as: Abbasian E. et al. Study of the effect of plasma jet on Fusarium isolates with ability to produce DON toxins . *World Family Medicine.* 2017; 15(9):204-207
DOI: 10.5742/MEWFM.2017.93126

Introduction

Fusarium species cause a variety of infections in humans, such as superficial, invasive and disseminated infections [1]. Clinical manifestation of Fusariosis depends on the host immune system and the entrance site of the organism [2]. Superficial and localized infections occur mainly in people with healthy immune systems, while invasive and disseminated infections have been seen in immunocompromised persons [3]. *Fusarium* species are considered as pathogenic agents in plants, crops and in some animals [4]. *Fusarium* species are widely distributed in soil and water [5, 6]. More than 50 species of *Fusarium* have been identified, twelve of which are associated with disease including; *Fusariumsolani, Fusarium oxysporum* and *Fusarium* which contributes to nearly 70 % of the cases [7, 8].

Fusarium species carry several virulence factors, including Mycotoxins which are cellular and humoral immune suppressive and cause tissue problems [9]. In addition, Fusarium species have the ability to combine to prosthetic materials and could also produce protease and collagenase [10].

Deoxynivalenol (DON) is one of the several Mycotoxins produced by Fusarium species which causes contamination in maize, wheat, barley, rice and other grains during their storage life and it is considered a risk factor for humans and animals [11]. This toxin causes nausea or vomiting and was first reported in Japan in 1972 following the consumption of mouldy barley [12].

DON is chemically a member of trichothecenes mycotoxins family and structurally is apolar organic material belonging to trichothecenes type B, with three free hydroxyl groups which causes its toxicity. One of the most significant physicochemical properties of DON is high-temperature heat resistance and water solubility [13].

Plasma as a state of matter has significantly different characteristics; plasma has no fixed shape or volume and can form magnetic lines and rays under magnetic fields. In accordance to this method used, plasma can be converted into a wide range of states; from being unbalanced to thermal equilibrium. The antimicrobial effects of plasma have been known for almost 50 years [18, 16].

Research has mainly focused on the use of plasma on nonliving surfaces, such as medical instruments. Plasma is a cold gas-like mixture of charged particles (free electron and proton particles) with neutral reactive particles including; gas molecules, free radicals and ultraviolet photons. When the reactor is launched in atmospheric pressure, a cool plasma jet is blown into the air [17]. Since this plasma jet can be used in sterilization of sensitive surfaces, it is a proper candidate to be applied instead/with the autoclave sterilization process for surgical and dental use as an effective agent to destroy bacteria and viruses [15].

The aim of this research is to study the effects of argon cold double atmospheric pressure plasma (DAPACP) on deactivating the cells of *Fusarium* spores which can seriously damage food products in vitro conditions. Moreover, fungi are used to investigate the efficacy of cold plasma in suppressing the produced mycotoxins.

Materials and Methods

Sampling:
Samples were obtained from May 2015 to September 2016 during three cultivation periods of tea in Gilan and Mazandaran province through following the instructions of outdoor and indoor sampling. One sample was taken from each 50 square hectares of tea plantations that were prepared for harvesting and also from 60 tea manufacturers. Sampling was carried out by placing open plates at a height of 90-110 cm, 3 to 5 days after each rainfall from 9 o'clock till 3 pm during sunshine at 25 ± 3 ° C and when their velocity was measured at 30 m / s.

Six plates with malt extract agar, yeast extract agar, Czapek yeast extract agar, Czapek agar, sabouraud dextrose agar and potato dextrose agar were all mixed with 100 ppm chloramphenicol and 50 ppm tetracycline and were examined 3 to 5 days at 25 ° C before operation. All of them were applied for one group of samples. Plates containing 15 to 25 cubic centimeter of agar after 30, 60 and 90 minutes were sampled through plantations and 15, 30 and 60 minutes through factories; 900 plates were taken and then were placed in perforated polyethylene bags and sent to the laboratory. The plates were incubated at 25 ± 2 ° C in an aerobic environment.

One plate was kept in the dark, another one in the light and finally a pair of them was kept in light-dark enviroment. At intervals of 3, 7 and 15 days, plates were studied and the colonies on each plate were detected and isolated and then their microscopic and macroscopic properties were documented. Finally150 colonies were selected.

Cultivation & Isolation:
We prepared Czapekand liquid environments (Czpk), then the isolated samples were cultured using stab (in 3 places with a distance of 2 cm from each other and from the edge of the plate). Then they were incubated for 14 days at 25 ° C. Samples were then cultured in liquid environments of sB + ME and sB + yE. They were checked regularly to avoid drying and reduction in the volume of liquid, PBS was added to these environments. The samples were collected, and the extracted solution was added and filtered.The slides of the cultures were prepared and then stained with lacto phenol.

Extracted solutions from solid and liquid environments were prepared for ELISA technique. Then the samples were exposed to cold plasma jet and were set at 30 seconds, 60 seconds and 360 seconds in certain concentrations. At this stage, sample volume was reduced.

Plasma Jet System

Plasma system is a DAPACP system (AL2O3). A high voltage with 25KHZ frequency is applied to a high voltage electrode. Voltage and the waveforms are recorded through a high voltage electrical connector with visual indicator. Argon gas is blown into the air through micro tubes to form a double plasma jet. *Fusarium* biomass and the extracted samples from culture media were collected at the bottom of the jet at a distance of 12 mm from the top of the double jet.

The emission spectrum of DAPACP jet is recorded using Spectroscopy. The spectra in Spectrograph are coupled via UV fiber.The effective gas enters a flexible tube and the plasma jet is induced by high frequency RF power supplies.

The fungus used in this study is called *Fusarium*. For inoculation, MEA is cultured on the new plates and at the end of the incubation period, spores are carefully removed and combined with 2% of Tween 80 as emulsifier and the solution is filtered.

After applying an appropriate solution, spores are released on the surface of OMMEA and they are incubated at 25 ° C for 7 days where the colonies are counted. After plasma jet exposure, the activated spores in distilled water are placed in sterilized tubes and plasma-exposed samples were used.

Colonies are regularly counted and 5 tests are used for each sample during each treatment. The experiment is repeated three times with similar conditions. Due to plasma treatment, another control sample is inoculated with the spores and is exposed to argon-oxygen gas mixture with same velocity.

This is to ensure the deactivation of plasma-exposed fungi or the removal of the spores from the surface of samples. The production of five mycotoxins which are isolated from five *Fusarium* species obtained from processing manufacturers and different foods and the spores of the investigated fungus are obtained on malt extract agar (MEA).

In preliminary tests, the isolated *Fusarium* used in this study are identified as a major source of T and DON toxin. The procedure used in this experiment is similar to what is used for spore sprouting. Inoculated fungi that had been previously sterilized without plasma treatment, are used as control in 5 culture medias and the tests are repeated three times under the same conditions.

Results

Correlations between V1 and V3 in DON toxin:
The amount and type of toxins vary and in the environment with fixed toxin, the purpose is to assess the correlation between V1 and V3. In other words, DON toxin production by fungal isolate has a significant positive correlation (Sig=0/PC = 0.997). If DON toxin production amount is high, T2 will be low. In the metabolic cycle, DON is first produced and then is metabolized in a few steps.

There is a significant negative correlation between the produced DON in potato culture media containing yeast extract and DON in the samples obtained from the same environments which is exposed to plasma jet for 60 seconds . Plasma jet treatment causes a relative reduction in concentration of DON per solvent volume or culture media, statistically a significant negative correlation is observed here. This feature has also a statistical significant positive correlation in the conversion of DON to non-toxicity statement after a 60-second treatment with Plasma jet (Sig=0.058 /pc=0.797)

According to the particular negative correlation which is statistically significant between DON concentration and its mean size in potato yeast extracted compared to the DON produced in the same environment but is supposed to be exposed to plasma jet pressure for 60 seconds, the results were as follows : (Sig = 0.045 / pc = -0.821). Therefore toxin reduction due to plasma jet exposure is justified. The negative correlation between DON, has been measured in samples previously exposed to plasma jet for 60 seconds. The results of Sig = 0.028 / Z = -2 / 201 indicate that in fungus strains, during their incubation period, large amounts of DON have been converted. While a negative correlation was observed in the amount of DON reduction in both environments of potato malt extract and potato yeast extract, after 60 seconds of plasma jet treatment, and we noticed a significant numerical difference.

Moreover, when Z= -1/992, Sig=0.046 (Z = numerical differentiation), the numerical differentiation of T2 in potato yeast extract with the same amount of toxin and in the same environment,where it has been exposed to plasma jet for 60 seconds, is statistically significant.

Therefore, Z = -2 / 201, Sig = 0.028 proves that the sharp decline in the value of T2 in potato yeast extract after 60 seconds treatment with Plasma jet is significant, and it occurs with more intensity compared to DON.

Kolmogorov-Smirnov test (Nonparametric):
The standards (Standard Deviation) are mostly above 2. The average deviation is between 0.5 to 2. A significant correlation was detected between the amount of DON , produced in potato malt extract in fungal samples. According to the obtained data (DON precursor in the intracellular metabolism) , there has also been a significant correlation between the produced DON in potato yeast extract and its concentration after a 60-second plasma jet treatment in the same environment.

However, there was a significant positive correlation between the amount of DON produced in potato yeast extract and the reduced concentrations after 60 seconds of plasma jet treatment. Eventually a significant negative correlation was observed between DON reduction rate after a 60-second plasma jet treatment in potato yeast extract with T2 amount in the same environment and after

of plasma jet treatment. Eventually a significant negative correlation was observed between DON reduction rate after a 60-second plasma jet treatment in potato yeast extract with T2 amount in the same environment and after the same treatment.

Discussion

Mycotoxins such as aflatoxins and zearalenones are the most common toxins in foods which can be produced in a wide range of agricultural products [17, 18]. Since mycotoxins have different toxic effects and good thermal stability, their presence in food products could potentially threaten the health of humans and animals [14]. It has been proven that they cause Mycotoxicosis in humans and animals [13,18].

Various methods have been reviewed to eliminate and destroy the toxicity of mycotoxins through physical removal of the contaminated parts of the food, such as heat, chemical and radiation treatments, in order to convert toxins to relatively harmless compounds which lead to eradication of toxin effects[12]. Some of these methods are not always effective, especially when mycotoxins are disseminated through the substance. In addition, some of these toxin elimination techniques are expensive and impractical for business consumption [11,16].

In a study by Jong-Chul Park et al. (2007. Japan) on AFB1, DON and NIV toxins, they observed that plasma jet has fine deterrence effects on toxins; they have confirmed it by using HPLC method. They have also noticed that DON and NIV toxins compared to AFB1 will be destroyed more slowly [10,14]. Our results showed that the 60-second plasma jet treatment reduces DON concentration per solvent volume or culture media,and in the case of those samples being previously exposed to plasma jet for 60 seconds, it was shown that T2 toxin is more affected with plasma jet compared to DON.

Plasma jet effect on toxin in this method is a time-dependent factor.We have set the certain concentration of plasma jet at 30 seconds, 60 seconds and 360 seconds. At this stage, the solubility volume of the samples decreases, in other words, the conversion rate of DON accumulation rate. Fungi samples tend to produce more DON toxin rather than T2 in the same environment and under the same conditions.

Conclusions

This study has confirmed that argon plasma jet system has destructive effects on mycotoxins such as DON , and also on the microorganisms which produce mycotoxins. Although the physicochemical properties and structural changes of mycotoxins were not explained under plasma jet treatment,this study revealed that the plasma system needs certain conditions like; time and toxin concentration of food in order to remove and inactivate mycotoxins.

Acknowledgment
With special thanks to The Research and Technology deputy of the Islamic Azad University, Tehran Branch.

References

1- Appelqvist IAM, Debet MRM. Starch-biopolymer interactions: a review. Food Rev Int 1997; 13: 163–24.
2- Armero E, Collar C. Texture properties of formulated wheat doughs. Z Lebensm- Unters Forsch 1997; 204:136–45.
3- Bell DA. Methylcellulose as a structure enhancer in bread baking. Cereal Foods World 1990; 35: 1001–1006.
4- Bouaziz, M. A., Amara , W. B., Attia, H., Blecker, C., & Besbes, S. (2010). Effect of the addition of defatted date seeds on wheat dough performance and bread quality, Journal of Texture Studies, 41, 511-531.
5- Brady PL and Mayer SM, 1985. Correlation of sensory and instrumental measures of bread texture. Cereal chemistry 62(1): 70.
6- Collar, C.E.1996. Retrogradation of the starch franction in wheat bread. Food Science and Technol.Int. 2: 323-333.
7- Guarda A, Rosell CM, Benedito C, Galotto MJ (2004) Food Hydrocolloid. 18: 241-247.
8- Kim, S.K. and D'Appolonia, B.L. (1977a) Bread staling studies. I. Effect of protein content on staling rate and bread crumb content on staling rate and bread crumb pasting properties. Cereal Chemistry, 54, 207–15.
9- Mettler, E. and Seibel, W.1993. Effect of emulsifiers and hydrocollid on whole wheat bread quality. cereal chemistry.70: 373-377.
10- MacRitchie F, Gras PW. 1973. The role of flour lipids in baking. Cereal Chem 50: 292.
11- Ozkoc, S. O., Sumnu, G., and Sahin, s. 2009. The effects of gums on macro and micro-structure of breads baked in different ovens. Food hydrocolloids, 23: 2182-2189.
12- Pouresmaeil, N.2010. Formulation and production of prebiotic gluten free bread using transglutaminase enzyme and hydrocolloids: guar and xanthan. M.Sc Thesis, Department of Food Science and Technology, School of Agriculture, Tarbiat Modarres University, Tehran, Iran
13- Rojas J.A., Rosell C.M., Benedito de Barber C. 1999. Pasting properties of different wheat flour-hydrocolloids system. Rojas 1999. Food Hydrocolloids 13, 27-33.
14- Sarkar N, Walker LC. Hydration-dehydration properties of methylcellulose and hydroxyprophylmethylcellulose. Carbohyd Polym 1995; 27: 177–85.
15- Selomulyo VO, Zhou W. Frozen bread dough: effect of freezing storage and dough improvers. J Cer Sci 2007; 45(1): 1–17.
16- Sidhu, S. J. and Seibel, W.1988. Measurment of chapati texture using Zwick universal testing machine. Lebensm Wiss. U. Technal. 21:147-150.
17- Volpini-Rapina LF, sokei FR, conti-silva AC. 2012 . Sensory profile and preference mapping of orange cake with addition of prebiotics Inulin and oligofructose. LWTFood Science and Technology1-6.
18- Yarmand, M. S., & Seyedein Ardebili, M. (2005). Effect of Gluten and Malt Flour on Staling and Quality of Barbari Flat Bread. Iranian, J. Agric. Sci, 36, 591-602.

The comparison of anti-inflammatory effect in two methods of topical dexamethasone injection and topical application of ginger aqua-alcoholic extract after removing mandibular wisdom teeth

Sahar Zandi (1)
Seyyed Muhammadreza Alavi (2)
Kamran Mirzaie (3)
Ramin Seyedian (4)
Narges Aria (5)
Saman Jokar (6)

(1) Dentistry faculty, Bushehr University of Medical Sciences, Bushehr, Iran
(2) Dentistry faculty, Bushehr University of Medical Sciences, Bushehr, Iran
(3) Department of Social Medicine, Medicine faculty, Bushehr University of Medical Sciences, Bushehr, Iran
(4) Department of Pharmacology, Medicine faculty, Bushehr University of Medical Sciences, Bushehr, Iran
(5) Department of Oral & Maxillofacial Radiology, Dentistry faculty, Bushehr University of Medical Sciences, Bushehr, Iran
(6) Department of Oral & Maxillofacial Surgery, Dentistry faculty, Bushehr University of Medical Sciences, Bushehr, Iran

Corresponding Author:
Saman Jokar
Department of Oral & Maxillofacial Surgery,
Dentistry faculty, Bushehr University of Medical Sciences,
Bushehr, Iran
Tel: +989170412008
Email: saman.jokar@yahoo.com

Abstract

Introduction: Removing wisdom tooth is one of the most damaging facial surgeries encountered. Dexamethasone is a complex of drugs used that has many side effects. On the other hand, ginger has anti-inflammatory properties without side effects. Therefore, this study compared anti-inflammatory properties of two soft tissue injections of dexamethasone sodium phosphate 1/6 mg, using topical mucobioadhesive containing ginger extract.

Method: 45 healthy patients were selected without any systemic diseases with double-sided wisdom teeth that they intended to have removed. Two-way teeth of the patients were removed by a similar procedure by maxillofacial surgeon. On one side of 2 cm² of mucobioadhesive containing ginger extract (20%) and on the other side, dexamethasone phosphate 1/6 mg was used. The maximal oral opening rate was measured by the researcher before surgery and 24 and 72 hours after surgery to evaluate Trismus.

Results: 45 patients with an average age of 28 years participated in this study. During the measurements, the mean of maximum mouth opening before teeth removal was 47/48 mm. At the side using the mucobioadhesive containing ginger extract (20%) this value after 24 hours was 39/57 and after 72 hours was 40 mm. At the side using dexamethasone phosphate 1/6 mg this value after 24 hours was 46/42 and after 72 hours was 44/55 mm.

Conclusion: Based on the statistical data obtained from this study, it seems that topical administration of tissue glue containing ginger extract (20%) and soft tissue injection of dexamethasone sodium phosphate (1/6 mg) after surgery both reduced trismus after surgery. But dexamethasone sodium phosphate was slightly more successful than the mucobioadhesive containing ginger extract.

Key words: third molar removal, trismus, mucobioadhesive, ginger, dexamethasone sodium phosphate,

Please cite this article as: Please cite this article as:
Zandi S. et al. The comparison of anti-inflammatory effect in two methods of topical dexamethasone injection and topical application of ginger aqua-alcoholic extract after removing mandibular wisdom teeth. *World Family Medicine.* 2017; 15(9):208-213
DOI: 10.5742/MEWFM.2017.93127

Introduction

Nowadays, the act of removing wisdom teeth, whether surgically or non-surgically, is one of the most commonly used actions by general and specialized dentists. Many reasons cause patients and dentists to remove the wisdom teeth. In this regard, root analysis of second molar tooth (in case of a false growth pattern of the tooth (horizontally), the formation of cysts and tumors with dental origin around the latent wisdom teeth, which may be benign or malignant depending on the lesion, jaw bone weakening by a latent tooth and lacking the mechanical strength of the jaw bone against impact, and facing irregularity and mess in the rest of the jaw teeth can be observed (1). Also, extensive caries or damage in the pulp of the wisdom teeth due to the difficulty of working conditions and performing root canal surgery on these teeth, as well as weakness, inability of the patient to cooperate or patient's desire, is a preferred decision to remove wisdom teeth. The prevalence of impacted wisdom teeth in the mandible has been reported 31/9% in mandibular left third molar, and 28% in mandibular right third molar. Based on the abundance of data, it includes the following types: The mesioangular impacted teeth (43%), Vertical impaction (38%), distoangular impaction (6%), horizontal impaction (3%). In general, tooth extraction toughness (easy to hard, respectively) is as follows: Vertical, angle to mesial, horizontal, angle to distal (2). In general, the most common problems after removing the wisdom tooth are complications such as pain, swelling, trismus, and the anesthetic of the lingual nerve, infection, etc. which occur due to the trauma to the tissue and the inflammation caused by it (3, 4). Inflammation is the natural defense mechanism of the body to damage or cell death, which is characterized by redness, warmth, pain and swelling in the area (5). When tissue damage occurs, a large amount of histamine, bradykinin, serotonin, and other chemicals are released in the area. These substances, in particular, histamine, cause local vasodilatation, increased blood flow to the affected area, as well as the permeability of the capillaries and venules (6-8). Following this, edema occurs which itself causes the patient's unpleasant experience, pain, disability and possibly greater paresthesia (9). The complications of removing these teeth and surgical pain that occurs in 90% of patients with moderate to severe severity and the effect on the daily activities of the patient, has turned the removal of pain and discomfort into one of the important goals in dentistry. And for many years, science has sought to find ways to reduce pain (10, 11).

In this context, these strategies include less manipulation during surgery, maintaining periost health, taking painkillers, corticosteroid injections, etc. (12). Nowadays, drugs such as non-steroidal anti-inflammatory drugs, drug-containing painkillers and corticosteroids, etc. are available to reduce pain and side effects (6). The use of corticosteroid drugs, such as dexamethasone and betamethasone, is also one of the methods for controlling pain, swelling and trismus after wisdom teeth surgery (13, 14). Dexamethasone is a pharmaceutical and long-acting form of corticosteroids (half-life of the plasma is 110-120 minutes and the biological half-life is 36-45 hours). One of the most useful methods is intraoral injection of dexamethasone, which has already been reported to have an effect on pain and edema caused by dental surgery similar to that of intramuscular injection (15). Therefore, it has a significant effect on postoperative pain and edema. Even mucosal injections are better than muscle injections due to less complications and equal effects (16).

Despite the benefits mentioned, this drug has different short-term and long-term complications (17, 18). The most common side effects of dexamethasone that appear in the short term include euphoria, insomnia, decreased or blurred vision, frequent urination, irritation, excessive thirst, numbness, mental weakness, pain and swelling, allergy, infection at the injection site, pain at the injection site, restlessness, skin rash, redness, eye sensitivity to light, gastrointestinal ulcer and the most important complications are seizure, heart failure, bloody stools, heart rate disorder, muscle pain and muscle weakness, menstrual disorder, nausea and vomiting, pain in the back of the arms, headache, swelling of the legs, etc. (19). Due to its anti-inflammatory effects, dexamethasone is one of the most widely used drugs in Iran and an overdoing process of consuming it has taken place. (20).

Given the complications, new research suggests the use of complementary medicine, especially herbal medicine, as a low-cost treatment with minimal side effects. Ginger is one of the most widely used medicinal plants, which has been introduced in ancient medicine as an anti-inflammatory herb (21). The antioxidant and anti-inflammatory properties of ginger are well known and are influenced by substances such as gingerol in this plant. Its anti-cancer properties have also been proven inside the laboratory. In the process of drying ginger, gingerol is converted to shogoal (22).

Recent research has proven shogoal's properties in preventing Alzheimer's disease. The active compounds of this plant, such as zingerone, shogaol, gingerdion, gingerol have the ability to inhibit the production of prostaglandins and nitrite oxide and even interleukins involved in inflammation. In addition, and more specifically, the enzymes that produce these inflammatory mediators are controlled by the active ingredients of ginger (23).

With regard to the above, and that wisdom teeth surgery is one of the most commonly used traumatic dentistry actions that causes a patient significant inflammation and pain, and on the other hand, suggested strategies to reduce this distressing pain are the use of steroidal anti-inflammatory and non-steroidal anti-inflammatory drugs, which they themselves cause serious damage, including digestive, cardiovascular and bone damage; therefore, considering the anti-inflammatory and analgesic properties of ginger extract which is a medicinal herb with high efficiency and low side effects, it seems that if it is effective, it can replaced a harmful steroidal drug. Therefore, this study, by comparing the effect of topical application of ginger aqua-alcoholic extract with topical injection of dexamethasone 1/6 mg, intends to introduce this method, in case of efficiency, as an alternative to dexamethasone injection.

Materials and Methods

45 patients referred to the Bushehr faculty of Dentistry clinic in 2017 who had double mandibular wisdom teeth and were referred to have a simple tooth extraction (without surgery) or extraction with surgical procedures. The similarity of the two mandibular teeth was determined by an expert Oral & Maxillofacial radiologist through panoramic radiography images and based on the indications in the radiology images and the classifications available in the reference books as well as by a clinical examination by a Oral & Maxillofacial surgeon to make sure that the angle of tooth placement in the jaw, the amount of bone and soft tissue on the tooth, as well as the condition of the tooth is similar to that of the Ramos anterior border. The tooth extraction toughness was determined by the Winter's & Terence guidelines and the Pell-Gregory criteria (24). Patients underwent injections of two carpule of lidocaine anesthetics using the method of inferior alveolar nerve block and long buccal, then teeth were removed by maxillofacial surgeon and under the mucoperiosteal flap cutting procedure (if surgery was required) or by simple dragging. Then, with a random choice based on random numbers, 4 cm² of bioadhesive containing 20% ginger extract was placed in the extracted cavity, or 1/8 ml dexamethasone 1/6 mg was injected there.

Criteria for entering the study:
The patient has a double-sided dental wisdom in the lower jaw (according to the angle of tooth placement in the jaw, the amount of bone and soft tissue on the tooth, the condition of the tooth relative to the Ramos anterior border), and has a tendency to cooperate and has no prohibition of dental surgery and allergy to ginger. The mentioned tooth do not have any pathological lesions in the root zone in clinical and radiographic examinations. Failure to perform any other surgery for at least two weeks.

Criteria for exiting the study:
Systemic diseases, including kidney or liver, bleeding problems such as hemophilia, neutropenia, blood platelet deficiency, etc., previous or current stomach ulcers, any heart disease, known allergies, allergies or individual reactions to each of the medicines used or the medicines that are likely to be used in the study (Ginger, Lidocaine anesthesia, Acetaminophen Codeine 300, Gelofen 400, Amoxicillin 500, and Metronidazole 250 mg), pregnancy and lactation, the use of analgesic or anti-inflammatory drugs 24 hours before the study, taking any anti-inflammatory or analgesic medicine etc., except for the prescribed analgesic substance (acetaminophen Codeine 300 mg), having pain and other inflammatory symptoms including swelling, high blood pressure, any deviations and inability to open the full mouth before the study, smoking or consuming other tobacco products less than a week before the study, smoking or consuming other tobacco products up to two weeks after surgery, alcohol consumption.

The amount of opening the patient's mouth before surgery (Trismus Status Review) was measured and recorded using a tool named "Caliper" in each side, 24 hours and 72 hours after surgery.

The method of data collection and statistical analysis
The method of collecting information in this study field and its tool was a questionnaire, observation and checklist. Descriptive statistics, abundance (percentage) and mean (standard deviation, mean, and range) were used to analyze the data, and for the inflation situation, the McNemar test was used at a significant level of 0.05 and using SPSS V.19 statistical software.

Results

In this study, 45 patients who intended to remove the mandibular double-sided wisdom teeth participated. The mean (± standard deviation) age of patients was 28/31 (± 6/37) with a min age of 19/00 and a maximum age of 43/00 years.

Maximum mouth opening (the distance between the incisal edges of the upper and lower central incisors in the maximal opening of the mouth) was measured before performing treatment interventions in the patients participating in the study.

During the measurements, the distance between the incisal edges of the upper and lower central incisors in the maximal opening of the mouth before teeth removal was at least 39/00, the most 63/00 mm and the average was 47/48 mm.

In the place where the mucobioadhesive containing ginger extract was used, after 24 hours, these values were 28/00, 58/00 and 39/57 mm, respectively, and 72 hours later, were 22/00, 59/00 and 40/02, respectively. Statistical analysis revealed a decrease in amount of mouth opening within 24 hours and 72 hours after tooth extraction. However, there was no significant difference between the time of follow-up 24 and 72 hours after tooth extraction. (Pvalue=0/518)

Also, in the place where the local injection of dexamethasone sodium phosphate 1/6 mg was done, 24 hours after surgery, these values were at least 29/00, the maximum was 61/00 and the mean of was 46/42 mm; and after 72 hours, were 30/00, 63/00 and 44/55 mm, respectively. Statistical analysis revealed a difference in mouth opening rate in patients receiving dexamethasone sodium phosphate (1/6 mg) during the follow-up period (P value = 0.008) so that after 24 hours the maximum oral contraction showed reduction. Also, the maximum oral opening was lower after 72 hours compared to the first 24 hours, which showed a statistically significant decrease compared to before intervention. (P value (001/0>).

Discussion

After extraction of the mandibular wisdom teeth due to damage to the surrounding tissues and vessels, severe inflammation is caused which causes pain, swelling, and trismus; thus, the medicine used to reduce these symptoms such as trismus is often an injection of dexamethasone anti-inflammatory drug, which has many serious side effects (14, 24). Hence, this study aimed to compare analgesic

Table 1: The average maximal oral opening rate before, 24 hours and 72 hours after the extraction of mandibular wisdom teeth in patients receiving mucobioadhesive containing ginger 20%

Variable	Subgroups	Mean	Standard deviation	Minimum	Maximum
Patients' maximal mouth opening	Before tooth removal	47.48	6.55	39	63
	24 hours after tooth removal	39.57	8.15	26	58
	72 hours after tooth removal	40.02	10.07	22	59

Table 2: The average amount of mouth opening rate before, 24 hours and 72 hours after the extraction of mandibular wisdom teeth in patients receiving dexamethasone sodium phosphate (1/6 mg)

Variable	Subgroups	Mean	Standard deviation	Minimum	Maximum
Patients' maximal mouth opening	Before tooth removal	47.48	6.55	39	63
	24 hours after tooth removal	42.46	7.45	29	61
	72 hours after tooth removal	44.55	7.34	30	63

and anti-inflammatory effects of two methods of injection of dexamethasone sodium phosphate 1/6 mg with topical application of the tissue glue contains 20% ginger extract, which is a herbal remedy that has no side effects, after removing the mandibular wisdom teeth.

In a meta-analysis conducted in 2012 by Sudarshan et al., a large number of clinical studies have shown that ginger has many healing properties. It is used in dentistry in cases of oral mucous membrane Candida albicans, inflammation and pain in the oral cavity, herpes virus, and so on. It also has proven anti-cancer properties. But the author himself acknowledges that the effects of this drug in the field of dentistry are certainly more and more important than the ones mentioned and the proof of it, is performing more clinical studies with appropriate design for the use of ginger in different fields, forms and doses (25).

Although many studies have already been done to prove the anti-inflammatory and analgesic effects of ginger and dexamethasone sodium phosphate, according to a study, there was no study that looked at the effects of these two after removing mandibular wisdom teeth, or a study that examined the effects of topical tissue glue containing ginger extract after removing teeth from the jaw.

The results of this study showed that the mucobioadhesive containing ginger extract and topical injection of dexamethasone sodium phosphate had both anti-inflammatory properties to reduce post-surgery trismus, so that in both groups, 24 hours after removal of the teeth, the opening of the mouth was reduced, but 72 hours later the opening of the mouth slightly improved, but still was less than before the time the teeth came out. Therefore, the present study showed that dexamethasone sodium phosphate was more successful than ginger extract.

The results of using mucobioadhesive containing ginger extract in the present study were consistent with the results of using 500 mg ginger powder capsule compared to ibuprofen and placebo in the study of Najafi et al. Inflation in the ginger consumer group was slightly lower than the ibuprofen and placebo groups; in addition, the maximum oral opening rate was slightly higher in the ginger group than in the ibuprofen and placebo groups. Also, the number of over-taking of acetaminophen codeine in patients with ginger consumption was much lower than the placebo group and slightly higher than the ibuprofen group (26).

On the other hand, the effect of post-surgical dexamethasone sodium phosphate injection in a clinical study conducted by Mung Latt et al. in 2016 on patients with bilateral dental wisdom teeth extracted showed that the use of dexamethasone after mandibular wisdom teeth surgery significantly reduces pain, trismus, swelling and consuming extra analgesics after surgery in patients, compared with placebo. Pain, especially one day after surgery, showed a significant decrease, and the use of excessive analgesics was lower (27).

Statistical analysis revealed a difference in mouth opening rate in patients receiving dexamethasone sodium phosphate 1/6 mg during the follow-up period, in a way that after 24 hours the maximum oral opening rate decreased. In addition, the maximum oral opening after 72 hours compared to the first 24 hours was lower, which showed

a statistically significant decrease compared to before intervention and in fact, there was no improvement in the amount of mouth opening rate on the third day compared to the first day. This was also the opposite of our study's result, and was due to the lower dosage of dexamethasone sodium phosphate (1/6 mg) in our study compared to other studies (4 or 8 mg).

Another study by Bambgose et al in 2005 examined the effect of dexamethasone on trismus and swelling caused by the extraction of latent mandibular wisdom teeth. In this study, 100 patients with unilateral or bilateral teeth participated. On one side, diclofenac potassium was used alone and on the other side, diclofenac potassium was used with dexamethasone 4 mg. The results of the study showed that trismus status in the place where dexamethasone was used was not superior to the other side. Therefore, in this study, the use of dexamethasone did not show any effect on trismus after surgery (28).

In the study of Nawab Azam et al., which was done in the year 2008, the effect of mucosal and intravenous infusion of dexamethasone sodium phosphate after surgery was studied. Twenty patients were randomly divided into two groups of 10. In one group, 8 mg dexamethasone was injected intravenously and another group received 4 mg mucosal dexamethasone. The results showed that both of them had an effect on trismus after surgery, but they were not statistically different (29, 30).

Conclusion

Based on the statistical data obtained from this study, it seems that topical administration of mucobioadhesive containing ginger extract (20%) and soft tissue injection of dexamethasone sodium phosphate (1/6 mg) after surgery both reduced trismus after surgery. But dexamethasone sodium phosphate was slightly more successful than the tissue glue containing ginger extract.

Acknowledgments
The authors of this article are thankful for the cooperation of the Dental Clinic of Bushehr University of Medical Sciences and financial support of the Vice-Chancellor for Research in Bushehr University of Medical Sciences. They are also grateful for the endless efforts of the distinguished professor Mr. Dr. Sohrab Kazemi.

References

1. Holland CS. The development of a method of assessing swelling following third molar surgery. Br J Oral Surg. 1979;17(2):104-14.
2. Juodzbalys G, Daugela P. Mandibular Third Molar Impaction: Review of Literature and a Proposal of a Classification. Journal of Oral & Maxillofacial Research. 2013;4(2):e1.
3. Palma-Carrio C, Garcia-Mira B, Larrazabal-Moron C, Penarrocha-Diago M. Radiographic signs associated with inferior alveolar nerve damage following lower third molar extraction. Med Oral Patol Oral Cir Bucal. 2010;15(6): e886-90.
4. Szalma J, Lempel E, Jeges S, Olasz L. Digital versus conventional panoramic radiography in predicting inferior alveolar nerve injury after mandibular third molar removal. J Craniofac Surg. 2012;23(2).
5. Nakamori K, Fujiwara K, Miyazaki A, Tomihara K, Tsuji M, Nakai M, et al. Clinical assessment of the relationship between the third molar and the inferior alveolar canal using panoramic images and computed tomography. J Oral Maxillofac Surg. 2008;66(11):2308-13.
6. Piira OP, Miettinen JA, Hautala AJ, Huikuri HV, Tulppo MP. Physiological responses to emotional excitement in healthy subjects and patients with coronary artery disease. Auton Neurosci. 2013;177(2):280-5.
7. Shoelson SE, Lee J, Goldfine AB. Inflammation and insulin resistance. J Clin Invest. 2006;116(7):1793-801.
8. Gao ZG, Ye JP. Why do anti-inflammatory therapies fail to improve insulin sensitivity? Acta Pharmacol Sin. 2012;33(2):182-8.
9. Copland JA, Sheffield-Moore M, Koldzic-Zivanovic N, Gentry S, Lamprou G, Tzortzatou-Stathopoulou F, et al. Sex steroid receptors in skeletal differentiation and epithelial neoplasia: is tissue-specific intervention possible? Bioessays. 2009;31(6):629-41.
10. Jakse N, Bankaoglu V, Wimmer G, Eskici A, Pertl C. Primary wound healing after lower third molar surgery: Evaluation of 2 different flap designs. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology. 2002;93(1):7-12.
11. Elo JA, Sun H-H, Dong F, Tandon R, Singh HM. Novel incision design and primary flap closure reduces the incidence of alveolar osteitis and infection in impacted mandibular third molar surgery. Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology. 2016;122(2):124-33.
12. Singh G, Gaur A, Mishra M, Mahesh C, Aurora JK, Gupta P. Comparative evaluation of primary and secondary closure after surgical removal of impacted mandibular third molar. Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology. 2014;26(2):133-7.
13. Provan D, Stasi R, Newland AC, Blanchette VS, Bolton-Maggs P, Bussel JB, et al. International consensus report on the investigation and management of primary immune thrombocytopenia. Blood. 2010;115(2):168-86.
14. Charmandari E, Kino T, Ichijo T, Chrousos GP. Generalized glucocorticoid resistance: clinical aspects, molecular mechanisms, and implications of a rare genetic disorder. J Clin Endocrinol Metab. 2008;93(5):1563-72.
15. Ferrero-Miliani L, Nielsen OH, Andersen PS, Girardin SE. Chronic inflammation: importance of NOD2 and NALP3 in interleukin-1beta generation. Clin Exp Immunol. 2007;147(2):227-35.
16. Carneiro LA, Travassos LH, Girardin SE. Nod-like receptors in innate immunity and inflammatory diseases. Ann Med. 2007;39(8):581-93.
17. Grossi GB, Maiorana C, Garramone RA, Borgonovo A, Beretta M, Farronato D, et al. Effect of submucosal injection of dexamethasone on postoperative discomfort after third molar surgery: a prospective study. J Oral Maxillofac Surg. 2007;65(11):2218-26.

18. Majid OW. Submucosal dexamethasone injection improves quality of life measures after third molar surgery: a comparative study. J Oral Maxillofac Surg. 2011;69(9):2289-97.
19. Klongnoi B, Kaewpradub P, Boonsiriseth K, Wongsirichat N. Effect of single dose preoperative intramuscular dexamethasone injection on lower impacted third molar surgery. Int J Oral Maxillofac Surg. 2012;41(3):376-9.
20. Carrasco-Labra A, Brignardello-Petersen R, Yanine N, Araya I, Guyatt G. Secondary versus primary closure techniques for the prevention of postoperative complications following removal of impacted mandibular third molars: a systematic review and meta-analysis of randomized controlled trials. J Oral Maxillofac Surg. 2012;70(8):12.
21. Thomson M, Al-Qattan KK, Al-Sawan SM, Alnaqeeb MA, Khan I, Ali M. The use of ginger (Zingiber officinale Rosc.) as a potential anti-inflammatory and antithrombotic agent. Prostaglandins, Leukotrienes and Essential Fatty Acids. 2002;67(6):475-8.
22. Nurtjahja-Tjendraputra E, Ammit AJ, Roufogalis BD, Tran VH, Duke CC. Effective anti-platelet and COX-1 enzyme inhibitors from pungent constituents of ginger. Thrombosis Research. 2003;111(4):259-65.
23. Afzal M, Al-Hadidi D, Menon M, Pesek J, Dhami M. Ginger: an ethnomedical, chemical and pharmacological review. Drug metabolism and drug interactions. 2001;18(3-4):159-90.
24. Akinwande JA. Mandibular third molar impaction—A comparison of two methods of predicting surgical difficulties. Nigerian Dental Journal. 1991;10: 3-7.
25. Sudarshan R, Vijabala G. Role of ginger in medicine and dentistry-An interesting Review Article. South East Asia. 2012;1:66-72.
26. Rayati F, Hajmanouchehri F, Najafi E. Comparison of anti-inflammatory and analgesic effects of Ginger powder and Ibuprofen in postsurgical pain model: A randomized, double-blind, case–control clinical trial. Dental research journal. 2017;14(1):1-7.
27. Latt MM, Kiattavorncharoen S, Boonsiriseth K, Pairuchvej V, Wongsirichat N. The efficacy of dexamethasone injection on postoperative pain in lower third molar surgery. Journal of Dental Anesthesia and Pain Medicine. 2016;16(2):95-102.
28. Bamgbose BO, Akinwande JA, Adeyemo WL, Ladeinde AL, Arotiba GT, Ogunlewe MO. Effects of co-administered dexamethasone and diclofenac potassium on pain, swelling and trismus following third molar surgery. Head Face Med. 2005;1(1):11.
29. Navab Azam AR, Sadrearhami AR, Khalesi M, Sharifi S, Akbari MB. The Comparison of Effects of Local and Intravenous Dexamethasone on Edema and Trismus Following Impacted Mandibular Third Molars Surgery. Journal of Rafsanjan University of Medical Sciences. 2008;7(4):245-50.
30. Zahmati, A. H. A., R. Alipoor, et al. (2017). “Chemical Decellularization Methods and Its Effects on Extracellular Matrix.” Internal Medicine and Medical Investigation Journal 2(3): 76-83.

The effect of curcumin on growth and adherence of major microorganisms causing tooth decay

Leila Helalat (1)
Ahmad Zarejavid (2)
Alireza Ekrami (3)
Mohammd Hosein Haghighizadeh (4)
Mehdi Shiri Nasab (5)

(1) MSc in Nutrition, School of Paramedicine, Ahvaz Jundishapur University of Medical Science, Ahvaz, Iran
(2) Phd in Nutrition, School of Paramedicine, Ahvaz Jundishapur University of Medical Science, Ahvaz, Iran
(3) Phd in Laboratory sciences, School of Paramedicine, Ahvaz Jundishapur University of Medical Science, Ahvaz, Iran
(4) MSc in Biostatistics, School of health, Ahvaz Jundishapur University of Medical Science, Ahvaz, Iran
(5) MSc in Food Industry, School of Paramedicine, Ahvaz Jundishapur University of Medical Science, Ahvaz, Iran

Corresponding Author:
Ahmad Zarejavid
School of Paramedicine,
Ahvaz Jundishapur University of Medical Science,
Ahvaz, Iran
Email: ahmadzarejavid@gmail.com

Abstract

Background and objective: Streptococcus mutans and Lactobacillus acidophilus are bacteria producing tooth decay which by adhering to tooth surfaces contribute to its pathogenesis. By increasing bacterial resistance to antibiotics, along with other high-cost of treatment, the use of natural antibacterial agents is essential. In this regard, the role of curcumin on the adhesion process of cariogenic pathogens has been studied.

Materials and Methods: The bacterial strains of Streptococcus mutans (PTCC1683) and Lactobacillus acidophilus (PTCC1643) were obtained from the Iranian Research Organization for Science and Technology). The early growth of the bacteria was carried out in BHI medium, and then the concentration of microorganisms reached the half-MacFarland standard, and using different concentrations of curcumin (1, 2, 4, 8, 16, 31, 25, 52, 62, 125, 250, 500 µg/ml) obtained by serial dilution method the substances were mixed. BHI medium without bacteria was considered as negative control. Then samples were incubated for 24 hours at 37°C in anaerobic conditions for determining the minimum inhibitory concentration. Inhibitory concentrations determined in the previous step were used to determine adhesion using the amount of light absorbance determination method.

Results: The minimum inhibitory concentration of growth was determined in both bacterial strains of 250 µg/ml. The results showed a decrease in light absorption with increasing curcumin concentration ($P<0.001$), which indicates a high correlation (correlation coefficient of -0.93) of curcumin concentrations with reverse adhesion.

Conclusion: Adhesion is the most important factor in tooth decay and its reduction is an effective solution in preventing the disease. Considering the inhibitory role of curcumin on growth and binding of bacterial strains, this curcuminoid agent is considered as a potent anti-decay agent.

Key words: Adhesion, Curcumin, Tooth decay

Please cite this article as: Please cite this article as: Helalat L. et al. The effect of curcumin on growth and adherence of major microorganisms causing tooth decay. *World Family Medicine.* 2017; 15(9):214- 220
DOI: 10.5742/MEWFM.2017.93128

Introduction

The oral cavity diseases, especially tooth decay, are common diseases with high prevalence in human societies (1). 95% of people in each society suffer from dental caries and periodontal diseases (2). However, our country's state of health in terms of oral hygiene and the teeth of children aged 6 to 12 in the Middle East region are the best, but unfortunately we (Iranian) are the worst in the 20-25 age group among the countries of the region. There is no exact data on the rate of caries of Iranian teeth, but what is certain is that we do not have a good situation in this age group (3).

Dental caries is a multi-factorial infectious disease, mainly due to the reduction in pH following carbohydrate fermentation, due to the action of two bacterial strains of streptococci and lactobacillus (1 and 4).

The formation of dental biofilms has been associated with the onset and development of dental caries as the extracellular matrix surrounding the bacteria (7-5). The first step in the formation of dental biofilms is bacterial adhesion to the dental surfaces (8). Oral and oral diseases have a negative effect on the quality of life, general health, nutritional status and social function of individuals. The pain, infection, sleep disorders and difficulty in chewing and eating and talking are considered as adverse outcomes of oral and dental illnesses in individuals (9). Dental diseases such as dental caries and gum disease may also significantly affect the health of the individual. Dental caries are associated with the development of chronic diseases such as diabetes and heart disease (9, 27).

Considering the high cost of treatment in oral cavity diseases (1) as well as increased bacterial resistance to commonly used antibiotics for treatment, new strategies for the prevention and treatment of dental caries and the fight against pathogens are needed (10). Nutrition is an effective factor in the prevention and treatment of dental caries and primary prevention programs at community level, including nutritional control, have played an important role in reducing tooth decay (11). Today, the use of natural antimicrobial agents in the form of alternative therapies has expanded due to the low and effective nature of the treatment and even the prevention of many diseases, including oral and dental diseases (13-12). Therefore, finding these natural and low risk compounds and studying the effect of these compounds on growth and adhesion of cariogenic bacteria, as the first step in the onset of tooth decay is considered necessary (5.8).

Tumeric is a yellow spice of the family Zingiberaceae (14), which grows mainly in the southern and tropical regions of Asia, such as China, India and Malaysia. The root and stem of this plant mainly contains a yellow curcuminoid compound (15). Turmeric is one of the most popular plants with extensive therapeutic properties in traditional medicine (16).

Curcumin (diferuloylmethane), as the main constituent of the main color of yellow in turmeric (17), due to its various antioxidant, anti-inflammatory, anti-carcinogenic, antimicrobial and antiparasitic effects can be used in various parts of the body, including the oral cavity (18-20). Most studies in the field of oral cavity diseases, such as the study by Izui et al. (29), have focused on periodontal disease due to the anti-inflammatory effects of curcumin, or in the form of mouthwash containing curcumin in the study of Mali et al. (22) and in the form of a curcumin-based gel by Bhatia et al (21), curcumin has been shown to be effective on periodontal disease, but the effect of curcumin on dental caries is less marked. On the other hand, studies such as Mandroli and Bhat (23) have mainly focused on the growth and microbiological counting of decay pathogens. Therefore, studying the effect of curcumin on growth of major microorganisms of dental caries as a biological factor along with their adhesion, which is one of the main causes of their pathogenicity, is one of the goals to be considered in this study.

Materials and Methods

Analysis method

This study is an experimental study approved by the Ethics Committee of the Medical University of Ahvaz number 1395.590IR.AJUMS.REC. The curcumin used in this study was from the German Merck company with a purity of about 97%. DMSO (Dimethyl sulfoxide) solution was used to increase solubility and the final concentration of 1mg/ml solution was prepared from curcumin solution, from which was obtained a uniform solution of curcumin using shaker. A bacterial filter was used to remove contaminants.

Microorganisms

The bacterial strains of Streptococcus mutans (PTCC1683) and Lactobacillus acidophilus (PTCC1643) were obtained from the Iranian Research Organization for Science and Technology). BHIB (Brain heart infusion broth) containing 1% sucrose was used for early growth of the microorganisms. The culture media was incubated in anaerobic conditions after inoculation of bacteria for 24 hours at 37°C.

Preparation of bacterial suspension: A linear culture of the initial BHI medium was performed on a Blood Agar culture medium under sterile conditions and resumed for 24 hours at 37°C incubation. The selective harvesting of microbial colonies was performed from Blood Agar level (surface) under sterile conditions and the colonies were transferred to a culture medium (BHIB) (Brain heart infusion broth) containing 1% sucrose and then incubated for 24 hours under anaerobic conditions at 37°C. The growth concentration was adjusted to 5×106 organism/ml by using 0.5 McFarland's turbidity standard.

To prepare McFarland's standard, 0.6 ml of 1% sodium chloride solution was dissolved in 100 ml of sulfuric acid in a volume of 100 ml and uniform solution of bacterial suspension was obtained by shaker.

Using an ultraviolet spectrophotometer (UV-2802 United States Unicode), the OD (optical absorption) at a wavelength of 620 nm was set at a pH of about 0.1 to achieve a concentration of 5×106 CFU (24).

The method of exposure to bacterial strains with different concentrations of curcumin
Different concentrations of curcumin solution were obtained by serial dilution method. In such a way 12 sterile tubes were considered. In all tubes, 1ml of bacterial solution was added at a concentration equivalent to the 0/5 McFarland's turbidity standard. Then in the first tube containing 1 ml bacterial solution, 1 ml of the curcumin solution was added. After mixing well, 1 ml was transferred to the second tube, this was continued till the last (10th) tube. From the last tube 1ml of final solution was discarded. By following this serial dilution, the concentration of, 500, 250, 125, 5.62, 25.31, 16, 8, 4, 2, 1µg/ml, respectively was acheived) (23).

BHI medium without bacteria was considered as a negative control and non-curcumin bacterial suspension as a positive control, and then the test and control samples were incubated at 37°C for 24 hours under anaerobic conditions.

Determination of MIC
(Minimum inhibitory concentration)
Considering the generation of turbidity from bacterial growth, examination of the transparency of tubes indicated the inhibition of growth in tubes.

The the tubes were incubated for 24 hours at 37°C after the incubation, the MIC values were determined by visual inspection of tubes. In each series of tubes, the last tube with clear supernatant was considered to be without any growth and taken as MIC value. Turbidity in the tube indicated growth of the bacteria implying that the bacteria are resistant to curcumin. All steps for each bacterial strain were repeated 2 times and the mean of measurements was expressed in 2 replicates (23.31).

Assessment of adhesion
2.5 ml of inhibitory concentrations of curcumin, which did not inhibit the growth of bacteria in the previous stage, was added to 2.5 ml of BHI medium containing 1% sucrose and 250µl of bacterial suspension prepared at a concentration of 5×106 CFU. In positive control sample, instead of the curcumin solution, DMSO alone was used and in the negative control sample, BHI medium containing 1% sucrose without bacteria was considered. Then, at 37°C, for 24 hours, with Angle 30, the incubation was performed under anaerobic conditions. The tubes were examined externally, and the lowest concentration without attachment of visible cell to tubes wall was determined as Total Bacterial Adherence Inhibition (TBAI) (25). After removing the contents of the tubes containing suspended cells for isolation of the cells that were attached to the tubes, 3ml of KPB 0.5M buffer with Ph=6.8 was used and 0.25ml trypsin. The amount of cells suspended by optical density was measured by a spectrophotometer (UV -2802 Unico) at a wavelength of 490nm. All tests were repeated for 2 bacterial strains and the mean of measurements was expressed in 2 replicates (26).

Statistical analysis
In this study, data analysis and statistical analysis of data were performed using SPSS22 software. Spearman statistical test to examine the correlation between quantitative variables and Independent sample-T test to compare the mean of quantitative variables in two groups and One Way ANOVA test followed by a Sidak test to compare the mean of quantitative variables in the control group with each of the test groups were used.

Results

MIC
After 24 hours of incubation, tubes containing different concentrations of curcumin and control tubes in both bacterial strains were examined externally, and as shown in Figure 1, in the Lactobacillus acidophilus strain examination, negative control with a completely transparent coating without any turbidity and positive control with a similar turbidity with 1µg/ml curcumin solution, and with increasing curcumin concentration, the turbidity of the tubes was reduced and in the concentrations of 250 and 500µg/ml, completely transparent procedure with a transparency equal to the negative control tube was observed. In the strain of Streptococcus mutans, a negative control with a perfectly transparent procedure without any turbidity and positive control with a turbidity similar to that of 2 and 1µg/ml of curcumin solution and by increasing the concentration of curcumin, the turbidity of the tubes was reduced and at 250 and 500µg/ml concentrations, completely transparence with a transparency equal to negative control tube, was detected. The lowest concentration with transparent procedure was determined as MIC. In the study, MIC in both samples of Lactobacillus acidophilus and Streptococcus mutans was obtained in 250µg/ml.

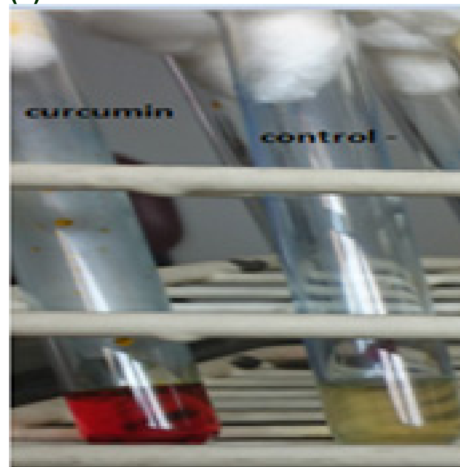
Evaluation of adhesion
In the apparent examination (Figure 2) of the Lactobacillus acidophilus strain, no visible cells were observed in the tube wall after about 24 hours at a concentration of 31.25µg/ml and higher of curcumin. In the apparent inspection (evaluation) of Streptococcus mutans strain, in curcumin concentrations of less than 125µg/ml, visible cells adhered to the tube wall were clearly and significantly higher than lactobacillus acidophilus.

In the method to evaluate the adherence (adhesion) by determining the optical absorption, in both bacterial strains, there was a high inverse correlation coefficient (-0.93) between the adhesion and curcumin concentration and with increasing the curcumin concentration, the optical absorption was significantly reduced which indicates a significant reduction in adhesion ($p<.001$).

In the comparison between the control tube and the other tubes, it was observed that in both bacterial strains, adhesion in the tube walls was significantly less than the

Figure 1: Determination of MIC at different concentrations of curcumin prepared by serial dilution method. In curcumin concentrations of 250µg/ml and above, the transparent layer is clearly visible (a) negative control and curcumin solution; (b) Lactobacillus acidophilus strain; (c) Streptococcus mutans

(a)



(b)

(c)

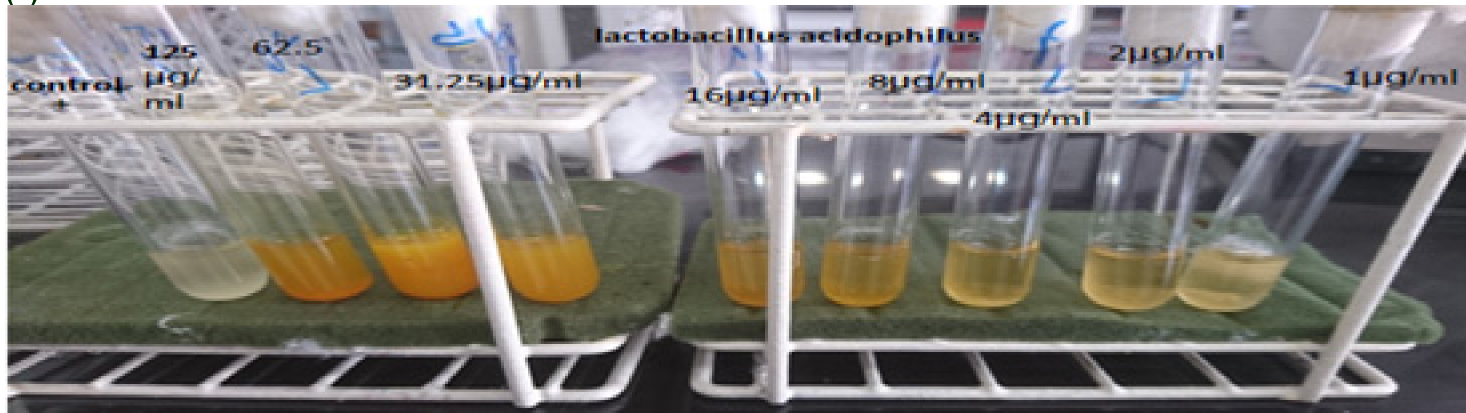
adhesion in the positive control tube and more than the cells adhering to the negative control wall. In The Lactobacillus acidophilus strain, the mean of optical absorption of cells adhering to the test tube wall (Figure 1), showed a significant statistical difference in the concentrations of less than 4 µg/ml of the curcumin solution with the negative control group ($p<0.001$). While there was no significant difference ($p<0.05$) comparing the concentrations equal to and above the concentration of 4 µg/ml with the negative control group. Concentrations of less than of 2µg/ml curcumin solutions showed no significant statistical difference ($p<0.05$) compared to positive control, indicating a significant decrease in the binding of bacterial cells by increasing the concentration of curcumin.

In Streptococcus mutans strain, the comparison of curcumin concentration and control group at concentrations less than 125µg/ml showed significant differences with the negative control group, and the difference was significant ($p<0.001$) at concentrations ranging from 4 to 1 µg/ml, and with increasing concentrations, there is less difference. The difference in

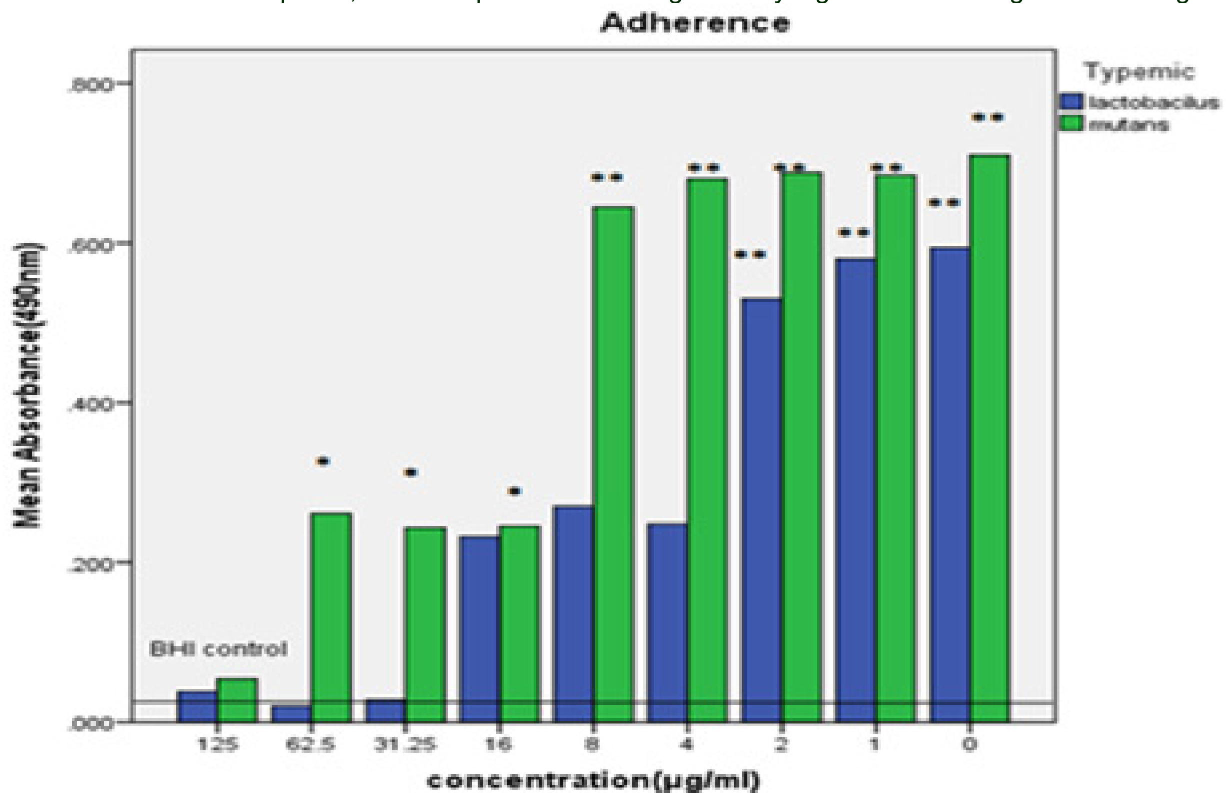
Figure 2: The adhered (sticking) cells in test tubes wall in various concentrations of curcumin. (a) Streptococcus mutans: Curcumin at a concentration of 125 µg/ml and above caused adhesion inhibition on the surfaces of the test tube (b) Lactobacillus acidophilus: Curcumin at a concentration of 31.25 µg/ml and more caused adhesion inhibition tested on the test tube surfaces.

(a)

(b)



Graph 1: The comparison of the adhesion based on the mean optical absorption in Streptococcus mutans and Lactobacillus acidophilus. The horizontal line shows the mean optical absorption in the negative control group. * Significant difference with negative control group with (p<0.05) ** : Significant difference with negative control group with (p<0.001) in curcumin concentration less than 8 µg/ml and less than 2 µg/ml in strains of Streptococcus mutans and Lactobacillus acidophilus, the absorption rate was significantly higher than the negative control group.



concentrations of 8 to 62.5µg/ml of curcumin solution with negative control group was significant ($p<0.05$).

Concentrations of 8-1 µg/ml of curcumin solution ($p<0.001$) showed a significant difference compared to the positive control group, while at a concentration of 16 to 125 µg/ml of curcumin, this difference wasn't statistically significant ($p<0.05$) which is indicative of a significant reduction in the binding of bacterial cells by increasing the concentration of curcumin.

The comparison between Streptococcus mutans and Lactobacillus acidophilus showed no significant difference ($p<0.05$) between the two bacterial strains.

Discussion

Considering the polymicrobial nature of the dental caries (27) and the major role of two bacterial strains of Streptococcus and Lactobacillus acidogenesis in its pathogenesis (4), the study of pathogenicity of these microbial species is of particular importance. Adhesion of microbial cells to surfaces and aggregation of these cells are a key step in the formation of multilayer cell clusters (biofilms). In this regard, adhesion is considered as one of the major factors of pathogenicity (28). Based on the results of this study, curcumin was found to be effective at certain concentrations as a polyphenolic agent with anti-bacterial and antioxidant effects (8) on inhibiting growth and adherence inhibition, Lactobacillus acidophilus and Streptococcus mutans. This inhibitory growth in both bacterial strains has increased with curcumin concentration increase. Curcumin inhibitory effect was not statistically significant in comparison with the two bacterial species.

Most studies on oral cavity diseases have focused on the pathogens of periodontal disease, given the curcumin-based anti-inflammatory nature. In this regard, Izui et al., (2005) examined the effect of curcumin on bacteria producing periodontal disease and showed that curcumin had a dose-dependent inhibitory effect on pathogen microorganisms at all concentrations (29).

In the year 2015, Shahzad et al. investigated the effects of a number of polyphenols, including curcumin, on the growth and biofilm formation of a number of periodontal microorganisms producing diseases, and it was found that polyphenols, including curcumin, can be considered as inhibitors of growth and the biofilm formation in these diseases (30). Similarly, in the same year, Savita and colleagues showed a strong anti-bactericidal effect of curcumin on aggregatibacter actinomycetemcomitans bacteria (31).

In relation to dental caries, Hu and colleagues investigated the effect of curcumin on inhibiting the activity of sortase A produced by mutants as an enzyme involved in adhesion and biofilm formation, and finally, an inhibitory effect on adhesion was demonstrated through inhibition of enzyme (32), as well as Mandroli and Bhat, who investigated the effect of curcumin on a string of oral bacterial bacteria. In this study, the inhibitory effect of curcumin on all studied microorganisms was shown except for enterococcus faecalis with different minimal inhibitory concentrations (23).

In relation to the effect of curcumin on dental caries, studies have focused on inhibiting growth or microbiological counting cariogenic microorganisms as a factor associated with bacterial bioactivity. In this study, along with inhibition of growth the evaluation of curcumin role on adhesion as one the main mechanisms involved in the pathogenesis of decay pathogens has been considered, as well as the effects of various concentrations of curcumin have been investigated to determine effective concentrations. In most studies, the protective effect of polyphenols against mutans has been demonstrated through effects on metabolic activity and virulence factors, and less effect on bioavailability has been detected (33). However, in this study, a significant inhibitory effect on growth inhibition as a viability factor with adhesion as a pathogenic factor was observed.

Conclusion

The present study showed that growth inhibitory and binding of cariogenic pathogens in culture media (in vitro) with increase in curcumin concentration, and this inhibitory effect is reported statistically significant at some concentrations.

In the end, the question remains what effects curcumin have on decay (cariogenic) pathogens in the oral cavity? And what practical solutions are available to determine the duration of contact with pathogens with curcumin in the oral cavity, and that effective concentrations on pathogens in the culture medium, so the oral cavity will also be safe and effective.

Acknowledgment
From here, the Deputy Director of the Jundishapur University of Ahwaz, who has been involved in the financing of the research project, as well as the Vice-Chancellor of the Faculty of Para-medicine and Laboratory of the Faculty of Paramedical Sciences of Ahvaz is commended.

References

1- Kshitiz P, Shipra Z, Rani S, Jayanti S, Naturo S. Anti-cariogenic effects of polyphenol plant products .IJRAP 2011;2(3):736-42.
2- Caglar E, Kargul B, Tanbogaet I. Bacteriotherapy and probiotics role on Oral health: Oral Disease. 2005; 11:1-7.
3- Zare Javid A, AmerianE, BasirL, EkramiA, Haghighi MH. Effects of Short-term Consumption of Probiotic Yogurt on Streptococcus Mutans and lactobacilli Levels in 18-30 Years Old Students with Initial Stages of Dental Caries in Ahvaz City. Nutrition and Food Sciences Research 2015; 2(2): 7-12.
4- Loesche WJ. Role of streptococcus in human dental decay. Microbiological Review1986;50(4):353-80.

5- Abraham KP, Sreenivas J, Venkateswarulu TC, Diwakar T, Prabhakar KV. Investigation of the potential antibiofilm activities of plant extracts. Inter J pharmacy & pharmaceutical Sci2012;4(4):2-8.
6- Morimoto Y, Matsu M, Komatsuzawa H, Kawahara KI, Kikuchi K,Torii M , et al. MK15: A new therapeutic approach for the treatment of oral disease. Medical hypotheses 2011;77:258-60.
7- Selwitz RH, Ismail A, Pitts B. Dental caries. Lancet 6 January 2007; 369(2):51-9.
8- Song J, Choi B, Jin EJ, Yoon Y, Choi KH. Curcumin suppresses streptococcus mutans adherence to human tooth surfaces and extracellular matrix proteins. Eur J Microbiol Infect
Dis 2012;31:1347-52.
9- Watt RG, Listl S, Peres M, Heilmann A. Impact of oral disease and oral health inequalities.1 n dEd.New York : Raven press;2015.
10- Gregoire S, Singh AP, Vorsa N, Koo H. Influence of cranberry phenolics on glycan synthesis by glucosyltranferases and streptococcus mutans acidogenicity. J Appli Microbiol2007;103(2):1960-68.
11- KaramiNogourani M, Esfahanian V, Soltani MR. The effect of chewing gums on plaque index in the lack of oral hygiene measures. J Mash Dent Sch 2009; 33(3): 247-54.
12- Jyotsna S,Lakshmi T. Application of spices in dentistry. Int.J.Drug Dev& Res June2014;6(2):1-9.
13- Salam R, Sarker BK, Haq R,Khokhon JU. Antimicrobial activity of medicinal plant for health and hygiene. Nat .Soc. Sci2015;2(1):1-12.
14- Nguyen H, Si J, Kang CH, Chung B, Ching D. Facile preparation of water soluble curcuminiods extracted from turmeric powder by using steviol glucosides. Food Chemistry J 2017;214:366-73.
15- Devidevaraj SH, Neelakantatan P. Curcumin pharmacological actions and its role in dentistry. Asian J Pharmaceut Res Health Care2016;6(1):19-22.
16- Amalraj A, Pius A, Gopi S, Gopi S. Biological activities of curcuminiods other biomolecules from turmeric and their derivatives – a review. J of traditional and complementary Medicine 2017;7:205-33.
17- Sambhav J, Rohit R, Ankit Raj U, Garima M. Curcuma Longa in the management of inflammatory disease . IAMJ 2014;2(1):33-40.
18- Hugar SS, Metgud R. Turmeric in dentistry.IJSR 2015;4(6):2553-57.
19- Jacob PS, Nath S, Sultan OS. Use of curcumin in periodontal inflammation.IJM 2014;1(2):109-14.
20- Sakanaka S, Aizawa M, Kim M, Yamamoto T. Inhibitory effect of green tea polyphenol on growth and cellular adherence of an oral bacteriumporphyromonas gingivalis. Biosci.Biotech.Biochem 1996;60(5:)745-9.
21- Bhatia M, Urolagin SS, Pentyala KB, Urolagin SB, Bhoi SH. Novel therapeutic approach for the treatment of periodontitis by curcumin.J Clin and Diag Res 2014 Dec;8(12):65-9.
22- Mali M, Amita G, Behel R, Sunita G.C omparative evalution of 1% turmeric mouth wash with 0.2 %chlorhexidin gluconate in prevention of plaque and gingivalis: A clinical and microbiological study. Journal of Indian Society of Periodontology 2012; 16(3):102-12.
23- Mandroli PS, Bhat K. An in vitro evalution of antibacterial activity of curcumin against common endodontic bacteria. J App pharm Sci 2013;3(10):106-8.
24- Habibipour R, Sadeghy M, Seif A, Bayat S. The effect of Nano-particles on Removing klebsiella pneumoniae from Industrial Residues. Sci J Hamadan Univ Med sci2017;23(4):306-13.
25- Furiga A, Lonvaud Funel A, Dorignac G, Badet C. In vitro anti-bacterial and anti-adherence effect of natural polyphenol compounds on oral bacteria. Jour Appli Microbiol 2008;105:1470-76.
26- Limsong J, Benjavongkulchai E, Kuvatanasuchati J. Inhibitory effect of some herbal extracts on adherence of streptococcus mutans. Journal of Ethnopharmacology2004;92(10):281-9.
27- Ranjbar F, Eslami G, Ahmad Ghahremanloo A, Taheri S, Ayatollahi M, Eslami S. Antibacterial Effect of Green Tea Extract on Streptococcus mutans and Enterococcus faecalis Isolated from Dental Plaque. J Mash Dent Sch 2015; 39(4): 335-42 .
28- Mirzaee M, Najar-Peerayeh SH, Behmanesh M, Forouzandeh Moghadam M, Ghasemian AM. Biofilm formation and presence of ica in staphylococcus aureus Isolated from intensive care unit. J Mazandaran Univ Med Sci 2014;24(115):43-51.
29- Izui SH, Sekine SH, Maeda K, Kuboniwa M, Takada A, Amano A et al. Antibacterial activity of curcumin against periodontopathic bacteria. journal of periodontology. Journal of periodontology 2016;87(1):83-90.
30- Shahzad M, Millhouse E, Culshaw SH, Edwards CA ,Ramage G, Combet E. Selected dirtary polyphenols inhibit periodontal pathogen growth and biofilm formation. Food Funct 2015;5(6):719-29.
31-Savita AM, Dawra C, Bhat K. An invitro evalution of antibacterial activity of curcumin against Aggregatibacter actinomycetemcomitans.World J Dent 2015;6(1):16-19.
32- Hu P, Huang P, Wei Chen M. Curcumin reduces streptococcus mutans biofilm formation by inhibitory sortase A activity. Oral Biology J2013;58:1343-48.
33-. Petti & Scully. Polyphenols,oral health and disease: A review .journal of dentistry 2009; 37(2):413-23.