MEJFM - Middle East Doctor of the Year
(the late) Dr Noori Abdulla Khider
Kurdistan, Iraq

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From the Editor

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Middle East Journal of Family Medicine/World Family Medicine Journal wish all her editorial board, readers authors and the production team a good start of the year. The journal has become the leader in the region and is well respected all over the World.   We look forward to working with everyone concerned to further raise the status of the journal, and new sections will be added to the journal this year.

This issue is rich with a number of papers from the region and we have a special paper with a biography of a prominent family physician who died last year. In view of his esteemed work and contribution to the field of family medicine in the Middle East and Iraq, the journal would like to nominate him as Dr of the Year and the award certificate will be sent to his family.

Dr Noori & Fayzeh did a cross-sectional study on 78 β-thalassaemia major patients, registered at Erbil thalassaemia center; they included 48 males and 30 females, aged between 10–33 years along with a control group of 30, age and sex matched healthy individuals. A questionnaire was used to evaluate demographic information, medical history, and growth parameters. The levels of T3, T4, and TSH hormones were assessed in all patients and controls.   They found that the mean levels of thyroid hormones; T3 and T4 were significantly lower (P<0.001) among thalassaemia patients, while the mean TSH level was higher (P=0.003) compared to the control group. The authors concluded that impaired thyroid function is frequent among their thalassaemia major patients and this necessitates regular follow up and early commencement of chelation therapy to prevent such complications.

Dr Al-Doghether stressed the importance of continuing medical education (CME) as a principle block in the structure of any health related institution, different medical education programs being held every month. These programs use different forms of teaching. Interactive techniques (audit/feedback, academic detailing/outreach, and reminders) are the most effective at simultaneously changing physician care and patient outcomes. Teaching program evaluation in medical education presents with a different set of challenges. The utility of some of these programs is gauged by some soft measures of outcome such as participant's perception of the program. The author assess in his paper the effectiveness of Continuing Professional Development (CPD) courses/events with medical errors in surgery as an example.

A combined paper between Saudi Arabia and Canada looked at Intimate partner violence (IPV). The authors stressed that (IPV) against women has recently gained recognition as a global health priority. Yet, little action has been taken to improve identification of IPV in primary-care settings in Saudi Arabia (SA), indicating a need to train front-line physicians to recognize and treat abused victims. The authors attempted to assess the knowledge, attitudes, and perceptions of IPV among a sample of Saudi family medicine (SFM) residents and use this data to develop and integrate an IPV curriculum into the SFM residency curriculum. They used The Physician Readiness to Manage Intimate Partner Violence Survey (PREMIS) was modified for cultural sensitivity and uploaded to a web-based survey management provider. Thirty residents participated in the survey yielding a response rate of 52%. None reported postgraduate training in IPV. Respondents scored low in perceived perpetration (2.59/7) and perceived knowledge to manage IPV (average score of 2.26/7).The mean actual knowledge score for residents was 18.1/38 (SD = 6.7).   The authors concluded that residents did not perceive themselves as either knowledgeable or well-prepared to discuss IPV with patients. These results signify a lack of education and exposure to IPV education in SA and indicate the need to train physicians on how to appropriately respond to abused victims.

A cross sectional study from Qatar looked at Unintentional Injuries Among Preschool Children. The authors stressed that unintentional injuries have replaced infectious diseases as the most serious public health problem of children worldwide. The objectives of this study were to estimate frequency and types of unintentional injuries, and to investigate determinants of unintentional injuries among preschool children, Doha .   The respondents were the mothers who attended primary health care centers in Doha city, 2010. An interview administered Arabic version questionnaires were used for data collection. The authors found that the occurrence of unintentional injuries in the current study was (69.3 %), almost (62.3%) of unintentional injuries occurred inside the home. Living room was the most reported place of unintentional injuries inside home (66.7%), and most frequent cause of these injures was falls (71.8%). Full recovery of unintentional injuries was the most frequent consequences. However, considerable proportion was followed by death. Developing and establishing a national household survey for home safety is recommended.

Dr Bahlas & Damia investigated the correlation between erythrocyte sedimentation rate (ESR) and c-reactive protein (CRP) levels with systemic lupus erythematosus (SLE) disease activity index (SLEDAI) and as well as the onset of renal impairment in inactive and active groups of systemic lupus erythematosus (SLE) patients. The total number of patients were 49 females who are positive for SLE. The authors found that ESR was significant in SLEDAI inactive group and SLEDAI active group. There was no significant correlation between SLEDAI and CRP positive and negative patients. There was no significant difference between inactive and active groups with reference to red blood cells (RBC) and white blood cells (WBC) in urine. They concluded that the correlation levels found in this study can be used as an appropriate marker for evaluation of disease activity and also used as an onset for renal impairment for SLE patients.

A paper from Princes Aisha Medical center – East of Amman attempted to highlight the main etiological agents of urinary tract infection in children, and their antibiotic susceptibility for selecting the most appropriate antibiotic for rapid initiation of an effective empirical treatment.   All documented positive urine cultures from children patients were reviewed. The bacterial isolates and their susceptibility to antibiotic were analyzed.   There were 159 documented positive urine culture, 87.42 %(139) of them were from female patients. E. coli isolates presented in 82.4 %(131) of the cultures, while Proteus and klebsiella isolates presented in 11.3 %(18), 6.3 %(11) of the cultures respectively. Bacterial Isolates from female patients were E. coli (82.73%), Proteus (10.79%) and Klebsiella (6.47%). The authors concluded that Escherichia- Coli remains the commonest microorganism causing urinary tract infection in children. Injectable Ceftriaxon , and Gentamicin followed by the oral Nitrofurantoin and Cefixim were the first line for empirical treatment of urinary tract infections in their location.

A paper from the Eastern Province of Saudi Arabia looked at Dysmenorrhea and Associated Risk Factors among University Students. A cross-sectional study was conducted in Art and Science Colleges of Dammam University. 924 students were selected by stratified random sampling with proportionate allocation. The participants completed a self-administered questionnaire, which assessed socio-demographic and menstrual characteristics. Results revealed that about 35% of the university students had severe dysmenorrhea and almost 21% had moderate to severe Premenstrual syndrome (PMS). The most common risk factor for dysmenorrhea was positive family history (67.9%), followed by physical inactivity (52.6%) and irregular menstruation (30.8%). About 57% of students used analgesics to relieve symptoms of dysmenorrhea. The results of this study calls for interventions, such as educational programs, to limit the adverse effects of the problem on the students' quality of life and productivity.

MEJFM Middle East Doctor of the Year 2013

(the late) Dr Noori Abdulla Khider
July 1, 1962 - 25th August 2013

Kurdistan, Iraq

Our Middle East doctor of the year for 2013 (retrospectively) is the late Dr Noori Abdulla Khider of Kurdistan Iraq. biography

Dr Noori Abdulla was a specialist in the field of family medicine, dermatology and child health for the past 25 years and he worked in Iran, Australia and Kurdistan, Iraq. He was born in 1962 at Hawler, Kurdistan (North of Iraq). In 1980, at the age of 18 he attended Mosul Medical College, Iraq and graduated in 1986 and received his M.B.Ch. B. He then did his residency at Rizgari and Jum'uri Public Hospital, Kurdistan, Iraq. From 1988 he moved to Shiraz, Iran and started his practice at Shiraz Hospital. He stayed there until 1989 and moved to Tehran, Iran. He worked there as a Family Physician until 1996.

In May 1996, he and his family moved to Ashfield, Australia and studied for the evaluation of his qualification into the Australian Health System. He then entered into the Australian Health System and moved to Frankston, Australia and started working in Frankston Hospital and worked there for about 2.5 years. From 2001-2004 he moved to Shepparton, Australia to work as a Family Physician in Wyndham house Clinic and obtained his Family Physician Fellowship in 2003. In 2004 he moved back to Sydney, Australia and started working in Primary Health Care in Bankstown, Liverpool Medical Centre and in the Advanced Family Medical Centre in Auburn until 2010. While in Sydney he obtained many different qualifications, including:

- In 2006: Diploma in Child Health at University of Sydney, Australia
- In 2007: Diploma of Dermatology in Cardiff University
- In 2009: Master of Skin Cancer in University of Queensland, Australia
- In 2010: Certificate in Laser Therapy

In September 2010 he came back to his homeland Hawler, Kurdistan and started working as a lecturer in Hawler medical University and to establish family medicine as a postgraduate degree in Kurdistan. With the grace of god he achieved this and as of this year family medicine is being taught as a subject in 5th year undergraduate degree at the medical college. Dr Noori helped many people and he was very passionate about bringing PHC to Kurdistan so people could have equal healthcare as in Australia. He even advocated for health insurance in Kurdistan but it is still under debate within the parliament.

He also started his own private clinic called "Noor Polyclinic" located in Kurdistan, Iraq. In addition to all this, he came back to Kurdistan to establish the field of family medicine within the board of Kurdistan and recently advocated for the opening of family medicine as a subject for Hawler medical undergraduate students. He was also involved in the health and safety department within Hawler medical university and very committed to making not only the university a safe environment but also bringing family medicine into Kurdistan.

Dr Noori died on the 25th August 2013. We convey our sincere condolences to his wife, Mrs Narmin Ali, and children Chra Abdulla, Gazang Abdulla, Mohammad Abdulla and Lana Abdulla.

Assessment of Thyroid Function among Transfusion-Dependant Thalassaemics in Erbil

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Abstract

Background and objectives: β-thalassaemia major may result in many endocrine complications. Hypothyroidism is one of these complications. The aim of this study is to evaluate thyroid function among b-thalassaemia major patients in Erbil city.

Material and Methods: a cross-sectional study was carried out on 78 b-thalassaemia major patients, registered at Erbil thalassaemia center. They included 48 males and 30 females, aged between 10-33 years along with a control group of 30, age and sex matched healthy individuals. A questionnaire was used to evaluate demographic information, medical history, and growth parameters. The levels of T3, T4, and TSH hormones were assessed in all patients and controls.

Results: The mean levels of thyroid hormones; T3 and T4 were significantly lower (P<0.001) among thalassaemia patients, while the mean TSH level was higher (P=0.003) compared to the control group. Nineteen patients (24.3%) had hypothyroidism, of these, 2 patients (2.5%) had overt hypothyroidism (low T4, and high TSH) and 17 patients (21.8%) had subclinical hypothyroidism (normal T4 and high TSH). They were heavily iron overloaded (mean S. Ferritin =5250 ng/ml) and were sub-optimally transfused (mean pre-transfusion Hb=8.2 g/dl). There was significant relation between the frequency of hypothyroidism and the pre-transfusional hemoglobin level and the frequency of blood transfusion (p value=0.008 and 0.03 respectively), while no significant relation between frequency of hypothyroidism and level of serum ferritin, age, sex, age at first blood transfusion or spleen status was noted.

Conclusion: Impaired thyroid function is frequent among our thalassaemia major patients and this necessitates regular follow up and early commencement of chelation therapy to prevent such complication.

Key words: Major thalassemia, blood transfusion, thyroid function, chelating agent, Erbil, Iraq.

Introduction

Definition and classification of thalassaemia: Thalassaemia is the most common monogenic disorder in the world.(1) It is an inherited impairment of hemoglobin production, in which there is partial or complete failure to synthesize a specific type of globins chain.(2) β-thalassaemia major, first described by Cooley and Lee, is a serious disease generally diagnosed within the first year of life on the basis of presentation with anemia, hepato-splenomegaly, growth retardation, and jaundice and bone changes.(3)The clinical severity of thalassaemia varies widely ranging from mild forms to severe or even fatal cases.(4) β-thalassaemia major is a common health problem in the Middle East, Africa, the Indian subcontinent, and Southeast Asia. While the homozygous state of β-thalassaemia usually causes severe transfusion-dependent anemia and often death before puberty, the heterozygous state, β -thalassaemia trait or thalassaemia minor is less severe, and causes mild to moderate microcytic anemia.(5) The gene frequency of b-thalassaemia is estimated to be 5-8% and it is present in all ethnic groups.(6) Thalassaemia affects men and women equally and occurs in approximately 4.4 of every 10,000 live births.(7) Iraq is one of the countries in which 6-10% of the population have a haemoglobinopathy of which thalassaemia is the most common(8). In Erbil a recent study among university students has reported a carrier rate of 7.8%.(9)In severe β-thalassaemia there is ineffective erythropoiesis, the hallmark of thalassaemia, which is the result of the deleterious effects of a relative excess of α-globin chains. There is intra-medullary death of red cell precursors and accelerated intramedullary apoptosis of late erythroblasts.(10) Depending on the type of mutation, transfusion in patients with thalassaemia major may be necessary from early infancy, as early as the 2nd months of life, in less severe cases, transfusions may not be necessary till the 2nd year of life, but rarely later.(11)

Due to the lack of physiological pathway for iron excretion, frequent blood transfusions and increased intestinal iron absorption will eventually lead to iron overload resulting in accumulation of iron in key organs such as liver, heart, and endocrine glands.(12) This massive accumulation may cause organ dysfunction and failure, and ultimately death.(13) Death was often due to cardiac failure, which typically began before the patient reached 20 years of age.(14) The toxicity of iron is mediated by its catalysis of reactions that generate free radicals which induce lipid peroxidation of cellular organelles including mitochondria, lysosomes and sacroplasmic membranes.(15) A decision to initiate regular transfusions in patients with β-thalassaemia may be difficult and should be based on the presence and severity of the symptoms and signs of anemia, including failure of growth and development. The goals of transfusion include correction of anemia, suppression of erythropoiesis and inhibition of increased gastrointestinal absorption of iron.(10) Hyper-transfusion (keeping hemoglobin above 9.0 g/dl) has improved the life expectancy of thalassaemia patients, however, an efficient chelation is needed which is expensive, difficult to administer and frequently not as readily available, hence the compliance is often poor despite regular transfusions resulting in iron overload.(16) Endocrine abnormalities are among the common complications of thalassaemia.(17) It has been reported in children, adolescents and young adults suffering from thalassaemia major; including thyroid dysfunction due to transfusion-related iron overload.(18) Due to the association of iron overload with organ dysfunction in transfusion-dependent β-thalassaemia major patients successful iron chelation therapy is essential for the optimal management of this disease.(13)

Thyroid Gland Dysfunction:
The thyroid gland has a critical role in maintenance of thermogenic and metabolic homeostasis.(19) It secretes two important

hormones namely; thyroxin (T4) and triiodothyronine (T3); these hormones play a very important role in controlling metabolic activity in children and adults, and affect the function of every organ.(20) Thyroid gland produces mainly T4 which has little effect on the body's metabolic rate. On other hand, only 20% of T3, the more active hormone, is produced by thyroid gland, whereas the remaining 80% of T3 is formed by deiodination of T4.(13) Zinc and Copper are important antioxidant element; they are required in trace amounts as cofactors that play key roles in maintaining cellular homeostasis.(21) Zinc is also required for thyroid metabolism and structure; and plays a role in conversion of T4 to T3 thus zinc deficiency may lead to reduction in concentrations of T3 in the plasma.(22) After approximately one year of transfusion; iron starts to accumulate in parenchyma tissues, where it brings about substantial toxicity as compared with iron stored in reticulo-endothelial cells.(23) Hypothyroidism may be partly related to the accumulation of iron in the gland, other factors as chronic hypoxic damage may play a role, too.(24)Haemosiderosis of various endocrine glands including the thyroid gland has been documented histologically in chronically transfused patients including thalassaemics.(25) Thyroid dysfunction has been reported in 13-60% of patients with thalassaemia, commonly after 10 years of age.(26)The commonest form of thyroid dysfunction seen in Thalassaemia patients is primary hypothyroidism,(26) which is usually sub clinical and is characterized by an elevated TSH level and normal T4; however its severity is variable in different series.(27) Secondary or central hypothyroidism is characterized by decreased T4 and low TSH(28). The prevalence of hypothyroidism depends on the age of studied population, the duration of receiving blood transfusions, the amount of iron overload, the dosage of iron-chelating agent, and the procedure used for evaluation.(29)In developing countries, like Pakistan, primary hypothyroidism occurs in a significant

proportion of thalassaemia-major patients (25.7%) in the absent clinical signs of hypothyroidism.(26) To our knowledge this study has not been done in Kurdistan, and there is lack of data about thyroid function among transfusion-dependent thalassaemia patients in Erbil city.

Aims and Objectives
Aim: the aim of this study is to evaluate thyroid function among β-thalassaemia major patients in Erbil city.

Objective: to measure prevalence of thyroid dysfunction among transfusion dependent thalassaemia patients, to define those in need for replacement therapy, to determine the relation between thyroid hormones level and body iron status, and frequency of transfusion and to study relation between thyroid hormones level and the steady state hemoglobin, age, gender, state of the spleen (splenectomized or not).

Subject and Materials

1.1 Study setting: The present study was performed in the thalassaemia center in Erbil city. This center is the main center for providing care for children with thalassaemia in Erbil governorate where they are referred from different areas of the governorate.

1.2 Study design: case-control study.

1.3 Period of study: the study extended from 1st April 2011, through 31st of March 2012. Collection of data was conducted over a period of six months from the 1st of May 2011, through to the 31st of October 2011.

1.4 Selection of the study participants: Seventy eight blood-transfused patients with β-thalassaemia major were recruited during the study period from the thalassaemia center. Registered patients all have firm diagnosis based on classical clinical presentation; typical red cells morphology, raised HbF levels on electrophoresis and positive parental screen for thalassaemia minor.(30)

The iron status of all patients was assessed monthly by measuring S. Ferritin level. Criteria for inclusion into this study were:

• Documented homozygous β-thalassaemia.
• Multiple blood transfusions. (10-15 ml packed erythrocytes per kg body weight or whole blood 20 ml per Kg given every 2-4 weeks to keep their hemoglobin level at a minimum 9 g/dl before each transfusion). Iron-chelating agent (Desferrioxamine) taken in a dose of 20-50 mg/kg body weight/day for 5 days per week, the drug was given by subcutaneous infusion pump over 8-12 hours.(29)
• Age 10 years and above.
• Recent (within 1 month) result of S. Ferritin level.
• A control group of 30 healthy, age and sex comparable individuals were included for comparison.

1.5 Data collection: Data were collected 1-2 sessions per week in Erbil thalassaemia center. The questionnaire was filled in for each patient and their parents by direct interview (3-7 patients were interviewed at each visit).

1.6 The questionnaire: The data collected included: General Sociodemographic information such as name, phone number, age in years, sex, consanguinity, religion, address, ethnicity.Clinical history includes: history of hepatitis, family history of thyroid disease, age at first blood transfusion, frequency of blood transfusion per year, history of splenectomy, age at start of iron-chelation therapy, type of chelation therapy, and compliance with chelation therapy. Physical examination was done: the height and weight of the patients and controls were recorded also spleen size of the patient was recorded.

1.7 Anthropometric measurements: The weight was measured by precision dial scale (seca optima). Participants were weighed in light clothing as far as possible without shoes. The scales were calibrated before use. Height was measured by using the (centre of disease control)

1.8 Laboratory investigation: From each patient and control subjects, 3 ml venous blood sample was withdrawn, samples were allowed to clot at 37oC, and sera were separated and stored at -20oC for the later assay of thyroid hormones level. Assay of thyroid hormones was performed at Nanakali Hospital for blood diseases / Microbiology Section, by ELISA technique on semi-automated ELISA machine (Biokit model ELx 800, USA) using commercial kits (Accubind ELISA Microwells; Monobind Inc. Lake Forest, CA 92630. USA). The principle of this technique depends on solid phase competitive enzyme immunoassay. The essential reagents required include immobilized antibodies, enzyme-antigen conjugate and native (test) antigen. Upon mixing immobilized antibody, enzyme-antigen conjugate and the serum containing the test antigen, a competition reaction results between the test antigen and the enzyme-antigen conjugate for a limited number of immobilized binding sites;after equilibrium is attained the antibody bound fraction is separated from unbound fraction by decantation or aspiration. The enzyme activity in the antibody bound fraction is inversely proportional to the test antigen concentration. By utilizing several different serum references of known antigen concentration, a dose response curve is generated from which the antigen concentration of an unknown can be estimated. Thyroid function was assessed by T3, T4, and TSH hormones.

• **Reference Values:** TSH 0.28 - 6.82 µIU/ml.
T4 8.5 - 12.7 µg/dl.
T3 0.52 - 1.85 ng/ml.
(Accubind ELISA Microwells. Monobind Inc. Lake Forest, CA 92630. USA).Serum ferritin was measured by immunoturbidometry using fully automated analyzer (Automated Architect Machine Abbott Company C-8000 USA) at Media Diagnostic Center.
• **Reference values:** Males 4-98 ng/ml.
Females 4-122 ng/ml.
Hemoglobin was measured by using

electronic blood analyzer that was coulter counter model (ACT 5 diff Beckman).
• **Reference values:** Males 13-18 g/dl.
Females 11.5-16.5 g/dl.31

We categorized hypothyroidism in three sets:

1) Primary overt hypothyroidism: low T3, T4, and high THS.
2) Secondary hypothyroidism: low T3, T4, and low TSH.
3) Subclinical primary hypothyroidism: normal T3, and T4 with high TSH. (30)

1.9 Ethical considerations: The study protocol was approved by Scientific Committee of the College of Medicine of Hawler Medical University and an informed consent was obtained from all patients and their parents prior to participation in the study. All selected patients were cooperative and agreed to participate in the study.

1.10 Statistical analysis: Data were analyzed using the statistical package for social sciences (SPSS) version18. Student t test was used to compare between means of two different samples, Chi-square test were used to test the association between variables. Correlation coefficient (r) was used to assess the strength of correlation between two numerical variables and P-value of ? 0.05 was considered as statistically significant.

Results
2.1. Distribution of the study patients by age and gender: This study included 78 homozygous b-thalassaemia patients; 48 males and 30 females, their ages ranged between 10 and 33 years with a mean age of 15.7 years. Distribution of studied patients by age and gender is shown in Figure 1 (next page).

2.2. Statistical summary of patients' characteristics
All patients have received multiple transfusions, 24 of the patients (32%) had their first transfusion during the first 6 months and 54 (70%) during
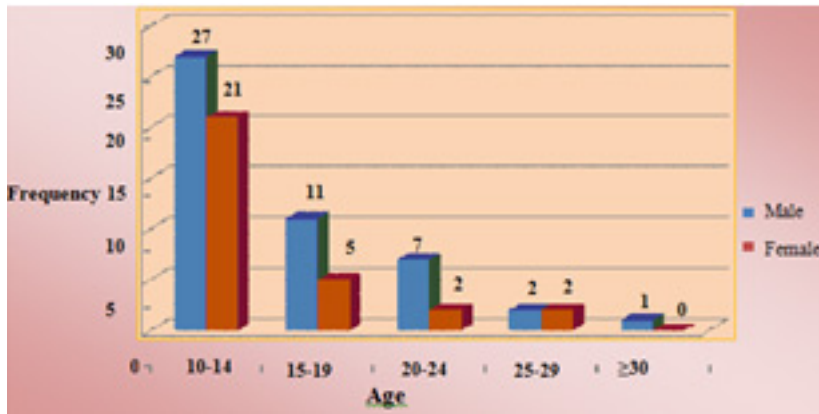
Figure 1: Age and sex distribution of studied patients

Patients characteristics	Mean ± SD	Range
Age (year)	15.7 ± 4.9	10-33
Gender	Male: 48(61.5%) Female: 30(38.5%)	
Height (cm)	138 ± 15.8	112-175
Weight (kg)	35.8 ± 10.8	18-67
Age at 1st BTX (year)	1.8 ± 1.7	0.16-12
Frequency of BTX/year	18.1 ± 4.0	8-36
Age at start of chelation (year)	5.75 ± 0.8	1-20
Steady state Hb.(g/dl)	8.28 ±1.1	6.5-10.7
S. ferritin (ng/ml)	5250 ±2954.9	1030-18000
Hepatitis C infection	23(30.8%)	
Splenectomy	48(61.5%)	
TSH	8.1 ±11.1	1.15-68.9
T4	6.24 ± 2.8	2.6-21.87
T3	1.06 ± 0.49	0.03-2.85

Table 1: Statistical summary of patients' characteristics

Figure 2: Distribution of S. Ferritin level among studied patients

Figure 3: Distribution of the mean weight of the patients and controls

Figure 4: Distribution of the mean height of the patients and controls

2.2. Statistical summary of patients' characteristics

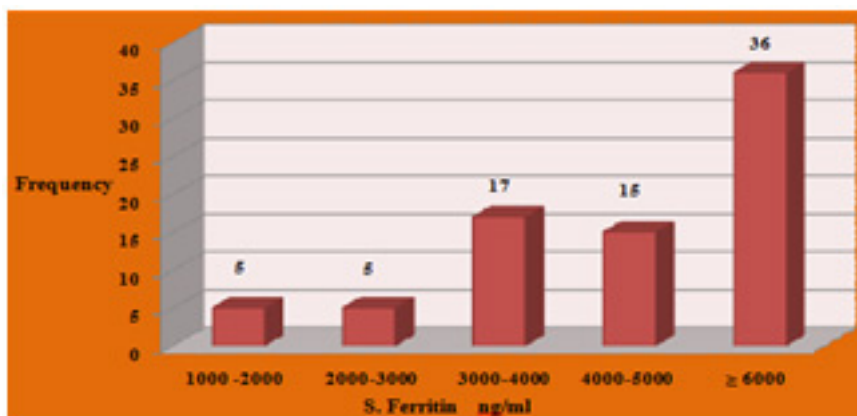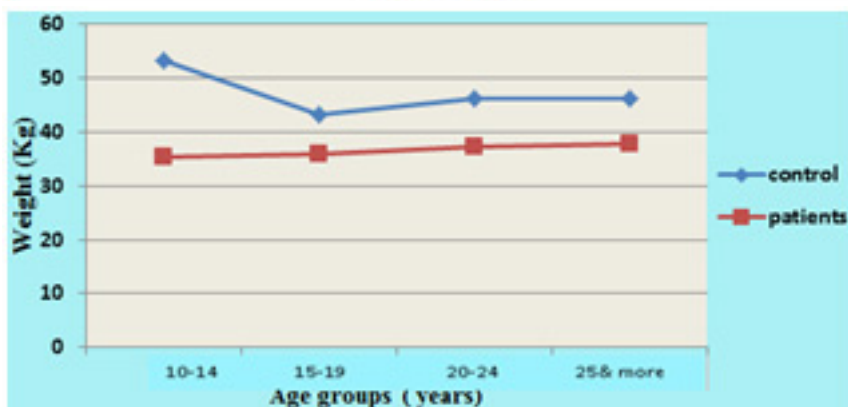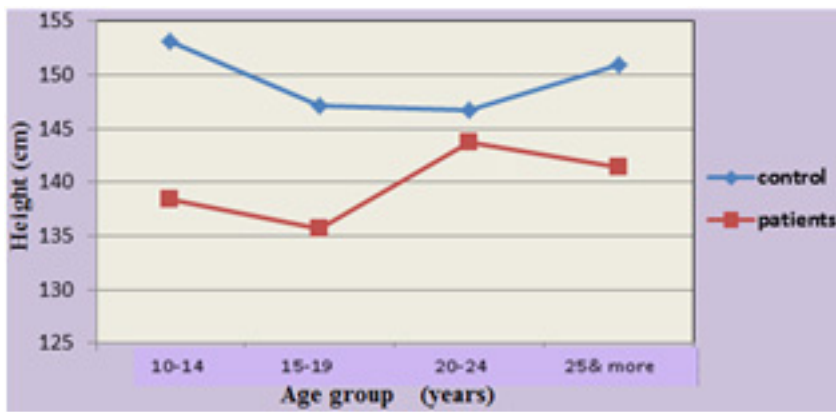All patients have received multiple transfusions, 24 of the patients (32%) had their first transfusion during the first 6 months and 54 (70%) during the first year of life, the average frequency of transfusions (times/year) was 18.1. This means that they were transfused every 20.2 days. Twenty three (30.8%) patients gave positive history of hepatitis-C infection. All patients were iron overloaded, the mean S. ferritin level was 5250 ng/ml, values ranged between 1030 and 18000 ng/ml. The various characteristic of studied patients are summarized in Table 1.

Transfusion therapy was optimal (hyper transfusion regimen) in 13 (16.7%) patients, when the steady state Hb was kept at 9.5 g/dL or more; the rest of the patients were transfused according to traditional method (transfusion is given when Hb drops to below 7-6 g/dl). Most patients were heavily iron overloaded, only in 5 (6.4 %) patients S.Ferritin was 1500 ng/ml or less, in another 5 (6.4%) of patients chelation was satisfactory (S. Ferritin $\leq$ 2500 ng/ml) (Figure 2)

2.3 Distribution of the mean weight and the height of the patients and controls:

The weight/height of the patients lagged behind those of the control group, this was especially evident in those below 15 years of age. They gradually cached up with controls by age; figures 3 and 4 show a comparison between the weight and height of the patients and controls

2.4. Comparison between patients and controls:

Compared to the control group the mean level of thyroid hormones (both T3 and T4) were significantly reduced (P<0.001) while that of TSH was increased significantly (P=0.003). A comparison between thyroid hormones status and some other parameters among patients and control subjects is shown in Table 2 (next page).

2.5. Thyroid function status among studied patients:

Thyroid function as indicated by the level of thyroid hormones was impaired in 19 out of 78 of patients (24.3%); 2 patients (2.5%) had overt hypothyroidism (low T3, low T4 and high TSH) while17 (21.8%) had subclinical hypothyroidism (Normal T3 and T4 with high TSH); no case of secondary hypothyroidism (low TSH, T4 and T3) was found. The distribution of hypothyroidism among studied patients in Figure 5.

2.6. Degree of association between different thyroid hormones and some of the clinical and lab parameters:

The correlation between hormones level and some of clinical and haematological parameters including S. ferritin , age , height, weight and the steady state Hb are shown in Table 3.

There was a significant correlation between T3 level and S. Ferritin. There was no significant correlation between T4 level and S. Ferritin. Also there was no significant correlation between TSH level and S. Ferritin.

2.7. Comparison of different parameters between euthyroid and hypothyroid patients:

Comparing different parameters among euthyroid and hypothyroid thalassaemics, the only two significant differences were the pre-transfusion haemoglobin, which was significantly lower among hypothyroid patients (P = 0.008) and the frequency of transfusions which was higher among hypothyroids (P= 0.03). The state of the spleen (splenectomized versus non-splenectomized), sex, age, and age at first transfusion were not related significantly to the level of the hormones. The different parameters among euthyroid and hypothyroid Thalassaemics are compared in Table 4.

Discussion

In this study the mean age of the patients was 15.7 years, which is close to those studied in Iran by Najafipouret al.(37) Endocrine dysfunction is the second most frequent complication; over 60% of thalassaemics after the age of 10 years have at least one endocrine gland dysfunction and about 40% have multiple endocrinopathies.(38) In this study about one fourth (24.3%) of patients had lab evidence of thyroid gland dysfunction; most of them (21.8%) had the compensated (subclinical) form, the minority had overt hypothyroidism. This finding is in agreement with other studies which had indicated the mild nature of hypothyroidism complicating thalassaemia major.(39) The frequency of hypothyroidism in this series is similar to that reported from Pakistan (25.7%), (26) and some parts of Iran (21.1%).(39) Authors from other countries have reported higher frequencies of hypothyroidism; (32%) in India,(40)and (30%) in Bangladesh.(41) Much lower

Parameter	Patients (Mean ± SD)	Control (Mean ± SD)	P value
Age t=-0.5	15.7 ± 5.6	16.3 ± 5.7	0.28
Height t=-3.02	138 ± 15.9	149.9 ± 14.6	0.001
Haemoglobin t=-15.73	8.2 ± 1.12	11.9 ± o.86	< 0.001
Weight t=-3.8	35.85 ± 10.9	4.5 ± 20.4	<0.001
T3 t=-4.602	1.061 ± 0.49	1.499±0.25	< 0.001
T4 t=-9.62	6.241± 2.87	12.516±3.25	< 0.001
TSH t=2.733	8.100±11.14	2.467±1.49	0.003

Table 2: Comparison between patients and controls
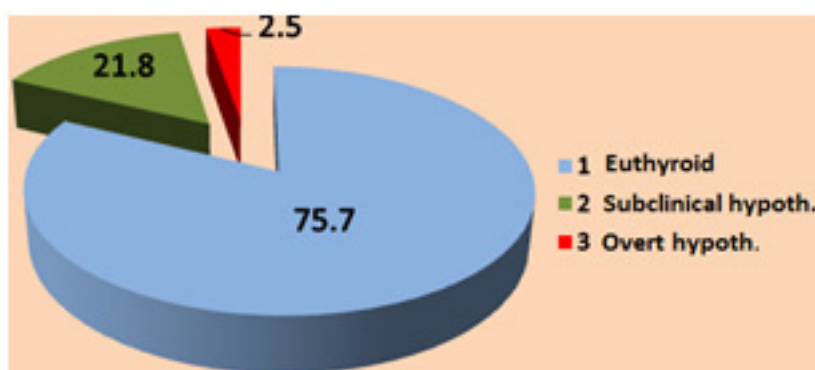
Figure 5: Thyroid function status among studied patients

	Age		Height		Weight		Hb		S. Ferritin	
	r	P	r	p	r	p	r	p	r	P
T3	0.03	0.76	0.1	0.34	0.09	0.39	0.05	0.66	0.4	0.002
T4	0.05	0.62	0.03	0.75	0.07	0.52	0.17	0.66	0.5	0.35
TSH	0.08	0.43	0.2	0.054	0.36	0.005	0.15	0.17	0.04	0.6

Table 3: Degree of association between thyroid hormones and some clinical/lab parameters

Patients' characteristics	Euthyroid (Mean ± SD)	Hypothyroid (Mean ± SD)	P value
No. of patients	59	19	
Age (Years)t=-0.496	15.47 ± 4.4	16.26 ± 6.44	0.25
Sex(Male/Female)X²=0.028	36/23	12/7	0.86
Weight (Kg)t=-0.52	35.49 ± 10.6	37 ± 11.9	0.
Height (cm)t=0.38	139.3 ± 11.8	137.68 ± 17.5	0.35
Steady state Hb (g/dl)t=2.52	8.45 ± 1.09	7.75 ± 1.04	0.008
Age at 1st transfusion (Years)t=1.57	2.0 ± 2.9	1.0 ± 1.0	0.06
Age of onset of chelation(Years) t=1.3)	5.75 ± 2.9	5.28 ± 2.4	0.4
Frequency of transfusion (Times/year)t=-1.8	17.5 ± 4.4	19.9 ± 6.0	0.03
S. Ferritin (ng/ml)t=0.17	5279.2 ± 2812	5156.6 ± 1679.8	0.8
Hepatitis C(seropositivity)X²=0.025	17/59	6/19	0.8
Splenectomy (No./total)X²=0.21	38/59	10/19	0.35

Table 4: Comparison of different parameters between Euthyroid and Hypothyroid patients

incidence figures of hypothyroidism among thalassaemics were reported in other parts of the world where chelation therapy started early in life and was carried out regularly. In a study from Jordan, none of the optimally chelated thalassaemia major patients had impairment of thyroid function.(13) Studies from Turkey and Gulf countries have reported frequencies close to 3%.(42) In Iran the frequency of hypothyroidism has varied from 6% to 21% from different parts of the republic. (43) In Italy, it is around 7.7%.(44) In the UK around 11%,(45) and in Israel about 7.7%.(46) Secondary hypothyroidism is a rare complication in thalassaemic patients, which was not observed in our study as also in other reports.(37) Parenchymal iron deposition commonly starts after the first year of blood transfusions,(10) and serious tissue damage does not occur before serum ferritin levels exceed 2500 ng/ml.(45) It is generally accepted that an optimal iron chelation corresponds to a serum ferritin of less than 1000 ng/ml, good chelation less than 1500 ng/ml, satisfactory or adequate chelation <2500 ng/ml. Serum ferritin levels above 2500 ng/ml indicates poor iron chelation.(48) In the current series, only five patients (6.4%) had ferritin levels below 1500 ng/ml; similar number had levels below 2500 ng/ml. This indicates that more than 85% of our thalassaemic patients are poorly chelated. Poor chelation may be due to irregular supply of chelating agents, scarcity of infusion pumps and poor compliance of patients. Our results showed no association between S. ferritin level and the frequency of hypothyroidism among studied patients; this finding is in agreement with results of studies elsewhere.(49) The explanation for this paradox is:

• S. Ferritin reflects the current iron status and does not indicate the iron status during early childhood when the damage usually begins. The mean age of the studied patients was 15.7 years; this indicates that many of our patients have lived their first decade when Iraq was under the effect of UN embargo. During that

period the supply of chelating agent (desferal) was very irregular and the subcutaneous infusion pumps were available only to very few patients.(48)

• S. Ferritin is an acute phase reactant, and is increased disproportionately, during inflammatory/liver disease. (50) One third of our patients have HCV infection(51). This raises S. ferritin level.

Just a significant positive association between S. ferritin and T3 level was found. This isolated T3 suppression with normal T4 and TSH, known as isolated T3 syndrome, is thought to result from aggressive chelation by desferal which chelates not only iron but other metals such as zinc which is important for deiodinization of T4 to T3; most of the latter is produced that way outside of the thyroid gland from T4.(44) There was no correlation between thyroid dysfunction and gender and age. Similar results have been documented in India and Pakistan.(53)The result also indicated that splenectomy has no effect on thyroid function, which is consistent with a previous study that was done in Thailand.(54)Compared to the control group, the studied patients had a lower mean height and weight; the causes for this are multiple and include endocrinal impairment, chronic anaemia and social, nutritional reason, however, it is accepted that thalassaemic patients have a delayed puberty and slower growth rate but ultimately the majority will catch up with their peers as age advances.(45) There was no significant difference regarding the height and weight of euthyroid and hypothyroid thalassaemia patients. Compared to euthyroid thalassaemics, the hypothyroid patients had significantly lower steady state haemoglobin level. Indeed tissue and organ damage can be caused by chronic hypoxia and apparently continued tissue hypoxia had contributed significantly in the pathogenesis of thyroid damage in hypothyroid patients in this series along with tissue siderosis.(32) Hypothyroid patients in this series have received transfusions more

frequently than euthyroid patients (P = 0.03); increased frequency of blood transfusions will increase iron input and there by increases tissue siderosis.(47) This is in agreement with other reports from Thailand.(29) Only a minority of patients in this series (16.7%) were optimally transfused (pre-transfusion haemoglobin not less than 9.5 g/dl). The usual practice most families and doctors follow, is to transfuse when haemoglobin drops to 5 or 6 g/dl. Optimal transfusion eliminates the complications of anemia and compensatory bone marrow expansion, permits normal development and extends survival. (52) Treatment for compensated primary hypothyroidism in hypertranfused b-thalassaemia patients is still the subject of controversy.(55) Pharmacological treatment for clinical hypothyroidism is readily available; it is important to monitor thyroid function in these patients and institute prompt therapy when indicated.(53)

Conclusion
Within the limitations of this study it was concluded that:

1. Impaired thyroid function is common in multiply transfused β-thalassaemia major patients in Erbil.
2. Thyroid function impairment was mild/compensated in most patients; only two patients needed replacement therapy.
3. The frequency of hypothyroidism in transfusion-dependant - β thalassaemia is not related to serum ferritin level.
4. Thalassaemic patients have poor iron chelation; only the minority is adequately chelated.
5. Transfusion is sub-optimal in most of patients; the majority are on traditional regimens of transfusion.
6. Chronic hypoxia may cause thyroid function impairment in transfusion-dependant β-thalassaemia patients.

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References

1- Agarwal MB. Advances in management of thalassaemia. Indian J pediatr 2004; 41: 989-92.

2- Graig JIO ,McClelland DBL, Ludlam CA .Blood disorders .In: Boon NA, Colledge NR, Walker BR, Hunter JA, editors . Davidson's Principles & Practice of Medicine.20th ed. New York: Elsevier; 2007: 1038.

3- Jimmy PS, Kai HL, Meng YL, Dong TL, Kuo SL, Jong DC, Cheng CF. Abnormal glucose tolerance in transfusion depending b-thalassemia patients. Diabetes Care.2001;24:850-854.

4- Yaish HM, Johnston JM, Harper JL, Chan HS and Coppes MJ.Thalassemia. Thalassemia 2001;27:1-80

5- Takeshita K. Thalassemia Beta 2010.[Accessed 17 February 2011]. Available from http:/www. emedicine. com/ent/topic 491.htm

6- Farzana T, Shamshi TS, Irfan M, Ansar SH, Baig MJ, Shakoor N. Peripheral blood stem cell transplantation in children with beta-thalassaemia major. J Coll Physicians Surge Pak 2003; 13: 204-6.

7- Muncie HL, Campell JR. Alpha and Beta Thalassemia. Am Fam Physician 2009; 80(4):339-44.

8- Rasheed NE ,Ahmed SA .Effect of b-Thalassemia on some Biochemical Parameters. Middle East J Fam Med 2009 ;7(2).

9- Mohammad H A .Prevalence of b-Thalassemia Carriers among a cohort of university students in Hawler province of Iraqi Kurdistan. MSc thesis. Hawler Medical University Erbil. Iraq;2008.

10- Nasef A, Helmy F, Kamal I, El Awady S.C-peptide in Thalassaemics patients. Sci Med J ESCME 2004 2(4);16

11- DeBaun MR, Vichinsky E. Hemoglobinopathy. In :Behrman RE, Kliegman RM, Jenson HB, Stanton BF, editors. Nelson Textbook of Pediatrics.18thed .Philadelphia: Saunders ; 2007: 2025-38.

12-Cunningham MJ, Macklin EA, Neufeld EJ, Cohen AR. Complications of beta-thalassemia major in North America. Blood 2004; 104:34-9.

13- Irshaid F, Mansi K .Status of Thyroid Function and Iron Overload in Adolescents and Young Adults with Beta- Thalassemia Major Treated with Desferrioxamine in Jordan. Int J BioSci 2011; 7:11-23.

14-Nancy FO, David GN, James HM, Alan SW, Peter PL, Alison M, et al Survival in medically treated patients with homozygous b-thalassemia. New Engl J Med 1994; 331:574-8.

15- Nancy FO, Gary MB. Iron chelating therapy and the treatment of the thalassemia. Blood. 1997;89(3):739-61.

16- Satwani H, Raza J, Alam M, Kidwai A. Endocrine Complications in Thalassaemia: Frequency and Association with Serum Ferritin Levels. Pak Pediatr J 2005; 29: 113-9.

17- Cappellin MD, Cohen A, Eleftherious A, Piga A, Porter J, Taher A, editors. Guidelines for the clinical management of thalassemia.2nded. Nicosia: Thalassemia International Federation; 2007: 68-9.

18- Toumba M, Sergis A, Kanaris C, Skordis N. Endocrine complications in patients with Thalassaemia Major. Pediatr Endocrinol Rev 2007; 5:642-8.

19- Jaafar FH, Al- Tememi WF, Ali HH. The influence of thyroid hormones on hemoglobin A2 and F expression. New Iraq J Med 2009;5(3):78-81.

20- Arthor JR, Beckett GJ. Thyroid function. Br Med Bull 1999; 55:658-68.

21- Kralik A, Eder K, Kirchgessner M. Influence of zinc and selenium deficiency on parameters relating to thyroid hormone metabolism. HormMetab Res 1996; 28:223-6.

22- Cohen AR, Galanello R, Piga A, Dipalma A,Vullo C, Tricta F. Safety profile of the oral iron chelatordeferiprone: A multi center study. Br J Haematol 2002; 108: 305-12.

23- Hoffbrand A, Cohen A, Hershko C. Role of deferiprone in chelation therapy for transfusional iron overload. Blood 2003;102 (1): 17-24.

24- Fung E, Harmatz PR, Lee PD . Increased prevalence of iron overload associated endocrinopathy in thalassaemia versus sickle cell disease. Br J Haematol 2006; 135:578-82.

25- Fucharoen S, Ketrichit P, Pootrakul P. Clinical manifestation of Beta- thalassemia/ hemoglobin E disease. J PediatrHematol Oncol.2000;22:552-7.

26- Malik S, Syed S, Frequency of hypothyroidism in patients of beta-thalassaemia . Pak J Med Sci 2010; 60:17-20

27- Shamshirsaz AA, Bekheirnia MR, Kamgar M, Pourzahedgilani N, Bouzari N, Habibzadeh M. Metabolic and endocrinologic complications in beta-thalassaemia major: A Multicenter Study In Tehran. BMC Endocr Disord 2003 3(1): 4.

28- Gallanello R, Origa R. Beta-thalassemia. Orphanet J Rare dis 2010;11(5):117-25.

29- Jaruratanasirikul S, Wongcharnchailert M, Laosombat V, Sangsupavanich P, LeetanapornK. Thyroid Function in b-thalassemic Children Receiving Hyper transfusions with Suboptimal Iron-Chelating Therapy. J Med Assoc Thai 2007;90(9): 1798-802.

30- Thein SL, Rees D. Haemoglobin and the inherited disorders of globin synthesis. In: Hoffbrand AV, Catovsky D, Tuddenham E, Green AR,editors. PostgraduateHaematology.6thed. LondonUK:WileyBlackWell;2011:93-4.

31- Walker SW. Appendix. In: Boon NA, Colledge NR, Walker BR, Hunter JA, editors . Davidson's Principles & Practice of Medicine.20th ed. New York: Elsevier; 2007:1322.

32- Najafipour F, Aliasgarzadeh A, Niafar M, Mobaseri M, Aghamohamadzadeh N, Sorkhabi R. Evaluation of Metabolism, Thyroid Function, Growth and Development Pattern and Calcium Status in Patients with Thalassemia Major. J Med well 2008;3(8): 867-73.

33- Eshragi P, Tamaddoni A, Zarifi K, Mohammadhasani A, Aminzadeh M. Thyroid function in major thalassemia patients: Is it related to height and chelation therapy?.Casp J Intern Med 2011;2(1):189-93.

34- Al-Elq A, Al-Saeed H. Endocrinopathies in patients with thalassemia. Saudi Med J 2004;25(10):1347-51.

35-Martin M, Butler C. Living With Thalassemia: Issues in Thalassemia Care. NewYork: Cooleys Anemia Foundation.[cited 2011 Nov 10] Available from:www.Cooleysanemia.org.

36- Pirinccioglu AG, Deniz T, Gokalp D, Beyazit N, Haspolat K, Soker M. Assessment of Thyroid Function in Children Aged 1-13 Years with Beta-Thalassemia Major. Iran J Pediatr 2011; 21(1):77-82.

37- Najafipour F, Aliasgarzadeh A, Aghamohmadzadeh N, Bahrami A, Mobasri M, Niafar M, Khoshbaten M.A Cross-Sectional Study Of Metabolic and Endocrine Complications in Beta-Thalassemia Major. Ann Saudi Med 2008; 28(5): 361-6.

38- Moaddab M, Hashemipour M, Naderi M. The prevalence of endocrine complications in patients with thalassemia major. Eur Cong Endocrinol 2008;16: 578

39- Hashemi A, Ordooei M, Golestan M, Ghalibaf M, Mahmoudabadi F, et al. Hypothyrodism and Serum Ferritin Level in Patients With Major b Thalassemia. Iran J Pediatr HematolOncol 2011;12(1):53-5

40- Jain M, Sinha R, Ghellani H, Anand N. Assessment of thyroid functions and its role in body growth in Thalassemia major. Indian J Pediatr 1995;32:213-9.

41- Ferdaus M, Hasan A, Shekhar H. Analysis of serum lipid profiles, metal ions and thyroid hormones levels abnormalities in b-thalassemic children of Bangladesh. J Pak Med Assoc 2010;60(5):360-4.

42- Mula-Abed W, Al Hashemi H, Al Muslashi M, Al Muslashi H, l Lamki M. Prevalence of Endocrinopathies in Patients with Beta-Thalassaemia Major. A Cross-Sectional Study in Oman .Oman Med J 2008; 23(4):214-23.

43- Hamidieh A, Moradbeag B, Pasha F, Jalili M, Hadjibabaie M, Keshavaznia M. High Prevalence of Hypoparathyroidism in Patients with Beta-Thalassemia Major .IJHOSCR 2009;3(3):17-9.

44- Sabato A, Sanctis V, Atti G, Capra L, Bagni B, et al. Primary Hypothyroidism and Low T3 Syndrome in Thalassemia Major. Arch Dis Child 1983;58:120-7.

45- Grundy R, Woods K, Savage M, Evans J. Relationship of endocrinopathy to iron chelation status in young patients with thalassemia major. Arch Dis Child 1994;71:128-32.

46- Ong C, Lim S, Tan W, Ong E, Goh A. Endocrine Complications In Transfusion Dependent Thalassemia In Penang Hospital .Med J Malaysia 2008; 63(2):109-112

47- Camaschella C, Hoffbrand AV, Iron overload. In: Hoffbrand AV ,Catovsky D, Tuddenham E, Green AR, editors .Postgraduate Haematology.6thed.London UK: Wiley-Black-Well;2011:54-6.

48- Ikram N, Hassan K, Younas M, Amanat S. Ferritin levels in patients of Beta Thalassemia major. Iran J Pathol 2004;2(2):71-4.

49- Filosa A, Di Mio S, Aloj G, Acompora C. Longitudinal study on thyroid function in Patients with Thalassemia major. J Pediatr Endocrinol Metab 2006;19:1397-404.

50- Kramifar H, Shahriari M, Sadjadian N. Prevalence of endocrine complications in beta-thalassemia major in the Islamic Republic of Iran. East Mediterr Health J 2003;9(1-2):55-60.

51- Alnakshbandi A. Antiphospholipid-Antibody in Thalassemia Major Patients in Erbil City. Ph.D. thesis. Hawler Medical University.Iraq;2007.

52- Nancy F, Oliver And Gary M, Brittenham. Iron-Chelation therapy and the treatment of thalassemia. Blood 1997;89:739-61.

53- Gathwala G, Das K, Agrawal N. Thyroid hormone profile in Beta-thalassemia major children .Indian J Pediatr 2009;4(2):20-9.

54- Aruratanasirikul S, Wongcharnchailert M, Laosombat V, et al. Thyroid Function in b-Thalassemia children receiving hyper transfusions with suboptimal iron-Chelating therapy .J Med Assoc Thai 2007;90(9):1798-802.

55 -Landau H, Matoth I, Landau-Cordova Z, Goldfarb A, Rachmilewitz EA, Glaser B. Cross-sectional and Longitudinal Study of the Pituitary-thyroid Axis in patients with Thalassemia Major. ClinEndocrinol (Oxf) 1993; 38:55-61.

Saudi Family-Medicine Residents' Readiness to Manage Intimate Partner Violence: A Needs Assessment Study

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Abstract

Background: Intimate partner violence (IPV) against women has recently gained recognition as a global health priority. Yet, little action has been taken to improve identification of IPV in primary-care settings in Saudi Arabia (SA), indicating a need to train front-line physicians to recognize and treat abused victims.

Objective: To assess the knowledge, attitudes, and perceptions of IPV among a sample of Saudi family medicine (SFM) residents and use this data to develop and integrate an IPV curriculum into the SFM residency curriculum.

Methods: The Physician Readiness to Manage Intimate Partner Violence Survey (PREMIS) was modified for cultural sensitivity and uploaded to a web-based survey management provider.

Results: Thirty residents participated in the survey yielding a response rate of 52%. None reported postgraduate training in IPV. Respondents scored low in perceived perpetration (2.59/7) and perceived knowledge to manage IPV (average score of 2.26/7). The mean actual knowledge score for residents was 18.1/38 (SD = 6.7).

Conclusion: Residents did not perceive themselves as either knowledgeable or well-prepared to discuss IPV with patients. These results signify a lack of education and exposure to IPV education in SA and indicate the need to train physicians on how to appropriately respond to abused victims.

Key words: Intimate partner violence, women, domestic violence, family medicine, residency training, needs assessment

Introduction

Male perpetrated intimate partner violence (IPV) is defined by the Centers for Disease Control and Prevention as 'any physical, sexual or psychological harm by a current or former partner or 'spouse'.(1). IPV occurs in all countries; all social, economic, religious and cultural groups; and has serious adverse effects on the health of women and children(2,3). According to the recent World Health Organization (WHO) report, Global and Regional Estimates of Violence Against Women, the global lifetime prevalence of intimate partner violence among ever-partnered women is 30.0%(4). Although limited research has been conducted in the Middle East, Saudi Arabia has begun exploring issues of violence and reports that one in three women experiences at least one form of abuse in their lifetime (5,6,7).

Saudi Arabia undertook the first initiatives in family violence in response to a series of fatal cases of child abuse and neglect made public in 2004. As a result, policies to deal with child abuse and neglect (CAN), child protection centers (CPCs), and a National Family Safety Program (NFSP) were implemented (8).The goal of the NFSP was to establish a safe, collaborative, and cooperative environment to address familial violence experienced by vulnerable groups including women, children, the elderly, and people with special needs. As a result, 17 provincial multidisciplinary Social Protection Committees were established to serve victims of abuse. In 2009, a hot line number and website for the reporting of any form of family violence, including IPV, were established (8,9).

One of the main challenges to the implementation of the NFSP program, however, has been the lack of qualified health care providers to manage the cases of IPV (8). Despite recommendations from other parts of the world to integrate IPV training and education into curricula for medical students, residents, and professionals' continuing medical education (10,11,12,13), in Saudi Arabia little has been done to address primary care providers' knowledge gaps.

The objective of this study was to assess the knowledge, attitudes, and perceptions of IPV among a sample of family medicine residents in Saudi Arabia as a first step in the development of a curriculum on IPV specific to family-medicine.

Methodology

Study Population

Saudi family medicine residents (FM) enrolled in the Saudi Board family medicine training program (SBFM) and working at Prince Sultan Military Medical City (PSMMC) in 2011-2012.

Study Design

A validated, standardized tool PREMIS (Physician Readiness to Manage Intimate Partner Violence) (Short, Alpert, Harris, Surprenant, 2006) was assessed for cultural suitability (Appendix A), translated, back-translated, piloted and then administered using an online survey service (http://freeonlinesurveys.com)(14). The survey had five sections: respondent profile, background, IPV knowledge, opinions, and practice issues. Participants were included in the study if they were Saudi family medicine residents and were enrolled in the Saudi Board Family Medicine training program (SBFM) and working at PSMMC during the study period (2011-2012). We included all Family medicine residents because of the intention to develop the curriculum for FM residents as a pilot.

Ethics

Ethics approval was obtained from the research committee at Prince Sultan Military Medical City, Women's College Hospital, and the University of Toronto.

Data Analysis

Analysis was completed using the Statistical Package for Social Science (SPSS, Version 18; SPSS IBM) and the scoring information codebook provided with the original PREMIS tool by Short et al (2006), (available online at: ajpm-online.net). Individual questions were consolidated into several scales according to the survey instrument (some negative-worded items were reverse-coded for the needs of the analysis). Descriptive and inferential analyses were applied to all collected data. The level of significance for statistical test was 0.05.

Scale Reliability

Internal consistency and reliability within identified scales were determined using Cronbach's coefficient alpha, for which > 0.7 was considered satisfactory (15). Using the final version of the adapted instrument, responses in the three background scales are shown in Table 1a (next page). Internal consistency was high for the perceived preparation (a = 0.967), perceived knowledge (a = 0.979), and actual knowledge (a = 0.871) scales. Researchers also assessed reliability of five of the opinion scale questions. Three opinion items demonstrated high reliability (staff preparation, workplace issues, and alcohol/drugs), representing a Cronbach's a > 70. The same reliability results were obtained using the original PREMIS survey tool (14) (see Table 1b). Opinions about legal requirements were not assessed in our results; the related items were deleted as they were not applicable to Saudi culture and practices (Items 12a, 12c, and 17).

Construct Validity

The construct validity of the instrument was measured by estimating the correlations between the instrument's scales (see Table 2). The amount of previous training did not correlate with any of the five opinion scale items. However, the perceived preparation score significantly correlated with workplace issues (r = 0.414) and self-efficacy (r = 0.450) items. Similarly, perceived knowledge score significantly correlated with workplace issues (r = 0.348) and self-efficacy (r = 0.405) items. Actual knowledge was significantly correlated with self-efficacy (r = 0.331) and alcohol/drugs opinion (r = 0.394) items, while negatively correlated with staff preparation (r = -0.203) and victim understanding (r = -0.343).

A)   Measures of Perceived Preparation and Knowledge

	Number of Items	Alpha (Short)	Alpha (Our)	Residents (n=29) M (SD)	Non-residents (n=11) M (SD)
Perceived Preparation	12	0.959[1]	0.967	2.25 (1.29)	3.46 (1.39)
Perceived Knowledge	16	0.963	0.979	2.08 (1.26)	2.73 (1.13)
Actual Knowledge	38	-[2]	0.871	18.10 (6.70)	25.27 (4.24)

B)   Measures of Opinion

Opinion Scale	Number of Items	Alpha (Short)	Alpha (Our)	Residents (n=29) M (SD)	Non-residents (n=11) M (SD)
Staff Preparation	5	0.85	0.903	3.64 (1.57)	3.80 (1.60)
Workplace Issues	6	0.79	0.771	2.88 (1.03)	2.82 (1.20)
Self-efficacy	3	0.69	0.548	2.92 (0.94)	2.85 (1.13)
Alcohol/drugs	3	0.70	0.745	4.56 (1.38)	5.18 (1.34)
Victim Understanding	6	0.69	0.316	4.45 (0.61)	3.91 (1.05)

Table 1: Survey of PSMMC Saudi family medicine residents Non-residents regarding intimate partner violence (IPV)

Opinion scales	Amount of prior training (hrs)	Perceived Preparation Score	Perceived Knowledge Score	Actual Knowledge Score
Staff Preparation	.245	.319*	.298	-.203
Workplace Issues	.250	.414**	.348*	.184
Self-efficacy	.064	.450**	.405*	.331*
Alcohol/drugs	.207	.120	.183	.394*
Victim Understanding	.079	.001	.095	-.343*

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
Table 2: Correlations between five opinion scales and previous IPV training, preparation and knowledge

Results

Forty-one surveys were received with an overall response rate of 72%. Of these, 30 were residents in the SBFM training program (n = 30), and 11 were senior family medicine physicians (i.e., registrars, senior registrars, consultants) who answered the survey after receiving it through the common institutional group-mail. The response rate for the SBFM residents alone was 52%, which may be attributed to the recruitment period conflicting with exams and summer vacation.

Respondent Characteristics

The majority of respondents were men (66.7%, n = 20) and fairly representative of the Saudi medical population (see Table 3). None had received training on IPV within the last six months. None had received training on IPV during their postgraduate training. Three residents reported less than one hour of teaching on IPV during their undergraduate medical training. A majority of residents (74%, n = 22), were either not aware or unsure of the existence of either hospital or national policies to deal with various types of abuse (e.g., child abuse, woman abuse, elder abuse).

Respondents' Preparation for, Knowledge of, and Practice in IPV

Respondents scored low in all perceived preparation items, with an average score of 2.59 out of 7 (SD = 1.41) indicating they were 'not prepared' to 'minimally prepared'. Almost two-thirds of the respondents (70%) felt either unprepared or minimally prepared to ask appropriate questions about IPV, help an IPV victim create a safety plan, or fulfill hospital reporting requirements.

Demographic Characteristics	Residents (n=29) M (SD) or N (%)	Non-residents (n=11) M (SD) or N (%)
-Gender		
Men	19 (65.5%)	8 (72.7%)
Women	10 (34.5 %)	3 (27.3%)
-Years of practice	3.35 (1.41)	6.23 (1.83)
-Level of residency training N (%)		
R1 (First year of residency)	4 (13.8%)	
R2 (Second year of residency)	10 (34.5%)	
R3 (Third year of residency)	9 (31.0%)	
R4 (Fourth year of residency)	6 (20.7%)	
-Number of patients per week		
Not seeing patients	2 (6.9%)	-
Less than 20	12 (41.4%)	1 (9.1%)
20-39	8 (27.6.%)	1 (9.1%)
40-59	1 (3.4%)	-
60 or more	6 (20.7%)	9 (81.8%)
-Previous IPV training within the last 6 months		
Yes	-	-
No	29 (100%)	11 (100%)
-Previous IPV training (postgraduate)		
Yes	-	-
No	29 (100%)	11 (100%)
-Previous IPV training (undergraduate)		
Yes	-	4(36.4%)
No	29 (100%)	7 (63.6%)
-Amount of prior training (total hours)	0.34 (1.20)	3.18 (5.95)
-General awareness about abuse policy		
Yes	7 (24.1%)	6 (54.5%)
No	11 (37.9%)	2 (18.2%)
Not sure	11 (37.9%)	3 (27.3%)

Table 3: Demographic Characteristics and previous IPV exposure of respondents

Similarly, almost 50% of the respondents perceived themselves as being either unprepared or minimally prepared to document IPV history and physical examination findings in the patient chart and make appropriate referrals.

The perceived IPV knowledge score ranged from 1 (nothing) to 7 (very much). PSMMC family medicine residents reported an average perceived knowledge score of 2.26/7 (SD = 1.25) (i.e., know nothing or very little about IPV). Almost 8% (n = 32) of respondents knew nothing or very little about referral resources for IPV victims, while two-thirds of respondents knew nothing or very little about the questions to ask and the stages experienced by a victim who wants to change her situation.

For the third measure, actual knowledge, respondents reported a mean score of 18.10/38 (SD = 6.7). Of the 38 items less than 50% of respondents correctly answered 17 of the actual knowledge questions. Only 10% correctly identified female gender as a single risk factor or predictor of becoming a victim of IPV, while 67% thought that a husband's use of alcohol or drugs was the strongest risk factor. More than half (54%) of respondents correctly answered that batterers use violence against their victims as a means of controlling their partners, while almost 98% of respondents believed that even if a child is not in immediate danger, physicians are mandated to report to child protection services any instance of a child witnessing IPV. The opinion scale was a Likert-type scale whose responses ranged from 1 (strongly agree) to 7 (strongly disagree); the average respondent score for all the items was 3.5/7.

Practice Issues

Nearly 67% (n = 26) of respondents either did not know or were unsure if an IPV protocol existed within PSMMC to deal with IPV. Similarly, 74% (n = 28) of respondents indicated that they were not familiar with the institutional IPV screening and management policy, and 74% did not know if there was a hospital screening and management policy. However, 62% (n = 24) of the sampled residents were not certain if a provisional or national policy mandated reporting of IPV cases. Almost 90% (n = 33) of participants were not sure or denied the availability of IPV patient education or resource materials within their practice settings and felt that referral resources, including mental health referrals for IPV patients, were inadequate.

Discussion

The goal of this study was to identify Saudi family medicine residents' readiness to manage patients who experience IPV. Results show that PSMMC family medicine residents generally did not perceive themselves as either well prepared to discuss IPV with patients or knowledgeable about IPV. Interestingly, senior family physicians reported relatively higher scores on knowledge and their preparedness to address IPV. This may be the result of experiential learning acquired during years of practice and speaks to a potential role for senior family physicians in training residents using the planned for curriculum. On the other hand, the low IPV knowledge scores for residents may be attributed to the lack of prior training or exposure to family violence issues, including IPV. The low scores pose a concern for the profession and suggest there is some urgency in establishing an IPV curriculum to provide physicians with the essential knowledge and skills necessary to increase their comfort levels in identifying and managing victims of abuse in Saudi Arabia. This is especially pertinent in light of the recent review and update of the U.S. Preventive Services Task Force (USPSTF) recommendation on screening women for IPV which states that screening women for IPV can be beneficial and recommends screening all women of childbearing age(16,17).

Interestingly, respondents strongly believed that drug and substance abuse by husbands represents a significant risk factor for perpetration of abuse. Al-Haqwi also found that Saudi medical students strongly believe that alcohol and substance abuse is not an uncommon problem in the Saudi community, especially among young males(18). Few of our respondents (10%, n = 4) correctly identified that being female is the most significant risk factor for abuse. It is possible that the respondents were unaware of the ways that patriarchy and cultural norms reinforce male dominance and increases risk for IPV(19).

Similarly, respondents lacked awareness of existing local and national domestic violence policies. This may not be surprising as the current policies are clear for child abuse but still vague for wife abuse and other forms of abuse.

Training frontline physicians and healthcare workers about IPV requires collaboration. In Saudi Arabia, it will necessitate significant collaboration among the program supervisors at the Saudi Commission for Health Specialties and leaders and policy makers in the Ministry of Social Affairs and National Family Safety program. Collaborations however, may encourage the development of multi-professional IPV training initiatives and even leads to the formation of networks to facilitate a timely response. While policies requiring the mandatory reporting of child abuse and neglect to child protective services have been developed in Saudi Arabia, the lack of a policy or clear guidelines on the reporting or management of IPV may create obstacles for physicians and other health care providers to effectively respond and help abused women(8).

Limitations

Our study had several limitations including potential selection bias and the use of self-reported behaviors. Moreover, the small sample size means that study results may not be generalizable to family residents at other institutions. However, this study offers a method for determining the level of knowledge, attitudes, and practices regarding IPV by family medicine residents across the country.

Conclusion

Results from our study have shown that the adapted PREMIS instrument was valid and reliable among a sample of Saudi family medicine residents indicating its usefulness for estimating the knowledge and preparedness of Saudi family medicine practitioners to manage IPV. However, the results of this study emphasize the critical need for the development and implementation of a culturally sensitive, competency-based curriculum into the Saudi family medicine residency program in order to train physicians on appropriately responding and intervening with victims of IPV.

Appendices

Appendix A: Cultural Adaptation
As the survey was developed for a North American audience, some items and terms were modified to suit the more conservative Saudi culture. In addition, we replaced the word, partner, with the term, husband as Saudi culture and dominant religious beliefs forbid living with a partner outside of a marital relationship.

Changes were also made to specific questions. For example, there are no state reporting requirements of IPV in Saudi Arabia, thus Item J in the Background Section was rewritten to capture the existence of any hospital reporting requirements (Background Section: item J.) As well, statement number 15 on the Opinions Scale was deleted as it was not applicable to Saudi Arabia.

Similarly, the following groups were deleted from questions two through four of the Practice Issues section questions as they were not applicable to the Saudi population: single mothers, Black or Hispanic women, immigrant women, lesbian women, and homosexual men. As there are limited support services in Saudi Arabia, reference to legal advocates, victim witness advocates, batterers' treatment programs, battered women support groups, and lesbian/gay/transgender/bisexual support groups were deleted. In the practice issues section, item C from question 9 was removed, because it was not applicable. The final version of the survey version was reviewed by a senior family-medicine consultant and the chairman of the High Training Committee in family medicine in Saudi Arabia prior to pilot testing. Results from the pilot phase highlighted difficulties in understanding some of the terms used in the survey questions. Thus, definitions for three terms, perpetrator, batterers, and retribution were added prior to the final version.

References

1- Centers for Disease Control and Prevention (CDC). Intimate partner violence: definitions.2010a. Available from: http://www.cdc.gov/violenceprevention/intimatepartnerviolence/definitions.html.
2- World Health Organization. Understanding and addressing violence against Women. 2012.

Available from: http://www.who.int/reproductivehealth/publications/violence/en/index.html
3- Chibber KS, Krishnan S. Confronting intimate partner violence: a global health priority. Mount Sinai Journal of Medicine 2011;78(3):449-57.
4- World Health Organization (WHO). Global and regional estimates of violence against women: prevalence and health effects of intimate partner violence and non-partner sexual violence. 2013. Available from: http://www.who.int/reproductivehealth/publications/violence/9789241564625/en/
5- Tashkandi AA, Rasheed P. Wife abuse: a hidden problem. A study among Saudi women attending PHC centers. Eastern Mediterranean Health Journal 2009;15(5):1242-53.
6- Afifi ZE, Al-Muhaideb NS, Hadish NF, Ismail FI, Al-Qeamy FM. Domestic violence and its impact on married women's health in Eastern Saudi Arabia. Saudi Medical Journal 2011;32(6):612-20.
7- Rachana C, Suraiya K, Hisham AS, Abdulaziz AM, Hai A. Prevalence and complications of physical violence during pregnancy. European Journal of Obstetrics & Gynecology and Reproductive Biology 2002;103(1):26-9.
8- Almuneef M, Al-Eissa M. Preventing child abuse and neglect in Saudi Arabia: are we ready? Annals of Saudi Medicine. 2011;31(6):635-40.
9- Ministry of Social Affairs (MOSA). Kingdom of Saudi Arabia. Social protection. 2012. Available from: http://mosa.gov.sa/portal/modules/smartsection/item.php?itemid=13.
10- Venugopal R. Barriers limiting clinician recognition of intimate partner violence. The Dalhousie Medical Journal 1999. Available from: http://edmj.medicine.dal.ca/archives/spring99/orig2.htm.
11- Sidelinger DE, Guerrero AP, Rodríguez-Frau M, Mirabal-Colón B. Training healthcare professionals in youth violence prevention: an overview. American Journal of Preventive Medicine 2005;29(5Suppl.2):200-5.
12- Krug EG, Dahlberg LL, Mercy JA, Zwi AB, Lozano R. World report on violence and health. Geneva, World

Health Organization 2002.
13- Hamberger LK. Preparing the next generation of physicians: medical school and residency-based intimate partner violence curriculum and evaluation. Trauma Violence Abuse 2007;8(2):214-25.
14- Short L, Alpert E, Harris J, Surprenant Z. A tool for measuring physician readiness to manage intimate partner violence. American Journal of Preventive Medicine 2006; 30(2):173-80.
15- Cormack D. The research process in Nursing. 4th Edition. London: Blackwell Science Ltd.,2000.
16- Nelson HB, Bougatsos C, Blazina I. Screening women for intimate partner violence: a systematic review to update the 2004 U.S. Preventive Services Task Force recommendation. Annals of Internal Medicine 2012;156(11):1-13.
17- Moyer VA, on behalf of the U.S. Preventive Services Task Force*. Screening for intimate partner violence and abuse of elderly and vulnerable adults: U.S. Preventive Services Task Force recommendation statement. Annals of Internal Medicine 2013; 158(6):478-86.
18- Al-Haqwi A. Perception among medical students in Riyadh, Saudi Arabia, regarding alcohol and substance abuse in the community: a cross-sectional survey. Substance Abuse Treatment, Prevention, and Policy 2010;5(2).
19- Htun M, Weldon SL. The civic origins of progressive policy change: combating violence against women in global perspective, 1975-2005. American Political Science Review 2012;106(3):548-69.

Correlation between Erythrocyte Sedimentation Rate and C-Reactive Protein Levels with Disease Activity in Systemic Lupus Erythematosus Patients

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Abstract

Aim: To investigate the correlation between erythrocyte sedimentation rate (ESR) and c-reactive protein (CRP) levels with systemic lupus erythematosus (SLE) disease activity index (SLEDAI) as well as the onset of renal impairment in inactive and active groups of SLE patients.

Methods: This study was done using 49 women patients who are positive for SLE. They were classified into inactive and active groups based on the SLEDAI. All the physical examination and the laboratory parameters were used to determine SLEDAI. Fully automated cell counter was used for the estimation of ESR and the CRP was detected by latex agglutination slide test.

Results: ESR was significant in SLEDAI inactive group and SLEDAI active group. There was no significant correlation between SLEDAI and CRP positive and negative patients. There was no significant difference between inactive and active groups with reference to red blood cells (RBC) and white blood cells (WBC) in urine.

Conclusion: The correlation levels found in this study can be used as an appropriate marker for evaluation of disease activity and also used as an onset for renal impairment for SLE patients.

Key words: erythrocyte sedimentation rate, c-reactive protein, systemic lupus erythematosus disease activity index, latex agglutination, renal impairment.

Introduction

Systemic lupus erythematosus (SLE) is a fatal autoimmune disease characterized by unpredictable exacerbations and remissions with variable clinical manifestations(1). The disease is characterized by multi-organ damage with infiltration and sequestration of leukocyte sub-populations by the presence of autoantibodies.(1) The disease occurs nine times more often in women than in men. It occurs especially in women in child-bearing years between ages 15 to 35.(2) The prevalence of SLE is higher among Asians, Afro-Americans, Afro-Caribbeans, and Hispanic Americans compared with Americans of European decent in the United States, and among Asian Indians compared with Caucasians in Great Britain.(3) The estimated incidence rate of SLE is 1 to 25 per 100,000 in North America, South America, Europe and Asia.(4) There are many factors contributing to the developing pathogenesis in SLE such as genes associated with disease induction as well as immune cell abnormalities that lead to autoimmune pathology (Crispin et al. 2010). Its etiology is known to involve dysregulation of the immune system leading to a functional imbalance of T cell subsets producing a wide range of autoantibodies. The role of hormones and sex chromosomes may also play a role of in the development of SLE (Crispin et al. 2010). In addition, the importance of dysregulation of cytokine expression has also been noted in many cases.(5)

Disease activity and damage in SLE cannot be measured directly by using any individual laboratory value or clinical signs. Thus, disease activity and damage measures have been developed for SLE in recent years.(6) SLE disease activity index (SLEDAI) is a global score reflecting all aspects of disease activity.(7) SLEDAI has been validated for use in SLE and

it has been shown that cumulative disease activity measured by SLEDAI is one of the single best predictors of disease damage in SLE. (8-10) To stabilize the treatment and prognostic factors for SLE patients, there have been wide array of procedures and tests that are being employed to detect DNA, c1q and complement tests. SLE gets activated due to the complement factors that play a major role. However, there exists the question whether SLE occurs as a resultant of the complement activity or it occurs on its own. However, the immune complex mediated mechanisms that lead to the tissue damage in SLE are mainly attributed by the complement deficiency.(11) Despite these factors, activation of complement has also been shown to indicate the severity of SLE and there is a reduction in CRP levels which leads to flare reaction in almost all SLE cases.(12)

There have been many reports correlating CRP and anti-dsDNA antibodies, where high CRP activity indicates the presence of anti-dsDNA antibodies and serositis accompanied by series of complications. However, different opinions exist about the CRP levels in SLE patients. The existing literature suggests strong correlation between disease activity and a rise in dsDNA and a fall in the complement component (C3 and C4) levels.(7) However; it may not be true in all patients. Studying correlation between SLEDAI, anti-dsDNA, C3 and C4 in different clinical subsets of SLE during disease flare and in remission will be useful. There are no prospective studies available in Saudi Arabian women patients on this subject. Hence, we have undertaken this study to correlate SLEDAI scores with ESR, CRP, complement (C3, C4) and anti-dsDNA antibody levels in patients with active and inactive SLE.

Materials and Methods

Subjects
Forty nine women patients with established SLE were recruited into this study from King Abdul-Aziz university hospital in Jeddah, Kingdom of Saudi Arabia between March and October 2011. Patients

tested positive for SLE according to SLEDAI were identified and divided into two groups.(13) Group I included 26 patients with inactive SLEDAI and Group II comprising of 23 patients with active SLEDAI. This study was approved by the Ethics and Research Committee of King Abdul-Aziz University, Jeddah, KSA.

Systemic lupus erythematosus disease activity index
Diagnosis of SLE in our study was based on the ACR guidelines. Moreover, a patient with fewer than four of these criteria could be diagnosed with SLE based on clinical judgment (American College of Rheumatology, 1999). SLEDAI consists of 24 weighted attributes grouped into 9 domains called organ systems (weightings in brackets): central nervous system, vascular, renal, musculoskeletal, serosal, dermal, immunologic, constitutional, and hematological parameters.(6) If during a 10-day period prior to the assessment if a patient fulfills an attribute then the corresponding weighted score will be taken into account. The sum of all weighted attribute scores comprise the final SLEDAI score. Final SLEDAI scores range between 0 and 105 with 0 being no disease activity.

Clinical procedures
CRP was detected by latex agglutination slide test (Biocientifica, SA kit). The agglutination occurring within 2 minutes, show a CRP level equal or higher than 8 mg/L.(14) Cumulative clinical features were recorded for each patient during their last visit to the clinic. Anti-dsDNA antibodies were measured at the initial visit with the Crithidialuciliae assay. ESR was measured by Westergren method.(15)

Statistical analysis
Statistical analysis was performed using SPSS V.18.0 (SPSS Inc., Chicago IL, US). Parametric data were expressed as mean ± standard deviation (SD). Pearson correlation coefficient was done to correlate physico-chemical parameters among groups. P-values < 0.05 were considered to be statistically significant.

Results
This study was performed among 49 women grouped into inactive group (n = 26, SLEDAI > 10) and active group (n = 23, SLEDAI < 10). The mean age of inactive group was 34.85 ± 12.43 years and 31.17 ± 9.52 years for active group. The mean duration of disease in inactive group was 5.07 ± 3.07 while it was 6.6 ± 3.7 in active group. Levels of antinuclear antibodies (ANA), anti-dsDNA, ESR, CRP, WBC, RBC, Platelet and RF in active and inactive groups were summarized in Table 1.

There was a significant correlation between SLEDAI and ANA levels of inactive groups (r = 0.467, p < 0.05) and active groups (r = -0.333, p < 0.05). The correlation between anti-dsDNA levels and SLEDAI score as a quantitative variable between inactive and active groups were evaluated. There was no statistically significant differences between SLEDAI and anti-DNA levels in inactive group (r = 0.412, p > 0.05) but there was a significant correlation in active group (p < 0.05) (r = 0.365). ESR was highly significant with SLEDAI inactive group (r = 0.463, p < 0.01) and SLEDAI active group (r = -0.193, p < 0.05). CRP was negative in SLEDAI active group (r = -0.255) and positive in inactive SLEDAI group (r = 0.350). The SLEDAI was significantly different in CRP positive and CRP negative patients (p < 0.05). The C3 and C4 normal ranges are 70-170 mg/dL and 15-55 mg/dL respectively. In this study there was a significant correlation between SLEDAI active and inactive groups with reference to C4 (p < 0.05) (r = -0.347 for inactive) (r = 0.156 for active). There was a significant correlation between SLEDAI inactive group and C3 (r = 0.220, p < 0.05) and it was not significant for active group (r = -0.424, p > 0.05). There was a significant correlation between SLEDAI active and inactive groups with reference to RBC (p < 0.05) (r = -0.265, p < 0.05 for inactive) (r = -0.121 for active) and WBC (p < 0.05) (r = -0.940, p < 0.05 for inactive) (r = -0.160 for active). SLEDAI active and inactive groups were found significant with platelets (r = 0.118, p < 0.05 for inactive) (r = 0.392 for active). However, there is no significant

Table 1: Correlation between systemic lupus erythematosus disease activity index and studied variables in inactive group

Laboratory parameter	r value	P-value
Erythrocyte sedimentation rate (ESR) (mm/h)	0.463	0.017*
C-reactive protein (CRP)	0.350	0.079
C3	0.220	0.279
C4	-0.347	0.082
Anti-DNA	0.412	0.036*
Antinuclear antibodies (ANA)	0.467	0.016*
Red blood cells (RBCs) ×10⁶/cm m	-0.265	0.190
White blood cells (WBCs) ×10³/cm m	-0.940	0.648
Platelets ×10³/cm m	0.118	0.566

Table 2: Correlation between systemic lupus erythematosus disease activity index and studied variables in active group

Laboratory parameter	r value	P-value
Erythrocyte sedimentation rate (ESR) (mm/h)	-0.193	0.379
C-reactive protein (CRP)	-0.255	0.240
C3	-0.424	0.044*
C4	-0.156	0.476
Anti-DNA	0.365	0.086
Antinuclear antibodies (ANA)	-0.333	0.120
Red blood cells (RBCs) ×10⁶/cm m	-0.121	0.333
White blood cells (WBCs) ×10³/cm m	-0.160	0.467
Platelets ×10³/cm m	0.392	0.064

*P < 0.05. Complement components (C3, C4)

Table 3: Comparison of kidney functions with systemic lupus erythematosus disease activity index in study groups

Studied variables	Inactive group (n = 23) Mean ± SD	Active group (n = 26) Mean ± SD	r	P
WBCs in urine	14.38 ± 41.69	10.52 ± 18.89	0.046	0.753
RBCs in urine	15.31 ± 52.88	4.83 ± 9.49	0.019	0.898

difference between inactive and active groups with reference to RBCs (r = 0.019) (p < 0.05) and WBCs in urine (r = 0.046) (p < 0.05) (Table 3).

Discussion

SLE is an autoimmune disease characterized by the production of antinuclear antibodies1. The present investigation is aimed to assess the relationship between SLEDAI with reference to important physico-chemical parameters in inactive and active groups. Our findings indicated that ANA levelswere found to be statistically significant in SLEDAI active and inactive groups. Recent research on human and murine lupus suggests that disease susceptibility results from impairing the clearance of apoptotic cells and increasing apoptosis as well as genetic polymorphisms regulating immune responses. Because of the products of dead cells including nucleic acids have immunologic activity which can promote antigen driven ANA responses.(16) Determination of serum anti-dsDNA titre and complement levels (C3, C4) are useful tests available for assessing disease activity and predicting flares in SLE. Highly significant positive correlation between SLEDAI and anti-dsDNA was found in active group where the levels were non-significant in inactive group. Our findings were in coincidence with Yajimaet al.(17) who observed that they were positively correlated with disease activity as measured by SLEDAI and anti-dsDNA.

There are conflicting reports on CRP values in different spectrum of disease activity in SLE. Though CRP values are higher in active disease compared to inactive disease, its value may or may not correlate with disease activity.(18) In the present study we have found that there was a significant correlation between SLEDAI and CRP in both active and inactive groups. The results observed in our present study was also consistent with Liou (2001); Sari et al. (2002); Rezaieyazdi et al. (2011) who had found any significant correlation between SLEDAI and CRP; it seems that this marker is not a good indicator for disease activity.

Women with SLE may produce antibodies against many different tissue components such as RBCs, WBCs and platelets. Our study have shown that a significant correlation between SLEDAI and the assessed tissue components in both active and inactive groups. ESR is a simple and inexpensive laboratory test for assessing the inflammatory or acute response in SLE patients. ESR is also helpful in the follow-up of SLE, but of questionable value in case of inflammatory myopathy or spondyloarthropathy.(19) ESR was found to be highly significant with SLEDAI inactive group and active group. In a similar study the ESR levels did not differ significantly between patients with disease flare and active infection.(20)

RBC and WBC in urine typically indicate infection, inflammation or damage to the urinary tract or kidneys. Visible blood cells often signify damage to the bladder or the urethra, whereas microscopic cells might reflect damage to the kidneys. In the present study there was no significant difference between inactive and active groups indicating the renal infections in SLE patients of both the groups (Table 3). The results of our findings coincide with a similar study by Hebert et al.(21) where the appearance of RBCs and WBCs in urine predicted the onset of renal relapse in patients with SLE.
It is obvious that the SLE disease activity score system could be affected by different factors. The scores evaluate the patient's status for a limited time and thus these controversies might have originated from the low number of patients, medications, and duration of activity prior to sampling.

Conclusion

Our study in Saudi Arabian SLE patients confirms the significant correlation between the disease activity and the biochemical parameters. Renal parameters studied may be useful for the diagnosis of renal impairment and the follow up of patients with SLE associated with renal dysfunction. Hence this association may be a useful tool for the management of SLE patients in near future.

References

1. Ruiz-Irastorza G, Khamashta MA, Castellino G, Hughes GR (2001) Systemic lupus erythematosus. Lancet 357, 1027-32.
2. James, William, Berger, Timothy, Elston, Dirk (2005). Andrews' Diseases of the Skin: Clinical Dermatology. (10th ed.). Saunders.
3. Anisur Rahman, David A, Isenberg (2008) Review Article: Systemic Lupus Erythematosus. N Engl J Med 358 (9): 929-939.
4. Pons-Estel GJ, Alarcon GS, Scofield L, et al. (2010) Understanding the epidemiology and progression of systemic lupus erythematosus. Semin Arthritis Rheum 39, 257.
5. Dean GS, Tyrrell-Price J, Crawley E, Isenberg DA (2000) Cytokines and systemic lupus erythematosus. Ann Rheum Dis 59, 243-51.
6. Hermine I, Brunner, Earl D, et al. (2003) European Consensus Lupus Activity Measurement Is Sensitive to Change in Disease Activity in Childhood-Onset Systemic Lupus Erythematosus Arthritis & Rheumatism (Arthritis Care & Research), 49, (3): 335-341.
7. Narayanan K, Marwaha V, Shanmuganandan,K Shankar S (2010) Correlation between Systemic Lupus Erythematosus Disease Activity Index, C3, C4 and Anti-dsDNA Antibodies. MJAFI 66, 102-107.
8. Gladman D, Ginzler E, Goldsmith C, Fortin P, Liang M, Urowitz M, et al. (1996)The development of the Systemic Lupus International Collaborating Clinics/American College of Rheumatology damage index in patients with systemic lupus erythematosus. Arthritis Rheum 39, 363-9.
9. Strand V, Gladman D, Isenberg D, Petri M, Smolen J, Tugwell P (1999) Outcome measures to be used in clinical trials in systemic lupus erythematosus. J Rheumatol 26, 490-7.
10. Brunner HI, Silverman ED, To T, Bombardier C, Feldman BM (2002) Risk factors for damage in childhood-onset systemic lupus erythematosus (cSLE), Cumulative disease activities over time and medication use predict disease damage. Arthritis Rheum 46, 436-44.

11. Mark J Walport (2002) Complement and systemic lupus erythematosus. Arthritis Res 4, (3): S279-S293.

12. Pereira de Silva JNM, Carvalho JOP, Lopes JCA, Oliveira RP, Oliveira LC (1996) Growth and yield studies in the Tapajo´s region, Central Brazilian Amazon. Commin. For. Rev 75 (4), 3325-3329.

13. Bombardier C, Gladman DD, Urowitz MB, Caron D, Chang CH (1992) and the Committee on Prognosis studies in SLE. Derivation of the SLEDAI: a disease activity index for lupus patients. Arthritis Rheum 35, 630-40.

14. Tillet WS, Francis TJ (1930) Serological reactions in pneumonia with a non portion somatic fraction of pneumococcus J, Exper. Med 52, 561-571.

15. Zakia Abu-Zahab, Sahar Saad Zalam, Radwa S. Shahien and Samia Taher (2010) Serum Levels of Soluble Fractalkine in Active Systemic Lupus Erythematosus and its Relation to Disease Activity and Renal Impairment. Australian Journal of Basic and Applied Sciences 4(6), 1070-1075.

16. Ardoin SP, Pisetsky DS (2008) Developments in the scientific understanding of the lupus. Arthritis Res Ther 10, 218.

17. Yajima N, Kasama T, Isozaki T et al. (2005) Elevated levels of soluble fractalkine in active systemic lupus erythematosus: Potential involvement in neuropsychiatric manifestations. Arthritis Rheum 52, 1670-5.

18. Pepys MB, Lanham JG, De Beer FC (1982) C-reactive protein in systemic lupus erythematosus. Clin Rheum Dis 8, 91-103.

19. Ballou SP, Kushner I (1996) Laboratory evaluation of inflammation. Textbook of Rheumatology. Kelly W, Harris E, Ruddy S, et al (eds). Philadelphia, Pa, Saunders, WB Co, 5th Ed, 799-805.

20. Firooz N, Albert D, Wallace D, Ishimori M, Berel D, Weisman M (2011) High-sensitivity C-reactive protein and erythrocyte sedimentation rate in systemic lupus erythematosus. Lupus 20(6), 588-597.

21. Hebert LA, Dillon JJ, Middendorf DF, Lewis EJ, Peter JB (1995) Relationship between appearance of urinary red blood cell/white blood cell casts and the onset of renal relapse in systemic lupus erythematosus. Am J Kidney Dis 26(3), 432-8.

22. Anonymous (1999) Guidelines for referral and management of systemic lupus erythematosus in adults. American College of Rheumatology Ad Hoc Committee on Systemic Lupus Erythematosus Guidelines. Arthritis Rheum 42, 1785-96.

Dysmenorrhea and Associated Risk Factors among University Students in Eastern Province of Saudi Arabia

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Abstract

Dysmenorrhea is a common problem among young females, and if severe enough, can adversely affect the productivity and quality of life. The aim of the present study was to determine the prevalence and predictors of dysmenorrhea among university students in Dammam. Accordingly, a cross-sectional study was conducted in Art and Science Colleges of Dammam University. 924 students were selected by stratified random sampling with proportionate allocation. The participants completed a self-administered questionnaire, which assessed socio-demographic and menstrual characteristics. In addition, weight and height were measured and body mass index was estimated.

Results revealed that about 35% of the university students had severe dysmenorrhea and almost 21% had moderate to severe Premenstrual syndrome (PMS). The most common risk factor for dysmenorrhea was positive family history (67.9%), followed by physical inactivity (52.6%) and irregular menstruation (30.8%). About 57% of students used analgesics to relieve symptoms of dysmenorrhea. Nearly 35% of the students skipped one day of college and about 8% skipped two or more days because of dysmenorrhea. Stepwise regression analysis of factors affecting dysmenorrhea revealed that the main predictors of dysmenorrhea were PMS (OR=1.6), family history (OR= 1.5) and beginning of dysmenorrhea within the first 3 years of menarche (OR= 1.4). PMS, the most preventable predictor of dysmenorrhea, was significantly associated with irregular menstruation. Hormonal manifestations of PMS were significantly associated with excess salt intake, while the circulatory manifestations were significantly associated with excess coffee intake.

The results of this study calls for interventions, such as educational programs, to limit the adverse effects of the problem on the students' quality of life and productivity.

Key words: Dysmenorrhea, university students, Premenstrual syndrome

Introduction

Dysmenorrhea affects a large proportion of women of child-bearing age. The prevalence and pattern of menstrual disorders varies in different countries; it was almost similar in one study conducted in Nigerian students (53.3%)(1) and students from Turkey (52.07%)(2), while other studies showed different rates (38 .1%, 67.2%, 71.65% & 89.5%) (3-6).

Primary dysmenorrhea is defined as painful menses in women with normal pelvic anatomy, which usually begins during adolescence. It is characterized by a crampy pelvic pain, beginning shortly before or at the onset of menses, and lasting one to three days. Dysmenorrhea can also be secondary to pelvic organ pathology (7). Studies on the prevalence of menstrual pain have shown that many factors are related to this disorder. These factors include: age below 20, low body mass index (BMI), smoking, early menarche, prolonged or aberrant menstrual flow, pelvic infections, somatization, psychological and genetic factors; all of these factors can influence the prevalence and the severity of dysmenorrhea (8-10). Life style modifications, for example choosing a diet low in fat like the vegetarian diet, was found to decrease the duration and the intensity of the menstrual cramps (7). However, to date, pharmacotherapy remains the most reliable and effective treatment for abdominal pain related to primary dysmenorrhea (11, 12).

A working definition of premenstrual syndrome (PMS) is, 'A condition which manifests with distressing physical, behavioral and psychological symptoms not due to organic or underlying psychiatric disease, which regularly recurs during the luteal phase of each menstrual cycle and which disappears or significantly regresses by the end of menstruation' (13). The main symptoms of PMS are: emotional symptoms, which include depression, mood swings, outbursts, anxiety/tension, confusion, social withdrawal, poor concentration, sleep disturbance, thirst and appetite/food cravings; and physical symptoms which include breast tenderness, bloating and weight gain, headache, swelling of extremities, cramps and aches (14-16). Stress, traumatic events, older age, early menarche, and positive family history are some risk factors which have been found to be associated with PMS (17, 18). Other risk factors include obesity, low intake of vitamin B, vitamin D and calcium, physical inactivity, unhealthy diet and high sodium or caffeine intake (19- 23).

Objectives

General:
To assess the magnitude of dysmenorrhea problem among university students in Eastern Province of Saudi Arabia.

Specific:
1. To estimate the prevalence of dysmenorrhea among students of University of Dammam.
2. To determine the risk factors associated with dysmenorrhea among university students.

Methodology

Study design and Setting:
A descriptive cross sectional study was conducted in Art and Science colleges of University of Dammam in the Eastern Province, KSA during November 2012.

Target population and sampling:
The study targeted all Art and Science students of all academic years, who were 9,264 students. The sample size was calculated by Epi Info at expected frequency of 35±3% (3) at 95% confidence level. It was found that the minimum required sample size is 880. Accordingly, 924 students were selected by stratified random sampling with proportionate allocation from different colleges, departments and academic years. Pregnant students were excluded from the study.

Ethical considerations:
Before conducting the research, approval was taken from College of Medicine of University of Dammam. After that, the approval was taken from Art and Science Colleges of University of Dammam. As the tool of data collection was an anonymous questionnaire, and as it contained the aim of the research, accepting to answer the questionnaire was considered an implicit consent.

Data Collection Tools:
A self-administered questionnaire was developed in Arabic, the mother tongue of all respondents, to assess dysmenorrhea and associated risk factors. To ensure its validity, it was reviewed by all Family and Community Medicine faculty members of Dammam University. A pilot study was conducted among a few students from the same age group to test the quality and clarity of the questions and to know the time needed to complete the questionnaire. Questions included personal information such as age, marital status, college and academic year, manifestations of dysmenorrhea and premenstrual syndrome, and possible risk factors such as smoking, tea/coffee drinking, salt intake, regular menstruation, vitamin and mineral supplementation, exercise and family history. Weight and height of the students were measured and Body Mass Index (BMI) was calculated by the investigators using the equation: weight (kg)/ height (m2) and classified into underweight, normal, overweight, obese and morbid obesity according to the ranges; < 18.5, 18.5-24.9, 25-29.9, 30-39.9 and $\geq$ 40 respectively.

The manifestations of dysmenorrhea asked about in the questionnaire were menstrual cramps and backache, and they were graded according to severity into five categories; no symptoms, mild, moderate, severe and disabling and given the scores 0, 1, 2, 3, 4 respectively. Accordingly, dysmenorrhea among the study sample was divided into three categories: No, mild or severe dysmenorrhea.

Total questions related to premenstrual syndrome symptoms were 24 questions, divided into different subscales assessing anxiety (PMS-A), circulatory (PMS-C),

depressive (PMS-D) and hormonal (PMS-H) manifestations of PMS. Each question was graded according to severity into; no symptoms, mild, moderate or severe and given the scores 0, 1, 2, 3 respectively. Each subscale's score was calculated separately, and then total PMS score of all manifestations was calculated. The total PMS score was then divided into four categories: No PMS, mild, moderate and severe. The reliability of PMS screening test was estimated, where Cronbach's alpha was found to be 0.91.

Data analysis:
Data was entered and verified using statistical package SPSS version 19. Data was presented in frequency tables and charts and analyzed by bivariate analysis using the following tests: independent-samples t-test and one-way ANOVA for quantitative variables and chi square for qualitative variables. Stepwise regression analysis

was also conducted to determine predictors of dysmenorrhea among university students. A P- value < 0.05 for these tests was considered to be statistically significant.

Results
A total of 924 students were included in the study. 552 students were from Art College and 372 were from Science College. Their mean age was 20.6 years ± 1.9, ranging from 18 to 33 years. The majority of students (84.5%) were single.

Figure 1 illustrates that 34.7% of the university students had severe dysmenorrhea, about 48% of them started to complain within the first 3 years of menarche.

Figure 2 (next page) illustrates the occurrence of risk factors of dysmenorrhea. It showed that almost two thirds of the students (67.9 %) had a positive family history of

dysmenorrhea, half of the students were physically inactive (52.6%) and one third had irregular periods (30.8%). Underweight, prolonged menstrual period, abdominal operation, early menarche and smoking were relatively less common among the study sample.

Table 1 (page 29) shows that severe dysmenorrhea was significantly associated with family history (P- value = 0.001). It has been found that 38.3% of those with a positive family history experienced severe dysmenorrhea compared to 27.1% of those with no family history. Also, 50.8% of the students who were using medications for irregular period had severe dysmenorrhea, compared to 33.6% of those who were not using them. The difference was statistically significant (P- value = 0.007).

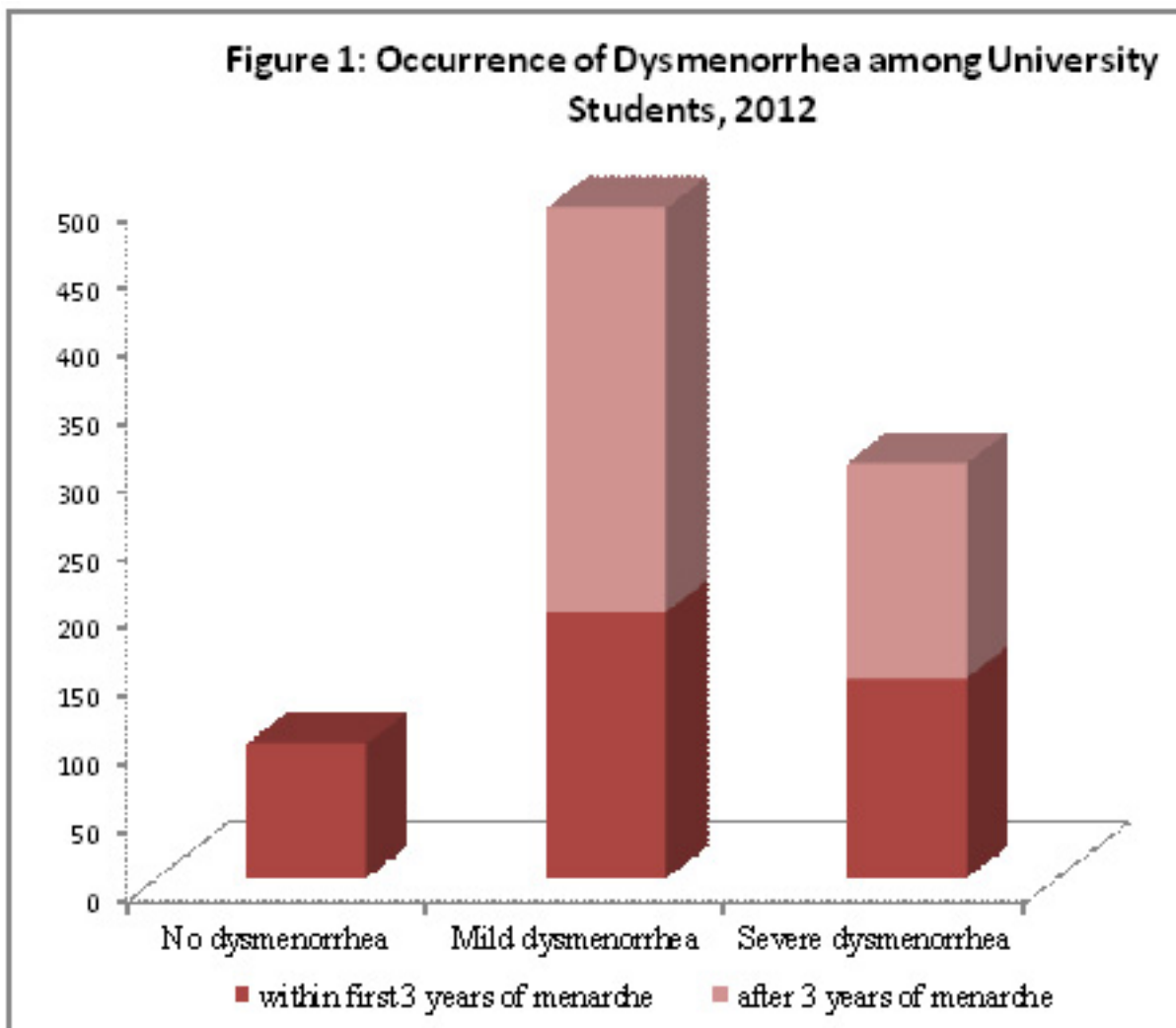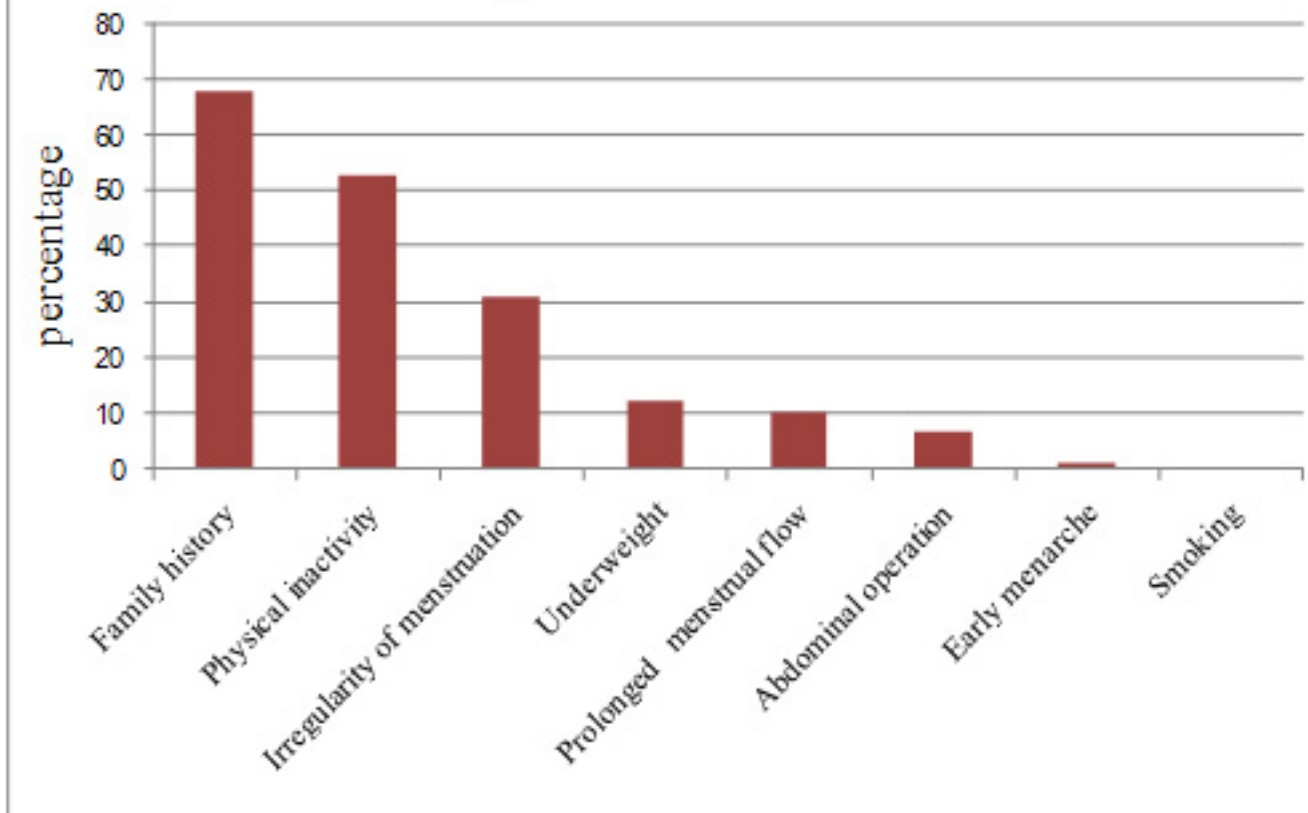Figure 1: Occurrence of Dysmenorrhea among University Students, 2012

Figure 2: Occurrence of Risk Factors of Dysmenorrhea among University Students in Dammam, 2012

There was no significant association between dysmenorrhea and age, physical inactivity, low BMI, prolonged menses, irregularity of the menstrual cycle, a past history of an abdominal operation, or early menarche among the study sample.

Regarding the association between using medications to relieve pain of the menstrual cramps Table 2 demonstrates that, more than half of the students (56.9%) were using analgesics. Concerning days of absence from college, about one third of students had to skip one day due to dysmenorrhea and 7.9 % skip 2 days or more.

Figure 3 shows the relation between PMS and severity of dysmenorrhea. Students who had no or mild PMS symptoms, were less likely to experience severe menstrual cramps. Moreover, nearly half of the students who reported severe PMS symptoms (48.4%), have claimed to have severe dysmenorrhea. Data analysis suggested a strong relation between the two conditions (P-value =0.00).

Figure 4 (page 30) demonstrates that almost half of the university students had no PMS; while 32% had mild symptoms and 21% had moderate to severe symptoms.

The mean total PMS score among girls with irregular menstruation was significantly higher than among those with regular menstruation (15.57 & 13.69 respectively; P-value = 0.015). Nonetheless, no statistically significant association has been found with daily coffee drinking, vitamin and mineral supplementations, regular exercise, obesity, use of contraceptive pills or with early menarche (Table 3 - page 31).

An interesting finding has been found in relation to salt consumption, as its association with the total PMS score had a P-value of 0.07 in Table (3), which is not far from being significant. When the same association was made with the PMS-Hormonal symptoms score, it was statistically significant (P-value = 0.015); which means that the mean PMS-H score increases with increased salt intake.

As Table 4 shows, girls who consume salt in high quantities had a mean score of 3.36, those with moderate consumption 3.024, while those with little consumption had a mean of 2.56.

Table 5 revealed that the mean score for circulatory manifestations of PMS was significantly higher among students drinking coffee daily than among those who are not (3.69 & 3.2 respectively; P= 0.019).

Table 6 shows the stepwise regression analysis for factors affecting dysmenorrhea. Age, age of menarche, regularity of menstruation, duration of period, physical exercise, weight, coffee and salt intake, smoking, minerals and vitamins supplementation, use of contraceptive pills, abdominal operation, severity of PMS, family history of dysmenorrhea and beginning of dysmenorrhea within first 3 years of menarche or later were entered in the regression model. It revealed that the strongest predictor of dysmenorrhea was moderate to severe PMS (OR= 1.6),

| Variable | | Dysmenorrhea | | | | Total | | P-value of Chi square |
| | | No / Mild | | Severe | | | | |
		No.	%	No.	%	No.	%	
Age group	Less than 20	184	63.9	104	36.1	288	100	0.57
	20 or more	414	65.8	215	34.2	629	100	
Family History of Dysmenorrhea	Yes	387	61.7	240	38.3	627	100	0.001
	No	207	72.9	77	27.1	284	100	
Regular Exercise	Yes	35	77.8	10	22.2	45	100	
	No	316	65	170	35	486	100	0.198
	Sometimes	248	64.4	137	35.6	385	100	
Regularity of Menstruation	Yes	419	67	206	33	625	100	0.079
	No	174	61.1	111	38.9	285	100	
Use of Medication for Irregular Period	Yes	29	49.2	30	50.8	59	100	0.007
	No	568	66.4	288	33.8	856	100	
Body Mass Index	Underweight	74	65.5	39	34.5	113	100	
	Normal	319	66.5	161	33.5	480	100	
	Overweight	129	62.3	78	37.7	207	100	0.661
	Obese	44	61.1	28	38.9	72	100	
	Morbid obesity	26	72.2	10	27.8	36	100	
Prolonged Menstrual Flow	Yes	62	64.6	34	35.4	96	100	0.88
	No	534	65.4	283	34.6	817	100	
Abdominal Operation	Yes	40	63.5	23	36.5	63	100	0.752
	No	559	65.5	295	34.5	854	100	
Age of Menarche	Less than 9	6	60	4	40	10	100	
	9-10	42	65.6	22	34.4	64	100	
	11-13	384	66.3	195	33.7	579	100	0.47
	More than 13 years	164	63.3	95	36.7	259	100	

Table 1: The Association between Severity of Dysmenorrhea and Risk Factors among University Students

followed by family history (OR= 1.5) and beginning of dysmenorrhea within the first 3 years of menarche (OR= 1.4).

Discussion

Dysmenorrhea is a common problem in women of reproductive age (7). Several studies indicated that dysmenorrhea interferes with women's daily activities and productivity (3,7, 24). It is an important health problem that requires special attention.

The overall occurrence rate of severe dysmenorrhea in the present study was 35%. There is a wide variation in prevalence of the problem worldwide;

Effect of Dysmenorrhea		University Students (n=924)	
		No.	%
Use of medications	No	335	36.5
	Analgesics	522	56.9
	Antispasmodics	26	2.8
Days of absence from college	0	519	56.9
	1	320	35.1
	2+	72	7.9

Table 2: Effect of Dysmenorrhea on the Quality of Life of University Students

Figure 3: The Relation between PMS and Severity of Dysmenorrhea
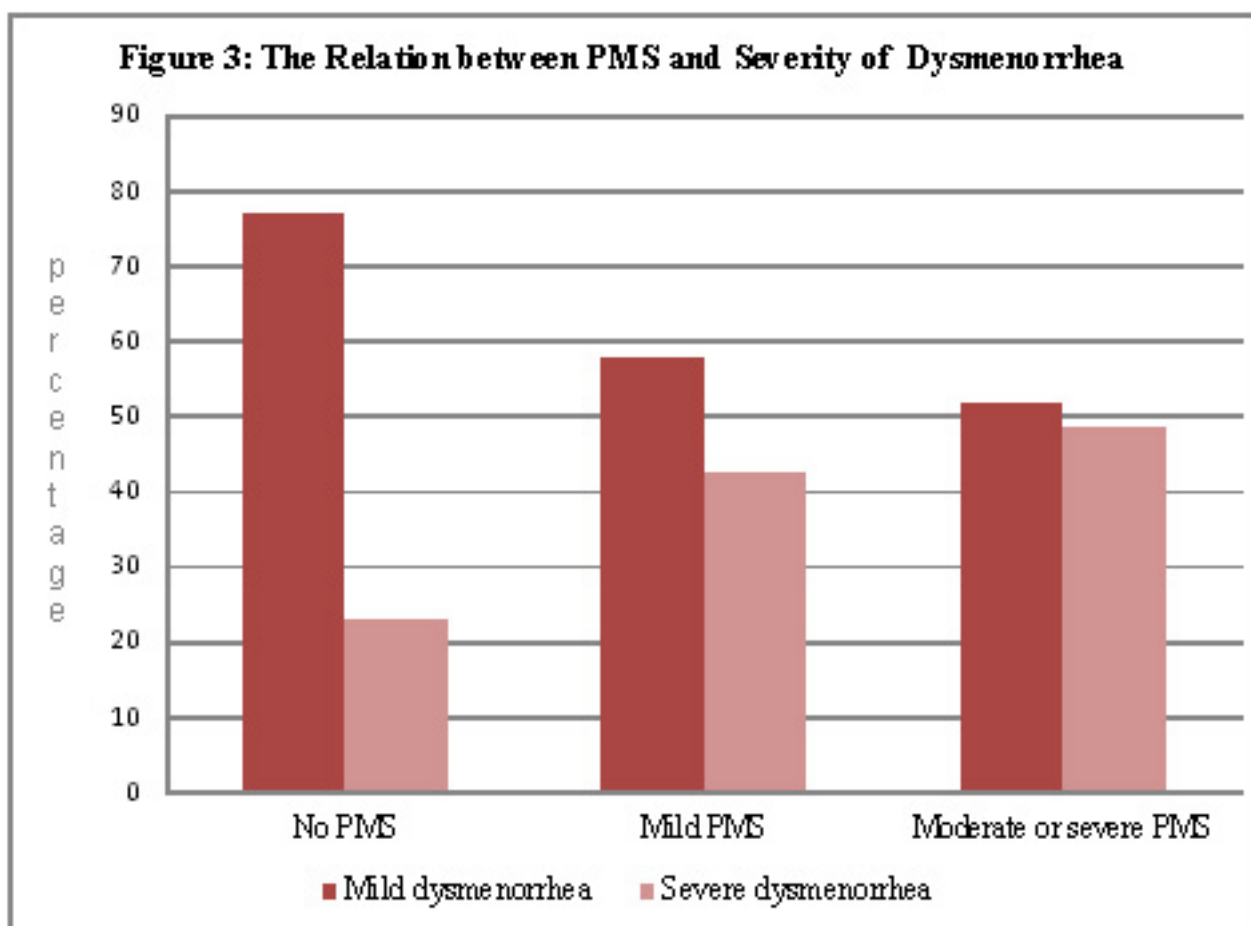
it was found to be 91% in Iran (25), 38.1% among nursing students in Lebanon (3) , and 53% in New Zealand (26). Furthermore, in a similar study from Turkey, the prevalence of dysmenorrhea was found to be 55.5% (18). The variation between these studies may be attributed to differences in age groups.

In our study, positive family history of dysmenorrhea, which was found in 67.9 % of the students, was significantly associated with dysmenorrhea and it was found to be consistent with a study done among university students in Turkey (27).

Body Mass Index and smoking were not found to be significantly

Figure 4: Prevalence of PMS among University Students, 2012

associated with dysmenorrhea. This finding was supported by a study conducted among Iranian women (25). In contrast, dysmenorrhea was found to be 1.5 times higher in Turkish women, who were underweight compared to those who were overweight or obese (27).
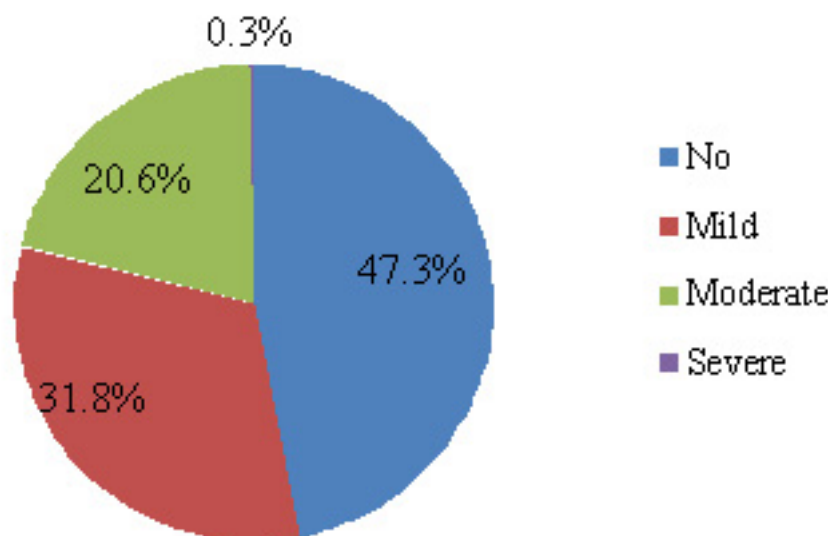
Smoking was found to increase the risk of dysmenorrhea among New Zealand and Canadian women (26,24). However, no association between smoking and dysmenorrhea could be detected in the present study. This may be due to cultural differences, as the percentage of smoking students in the current study was only 0.3%.

Early age of menarche was not associated with dysmenorrhea in the current study, which was consistent with the Canadian study (24). The total percentage of students who were using analgesics to alleviate pain in our study, was 56.9%. A study among Iranian University students indicated that the second most common cause of self-medication with analgesics was dysmenorrhea (28). Dysmenorrhea is a problem that affects daily activities and the academic attendance. About 43% of

the students in our study had to skip college because of pain. This rate was much higher than that reported by a Canadian study, which was only 17% (24) .

As the main preventable predictor of dysmenorrhea, Premenstrual Syndrome (PMS) was studied thoroughly. The results of the present study indicated that 52.4% of the university students had manifestations of PMS. These results were similar to the study conducted in 2012 among Lebanese adolescent girls that reported a prevalence of 54% (3). Another study conducted in 2005 in Pakistan, showed that 53% of the students had PMS (29). Nonetheless, in that study, 16.0% of the girls were diagnosed as having severe PMS, as compared to 21% with moderate to severe PMS in our study, a difference which can be attributed to variable criteria used to classify the severity of the syndrome.

In contrast, a study on PMS among Turkish college students (30) showed that 72.1% had PMS, which is consistent with the result of another study in Spain (31), where the prevalence was found to be 73.3%. However, in the latter study, the age

group of the study sample ranged from 15 to 49 years, while in Taiwan, one study showed that 39.9% of Taiwanese female university students had PMS (32). The authors of the latter study have pointed out several factors which might contribute to difficulties in comparing the findings of the various studies including; the definition of PMS, the target population, social and cultural contexts and the screening tools.

The present study has shown a significant relationship between premenstrual syndrome and the regularity of the menstrual cycle. This finding is in accordance with a review study on the epidemiology and social impact of premenstrual symptoms, which reported that irregular menses aggravates the symptoms of PMS (33). It also goes along with the results of Gul Pinar et al (30), who found that PMS was significantly high in students who have menstrual irregularities. In contrast, Cheng et al (32) found no statistically significant relationship between PMS and the regularity of the menstrual cycle among Taiwanese women.

Regarding the association between premenstrual syndrome and daily

Variable		Total PMS Score			P- value of t- test or One-way ANOVA
		No. (%)	Mean	Std. Deviation	
Regular menstruation	Yes	627(67.9)	13.7	10.7	0.015
	No	284(30.7)	15.6	10.9	
Daily coffee intake	Yes	430(46.5)	14.94	11.15	0.101
	No	487(52.7)	13.8	10.5	
Vitamins and minerals supplementation	Yes	141(15.3)	14.5	11.01	0.851
	No	773(83.7)	14.3	10.8	
Regular exercise	Yes	45(4.9)	14.9	10.3	0.703
	No	871(94.3)	14.25	10.8	
Salt intake	No	43(4.7)	15.2	11.04	0.07
	Little	210(22.7)	12.8	10.7	
	Moderate	415(44.9)	14.3	10.9	
	Much	247(26.7)	15.5	10.55	
BMI	Underweight	111(12.0)	12.8	9.9	0.458
	Normal	481(52.1)	14.2	10.7	
	Overweight	208(22.5)	14.8	10.9	
	Obese	72(7.8)	15.5	10.7	
	Morbid obesity	36(3.9)	13.75	12.8	
Contraceptive pills (among married)	Yes	40(4.3)	14.2	10.99	0.394
	No	99(10.7)	16.07	11.93	
Age of menarche	Less than 9	10(1.1)	15	9.38	0.276
	9-10	64(6.9)	15.5	11.95	
	11-13	580(62.8)	14.59	10.93	
	More than 13	258(27.9)	13.21	10.17	

Table 3: Mean PMS Scores by Risk Factors among University Students

Salt intake	PMS-H Score			P- value of One-way ANOVA
	No.	Mean	Std. deviation	
No	43	2.67	2.76	
Little	210	2.56	2.79	
Moderate	415	3.02	2.69	0.015
Much	247	3.36	2.71	
Total	915	2.99	2.73	

Table 4: Mean Scores of Hormonal Manifestations of PMS by Salt Intake among University Students

Salt intake	PMS-H Score			P- value of One-way ANOVA
	No.	Mean	Std. deviation	
No	43	2.67	2.76	
Little	210	2.56	2.79	
Moderate	415	3.02	2.69	0.015
Much	247	3.36	2.71	
Total	915	2.99	2.73	

Table 5: Mean Scores of Circulatory Manifestations of PMS by Coffee Intake among University Students

Variables in the equation	P value	OR	95% C.I.	
			Lower	Upper
PMS severity	0.000	1.636	1.349	1.984
Family history	0.026	1.480	1.048	2.088
Beginning of dysmenorrhea	0.035	1.386	1.022	1.878

Table 6: Stepwise Regression Analysis for Factors Affecting Dysmenorrhea among University Students

coffee drinking and total PMS score, but it showed association with premenstrual syndrome circulatory symptoms such as palpitation, headache, fatigue and dizziness. A significant association was found between daily consumption of caffeine-containing drinks and the prevalence of PMS in a study which was conducted in Oregon, USA(34). It has also shown that the effects of caffeine-containing drinks on women with severe PMS were dose-dependent. The findings of Gul Pinar et al (30) showed that PMS was significantly higher among those who consumed two cups of coffee or more. The study of Cheng et al (32), however, showed no association between PMS and drinking coffee or tea. Another study on 'Diet and lifestyle factors associated with premenstrual symptoms', didn't find sufficient evidence to support the effects of caffeine consumption on the frequency of reported physical or emotional premenstrual symptoms(35).

Vitamin and mineral supplement intake in general was not found to be significantly associated with premenstrual syndrome in the current study. Among the most thoroughly studied vitamin supplements and its association to PMS is the B complex. One study (20) didn't disclose a lower risk of PMS with vitamin B supplementation. Another one demonstrated the effectiveness of a combination of Mg and vitamin B6 tablets in decreasing the severity of PMS among women affected by PMS (36). One possible explanation for the difference in the results is a difference in the dose used in the latter study, as opposed to the dose present in the usual vitamin and mineral supplements.

Another factor studied in relation to PMS was regular exercise. Only 5% of the students claimed exercising regularly, and the difference in the total PMS score between this group, and those who didn't report exercising regularly wasn't found to be statistically significant. The study of Cheng et al (32) demonstrated a significant association between PMS and regular exercise, a difference that can be attributed to variation in the culture and level of awareness regarding the importance of physical activity to young girls. Another study (17), found out that women with PMS were 2.9 times more likely to be physically active than their counterpart, because they believed that it attenuated the symptoms.

Body mass index in relation to PMS was also considered in our study, but the findings showed no significant association between the two, which doesn't contradict the findings of Cheng et al (32).

Concerning the use of contraceptive pills, no significant association was deduced. Yet, it is of value to point out here that the item in the questionnaire related to contraceptive pills use was exclusive to married girls, who represented only 15.2% of the study sample. However, a review on the epidemiology and social impact of premenstrual symptoms indicated that the intensity of PMS symptoms faded with contraceptive pills use (33).

Finally, age of menarche was also studied in relation to PMS, but didn't appear to be significantly associated with it. According to Nora Al-Awadhi et al (37) early age of menarche was considered if it occurred at an age less than 11 years. A study in Texas, USA(38) on women with PMS and controls showed that age of menarche was similar in the two groups, a result that supports the findings of the present study. In contrast, a more recent study conducted in Alhasa in 2010, Saudi Arabia (18), found out that there is an association between early age of menarche and the development of premenstrual syndrome.

It was concluded that 35 % of the university students had severe dysmenorrhea and 21% had moderate to severe PMS. The two most common preventable risk factors of dysmenorrhea were physical inactivity and irregular menstruation. PMS was found to be the main preventable predictor of dysmenorrhea. Severe PMS has been found to be more common among those having irregular menstruation. Hormonal symptoms of PMS in particular, have been found to be more common among girls who liked excess salt intake, while those who drink coffee on a daily basis were more susceptible to dizziness, headache and other circulatory symptoms of PMS.

Based on the findings of the present study, we recommend that:

• Since dysmenorrhea and PMS apparently constitute a problem among college students, measures, including health education programs targeting school and university students and focusing on the proper measures for dealing with them, should be implemented to limit their interference with the student's life.
• Diet and lifestyle modifications such as restriction of salt intake and the excessive consumption of caffeinated drinks and physical exercise may effectively reduce the severity of PMS symptoms and thus should be encouraged.
• Students who use analgesics frequently should be informed about their possible side effects; safer management techniques such as using hot pads to manage the cramps should be encouraged.
• In order to generalize the results to all Saudi females, further similar studies in other regions of the Kingdom and/or ones including a wider age range, are recommended.

References
1. Olabisi M, Tomi A, Abiodun O. Prevalence and correlates of dysmenorrhea among Nigerian college women. ANZJOG. 2008; 48: 442-444
2. T Gagua, B Tkeshelashvili, D Gagua. Primary dysmenorrhea ; Prevalence in adolescent population of Tbilisi, Georgia and risk factors. JTGGA. 2012; 13(3): 162-8.
3. Karout N, Hawai SM, Altuwaijri S. Prevalence and pattern of menstrual disorders among Lebanese nursing students. East Mediterr Health J. 2012; 18(4): 346-52.
4. P Sharma, C Malhotra, D Taneja, R Saha. Problems Related to Menstruation Amongst Adolescent Girls. Indian J Pediatr. 2008; 75(2) :125-129.
5. Haidari F, Akrami A, Sarhadi M, Shahi M. Prevalence and severity of primary dysmenorrhea and its relation to anthropometric parameters. HAYAT. 2011; 17(1): 85.
6. Murat C, Ilke M, Taner K, I lknur G A Okten. Menstrual Pattern and common menstrual disorders among students in Turkey. Pediatric International. 2007; 49: 938-942.
7. French L. Dysmenorrhea. Am Fam Physician. 2005; 71(2): 285-291.
8. Rizk DE, Mosallam M, Alyan S, Nagelkerke N. Prevalence and impact of premenstrual syndrome in adolescent schoolgirls in the United Arab Emirates. Acta Obstet Gynecol Scand. 2006; 85(5): 589-598.
9. Tonini G. Dysmenorrhea, endometriosis and premenstrual syndrome. Minerva Pediatr. 2002; 54(6): 525-38.
10. Latthe P, Mignini L, Gray R, Hills R, Khan K. Factors predisposing women to chronic pelvic pain: systematic review. BMJ. 2006; 332(7544): 749-55.
11. Coco AS. Primary dysmenorrhea. Am Fam Physician. 1999; 60(2): 489-496.
12. Lefebvre G, Pinsonneault O, Antao V, Black A, Burnett M, Feldman K, et al. Primary dysmenorrhea consensus guideline. J Obstet Gynaecol Can. 2005; 27(169): 1119-1120.
13. Magos AL, Studd JWW. The Premenstrual Syndrome. In: StuddJ (ed.), Progress in Obstetrics and Gynaecology (Vol. 4). London, UK:

Churchill Livingstone, 1984; 334-350.

14. Freeman EW, Halberstadt SM, Rickels K, Legler JM, Lin H, Sammel MD. Core symptoms that discriminate premenstrual syndrome. Journal of Womens' Health. 2011; 20: 29-35.

15. Gianni Allais, Ilaria Castagnoli,Gabellari, Chiara Burzio, Sara Rolando, Cristina D, et al. Premenstrual syndrome and migraine. Official Journal of the Italian Neurological Society. 2012;33 Suppl 1:S111-5.

16. Deuster PA, Adera T, South-Paul J. Biological, social, and behavioral factors associated with premenstrual syndrome. Arch Fam Med. 1999; 8(2): 122-8.

17. Perkonigg A, Yonkers K, Pfister H, Lieb R, Wittchen HU. Risk factors for premenstrual dysphoric disorder in a community sample of young women: The role of traumatic events and posttraumatic stress disorder. Journal of Clinical Psychiatry.2004 ;65: 1314-22.

18. Balaha MH, Amr MA, Saleh Al Moghannum M, Saab Al Muhaidab N. The phenomenology of premenstrual syndrome in female medical students: a cross sectional study. Pan Afr Med J. 2010; 5: 4.

19. Masho MW, Adera T, South-Paul J. Obesity as a risk factor for premenstrual syndrome. J Psychosom Obstet Gynaecol. 2005; 26(1): 33-9.

20. Chocano-Bedoya PO, Manson JE, Hankinson SE, Willett WC, Johnson SR, Chasan-Taber L, et al. Dietary B vitamin intake and incident premenstrual syndrome. Am J Clin Nutr. 2011; 93(5): 1080-6.

21. Bertone-Johnson ER, Hankinson SE, Bendich A, Johnson SR, Willett WC, Manson JE. Calcium and vitamin D intake and risk of incident premenstrual syndrome. Arch Intern Med. 2005; 165(11): 1246-52.

22. Daley A. Exercise and premenstrual Symptomatology: a comprehensive review. J Womens Health. 2009; 18(6): 895-9.

23. Dickerson LM, Mazyck PJ, Hunter MH. Premenstrual syndrome. Am Fam Physician. 2003; 67(8): 1743-52.

24. Burnett MA, Antao V, Black A, Feldman K, Grenville A, Lea R et al. Prevalence of primary dysmenorrhea in Canada. J Obstet Gynaecol Can 2005; 27(8): 765-70.

25. Tavallaee M, Joffres MR, Corber SJ, Bayanzadeh M, Rad MM. The prevalence of menstrual pain and associated risk factors among Iranian women. J Obstet Gynaecol Res. 2011; 37(5): 442-51.

26. Pullon S, Reinken J, Sparrow M. Prevalence of dysmenorrhea in Wellington women. N Z Med J. 1988; 101(839): 52-4.

27. Ozerdogan N, Sayiner D, Ayranci U, Unsal A, Giray S. Prevalence and predictors of dysmenorrhea among students at a university in Turkey. J Gynaecol Obstet. 2009; 107(1): 39-43.

28. Chuong CJ, Burgos DM. Medical history in women with premenstrual syndrome. J Psychosom Obstet Gynaecol. 1995; 16(1): 21-7.

29. Sarahroodi S, Maleki-Jamshid A, Sawalha A, Mikaili P, Safaeian L. Pattern of self-medication with analgesics among Iranian University students in central Iran. J Family Community Med. 2012; 19(2): 125-129.

30. Tabassum S, Afridi B, Aman Z, Tabassum W, Durrani R. Premenstrual Syndrome: Frequency and Severity in young college girls. Journal of Pakistan Medical Association. 2005; 55(12): 546-9.

31. Pinar G, Colak M, Oksuz E. Premenstrual Syndrome in Turkish college students and its effects on life quality. Sexual Reproductive Healthcare J. 2011; 2(1): 21-27.

32. Dueñas JL, Lete I, Bermejo R, Arbat A, Pérez-Campos E, Martínez-Salmeán J et al. Prevalence of premenstrual syndrome and premenstrual dysphoric disorder in a representative cohort of Spanish women of fertile age. European Journal of Obstetrics and Gynecology and Reproductive Biology. 2011; 156(1): 72-77.

33. Chang YH, Yang YC. Factors associated with premenstrual syndrome - A survey of new female university students. Korean J Pediatr. 2011; 54(5): 201-206.

34. Johnson SR. The epidemiology and social impact of premenstrual symptoms. Clin Obstet Gynecol. 1987; 30(2): 367-76.

35. Rossignol AM, Bonnlander H. Caffeine-containing beverages, total fluid consumption and premenstrual syndrome. Am J Public Health. 1990; 80(9): 1106-10.

36. Gold EB, Bair Y, Block G, Greendale GA, Harlow SD, Johnson S, et al. Diet and lifestyle factors associated with premenstrual symptoms in a racially diverse community sample: Study of Women's Health Across the Nation (SWAN). J Womens Health. 2007;16(5):641-56.

37. Fathizadeh N, Ebrahimi E, Valiani M, Tavakoli N, Yar MH . Evaluating the effect of magnesium and magnesium plus vitamin B6 supplement on the severity of premenstrual syndrome. Iran J Nurs Midwifery Res. 2010; 15(Suppl1): 401-405.

38. Al-Awadhi N, Al-Kandari N, Al-Hasan T, Almurjan D, Ali S, Al-Taiar A. Age at menarche and its relationship to body mass index among adolescent girls in Kuwait. BMC Public Health. 2013; 13(1): 29.

Unintentional Injuries Among Preschool Children in Qatar: Cross Sectional Study

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Abstract

Introduction: Unintentional injuries have replaced infectious diseases as the most serious public health problem of children worldwide. Most unintentional injuries among children under 5 years of age occur in and around the home. There are a number of factors that contribute to child unintentional injuries, including: age, gender, race and socioeconomic status. These factors make the child susceptible to injury more than other children. Unintentional injuries are often called accidents, but are almost always predictable and preventable events. Because of their many causes and the close interrelationship between them; a wide range of preventive approaches are required.

Objectives: The objectives of this study were to estimate frequency and types of unintentional injuries, and to investigate determinants of unintentional injuries among preschool children, Doha VIII.

Methodology: A cross sectional study design with simple random sampling was employed to include 564 preschool children (1-4 years old). The respondents were the mothers who attended primary health care centers in Doha city, 2010.

An interviewer administered Arabic version questionnaires used for data collection.

Results: The occurrence of unintentional injuries in the current study was 69.3 %, almost 62.3% of unintentional injuries occurred inside the home. The living room was the most reported place of unintentional injuries inside home (66.7%) and the most frequent cause of these injures was falls (71.8%). Exposure to inanimate mechanical forces was reported in (22.4%), followed by contact with heat and hot substances (20.1%). The most frequent type of injury was bruising (51.2%), followed by cuts (41.2%) while burns was the third most frequent type (19%).

Age of child, birth order, nationality, history of disability, living in a home located on a main street and less educated fathers showed statistically significant relation to occurrence of unintentional injuries. Almost all injuries were followed by complete recovery in (97.9%) and (1.8%) ending with death due to drowning. About (61%) of respondent mothers considered unintentional injuries as unpreventable.

Conclusion and Recommendations:
The prevalence of unintentional injuries among preschool children in PHCCs Doha was higher compared to regional and global levels among a similar age group. Full recovery of unintentional injuries was the most frequent consequence. However, a considerable proportion was followed by death.

Developing and establishing a national household survey for home safety is recommended.

Introduction

Injuries include unintentional injuries such as those caused by motor vehicle crashes and fires; and intentional injuries such as violence and suicide. An injury is defined as unintentional or intentional damage to the body resulting from acute exposure to thermal, mechanical, electrical, or chemical energy or from the absence of such essentials as heat or oxygen. Injuries are not accidents and they can be prevented by changing the environment, individual behavior, products, social norms, legislation, and governmental and institutional policy(1).

Injuries account for 9% of global mortality, and are a threat to health in every country accounting for nearly one of every 10 deaths globally. However, deaths due to injury represent only the tip of the injury iceberg. For every death, it is estimated that there are dozens of hospitalizations, hundreds of emergency department visits and thousands of doctor appointments (2).

The majority of child injuries result from road traffic collisions, drowning, burns, falls or poisoning. These five categories, classified as unintentional injuries make up 60% of all child injury deaths. A further category, labeled other unintentional injuries, includes smothering, asphyxiation, choking, animal or snakebites, hypothermia and hyperthermia. This group accounts for a significant proportion of childhood deaths (23%)(3,4).

Unintentional injuries have replaced infectious diseases as the most serious public health problem of children in the industrialized world today. In the United States, more children between the ages of 1 and 4 die annually from unintentional injuries than from all childhood diseases combined(5). Furthermore, injuries represent an enormous cost to society for emergency care, hospitalization, rehabilitation, disabled years of life, and potential years of life lost(5).

In the European Region of WHO, unintentional injury results in an estimated almost 800,000 deaths. For every death, there are an estimated 30 hospital admissions for injury and 300 hospital emergency department visits, suggesting that the human, health service and societal costs are enormous(6).
Many factors contribute to child injury. These factors make the child susceptible to injury more than other children such as: age, gender, race and socioeconomic status.

Unintentional injuries can be prevented and controlled. Because of their many causes and the close interrelationship between them, a wide range of preventive approaches is required. The idea of injury prevention is not new in the sense that all countries have in place laws and regulations that address at least some of the issues associated with injury, and some steps that have already been taken to tackle the consequences of injury(7). Injury prevention in children must take into account both the causes of injury and their outcome(3).

In Qatar, the rapid transition in socioeconomic status with a dramatic rise in the national economy, expressed in terms of per capita income, has led to road crashes and the resulting fatalities being regarded as a growing social and economic problem. Road Traffic Crashes (RTCs) are common and are now considered the third leading cause of mortality. This positive association between socioeconomic status and traffic deaths may reflect also the increasing prevalence of unintentional injuries(8, 9).
In addition, there is no national surveillance system to monitor the occurrence of childhood injuries and also there is no study that assesses the magnitude and determinants of unintentional injuries among preschool children.

Methods

A cross-sectional study was conducted at six Primary Health Care Centers (PHCCs) located in Doha, the capital of Qatar. They were selected randomly using random

generator. PHCCs provide a good representation of the community. In addition, data from emergency departments, although available, are not ideal to study epidemiological features of childhood injuries due to their poor quality and only report the serious and fatal cases. An approval of Research Committee at Hamad Medical Corporation, and informed written consent were obtained.

Simple random sampling with proportionate allocation was employed within each center to enroll 564 children aged 1-4 years old of Arab nationality during the study period from August to January 2010. For woman who had more than one child in this age range, a random selection was done to select only one child to avoid clustering effect that may arise from collecting data of more than one child in the same family. The sample size was calculated using EPI info statistical software program version 10 using 23.2% effect size(10), 1.88 design effect to compensate for cluster sampling, 95% confidence level and 0.05 absolute precision on either side of the proportion p (d) and 10% compensation for non response.

Arabic version interview administered questionnaire was developed by the investigator guided by previous published studies, and WHO classification of injuries based on external causes of morbidity and mortality of the International Classification of Diseases, version 10 (ICD-10) (11).

The questionnaire included socio-demographic characteristics of parents (age, nationality, education, mother's occupation, number of residents at home, and family monthly income), demographic characteristics of child, medical history, and history of unintentional injury and its characteristics.

Pre-testing of the questionnaire was done on 10% of the study population. The data were analyzed using SPSS version 18. Frequency tables, proportions, mean and standard deviation, chi-square tests were used to assess difference between

two/more categorical variables. An alpha (P) value of < 0.05 was the cut-off level of significance.

Results

A total of 547 eligible children were enrolled in our study (96.9% response rate). Thirty six percent of the children were 2 years old or less with mean age 32.5 months (±11.9 SD) and about 67% were Qatari. More than half were males and 55.4% were ranked second to fourth, 3.3% were disabled and 11.2% had a chronic medical condition. (Table 1).

In cases of working mothers, house maids were the main care givers in 60.7%, followed by grandmothers (21.9%). (Figure 1)

Sixty nine percent of mothers reported exposure of their children (1-4 years) to unintentional injuries in the year preceding the study and 69.1% of them reported frequent exposure of the same child to unintentional injuries while unintentional injuries among siblings were 59.6%. Concerning the place of injuries, 62.3% of injuries occurred

inside the home, while (18.2%) occurred outside home and 19.5% occurred both outside and inside home. Living room was the most reported place of unintentional injuries inside home (66.7%), followed by the bed room and bath room (24.6% and 20.1%). (Figure 2)

As regards outside home injuries, more than half occurred in the home garden (57%) followed by street and shopping malls (32.4 and 30.3%). Injuries inside car while child is a passenger were reported by (19%) of respondents. (Figure 3 - page 40)

The most frequent cause was falls (71.8%). Exposure to inanimate mechanical forces was reported in (22.4%), followed by contact with heat and hot substances (20.1%). (Table 2) The most frequent type of injury was bruising (51.2%), followed by cuts (41.2%) while burns was the third most frequent type (19%) and poisoning was the least frequent (2.9%). (Figure 4)

The child had a companion at the time of injury in (82.6%) and parents, one parent or both, were the companion in more than half of them (55.6 %). Almost all injuries were followed by complete recovery (97.9%), either after home management or treatment at primary health care centers or hospital admission. Only (0.3%) of injuries were followed by disabilities and (1.8%) ending with death. (Table 3)

On assessing the relation between the demographic characteristics of the mothers and the occurrence of unintentional injuries, Qatari, less educated and older mothers as well as the divorced and widows reported the highest percentage of injuries among their children, although these relations were not statistically significant except for mother's nationality which was the only statistically significant characteristic. (Table 4)

Moreover, Qatari and less educated fathers showed the most frequent injuries among their children than fathers who were non Qatari and university educated and above. (Table 5)

Characteristics	Frequency (%)
Age (months)	
12-24	197 (36.0%)
25-36	157 (28.7%)
37-48	193 (35.3%)
Sex	
Male	282 (51.6%)
Female	265 (48.4%)
Birth Order	
1st	117 (21.4%)
2nd - 4th	303 (55.4%)
≥ 5th	127 (23.2%)
Nationality	
Qatari	367 (67.1%)
Non-Qatari	180 (32.9%)
History of Disability	
YES	18 (3.3%)
NO	529 (96.7%)
History of chronic medical conditions	
YES	61 (11.2%)
NO	486 (88.8%)

Table 1: Characteristics of children under study (1- 4 years old), PHCCs, Doha, 2010, N=547
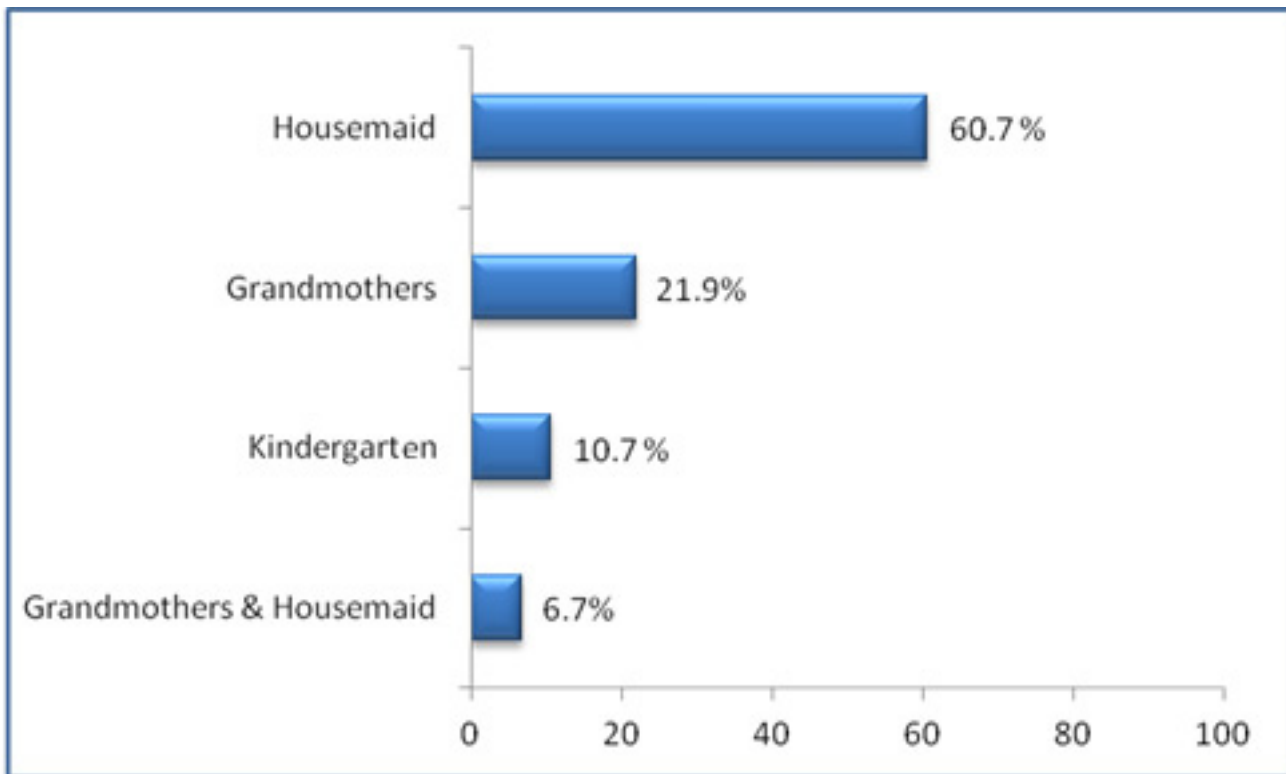
Figure 1: Frequency of Child's care givers in case of working mothers outside home, PHCCs, Doha, 2010, n=270
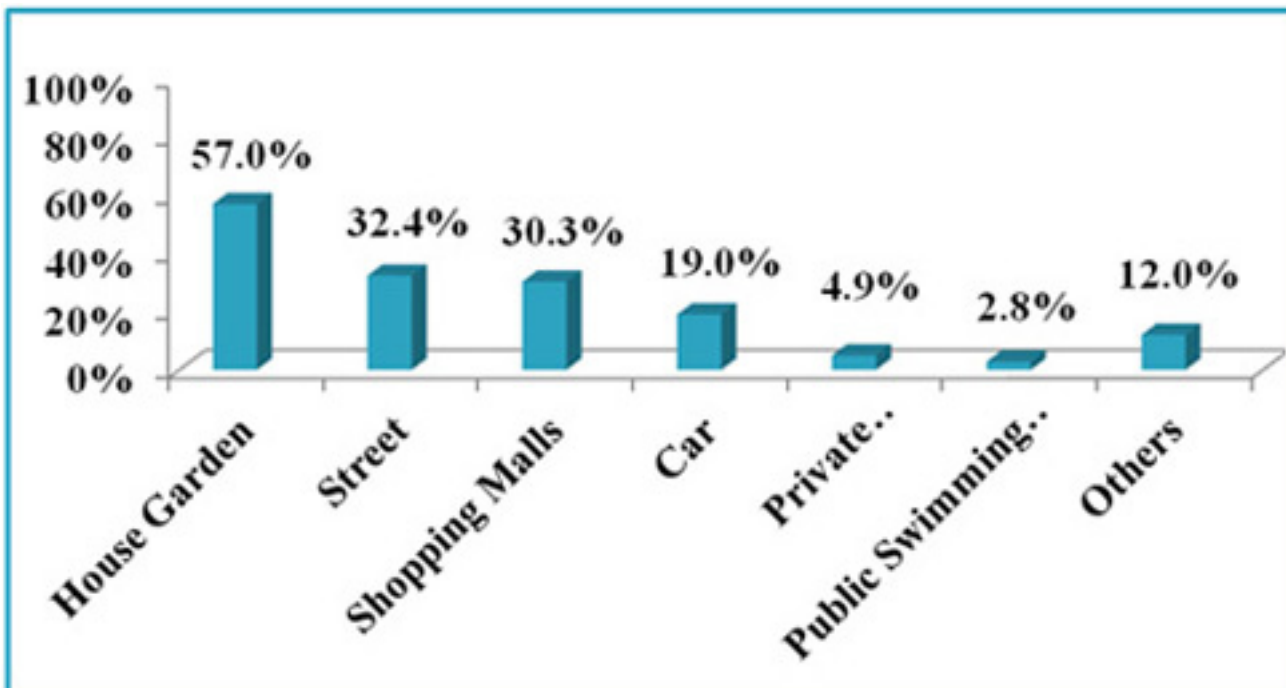
Figure 2: Place of unintentional injuries inside home among injured children (1-4 years), PHCCs, Doha, 2010, n=310

Age of child, birth order, nationality and history of disability showed statistically significant relation to the injury occurrence where child aged 3 years and older was exposed more to injuries if compared to a younger child and also being the fifth child or more. In addition, around (74%) of Qatari children were exposed to injuries in comparison to (59.4%) of non Qatari. All children with history of disabilities (100%) had been exposed to unintentional injuries. (Table 6)

Homes were located on a main street in 76% of injured children and 61 % of respondent mothers considered unintentional injuries as unpreventable.
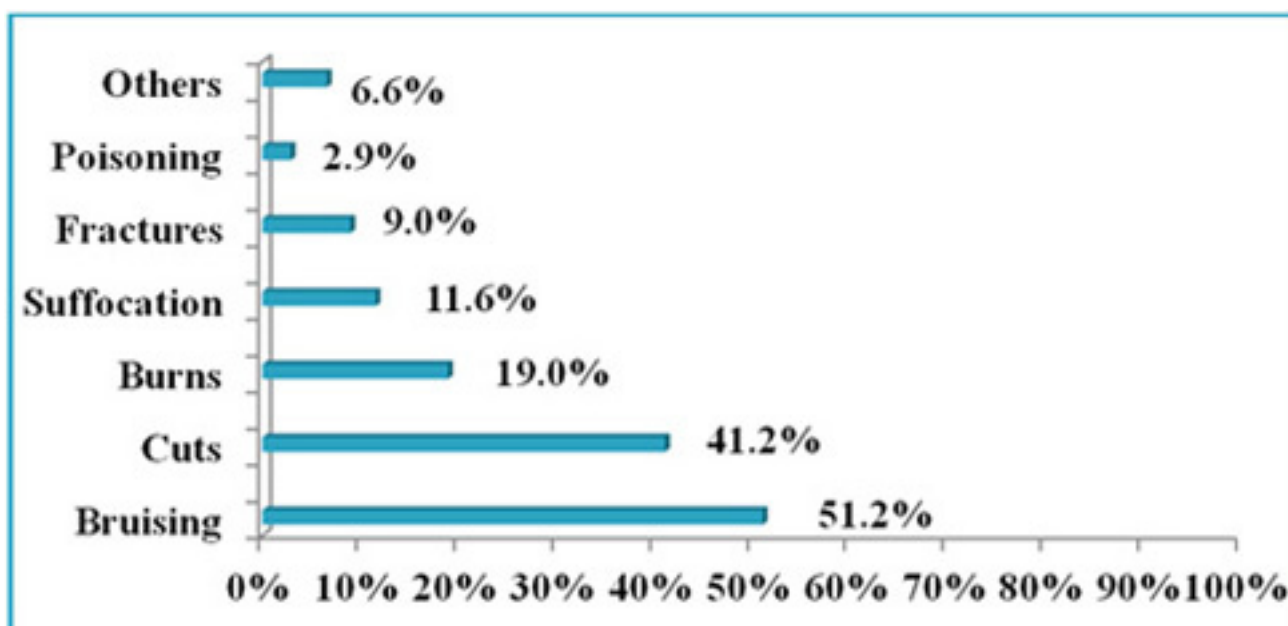
Figure 3: Place of unintentional injuries outside home among injured children (1-4 years), PHCCs, Doha, 2010, n=143

Causes	Frequency %
Falls	272 (71.8%)
Exposure to inanimate mechanical forces (Collision with steady object like wall)	85 (22.4%)
Contact with heat & hot substances	76 (20.1%)
Accidental exposure to other & unspecified factors (cuts by a sharp object)	44 (11.6%)
Accidental swallowing of small objects	35 (9.2%)
Over-exertion (Tired)	31 (8.2%)
Exposure to smoke, fire & flames	16 (4.2%)
Exposure to electric current	14 (3.7%)
Accidental poisoning & exposure to noxious substances	10 (2.6%)
Accidental drowning	17 (4.5%)
Exposure to animate mechanical forces (Road Accidents)	19 (5.0%)
Contact with venomous animals and plants	15 (4.0%)
Exposure to forces of nature (Cold or Hot temperatures)	28 (7.4%)
Others	12 (3.2%)

Table 2: Frequency of the causes of unintentional injuries among injured children (1-4 years), PHCCs, Doha, 2010,n=379
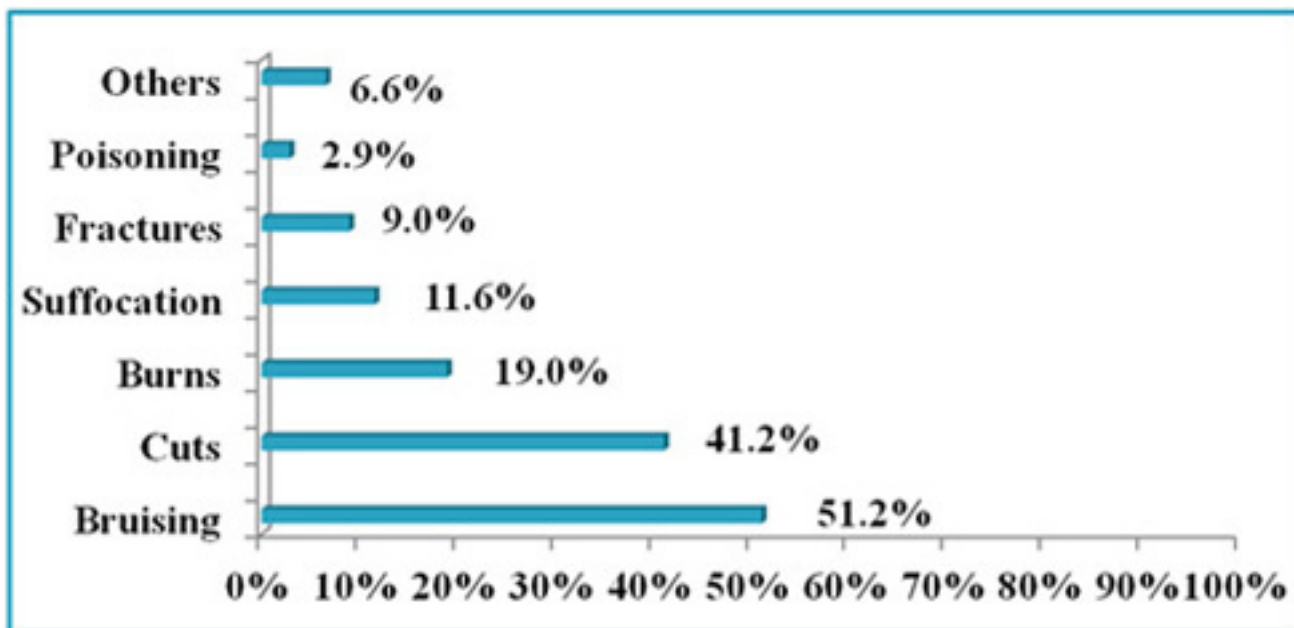
Figure 4: Frequency distribution of unintentional injuries among children (1-4 years) according to type, PHCCs, Doha, 2010, n=379

Characteristic	Frequency (%)
Child had a companion at the time of injury	
YES	313 (82.6%)
NO	66 (17.4%)
Who was the companion at the time of injury?	
Parents	174 (55.6%)
Siblings	49 (15.7%)
House maid	67 (21.4%)
Others	23 (7.3%)
Injury outcome	
Complete Recovery	371 (97.9%)
Death	7 (1.8%)
Disability	1 (0.3%)

Table 3: Presence of a companion at the time of injury & injury outcome among injured children, PHCCs, Doha, 2010, n=379

Discussion

The occurrence of unintentional injuries was 69.3% which is much higher than what was obtained by Bashour et.al. 2008 (23.2%)(10). Since inside home especially the living room is considered as a safe environment for preschool children to play where the regular family activities take place, the majority of unintentional injuries (62.3%) occurred inside home and more often in the living room, bedroom and bathroom (66.7%, 24.6% and

20.1%). This is in agreement with Bashour et.al. 2008, Thein et al 2005, and Lasi et al 2010(10,12,13).

Our study revealed that the most common type of unintentional injuries were bruising and cuts (51.2% and 41.2%) whereas falls were the most common cause (71.8%). This is consistent with Yamma et al 2007 and Bashour et al 2008(14,10) while Hyder et al (2009) reported that falls reoccurred (56%), followed by road traffic injuries (22%) and burns (13%)(15).

A house hold survey conducted in Riyadh, Saudi Arabia (2010) demonstrated falls as the most common type of unintentional injuries (40.4%)(16). Burns was the third cause of unintentional injuries similar to the Wilson report (2008)(17), while Othman et al 2010 revealed burns as the most common cause of unintentional home related injuries(18). This difference might be attributed to variation of the living circumstances and the general conditions of the home safety where the cooking area is located in the

Characteristics	Occurrence of unintentional injuries			
	Yes	No	Total	P-Value
	No. (%)	No. (%)		
Age (Years)				
≤ 30	156 (64.5)	86 (35.5)	242	**0.071**
31-40	179 (72.2)	69 (27.8)	248	
> 40	44 (77.2)	13 (22.8)	57	
Nationality				
Qatari	258 (74.4)	89 (25.6)	347	0.001
Non-Qatari	121 (60.5)	79 (39.5)	200	
Educational level				
High school or less	209 (71.3)	48 (28.7)	293	
University education and above	170 (66.9)	84 (33.1)	254	0.266
Marital status				
Married	349 (69.0)	157 (31.0)	506	0.438
Divorced or Widow	30 (73.1)	11 (26.9)	41	
Working status				
House wife	173 (67.3)	48 (32.7)	257	0.428
Working Inside Home	16 (80.0)	4 (20.0)	20	
Working Outside Home	190 (70.4)	80 (29.6)	270	

Table 4: Relation between maternal demographic characteristics and the occurrence of unintentional injuries among children (1-4 years), PHCCs, Doha, 2010, N=547

Characteristics	Occurrence of unintentional injuries			
	Yes	No	Total	P-Value
	No. (%)	No. (%)		
Age (Years)				
≤ 30	77 (65.8)	40 (34.2)	117	**0.510**
31-40	180 (69.0)	81 (31.0)	261	
> 40	122 (72.2)	47 (27.8)	169	
Nationality				
Qatari	272 (74.1)	95 (25.9)	367	**0.001**
Non-Qatari	107 (59.4)	73 (40.6)	180	
Educational level				
High school or less	231 (75.0)	77 (25.0)	308	**0.001**
University Education & above	148 (61.9)	91 (38.1)	239	
Drugs & Alcohol Use				
YES	16 (88.9)	2 (11.1)	18	**0.067**
NO	363 (68.6)	166 (31.4)	529	

Table 5: Relation between demographic characteristics of fathers and the occurrence of unintentional injuries among children (1-4 years), PHCCs, Doha, 2010, N=547

| Characteristics | Occurrence of unintentional injuries | | | |
	Yes No (%)	No No (%)	Total	P-Value
Age (months)				
12-24	116 (58.9)	81 (41.1)	197	**0.001**
25-36	111 (70.7)	46 (29.3)	157	
37-48	152 (78.8)	41 (21.2)	193	
Sex				
Male	195 (69.1)	87 (30.9)	282	**0.942**
Female	148 (69.4)	81 (30.6)	265	
Birth Order				
1st	83 (70.9)	34 (29.1)	117	**0.007**
2nd-4th	195 (64.4)	108 (35.6)	303	
≥5th	101 (79.5)	26 (20.5)	127	
Nationality				
Qatari	272 (74.1)	95 (25.9)	367	**0.001**
Non-Qatari	107 (59.4)	73 (40.6)	180	
History of Disability				
YES	18 (100)	0 (0.0)	529	**0.004**
NO	361 (68.2)	168 (31.8)	18	

Table 6: Relation between demographic characteristics of children (1-4 years) and the occurrence of unintentional injuries, Doha, 2010, PHCCs, N=547

same area of family regular activity in poorer regions and with limited safety measures. An epidemiological review highlighted the importance of low maternal education and lack of supervision as risk factors of burns within low and middle income countries (LMIC) and the need to address them to enhance preventive efforts in these settings(19). This is similar to our study where low education level of parents showed higher frequency of injuries among their children. This may be related to lack or limited awareness about nature, causes and prevention of unintentional injuries. In the current study, more than 82% of children had a companion at the time of injury which is higher than what was revealed by Bashour et al (59.1%)(10).

Children of Qatari and older age parents had a higher frequency of injuries compared to those of non Qatari and younger age parents. There was no difference in unintentional injury occurrence between boys and girls since interest and development stage at this age group is not varied much and children in this age group tend to be in groups of both sexes (likewise Yamma et al (14) and, Bashour et al((10). However, boys tend to have more severe injuries than girls (Peden et al 2008(3)).

Child ranking fifth or more was associated with high frequency of unintentional injury where the younger child, with less developed motor skills and judgment, may attempt to keep up with the older sibling, leading to more frequency

of injury. Explanation suggests that the principal mechanism by which an older sibling increases the risk of injury is through lack of adequate supervision. More than half of mothers thought that these injuries can't be prevented, conversely to Bashour et al(10).

In conclusion, the prevalence of unintentional injuries among preschool children in Doha is higher compared to regional and global levels. Bruising and cuts were most common types while falls were the most frequent cause. Homes were the most common place of unintentional injuries and usually with presence of a companion.

Living in a home located on a main street was related to occurrence of unintentional injuries. The findings

of this study are subject to certain limitations. All results are based on self-reported information and recall. Therefore, findings might be over or under-estimated. However, we are convinced of the validity of the self-report answers, since it is unlikely that participants spent time giving unreliable and biased responses especially if it related to their children`s health. In addition, our survey could be a useful tool for Qatari decision makers to promote programs and campaigns aimed at informing and educating families. Finally, this study recommends a community-based awareness campaign about home safety education especially parents and developing a national policy and guidelines regarding home safety measures.

Acknowledgements

References

1. U.S. Department of Health and Human Services. Healthy People 2010. 2nd ed. 2 vols.

2. Prakash G, Dhimal M, Ghimire U. Epidemiological Study on Injury and Violence in Nepal. Ramshah Path Kathmandu; 2009.

3. Peden M, Oyegbite K, Smith J, Hyder A, Branche CH, Rahman F, et al. World Report in Child Injury Prevention: World Health Organization and UNICEF; 2008

4. Annie E. Kids Count Indicator Brief: Reducing the Child Death Rate. Baltimore; 2009 July.

5. Abboud Dal Santo J, Goodman R, Glik D, Jackson K. Childhood Unintentional Injuries: Factors Predicting Injury Risk Among Preschoolers. Journal of Pediatric Psychology 2004;29(4):273-83

6. Shields N, Sethi D, Racioppi F, Yordi Aguirre I, Baumgarten I. National responses to preventing violence and unintentional injuries. Denmark; 2006.

7. Schopper D, Dominique Lormand J, Waxweiler R. Developing policies to prevent injuries and violence: guidelines for policy-makers and planners. Geneva, Switzerland: World Health Organization 2006

8. Bener A, Hussain S.J., Al Malki, Shotar, Al Said, Jadaan K.S. Road traffic fatalities in Qatar, Jordan and the UAE: estimates using regression analysis and the relationship with economic growth. Eastern Mediterranean Health Journal. 2010;16(3).

9. David M M, Carboneau D.M, Hardan M, Mohamed F.A. Seatbelt Use in Qatar in Association with Severe Injuries and Death in the Prehospital Setting. Prehospital and Disaster Medicine. 2008;23(6).

10. Bashour H, Kharouf M. Community-based study of unintentional injuries among preschool children in Damascus. Eastern Mediterranean Health Journal. 2008; 14(2).

11. ICD Global Burden of Disease Injury Expert Group: Global Burden of Disease Injury Expert Group; 2009. Available from: http://sites. google.com/site/gbdinjuryexpertgroup [accessed 4 June 2010].

12. Thein M, Lee W, Bun Y. Childhood injuries in Singapore: a community nationwide study. Singapore Med J 2005; 46(3).

13. Lasi S, Rafique G, Peermohamed H. Childhood Injuries in Pakistan: Results from Two Communities. J HEALTH POPUL NUTR 2010; 28(4):392-8

14. Yamma W. Factors Associated to Home Injuries in Preschool Children: Mahidol University; 2007.

15. Hyder AA, David E, Andres S et al: Global childhood unintentional injury surveillance in four cities in developing countries: a pilot study. Bull World Health Organ 2009;87:345-352.

16. Gad A, AL-Eid R, Al Ansary S, Saeed A, Kabbash A. Pattern of Injuries among Children and Adolescents in Riyadh, Saudi Arabia: a household survey. JOURNAL OF TROPICAL PEDIATRICS. 2010.

17. Wilson J. Illawarra and Shoalhaven: Australian Government Department of Health and Ageing; 2008.

18. Othman N, Kendrick D. Epidemiology of burn injuries in the East Mediterranean Region: a systematic review. BMC Public Health 2010; 10(83).

19. Forjuoh SN. Burns in low- and middle-income countries: a review of available literature on descriptive epidemiology, risk factors, treatment, and prevention. Burns 2006;32:529-37.

Evaluation of a medical education program: medical errors in surgery as an example

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Abstract

As Continuing Medical Education (CME) constitutes a principle block in the structure of any health related institution, different medical education programs are being held every month. These programs use different forms of teaching. Interactive techniques (audit/feedback, academic detailing/outreach, and reminders) are the most effective at simultaneously changing physician care and patient outcomes. The main objective of them is to bridge the clinical care gap between current practice (What is?) and ideal evidence-based practice (What should be?). Teaching program evaluation in medical education presents a different set of challenges. The utility of some of these programs is gauged by some soft measures of outcome such as participant's perception of the program. This measurement will only give part of the picture about the effectiveness of the teaching program. Under standing what CME tools and techniques are most effective in disseminating and retaining medical knowledge is critical to improving CME and thus diminishing the gap between evidence and practice.

This paper would help in assessing the effectiveness of Continuing Professional Development (CPD) courses/events with medical errors in surgery, as an example.

Key words: medical education, continuing professional development, surgery

Introduction

A broad range of continuing medical education (CME) activities are offered with the aim of educating practicing physicians through the provision of up-to-date clinical information. It has been suggested that the ineffective nature of CME either accounts for the discrepancy between evidence and practice or at a minimum contributes to this gap. Understanding what CME tools and techniques are most effective in disseminating and retaining medical knowledge is critical to improving CME and thus diminishing the gap between evidence and practice. One of the common modalities of CME are didactic presentations and distributing printed information which only have little or no beneficial effect in changing physician practice. (1,2). To understand how we might go about evaluating our program, we first need to understand the different levels of educational program evaluation which are composed of five levels, namely; participation in the program, perceptions of the program, competence with skills, individual performance, and health outcomes.

Patient safety and medical errors are one of the hot topics in the medical field and (3.4) the public media as well. (5)

Although from the first day of medical school, we are taught: Primum non nocere: The Latin words for the medical slogan "First do no harm," a fundamental medical precept of Hippocrates (ca. 460-ca.377 B.C.). A well-publicized 2009 report estimated that retention of sponges or surgical instruments occurred in between 1/8,801 and 1/18,760 inpatient operations at non-specialty acute care hospitals. This figure is probably an underestimate. Retained surgical foreign bodies continue to be a significant problem with an incidence of 1 per 1000 abdominal operations.(6)

In 1998 a database was instituted by the joint commission for Accreditation of Healthcare Organization (JCAHO)

which contained 150 cases of wrong-site, wrong-person, or wrong-procedure surgery as of December 2001 (7).

The Colorado/Utah study, using a random sample of 15,000 non-psychiatric discharges during 1992, found that the annual incidence of adverse surgical events was 3.0% and that 54% of these events were preventable. Nearly half of all adverse surgical events were accounted for by technique-related complications, wound infections, and postoperative bleeding. (8) Eleven common operations were associated with significantly higher risk of an adverse event. (9) (See Table 1)

In 2004, the HQCA conducted a telephone survey (response rate: 55%) of 1,500 adult Albertans to assess their perceptions of, and personal experiences with, preventable medical errors (PMEs). A total of 559 (37.3%) responses reported that they or a family member had ever experienced a PME. (10). In the United Kingdom, adverse events with resultant harm were estimated to occur in some 10% of hospital admissions, equating to more than 850,000 events annually. In the United States, extrapolations are based on medical errors each year. (10)

Zhan and Miller examined the incidence of 18 hospital based diagnoses suggestive of errors and found that injuries may add 2.4 million extra days in hospitals and more than 32,000 deaths per year in the Unites States. (11)

In assessing the physicians' error disclosure attitudes and experiences in North America (USA and Canada), medical error disclosure was a problem as 74% of the physicians thought disclosing a serious error would be very difficult. But fortunately being a surgeon was independently associated with higher support for disclosing serious errors (odds ratio, 1.26). (12) A major cause of underreporting medical errors is the use of a punitive reporting system. In such systems, caregivers are often reluctant to discuss errors out of concern that the major reports might be used against them. Errors in medicine are a major cause of harm to patients. Though there is little controversy among clinicians about the importance of accurate and reliable clinical data and the imperative of correct diagnosis, that committed to exactitude dissolves when errors happen. Then, clinicians and managers may behave in a way that limits investigation. We often use the subjectivity and complexity of medicine to rationalize and justify error. (13)

Continuing Medical Education (CME) focuses on the link between knowledge and quality of patient care would be one of the early common interventions to be applied at the level of the hospital and later at the regional levels. Although there is a clear relationship between CME and performance on board recertification examinations (14), the actual relationship between CME and better patient care is far more complex.

Systematic reviews of differences in the impact of various CME strategies on actual practice change have raised serious concerns about the value of some current CME. The most effective change strategies (e.g. reminders, patient-mediated interventions, outreach visits, input from opinion leaders, and multifaceted activities) appear to be those that place substantial emphasis on performance change rather than just on learning. (15-18)

Type of Medical Errors

Surgical Errors: Surgical errors, or surgical adverse events, may account for a high percentage of adverse events.

Diagnostic Inaccuracies: an accurate diagnosis is the first requirement for correct and effective treatment. Inaccurate diagnosis may

Table 1: Procedures Associated with a Significantly Higher Incidence of Adverse Surgical Events

Procedure	Incidence of Adverse Events (%)	Confidence Interval (%)
AAA repair	18.9	8,3-37.5
Lower extremity arterial bypass	14.1	6.0-29.7
CABG/valve replacement	12.3	7.9-18.7
Colon Resection	6.8	2.9-14.8
Cholecystectomy	5.9	3.7-9.3
Prostatectomy	5.9	2.3-14.3
TURP/TURBT	5.5	2.7-10.7
Knee/hip replacements	4.9	2.9-8.4
Spinal surgery	4.5	2.8-7.3
Hysterectomy	4.4	2.9-6.8
Appendectomy	3.0	1.4-6.6

AAA = abdominal aortic aneurysm, CABG = coronary artery bypass grafting, TURP = transurethral prostatectomy. TURBT = transurethral resection of bladder tumor.

delay treat or result in incorrect, ineffective treatment or unnecessary tests, which can prove costly and invasive.

Medication Errors: Medication-related error is one of the most common types of error, and of primary concern to nurses who administer medications, as well as to the practitioner who prescribes medications, and the pharmacist who dispenses medications. Medication errors are called preventable adverse drug events (ADEs).

System Failures: Analysis of medical errors continues to show that human fallibility is only part of the picture; system failures are also guilty. A major study in 1995 (19) showed that failures at the system level - in disseminating pharmaceutical information, in checking drug dosages and patient identities, and in making patient information available - were the real culprits in more than 75 percent of adverse drug events.

Populations of Special Vulnerability
• Infants and Children
• Older Patients.
• Persons with Limited English Language Skills and / or Limited Literacy.

Reporting Errors
Improving patient safety begins with prompt reporting of errors followed by analysis of the root causes and contributing factors and developing a plan of action to prevent similar errors in the future. Only in this way can a health care organization assess the safety of care delivered and whether safety is improving.

Real story
Salah Al-Deen died due to a medical error at a private hospital in Jeddah on Thursday 15th November 2012. The eight-years old boy was "*taken to the hospital for a checkup, after he developed symptoms of swollen lymphatic glands, following a two-week-long about of fever*". Salah Al-Deen's mother said.. Doctors operated upon the boy. In the course of anesthesia, the

boy was administered nitrogen instead of oxygen. By the time the surgeons discovered the mistake, the circulatory system had been completely damaged.

The surgical team is under investigation.
(Arab News, Sunday, 18 November 2012: http:www.arabnews.com/)

Saleh Al-Deen's tragedy was one of many hidden in the medical practice which represents what medical error can end up with.

As a response, many public newspapers asked for some sort of intervention to ensure this tragedy does not happen again.

Many medical activities started to be prepared to tackle this issue in the Saudi Arabia, so different workshops and conferences were expected to take place in the kingdom of Saudi Arabia with different goals and objectives.

Physicians' disclosure of medical error and how to report it, is an example of short-term objectives. Decrease the medical error related morbidity and mortality is an example of the long-term objective to the medical activities.

The success of the CME activity will depend on a reliable evaluation process taking into consideration the objectives of the CME program, which would be around the following objectives:

• Recognize that medical error is a major health care problem.
• Define strategies for prevention of medical errors.
• Understand the factors that lead to potential for medical errors.

This CME activity with these objectives would be the first step in the road to change in practice according to Pathman stages which will help to achieve awareness and agreement of the need to change behavior to overcome medical errors. For Pathman-PRECEED model for knowledge translation see the appendix.

Evaluation of Medical Education Program on Surgical Errors

Unfortunately, apart from the participant's evaluation form, the evaluation process of such a program is incomplete in real practice.

Evaluation planning should begin at the same time as the program design. This early planning for program evaluation will offer a number of important data which will be helpful in writing the evaluation report. These data can be obtained by answering questions in Table 2.

Table 2: Early Program and Evaluation Planning important Data:
• What needs are we trying to address?
• How are these needs best identified?
• Who is our targeted audience? What are the characteristics of the targeted audience?
• What factors will influence levels of participation and program success?

Knowing the finer details of context is also crucial for program and evaluation, for example lack of time, or transportation barriers may deter the targeted audience from attendance.

There are a number of questions we need to ask ourselves before we conduct a program evaluation.

What is the purpose of our evaluation?
There are potentially numerous reasons for undertaking evaluation. Muraskin (1997) lists some of the common reasons for conducting evaluations and common areas of evaluation activity (Table 3 - top of next page).

Who will use the evaluation?
These are likely to be :

• The stakeholders in all our educational efforts
• The program planning staff

Table 3: Common reasons for understanding evaluation and common areas of evaluation activity (after Muraskin 1998).

• **To determine the effectiveness of programs for participants**
• **To document that program objectives have been met**
• **To provide information about service delivery that will be useful to program staff and other audiences**
• **To enable program staff to make changes that improve program effectiveness**

Areas of Evaluation activity
• **Evaluation for project management**
• **Evaluation for staying on track**
• **Evaluation for program efficiency**
• **Evaluation for program accountability**
• **Evaluation for program development and dissemination**

• Our audience - they need to get feedback on the evaluations they participate in (which can be an enforcing method for change practice).
• Other stakeholders? e.g. Ministry of Health.

Levels of Evaluation

To understand how we might go about evaluating our program, we first need to understand the different levels of educational program evaluation.

1- Participation in the program
2- Perceptions of the program
3- Competence with Skills/ Knowledge/Abilities or attitudes acquired
4- Individual Performance
5- Health outcomes

The potential cost of the evaluation often plays a major role in determining the scope of the evaluation and identity of the evaluator(s) (2), as the cost will have to be met from the program budget, or by seeking additional funding.

What are our specific objectives?

• To increase their knowledge about the magnitude and some types of medical errors related to surgery (especially, retained foreign bodies, wrong site surgery)
• To practice patient safety measures.
• To change their attitudes towards a disclosure of medical error
• To teach them how to use available resources to disclose possible error and prevent its occurrence when they back at their hospitals
• To decrease error incidence rate
• To improve the post-operation outcome.

What resources do we have for this evaluation project?

Our final (but perhaps our first) question should be: What resources do we have to conduct this evaluation project? The kinds of resources include:
• Time
• Money
• People to do the work, expertise in evaluation
• Are there existing data that can help us, that is already collected?

Knowing Needs assessment and participants' objectives from attending this educational program is an essential step in planning the change of behavior and the evaluation of the program. Our tools that support reaching the goal of the program during the planning of the program include a commitment to change statement.

Data Analysis

We will need skills in data management, summarization, and analysis if we want to make sense of the evaluation information we gather. The statistical tests we should be most familiar with are :
• Student's t-test to compare means
• A non-parametric test like the sign test to compare paired data for increases, decreases or no change.
• Chi-square contingency table analysis
• Multivariate analysis

Evaluation of the program

The appropriate evaluation would consider all levels of objectives that end up with improve health care of the community in general.

To classify and analyze outcomes, we will use modified Kirkpatrick's model of education outcomes (3), which offers a useful evaluation framework for this purpose. The model describes six levels of outcomes:

1- Participation (the number and characteristics of surgeons who registered and attended);
2- Learners' reaction and satisfaction (to the educational experience);
3- Learning and competency (changes in attitudes, knowledge and skills);
4- Performance (changes in practice and the application of learning to practice);
5- Patient health (change in health status of patients due to changes in practice behavior), and
6- Population health (change at the level of health status of population of patients managed in the surgical staff at the organization).

Level One: Participation

Assesses the attendance and determines if our target group was met. This level can be assessed by attendance sheets or registration records, which are essential to determine if the program was meeting attendance goals. This level is commonly practiced in medical evaluation.

The trend in the medical care is the team care instead of solo care, so medical education activities need to consider this.

Part of the evaluation would be the percentage of target audience who participated, and compare it with

a previous program or similar program with the same objectives, and target audience.

Analysis of data would help to anticipate solutions for future education programs
e.g. transportation, time, rewards, appropriate fees … etc)

Level Two : Reaction
Assesses the participants' initial reaction to the training programs, which included participant satisfaction, perception of program usefulness and acceptability and value of the activity. At this level, satisfaction was usually measured on a Likert scale, of 4-5 points, where participants are asked to point their reactions to certain statements, on a comparable categorical scale, from poor to excellent. It can be done using qualitative methods such as a focus group where the group leader elicits and probes for more specific comments about the course.

Advantages of this level are
(a) relative ease in designing and implementing the measurement instrument,
(b) ready availability of participants at the end of program,
(c) utilization of the least amount of resources and money, and
(d) ease analysis. In addition, this level explicitly assesses their motivation and attitude.

For these advantages, it is the most commonly used level of evaluation in CPD programs.

The major disadvantage is that it only measures the participants' opinion and is not reflective of overall effectiveness of the program.

In this level, both the contents and process should be assessed. Content area evaluation explores their reaction to materials, content coverage, and relative importance among different contents. Process area evaluation explores instructional methods such as effective use of audio-visual materials, instructional skills and enthusiasm of tutors, and facilities within the classroom.

This can be for the program in general and every session.

Example of statements in Likert scale for this level evaluation:

Process focused:
I was given sufficient information on the aims and methods of the program before my arrival.
Strongly agree Agree Neutral Disagree Strongly disagree

Contents Focused:
The materials on safe prescription habits were of good quality.
Strongly agree Agree Neutral Disagree Strongly disagree

At this level other aspects that encourage change in behavior of participant will be assessed like was his learning needs asked for before by the organizing committee of the program.

Level Three: Learning
Assesses learning and competency. Although it is the cognitive (knowledge) domain that is most frequently assessed in this level of evaluation, psychomotor (skill) and affective (attitude) domains can be assessed during this level.

Assessing how well the participants reconstitute and prepare the patient appropriately for surgery often entails significant psychomotor learning.

Similarly assessing how the participants changed their thinking regarding disclosure of medical error is an example of this level affective domain evaluation.

This level assessment criteria will be driven from the objectives of the program. This is an example why evaluation planning should be part of program planning process, not after the program has finished.

A common example of this level assessment is to devise a pretest, post-test, and demonstrate any change in learning before and after the program.

This can be done immediately or within a short period (3-6 months)

after completion of the program. The usual formats are multiple-choice questions, case studies (written or videotaped), and/or objective structured clinical examination OSCE with use of manikins.

At this level, was the participant asked to commit to change his behavior according to the recommendations of the program?

Level Four: Transfer
Assesses transfer of knowledge, skills and behavior that has been offered in the training program to actual real life (performance). This assessment will depend on the objectives of the training program as well. For example, we will be interested in finding what proportion of the participants is consistently compliant with the recommendations. Thus, this level in effect assesses the strength of the program.
The tools for assessment include observations, chart reviews, incident reports of medical errors, interview with nurses on the patient safety measures pre and post surgical interventions, as well as survey of patients who had undergone surgical interventions in that hospital, about the measures that he/she was aware of pre and post interventions (explanation of the medications, surgical interventions, possible complications, etc).

Timing of the assessment can be done six weeks to six months after the end of the program.

A periodic follow up assessment would help to asses if the program still has its effect.

Although self-reported, surveying of clinicians about improvements in their abilities and use of specific recommendations related to the prevention of medical errors, might be utilized as supportive data.

Level Five: Results
Assesses the ultimate result of the program; example is increase in the number of errors self reported by certain proportion, impact of the program in reducing the cost of hospitalization by a certain proportion

(say 30%), decreased in proportion of post-operative complications (e.g. bleeding, wound infection, or deep vein thrombosis).

Commonly used tools are auditing, chart reviews, and surveys.

This level is the most accepted document of the program's real worthiness. Change in organizational systems in the hospital might be related to decrease in medical errors, but that would depend on the objective of the training program. I would believe the change in hospital system is necessary with the use of technology (e.g. electronic filing system.) will be needed to be done at the same time with involvement of other people with different objectives.

Part of this level is to assess change in medical error-related morbidity and mortality in the surgical department and the hospital. The usual tools are surveys, chart reviews.

Cost of the training program:
No program would be properly evaluated if the cost of it was not part of the process. The stakeholders are interested to know to what degree did this program safe money, improved quality of patients and community. An example is do the program's cost outweigh its benefits? If yes, the program needs to bee changed or cancelled.

Strategies for Data Collection:
At this stage in designing our evaluation, I think about the program activities, possible sources of information (e.g. clinicians, patients, and administrative staff) about how well these activities are working, and different ways to collect information from each of these sources, and at different levels.

There are four basic ways to collect evaluation data. Chart review, observations, interviews, and surveys. Using a combination of these methods will help us to check our findings. Data analyses should contain quantitative and qualitative information.

Defining the evaluator's role:
The evaluator(s), having been appointed, must reflect on his/her

role in the evaluation. It is at this point that the evaluator decides where, and to whom, his/her responsibility lies, and on the values he/she requires to make explicit.

The ethics of evaluation:
To assist evaluators a number of organizations including the Joint Committee on Standards for Educational Evaluation (1994); the American Evaluation Association; the Canadian Evaluation Society and the Australian Evaluation Society (AMIE 1995) have issued guidance for evaluators undertaking evaluation.

References

1- Davis D, Galbraith R. Continuing medical education effect on practice performance: effectiveness of continuing medical education: American College of Chest Physicians Evidence-Based Educational Guidelines. Chest. 2009 Mar;135(3 Suppl):42S-48S

2- Kühne-Eversmann L, Fischer MR. Improving knowledge and changing behavior towards guideline based decisions in diabetes care: a controlled intervention study of a team-based learning approach for continuous professional development of physicians. BMC Res Notes. 2013 Jan 15;6:14.

3- KSAU-HS. Paienty Safety Forum 2013. 9-11 April 2013.KSAU-HS Riyadh. Saudi Arabia . accessed at 12 June 2013 http://www.ngha.med.sa

4- Al-Ahmadi Talal A. Measuring Patient Safety Culture in Riyadh's Hospitals: A comparison between Public and Private Hospitals. J Egypt Public Health Assoc. 2009, 84 (5) : 479-500

5- Arab News. Medical error blamed for death of 8- years- old boy. Arab News. Sunday, 18 November 2012 accessed at 12 June 2013 http://www.arabnews.com

6- Stawicki SP, Evans DC, Cipolla J, Seamon MJ, Lukaszczyk JJ, Prosciak MP, et all . Retained Surgical foreign bodies: a comprehensive review of risks and preventive strategies. Scand J S 2009, (98): 8-17

7- Hughes RG, editor. Patient Safety and Quality: An Evidence - Based Handbook for Nurses. Rockville (MD): Agency for Health Care Research and Quality (US), 2008 April.

8- Khoja T, Neyaz Y, Qur eshi NA, Magzoub MA, Haycox A, and Walley T. Medication errors in Primary care in Riyadh City, Saudi Arabia. EMHJ 2011, 17 (2): 156-159.

9- American College of Obstetricians and Gynecologists. Patient Safety in the surgical environment. committee Opinion, Am College Obst Gyn. 2010 , (464): 1-5 Reaffirmed 2012.

10- Vanderheyden LC, Northcott HC, Adir CE, McBrien-Morrison C, Meadows LM, Norton P, Cowell J. Reports of preventative Medical errors from the Alberta Patient Safety Survey 2004. Health Q. 2005,8 Spec No: 107-14

11- Zhan C, Miller MR. Excess length of stay, charges and mortality attributable to medical injuries during hospitalization. JAMA 2003, 290, 1868-74

12- Gallagher TH, Waterman AD, Garbutt JM, Papp JM, Chan DK Dunagan CW., et al. US and Canadian Physicians' Attitudes and Experiences Regarding Disclosing Errors to Patients. Arch inter Med. 2006, 166:1605-1611

13- Pietro DA, Shyavitz L J, Smith RA, Auerbach B S. Detectning and reporting medical errors: why the dilemma? BMJ 2000,320:794-796.

14- Rhodes RS, Biester TW, Ritchie WP, Malangoni MA: Continuing Medical Education activity and American Board of Srgery Examination Performance. J Am Coll Surg 2003, 196(4): 604-9

15- Davis D, Barnes BE, and Fox R.The continuing professional development of physicians, from research to practice. 2003. AMA press,515N Chicago, IL 60610

16- Cauffman J G, Forsyth R A., Clark VA, Foster JP,, Martin K J. Lapsys F X., Davis D A. Randomized controlled trials of continuing medical education: What makes them most effective? J Contin Educ Health Prof.2003 Spring, 23 (2):67.

17- Davis DA, O'Brien MJT, Freemantle N, et al: Impact of formal continuing medical education: do conferences, workshops, rounds and other traditional activities change physician behavior or health care outcomes? JAMA 1999, 282:867-874.

18- Davis D, Galbraith R. Continuing medical education effect on practice performance: effectiveness of continuing medical education: American College of Chest Physicians Evidence-Based Educational Guidelines. Chest. 2009 Mar;135(3 Suppl):42S-48S

19- Ramalanjaona Georges. Faculty development: How to evaluate the effectiveness of a faculty development program in emergency medicine. Acad Emerg Med. Philadelphia: 2003. 10(8): 891

Appendices

Appendix-1
Continuing Medical Education Evaluation Form

{CME Activity Title}
{Activity Date}
{Activity Location}

Attendee Name: ---------------------------------
Attendee Address ---------------------------------
(Certificate of Attendance will be mailed to address indicated.)
Affiliation : (Circle One) Physician Non-Physician

Objectives Evaluation	Excellent	Good	Average	Fair	Poor
1) recognize the medical error magnitude	5	4	3	2	1
2) recognize the important measures to prevent errors in surgery	5	4	3	2	1
3) feel able to perform certain safe procedures	5	4	3	2	1
4) identify the team work objectives	5	4	3	2	1
5) ability to dealing with medical error	5	4	3	2	1
EVALUATION OF CONTENT:					
Presentation met your needs	5	4	3	2	1
Presentation provided usable ideas and / or techniques	5	4	3	2	1
Program will improve professional effectiveness	5	4	3	2	1
Time for questions & answers was sufficient	5	4	3	2	1
Handouts were useful	5	4	3	2	1
Seminar met your expectations	5	4	3	2	1
Format and organization were effective	5	4	3	2	1
EVALUATION OF PRESENTER(S):					
Presenter was effective	5	4	3	2	1
Presenter demonstrated expertise of topic	5	4	3	2	1

Was the activity commercially biased? YES { } NO { }
Would you attend a similar conference next year? YES {) NO { }
Additional comments or suggestions for future topics: --------------------

Appendix-2

(Letter)

Date: / / 2013

Commitment to change

By attending this CME program, you are committed to change your practice toward patient safety measures before, during and after the surgical intervention.

Your Name (Optional):

Your work address:

Signature

Appendix-3

Pathman-PRECEED model for Knowledge translation
Perspective of target (policy maker, consumer, or clinician)

Intervention*	Awareness	Agreement	Adoption	Adherence
Predisposing	Distribution of printed information, journals, media campaigns, lectures, rounds, academic detailing			
Enabling		Opinion leaders; small group sessions for clinicians	small group sessions for clinicians; patients education methods; clinical flowcharts or algorithms; academic detailing	
Reinforcing			small group session for audit and feedback	Reminders (Professional and patient), multiple interventions

*Perspective of healthcare or educational system. Source: Dave Davis. The case for knowledge translation: shortening the journey from evidence to effect. BMJ, 2003 July 5, 327 (7405). 33- 34

Appendix-4

Prevention of Medical Errors in Surgery : (Post-test)

1- Mistakes happen where?
a) in hospitals
b) in outpatient clinics
c) in nursing homes
d) all of the above

2- ADE Stands for what?
a) adverse drug event
b) addition error
c) advanced directive exception
d) none of the above

3- What is the first requirement for correct and effective treatment?
a) an accurate diagnosis
b) collecting the payment
c) informed consent
d) none of the above

4- What are the most frequently reported types of medication errors?
a) omission errors
b) improper dose/quantity errors
c) unauthorized drug errors
d) all of the above

5- The primary contributing factor/s to medication errors are?
a) distractions
b) workload increases
c) both a and b
d) none of the above

6- What medications are most often associated with errors?
a) insulin
b) heparin
c) warfarin
d) all of the above

7- Which patients are most vulnerable to the effects of medical errors?
a) the very young
b) the very old
c) both a and b
d) none of the above

8- Which of the following are risk factors for falls?
a) age 65 or over
b) history of falling
c) impaired mobility or difficulty waking
d) all of the above

9- The goal of a Root Cause Analysis is to find out
a) What Happened?
b) Why did it happen?
c) What do you do to prevent it from happening again?
d) All of the above

10- Making the patient and the family part of the health care team is an important strategy in improving patient safety and reducing medical errors?
* True
* False

11- Research shows that patients who are more involved with their care tend to get better results?
* True
* False

Causative micro-organisms of urinary tract infections and their antibiotic susceptibility in children

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Abstract

Aim: To highlight the main etiological agents of urinary tract infection and their antibiotic susceptibility in children, for selecting the most appropriate antibiotic for rapid initiation of an effective empirical treatment.

Method: This a retrospective study conducted at Princes Aisha Medical center - East of Amman/Jordan during the period from January 2010 to January 2012. All documented positive urine cultures from child patients were reviewed. The bacterial isolates and their susceptibility to antibiotic were analyzed.

Results: There were 159 documented positive urine culture; 87.42 %(139) of them were from female patients. E. coli isolates presented in 82.4 %(131) of the cultures, while Proteus and klebsiella isolates presented in 11.3 %(18), and 6.3 %(11) of the cultures respectively. Bacterial Isolates from female patients were E. coli (82.73%), Proteus (10.79%) and Klebsiella (6.47%). Bacterial isolates from male patients were E. coli (80%), Proteus (15%), and Klebsiella (5%). The lowest antibiotic resistance shown by E. Coli was for the injectable antibiotic Ceftriaxon(10.7%), and Gentamicin(14.6%) , while it showed highest resistance to Amikiacin injection(83.2%). 86.1% of uropathogens isolated (E. Coli , Proteus,and Klebsiella) were sensitive to Ceftriaxon (86.1%), and 82.3% were sensitive to Gentamicine. The highest resistance to oral antibiotic shown by E. coli was for Co-Trimoxazol (88.5%), Cephelexin (87.8%), Ampicillin (58.02%), and Nalidixic acid (56.5%). The lowest resistance to oral antibiotic was for Cefixim (41.98%) and Nitrofurantoin (25.98%).

Conclusion: Escherichia- Coli remains the commonest micro-organism causing urinary tract infection in children. Injectable Ceftriaxon and Gentamicin followed by the oral Nitrofurantoin and Cefixim were the first line for empirical treatment of urinary tract infections in our location.

Key words: UTI, antibiotic susceptibility bacterial isolates

Introduction

Urinary tract infection is a common bacterial disease, and often contributes to a frequent cause of morbidity in out-patients as well as hospitalized-patients (1). Under the age of 1 year, the incidence of UTI in boys is higher than in girls (2); however, it decreases in boys after infancy to be more predominant in girls (3-5%) (3, 4). The cumulative incidence of symptomatic UTI in children younger than 6 years of age is 6.6% for girls and 1.8% for boys (5). A documentation of UTI in children must depend on a precise diagnosis, because it mandates performing many steps for the management of patients regarding their gender and age. These include using different types of antibiotics for the treatment and prophylaxis from UTI with their possible side effects, and also includes the radiological investigations which may be needed like MCU with its high radiation exposure, and possible traumatic effects. Culture of the urine remains the gold standard for diagnosing UTI (6, 7). Supra-pubic specimen for culture remains the proper way for urine collection(8) , while mid-stream clean catch sample of urine is commonly used as children get older and toilet trained (9,10). The appropriate treatment of UTI has been controversial and has become more complex with the emergence of resistance to commonly used antibiotics. Our retrospective study was conducted to highlight the common causative micro-organisms of UTI and their antibiotic sensitivity patterns for starting early effective empirical treatment.

Method

This a retrospective study conducted at Princes Aisha Medical center - East of Amman, Jordan during the period from January 2010 to January 2012. This center offers medical services for a large group of people with low income in this crowded area. All documented positive urine cultures from child patients were reviewed. The bacterial isolates and their susceptibility to antibiotics were analyzed.

Results

There were 159 documented positive urine culture, 87.42 % (139) of them were from female patients. E. coli isolates presented in 82.4 % (131) of the cultures, while Proteus and klebsiella isolates presented in 11.3 % (18), and 6.3 % (11) of the cultures respectively. Bacterial Isolates from female patients were E. coli (82.73%), Proteus (10.79%) and Klebsiella (6.47%) (Table 1). Bacterial isolates from male patients were E. coli (80%), Proteus (15%), and Klebsiella (5%). The lowest antibiotic resistance shown by E. Coli was for the injectable antibiotic Ceftriaxon (10.7%), and Gentamicin (14.6%) , while it showed the highest resistance to Amikiacin injection (83.2%). 86.1% of uropathogens isolated (E. Coli, Proteus and Klebsiella) were sensitive to Ceftriaxon (86.1%), and 82.3% were sensitive to Gentamicine (Tables 2, 3). The highest resistance to oral antibiotic showed by E. coli was for Co-Trimoxazol (88.5%), Cephelexin (87.8%), Ampicillin (58.02%), and Nalidixic acid (56.5%). The lowest resistance to oral antibiotic was for Cefixim (41.98%) and Nitrofurantoin (25.98%).

Sex	E.COLI	Proteus	Klebsiella
Female	115(82.73%)	15(10.79%)	9(6.47%)
Male	16(80%)	3(15%)	1(5%)
Total	131(87.42%)	18(11.3%)	10(6.3%)

Table 1: Sex distribution of bacterial isolates from urine cultures

	Sensitivity	Resistance
Ceftriaxon	89.31%	10.8%
Gentamicin	85.38%	14.62%
Cefixem	57.69%	42.31%
Furodantin	52.3%	47.7%
Nalidexic acid	43.07%	56.8%
Ampicillin	42.3%	57.7%
Amikiacin	16.15%	83.85%
Septrin	11.53%	88.47%
Ciproflax	30.76%	69.24%

Table 2: Antibiotic sensitivity of E.Coli isolates

	Proteus isolates Sensitivity	Klebsiella isolates Sensitivity
Ceftriaxon	14(77.77%)	6(60%)
Gentamicin	12(66.66%)	7(70%)
Cefixem	10(55.55%)	4(40%)
Furodantin	7(38.88%)	4(40%)
Nalidexic acid	6(33.33%)	4(40%)
Ampicillin	1(5.55%)	2(20%)
Amikiacin	2(11.11%)	2(20%)
Septrin	0	0
Ciproflax	2(11.4%)	2(20%)

Table 3: Antibiotic sensitivity of Proteus and Klebsiella sensitivity

Discussion

Urinary tract infections (UTIs) remain the most common bacterial infection in childhood(11). Without timely treatment, renal scarring can occur(12) , which is likely to affect approximately 5-15% of young children with a UTI(13, 14, 15, 16). The American Academy of Pediatrics recommends that young children with culture proven UTI be treated with parenteral or oral antibiotics, depending on the clinical status (17). As Clinical experience has indicated the presence of numerous cases of antibiotic resistance to common antibiotics by uropathogens in both developed and developing countries(18) , then documentation of the pattern of infection and antimicrobial sensitivities by urine culture is critical to rational use of antibiotics in any geographical location. In our study, 87.42% of the documented positive urine cultures were from female children. Invariably, Escherichia coli (E. coli) has been found as a most common uropathogen in a number of reports worldwide(19,20,21). It is responsible for over 80% of pediatric UTI(22),as well as the causative organism in 82.4% of our patients. It is nearly of equal incidence in causing UTI in both male and female children which was 80% and 82.7% respectively. As in other studies(23), Proteus isolates followed by klebsiella isolates were found to be the commonest bacteria after E. coli in causing UTI. Proteus is a common pathogen in males(24); this was consistent with our finding that 15% of Proteus isolates were from boys and 10.8% from girls. Regarding klebsiella, the isolates were nearly with equal frequency in both sexes. As E. coli was the commonest cause of UTI in our patients, and as many previous reports have shown that several countries experienced rising resistance for antibiotics particularly the resistance of E. coli to beta-lactam antibiotic, so studying the pattern of culture sensitivity to these bacteria is of great importance in determining the suitable antibiotic for effective treatment. In our study, the lowest antibiotic resistance shown by E. Coli was for Ceftriaxon (10.7%) and Gentamicin (14.6%)

(Figure 2). Similar to our results, Ipek IO, et-al showed that resistance to ceftriaxon and Gentamicin were seen in 10.7% and 12.6% of the isolates, respectively. Overall, 86.1% of uropathogens isolated (E. Coli, Proteus , Klebsiella) in our study, were sensitive to Ceftriaxon, while 82.3% of them were sensitive to Gentamicin.The susceptibility exhibited by these bacteria to the mentioned two drugs may be explained by the fact that these drugs were not the first line of treatment to use unless there is severe illness, or no oral antibiotic choice revealed by culture sensitivity to be used. Furthermore their use mandates hospitalization and monitoring renal function as during Gentamicin usage. Regarding oral antibiotics, E .Coli showed highest resistant to Co-trimoxazol (88.5%), cephalexin (87.8%), Ampicillin (58.02%), Nalidixic acid (56.5%) and cefixim (41.98%). This may be due to the common use of these antibiotics by the patients as prescribed by primary medical centers, or to the easy access to these antibiotics by many parents who believed in their use for recurrent upper respiratory tract infections, and also of Co-trimoxazol usage for acute gastroenteritis. Resistance to Nitrofurantoin was detected in 26.1% of E. Coli isolates. This may be due to the limitation of the usage of this drug due to unavailability of syrup form of the drug at our location for small children who cannot ingest the tablet form and to the gastric upsets seen in some patients. Based on the results of our study and many studies which were discussed regarding this field(25,26,27,28), it was concluded that E. coli was the most common bacterium isolated from urinary tract infection in children, while there were considerable variations between our results and that of these studies regarding the susceptibility exhibited by this bacteria to the antibiotics (injectable or oral antibiotic) in common use for treatment of UTI in children; furthermore the variability of the results was also noted between these studies which were conducted at different geographical areas .

In conclusion, the choice of an antibiotic for early effective empirical treatment of urinary tract infection in children should be based on knowing the uropathogenic profile and their culture sensitivity to antibiotics in that area.

References

1- Wagenlehner FM, Naber KG. Treatment of bacterial urinary tract infections: presence and future. Eur Urol. 2006; 49(2):235-244.

2 -Herr S. M., E. R. Wald, R. D. Pitetti, and S. S. Choi. 2001. Enhanced urinalysis improves identification of febrile infants ages 60 days and younger at low risk for serious bacterial illness. Pediatrics 108:866-871.

3- Klein JO, Long SS. Bacterial infections of the urinary tract. In: Remington JS, Klein JO, eds. Infectious diseases of the fetus and newborn infant. 4th ed. Philadelphia: Saunders, 1995: 925-34.

4- Elder JS. Urologic disorders in infants and children. In: Behrman RE, Kliegman RM, Jenson HB, eds. Nelson Textbook of Pediatrics. 17th ed. Philadelphia. PA: W.B.Saunders; 2004: 1785-90

5- Mårild S, Jodal U. Incidence rate of first-time symptomatic urinary tract infection in children under 6 years of age. Acta Paediatr 1998; 87(5):549-52.

6- R. Quigley, "Diagnosis of urinary tract infections in children," Current Opinion in Pediatrics, vol. 21, no. 2, pp. 194-198, 2009.

7- D. Sobel and J. A. Vazquez, "Fungal infections of the urinary tract," World Journal of Urology, vol. 17, no. 6, pp. 410-414, 1999.

8- "UTI Clinical practice guidelines for the diagnosis and management of initial UTI in febrile infants and children 2-24 months of age," Pediatrics, vol. 128, p. 595, 2011.

9- S. Vaillancourt, D. McGillivray, X. Zhang, and M. S. Kramer, "To clean or not to clean: effect on contamination rates in midstream urine collections in toilet-trained children," Pediatrics, vol. 119, no. 6, pp. E1288-e1293, 2007.

10- A. Lohr, L. G. Donowitz, and S. M. Dudley, "Bacterial contamination rates for non-clean-catch and clean-catch midstream urine collections in

boys," Journal of Pediatrics, vol. 109, no. 4, pp. 659-660, 1986.

11- R. Beetz, "May we go on with antibacterial prophylaxis for urinary tract infections?" Pediatric Nephrology, vol. 21, no. 1, pp. 5-13,2006.

12- Jacobson SH, Eklöf O, Eriksson CG, Lins LE, Tidgren B, Winberg J: Development of hypertension and ureaemia after pyelonephritis in childhood: 27 year follow up. Brit Med J 1989, 299:703-706.

13- Pylkkänen J, Vilska J, Koskimies O: The value of level diagnosis of childhood urinary tract infection in predicting renal injury. Acta Paediatr Scand 1981, 70:879-883.

14- Vernon SJ, Coulthard MG, Lambert HJ, Keir MJ, Matthews JNS: New renal scarring in children who at age 3 and 4 had had normal scans with dimercaptosuccinic acid: Follow up study. Brit Med J 1997, 315:905-908.

15- Winberg J, Andersen HJ, Bergström T, Jacobsson B, Larson H, Lincoln K: Epidemiology of symptomatic urinary tract infection in childhood. Acta Paediatr Scand 1974, Suppl 252:1-20.

16- Coulthard MG, Lambert HJ, Keir MJ: Occurrence of renal scars in children after their first referral for urinary tract infection. Brit Med J 1997, 315:918-919.

17- Committee on Quality Improvement. Subcommittee on Urinary Tract Infections. Practice parameter: the diagnosis, treatment, and evaluation of the initial UTI in febrile infants and young children. Pediatrics 1999; 103:843-52.

18- Gupta K. Addressing antibiotic resistance. Am J Med. 2002; 113(Suppl 1A):S29-S34.

19- Chakupurakal R, Ahmed M, Sobithadevi DN, Chinnappan S, Reynolds T. Urinary tract pathogens and resistance pattern. J Clin Pathol. 2010; 63(7):652-654.

20- Karlowsky JA, Lagace-Wiens PR, Simner PJ, DeCorby MR, Adam HJ, Walkty A, Hoban DJ, Zhanel GG. Antimicrobial resistance in urinary tract pathogens in Canada from 2007 to 2009: CANWARD surveillance study. Antimicrob Agents Chemother. 2011;55(7):3169-3175. doi: 10.1128/AAC.00066-11.

21- Farajnia S, Alikhani MY, Ghotaslou R, Naghili B, Nakhlband A. Causative agents and antimicrobial susceptibilities of urinary tract infections in the northwest of Iran. Int J Infect Dis. 2009;13(2):140-144.

22- R. G. Bhat, T. A. Katy, and F. C. Place, "Pediatric urinary tract infections," Emergency Medicine Clinics of North America, vol. 29, no. 3, pp. 637-653, 2011.

23-- Ipek IO, Bozaykut A, Arman DC, Sezer RG. Antimicrobial resistance patterns of uropathogens among children in Istanbul, Turkey. Southeast Asian J Trop Med Public Health. 2011 Mar;42(2):355-62.

24- C. J. Clark, W. A. Kennedy, and L. D. Shortliffe, "Urinary tract infection in children: when to worry," Urologic Clinics of North America, vol. 37, no. 2, pp. 229-241, 2010.

25- Catal F, Bavbek N, Bayrak O, Karabel M, Karabel D, Odemis E, Uz E. Antimicrobial resistance patterns of urinary tract pathogens and rationale for empirical therapy in Turkish children for the years 2000-2006. Int Urol Nephrol. 2009 Dec;41(4):953-7. Epub 2008 Aug 14.

26- Yüksel S, Oztürk B, Kavaz A, Ozçakar ZB, Acar B, Güriz H, Aysev D, Ekim M, Yalçinkaya F. Antibiotic resistance of urinary tract pathogens and evaluation of empirical treatment in Turkish children with urinary tract infections. Int J Antimicrob Agents. 2006 Nov;28(5):413-6. Epub 2006 Sep 26.

27-Tseng MH, Lo WT, Lin WJ, Teng CS, Chu ML, Wang CC. Changing trend in antimicrobial resistance of pediatric uropathogens in Taiwan. Pediatr Int. 2008 Dec;50(6):797-800.

28- Vu-Thien H. Antibiotic sensitivity to isolated bacteria in pediatric urinary tract infections]. Arch Pediatr. 1998;5 Suppl 3:266S-268S.

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