**Prevalence of Childhood Obesity Among a Sample of Basic Education School Children in Erbil City ... page 4**

# From the Editor

This is the last issue this year and the editorial office and the publishing team wish to send all the readers and the authors season's greeting and a Happy New Year.

In this issue two papers discussed the issues of obesity. A cross sectional study from Iraq aimed at finding out the prevalence of childhood obesity in Erbil city and its association with socio-demographic characteristics and risk factors. A multi-stage cluster sampling method was used to select 1200 children, 12-19 years old from 30 different basic education schools inside Erbil city. A structured questionnaire was used to collect the relevant data. Measures of height, weight and waist circumference were also recorded. The prevalence of overweight and obesity among the study sample was 9.3% and 1.6%, respectively. The authors concluded that the problem of childhood obesity affecting Iraqi children is not so profound in comparison with other countries, especially the Gulf and other neighbouring countries.

A retrospective study from Yemen looked at Colonoscopic findings in patients with hematochezia. Hematochezia is a chronic intermittent passage of a small amount of bright red blood from the rectum and it is a common complaint in adult patients of all ages. A total of 386 colonoscopy records of patients with hematochezia were reviewed (65% males and 35% females). The mean age was 45.5 ± 17.2 years. 43.5% aged ≤ 40 years and 56.5% aged > 40 years. Normal findings were 11.1%. Hemorrhoids were the most common cause 52.8%, followed by cancer 15.6%, and ulcerative colitis 9.3%. Most cancers 11.9% were in patients aged > 40 years. The location of cancers were 17 (4.4%) in sigmoid colon, 15 (3.9%) in each one of descended colon and recto-sigmoid, and 13 (3.4%) in rectum. The authors concluded that ulcerative colitis and solitary rectal ulcer were relatively high in patients aged ≤ 40 years. Diverticulosis was only seen in patients aged > 40 years. Hematochezia causes were significantly associated with age (p < 0.05). Hemorrhoids were the most common cause, followed by cancer.

A cross sectional survey from Pakistan attempted to study the psycho-social aspects of obesity and to determine the patients' insight into the causes, prevention and treatment of obesity among patients visiting two tertiary care Hospitals in Karachi, Pakistan. Patients 18 years old or above, with a BMI of at least 30 kg/m2 were included in the study. The exclusion criteria included age less than 18 years, BMI less than 30 kg/m2 and pregnant females. A total of 100 individuals agreed to participate in the study and all of them completed the interview. The study population had a mean age of 38.9 years (18-75 years) and a mean BMI of 34.8 kg/m2 (Range: 30.0-44.4 kg/m2). The authors concluded that the obese individuals in their study seemed to have suffered from major psycho-social disturbances and have insight into the cause of their illness. It is extremely important to explore the psycho-social aspect of obesity and to increase awareness regarding the causes and prevention of obesity.

A paper from Qatar attempts to assess the effectiveness of a culturally sensitive structured education program (CSSEP) on biomedical, knowledge, attitude and practice measures among Arabs with type 2 diabetes. A total of 430 patients with type two Diabetes Mellitus living in Doha, Qatar were enrolled in the study. They were randomized to either intervention (n = 215) or control group (n= 215). A statistically significant reduction in HbA1C was observed in the (CSSEP) group (0.12%, P < 0.0001) , fasting blood sugar (1.37 mmol/L, P<0.0001), body mass index (0.37 Kg/m2, P = 0.004) and albumin/Creatinine ratio (2.45, P <0.0001) but not in the control group . The intervention group had an improvement in the scores of diabetes knowledge (12.16, P <0.0001) , attitude (8.41, P<0.0001) , and practice (12.90, P<0.0001). The authors concluded that this study demonstrates the effectiveness of a culturally sensitive structured group-based diabetes education in enhancing biomedical and behavioral measures among diabetic patients.

A descriptive cross-sectional research was conducted on diabetic patients attending the diabetic center in Nassyria city in Iraq looking at Herbal remedies use among diabetic patients. The authors pointed that despite the availability of conventional hypoglycemic medications, many diabetic patients still prefer to use herbal remedies. The study revealed that 153 (17.3%) out of 884 respondents had utilized herbal remedies within the last year. Herb users were more likely to be highly educated, employed, type 2 diabetics, and with a shorter duration of diabetes. The peer influence was noted among 77.1% of users. The authors concluded that a considerable number of patients with diabetes mellitus in Nassyria used herbs. Therefore, proper health information about herbal remedies should be provided by health professionals.

A case report from Oman presented a case of reversible acute renal failure in a patient with profound hypothyroidism. The authors stated a case of acute renal failure in a patient with hypothyroidism constitutes a rare occurrence. The patient is a 25 year-year-old male, an Omani, who presented with two months' history of puffiness of the face, swelling of the legs, weight gain, generalized fatigability, excessive snoring and dysarthria. He also complained of cramps of the muscles of the right upper and lower limbs. Investigations done were renal functions (urea, creatinine, electrolytes), urine analysis, serology for autoimmune diseases, serum creatine phophokinase (CPK), and thyroid function tests. He was found to have serum creatinine of 143 umol/L with normal urinalysis, negative serology for autoimmune diseases, and very high level of serum CPK. He was subsequently found to be hypothyroid with a thyroid stimulating hormone (TSH) level of >100 miu/L. The case report in Oman indicates acute renal failure hypothyroidism could be ameliorated with thyroid replacement therapy. This finding, along with others, offers tentative ground for exploration of such a link using a more vigorous research paradigm.

A paper from Bahrain looked at Prevalence of Selected Risk Factors and Blood Pressure Control All hypertensive patients attending the Non-Communicable Diseases Clinic in Northern Muharraq Health Centre in a period of three weeks, were included. Data was extracted from patient records and questionnaires. The authors found that among hypertensive patients, around half had satisfactory blood pressure control. Systolic blood pressure was statistically significantly directly correlated with age (p=.033), a positive family history of hypertension in parent(s) (p=.018) and diastolic blood pressure (p=.000). Diastolic blood pressure was statistically significantly directly correlated with smoking (p=.008), positive family history of hypertension in sibling(s) (p=.024), and systolic blood pressure (p=.000). It was also statistically significantly inversely correlated with age (p=.018). The authors concluded that blood pressure control among hypertensive patients has improved.

**Original Contribution / Clinical Investigation**

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**Medicine and Society**

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**Clinical Research and Methods**

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**Case Report**

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# Prevalence of Childhood Obesity Among a Sample of Basic Education School Children in Erbil City

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## Introduction

Obesity is a disease in which excess body fat has accumulated to such an extent that health may be negatively affected(1). Most researchers agree that a combination of excessive calorie consumption and a sedentary life style are the primary causes of obesity(2). It is estimated that 1·1 billion people and 10% of children are now classified as overweight or obese(3).

Childhood obesity is a medical condition that affects children. It is characterized by a weight well above the mean for their height and age and a body mass index (BMI) well above the norm. It is one of the most serious public health challenges of the 21st century. The problem is global and is steadily affecting many low- and middle-income countries, particularly in urban settings. The prevalence has increased at an alarming rate(4).

It is not only the scale of childhood obesity that is challenging, but also the speed at which the prevalence has increased. During the past few decades, the prevalence of obesity in children has risen greatly worldwide(5). Childhood obesity is associated with a higher chance of premature death and disability in adulthood. Overweight and obese children are more likely to stay obese into adulthood and to develop non-communicable diseases (NCDs) like diabetes mellitus (DM) and CVD at a younger age. For most NCDs resulting from obesity, the risks depend partly on the age of onset and on the duration of obesity. Obese children and adolescents suffer from both short-term and long-term health consequences(6).

Many low- and middle-income countries are now facing a "double burden" of disease: as they continue to struggle with the problems of infectious diseases and under-nutrition; at the same time they are experiencing a rapid increase in risk factors of NCDs such as obesity

## Abstract

**Background and Objectives:** A combination of excessive calorie consumption and a sedentary life style are the primary causes of obesity. This study aimed at finding out the prevalence of childhood obesity in Erbil city and its association with socio-demographic characteristics and risk factors.

**Subject and Methods:** A cross sectional study was carried out between the 10th of January to the 15th of October 2009, and a multistage cluster sampling method was used to select 1200 children, 12-19 years old from 30 different basic education schools inside Erbil city. A structured questionnaire was used to collect the relevant data. Measures of height, weight and waist circumference were also recorded.

**Results:** The prevalence of overweight and obesity among the study sample was 9.3% and 1.6%, respectively. Binary logistic regression analysis revealed that overweight was significantly associated with high socio-economic level, not having regular breakfast and decreased number of hours of practicing exercise. There was a strong positive correlation between BMI and waist circumference of the study subjects.

**Conclusion:** The problem of childhood obesity affecting our children is not so profound in comparison with other countries, especially the Golf and other neighboring countries.

**Key words:** Obesity, childhood, prevalence, Erbil

and overweight, particularly in urban settings(7).

Research on prevalence of obesity and its associated factors is scarce in Iraq and has not been conducted yet in Erbil city. The study objectives were; to assess the prevalence of childhood obesity among the studied sample in basic education school children in Erbil city, to study the factors that may be associated with obesity like dietary habit, physical activity, socioeconomic status, etc, and to build baseline data for future research.

## Subjects and Methods

A school based cross sectional study was carried out during the period January 10 to October 15, 2009 in Basic Education schools in Erbil city. Based on the Department of Education's updated list, a sample of 30 basic education schools was selected from the total of 92 schools. The Probability Proportional to Size (PPS) sampling technique was used to identify these schools(8). The sample size was calculated by Epi Info-6 issued by CDC and WHO, using 95% level of significance (confidence level). As a result the calculated expected sample size was (1,191), however a sample of (1,200)

students was taken, 640 girl students and 560 boy students. Among 1,200 study subjects, 400 students were randomly selected from each of the classes; seven, eight and nine.

A structured questionnaire was used for each of the study subjects which included child's age, class, sex, etc; the socioeconomic status of the child was determined through the number of years of formal education of both father and mother, number of family members, type of housing e.g owned, rented, etc, number of rooms, possession of car and number of electrical machines in the house; the child's dietary habit and practicing exercise or physical activity.

With regard to the anthropometric measures, Body Mass Index was calculated by dividing the weight in (kg) on the square height in (m). BMI varies with age and gender according to standard WHO calculation of BMI-for-age, Boys and Girls, 5-19 years, z-scores(9). Children in the sample were divided into four main categories in relation to their weight status; underweight for those less than -2 SD, normal weight for those between -2 SD and 2 SD, overweight for those between 2.01 SD and 3 SD, and lastly obese for those above

3 SD. The Waist-to-Hip Ratio was also calculated through dividing the waist circumference over the hip circumference(10).

SPSS 11.5 was used to reveal frequencies and association of different variables collected during the period of the study. Chi-square $(X^2)$ test of association, logistic regression analysis, correlation and paired-samples t-tests were used to identify any kind of association between different variables in the study. A P-value of $< 0.05$ was considered as statistically significant.

## Results

The male:female ratio in this study was 0.875:1. The mean age ± SD was 14.38 ± 1.53 years ranging from 12-19 years. Only 9.3% of children included in this study were overweight while just 1.6% of them were obese. The weight status of children is shown in Figure 1.

The two weight status categories (overweight and obese) were merged under one name referred to as "Overweight" which formed 10.9% of the studied population, in order to be compared with the "Normal Weight" category which represents normal BMI of the rest of the children in the
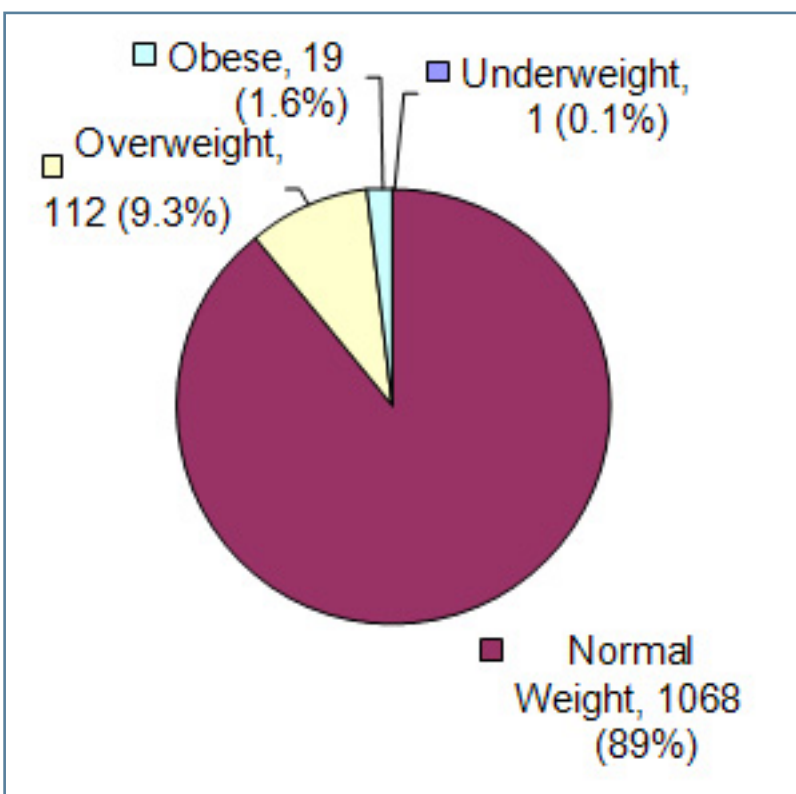


Figure 1: Distribution of the sample by weight status of children as assessed by BMI
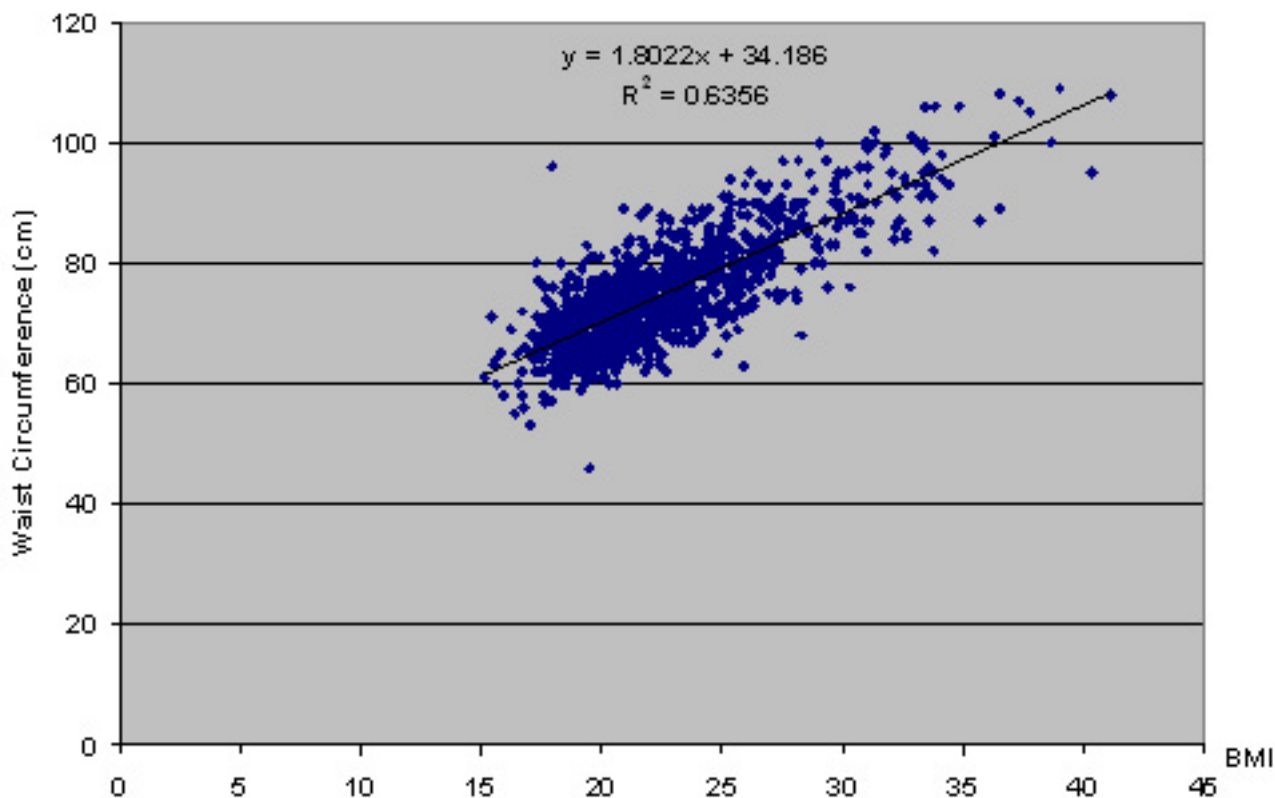
Figure 2: Correlation between BMI and Waist Circumference

The equation shown on the figure:

$$y = 1.8022x + 34.186$$
$$R^2 = 0.6356$$

| | Normal Weight No. (%) | | Overweight No. (%) | | Chi-Square (df) | P |
|---|---|---|---|---|---|---|
| **Age group (years)** | | | | | | |
| 12-14 | 650 | (87.25) | 95 | (12.75) | 6.803 (1) | 0.009 |
| 15-19 | 419 | (92.09) | 36 | (7.91) | | |
| **Sex** | | | | | | |
| Male | 489 | (87.32) | 71 | (12.68) | 3.352 (1) | 0.067 |
| Femal | 580 | (90.63) | 60 | (9.37) | | |

Table 1: Distribution of weight status of children by age and sex

study population. The 0.1% of the underweight children were ignored and considered among the "Normal Weight" group.

There was a strong positive correlation between BMI and waist circumference of the study subjects as Pearson Correlation (r) was equal to 0.797 (P<0.05), as is shown in Figure 2 (above).

The younger age group showed a higher rate of overweight status (12.75%) compared to the older group (7.91%) which was statistically significant, but as is shown in Table 1, no statistically significant difference was found between males and females.

As shown in Table 2, (opposite page)more than 16% of the children who live in a high socio-economic environment were overweight,

therefore, the higher the socio-economic standard, the bigger the rate of obesity (P=0.001).

The rate of children who regularly have breakfast is higher than those who don't regularly have breakfast, and the association is statistically significant, Table 3 (opposite page).

As is clear from Table 4, 12.9% of children who practice exercise less than one hour a day were found to

| Socio-economic Status | Normal Weight No. (%) | Overweight No. (%) | Chi-Square (df) | P |
|---|---|---|---|---|
| Low | 180 (93.3) | 13 (6.7) | | |
| Medium | 612 (90.5) | 64 (9.5) | 14.845 (2) | 0.001 |
| High | 277 (83.7) | 54 (16.3) | | |

Table 2: Distribution of weight status of children by the socio-economic status

| Having breakfast daily | Normal Weight No. (%) | Overweight No. (%) | Chi-Square (df) | P |
|---|---|---|---|---|
| No | 354 (84.7) | 64 (15.3) | 12.737 (1) | < 0.001 |
| Yes | 715 (91.4) | 67 (8.6) | | |

Table 3: Distribution of weight status of children in relation to the regularity of having breakfast

| | Normal Weight No. (%) | Overweight No. (%) | Chi-Square (df) | P |
|---|---|---|---|---|
| **No. of hours of exercise** | | | | |
| < 1 | 609 (87.1) | 90 (12.9) | | |
| 1 – 3 | 183 (89.7) | 21 (10.3) | 6.821 (2) | 0.033 |
| > 3 | 116 (95.1) | 6 (4.9) | | |

Table 4: Distribution of weight status of children in relation to number of hours of practicing exercise

be overweight compared to 10.3% who practice exercise between 1-3 hours a day and 4.9% for more than 3 hours a day. (P = 0.033).

The logistic regression analysis model, as shown in Table 5 (page 8), revealed that only the socio-economic status of the child's family remained as a significant factor that is associated with being overweight.

## Discussion

The percentages of childhood overweight and obesity in this study were less than those reported in the study conducted in Dohuk Governorate which showed prevalence of childhood overweight and obesity as 8.3% and 7.9% respectively(11). This might be due to the difference in age groups of the target population since Duhok children were much younger than children in this study. Our figures were also lower than those in a study conducted in Baghdad which revealed a prevalence of 12.4% for overweight and 4.1% for obesity(12). The study showed a strong positive correlation between BMI of children and their waist circumference (r = 0.797), and that this correlation is statistically significant (P<0.01). These results are consistent with those from a study conducted on

| | B | S.E. | df | Sig. | OR | 95% C.I. for OR | |
| | | | | | | Lower | Upper |
|---|---|---|---|---|---|---|---|
| Age | -0.07 | 0.07 | 1 | 0.270 | 0.92 | 0.802 | 1.064 |
| Socio-economic status (SES) | | | 2 | 0.000 | | | |
| Medium SES | 0.50 | 0.36 | 1 | 0.159 | 1.66 | 0.821 | 3.360 |
| High SES | 1.20 | 0.36 | 1 | 0.001 | 3.32 | 1.621 | 6.813 |
| No eating regular breakfast | 0.67 | 0.20 | 1 | 0.001 | 1.95 | 1.317 | 2.904 |
| Hours of exercise | -0.31 | 0.11 | 1 | 0.005 | 0.73 | 0.585 | 0.911 |
| Constant | -1.51 | 1.09 | 1 | 0.16 | 0.22 | | |

**Table 5: Logistic regression analysis of risk factors by overweight**

primary-school children in Egypt which revealed a highly positive and statistically significant correlation between waist circumference and BMI[13], and also with a study conducted on Swedish adolescents of 17 years old which revealed a strong positive correlation between BMI and waist circumference in both sexes (r = 0.68 - 0.73), and this correlation was statistically significant[14].

The study revealed that younger age groups had higher rate of overweight, and this might be attributed to less physical activity in addition to the hormonal changes in children while growing. This is consistent with the study conducted in Egypt which revealed 7.2% and 6.6% prevalence of overweight and obesity respectively among children aged 11-14 years compared to 6.5% and 5.9% respectively for those aged 15-19 years[15], but these results are not consistent with those from the study conducted in Babil Governorate which showed opposite results since the proportion of overweight and obesity increased from 5% and 0.9% at age 7 reaching 6.5% and 1.8%, respectively, at the age of 12 years[16].

The study revealed that the highest rate of overweight was found among children living in high socio-economic level households (16.3%) compared to those living in medium (9.5%) and low (6.7%) socio-economic levels. These results reinforce the fact that overweight rates are higher among children of affluent families since changes such as the availability of more western-style foods, the prevalence of snacking, a decline in physical activity, and the inactivity associated with watching television and playing computer games may all be contributing to the rise of overweight rates. These results were consistent with a study done in Turkey where there was a statistically significant association between socio-economic level and overweight rates among Turkish adolescents[17], but inconsistent with a number of studies conducted in United States where they revealed

that overweight and obesity are inversely related to family socio-economic status and are more prevalent among children from families of lower socio-economic classes(18,19,20). In conclusion these results may reinforce the fact that overweight rates are higher among children living in high socio-economic levels in developing countries, and that this association becomes the opposite for children of developed countries since the wealthy people in these countries are able to afford more nutritious food, they are under greater social pressure to remain slim and have more opportunities for physical fitness, but a number of studies still showed limited and inconclusive evidence of association between these two variables in developed countries(21). This study also showed that there is significant association between the regularity of having breakfast, on daily basis, and the overweight status of children. The rate of overweight children among those who don't have breakfast regularly was 15.3% compared to 8.6% among those who have regular breakfast on daily basis. The results come in agreement with a study done in Saudi Arabia which revealed that missing or infrequent intake of breakfast at home is a predictor of obesity and overweight among male school children(22).

The study showed that 12.9% of children who practice exercise less than one hour a day were found to be overweight compared to 10.3% who practice exercise between 1-3 hours a day and 4.9% for more than 3 hours a day. The results are in agreement with those of a study conducted on Turkish adolescents which revealed a significant association between the frequency of practicing exercise and weight status(23), and a study conducted on Canadian children which showed that both organized and unorganized sport and physical activity are negatively associated with being overweight (10-24% reduced risk) or obese (23-43% reduced risk) (24).

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**Appendix I**
**The Questionnaire Form**

| | |
|---|---|
| Date: | |
| Child's Code: | |
| School's Name: | |
| Class:  7. 7th   8. 8th   9. 9th | |
| Name: | |
| Age:   0. 13 years   1. 14 years   2. 15 years | |
| Sex:   0. Male   1. Female | |
| Weight in(Kg): | |
| Height in (m): | |
| Waist Circumference (cm): | |
| Hip Circumference (cm): | |
| Parents' status/living with the child:   0. None   1. One   2. Both | |
| Number of years of formal education of father: | |
| Number of years of formal education of mother: | |
| Number of family members: | |
| Type of housing:  0. Owned   1. Partially owned   2. Rented   3. Other, specify | |
| Number of rooms except kitchen and bath: | |
| Possession of car:   1. Yes   0. No | |
| Electrical machines in the house:<br>TV   0   1   2   3<br>Receiver   0   1   2   3<br>Refrigerator   0   1   2   3<br>Air conditioner   0   1   2   3<br>Computer   0   1   2   3 | |
| Number of main meals eaten during the day: | |
| How frequent do you eat rice:   1. > once a day<br>2. once a day   3. 2-3/week   4. weekly   5. other, specify | |
| Do you eat between meals:  1. Yes   0. No | |
| If yes, what? | |
| Do you eat between supper and bed time? 1. Yes   0. No | |
| If yes, what? | |
| Do you eat fruits/vegetables during the day? 1.Yes   0. No | |
| If yes, how frequent? | |

(continued top of next page)

| | |
|---|---|
| Do you drink soft drinks during the day?   1. Yes   0. No | |
| If yes, how many cans a day? | |
| Do you eat chocolate, Potato chips, etc?   1. Yes   0. No | |
| If yes, how many a day? | |
| Do you drink Tea?       1. Yes       0. No | |
| If yes, how may cups a day? | |
| What do you buy from the school shop?<br>Biscuits                    1. Yes                 0. No<br>Sandwiches              1. Yes                 0. No<br>Soft drinks               1. Yes                 0. No<br>Chocolate                 1. Yes                 0. N0<br>Potato chips             1. Yes                 0. No | |
| Do you eat fast food during the day?   1. Yes   0. No | |
| If yes, how frequent? | |
| Does your family have lunch/dinner outside at restaurants?<br>1. Yes       0. No | |
| If yes, how many times a week? | |
| Are you doing exercise/physical activity?   1. Yes  0. No | |
| If yes, which type?    1. bicycle             2. football<br>                          3. walking/running  4. other/specify | |
| How many hours a day? | |
| Do you watch TV/play video games/computer games?<br>  1. Yes        0. No | |
| If yes, how many hours a day? | |
| Do you think that your parents are overweight or obese?<br>1. Yes        0. No | |
| Do your parents have Diabetes?<br>0. No        1. One of them     2. both of them | |
| Do you think that you are overweight or obese?<br>1. Yes        0. No | |
| Do you think that obesity in children is a health risk?<br>1. Yes        0. No | |
| If yes, what diseases? | |
| Have you heard about the bad effect of overweight and<br>obesity?          1. Yes                 0. No | |
| If yes, from what source/sources? | |

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## Appendix II

**The Specific "eighteen score" scoring system to determine the socio-economic classes of the study population**

| Socio-economic Criteria | Category | Score |
|---|---|---|
| Father Education | Illiterate | 0 |
| | Read and Write | 1 |
| | Primary | 2 |
| | Intermediate and Secondary | 3 |
| | Diploma, University and High Education | 4 |
| Mother Education | Illiterate | 0 |
| | Read and Write | 1 |
| | Primary | 2 |
| | Intermediate and Secondary | 3 |
| | Diploma, University and High Education | 4 |
| Crowding Index | < 1.5 | 2 |
| | 1.5 - 2.9 | 1 |
| | ≥ 3 | 0 |
| Possession of Car | Yes | 2 |
| | No | 0 |

(continued top of next page)

| | | |
|---|---|---|
| **Type of Housing** | Owned | 3 |
| | Partially Owned | 2 |
| | Rented | 0 |
| | Help | 0 |
| | Government Owned | 0 |
| **Cost of Electrical Machines** | $ < 1500 | 1 |
| | $ 1500 – 3000 | 2 |
| | $ > 3000 | 3 |

# The Psychosocial aspects of obesity and Patients' insight into the causes, prevention and treatment of obesity among Patients visiting Two Tertiary Care Hospitals at Karachi, Pakistan: Results of a Pilot study

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## Abstract

**Aim:** To study the psychosocial aspects of obesity and to determine the patients' insight into the causes, prevention and treatment of obesity among patients visiting two tertiary care
Hospitals in Karachi, Pakistan.

**Methods:** A cross sectional survey was conducted at the out-patient departments of two tertiary care hospitals of Karachi, Pakistan. Participation in the survey was voluntary and written informed consent was taken. Patients 18 years old or above, with a BMI of at least 30 kg/m2 were included in the study. The exclusion criteria included age less than 18 years, BMI less than 30 kg/m2 and pregnant females.

**Results:** A total of 100 individuals agreed to participate in the study and all of them completed the interview. The study population had a mean age of 38.9 years (18-75 years) and a mean BMI of 34.8 kg/m2 (Range: 30.0-44.4 kg/m2). 76% were unhappy with their weight (76%), and 83% considered themselves to be overweight. 55% of the obese individuals were teased or bullied as a result of their weight. 67% of the obese individuals reported being victims of criticism and discrimination. 74% of the obese patients were significantly affected by obesity. 43.2% (n=32) reported that the most significant issues that they faced were psychological, 32.4% (n=24) social, 13.5% (n=10) monetary and 9.5% (n=7) medical. 40% believed that the most likely cause of being obese is an unhealthy diet, 27% said that the cause is familial, 11% thought it was due to the lack of physical activity in their lives, and 8% said it was related to their state of emotions.

**Conclusion:** The obese individuals in our study seemed to have suffered from major psychosocial disturbances and have insight into the cause of their illness. It is extremely important to explore the psychosocial aspect of obesity and to increase awareness regarding the causes and prevention of obesity.

**Keywords:** Obesity; Overweight; Psychosocial

## Introduction

Expansion in research and a better understanding of clinical practice during the past two decades have changed the dynamics of medical practice around the world. Such advancements have ultimately led to an increase in life expectancy. A growing grey population means physicians are now coming across more chronic illnesses, and end stage diseases.

Obesity is a condition that has many chronic complications associated with it. Its rising prevalence is becoming an economic burden and therefore countries are now investing heavily in primary care to focus more on prevention.

Obesity means having too much body fat. It is different from being overweight, which means weighing too much. The weight may come from muscle, bone, fat and/or body water. Both terms mean that a person's weight is greater than what is considered healthy for his or her height.(1) A crude population measure of obesity is the body mass index (BMI), a person's weight (in kilograms) divided by the square of his or her height (in meters). A person with a BMI of 30 or more is considered obese.(2)

Obesity in Pakistan is a health issue that has attracted concern only in the past few years. Urbanization and an unhealthy, energy-dense diet (the high presence of oil and fats in Pakistani cooking), as well as changing lifestyles, are among the root causes contributing to obesity in the country. Research indicates that people living in large cities in Pakistan are more exposed to the risks of obesity as compared to those in the rural area. Women have higher rates of obesity as compared to men.(3)

Much research has been done on the medical aspect of obesity but studies have been lacking when it comes to determining the psychosocial aspects of obesity in Pakistan. Obesity has a significant impact on the psychosocial well-being of those affected. Among the major social problems faced by people who are obese are prejudice and discrimination at work, in public, and in interpersonal relationships. In the western societies, obesity is associated with ugliness, failure and lack of social acceptability but it's looked upon differently in parts of the Middle East and many developing countries.(4, 5)

While it is clear that there are some psychological conditions that can be considered causal, e.g. binge-eating disorder, the traditional view that places overeating as a cause of obesity has largely been replaced by the idea that genetic predisposition is driving the overconsumption and that most psychological problems are likely to be consequences rather than causes of obesity.(5) Most individuals who are obese have normal psychological functioning. A significant minority, however, suffer from depression, binge eating, trauma, or other emotional complications that may require treatment.(6)

There is a real need to educate people about obesity and its ill effects on health. A large number of obese individuals have very unrealistic ideas about the causes and the consequences of their obesity. Therefore, this study was conducted to determine the psychological and the social issues that can arise as a result of obesity. We evaluated the patients' level of knowledge on obesity and at the same time educated them about the ill effects of obesity. The above interventions can serve as a great tool for physicians when addressing obese patients. This will also help the physicians to better understand their patients and to encourage them to change their lifestyles, at least in accordance with the patient's own beliefs and understanding.

## Material and Methods

A cross sectional survey was conducted at the out-patient departments of two tertiary care hospitals of Karachi, Pakistan. Participation in the survey was voluntary and written informed consent was taken from all the patients and confidentiality of information was assured. All participants were informed about the nature of the study.

A hundred obese patients agreed to participate in the study using the convenience sampling method. Information was collected using personal interviews and self-administered questionnaires based on a structured, pre-tested questionnaire. Strict confidentiality was maintained throughout the process of data collection, entry and analysis. The duration of the study was four months which included data collection and analysis. All patients aged 18 years old or above with a BMI of at least 30 kg/m2 were included in the study. The exclusion criteria included age less than 18 years, BMI less than 30 kg/m2 and pregnant females.

The questionnaire was designed keeping four objectives in mind which were to determine the psycho-social aspects of obesity, gender getaway in the society with respect to obesity, its relationship with the level of education and to determine the patient's understanding and knowledge of the causes, prevention and treatment of obesity.

The data was entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 19.0. As part of the descriptive statistics, mean, median and mode were used to express the data collected. Proportions were calculated for all the categorical variables. Associations between variables were assessed using the Chi-square test. P values were determined; a p-value of less than or equal to 0.05 was considered insignificant. Tables and figures were used for an all-inclusive viewing of the results.

## Results

A total of 100 individuals agreed to participate in the study and all of them completed the interview. Figure 1 describes the socio demographic characteristics of the study population with a mean age of 38.9 years (18-75 years) and a mean BMI of 34.8 kg/m2 (30.0-44.4 kg/m2).
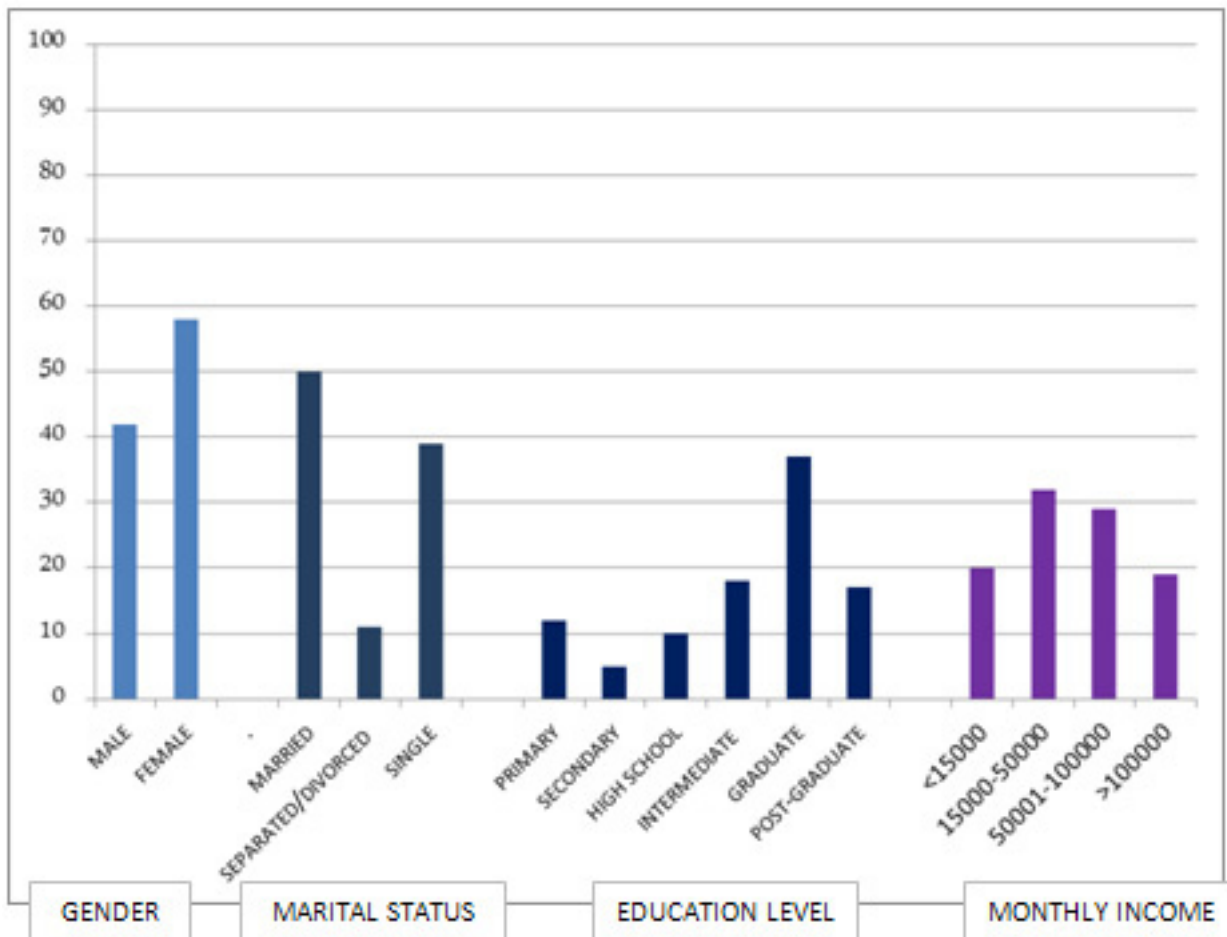
**Figure 1: Socio-demographic Characteristics of study participants**
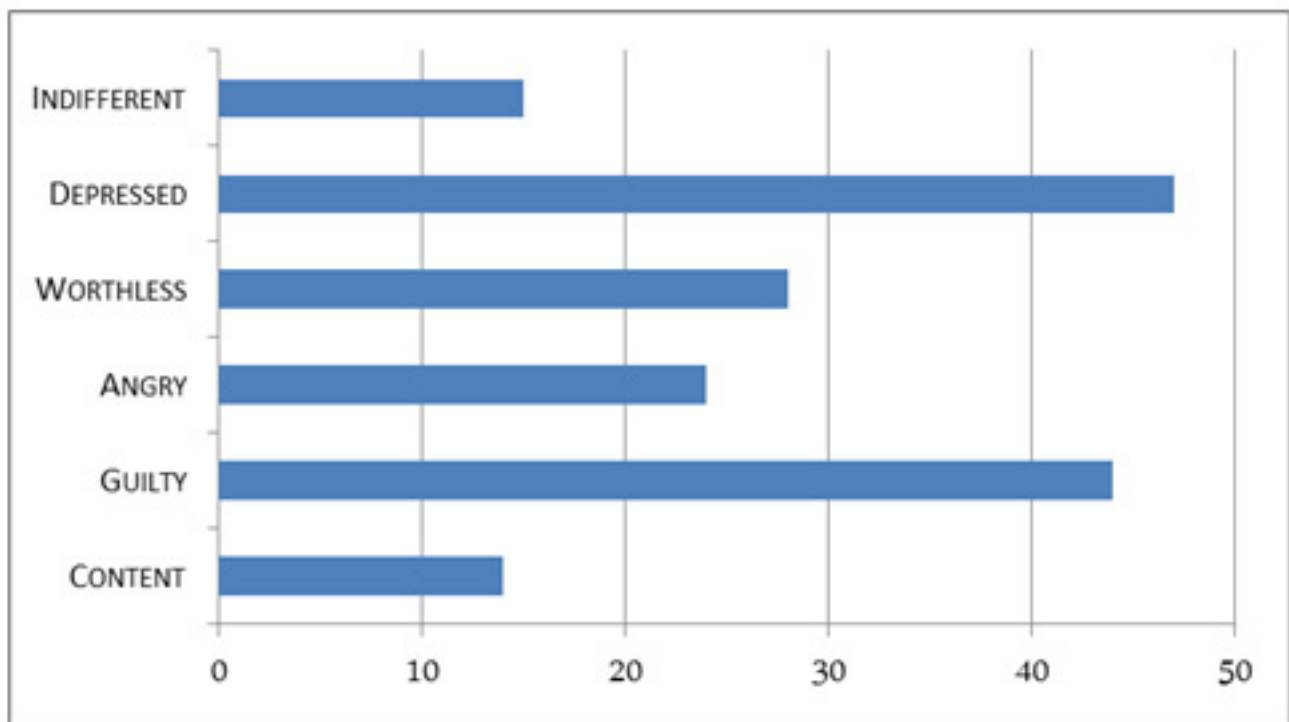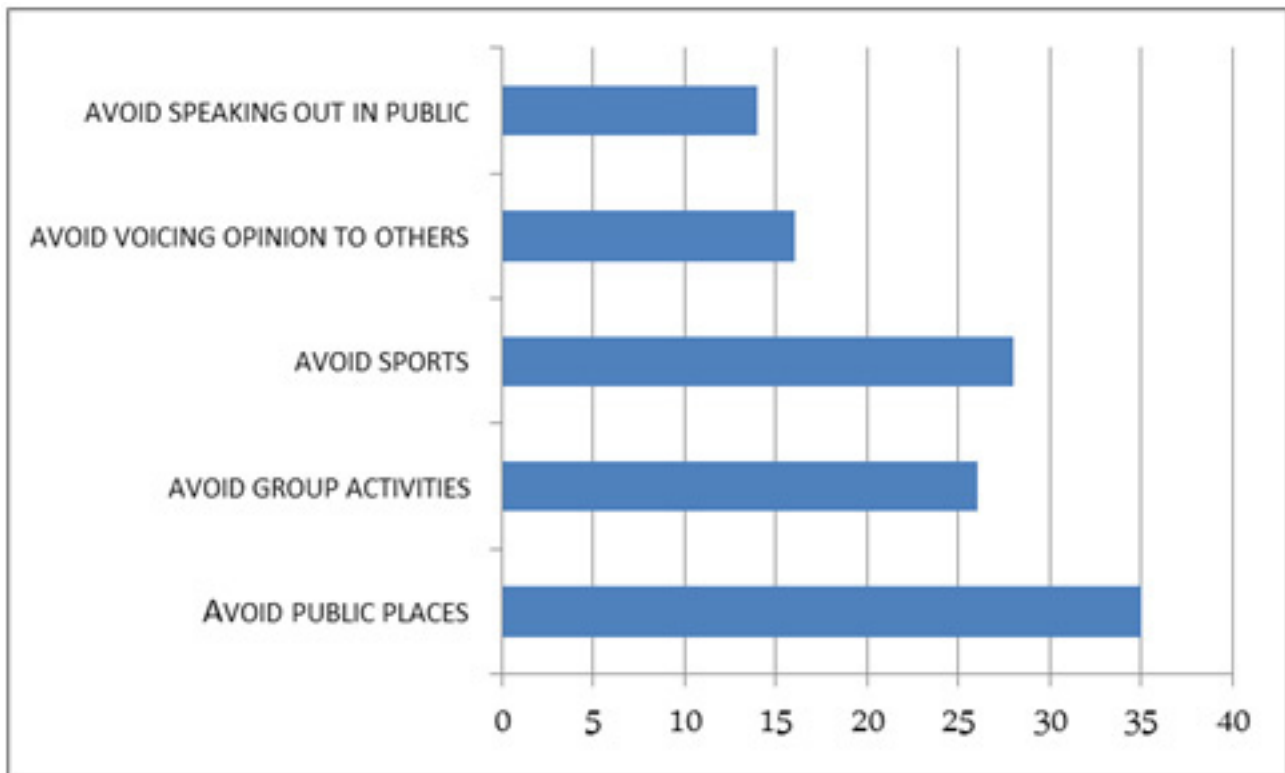


**Figure 2: Feelings of obese individuals due to their weight**

**Figure 3: Activities avoided by obese individuals due to their weight**

The results of this study showed that a large number of obese individuals were unhappy with their weight (76%), and 83% considered themselves to be overweight. Figure 2 demonstrates how obese individuals feel as a result of their weight. One obese individual reported that she suffered from low self-esteem and another felt suicidal as a result of her weight. Figure 3 on the other hand exhibits the situations or events that obese individuals avoid due to their weight. One obese individual reported that she avoided wearing tight clothing due to her weight. The results showed that 42 obese individuals do not avoid anything as a result of their weight.

The results showed that 49% of the obese individuals felt that, in our society, it's easier to get away as an obese male compared to an obese female and 26% had opposing feelings. Out of the 49% that felt it's easier for obese males compared to females in the society, 63% were females. The remaining 25% felt that gender perception in society does not matter when it comes to obesity.

The results showed that 55% of the obese individuals were teased or bullied as a result of their weight

out of which 64% were females, 24% of the obese individuals faced difficulties getting a job and 34% of the obese individuals were neglected by physicians as a result of their weight out of which 62% were females.

Out of the 67% of the obese individuals who faced some sort of criticism 55.2% (n=37) had this experience at home and 46.2% (n=31) had this experience at school. A smaller percentage of them were also criticized in the health field (32.8%), public transport (34.3%) or their work environment (32.8%). 33% of the obese individuals reported that they have never been criticized or have been a victim of discrimination. Out of the 67% that admitted to being criticized only 18% reported that out of their close friends 50% or more are obese whereas out of the 33% that denied any criticism, 45% reported that out of their close friends 50% or more are obese.

When asked about the most significant issue that the obese individuals face 26% of them reported that they do not face any difficulties, the remaining 74% had a positive reply to this question. Out of these 74%, 43.2% (n=32) reported

that the most significant issues that they faced were psychological, 32.4% (n=24) said social, 13.5% (n=10) said monetary and 9.5% (n=7) said medical.

Out of the hundred obese persons, 40% believed that the most likely cause of being obese is unhealthy diet, 27% said that the cause is familial, 11% thought their obesity is due to the lack of physical activity in their lives, 8% said it is related to the state of emotion they are in. Five percent of the obese claimed to be stress eaters, 4% believed that obesity is associated with chronic illnesses and 1% blamed it on the media and the impact it has on the society. One percent answered in the 'other' category but did not point out a specific cause and 3% of the obese individuals informed that they did not know the cause of their obesity.

Table 1 (top of next page) exhibits the response of the obese individuals when asked what they believe is the best method for losing weight. Almost half of the patients thought that diet is the best method for losing weight.

Figure 4 displays the understanding and awareness that obese patients have about the best preventive

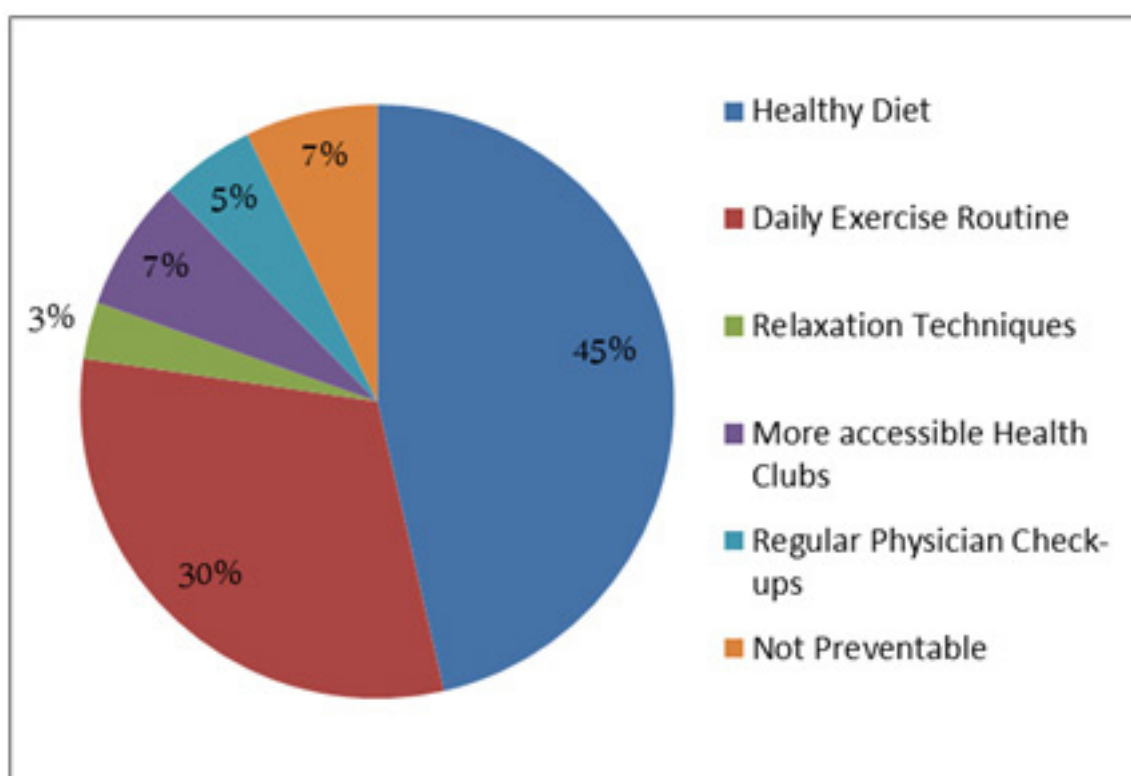| Variables | n | Percent |
|-----------|-----|---------|
| Exercise | 29 | 29.0 |
| Diet | 47 | 47.0 |
| Surgery | 14 | 14.0 |
| Medicine | 7 | 7.0 |
| Other | 3 | 3.0 |

**Table 1: Best method for losing weight**



**Figure 4: Patient perception on the best preventive strategy for obesity**

strategy for obesity. The majority of the patients, 45%, believed that healthy diet is the best strategy to prevent obesity followed by daily exercise 30%. A small number of respondents (3%) believed that relaxation technique can also play a role in preventing obesity.

## Discussion

In this study, we have attempted to display the difficulties that the obese population faces as part of our society. A hundred adult obese patients were interviewed, irrespective of their race or religion, based purely on convenience sampling methodology.

Obesity in Pakistan has been overlooked, as a major health problem, for many years until recently. Now considered a major health issue, this has led to a change in the attitudes of our physicians when dealing with obese patients but psychosocial aspects of obesity are still not being properly addressed. The study revealed that 26% of the obese individuals did not face any difficulties as a result of their weight. The remaining 74% revealed that the most significant issue they face due to their weight is psychological (43.2%) (n=32).

The results showed that 76% of the obese individuals were unhappy

with their weight. Out of these 76%, 67.1% were females which means that out of 52% of the obese females 88% were unhappy with their weight whereas out of the 42% of the obese males 60% were unhappy with their weight. This shows that a significant number of the female obese patients were unhappy about weight compared to obese males (p value - 0.01). In this study, the most common feelings among the unhappy obese individuals were feelings of guilt and depression. A study conducted in Sweden revealed that obese men and particularly women have markedly worse implications on mental well-being and they have more anxiety and depressive

symptoms.(6) Another study showed that overweight females scored higher on sociability and extroversion scales than non-overweight females but it could not be concluded whether these results were primary or secondary to obesity.(7)

Even though 76% of the obese individuals reported being unhappy with their weight 42% of the obese individuals said being obese is not a hindrance to their lifestyle and that they do not avoid any activity or situation as a result of being obese whereas 58% accepted obesity as a limitation. The most common difficulties they faced were going to public places (n=35), participating in sports (n=28) and taking part in group activities (n=26).

Another issue is how these obese individuals are treated by others and the criticism and discrimination they face in the society. It was seen that 33% of the obese individuals did not face any criticism or discrimination but the rest felt that they had been criticized in one setting or another. The most frequent setting for criticism or discrimination, for the 67% that were victims of these evils, were home (n=37), school (n=31), public transport (n=23) and workforce (n=22). It was seen that 55% of the obese individuals were teased or bullied at some point in their lives, 34% were neglected by physicians as a result of being obese and 24% reported that they had difficulty finding employment. The results of another study showed a similar outcome with respect to criticism and discrimination where 78.2 % of the obese patients reported that they feel that they have been treated disrespectfully by medical professionals as a result of their weight; 73.6% felt that they and their shopping carts are looked upon critically at the grocery stores and 64.2% felt that their weight is a factor in determining whether or not they have been considered for promotions at work.(6, 8)

We also tried to determine a link between obesity and the level of education of these obese patients and it was found that 54% of them

were college graduates and the rest (46%) did not receive any education beyond high school. So the results were inconclusive and furthermore it was hard to determine whether the BMI was responsible for their lack of motivation to go to college or if it was the other way round. Another reason could have been a lack of financial means to pursue their goals in life.

In most societies the standards concerning appearance and body have been harsher for women than for men and also the norm of thinness has affected women more strongly. This has probably led to the increase in psychosocial problems for women compared to men. Our study shows that 49% of the obese individuals felt that it's easier for males to live in society as obese compared to women and out of these 63% were females. Out of the 74% who reported that they faced some kind difficulty as a result of their weight 63.5% were women and 53.2% of these women reported that the most significant issues they face as a result of being obese are psychological. Compared to the women, only 26% of the men said that the most significant issues they face are psychological. Research has shown that in relation to gender, the embarrassment associated with being obese is more for women and those obese women are discriminated against more than men because of their weight.(9) It has also been observed that for women even imagined overweight is a significant source of feelings of shame, guilt and inadequacy.(10)

Whether it is adults in their offices or children in schools, the most popular type of food nowadays is fast food. People are so busy with their lives that they are spending less time at home and more at work and a significant number of them have both lunch and dinner at their offices. Even though they are educated and aware of the consequences of their life style there are very few people who decide to do something about it. When at home most of them spend their time resting or in front of the television. Our aim was to determine if these obese patients

are aware of the causes as well as the preventive strategies and treatment of their condition. In our study 96% of the obese individuals had something to say concerning the cause of their obesity but the remaining 4% mentioned that they were either unsure or did not know the cause of their obesity. The majority of them (40%) felt that the most likely cause of their obesity is unhealthy diet (n=40), 27% felt that obesity runs in their families and 11% reported that their obesity is most likely due to a lack of physical activity. There is much evidence that modern diet, which is high in fat, calories and palatability as well as being easily available in large amounts, has created a phenomenon known as "passive overconsumption" of excess energy.(11, 12) In one study conducted in Pakistan, 60% of the obese sample admitted to having a family history of obesity and 88% of the obese disclosed that they take oil rich foods, that they take high fiber diets in abundance, eat sweets and were addicted to carbonated beverages. The same study revealed that 78% of the obese individuals had no exertion in their daily routine and 33% were spending more than four hours daily watching television.(13) One of the interesting new hypotheses for explaining the development of obesity involves a food addiction model, which suggests that food is not eaten as much for survival as pleasure and that there are a number of shared neural and hormonal pathways that may help researchers discover why certain individuals continue to overeat despite health and other consequences, and become more and more obese.(14)

The results of our study show that 47% of the obese individuals thought that the best method for losing weight is to limit dietary intake and to eat healthily. Research shows that limiting calories and not the types of foods you eat causes more weight loss over the longterm. For example, cutting only carbohydrates or fat will not cause any more weight loss than a healthy and balanced low-calorie diet.(15) The other most frequent answers to the "best method for

weight loss" question were a daily exercise routine (29%) and surgery (14%). The American College of Sports Medicine recommends that people who are overweight or obese get at least 150 minutes a week of moderate-intensity physical activity to prevent further weight gain or to lose a modest amount of weight. But to achieve significant weight loss, you may need to get as much as 250 to 300 minutes of exercise a week.(16) When surgery is considered, bariatric surgery is the only currently available, effective, long-term method for controlling morbid obesity.(5)

It is believed that prevention is better than cure and most of the obese individuals in our study, even though not implementing this strategy in their lives, had good knowledge of the best ways to prevent obesity. A total of 75 obese individuals felt that the best ways to avoid obesity are to eat healthily (n=45) and to implement an exercise routine in their daily lives (n=30). Five of the obese individuals felt that regular physician checkups are the best way to avoid obesity and 7% reported that obesity cannot be prevented. A study shows that one-third of overweight preschool children and one-half of overweight school age children remain overweight as adults.(17) This makes it critical to prevent overweight and obesity in children. Recent research also indicates that weight maintenance in young adults requires additional energy expenditure or a reduction of 100 kcal per day. When compared against a deficit of 500-1,000 kcal per day needed to produce one to two pounds of weight loss a week, these values show the relative benefits and ease of preventing weight gain over the more difficult task of weight reduction.(18)

## Conclusion

The obese individuals in our study are suffering from major psychosocial disturbances but still appeared to have insight to the cause of their illness. It is extremely important to explore the psychosocial aspect of obesity, especially in Pakistan, and to increase awareness regarding the causes and prevention of obesity. This can only be achieved through

the development of trust between the physicians and their patients.

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# Efficacy of a culturally competent group-based educational program for type 2 diabetics: A randomized controlled trial

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## Abstract

**Background:** Epidemiological studies have demonstrated that the prevalence of type 2 diabetes among Arabian Gulf countries is among the highest worldwide reaching up to 27% (IDF2007). The aim of this trial was to develop and implement a culturally sensitive theory based educational interventional programme for Arab adult type 2 diabetic patients living in the state of Qatar.

**Method:** A prospective randomized controlled trial was implemented in Qatar Diabetes Association conference rooms in Doha, Qatar. The intervention consisted of 4 educational sessions. A modified reliable and valid questionnaire was used to assess knowledge, attitude and practice pre and post intervention.

**Results:** Baseline assessment of control and intervention arms showed lower knowledge and practice about diabetes in both arms, however the intervention group had rated themselves

higher with regards to attitude (p<0.0001). One year later i.e. after the conclusion of the study, the intervention group had shown significant improvements in scores for knowledge, attitude and practice (P < 0.0001) in comparison to the control group.

**Conclusions:** This study demonstrated that carrying out a culturally sensitive educational intervention in patients with type 2 diabetes is feasible and cost effective in improving knowledge, attitude and practice.

## Introduction

The prevalence of type 2 diabetes is forecast to increase over the next few decades posing a huge global health challenge (1). Ethnicity is associated with variable prevalence of type 2 diabetes according to epidemiological studies. In Europe and America the prevalence of type 2 diabetes ranges from 0.7 to 11.5% while it ranges from 4.6 to 27% in the Middle East being highest among the Arabian Gulf countries(IDF 2007). Although clinical trials in the west have demonstrated the effectiveness of theory based structured group based education in diabetes management, it is worrying that despite the alarmingly high prevalence of type 2 diabetes in the Arabian Gulf region no structured theory based group based education exists nor has its effectiveness been tested through a randomized controlled trial. Our initial goal was to assess baseline knowledge, attitude, and practice in a representative sample of Arab patients suffering from type 2 diabetes in Doha, Qatar. We utilized the baseline data to aid in developing and implementing a theory based culturally sensitive educational interventional programme for this sample. Next we investigated whether this intervention would produce a statistically significant difference in knowledge, attitude, and practice compared to the control group.

## Methods
**Study setting and population**
Arab people (defined as any one of Arabic origin) suffering from type 2 diabetes over the age of 18 were identified from randomly selected primary health care centers and hospital based diabetes clinics catering for a significant number of Arab patients. Each health centre represented one of the four geographical regions that the country has been divided into. Letters were

sent to all participants and phone calls were made inviting them to participate in the study. If there was no response, participants were sent a reminder via post, email and phone calls.

## Research Design and Methods
A total of 430 Arabic speaking adult patients with type II diabetes mellitus, attending 22 primary health care centers and hospital diabetic clinics in Doha, Qatar were enrolled in this randomized controlled trial. Informed consent letters were sent to all participants inviting them to participate. The study conformed with the principles stated in the declaration of Helsinki (7).

**The Nature and Purpose of the Study:**
The study was a multi-stage theory based randomized controlled study (see Figure 1); the model was based on two previous studies in the United Kingdom, one in England (8) and another in Glasgow, Scotland (9).

Research protocol and ethical considerations:
Approval for this study was granted by Hamad Medical Corporation (HMC) Research Ethics Committee (Research Protocol #412/2006) and The University of Greenwich (U.K.) research ethics committee (UGREC).

**Subject Recruitment:**
*Eligibility Criteria*
Subjects included in the study were Arab adults living in Qatar suffering from type II diabetes mellitus and registered with primary health care (PHC) centres and the Main General Hospital (HGH). Participants were excluded from the study if they were diagnosed with type 1 diabetes mellitus, or had alcoholism or drug abuse documented.

A total of 800 subjects were enrolled; of these 430 subjects gave consent and returned the complete questionnaire; the remaining 370 declined to participate or gave incomplete questionnaires and information. The remaining 430 subjects were randomly allocated to either intervention or control group with 215 subjects in each arm. A

further 49% drop out was noticed at six months interval (106 of 215) in the intervention arm and 16% (34 of 215) in the control group. (See Figure 2) Reasons for lack of follow up included: heavy traffic, lack of time on the part of the participants and the month of Ramadan where people are fasting the day and going on leave.

Participants were recruited in the first stage by random selection; the second stage involved sending a letter of invitation to the subjects and the third stage involved randomly assigning participants to one of two groups using a random number table (10). Stratified randomization was used to ensure that important characteristics were balanced approximately. This was done by producing a separate block randomisation list for each group.

All participants ultimately received the diabetes educational toolkit as it was deemed unethical to withhold the educational tool kit from the control group. Non-contamination of our subjects was insured since none had participated in any pharmacological or behavioural interventions previously.

Scores on knowledge, attitude and practice formed the basis of the intervention. The (CSSEP) was delivered by Health Educators who were specifically trained prior to the trial to deliver diabetes self management in its broad domains utilizing counselling skills and empowerment.

## Hypotheses
Delivery of a structured group based education coupled with an educational kit utilizing counselling techniques, empowerment and a change of locus of control will lead to enhanced diabetes knowledge, and emotional and psychological adjustment.

**Setting:**
The intervention was based on the theory of empowerment and changing locus of control from an external one to an internal one. This was achieved via utilization of counselling techniques and

non-didactic health education where patients are helped to help themselves and act as independent experts of their own disease. The intervention group had scheduled group educational sessions conducted in a seminar room at the Qatar Diabetes Association (QDA) main building. In this study, 10 to 20 participants were allocated per session and all educational sessions were run in Arabic language and examples used were local and culturally based. The educational toolkit developed as part of this project was used as the main text source for education. The toolkit was developed in Arabic and each subject had their own copy to take home with them and to share with their families. All educational sessions were interactive, focus-group based and allowed for participants to share their experiences and learn from each other. A summary of the culturally sensitive intervention is seen in Figure 1 - opposite page. The educational tool kit was also given to the control group at the start of the study as it was deemed unethical to withhold it from them.

**Measures:**
Assessment of knowledge, attitudes and current practices was ascertained by using a previously validated questionnaire used in a similarly designed study (9) and modified and translated into Arabic to suit the requirements for the target population. The questionnaire consisted of 36 items using a Likert scale scoring system. Questions assessing knowledge comprised 12 items designed to determine subjects' knowledge about diabetes, its complications, correct diet to follow, proper management decisions and exercise habits. Similarly, attitude appraisal questions assessed subjects attitude towards their disease, life style issues, diet, controlling diabetes and having confidence in declaring having diabetes. Practice questions on the other hand concentrated on the patients' compliance with treatment, diet adherence, exercise, foot examination and regular follow up.
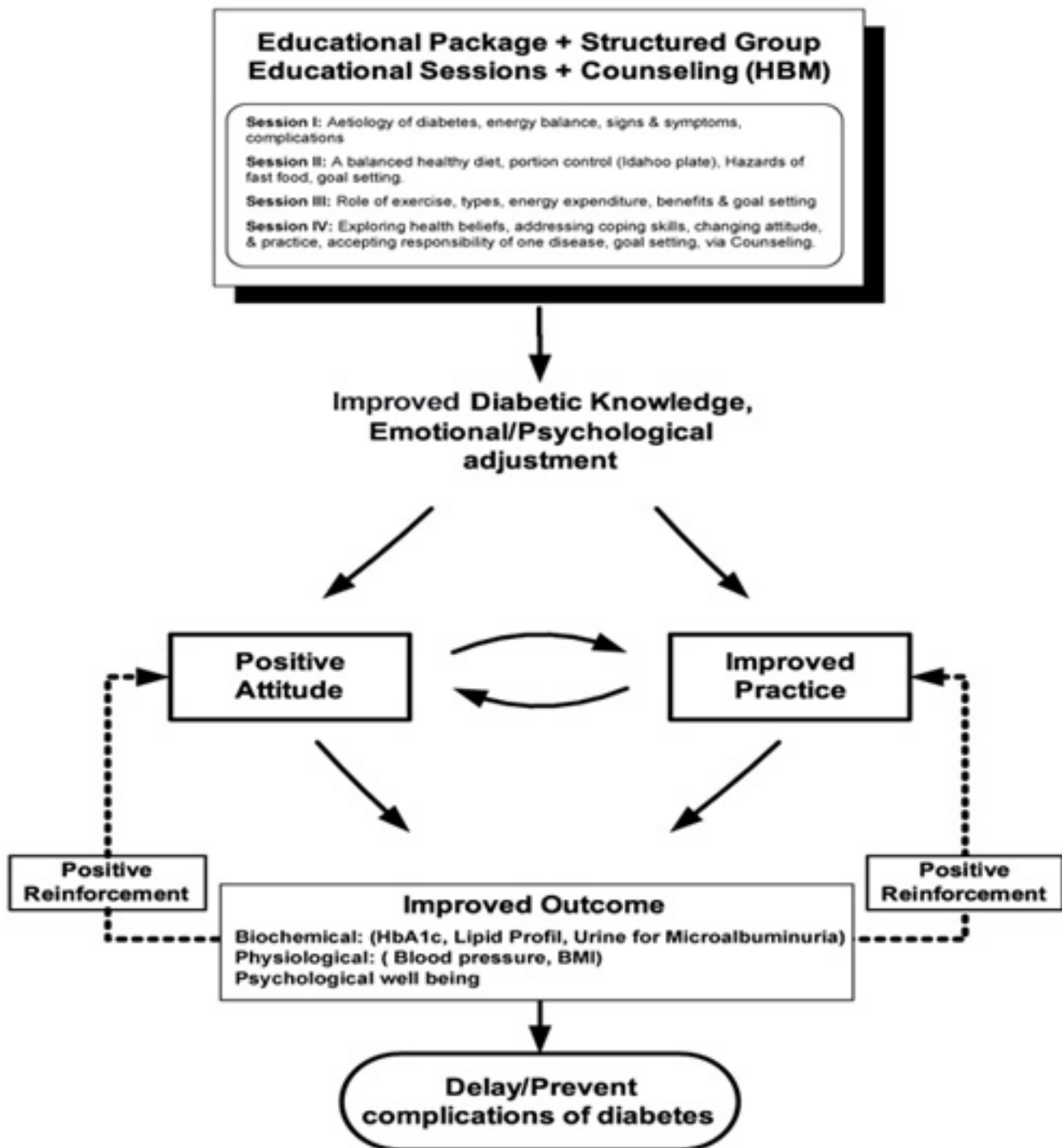
**Figure 1: A Theoretical framework of intervention for patient-self management of Type 2 Diabetes Mellitus in Doha, Qatar**

**Study outcomes:**
The primary outcomes of the intervention at 12 months included improvement in diabetes knowledge, attitude and practice**.**

**Statistics analysis:**
An intention to treat basis was used during statistical analysis. The primary outcome measures were used to test the study hypotheses by calculating means, standard deviations (SD) and standard errors of means (SEM). Mean differences and their equivalent 95% confidence intervals (95% CI) were calculated to allow for further statistical comparisons between control and intervention groups similar to methods employed in previous studies (13). Quantitative data collected from physical and physiological and biochemical measurements were also grouped as means (±SD) values. The Mann-Whitney U-test was employed in statistical analysis to compare means, as the data did not appear to fit (or obey completely the rules of) a normal distribution pattern. A series of univariate analysis of covariance two group was done at multiple intervals.
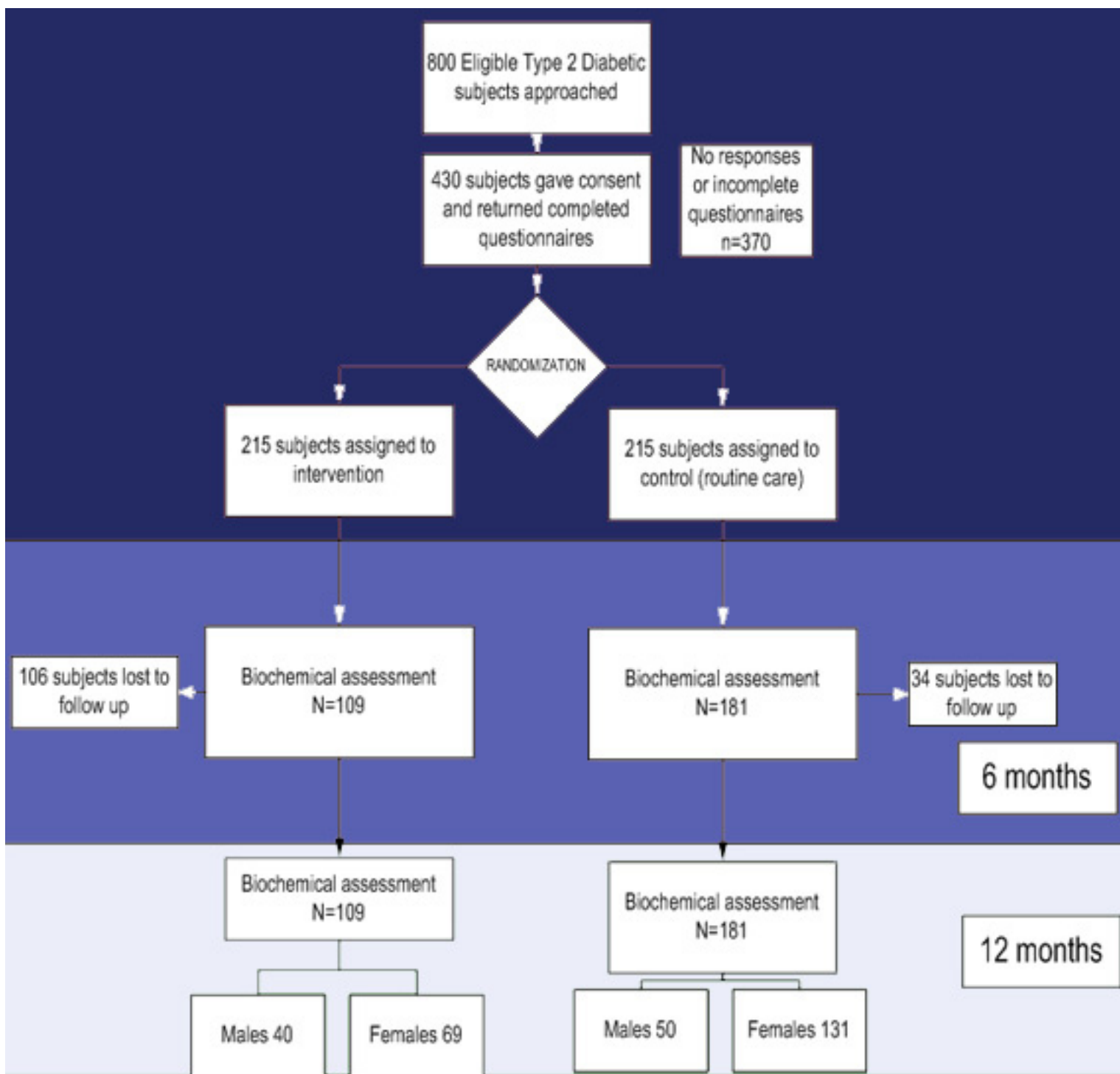
**Figure 2: Consort Diagram of study design**

## Results

The majority of subjects were females and obese with poor metabolic control and had elevated FBS, HbA1C, LDL cholesterol and a high albumin/creatinine ratio at baseline (see Table 1). At baseline there were no statistically significant differences between the intervention and control group with regards to F.P.G, HbA1C, HDL cholesterol and albumin/creatinine ratio and blood pressure. However, statistically significant changes in metabolic parameters were evident at baseline between the intervention and control group in few outcome measures including total cholesterol, LDL cholesterol and triglycerides and BMI (see Table 1).

On the other hand, with regards to knowledge, attitude and practice there were no statistically significant changes between intervention and control group (see Table 1). After the completion of the study the intervention group had significant improvement in diabetes knowledge (5.9%, P <0.0001), attitude (6.56 %, <P0.0001 ) and practice (6.25% , P=0.0001) (see Table 2).

## Discussion

Enrollment in this (CSSEP) significantly improved psychosocial adjustment and wellbeing which was evident from the statistically significant improvement seen in the domains of diabetes knowledge, attaining a positive attitude towards diabetes and improved practice.

| | Intervention | Control | Difference in means (95% CI) | P - Value |
|---|---|---|---|---|
| Age ( years ) | 52 (8.9) | 55 (10.7) | - | 0.04 * |
| Age at diagnosis ( years ) | 53.1 (12.4) | 50 (12.4) | - | 0.09 |
| Duration | 11.5 (9.0) | 10.3 (8.4) | - | 0.46 |
| Education (less than a high school education) | 57.9 (22.0) | 50.0 (15.0) | - | 0.63 |
| Income ( < $ 20.000 / year) | 52.8 (19.0) | 44.4 (12.0) | - | 0.72 |
| Knowledge Score | 14.32 (6.50) | 14.69 ( 6.22) | - 0.37 (-1.80, 1.06) | 0.65 |
| Attitude Score | 8.26 (3.68) | 6.34 (3.10) | 1.92 (1.15, 2.70) | 0.67 |
| Practice Score | 11.21 (5.18) | 11.01 (6.11) | 1.21 (1.03, 1.45) | 0.63 |
| Overall Score | 33.80 (9.13) | 32.03 (9.74) | 1.76 (0.33, 3.85) | 0.62 |
| Systolic B.P (mmHg) | 137.3 (12.68) | 136.0 (12.72) | 1.31 (-1.72, 4.34) | 0.395 |
| Diastolic (mmHg) | 85.2 (13.34) | 82.1 (13.48) | 3.10 (0.10, 6.30) | 0.057 |
| BMI (kg/m2) | 34.8 (5.41) | 32.7 (3.05) | 2.07 (0.95, 3.18) | P<0.0001 * |
| HbA1C (%) | 8.67 (1.50) | 8.61 (2.9) | 0.06 (-0.36, 0.47) | 0.794 |
| Fasting plasma glucose | 9.49 (3.30) | 9.45 (4.20) | 0.04 (-0.83, 0.92) | 0.928 |
| Total Chol ( mmol/L) | 5.37 (0.97) | 4.83 (1.01) | 0.53 (0.50, 2.99) | P<0.0001 * |
| HDL-Chol (mmol/L) | 1.35 (0.28) | 1.31 (0.27) | 0.04 (0.02, 0.11) | 0.202 |
| LDL – Chol (mmol/L) | 3.49 (0.63) | 3.14 (0.06) | 0.35 (0.05, 0.19) | P<0.0001 * |
| Triglyceride (mmol/L) | 1.77 (0.32) | 1.60 (0.33) | 0.18 (0.10, 0.25) | P<0.0001 * |
| Albumin / Creatinine Ratio | 4.84 (3.98) | 5.72 (4.55) | 0.87 (-1.88, 0.13) | 0.087 |
| * Significant P-value | | | | |

**Table 1: Baseline demographic characteristics of the clinical trial population**

Knowledge, attitude and practice were all significantly improved in the intervention group at the conclusion of the study and not in the control group.

And although knowledge is important in managing diabetes it is not enough as suggested by studies done recently ( 14,15).

Improvements in (KAP) score could be related to the use of a group-based approach which leads to higher patient satisfaction, interactive learning ( 16 ), dilution of stigma, and installing a sense of belonging among the group members.

The (CSSEP) was effective because it was theory based utilizing the health belief model, empowerment and a change in locus of control from an external one to an internal one i.e. owning responsibility and taking control of one's own disease (see Figure 1).

Health educators were counseling the participants, and explaining coping strategies thereby empowering the participants to take control of their own disease.

It is well known that patients may under estimate the grave consequences of diabetes because of its silent evolution; secondly patients indulging in immediately " pleasurable activities" (e.g. enjoying smoking, sweet meals, not exercising) may work as a powerful deterrent for adopting healthy behavior (17). As a result participants were counseled regularly to convert

| | Intervention (N= 109) Mean (SD) | Control (N= 181) Mean (SD) | Difference in means (95% CI) | Overall change repeated measures ANOVA P-value |
|---|---|---|---|---|
| **KAP Score Outcomes** | | | | |
| Knowledge Score | 26.68 (5.91) | 20.77 (4.73) | **5.91** (4.59, 7.22) | <0.0001 |
| Attitude Score | 15.77 (3.13) | 9.21 (2.85) | **6.56** (5.84, 7.29) | <0.0001 |
| Practice Score | 24.15 (5.11) | 17.62 (4.38) | **6.52** (5.36, 7.68) | <0.0001 |
| Overall Score | 66.60 (9.02) | 47.61 (7.08) | **18.99** (16.99, 20.98) | <0.0001 |

**Table 2: Changes in clinical & behavioural outcome following the intervention**

their locus of control from an external one to an internal one. This is very important since individuals with diabetes must make a series of daily decisions involving lifestyle changes and stress management (18).

Previous studies have shown that advantages gained from self management strategies can be lost after 3 months (19); our primary outcome (improvement in KAP) was sustained until 12 months.

Although, group based education is more effective than one - to - one education (20) however the active ingredient (S) is difficult to define (21). However, in our study the effectiveness of the intervention may be attributed to several factors including counseling, empowering patients and forming a psycho therapeutic alliance.

Furthermore, diet was approached by utilizing the Idaho - plate method in a culturally acceptable way where local cuisine were reinforced and portion control was explained and applied using live demonstrations.

Strengths and limitations of the study
The study has several strengths. Firstly, the sample size was representative. Secondly, the small number, 10-20 patients per session, makes it a feasible option to be applied in all primary health care centers in Qatar since each health center is equipped with a conference room.

Thirdly, the utilization of the "culturally sensitive Idaho - plate" method makes it an attractive and pragmatic way of cutting down on calories without the feeling of hunger or the need to use exchange lists and diet sheets.

Fourthly, the intervention is likely to be generalizable to neighbouring Arab countries since they share the same cultural beliefs and habits. However, there are several limitations. Firstly, the high attrition rate encountered in the course of the trial may represent a setback. Secondly, dietary intake, physical activities, and medication change were not counted for. Thirdly, complementary and alternative

medicine usage was not assessed as many patients use herbal medicine to treat their diabetes but without divulging the information to their treating physicians.

In spite of these limitations to the present study, the significant improvement in knowledge, attitude, and practice parameters provide a great opportunity for the study to be replicated in the Arabian countries. This is particularly important since no structured group based education currently exists or is applied in the region.

## Conclusion
The study has provided useful insights about Arab patients with type 2 diabetes and based on the findings of this intervention the following recommendations could be useful for future studies. Although this study has demonstrated the effectiveness of theory based structured group education, future research could explore the economic cost effectiveness of such an intervention, the influence of psychological burden, concomitant use of

| | | Agree | | | | | | Disagree |
|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1 | Insulin raises your blood sugar level | | | | | | | |
| 2 | Food is not an essential part of my life and I can accept changes | | | | | | | |
| 3 | I examine my feet on a regular basis | | | | | | | |
| 4 | I should immediately eat or drink something sweet when feeling hungry, dizzy and weak | | | | | | | |
| 5 | Diabetes is an embarrassing disease to tell people about | | | | | | | |
| 6 | When I have blurred vision I see my doctor | | | | | | | |
| 7 | Rice is mainly protein | | | | | | | |
| 8 | I find it difficult to control my weight | | | | | | | |
| 9 | Loss of sensation in the feet is a normal occurrence in diabetics and should be ignored | | | | | | | |
| 10 | The normal range of blood glucose is (20-30 mmol/L) 370-555 mg/DL | | | | | | | |
| 11 | Diabetes is the most unpleasant thing happened in my life | | | | | | | |
| 12 | I often eat fast food | | | | | | | |
| 13 | Fibrous food is good as it absorbs sugar more efficiently | | | | | | | |
| 14 | Adjusting my life to diabetes is quite difficult | | | | | | | |
| 15 | I exercise regularly | | | | | | | |
| 16 | Being overweight does not worsen Blood sugar control | | | | | | | |
| 17 | Most people don't know what it feels like to live with diabetes | | | | | | | |
| 18 | I do not take my diabetic medication on time (oral or insulin) | | | | | | | |
| 19 | Heart, Eyes, Kidneys and Feet can be damaged in uncontrolled diabetes mellitus | | | | | | | |
| 20 | It is essential to involve a family member in managing my diabetes. | | | | | | | |
| 21 | I eat at least one plate full of rice every day | | | | | | | |
| 22 | Smoking does not have any complications on diabetic subjects | | | | | | | |
| 23 | Controlling diabetes seems to be a very hard goal to achieve | | | | | | | |
| 24 | I use butter instead of vegetable oil in the house | | | | | | | |
| 25 | Diabetic patients should avoid physical exercise | | | | | | | |
| 26 | I know everything about diabetes | | | | | | | |
| 27 | Separate type of food is being prepared for me at home | | | | | | | |
| 28 | The diabetic patients can eat fruits but not too often | | | | | | | |
| 29 | Having diabetes makes me feel different to the rest of the people | | | | | | | |
| 30 | I often take soft drinks with my meals. | | | | | | | |
| 31 | Type II diabetes is due to lack of insulin and insulin resistance | | | | | | | |
| 32 | I feel quite confident in controlling my diabetes with little help from doctors | | | | | | | |
| 33 | I eat fruits daily | | | | | | | |
| 34 | The presence of glucose in urine is a bad sign | | | | | | | |
| 35 | I feel happy being told that my diabetes is under control | | | | | | | |
| 36 | When I feel dizzy, weak and hungry, I immediately eat sweets | | | | | | | |

**Table 3: Knowledge, Attitude, Practice (KAP) Questionnaire**

complementary and alternative medicine, energy balance including dietary habits and prescribed exercise, quality of life, influence of family support, gender issues including male to male education and female to female education and finally a longer timeline such as a five year span to see if these changes are sustainable over longer timelines.

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# Hypertension: Prevalence of Selected Risk Factors and Blood Pressure Control

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## Abstract

**Background and Objectives:** Hypertension is highly prevalent worldwide. The objectives of this study were to investigate the prevalence of selected risk factors and the degree of blood pressure control in hypertensive patients.

**Methods:** All hypertensive patients attending the Non-Communicable Diseases Clinic in Northern Muharraq Health Centre in a period of three weeks, were included. Data were extracted from patient records and questionnaires.

**Results:** Among hypertensive patients, around a half had satisfactory blood pressure control. Systolic blood pressure was statistically significantly directly correlated with age (p=.033), a positive family history of hypertension in parent(s) (p=.018) and diastolic blood pressure (p=.000). Diastolic blood pressure was statistically significantly directly correlated with smoking (p=.008), positive family history of hypertension in sibling(s) (p=.024), and systolic blood pressure (p=.000). It was also statistically significantly inversely correlated with age (p=.018). As for systolic blood pressure, and according to linear regression, age (p=.000) and a positive family history of hypertension in parents (p=.017) were found to be significant predictor variables. For diastolic blood pressure, age (p=.000), smoking (p=.005) and systolic blood pressure (p=.000) were found to be significant predictor variables.

**Conclusion:** Blood pressure control among hypertensive patients was improved.

**Keywords:** hypertension, risk factors, control

## Introduction

**Background**

Hypertension (HTN) is a highly prevalent risk factor for cardiovascular diseases (CVD) throughout the developed countries. The prevalance of HTN is expanding worldwide due to many factors including obesity, physical inactivity and unhealthy diets. There is not any real observed difference in the current prevalance of hypertension between many developing countries particularly in urban societies, and the developed countries. Globally, 7.1 million premature deaths and 4.5% of the disease burden [64 million disability-adjusted life years (DALYs)] are estimated to be caused by HTN.(1) Locally, in 2007, the prevalence of HTN in Bahrainis was 38.2%; 42.9% of whom were males compared to 33.7% females. However, the prevalence of HTN in 1995 in Bahrain was 21.1%.(2)

HTN is defined as high blood pressure (BP).(3) In more than 95% of cases, a specific underlying cause of HTN cannot be found. This is called essential HTN which has not a clearly understood pathogenesis. The kidney, the peripheral resistance vessels and the sympathetic nervous system have been proposed by different researchers as the seat of the primary abnormality. In fact, such a problem is probably multifactorial.(4) On the other hand, HTN that is caused by another medical condition or medication is called secondary HTN.(3)

Aside from hypertension, a number of risk factors are highly prevalent in Bahrain. For instance, 19.9% of the population are smokers, 57.1% are physically inactive at leisure time, 69.2% have a body mass index (BMI) $\geq 25 \text{kg/m}^2$, 25.8% have a fasting blood glucose >5.8mmol/L and 40.6% are hypercholesterolemic.(5)

Grading of HTN is distinct. While the British Hypertension Society(4) and the 2007 ESH-ESC Practice Guidelines for the Management of Arterial HTN(6) agreed on classifying BP into optimal, normal and high normal; and HTN into grade 1, 2 and 3. US Department of Health and Human Services, National Institutes of Health and National Heart, Lung and Blood Institute, changed the classification of BP from optimal, normal and borderline; and HTN from grade 1, 2 and 3 in its sixth report, to be normal, pre-hypertension and HTN grade 1 and 2 only.(7)

## Objectives

This study was undertaken in order to investigate the prevalence of selected risk factors; namely dyslipidaemia, diabetes mellitus (DM), smoking, obesity and family history of DM, HTN and CVD in first degree relatives in hypertensive patients, and to explore the degree of blood pressure control (BPC) among these patients in Northern Muharraq Health Centre.

## Methods
### Data collection and analysis

#### Selection of participants
It is estimated that the population of Muharraq Governorate is 169,299.(8) There are six governmental health centers in Muharraq Governorate with a total of 658,885 visits in 2009, 54% of which were to Northern Muharraq Health Centre.(9)

All hypertensive patients attending the Non-Communicable Diseases Clinic (NCDC) in Northern Muharraq Health Centre in a period of three weeks were included. No patients were excluded regardless of their age, sex, nationality, educational level or socioeconomic status.

#### Data extraction and analysis
Data were collected using two methods; patients' records and questionnaires. Patients' records were used to extract the most recent available data; namely the sex, age, BP reading, BMI, smoking status and the diagnosis of dyslipidaemia or DM. Questionnaires were administered in two languages; Arabic and English.

This included items on the family history of CVD, DM and HTN in first-degree relatives and physical activity.

SPSS Statistics 17.0 was used for statistical analysis. Variables were tested with Chi square analysis. Spearman's rho and linear regression analysis where applicable. A p-value of <0.05 was considered significant.

### Definition of variables

- HTN was defined as shown in Table 1. BPC is considered satisfactory if BP is <140/90.
- History of CVD in first degree relatives
  - CVD: disorders of the heart and blood vessels. This includes coronary heart disease, cerebrovascular disease, raised BP, peripheral artery disease, rheumatic heart disease, congenital heart disease and heart failure.(10)
  - A first degree relative: "a family member who shares about 50% of their genes with a particular individual in a family. First degree relatives include parents, offspring, and siblings."(11)
- Interpretation of BMI is provided in Table 2.
- Physical inactivity:
  The recommended physical activity is combinations of moderate- and vigorous-intensity activity:
  - Moderate intensity physical activity: includes brisk walking, cycling at moderate speeds, mopping or walking with a purpose; 30 minutes/day, five days per week as a minimum. Or:
  - Vigorous-intensity physical activity: exemplified by jogging, and causes rapid breathing and a substantial increase in heart rate; three days per week; 20 minutes a day.(13)
  - Patients were considered physically active if they exercise according to, or more than the recommended; inadequately active if they exercise less than the recommended; or physically inactive if they do not exercise.
- Dyslipidaemia and DM were considered if a patient was a known case of these diseases or

was diagnosed with these diseases on the last visit.

## Results
### Descriptive
In this study, data collected from 110 patients were analyzed. The mean age of participants was 56.44±10.857 years. Fifty-five percent of the sample were women compared to 45% men, with mean ages of 55.56 and 57.53 years respectively. The mean systolic blood pressure (SBP) and diastolic blood pressure (DBP) were 137.7091±18.07596 and 82.1455±10.25262 mmHg respectively. Unsatisfactory BPC was prevalent among half of the sample. Characteristics of the study sample and prevalence of variables are presented in Table 3 (page 32-33).

As for the BMI, almost one-fifth of the sample were normal in comparison to one-quarter who were overweight and 57% who were obese or morbidly obese; half of those with a BMI>30Kg/m$^2$ had an unsatisfactory BPC.

The prevalence of dyslipidaemia in this sample was almost two-thirds; of those who were dyslipidaemic, around half had an unsatisfactory BPC.

Three-quarters of individuals were diabetics; around half of whom had an unsatisfactory BPC and one third of diabetics were classified as having isolated systolic hypertension grade 1 (ISH-1).

As for lifestyle factors, smoking was prevalent among 6% of the sample; almost three-quarters of smokers had an unsatisfactory BPC. Three-quarters of the sample were not following the recommended physical activity; 62% of them were physically inactive compared to 38% who were inadequately active. Fifty-five percent of those who were not following the recommended physical activity had unsatisfactory BPC.

A family history of DM, CVD or HTN in first-degree relatives was positive among 90% of individuals; around half of them of them had unsatisfactory BPC.

| Control | | Category | SBP | DBP |
|---|---|---|---|---|
| Satisfactory | BP | Optimal | < 120 | < 80 |
| | | Normal | < 130 | < 85 |
| | | High Normal | 130-139 | 85-89 |
| Unsatisfactory | HTN | Grade 1 (mild) | 140-159 | 90-99 |
| | | Grade 2 (moderate) | 160-179 | 100-109 |
| | | Grade 3 (severe) | ≥ 180 | ≥ 110 |
| | ISH | Grade 1 | 140-159 | < 90 |
| | | Grade 2 | ≥ 160 | < 90 |

BP- Blood pressure; ISH- Isolated systolic hypertension
SBP-Systolic BP; DBP-Diastolic BP

**Table 1: Definition of hypertension (HTN)**(4)

| Category | Body mass Index (Kg/m2) |
|---|---|
| Normal | <25 |
| Overweight | 25 to 29.99 |
| Obese | 30 to 39.99 |
| Morbid Obesity | ≥40 |

**Table 2: Interpretation of Body mass index** (12)

The prevalence of specific variables, namely DM, dyslipidaemia, smoking, a BMI≥25Kg/m², exercising less than the recommended and positive family history of CVD, HTN or DM in first degree relatives was investigated in all cases. Results showed that 9% had a minimum of one variable, another 9% had a maximum of six variables and 41% had four variables.

Inferential and correlation analysis
As shown in Table 3, there where no statically significant differences in BPC across sex, dyslipidaemia, DM, smoking, physical activity and positive family history of CVD, HTN and DM in general. However, a statically significant difference was found in BPC in the case of positive family history of DM in sibling(s) (X2=15.478, p=.030) (highlighted).

Table 4 (page 34) shows that SBP was statistically significantly directly correlated with age (p=.033), a positive family history of HTN in parent(s) (p=.018) and DBP (p=.000). Table 5 shows that DBP was statistically significantly directly correlated with smoking (p=.008), positive family history of HTN in sibling(s) (p=.024), and SBP (p=.000). It was also statistically significantly inversely correlated with age (p=.018). Correlations between different SBP and DBP with different variables are provided in the Appendix- Table 1 (page 38).

**Regression analysis**
The results of linear regression using sex, age, SBP or DBP, BMI, dylipidaemia, DM, smoking, physical inactivity, family history in general and specified family history as predictive covariates are available in Appendix- Table 2 (page 39).

For SBP, age (p=.000), positive family history of HTN in parent(s) (p=.017) and DBP (p=.000) were found to be significant predictor variables (Table 6 - page 34). For DBP, age (p=.041), smoking (p=.005) and SBP (p=.000) were found to be significant predictor variables (Table 7 - page 35).

**Prevalence: n (%)**

| Variables | | Blood Pressure Control | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Optimal | Normal | High normal | HTN-1 | HTN-2 | HTN-3 | ISH-1 | ISH-2 | |
| Sex (X²=2.520, p=.926) | male | 3 (6) | 10 (20) | 9 (18) | 10 (20) | 4 (8) | 0 | 9 (18) | 4 (8) | 49 (44) |
| | female | 5 (8) | 14 (23) | 13 (21) | 8 (13) | 5 (8) | 1 (2) | 12 (20) | 3 (5) | 61 (56) |
| Not applicable | | | | | | | | | | |
| Age | 31 - 40 | 1 (10) | 3 (30) | 1 (10) | 0 | 0 | 0 | 5 (50) | 0 | 10 (9) |
| | 41 - 50 | 1 (6) | 2 (11) | 5 (28) | 5 (28) | 2 (11) | 0 | 0 | 3 (17) | 18 (16) |
| | 51 - 60 | 2 (5) | 10 (24) | 5 (12) | 10 (24) | 2 (5) | 0 | 11 (26) | 2 (5) | 42 (38) |
| | 61 - 70 | 4 (12) | 7 (21) | 8 (24) | 2 (6) | 4 (12) | 1 (3) | 5 (15) | 2 (6) | 33 (30) |
| | 71 - 80 | 0 | 2 (50) | 2 (50) | 0 | 0 | 0 | 0 | 0 | 4 (4) |
| | 81 - 90 | 0 | 0 | 1 (33) | 1 (33) | 1 (33) | 0 | 0 | 0 | 3 (3) |
| Not applicable (X²=13.679, p=.057) | | | | | | | | | | |
| BMI | normal | 3 (15) | 4 (20) | 1 (5) | 3 (15) | 3 (15) | 1 (5) | 3 (15) | 2 (10) | 20 (19) |
| | over weight | 1 (4) | 5 (19) | 8 (30) | 2 (7) | 1 (4) | 0 | 8 (30) | 2 (7) | 27 (25) |
| | obese | 4 (8) | 12 (24) | 11 (22) | 11 (22) | 2 (4) | 0 | 7 (14) | 3 (6) | 50 (45) |
| | morbidly obese | 0 | 3 (23) | 2 (15) | 2 (15) | 3 (23) | 0 | 3 (23) | 0 | 13 (12) |
| Dyslipidaemia (X²=8.007, p=.332) | Negative | 3 (8) | 6 (16) | 11 (29) | 10 (26) | 4 (11) | 0 | 2 (5) | 2 (5) | 38 (35) |
| | Positive | 5 (7) | 18 (25) | 11 (15) | 8 (11) | 5 (7) | 1 (1) | 19 (26) | 5 (7) | 72 (65) |
| DM (X²=5.974, p=.543) | Negative | 4 (15) | 3 (11) | 7 (26) | 2 (7) | 3 (11) | 0 | 6 (22) | 2 (7) | 27 (25) |
| | Positive | 4 (5) | 21 (25) | 15 (18) | 16 (19) | 6 (7) | 1 (1) | 15 (18) | 5 (6) | 83 (75) |
| Smoking (X²=9.889, p=.770) | Non smoker | 8 (8) | 23 (22) | 21 (20) | 16 (16) | 7 (7) | 1 (1) | 20 (19) | 7 (7) | 103 (94) |
| | Smoker | 0 | 1 (14) | 1 (14) | 2 (29) | 2 (29) | 0 | 1 (14) | 0 | 7 (6) |
| Physical Activity | Physically inactive | 5 (7) | 16 (24) | 11 (16) | 10 (15) | 4 (6) | 1 (1) | 15 (22) | 6 (9) | 68 (62) |
| | Inadequately active | 1 (7) | 2 (14) | 2 (14) | 4 (29) | 2 (14) | 0 | 3 (21) | 0 | 14 (13) |
| | Physically active | 2 (7) | 6 (21) | 9 (32) | 4 (14) | 3 (11) | 0 | 3 (11) | 1 (4) | 28 (25) |

**Table 3: Characteristics of the sample (Part A) - Part B is on opposite page**

Table 3: Characteristics of the sample (Part B)

| Family history | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **HTN in sibling(s)** (X²=7.849, p=.346) | | | | | | | | | | |
| | negative | 4 (7) | 9 (15) | 11 (19) | 6 (10) | 0 | 12 (20) | 6 (10) | | 59 (54) |
| | positive | 4 (8) | 15 (29) | 11 (22) | 3 (6) | 1 (2) | 9 (18) | 1 (2) | | 51 (36) |
| **HTN in parent(s)** (X²=10.004, p=.188) | | | | | | | | | | |
| | negative | 5 (11) | 14 (30) | 10 (22) | 5 (11) | 2 (4) | 0 | 9 (20) | 1 (2) | 46 (42) |
| | positive | 3 (5) | 10 (16) | 12 (19) | 13 (20) | 7 (11) | 1 (2) | 12 (19) | 6 (9) | 64 (58) |
| **HTN in offspring** (X²=5.809, p=.562) | | | | | | | | | | |
| | negative | 8 (7) | 24 (22) | 18 (17) | 9 (8) | 1 (1) | 19 (18) | 7 (7) | | 107 (97) |
| | positive | 0 | 1 (33) | 0 | 0 | 0 | 2 (67) | 0 | | 3 (3) |
| **DM in sibling(s)** (X²=15.478, p=.030) | | | | | | | | | | |
| | negative | 4 (8) | 5 (10) | 12 (24) | 2 (4) | 1 (2) | 8 (16) | 5 (10) | | 49 (44) |
| | positive | 4 (7) | 19 (31) | 10 (16) | 7 (11) | 0 | 13 (21) | 2 (3) | | 61 (56) |
| **DM in parent(s)** (X²=4.653, p=.702) | | | | | | | | | | |
| | negative | 4 (8) | 10 (20) | 11 (22) | 5 (10) | 0 | 11 (22) | 4 (8) | | 50 (45) |
| | positive | 4 (7) | 14 (23) | 11 (18) | 4 (7) | 1 (2) | 10 (17) | 3 (5) | | 60 (55) |
| **DM in offspring** (X²=7.632, p=.366) | | | | | | | | | | |
| | negative | 8 (8) | 20 (20) | 18 (18) | 8 (8) | 1 (1) | 17 (17) | 7 (7) | | 102 (93) |
| | positive | 0 | 2 (25) | 0 | 1 (13) | 0 | 4 (50) | 0 | | 8 (7) |
| **CVD in parent(s)** (X²=9.410, p=.225) | | | | | | | | | | |
| | negative | 5 (6) | 16 (21) | 10 (13) | 8 (10) | 0 | 16 (21) | 7 (9) | | 77 (70) |
| | positive | 3 (9) | 8 (24) | 8 (24) | 1 (3) | 1 (3) | 5 (15) | 0 | | 33 (30) |
| **CVD in sibling(s)** (X²=13.084, p=.070) | | | | | | | | | | |
| | negative | 8 (8) | 21 (21) | 16 (16) | 7 (7) | 0 | 19 (19) | 7 (7) | | 99 (90) |
| | positive | 0 | 3 (27) | 2 (18) | 2 (18) | 1 (9) | 2 (18) | 0 | | 11 (10) |
| **CVD in offspring** (X²=3.409, p=.845) | | | | | | | | | | |
| | negative | 8 (7) | 23 (21) | 17 (16) | 9 (8) | 1 (1) | 21 (19) | 7 (6) | | 108 (98) |
| | positive | 0 | 1 (50) | 1 (50) | 0 | 0 | 0 | 0 | | 2 (2) |

HTN-1- Mild hypertension; HTN-2- Moderate hypertension ; HTN-3- Severe hypertension ; ISH-1- Isolated systolic hypertension grade 1; ISH-2- Isolated systolic hypertension grade 2; BMI-Body mass index; DM-Diabetes mellitus

| Variables | Spearman's rho | SBP |
|---|---|---|
| Age | Correlation Coefficient | .203* |
| | Sig. (2-tailed) | .033 |
| DBP | Correlation Coefficient | .597** |
| | Sig. (2-tailed) | .000 |
| HTN in parent(s) | Correlation Coefficient | .226* |
| | Sig. (2-tailed) | .018 |
| * Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed). SBP-Systolic blood pressure; DBP- Diastolic blood pressure; HTN-Hypertension | | |

**Table 4: Statistically significant correlations between SBP and different variables**

| Variables | Spearman's rho | DBP |
|---|---|---|
| Age | Correlation Coefficient | -.225* |
| | Sig. (2-tailed) | .018 |
| SBP | Correlation Coefficient | .597** |
| | Sig. (2-tailed) | .000 |
| Smoking | Correlation Coefficient | .252** |
| | Sig. (2-tailed) | .008 |
| HTN in sibling(s) | Correlation Coefficient | -.216* |
| | Sig. (2-tailed) | .024 |
| * Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed). SBP-Systolic blood pressure; DBP- Diastolic blood pressure; HTN-Hypertension | | |

**Table 5: Statistically significant correlations between DBP and different variables**

| Variables | SBP | | | | |
|---|---|---|---|---|---|
| | Un-Std. Coefficients | | Std. Coefficients | t | Sig. |
| | B | Std. Error | Beta | | |
| Age | .593 | .133 | .356 | 4.466 | .000 |
| DBP | 1.213 | .136 | .688 | 8.902 | .000 |
| HTN in Parent(s) | 7.307 | 3.018 | .200 | 2.421 | .017 |
| SBP-Systolic blood pressure; DBP- Diastolic blood; HTN-Hypertension | | | | | |

**Table 6: Linear regression with significant predictor variables for SBP**

| Variables | DBP | | | | |
| --- | --- | --- | --- | --- | --- |
| | Un-Std. Coefficients | | Std. Coefficients | t | Sig. |
| | B | Std. Error | Beta | | |
| Age | -.328 | .075 | -.347 | -4.374 | .000 |
| SBP | .384 | .043 | .677 | 8.902 | .000 |
| Smoking | 8.630 | 2.993 | .206 | 2.884 | .005 |
| SBP-Systolic blood pressure; DBP- Diastolic blood | | | | | |

**Table 7: Linear regression with significant predictor variables for DBP**

## Discussion

**Prevalence and correlation of variables**
Results showed that SBP was statistically significantly directly correlated with age. This significant correlation could be referred to different causes including age-related alterations in hormone profiles, tendency of elderly to over-salt the meals due to reduced taste bud sensitivity, age-related changes in blood vessels and decreased cardiac efficiency.(14) This result is compatible with Tee et al (2010) where the mean SBP was statistically correlated with age (p=.000).(15) Moreover, results showed that age was also a significant predictive variable for SBP. Tee et al (2010) found that age was a significant predictive variable for HTN. (15)

A statistically insignificant higher proportion of the sample was females. A possible explanation is the relationship between pregnancy and HTN.(16) This insignificant relationship is compatible with Önel et al (2004) where it was found that prevalence of hypertension was higher among women than in men with statistically insignificant correlation.(17) Moreover, Al-Mahroos et al (2000) found that "prevalence of hypertension was not significantly higher in women than in men".(18)

Obesity,(19) dyslipiaemia,(18) glucose intolerance(18) and physical inactivity(20) are variables that are well-studied and found to be correlated with HTN. In this study however, obesity, dyslipidaemia,

DM and physical inactivity were statistically insignificantly correlated to SBP. This statistically insignificant correlation could be referred to different reasons including the sample size or possibly, the good compliance to anti-dyslipidaemic and anti-hyperglycaemic medicines.

A statistically significant direct correlation was found between positive family history of HTN and SBP. Furthermore, a positive family history of HTN in parents was a predictive variable for SBP. This result is compatible with Al-Mahroos et al (2000) (p<0.001). (18) Smoking was statistically significantly directly correlated to DBP. Moreover, smoking was found to be a significant predictive variable for it. A possible explanation is the restrictor effect of smoking on blood flow and hence BP rising.(22) Dogan et al (2012)(22) found that smoking status is statistically significantly directly correlated to HTN. However, Tee et al (2010) found that smoking is a statistically insignificant predictive variable with a direct correlation to DBP.(15)

Age was statistically significantly inversely correlated to DBP. It was also found that age is a significant predictive variable for DBP. The results of this study, where age was directly correlated with SBP and inversely correlated with DBP can explain the ISH. Isolated systolic hypertension in this study was prevalent among one-quarter of the sample. Of those who were diagnosed with ISH, around two-thirds were above the age of 60.

However, this inverse correlation is not compatible with Tee et al (2010) where it was found that DBP is statistically significantly directly correlated to DBP (p= .014). (15)

**Blood pressure control**
A large percentage of hypertensive patients had a satisfactory BPC (49%). The results of this study showed an improvement in BPC compared to Al-Mahroos et al (2000)(18) where the satisfactory BPC was only 21%. This progression could be due to several factors including the establishment of NCDC where special attention is paid to such diseases. Furthermore, rising of awareness is another possible cause, especially where a nurse would sit with every patient on every visit and advise him/her on lifestyle modifications. Moreover, this improvement could be due to developments in pharmacology and medicine.

Although unsatisfactory BPC was higher among patients who were dyslipidaemic, diabetic and physically inactive; this correlation is statistically insignificant. However, while positive family history of CVD, HTN and DM in first degree relatives in general was statistically insignificant, a positive family history of DM in sibling(s) was statistically significantly correlated to BPC.

**Limitations**
The main limitations of this study were the small sample size which was, localized to one governorate.

## Conclusion

Systolic blood pressure was statistically significantly directly correlated with age, a positive family history of hypertension in parent(s) and DBP. Diastolic blood pressure was statistically significantly directly correlated with smoking, positive family history of HTN in sibling(s), and SBP. It was also statistically significantly inversely correlated with age. As for SBP, and according to linear regression, age, DBP and a positive family history of HTN in parents were found to be with significant predictor variables. For DBP, age, smoking and SBP were found to be directly correlated with significant predictor variables. Among hypertensive patients, around half of them had a satisfactory BPC. This improvement in BPC should encourage the Ministry of Health to establish similar clinics in all health centers.

It is highly recommended that further studies be conducted:

- with a larger number of participants
- to cover the five governorates of the Kingdom of Bahrain
- to include both; normotensive and hypertensive individuals

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## Appendix Table 1

Table 1. Spearman's rho of SBP and DBP with different variables

| Variables | Spearman's rho | SBP | DBP |
|---|---|---|---|
| Sex | Correlation Coefficient | -.104 | -.120 |
| | Sig. (2-tailed) | .280 | .211 |
| Age | Correlation Coefficient | .203* | -.225* |
| | Sig. (2-tailed) | .033 | .018 |
| SBP | Correlation Coefficient | 1.000 | .597** |
| | Sig. (2-tailed) | . | .000 |
| DBP | Correlation Coefficient | .597** | 1.000 |
| | Sig. (2-tailed) | .000 | . |
| BMI | Correlation Coefficient | -.019 | .048 |
| | Sig. (2-tailed) | .841 | .621 |
| Dyslipidaemia | Correlation Coefficient | .066 | -.097 |
| | Sig. (2-tailed) | .494 | .313 |
| DM | Correlation Coefficient | .044 | .117 |
| | Sig. (2-tailed) | .651 | .223 |
| Smoking | Correlation Coefficient | .050 | .252** |
| | Sig. (2-tailed) | .601 | .008 |
| Physical Activity | Correlation Coefficient | .042 | .065 |
| | Sig. (2-tailed) | .666 | .500 |

| Variables | Spearman's rho | SBP | DBP |
|---|---|---|---|
| HTN in sibling(s) | Correlation Coefficient | -.152 | -.216* |
| | Sig. (2-tailed) | .112 | .024 |
| HTN in parent(s) | Correlation Coefficient | .226* | .159 |
| | Sig. (2-tailed) | .018 | .097 |
| HTN in offspring | Correlation Coefficient | .081 | -.058 |
| | Sig. (2-tailed) | .401 | .547 |
| DM in sibling(s) | Correlation Coefficient | -.091 | -.142 |
| | Sig. (2-tailed) | .344 | .139 |
| DM in parent(s) | Correlation Coefficient | -.057 | -.015 |
| | Sig. (2-tailed) | .557 | .877 |
| DM in offspring | Correlation Coefficient | .129 | -.060 |
| | Sig. (2-tailed) | .179 | .533 |
| CVD in parent(s) | Correlation Coefficient | -.140 | -.050 |
| | Sig. (2-tailed) | .144 | .606 |
| CVD in sibling(s) | Correlation Coefficient | .062 | .176 |
| | Sig. (2-tailed) | .523 | .066 |
| CVD in offspring | Correlation Coefficient | -.028 | -.102 |
| | Sig. (2-tailed) | .773 | .290 |

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

SBP-Systolic blood pressure; DBP- Diastolic blood pressure; BMI- Body mass index; Dm- Diabetes mellitus; HTN-Hypertension; CVD-Cardiovascular diseases

## Appendix Table 2

Table 2. Linear regression using specific variables with SBP and DBP

| Model | SBP Un-Std. Coefficients B | SBP Std. Error | SBP Std. Coefficients Beta | SBP t | SBP Sig. | DBP Un-Std. Coefficients B | DBP Model Coefficients Std. Error | DBP Std. Coefficients Beta | DBP t | DBP Sig. |
|---|---|---|---|---|---|---|---|---|---|---|
| (Constant) | 9.474 | 16.547 | | .573 | .568 | 43.826 | 8.115 | | 5.401 | .000 |
| Sex | -.654 | 2.919 | -.018 | -.224 | .823 | .956 | 1.640 | .047 | .583 | .561 |
| Age | .593 | .133 | .356 | 4.466 | .000 | -.328 | .075 | -.347 | -4.374 | .000 |
| BP (SBP or DBP) | (DBP) 1.213 | .136 | .688 | 8.902 | .000 | (SBP) .384 | .043 | .677 | 8.902 | .000 |
| BMI | -1.368 | 1.464 | -.070 | -.935 | .353 | .157 | .827 | .014 | .189 | .850 |
| Dyslipidaemia | 1.691 | 2.760 | .045 | .613 | .542 | -1.173 | 1.551 | -.055 | -.756 | .452 |
| DM | -1.743 | 3.050 | -.042 | -.571 | .569 | 1.748 | 1.709 | .074 | 1.023 | .309 |
| Smoking | -8.744 | 5.482 | -.119 | -1.595 | .114 | 8.630 | 2.993 | .206 | 2.884 | .005 |
| Physical inactivity | .167 | 1.621 | .008 | .103 | .918 | .546 | .910 | .046 | .600 | .550 |
| Family history | -1.303 | 5.106 | -.022 | -.255 | .799 | 1.551 | 2.869 | .046 | .541 | .590 |
| HTN in sibling(s) | .378 | 3.084 | .010 | .122 | .903 | -1.808 | 1.725 | -.088 | -1.048 | .297 |
| HTN in parent(s) | 7.307 | 3.018 | .200 | 2.421 | .017 | -.313 | 1.752 | -.015 | -.179 | .859 |
| HTN in offspring | -8.413 | 8.781 | -.076 | -.958 | .341 | 1.260 | 4.963 | .020 | .254 | .800 |
| DM in sibling(s) | -1.894 | 3.115 | -.052 | -.608 | .545 | .180 | 1.756 | .009 | .102 | .919 |
| DM in parent(s) | -.994 | 2.934 | -.028 | -.339 | .735 | -.823 | 1.649 | -.040 | -.499 | .619 |
| DM in offspring | 2.859 | 5.660 | .041 | .505 | .615 | 1.535 | 3.185 | .039 | .482 | .631 |
| CVD in parent(s) | -4.746 | 2.890 | -.121 | -1.642 | .104 | .369 | 1.649 | .017 | .224 | .823 |
| CVD in sibling(s) | -.764 | 4.403 | -.013 | -.174 | .863 | 4.152 | 2.439 | .122 | 1.703 | .092 |
| CVD in offspring | 5.334 | 9.706 | .040 | .550 | .584 | -2.556 | 5.463 | -.033 | -.468 | .641 |

SBP-Systolic blood pressure; DBP- Diastolic blood pressure; BMI- Body mass index; Dm- Diabetes mellitus; HTN-Hypertension; CVD-Cardiovascular diseases

# Herbal remedies use among diabetic patients in Nassyria, Iraq

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## Abstract

**Background:** Despite the availability of conventional hypoglycemic medications, many diabetic patients still prefer to use herbal remedies. This study was done to estimate the prevalence of herbal remedies use among diabetic patients in Nassyria city, Iraq, and to identify the factors affecting the herb use.

**Subjects and Methods:** A descriptive cross-sectional research was conducted on diabetic patients attending the diabetic center in Nassyria city, Iraq, over a 5-month period between the 1st of January and the 31st of May 2010, using a questionnaire that contained items related to diabetes and the use of herbs by diabetics.

**Results:** The study revealed that 153 (17.3%) out of 884 respondents had utilized herbal remedies within the last year. Herb users were more likely to be highly educated, employed, type 2 diabetics, and with a shorter duration of diabetes. The peer influence was noted among 77.1% of users. The majority of them used herbs as a supportive measure to conventional medical treatment and they believed that that they are beneficial.

**Conclusion:** A considerable number of patients with diabetes mellitus in Nassyria used herbs. Therefore, proper health information about herbal remedies should be provided by health professionals.

**Key words:** Herbal remedies, Diabetes, Nassyria, Iraq

## Introduction

Despite the introduction of hypoglycaemic agents from natural and synthetic sources, diabetes and its secondary complications continue to be a major medical problem to people.(1) The global estimates of the prevalence of diabetes for 2010 is around 6.4%, affecting 285 million adults, and will increase to 7.7%, and 439 million adults by 2030.(2)

Type 2 diabetes mellitus is highly prevalent in many countries in the Eastern Mediterranean Region. This is due to increasingly sedentary lifestyle, higher life expectancy and obesity. Studies conducted in different populations of the region have reported high prevalence rates varying from 7% to 25% in the adult population. In addition, many countries are now reporting the onset of type 2 diabetes mellitus at an increasingly young age. (3) In the United Arab Emirates, the prevalence was 20%,(4) in Qatar 16.7%,(5) and in Oman, 16.1%. (6)

In Iraq, although there is inadequate information about accurate estimates, a household survey showed that the prevalence of self- reported diabetes was 4.1%.(7)

Patients with diabetes experience significant morbidity and mortality from microvascular (Retinopathy, neuropathy, nephropathy) and macrovascular complications (heart attack, stroke and peripheral vascular disease).(8)

The presence of such a chronic debilitating illness, the high cost of modern medications and the side effects associated with these medications were identified as reasons why patients seek out complementary and alternative medicine (CAM). (9-11)

The National Center for Complementary and Alternative

Medicine (NCCAM) defines CAM as "a group of diverse medical and healthcare systems, practices and products, that are not currently part of conventional medicine".(12) Self-medication with oral natural preparations and herbs is fairly common as part of complementary and alternative medicine (CAM) which is used by individuals with and without diabetes. (13, 14)

Plant derivatives with hypoglycaemic properties have been used in folk medicine and traditional healing systems around the world from ancient times.(15)

In diabetes, some herbal remedies are proven to provide symptomatic relief and assist in the prevention of the secondary complications of the disease. Some herbs have also been proven to help in the regeneration of ß-cells and in overcoming insulin resistance, and maintaining normal blood sugar level.(8)

While in the developed countries diabetes care is largely sought in medical healthcare centers; a rather different, pluralistic approach prevails in developing countries. Many people often 'supplement' the care they receive in clinics and hospitals with treatment from traditional healers. (16)

Traditional medicines derived from medicinal plants are used by about 60% of the world's population. In developing countries, people believe that natural products and herbal formulations are preferred due to lesser side effects and lower cost.(14)

For centuries, herbal medicine has been used worldwide for the treatment of diabetes. Although only a small number of herbs have received scientific and medical evaluation to assess their efficacy, people are still using herbs and find them efficacious.(17) The patterns of herbal remedies use among diabetic population in Nassyria city are largely unknown, and no relevant study has been conducted among such a population.

## Objectives of the Study

The objectives of this study were to estimate the prevalence of herbal remedies use among diabetic patients in Nassyria city, Iraq, and to identify the factors affecting the herb use.

## Subjects and Methods

### Study design

This was a descriptive cross-sectional study conducted in Nassyria city, Iraq between the 1st of January and the 31st of May 2010.

### Sample

Diabetes registers were not available so the sample was a convenience sample. The participants were diabetic subjects, of both sexes, aged 18 years and above who were attending the diabetic center in Nassyria city during the period of the study. Excluded were those who declined to participate.

Participation in the study was voluntary. To prevent duplication, the patients were asked if they had been previously interviewed. The average number of patients attending this center is about 50 patients per day.

Instrument and data collection
A semi-structured questionnaire was developed by the researchers to fulfill the research objectives. Its validity was reviewed by three health care experts and professionals, followed by a pilot study testing. The questionnaire was customized for the study.

The diabetic center was visited 5 days/week from 9 to 12 am. After an informed consent was obtained from the respondents, they were face to face interviewed by one of the researchers who filled in the questionnaire.

The questionnaire covered the following aspects: socio-demographic characteristics including age, sex, marital status, residence, employment, educational level, and family monthly income per capita, which was defined as low (<100,000 Iraqi Dinar, Moderate 100,000-250,000 Iraqi Dinar, and High > 250,000 Iraqi Dinar). The diabetes-

related variables were: duration of diabetes (< 1 year, 1-5 years, and > 5 years); type of treatment (on diet only, oral hypoglycemic drugs, insulin, or mixed); regularity of treatment (regular or irregular); complications (presence or absence of chronic complications such as cardiovascular diseases, retinopathy, nephropathy, neuropathy, and diabetic foot); history of other chronic diseases such as asthma, epilepsy). The patients were asked whether they had used herbal remedies during the last year specifically for diabetes. If the answer was yes, then they were asked further questions regarding the herbal remedies such as their type, regularity of use, who advised them to use it, perception of benefit, patient satisfaction with it, and if he/she had informed his/her doctor regarding the use of herbs.

This study was approved by the Ethics and Human Research Committee of Basrah Medical College.

### Statistical Analysis

Data were analyzed using SPSS version 15. The data were tabulated and frequencies were calculated. The Chi-squared test or Fisher Exact test were used where applicable to show the significance of association between different variables and use of herbal remedies. A p-value of <0.05 was considered significant.

## Results

A total of 987 patients who fulfilled the inclusion criteria were invited to participate in the study, with 103 patients declining consent. A total of 884 participants completed the interviewing. (The response rate was 89.6%). The mean age of the participants was 50.9±13.1 years. Females constituted 58.3% of the participants. The majority of the subjects were married (77.7%), and 51.4% were illiterate. (Table 2)

The prevalence of use of herbal remedies in the last year was 17.3%. The most commonly used type was a mixture of herbs made by local herbalists (17%). Of the participants, 39.9% reported that they used more than one herb at the same time.

| English Name | Traditional remedy local name | Latin name | No. of users | % |
|---|---|---|---|---|
| | Mixture made by herbalist | | 26 | 17 |
| Cinnamon | Darcein | *Cinnamomum zeylanicum* Blume | 19 | 12.4 |
| Black Cumin | Habba Soda | *Nigella sativa* L. | 17 | 11.1 |
| Garlic | Thum | *Allium sativum* L. | 10 | 6.5 |
| Aloe | Sabr | *Aloe vera* L. | 6 | 3.9 |
| Fenugreek | Helba | *Trigonella foenum-graecum* L | 5 | 3.3 |
| Wormwood | Sheeh | *Artemisia judaica* L. | 4 | 2.6 |
| Bitter apple | Hanthal | *Citrullus colocynthis* (L.) Schrad | 2 | 1.3 |
| Syrian Rue | Harmal | *Peganum harmala* L. | 2 | 1.3 |
| Kernels of dates | Nawa Al-Tamer | - | 1 | 0.7 |
| More than one type | - | - | 61 | 39.9 |

Table 1: The most commonly used herbs and the frequency of their use (No. of users= 153)

Cinnamon use was reported by 12.4%, Black Cumin by 11.1%, and Garlic by 6.5%.(Table 1)

Although no significant association was found between age and herbal remedies use, the prevalence of herb use was higher among those aged 26-40 years and 41-55 years than among younger and elderly people. Education and occupation were found to be significantly associated with herb use. Patients with high educational level (Basic university and above) were found to be more frequent users than patients with a lower level of education. Patients who were employed used herbal remedies more than non-employed or retired patients (24.3% Vs 16.3%, 12.6% respectively). (Table 2)

The percentage of herb users was 18.3% among patients with type 2 diabetes compared to 8.7% among patients with type 1 diabetes. Regarding the duration of diabetes, 29.6% of those with < 1 year duration were herb users as compared to 16% of those who had diabetes for more than 5 years. A significant association was found between absence of complications, irregular medical treatment and herb use. No relationship was found between the presence of diseases other than diabetes and the use of herbal remedies. (Table 3 - page 42)

Although the ultimate decision to use herbs is a personal one, friends seem to provide advice in a high percentage of cases (77.1%). Of users, 70.6% reported that they used herbs as a supportive measure to conventional medicine. Most of them (77.8%) were satisfied with the use of herbal remedies and the majority (79.1%) perceived the use of herbs as a beneficial measure in treatment of diabetes mellitus. Only 5.9% of herb users informed their doctor about their use. (Table 4 - page 42)

## Discussion

The popularity of herbal therapy of patients with chronic diseases may be attributed to the long standing suffering of the patients or failure of the medical treatment to bring a quick and long-lasting relief.(18) In general people believe that herbal therapy is more natural than modern pharmaceuticals. This is not always true as it is documented in a WHO report that some herbal remedies are potent and their safety is not as evident as people think. Also they can be dangerous when taken in combination with modern pharmaceuticals.(19)

Our study showed that 17.3% of the diabetic patients had used herbal remedies in the last year. The prevalence of herb use in our diabetic patients is similar with that in Saudi Arabia (17,4%),(18) but it was lower than that reported in Turkey (25%),(20) and in Bahrain (46%).(21) These differences may be attributed

to differences in methodology such as including other alternative medicine, differing timeframes, or may be due to socio-cultural differences.

Among the herbs used by the subjects in the present survey, aloe (*Aloe vera*), and garlic (*Allium sativum L.*) have established hypoglycemic activity.(17) The hypoglycemic effect of aloes may be mediated through stimulating synthesis and/or release of insulin from the beta-cells of Langerhans.(22) The effect of Garlic is thought to be due to increased hepatic metabolism, increased insulin release from pancreatic Beta cells and/or insulin sparing effect.(23) Upon administration of S-allyl cysteine sulfoxide, a sulfur containing amino acid of garlic, to diabetic rats, it was found that their condition was improved.(24)

Fenugreek (*Trigonella foenum graecum L.*) is found by clinical studies to be effective in reducing fasting and postprandial blood levels of glucose, cholesterol and triglycerides.(25, 26) 4-hydroxyleucine, a novel amino acid from fenugreek seeds increased glucose stimulated insulin release by islet cells in both rats and humans.(27)

In this study it was found that herbal remedies use was higher among middle aged patients. This result

| Factor | No. of patients (%) | No. of users | Prevalence of use (%) | P-Value |
|---|---|---|---|---|
| **Age (years)** | 43 (4.9) | 4 | 9.3 | |
| 18 – 25 | 150 (16.9) | 28 | 18.7 | |
| 26 – 40 | 335 (37.9) | 61 | 18.2 | 0.574 |
| 41 – 55 | 356 (40.3) | 60 | 16.8 | |
| ≥ 56 | | | | |
| **Sex** | | | | |
| Male | 369 (41.7) | 65 | 17.6 | 0.887 |
| Female | 515 (58.3) | 88 | 17.1 | |
| **Residence** | | | | |
| Urban | 690 (78.1) | 125 | 18.1 | 0.308 |
| Rural | 194 (21.9) | 28 | 14.4 | |
| **Education** | | | | |
| Illiterate | 454 (51.4) | 77 | 17.0 | |
| Primary school | 162 (18.3) | 22 | 13.6 | |
| Intermediate school | 95 (10.8) | 12 | 12.6 | |
| Secondary school | 88 (9.9) | 16 | 18.2 | 0.005 |
| Basic university & above | 85 (9.6) | 26 | 30.6 | |
| **Occupation** | | | | |
| Employed | 152 (17.2) | 37 | 24.3 | |
| Non employed | 637 (72.1) | 104 | 16.3 | 0.019 |
| Retired | 95 (10.7) | 12 | 12.6 | |
| **Family monthly Income** | | | | |
| Low | 221 (25.0) | 37 | 16.7 | |
| Intermediate | 575 (65.0) | 97 | 16.9 | 0.412 |
| High | 88 (10.0) | 19 | 21.6 | |
| **Marital status** | | | | |
| Married | 687 (77.7) | 118 | 17.2 | |
| Unmarried | 60 (6.8) | 8 | 13.3 | 0.548 |
| Others | 137 (15.5) | 27 | 19.7 | |
| **Smoking** | | | | |
| Non smokers | 580 (65.6) | 98 | 16.9 | |
| Ex-smokers | 197 (22.3) | 32 | 16.2 | 0.490 |
| Current smokers | 107 (12.1) | 23 | 21.5 | |
| **Total** | 884 (100) | 153 | 17.3 | |

Table 2: Prevalence of herbal remedies use according to socio-demographic factors (n= 884)

| Factor | No. of patients | No. of users | Prevalence of use (%) | P-Value |
|---|---|---|---|---|
| **Type of diabetes** | | | | |
| Type 1 | 92 | 8 | 8.7 | 0.020 |
| Type 2 | 792 | 145 | 18.3 | |
| **Duration of DM (years)** | | | | |
| < 1 | 54 | 16 | 29.6 | |
| 1 – 5 | 425 | 72 | 16.9 | 0.046 |
| > 5 | 405 | 65 | 16.0 | |
| **Type of treatment** | | | | |
| Diet only | 27 | 10 | 37.0 | 0.001 |
| Oral | 627 | 123 | 19.6 | |
| Insulin | 218 | 20 | 9.2 | |
| Mixed | 12 | 0 | 0.0 | |
| **Regularity of treatment** | | | | |
| On diet only | 27 | 10 | 37.0 | 0.001 |
| Regular medical treatment | 796 | 124 | 15.6 | |
| Irregular medical treatment | 61 | 19 | 31.1 | |
| **Complications** | | | | |
| Absent | 521 | 102 | 19.6 | 0.041 |
| Present | 363 | 51 | 14.0 | |
| **Other diseases** | | | | |
| Absent | 461 | 84 | 18.2 | 0.416 |
| Present | 423 | 69 | 16.3 | |
| **Total** | 884 | 153 | 17.3 | |

**Table 3: Use of herbal remedies according to diabetes- related factors (n= 884)**

| | No. | % |
|---|---|---|
| **Influence of use** | | |
| Self- option | 16 | 10.5 |
| Friends | 118 | 77.1 |
| Family | 8 | 5.2 |
| Media | 11 | 7.2 |
| **Indications for use** | | |
| Supportive | 108 | 70.6 |
| Loss of confidence with drugs | 0 | 0.0 |
| To avoid complications | 1 | 0.7 |
| More than one cause | 44 | 28.7 |
| **Satisfaction** | | |
| No | 33 | 21.5 |
| Not sure | 1 | 0.7 |
| Yes | 119 | 77.8 |
| **Inform his/her doctor** | | |
| Yes | 9 | 5.9 |
| No | 144 | 94.1 |
| **Total** | 153 | 100 |

**Table 4: Attitude and perception of use of herbal remedies (No. of users=153)**

agrees with that of other studies.(18, 28) While in USA, a study identified that those aged over 65 years as being three times more likely to use alternative medicine than those aged less than 65 years.(29) The sex difference for herb use was not significant, a result which had been noticed by others,(28,30) but this result disagrees with that of other studies which showed that women were somewhat more likely than men to use herbs.(29,31)

Employment and higher level of education were found to be significantly associated with herb use, a result which is consistent with that of other studies.(28, 29, 32) It is unclear why there is a higher likelihood of herb use in these groups of patients. It may be that employment and higher educational attainment are surrogates for higher earning power, which is needed to pay for the out-of-pocket expenses associated with herb use.(33)

In this study, patients who had diabetes for less than one year used herbal remedies more than those with longer duration which disagrees with the results of other studies. (18, 28) This is probably because patients with new onset of diabetes mellitus may not cope well with the disease, so they search for more than one type of therapy.

The opinion of others heavily influenced the decision-making process and the most common reason for initial herbal remedies use, reported by the participants, was that people close to them believed in the efficacy of herbs. However, a person may start out taking herbs voluntarily without advice from others. The influence of friends in use of herbal remedies was reported by 77.1% of our patients which is in agreement with that of other studies.(18,34) The majority of the herb users (77.8%) were satisfied with this use. This may be due to the fact that most of them (79.1%) perceived it as beneficial. In this study, as in similar studies,(18,21,35) there was a low disclosure rate of herbs use to physicians. This may be due to lack of, or inadequate doctor-patient relationship during

consultations, or patients may be worried regarding the negative attitude of doctors toward herbs. In addition health care providers may neglect to ask about use of herbal remedies.(20)

The issues of representativeness, non-response and self-view on the significance of reporting are important factors that affect the validity of results.

Our study results should be interpreted in the context of several limitations. First, the sample was a convenience sample and mainly from urban adults, so caution needs to be exercised in generalizing conclusions from a convenience sample. Second limitation: the patients were drawn from a diabetic center not from the community. This is particularly important as patients in the community may be using clinical services irregularly and the way they use herbs may be different.(18) A further limitation is that this study was a cross-sectional study, thus precluding inferences of causality among variables. Recall bias cannot be excluded. The content and form of questions, and relating exposures to life events may affect recall accuracy. Also, cases (individuals identified as having the disease under study) tend to better recall past exposures. Non-response is a particular problem affecting cross-sectional studies and can result in bias of the measures of outcome. This is a particular problem when the characteristics of non-respondents differ from respondents. In this study, the response rate was good, and there is no reason to think that those who were declined were systematically different from those included in the study in terms of their herb use or characteristics, and if there is a difference, it will be trivial.

Herbal remedies were identified simply from the vernacular names reported by patients, and no attempt was made to collect samples for identification. Seaforth et al (36) have pointed out that identification of species from vernacular names is sometimes unreliable because the same name may be applied to different plants in the same or different regions.

By sampling from a government health center, an economically less privileged group of the population was recruited. In addition, less frequent users of formal health care, among whom the use of herbal remedies might be higher, may have been underrepresented by this sampling procedure. However, despite these limitations, the results of our study are still comparable to published findings.

In conclusion, herb use was not rare among diabetic patients in Nassyria city. Many factors affect the use of herbs, such as occupation, anti-diabetic treatment regularity, educational level, duration and type of diabetes mellitus. Most diabetic patients in Nassyria had a positive attitude toward use of herbal remedies. Therefore, health care providers must respect patients' wishes to use herbal remedies and it is essential to increase the level of awareness among diabetic patients and health care providers regarding the efficacy and toxicity of these medicinal herbs.

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# Colonoscopic findings in patients with hematochezia: A retrospective study

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## Abstract

**Background:** Hematochezia is a chronic intermittent passage of a small amount of bright red blood from the rectum and it is a common complaint in adult patients of all ages.

**Objective:** To identify the common causes of rectal bleeding in the study patients.
**Methods:** A retrospective study of colonoscopy findings performed in 2005 and 2010. The variables were age, sex, and findings. Chi-square test was used with significance at $p < 0.05$.

**Results:** 386 colonoscopy records of patients with hematochezia were reviewed (65% males and 35% females). The mean age was 45.5 ± 17.2 years.

43.5% were aged $\leq$40 years and 56.5% aged > 40 years. Normal findings were 11.1%. Hemorrhoids were the most common cause 52.8%, followed by cancer 15.6%, and ulcerative colitis 9.3%. Most cancers (11.9%) were in patients aged > 40 years. The location of cancers were 17 (4.4%) in sigmoid colon, 15 (3.9%) in each one of descended colon and recto-sigmoid, and 13 (3.4%) in the rectum.

Ulcerative colitis and solitary rectal ulcer were relatively high in patients aged $\leq$40 years. Diverticulosis was only in patients aged > 40 years. Hematochezia causes were significantly associated with age ($p < 0.05$).

**Conclusion:** Hemorrhoids were the most common cause, followed by cancer.

**Key words:** Hematochezia, colonoscopy, finding, Aden

## Introduction

Hematochezia, the passage of bright red or maroon blood from the rectum, usually originates from a source in the lower parts of the gastrointestinal tract especially in a hemodynamically stable patient (1).

Hematochezia is defined as a chronic intermittent passage of a small amount of bright red blood from the rectum and is a clinical problem frequently found in adults of all ages (1,2,3,4). It is the passing of red blood via the rectum, usually from the lower gastrointestinal tract, but sometimes from a briskly bleeding upper gastrointestinal source (5). Bleeding per rectum (BPR) may be overt or occult, and overt bleeding can be acute, massive or chronic. BPR represents up to one third of the total cases of gastrointestinal bleeding. In practice, there are three common clinical scenarios related to BPR: active bleeding, recent bleeding, and chronic bleeding. International nomenclature defines acute BPR as a bleeding of less than 3 days' duration associated with instability of vital signs and anemia. Chronic BPR is any passage of blood per rectum that results from intermittent or slow loss of blood (6,7).

Its prevalence in the apparently healthy general population is between 9% and 19% (2,3,4). Others reported that BPR occurs in 20% of the population annually (8,9). However, the true incidence can be higher than these figures because patients do not usually check their stool in toilets (10). Colonoscopy is the diagnostic tool of choice in a hemodynamically stable patient with a suspected lower gastrointestinal bleeding (11,12).

The main objectives of the study were to describe the characteristics of patients with hematochezia and to identify the common causes of rectal bleeding.

## Material and Methods

We conducted a retrospective review of 783 medical records of patients who had undergone colonoscopy from 2005 to 2010 at the private clinic of digestive endoscopy in Aden governorate. From those, 386 patients who underwent colonoscopy with the indication of hematochezia met the criteria of the study which was firstly all male and female patients with different ages, secondly, patients in whom it was found in their medical record that the chief complaint was visible rectal bleeding. The study patients were grouped as patients older than 40 years (> 40 years), and patients aged 40 years and less (≤ 40 years).

The medical records were retrieved and we obtained the demographic data, colonoscopic information, and the histopathologic results.

All patients were subjected to fibre-optic colonoscopy after necessary preparation. Statistical analyses were performed with SPSS 17.0. The study findings were presented as means and percentages. We compared groups with the use of Chi-square test and reported as significant p-values <0.05.

## Results

Out of 783 colonoscopies carried out over the 6-year period, a total of 386 patients with hematochezia underwent colonoscopy. They were 251 (65%) males and 135 (35%) females giving a male to female ratio of 1.9:1. The age of patients ranged between 8 and 85 years with the mean age 45.5 ± 17.2 years. One hundred and sixty eight (43.5%) of patients in the series were 40 and less years of age, and 218 (56.5%) were more than 40 years (Table 1).

Table 2 summarizes the colonoscopy findings. Of the 386 patients, 43 (11.1%) had a normal finding. Abnormalities were found in 343 (88.9%) patients. Hemorrhoids were the most common cause of hematochezia, present in 204 (52.8%) patients followed by cancers in 60 (15.6%) patients, ulcerative colitis in 36 (9.3%) and diverticulosis in 19 (5%). Polyps were found in 17 (4.4%) patients, fourteen in the rectum and 3 in the sigmoid and they were adenomatous in type. The last common cause was solitary rectal ulcer in 7 (1.8%) patients.

Table 3 and Figure 1 show the colonoscopy findings related to age groups, ≤40 and > 40 years. There was 108 (28%) hemorrhoids in patients aged > 40 years compared to 96 (24.9%) in the age group ≤40 years. Forty six (11.9%) patients in the group > 40 years had colorectal cancer, while in patients aged ≤40 years it accounted for 14 (3.6%). Ulcerative colitis and solitary rectal ulcer are relatively high in patients aged ≤40 years, 19 (4.9%), and 6 (1.6%), respectively. Diverticulosis was found only in patients aged > 40 years, with 19 (4.9%). The difference of values was statistically significant (p < 0.05).

Table 4 (top of page 48) reveals that 17 (4.4%) patients had cancer in sigmoid colon, followed by cancer in descended colon and recto-sigmoid cancer, each one in 15 (3.9%) patients. Rectum cancer was found in 13 (3.4%) patients.

## Discussion

To our knowledge, no prior study has described the colonoscopic findings in patients with lower gastrointestinal bleeding in Aden.

The study firmly established the importance of further studies to find out the pattern of colorectal diseases and the true incidence of malignant colorectal diseases among the Yemeni population.

Males were approximately twice as females observed in the present study, with a ratio male to female of 1.9:1. A possible explanation for this difference is that in this part of the world few females attend hospitals for rectal bleeding due to social and cultural reasons (13,14). Previous studies in the region have reported this difference (15-18). Makela et al (19) reported that the relationship between BPR and gender is weak.

In our study the age of the patients ranged between 8 and 85 years, with a mean age 45.5 ± 17.2 years and the frequency of BPR was higher (56%) in older male and female patients > 40 years (p < 0.05). This finding was in agreement with other studies (15-18,20,21).

| Character | No | % |
|---|---|---|
| **Sex:** | | |
| Males | 251 | 65 |
| Females | 135 | 35 |
| **Age:** | | |
| ≤ 40 years | 168 | 43.5 |
| > 40 years | 218 | 56.5 |

**Table 1: Characteristics of 386 patients with BPR**

| Finding | No | % |
|---|---|---|
| Hemorrhoids | 204 | 52.8 |
| Colorectal cancer | 60 | 15.6 |
| Ulcerative colitis | 36 | 9.3 |
| Diverticular diseases | 19 | 5 |
| Polyps | 17 | 4.4 |
| Solitary rectal ulcer | 7 | 1.8 |
| Normal | 43 | 11.1 |
| Total | 386 | 100 |

**Table 2: Colonoscopy findings in 386 patients with BPR**

| Finding | Age group (years) | | | |
|---|---|---|---|---|
| | ≤ 40 | | > 40 | |
| Hemorrhoids | 96 | (24.9%) | 108 | (28%) |
| Colorectal cancer | 14 | (3.6%) | 46 | (11.9%) |
| Ulcerative colitis | 19 | (4.9%) | 17 | (4.4%) |
| Diverticulosis | 0 | (0.0%) | 19 | (4.9%) |
| Polyps | 8 | (2.1%) | 9 | (2.3%) |
| Solitary rectal ulcer | 6 | (1.6%) | 1 | (0.3%) |
| Normal | 25 | (6.4%) | 18 | (4.6%) |
| Total | 168 | (43.5%) | 218 | (56.5%) |

Chi-square = 35.8 ; p = 0.000 ; Percents calculation: Numerator/ (Denominator 386)

**Table 3: Colonoscopy findings in 386 patients with BPR related to age**
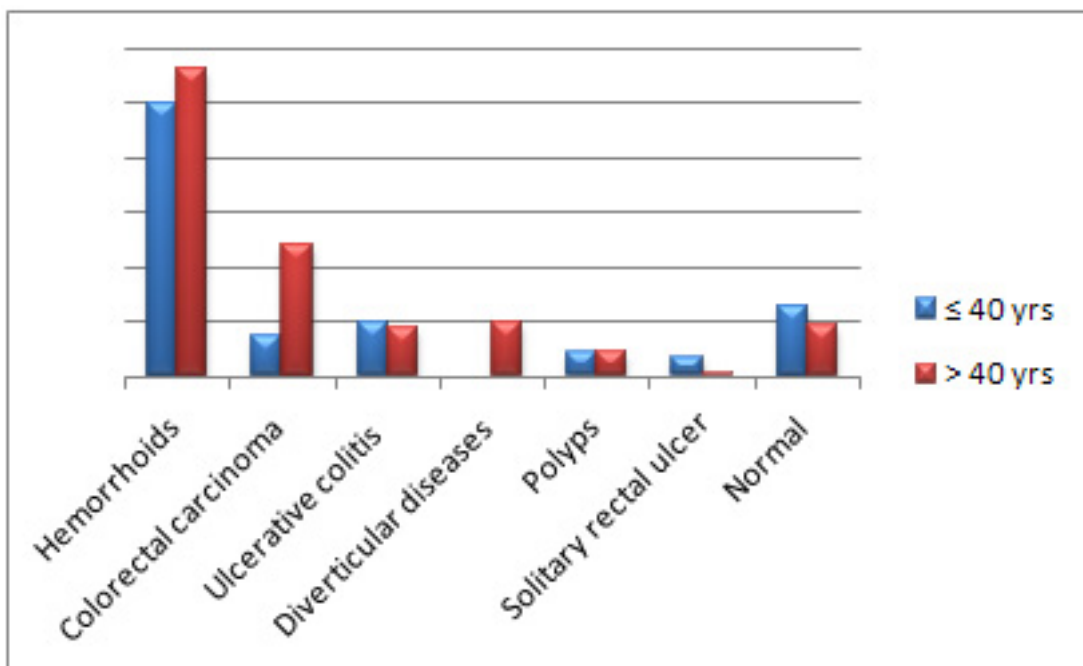


**Figure 1: Colonoscopy findings related to age groups**

| Location | No | % |
|---|---|---|
| Sigmoid | 17 | 4.4 |
| Descended colon | 15 | 3.9 |
| Recto-sigmoid | 15 | 3.9 |
| Rectum | 13 | 3.4 |

Percent calculation: Numerator/(Denominator 386)

**Table 4: Location of colorectal cancer (n = 60)**

In this study we found abnormalities in 343 (88.9%) patients and it is relatively high. The result supports almost similar results in other studies (16,22-24).

In our series the most common causes of BPR were hemorrhoids, colorectal cancer, and ulcerative colitis, then with low rates diverticular diseases, polyp, and solitary rectal ulcer. However, the reported frequency of various causes of BPR varies from country to country. Three studies from developing countries showed a different etiological pattern between their countries and our findings. Al-Shamali et al (15) in Kuwait found ulcerative colitis as the commonest cause, followed by hemorrhoids, colorectal cancer, polyps, solitary rectal ulcer and diverticular disease.

Goenka et al (25) in India found the major causes as ulcerative colitis, polyps, radiation colitis, solitary rectal ulcer, and colorectal cancer.

Hassan et al (21) in Morocco found the major causes as polyp, colorectal cancer, ulcerative colitis, and Crohn's disease.

Wong et al (23) mentioned that according to various authors, the most common cause of BPR in all age groups is hemorrhoid, ranging from 27% to 72%. Other studies reported similar results to ours (20,23,24,26,27).

Our study revealed that over a six-year period, 60 (15.6%) patients had a diagnosis of colorectal cancer. This number is less than the number reported by Sibiani et al (28) from Jeddah, Saudi Arabia: 185 cases in 6 years, and that reported by Hassan et al (21) from Rabat, Morocco: 89 cases over a period of 6 years and is somewhat similar to the number reported by Aljebreen (29) from Riyadh, Saudi Arabia: 113 cases in 10 years.

Regarding the frequency in age groups, we found colorectal cancer in 46 (11.9%) patients aged over 40 years and 14 (3.6%) in patients aged <40 years. This finding is compatible with studies from developing countries (15-17,20,21,28,29).

The location of cancer in this study was 17 (4.4%) in the sigmoid, 15 (3.9%) each of descended colon and recto-sigmoid and 13 (3.4%) in the rectum.

Our results were not commensurate with other studies carried out in the region. In Jeddah, Saudi Arabia, the most common location was the rectum, followed by sigmoid and rectosigmoid (28). In Tabriz, Iran, the most common location was the rectum and sigmoid (30). In Rabat, Morocco, more than a third of the colorectal cancers were localized in the rectum (21).

Ulcerative colitis was the third common cause of bleeding per rectum in our study and was found in 36 (9.3%). It was relatively high in patients aged <40 years. Ulcerative colitis is a disease of young with the majority occurring in the third to fourth decade of life and diagnosed relatively in younger age (31,32).

Diverticulosis was the fourth cause of BPR in this study. This result differs with the results of a series from western countries which found diverticulosis the commonest cause of rectal bleeding (33-35). Also, this study revealed that all cases of diverticulosis were above 40 years of age. Similar findings were reported by others (18,33,36).

Colorectal polyps were found in 17 (4.4%) patients in the present study.

They proved to be adenomatous polyps. Their locations were 14 in the rectum and 3 in the sigmoid. This finding was similar to the finding by Hasan et al (21) from Morocco, who found most polyps were localized in the rectum and in the sigmoid. Solitary rectal ulcers were found in 7 (1.8%) of the total patients, making it the sixth most common cause of BPR in this study. Most of our patients 6 (1.6%) were younger; they were ? 40 years of age. This was in agreement with previous series which reported that this disease mostly occurs in younger (third and fourth decades of life) patients (37).

## Conclusion

In this study, the most common colonoscopic findings in patients with hematochezia were haemorrhoids followed by colorectal cancers which are the most serious causes. Less frequently were ulcerative colitis, diverticulosis, polyps, and solitary rectal ulcer. The study revealed that 168 (43.5%) younger patients aged <40 years were afflicted with hematochezia. The causes of rectal bleeding varied in their distribution between younger patients aged <40 years and older patients aged > 40 years. Hemorrhoid, colorectal cancers, diverticulosis and polyps were found relatively high in patients of the age group > 40 years, while, ulcerative colitis and solitary rectal ulcer were more frequently in younger patients aged <40 years. However findings of this study are required to be confirmed by similar studies inducting large numbers of patients.

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# Reversible acute renal failure in a patient with profound hypothyroidism: Case report from Oman

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## Abstract

**Background and Objectives:** Acute renal failure in a patient with hypothyroidism constitutes a rare occurrence. Hereby we document the first case of acute renal failure in a patient with hypothyroidism in the Arabian Gulf with dramatic resolution of presenting signs and symptoms.

**Method:** The case in mind is a 25 year -old male, an Omani, who presented with two months history of puffiness of the face, swelling of the legs, weight gain, generalized fatigability, excessive snoring and dysarthria. He also complained of cramps of the muscles of the right upper and lower limbs. Investigations done were renal functions (urea, creatinine, electrolytes), urine analysis, serology for autoimmune diseases, serum creatinine phosphokinase (CPK), and thyroid function tests.

**Results:** He was found to have serum creatinine of 143 umol/L with normal urinalysis, negative serology for autoimmune diseases, and a very high level of serum CPK. He was subsequently found to be hypothyroid with a thyroid stimulating hormone (TSH) level of >100 miu/L. He had dramatic improvement for both symptoms and biochemical markers after institution of thyroid replacement therapy after six weeks follow up. He reverted back to his pre-morbid self with no relapse.

**Conclusion:** Previously reported cases of acute renal failure in a patient with hypothyroidism in other populations were noted with mixed outcome. The case report in Oman indicates acute renal failure hypothyroidism could be ameliorated with thyroid replacement therapy. This finding, along with others, offers tentative ground for exploration of such a link using a more vigorous research paradigm.

**Key words:** renal failure, hypothyroid, creatinine, Omani, case report

## Introduction

The temporal relationship between hypothyroidism and the integrity of kidney functioning has been documented previously (1). Hypothyroidism impacts renal function at different pathological levels. Such occurrence has various repercussions to the biological system including thickening of glomerular and tubular basement membranes and accumulation of various types of inclusions in the cell cytoplasm which is reversible after administration of thyroid hormones; observation that has been made many decades ago (2). It is also shown that thyroid hormones affect proximal tubular sodium transport, and this effect is mediated by the action of thyroid hormones on Na-K-ATPase activity. This has been linked with isotonic fluid re-absorption and hyponatraemia (3).

Hypothyroidism also increases the transcapillary leakage of the plasma protein such as albumin, which can lead to mild proteinuria and generalized oedema in these patients (4, 5).

Haemodynamically hypothyroidism reduces cardiac output, increases systemic and renal vascular resistance and reduces glomerular flow (ERPF) and glomerular filtration rate (GFR) to about 40% lower than the euthyroid state (6, 7). Although hypothyroidism affects the renal functions by different mechanisms, it does not usually result in clinical renal impairment and all the consequences such occurrences may entail.

In the available literature, there is a dearth of case reports with acute renal failure, hypothyroidism which has responded to thyroxin replacement. Available medical literature that came to our attention, efficacy of thyroxin replacement on such a clinical population has not been widely reported (8, 9, 10).

We hereby present another case of acute renal impairment, which upon further investigations, it was noted that the case is marked with hypothyroidism and myopathy, all of which was reversed by thyroxin replacement therapy. To our knowledge, this is the first report from this region.

## Case Report

A 25 year-year-old male presented with a two month history of puffiness of the face, swelling of the legs, weight gain, and slowed speech akin to dysarthria. The subject told the clinical team that he often has overwhelming and remitting feelings of generalized fatigability and cramps of the muscles of the right upper and lower limbs. He also complained of excessive snoring of recent onset.

Systemic review did not indicate other symptoms suggestive of volume overload such as no shortness of breath, dyspnoea on exertion and other cardiac symptoms. He also denied any history of skin rash, itching, relation to food, fever, joints pain or swelling, gross haematuria, change in urine colour, amount or urinary tract infection.

His past medical history was unremarkable except for history of operation of the right knee that took place approximately two years prior to the present consultation. His knee operation involved reconstruction of the anterior cruciate ligament, meniscectomy, as well as medial and lateral ligaments. He used non steroidal anti-Inflammatory drug "ibuprofen" occasionally to relieve the pain, but only for a short period after the orthopaedic operation. There was no past history of tonsillitis. He has never sought consultation for treatment of diabetes or hypertension. He denied history of cigarette smoking, alcohol consumption or illicit drugs.

On physical examination, he was not distressed. His weight was 69Kg. His blood pressure was 140/85 mmHg. His pulse was 80/min and regular, and his temperature was 36.5 degrees centigrade. He was found to have some degree of facial puffiness and pedal oedema. His jugular venous pressure was within the normal ranges. On the whole, his physical examination was unremarkable.

Laboratory investigations showed normal urine analysis on two separate occasions with no evidence of proteinuria, haematuria or pyuria. The patient had a negative urine culture. His full blood examination revealed: haemoglobin15.6g/dL, haematocrit 49%, white blood count (WBC) 4200/mm. These parameters are within the normal range in our criteria. He had normal prothrombin time (PT), partial thromboplastin time (PTT) and bleeding time. The erythrocyte sedimentation rate (ESR) was 2 mm/L per hour. His blood chemistry included a creatinine of 143 umol/L (59-104), BUN 5.3 mmol/L (2.1-7.1), sodium 136 mEq/L (135-145), potassium 5.3 mmol/L (3.5-5.1), chloride 95 mmol//L (98 -107), Glomerular filtration rate (GFR) 52 ml/min ( > 60), calcium 2.46 mmol/L (2.1-2.55), phosphate 1.14 mmol/L (87-1.45), uric acid was 0.37 mmol/L (0.2-0.45), cholesterol 7.3 mmol/L (3.5- 5.2), triglycerides 1.6 mmol/L (0.4-1.8), total bilirubin is 20 g/L (0-17 ), alanine aminotransferase (ALT) 33 IU/L (0-41), aspartate aminotransferase (AST) 88 U/L (0-38), alkaline phosphatase 65 U/L (40-129), total protein 82 g/L (64-83), albumin 52 g/L (34-48), Antinuclear antibody (ANA), Venereal Disease Research Laboratories (VDRL), HIV serologies, autoantibody screen, compliment 3, compliment 4, antistreptolysin O titre, hepatitis B surface antigen, and lupus erythromatosus (LE) cell prep were all negative. Also chest X-ray and ultrasound of abdomen were unremarkable.

The patient was suspected of having hypothyroidism based on the eight week history of fatigability, weight gain, puffiness of the face, swelling of the legs, slow speech and snoring. This was confirmed with a serum free thyroxin (Free T4) level of <3.2 pmol/L (7.9-14.4), and a thyroxin stimulating hormone (TSH) level of > 100 miu/L (3.4-5.6). His thyroid antibodies were > 500 IU/ml (0-50). A diagnosis of autoimmune thyroiditis was therefore contemplated. He was also found to have high creatinine phosphokinase (CPK) of 3274 u/L (39-308) which indicates myopathy. On clinical grounds, he was treated

with L-Thyroxine. Approximately, six week after the institution of thyroid replacement therapy, all indices of hypothyroidism, myopathy, and renal failure reverted back to normal ranges. In the subsequent follow-up, the patients concurred to us that he feels 'alive again'.

## Discussion

The present case had a low GFR which indicates a presence of moderate degree of renal impairment according to available guidelines (11). The patient also had a significantly elevated serum creatinine level as well as profound hypothyroidism. The serum creatinine usually is the balance between creatinine production and excretion. Myopathy, which is usually induced by hypothyroidism, increases plasma CPK and creatinine production (12), while hypothyroidism can result in reduction of the GFR (6, 7). These mechanisms can explain the increase of serum creatinine in our patient. The different morphological changes effects of hypothyroidism on the kidneys described above, contribute to the acute renal impairment and a decrease of GFR. His renal dysfunction is secondary to the hypothyroidism rather than to his thyroid autoimmunity (13). These changes are reversible following treatment of hypothyroidism as seen in our patient who showed a marked reduction of both symptoms and biochemical markers of renal failure.

Chronic renal failure (CRF) affects thyroid function in multiple ways, including low circulating thyroid hormone concentration (T3 &T4), altered peripheral hormone metabolism, disturbed binding to carrier proteins, possible reduction in tissue thyroid hormone content, and increased iodine store in thyroid glands. It is very important for the clinicians to differentiate between the above mentioned changes due to CRF patients and patients with high creatinine level due to hypothyroidism. Another important differentiating factor is that despite the low level of T3 and T4 in patients with CRF, the TSH is normal. This is testified by the fact that patients do not show clinical signs and

symptoms of hypothyroidism (14). It is worthwhile to note that excluding CRF as the possible cause of elevated serum creatinine in our patient: the elevated serum TSH, the reversible course of renal failure, and the absence of a past history of renal disease.

It is unlikely that the cause of the acute renal failure in our patient is due to analgesic nephropathy. It has been previously stated that the 'classic picture' of this disease is characterized by chronic use for many years, of mixtures containing at least two antipyretic analgesics and usually caffeine or codeine (or both). Such a combination is likely to lead to psychological dependence. In the early stages of the disease, the clinical symptoms are limited to polyuria, sometimes associated with pyuria, as well as renal colic which is associated with acute renal failure due to bilateral obstruction of the urinary tract (15). Broe et al. (16) is consonant with such views, that is analgesic nephropathy is caused by analgesic mixtures containing two analgesic compounds combined with potentially addictive substances.

The description of the above-mentioned previous report does not fit with the present observation. In the present report, there was ostensibly absence of consumption of such types of medications other than occasional use of a single non-steroidal anti-inflammatory drug for a limited period of time after his knee surgery that took place approximately two years back. Harirforoosh and Jamali (17) have stated that renal side effects of NSAIDs are generally a rare occurrence. If it does occur, it may be transient and reversible upon cessation of the culprit drug. Mann et al. (18) have also reported that analgesic nephropathy is triggered by ibuprofen therapy. Renal side-effects of ibuprofen appear to be dose-dependent, and were not reported at the recommended dosage as over-the-counter drug (0.2-0.8 g/d) except for a single child. Even at anti-inflammatory doses (>1.6 g/d), renal side-effects are almost exclusively encountered in patients with low intravascular volume and low cardiac

output among the elderly population. On the other hand, alternative analgesic and antipyretic agents are more likely to have negligible risk for renal injury than ibuprofen. Presence of oedema noted from the present case could be explained by the presence of hypothyroidism. Some studies suggested that thyroid hormone affects small vessel permeability (19). Parving et al (4) stated that the extra vascular accumulation of albumin, and presumably of all other plasma proteins, is important in triggering generalized edema typically found in myxedema. Inadequate lymphatic drainage may also play a part in the formation of exudates in the serous cavities that have been previous implicated to play a part in myxedema. Mahajan et al (20) stated that peripheral oedema is present in 55% of patients with hypothyroidism. In contrast, periorbital oedema is seen in 22%. Periorbital oedema is rare and probably precipitated by increased capillary permeability, decreased adrenergic (vasoconstrictor) tone and attenuated serotoninergic (vasodilator) activities (20).

The present observation has one important implication, namely, the importance of clinical and laboratory assessment of thyroid status in all newly diagnosed patients with renal impairment and assessing renal functions in new cases with hypothyroidism.

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