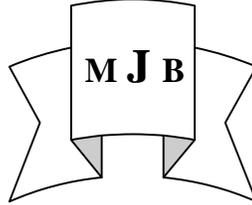# Metabolic syndrome among Type 2 Diabetic Patients in Babel Goverenate

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Abstract

Metabolic syndrome(MS) is becoming a serious global problem .This study was carried out on patients with type 2 diabetes mellitus attending Merjan teaching hospital, diabetic clinic in Babylon city, for the period from December 2009 to March 2010 ,to investigate the occurrence of metabolic syndrome among diabetic patients .The relevant data were collected ,anthropometric measurement and laboratory estimation of triglyceride and high density lipoprotein-cholesterol(HDL-C) . The study was conformed on 200 diabetic patients (90 males,110 females) the mean age group was 59.2±9.2 for males and 56.5 ±9.02 years old for females. Metabolic syndrome was diagnosed according to the criteria of National Cholesterol Education Programme(NCEP) in 133 patients(59 males and 74 females). The prevalence of metabolic syndrome among diabetic patients was 66.5%.MS was distributed in 65% urban and 35% rural area. In MS patients. The mean waist circumference in males was114±1.15Cm.and 107.8±12.9Cm in females. Mean triglyceride level in MS patients was 2.74mmol/l±0.38 in males and 2.4mml/l ±0.5 in female Mean level of high density lipoprotein was 0.83mmol/l±0.08 in males and 0.9mmol/l±0.14in females. Body mass index was 31.19 in MS patients. most patients with MS have three components mainly Diabetes and hypertension and one of these disorders (obesity as measured by BMI and waist circumference ,hypertriglycerdemia and decrease in HDL-C.

الخلاصة

بما إن التزامن الايضي أصبحت مشكلة عالمية خطيرة أجريت هذه الدراسة على مرضى السكري المراجعون لمستشفى مرجان التعليمي .عيادة السكري في مركز محافظة بابل .للتقصي عن ظاهرة التزامن الايضي لدى مرضى السكري.مدة الدراسة استمرت من شهر كانون الثاني 2009 إلى شباط 2010 . المعلومات شملت قياسات تم أخذها من المرضى وفحوصات مختبريه تضمنت قياس مستوى ثلاثيات الكليسيرايد.وكوليستيرول البروتين الشحمي العالي الكثافة.هذه الدراسة شملت 200مريض مــن مرضــى السكري(90 من الذكور، 110 من الإناث). التزامن الايضي تم تشخيصه حسب قياسات البرنامج التعليمي العالمي للكوليستيرول عند 133 مريض(59 من الذكور و 74 من الإناث) نسبة انتشار التزامن الايضي كانت (66,5%) وكان توزيع المرض 65% في المدينة و35%في المناطق الريفية. إن معدل محيط الخصر(ر1,15 ± 114 سم) عند الذكور (12,9 ± 107,8 سم) عند الإناث.معدل مستوى ثلاثيات الكليسيرايد 2,74 مليمول/لتر عند الذكور.و 2,4 مليمول/لتر عند الإناث.وكان معدل مستوى كوليستيرول البروتين الشحمي العالي الكثافة 0,83 مليمول/لتر0عند الذكور و0,9 مليمول/لتر عند الإناث .

مؤشر معامل كتلة الجسم كان بمعدل 31,19كغم/م2عند مرضى التزامن الايضي .إن معظم مرضى التزامن الايضي كان لــديهم ثلاثة ارتباطات غير طبيعية هي بالإضافة إلى السكري.السمنة.ارتفاع ضغط الدم .ارتفاع في مستوى ثلاثيات الكليسيرايد.انخفاض في مستوى كوليستيرول البروتين الشحمي العالي الكثافة.

Introduction

Metabolic syndrome(MS) is highly prevalent clinical entity, and become one of major public health challenges ,MS is world wide disease due to increase of mortality from its complication and because of long duration of disease[1]. As defined by the recent Adult Treatment Panel (ATP) III required three of the

following abnormalities for diagnosis the metabolic syndrome , waist circumference >88 cm in women and >102cm in male. Fasting serum triglycerides >1.69mmol/l, HDL cholesterol<1.03 in men and <1.29mmol/l in women, blood pressure ≥ 130/85 mm Hg, or fasting serum glucose ≥ 6.1mmol/l[2]. Insulin resistance with resultant hyperinsulunemia which causes type 2 of diabetes mellitus appears to be a major determinant of MS[3]. The pathogenesis of the metabolic syndrome is still unclear, although some environmental factors, coupled with unknown genetic factors, clearly interact to produce the syndrome[4]. However, metabolic syndrome associated with a marked increasing in the risk of cardiovascular disease (CVD)[5]. Multiple factors appear to predispose to metabolic susceptibility such as genetic defects in insulin signaling pathways, various disorders of adipose tissue, physical inactivity, mitochondrial dysfunction, polygenic variability in individuals and ethnic groups, advancing age, endocrine dysfunction, and certain drugs[6,7]. The prevalence of metabolic syndrome worldwide is between 20-40% among males and females,[8]. Rapid demographic, nutritional, and economic changes as are occurring in South Asians. The life expectancy and the percentage of elderly population have increased.

Most importantly, globalization of diets and consumption of nontraditional fast foods have occurred at a rapid place in urban areas[9]. rapid increase in western fast food outlets, sale of aerated sweet drinks, and increased consumption of fried snacks in work place is being seen commonly.[9].Intake of dairy products, sugar, and hydrogenated vegetable oil (vanaspatin) containing a high amount of trans fatty acids [TFA]

is widespread in people belonging to low and middle socioeconomic strata[10] In addition, modern are less physically active, and a sedentary lifestyle is increasing, migration from villages to cities is increasing. These intracountry migrants become urbanized and mechanized, resulting in nutritional imbalance, physical inactivity[11], Recent studies have reported that physical activity and physical fitness are associated with lower prevalence and incidence of metabolic syndrome and individual CVD risk factors (e.g., high blood pressure, insulin resistance, abdominal adiposity, and dyslipoproteinemia[12]. The other components of the metabolic syndrome, such as dyslipidemia, may have an equal or greater bearing on the syndrome and its association with coronary heart disease(CHD), and all cause mortality, Subjects with insulin resistance often display a characteristic form of dyslipidemia, with near-normal low-density lipoprotein cholesterol (LDL-C), low high-density lipoprotein-cholesterol (HDL-C), and elevated triglycerides, which are important disorders for diagnostics criteria to determine MS and related disorder[13]. Metabolic syndrome is responsible for increasing morbidity and mortality in all age groups and it is a very important health problem due to the expected long-term diseases and expenditure[14]. As MS is considered global health problem it is required for more studies and control method in treatment regimes control diabetes ,good guilty of food ,physical activity [15].The change in environmental condition and dietary habits among different population ,which differ from one country to the other necessitate the determination of biochemical and anthropometric parameters which evoke MS among Iraqi population.

Material and Methods

The study design was a cross-sectional study conducted between December 2009–March 2010 and,this study was carried out at Merjan teaching Hospital in the university of Babylon/college of medicine in Babylon Governorate on patients of diabetes mellitus type 2. The study including questionnaire and biochemical investigation, in questionnaire age, sex, address (rural and urban), duration of diabetes mellitus, types of antidiabetic treatment, history of chronic illness, hypertension history and treatment type of hypertension and family history of diabetes.

Measurements

Blood pressure

It was measured using mercury sphygmomanometer (used for all patients)while the patients sitting for five mints.

Body mass index; measured according to the formula of weight in(kilogram) divided by the square of height in (meter) :classifying underweight(BMI <18),normal(BMI 18-24.5),over weight (BMI 25-29.9) and obese (BMI> 30).

Waist circumference (WC): It was used to determined abdominal obesity. The waist was measured while the patients standing up, at the level of umbilicus as the smallest girth between the costal margins and the iliac crests.

Biochemical estimation

After a minimum of 10 hours of fasting, five milliliters of venous blood was drawn from the antecubital vein of each participant. Separation was done using a centrifuge at 3000 rpm for about 15 min, The high-density lipoprotein cholesterol (HDL-C) fraction was measured after precipitation of LDL-C and VLDL-C with dextran sulfate-magnesium techniques and fasting Triglyceride

estimation was measured by the enzymatic method[16]. Accuracy was monitored using commercial-quality control sera. measures representing the components of metabolic syndrome were obtained, including fasting blood glucose, waist circumference, triglyceride, HDL-C, and blood pressure. As detailed in the Adult treatment Panel (ATP III) report, participants having three or more of the following criteria were defined as having metabolic syndrome: Abdominal obesity (waist circumference >102cm in men and >88 cm in women), hypertriglycerdemia(>1.69 mmol/L, low HDL-C <1.04 mmol/L in men and<1.29 mmol/L in women), systolic blood pressure (>130mmHg, diastolic blood pressure >85 mmHg). The data were summarized using descriptive statistics (mean, standard deviations, and percentages); an independent t-test was used to compare the physical characteristics and biochemical variables of males and females. A p-value of 0.05 or less was considered statistically significant

Results

This study included 200 patients (90 males and 110 females) of a mean age of 59.14±9.26 for males and 56.9±9.02 for females.

There are 130 patients from urban area and 70 patients from rural area.

According to analysis of data obtained from this study ,there are 133 patients with obesity ,59 male ,74 female, represented by high BMI about 31.19 in male and 32 in female ,and mean of waist circumference 114.5±1.15 in male and 107.8±12.9 in females.

The results revealed that Patients with hyper triglyceredimia are 79 .24 males and 55 females ,with a mean of 2.74 mmol/l±0.38 in males and 2.4mmol/l±0.5 in females.

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Patients with low level of HDL-C are 64 ,27 males and 37 females with a mean 0.83mmol/l±0.08 in males and 0.9mmo/l±0.14 in females. These characters are represented in following table

Table 1 certain characteristics for persons with and without MS

| Character	Mean± Sd in male	Mean±Sd in female	Mean±Sd Without MS	Statistical significant
Waist circumference(cr	114.5±1.15	107.8±12.9	96 ± 4Male 86±3 female	P<0.05
BMI(Kg/m^2)	31.19±1.15	31.19±1.15	26.25±1.9	P<0.05
Triglyceride level(mmo	2.74 ±0.38	2.4l±0.5	1.29±0.24	P<0.05
HDL-C(mmol/L	0.83±0.08	0.9/l±0.14	1.4±0.4	P<0.05
Blood pressure Systolic/diastolic	145/85 ±20/15	150/90 ±20/15	135/80 ±15/15	Not significan

As patients have diabetes mellitus type 2 for ,duration of DM from 1 year to 15 year and most of patients on oral hypoglycemic drug with diet control and on periodic follow up for DM in diabetic consultant clinic .most of patients in this study have hypertension hypertensive patients were 170 and they are on antihypertensive measures. about 165 of patients are physically inactive so physical inactive percent is 81%,and physical activity are positive in 19% of MS .MS distribution represented in following table

**Table2** distribution of MS among type 2 diabetic patients

N0.of Abnormality	Types of Metabolic abnormality	male	female	Total No.and(%)
3	Hypertentionanddiabeticandabdominal obesity	59	74	133(66.5%)
3	HypertentionanddiabeticandHigh Tg.	24	55	79(39.5%)
3	HypertentionanddiabeticandHighHDL	27	37	64(32%)
4	HypertentionanddiabeticandobesityandHighTg.	43	47	90(45%)
5	HypertentionanddiabeticandobesityandHighTg.lowHDI	16	31	47(23.5%)
3	Diabetesand obesityandhigh Tg.	1	2	3(1.5%)
3	Diabetesand obesityandlowHDL	1	1	2(1%)

Age distribution of patients with MS are represented in following figure

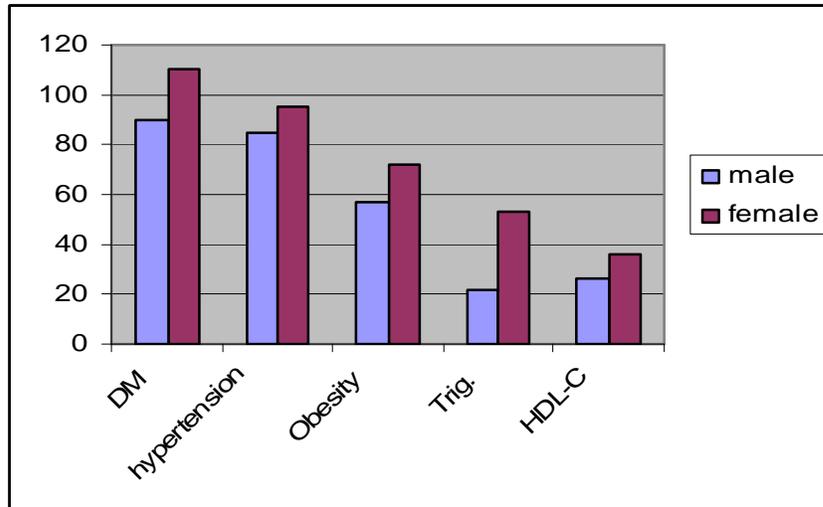**347**
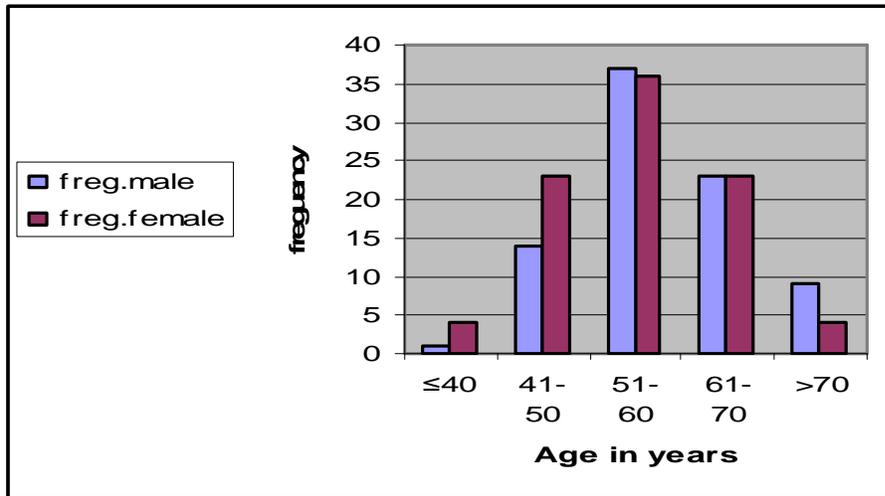
Figure1 Age distribution for MS patients

Rural and Urban distribution for MS patients are represented in following figure
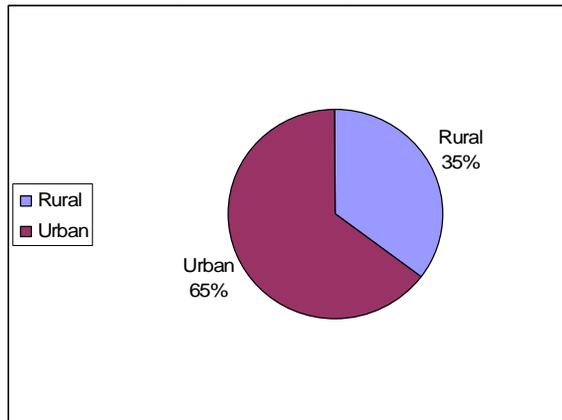
Figure2 Rural and Urban distribution for MS patients

The main abnormal characters including DM ,hypertension, obesity ,High triglyceride level ,low HDL-C among MS patients are represented in the following figure.

Figure 3 Types of abnormal characters among males and females

Discussion

This current study is to examine the presence and components of metabolic syndrome in type 2 diabetic patients in Babel Goverenate as they attending the special diabetic consultant clinic in Merjan Teaching Hospital for periodic check up. According to ATP III criteria, the prevalence of metabolic syndrome among our patients was found to be 66.5% in this study,we depend on definition ATPll,IDF,WHO for diagnosis of MS[17]. (Although there are difference in population in eastern and westerns society we depend on these definitions because there are no adjustment for this standards parameters in our society). In our study Mean age group for patients have MS was 59.14±9.26 for male and 56.9±9.02 for female respectively these are indicated that prevalence of MS increases with age ,this result was in good agreement with studies on MS in Sudan and Basra[18-19].

MS become prevalent medical problem and the prevalence of MS increase and become global medical problem, and mainly in urban societies, this study reveals that percentage of MS are 65% in urban area and this result , agree with studies in near by areas Turkia and Iran[20-21]. Increments of prevalence of MS in urban related to adoption of western life style in our society , low physical activity ,sedentary behaviors and unhealthy habits in healthier lifestyle and food.

The MS in this study in female more than male, the prevalence of MS and abnormal characters are due to obesity are 44% in male and 64% in female, and increase of triglyceride are 32% in male,68% in female ,and low level of HDL-c are 42% in male ,56% in female, the prevalence of MS among females more than males agree with other studies in western population and eastern area as in Iran and Pakistan [22-24]. high prevalence of MS in female can be related to increase obesity in female and lower level of physical activity and high calories food, and all these factors contributing to insulin resistance and MS . The mechanism by which excessive body fat causes insulin resistance and impairs glucose metabolism is not clearly defined, but fat stores are an important cause of increased free fatty acid and triglyceride in the skeletal muscle, which impairs insulin secretion. Central obesity is also associated with a decreased production

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of adinopectin, an antidiabetic collagen-like molecule [25]. Our report shows a mean HDL-C of 0.83±0.08 and 0.9±o.14mmol/L, , and triglyceride of 2.74± 0.38 mmol/L 2.4± 0.5 mmol/L in men and women respectively, the patients with hypertriglycerdemia are39.5%and about 32% for low level of HDL-C which are the main contributors for MS components according to ATPll definition ,and these tow metabolic abnormality have positive correlation with increase risk for cardiac diseases[26].

Conclusion

According to the results obtained from this study which indicated that MS become prevalence among diabetic patients, the patients in addition to diabetes mellitus type 2, by investigation were proved to have MS they have obesity , hypertension , dyslipidemia which are mainly contributed to increase rate of coronary artery diseases and increase mortality rate The main strategy for control MS is control of Diabetes mellitus by continuous follow up, weigh reduction and adaptation on good quality of food and increase in physical activity.

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