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Prevalence of Metabolic Syndrome among Sistanee Ethnic Women

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Abstract

Introduction: The frequency of the metabolic syndrome is increasing throughout the world. The etiology of the metabolic syndrome is dependent on different factors. This study aimed to evaluate the metabolic syndrome among Sistanee ethnic women in Gorgan, North East of Iran.
Methods: The study conducted on the hundred and sixty Sistanee women (20-40years) who were referred to the Health Centers in Gorgan. Metabolic syndrome was diagnosed using Adult Treatment Panel-III (ATP-III) guidelines.
Results: The mean body mass index, waist circumference, systolic blood pressure, diastolic blood pressure, fasting blood glucose and levels were significantly higher in the subjects with metabolic syndrome. The prevalence of low High Density Lipoprotein-cholesterol level, high waist circumference, high triglyceride level, , high blood pressure and high fasting glucose were 23.12%, 22.50%, 16.25%, 12.50% and 0.62%, respectively. Low HDL-cholesterol level (23.12%) and high waist circumference (22.50%) are the most frequent characteristics in comparison to other metabolic components.
Conclusion: The reasonable interpretation for our results is that Sistanee women in this area maybe had lower physical activity. Low HDL-cholesterol and high

waist circumference were the most usual factors of metabolic abnormality among these women.

Keywords: Metabolic syndrome, Sistanee ethnic women

Introduction

The metabolic syndrome is described by the clustering of several risk factors for cardiovascular disease (CVD) such as central obesity, glucose intolerance, low level of high-density lipoprotein (HDL), high triglyceride (TG) level, and hypertension (1).There are ethnic differences in the prevalence of metabolic syndrome (2-4). Differences in genetic background, diet, levels of physical activity, age and sex structure all influence the prevalence of both metabolic syndrome and its components (5). The prevalence of metabolic syndrome in adult population worldwide varies from 8 to 24.2% (6-7) in males and from 7 to 46.5% (8-9) in females. Cardiovascular disease is one of the main reasons of death among women in the world (10). The importance of the metabolic syndrome in general populations as a predictor of vascular disease has been confirmed by a number of large prospective epidemiologic studies (11-13). In the United States, the metabolic syndrome has become common (7). The metabolic syndrome is an important public health problem in both developed and developing countries. The prevalence of metabolic syndrome in Europe and among Americans of European ethnic groups change approximately between 20% and 30%, in both gender (2, 5, 7 and 14-15). Some studies show about increasing prevalence of metabolic syndrome in Asia (16). In our area, we do not have enough data on the adult Sistanee ethnic group women metabolic syndrome in Gorgan (South East of Caspian Sea), Iran. Therefore, it is very important to set up a study on these women with a risk of metabolic syndrome. The present study aimed to assess the metabolic syndrome among Sistanee women in this area.

Methods

This study group included 160 Sistanee adult women (Women who speak sistanee language which is native to them) who were referred to the different Health Centers in Gorgan. All the included subjects provided an informed consent. Data were collected by trained interviewers. First of all, a questionnaire was completed at each Health Center by trained interviewers. Demographic information is achieved by a questionnaire. The exclusion criterion was the coexistence of any other serious illness. Exclusion criteria included having hormone replacement therapy, taking drugs such as anti-diabetes and anti-hypertensive anti-lipidemic agents and smokers. A venous blood sample was collected from all the subjects who came after 8-12-hours in the morning after an overnight fast. The samples

were centrifuged for 10 minutes at 3000 rpm. The serum was used for estimating fasting blood glucose, triglycerides, total cholesterol, LDL-cholesterol and HDL-cholesterol concentrations, by biochemical kit using spectrophotometer techniques (Model JENWAY 6105 UV / VIS) in the Biochemistry Research Center (Gorgan Faculty of Medicine). Adult women considered to have metabolic syndrome if they had any three or more of the following, according to the ATP III Criteria: [1]
A) Abdominal obesity: Waist Circumference >88 cm
B) Hypertriglyceridaemia: serum triglycerides level > 150 mg/dl
C) Low HDL-cholesterol: < 50 mg/dl
D) High blood pressure: SBP > 130 mmHg and/or DBP > 85 mmHg or on treatment for hypertension.
E) High fasting glucose: serum glucose level > 110 mg/dl or on treatment for diabetes.
Weight was then measured, while subjects were minimally clothed without shoes, using digital scales. Height was measured in standing position using tape meter while the shoulder was in a normal position. Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared. Those with a BMI of 25.0-29.9 Kg/m^2 were classified as overweight, whilst those with a BMI ≥30 Kg/m2 were defined as obese. Subjects with BMI greater than 45 Kg/m2 were considered very obese (17). Waist circumference was measured at the point halfway between the lower border of ribs and the iliac crest in a horizontal plane (18). Systolic and diastolic blood pressure was measured in sitting position from the right hand. The results were reported as percentages and mean ± SD. The statistical analysis was done with SPSS- 16 version software. The results were evaluated by using independent student t and Chi square tests. Statistical significance was considered at $P < 0.05$.

Results

The baseline data of the subjects with and without the metabolic syndrome are shown in table 1. The mean body mass index, waist circumference, systolic blood pressure, diastolic blood pressure, fasting blood glucose and levels were significantly higher in the subjects with metabolic syndrome. There were no significant differences in the other parameters in subjects with and without the metabolic syndrome. Prevalence of metabolic syndrome and the components of metabolic syndrome in Sistanee ethnic group are shown in table 2. The frequency of metabolic syndrome is shown 23.75%. The prevalence of low High Density Lipoprotein-cholesterol level, high waist circumference, high triglyceride level, , high blood pressure and high fasting glucose were 23.12%, 22.50%, 16.25%, 12.50% and 0.62%, respectively. Low HDL-cholesterol level (23.12%) and high waist circumference (22.50%) are the most frequent characteristics in comparison to other metabolic components. The prevalence of Sistanee women with and without metabolic syndrome by age group is shown in table 3. The most age

distribution was in ages between 35-40 years. The highest prevalence of metabolic syndrome was in ages 35-40 years. There was increased frequency of metabolic syndrome from age 20-24 years. The prevalence of metabolic syndrome was significantly high in ages 30-34 years (21.05%) when compared subjects with and without metabolic syndrome. A number of subjects accomplishing the criteria of metabolic syndrome is shown in table 4. Our results showed that 18.12%, 6.87% and 1.87% had three, four and five criteria for metabolic syndrome, respectively.

Table 1 Baseline data of Fars women (Total subjects, subjects with and without metabolic syndrome).

Parameters	Total number of subjects	Subjects with metabolic syndrome	Subjects without metabolic syndrome	P-value
All women, No. (%)	160 (100)	38 (23.75)	122(76.25)	-
Age (years)	30.71±6.80	32.50±6.41	30.11±6.80	0.058
BMI, kg/m 2	26.26±3.98	27.92±4.46	25.76±3.71	0.003
WC, cm	93.51±14.93	100.84±14.17	91.23±14.47	0.001
SBP, mmHg	109.96±19.54	120.76±25.95	106.60±15.74	0.003
DBP, mmHg	67.52±11.98	74.05±13.20	65.49±10.85	0..001
FBS, mg/dl	91.40±26.75	114.35±41.16	84.26±14.34	<0.001
TG, mg/dl	112.44±73.85	159.05±88.21	97.91±62.35	<0.001
T-Chol, mg/dl	187.54±45.54	204.68±70.56	182.20±33.29	0.064
HDL-Chol , mg/dl	40.95±8.94	40.37±6.22	41.13±9.64	0.646
LDL-Chol , mg/dl	126.49±36.92	131.64±55.55	124.88±28.92	0.325

BMI: Body mass index, WC: waist circumference, SBP: systolic blood pressure, DBP: diastolic blood pressure, FBS: fasting blood glucose, TG: triglyceride, T-CHOL: total cholesterol, HDL-CHOL: HDL-cholesterol and LDL-CHOL: LDL-cholesterol

***P value less than 0.05 was considered significant.**

Table 2 Prevalence of metabolic syndrome and the components of metabolic syndrome in **Sistanee women (n=160)**

	Number	%
metabolic syndrome	**38**	**23.75**
Fasting Blood Sugar >110 mg/dl	**20**	**12.50**
High Density Lipoprotein-cholesterol < 50 mg/dl	**37**	**23.12**
Triglyceride > 150 mg/dl	**26**	**16.25**
Waist circumference > 88 cm	**36**	**22.50**
Systolic blood pressure >130 mmHg/ Diastolic blood pressure>85 mmHg	**1**	**0.62**

Table3. Distribution of Fars women with and without metabolic syndrome by age

Age groups in years	Subjects with MS(n=38)	Subjects without MS(n=122)
20-24 n (%)	3 (7.89)	13 (10.65)
25-29 n (%)	4 (10.52)	17 (13.93)
30-34 n (%)	8 (21.05)*	13(10.65)
35-40 n (%)	23(60.52)	79 (64.75)

MS: Metabolic Syndrome

***P value less than 0.05 was considered significant.**

Table 4.Number of subjects accomplishing the criteria of metabolic syndrome

Parameters	subjects(n=160)
3 criteria n (%)	29 (18.12)
4 criteria n (%)	11(6.87)
5 criteria n (%)	3(1.87)
Total criteria n (%)	38(23.75)

Discussion

The frequency of the metabolic syndrome is increasing throughout the world. The etiology of the metabolic syndrome is dependent on different factors such as the high prevalence of abnormal body fat distribution, high triglyceride, insulin

resistance, sociological and environmental, genetic factors and life style. The results of study in Asian people showed these risk factors and its high frequency might start at a young age. The epidemic of metabolic syndrome is worldwide health problem. It is not the only problem of western or Asian countries. Study in Italy showed that a prevalence of metabolic syndrome was 3–3.5% (on the basis of the presence of all five criteria)(20). Studies among Korean and Chinese populations showed that prevalence of metabolic syndrome were 13.8% (21) and 17.8% for females, respectively (22). In Iran, Eshtiaghi et al. showed that prevalence of metabolic syndrome was 18.3% (23). Deilbert (24), Figueiredo Neto (25) is shown that prevalence of metabolic syndrome was 23% and 24%, respectively. In our study the prevalence of the metabolic syndrome is higher than some other studies were done in Italy, Korea, China, Iran [20-23], Deilbert (24) and Figueiredo Neto (25), but our study is not in agreement with the studies were done by Ainy (53%) (26) and Heidari et al (44.9%) (27). Studies in Greece and USA have shown that prevalence of metabolic syndrome was similar in both genders (28, 9). Some other studies in Turkey, India, Iran, African Americans, Mexican Americans have shown that women to be much more frequently affected (9, 29), while in France and Australia the metabolic syndrome was found to be more common among men (29). Study on the components of metabolic syndrome showed that the most frequent changes of components of metabolic syndrome was low High Density Lipoprotein-cholesterol (23.12%), which is in agreement with the findings in USA (30), Turkey (31), Italy (32), Canada (33), UK (34) and Iranian population (35-36) that the most common found was high prevalence of low HDL-cholesterol. Some studies have reported that waist circumference is positively associated with the risk of cardiovascular occurrences (37-38). Study of Despres et al showed that extra fat mass rather than excess body weight was highly correlated with abnormal metabolism (39). Our study showed that women with metabolic syndrome had high abdominal obesity. This study showed that waist circumference was elevated among Sistanee women with metabolic syndrome. It was been also shown that women were overweight. Changes in central obesity can cause metabolism abnormality and influence health (40). It is important to reduce the risk of cardiovascular disease among these women. It suggests that among women with metabolic syndrome, blood glucose, and blood lipid profile monitoring and changing their life style leading to weight loss by diet and sport (25). Despite lifestyle changes such as an increase in high-fat, high-carbohydrate intake and a decrease in physical activity due to economical alterations in Iran, the metabolic syndrome in women remain an important problem. Study has been shown that 76.3% of females in Iran had physical inactivity (41). Iranian women mostly do less physical activity and overweight and obesity are more common between them (42). The reasonable interpretation for our results is that Sistanee women in this area maybe had lower physical activity. Low HDL-cholesterol and high waist circumference were the most usual factors of metabolic abnormality among these women. Prevalence of cardiovascular diseases might be increased. We have shown some related factors

of metabolic syndrome in these women to predict metabolic syndrome in these ethnic groups and help to prevent cardiovascular disease.

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