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Prevalence of Metabolic Syndrome in Baluch Women in Chabahar

[1]Mojdeh Ghiyas Tabari, [2]Fatemeh Naseri, [3]Edris Paad, [4]Fatemeh Majidi and [5]Abdoljalal Marjani

[1]Department of Biochemistry, Faculty of Medicine, Babol University of Medical Sciences, Iran
[2]Chabahar Veterinary Office, Chabahar, Sistane and Baluchestan Province, Iran
[3]Chabahar Health Center, Chabahar, Sistane an Baluchestane, Iran
[4]Department of Biochemistry, Zanjan Faculty of Medicine, Zanjan University of Medical Sciences, Iran
[5]Department of Biochemistry and Biophysics, Metabolic Disorders Research Center, Gorgan Faculty of Medicine, Golestan University of Medical Sciences, Gorgan, Golestan Province, Iran

Corresponding Author: Abdoljalal Marjani, Department of Biochemistry and Biophysics, Metabolic Disorders Research Center, Gorgan Faculty of Medicine, Golestan University of Medical Sciences, Gorgan, Golestan, Iran Tel/Fax: +98(171)4421651 and 4440225

ABSTRACT

Epidemiological studies have shown the importance of the metabolic syndrome. With estimation of the metabolic syndrome, it may predict cardiovascular disease, sudden death and the presence of some other cardiovascular risk factors. The aim of this study was to assess the metabolic syndrome among Baluch women. Our study consisted of 120 Baluch women. Baseline data of Baluch women, prevalence of metabolic syndrome and its components and distribution of body mass index were determined. The mean Body Mass Index (BMI), waist circumference, systolic blood pressure, triglyceride, High Density Lipoprotein-Cholesterol (HDL-Chol.) and fasting blood glucose levels were significantly higher in the subjects with metabolic syndrome. The prevalence of HDL-cholesterol, high triglyceride, high fasting glucose levels, high waist circumference and high blood pressure were shown to be 33.3, 20.8, 12.5, 11.8 and 2.5%, respectively. HDL-cholesterol (33.3%) and high triglyceride levels (20.8%) were the most frequent characteristics of metabolic components. The prevalence of subject with normal weight, overweight and obese BMIs were 77.5, 15 and 7.5%, respectively. About 9.17, 4.17 and 4.17% of Baluch women had three, four and five criteria of metabolic syndrome components, respectively. This study reveals that there is a significant difference in the metabolic syndrome components in patients with and without metabolic syndrome. The prevalence of HDL-cholesterol and high triglyceride in Baluch women was highest. Definition of metabolic syndrome may help physicians to estimate, decrease and prevent coronary heart disease and cardiovascular morbidity and mortality in subjects with metabolic syndrome.

Key words: Metabolic syndrome, baluch women, chabahar

INTRODUCTION

The metabolic syndrome prevalence is rising in the world. The syndrome is characterized by obesity, glucose intolerance, hypertension and dyslipidaemia (Miranda *et al*., 2005). This syndrome was clarified by Kyln for the first time in 1923 (Kylin, 1923) and in 1988, Gerald Reaven showed the concept of metabolic syndrome. He has been explained that the clustering of hypertension, glucose intolerance; high triglycerides and High Density Lipoprotein (HDL) concentration

characterized metabolic syndrome components (Reaven, 1988). Several studies have shown that there are differences in metabolic syndrome in different ethnic groups, gender, age, postmenopausal women and different countries (Marjani *et al*., 2012a, b; Marjani and Shahini, 2013; Marjani and Moghasemi, 2012; Shahini *et al*., 2013). It has been shown that worldwide alterations of metabolic syndrome prevalence changes from 10-84% (Kolovou *et al*., 2007). Some other studies revealed that the prevalence of metabolic syndrome alters worldwide from 8-24% and from 7- 46.5% among men and women, respectively (Gupta *et al*., 2003; Ford *et al*., 2002; Balkau *et al*., 2003; Ramachandran *et al*., 2003). Epidemiological studies have shown the importance of the metabolic syndrome (Shepherd *et al*., 1995; Downs *et al*., 1998; Ballantyne *et al*., 2001). In developed and developing countries, the metabolic syndrome is a main health problem. In European Americans and in Europe population, the metabolic syndrome prevalence changes almost from 20-30% in men and women (Ford *et al*., 2002; Meigs *et al*., 2003; Cameron *et al*., 2004; Qiao and The DECODE Study Group, 2006; Hildrum *et al*., 2007), but the prevalence of metabolic syndrome is increasing in Asian countries (Meigs, 2000). Some studies indicated that the prevalence of the metabolic syndrome among different age groups change. These studies showed that this syndrome in subjects with 15 (in Japan), 12-19 (in the United States), 10-18 (in Mexico), 10-19 (in Iran) (Duncan *et al*., 2004; Esmaillzadeh *et al*., 2006; Rodriguez-Moran *et al*., 2004; Saito *et al*., 2007) and 12-19 (US black) years old were 1, 6.4, 6.5, 10 and 4%, respectively (Johnson *et al*., 2009). The pathogenesis of the metabolic syndrome is not clearly shown. Prediction of cardiovascular disease, sudden death and cardiovascular dependent risk factors may estimate by determination of the metabolic syndrome (Empana *et al*., 2007). The aim of present study was to assess the metabolic syndrome among Baluch women.

MATERIALS AND METHODS

This study was done in the Chabahar Health Center in Sistan and Baluchestan. One hundred and twenty Baluch women who their native language was Baluchi participated in this study in 2015. All women were directed to the Health Center in Chabahar. Women with hormone replacement therapy, taking anti-diabetes and anti-hypertensive anti-lipidemic agents and active smokers considered as an exclusion criteria. After 12 h fasting, a blood sample was collected. Determination of serum fasting blood glucose, triglycerides, total cholesterol, LDL-cholesterol and HDL-cholesterol levels in all women were carried out by commercial kits. Spectrophotometer techniques (Model JENWAY 6105 UV/VIS) were used to determine all parameters. Metabolic syndrome was considered if women had 3 or more of the following.

ATP III criteria (Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults, 2001):

- Serum glucose level >110 mg dL^{-1}
- Low HDL-cholesterol <50 mg dL^{-1}
- Serum triglycerides level >150 mg dL^{-1}
- Systolic Blood Pressure (SBP) >130 mmHg and/or Diastolic Blood Pressure (DBP)>85 mm Hg (Hypertension)
- Waist circumference >88 cm (Abdominal obesity)

Weight was measured with minimal clothed, using digital scales. Height was measured with tape meter when the shoulder was in a normal position. Body Mass Index (BMI) was calculated

when weight in kilograms divided by height in meters squared. BMI with 18.5-24.9, 25.0-29.9 and ≥30 kg m^{-2} were considered as normal weight, overweight and obese, respectively (WHO., 1998). Abdominal obesity was assessed at the point halfway between the lower border of ribs and the iliac crest in a horizontal plane (Dalton *et al*., 2003). Blood pressure was determined in sitting position from the right hand. The data were shown in percentages and mean±standard deviation value. Analysis of data was done with SPSS-16 version software. Evaluation of results was carried out by independent student t test. The p-value <0.05 was considered statistical significant.

RESULTS

One hundred and twenty Baluch women were taken part in this study. The mean age of women was 28.31±9.11 years (the age range was 15-45 years old). Mean BMI was 21.94±4.68 kg m^{-2}. 17.5% (21/120) of women were diagnosed as having the metabolic syndrome. Table 1 shows the baseline data of the subjects with and without the metabolic syndrome. The Mean Body Mass Index (BMI), Waist Circumference (WC), Systolic Blood Pressure (SBP), Triglyceride (TG), High Density Lipoprotein-Cholesterol (HDL-Chol.) and Fasting Blood Glucose (FBS) levels were significantly higher in the subjects with metabolic syndrome ($p<0.01$). Table 2 shows the prevalence of metabolic syndrome and the components of metabolic syndrome in Baluch women. The prevalence of HDL-cholesterol, high triglyceride, high fasting glucose levels, high waist circumference and high blood pressure were shown to be 33.3, 20.8, 12.5, 11.8 and 2.5%, respectively. The HDL-cholesterol (33.3%) and high triglyceride levels (20.8%) were the most frequent characteristics of metabolic components. Table 3 shows the distribution of Baluch women by BMI categories. The prevalence of subject with normal weight, overweight and obesity BMIs were 77.5, 15 and 7.5%, respectively. Table 4 shows the prevalence of three or more components of the metabolic syndrome. Our results showed that 9.17, 4.17 and 4.17% of Baluch women had three, four and five criteria of metabolic syndrome components, respectively.

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

Parameters	Total number subjects	Subjects with metabolic syndrome	Subjects without metabolic syndrome	p-value
All women, No. (%)	120 (100)	21 (17.5)	99 (82.5)	-
Age (years)	28.310±9.11	29.050±9.15	28.190±9.18	0.700
BMI (kg m^{-2})	21.940±4.68	26.050±5.91	21.060±3.90	0.001
Waist circumference (cm)	69.590±10.97	79.620±15.19	67.440±8.57	0.002
Systolic blood pressure (mm Hg)	111.80±13.20	121.00±14.10	110.00±1.23	0.000
Diastolic blood pressure (mm Hg)	69.900±9.30	73.800±11.60	69.200±86	0.096
Fasting blood sugar (mg dL^{-1})	90.470±19.87	112.24 ±34.17	85.920±10.91	0.002
Triglyceride (mg dL^{-1})	120.10±45.50	190.24±42.92	105.26±29.48	0.000
High density lipoprotein-cholesterol (mg dL^{-1})	50.010±11.52	35.100±7.78	53.180±9.59	0.000

Table 2: Prevalence of metabolic syndrome and the components of metabolic syndrome in Baluch women (n = 120)

Parameters	Frequency (n)	Percentage
Metabolic syndrome	21	17.5
Fasting blood sugar >110 mg dL^{-1}	15	12.5
High density lipoprotein-cholesterol <50 mg dL^{-1}	40	33.3
Triglyceride >150 mg dL^{-1}	25	20.8
Waist circumference >88 cm	14	11.7
Systolic blood pressure >130 mg Hg/Diastolic blood pressure >85 mm Hg	3	2.5

Table 3: Distribution of Baluch women by BMI categories (n = 120)

BMI categories	Frequency (n)	Percentage
Normal weight	93.00	77.5
Overweight	18.00	15.0
Obesity	9.00	7.5
Total	120.00	100.00

BMI: Body mass index

Table 4: Frequency of subjects accomplishing the criteria of metabolic syndrome

	Subject (n = 120)	
Parameters	No.	%
3 criteria n	11.00	9.17
4 criteria n	5.00	4.17
5 criteria n	5.00	4.17
Total criteria n	21.00	17.5

DISCUSSION

Metabolic syndrome is an important health problem. The frequency of the metabolic syndrome is rising worldwide. The prevalence of metabolic syndrome may alter in different countries. These differences may be depended on lifestyle, different ethnicity and nutritional habits. Several studies have shown that the prevalence of metabolic syndrome in developing countries (Asian countries) was lower than developed countries (Ford *et al*., 2002; Qiao and The DECODE Study Group, 2006). The prevalence of metabolic syndrome in Philippines, Malaysia, India, Turkey, Iran, Venezuela, Brazil, Korea and Taiwan were 19, 24.2, 28.8, 33.4, 33.7, 31.2, 25.4, 31.9 and 36.6%, respectively (Misra and Khurana, 2008; Yoon *et al*., 2007). Another studies on Chinese women revealed that metabolic syndrome prevalence were 17.8% (Gu *et al*., 2005). Many other studies have shown that prevalence of metabolic syndrome was 53% (Ainy *et al*., 2007) and 44.9% (Heidari *et al*., 2010). In our study the prevalence of the metabolic syndrome is lower than some other findings (Misra and Khurana, 2008; Yoon *et al*., 2007; Ainy *et al*., 2007; Heidari *et al*., 2010) which were not in agreement with our study findings. Similar prevalence of metabolic syndrome was reported in males and female subjects in Greece and USA studies (Athyros *et al*., 2005; Ramachandran *et al*., 2003). Many studies have indicated that the metabolic syndrome was higher among women than men (Ramachandran *et al*., 2003; Cameron *et al*., 2004), while in some other populations the metabolic syndrome was found to be more common among men (Cameron *et al*., 2004).The prevalence of the metabolic syndrome in our study was 17.5%. The low prevalence of metabolic syndrome in Baluch women was almost in agreement with those of Philippines (19%) and Chinese (17.8%) populations (Misra and Khurana, 2008; Gu *et al*., 2005). Metabolic syndrome prevalence differences may be related to age distribution, nutritional statuses and ethnical differences. Several studies have proposed that some risk factors such as no physical activity, family history of diabetes, hypertension and cardiovascular disease and cigarette smoking may play an important role in progressing of metabolic syndrome in developing countries (Mohebbi *et al*., 2012). High triglyceride levels and HDL-cholesterol were very common in this study. Our results showed that 20.8% of women had triglyceride levels higher than150 mg dL^{-1}. Relationship between serum triglyceride levels and prevalence of coronary heart disease has indicated in some studies. High triglyceride level may help to predict women at risk for heart diseases (Assmann *et al*., 1998). It has reported that there are an association between HDL-cholesterol levels and increased levels of serum triglycerides (Rodriguez-Moran *et al*., 2004). An association between HDL-cholesterol levels and metabolic risk factors such as coronary heart disease were shown (Vega and Grundy, 1996). Study

on the components of metabolic syndrome revealed that the most frequent variations of components of metabolic syndrome was HDL-cholesterol (33.3%), which was in agreement with the findings of studies in USA (Heiss *et al*., 1980), Turkey (Onat *et al*., 1992), Italy (The Research Group ATS-RF2 of the Italian National Research Council, 1981), Canada (MacLean *et al*., 1999), UK (Mann *et al*., 1988) and Iranian population (Sharifi *et al*., 2008) that the most common found was high prevalence of HDL-cholesterol. According to our results, a component of metabolic syndrome such as HDL cholesterol is one of important risk factors to predict and prevent the early on set of cardiovascular disease and coronary heart disease (MacLean *et al*., 1999; Isomaa *et al*., 2001; Meigs *et al*., 1997; Natali *et al*., 2006).

CONCLUSIONS

The result of this study reveals that there is a significant difference in the metabolic syndrome components in patients with and without metabolic syndrome. Our findings have shown that the prevalence of HDL-cholesterol and high triglyceride in Baluch women was highest. Definition of metabolic syndrome may help physicians to estimate, decrease and prevent coronary heart disease and cardiovascular morbidity and mortality in subjects with metabolic syndrome.

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