

# Evaluation of the frequency of metabolic syndrome in a primary healthcare center in a metropolitan city

## Metabolik sendrom sıklığının bir büyükşehir birinci basamak sağlık merkezinde değerlendirilmesi

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### SUMMARY

**Aim:** Detection of undiagnosed Metabolic Syndrome cases in the community will be an important step in the fight against obesity and type 2 diabetes. In this study, we aimed to assess the frequency of metabolic syndrome and obesity among individuals at a metropolitan family health center.

**Material and Methods:** This cross-sectional study was conducted among adult individuals (aged  $\geq 18$  years) registered at a Family Health Center. Height, weight, waist circumference, and arterial blood pressure were measured and recorded. Body mass index and fasting blood glucose, triglycerides, and HDL levels were calculated. Evaluations were made according to the Metabolic Syndrome Diagnostic Criteria by the Turkish Endocrinology and Metabolism Society.

**Results:** The frequencies of Metabolic Syndrome among women and men were 32.97 % (n:31) and 32.43 % (n:24), respectively. Metabolic syndrome frequency did not differ between genders, but the condition was more prevalent among those with lower education levels and unemployed individuals.

**Conclusion:** Our study identified an inverse relationship between Metabolic Syndrome and education level in society. Furthermore, individuals with Metabolic Syndrome are often aware of their excess weight and seek treatment. These findings support the implementation of early detection and education programs in primary healthcare centers where individuals can always Access easily to reduce the burden of metabolic syndrome.

**Keywords:** Family medicine, metabolic syndrome, obesity, primary care

### ÖZET

**Amaç:** Toplumda tanı konmamış Metabolik Sendrom vakalarının tespiti, giderek salgın hale gelen obezite ve tip 2 diyabetle mücadelede önemli bir adım olacaktır. Bu nedenle çalışmamızda bir büyükşehir aile sağlığı merkezine kayıtlı bireylerde obezite ve metabolik sendrom sıklığını ve ilgili faktörleri araştırmayı amaçladık.

**Materyal ve Metotlar:** Bu kesitsel araştırma, bir Aile Sağlığı Merkezine kayıtlı 18 yaş ve üzeri bireyler arasında yapılmıştır. Değerlendirmeler Türk Endokrinoloji ve Metabolizma Derneği tarafından Metabolik Sendrom Tanı Kriterlerine göre yapılarak boy, kilo, bel çevresi ve arteriyel kan basıncı değerleri, vücut kitle indeksi açlık kan şekeri, trigliserit ve HDL düzeyleri kaydedildi.

**Bulgular:** Kadın ve erkeklerde Metabolik Sendrom sıklığı sırasıyla %32.97 (n:31) ve %32.43 (n:24) idi. Metabolik sendrom sıklığı cinsiyetler arasında farklılık göstermezken eğitim düzeyi düşük olanlarda ve çalışmayanlarda Metabolik sendrom sıklığı daha sık görüldü.

**Sonuç:** Çalışmamız Metabolik Sendrom ile toplumdaki eğitim düzeyi arasında ters bir ilişki saptamıştır. Ayrıca, Metabolik Sendrom'lu bireyler genellikle fazla kilolarının farkındadır ve çare arayışındadırlar. Bu bulgular metabolik sendromun yükünü azaltmak için bireylerin her zaman kolayca erişim sağlayabilecekleri birinci basamak sağlık merkezlerinde erken teşhis ve eğitim programlarının uygulanmasını desteklemektedir.

**Anahtar kelimeler:** Aile hekimliği, aile sağlığı merkezi, metabolik sendrom, obezite

## INTRODUCTION

Obesity and metabolic syndrome (MetS) are complex and common conditions frequently seen in communities with high mortality and morbidity. Being overweight or obese is defined as having excessive fat accumulation that presents risks to general health, and body mass index (BMI) is widely used to determine obesity based on the obesity classification of the World Health Organization (WHO) (1). Active molecules secreted by visceral adipocytes increase insulin resistance which is biological unresponsiveness to endogenous or exogenous insulin. Insulin resistance is one of the leading pathological causes of conditions such as dyslipidemia and hypertension, which also cause MetS and type 2 diabetes. (2,3) Definitions of MetS specify quantitative criteria, including large waist circumference, high blood pressure, dyslipidemia with high triglycerides and low HDL cholesterol (HDL-C), and fasting hyperglycemia, which all are strong predictors of cardiovascular disease and type 2 diabetes. The Turkish Endocrinology and Metabolism Society (TEMD) defines insulin resistance as the main diagnostic criterion of MetS, while the International Diabetes Federation (IDF) suggests abdominal obesity as the main diagnostic criterion (4,5).

The diagnosis of MetS is made according to the following diagnostic criteria recommended by TEMD: Presence of diabetes mellitus or impaired glucose tolerance or insulin resistance together with at least two of the following; hypertension (systolic blood pressure > 130 mmHg, diastolic blood pressure > 85 mmHg or using antihypertensives), dyslipidemia (triglyceride level > 150 mg/dl or HDL level < 40 mg/dl in men, < 50 mg/dl in women), abdominal obesity (BMI > 30 kg/m<sup>2</sup> or waist circumference: > 94 cm in men, > 80 cm in women) (4). According to the IDF, if the fasting blood glucose is 5.6 mmol/L or 100 mg/dL and above, the Oral Glucose Tolerance Test (OGTT) is helpful but not essential for the diagnosis of Metabolic Syndrome (5).

Detection of undiagnosed MetS cases in the community will be an important step in the fight against obesity and type 2 diabetes, which are gradually becoming an epidemic. The aim of the study is to determine the frequency of obesity and MetS among individuals registered to a family health center in a metropolitan city, İstanbul, and also evaluate how they struggle with weight control.

## MATERIAL AND METHODS

This research is a cross-sectional type study held among adult individuals (aged ≥ 18 years) registered and applied for any reason at the Sarıyer Merkez Family Health Center in January and February 2017. Individuals between the ages of 18 – 75, not receiving any surgical or medical treatment for obesity or diabetes, were included in the study. Eligible individuals were briefly informed about the

research, and their verbal consent was obtained before participating. Individuals not willing to participate or women in pregnancy and puerperal periods were excluded from the study. The collection of data using Family Health Center information systems and patient records was done after the informed consent according to Helsinki Declaration, was taken from each patient. Permission was granted via the Public Health Directorate of İstanbul, as the administration of the Family Health Center for the study. To ensure confidentiality, the data of each patient was transferred to the SPSS environment with a code, and all identification data were removed. All international conventions related to patient confidentiality and research ethics were followed during the study.

In the study, a questionnaire was applied to the participants, and they were asked about their age, gender, marital status, occupation, educational status, whether they had a chronic disease, and whether they were on a diet or not. Height, weight, waist circumference, and arterial blood pressure were measured and recorded. Body mass index (BMI) was calculated with the following formula:  $BMI = \text{Weight (kg)} / \text{Height (m}^2\text{)}$ . In addition, fasting blood glucose, triglycerides, and HDL levels were measured. In order to minimize measurement errors, all anthropometric measurements were made with the same measurement tools, and the blood tests were studied in the same laboratory. Evaluations were made according to the Metabolic Syndrome Diagnostic Criteria recommended by the Turkish Endocrinology and Metabolism Society which were defined above.

The obtained data were analyzed using the SPSS 18.0 program. Descriptive statistics, including numbers, percentages, means, and standard deviations, were used to summarize the data. The relationship between grouped variables was assessed using chi-square analysis, with statistical significance determined by the p-value ( $p < 0.05$ ).

## RESULTS

A total of 168 participants, aged between 18-75 years, with a mean age of  $54.2 \pm 11.7$ , were included in the study. The sociodemographic characteristics of the participants are presented in Table 1.

Body mass indexes were calculated by measuring the height and weight of the participants with the formula of  $BMI = \text{Weight (kg)} / \text{Height (m}^2\text{)}$ . Accordingly, the mean BMI is found as  $26.23 \pm 6.12$  (min:16,91-max:46.09) kg/m<sup>2</sup>. Despite this average of high BMI value, the body mass indexes of 46 participants were within the normal range. Of the participants with a BMI ≥ 30 (meaning obese), 26 (15.5%) were female, and 19 (11.3%) were male. Obesity frequency among women was 15.5% (n: 26); the obesity frequency in men was found to be 11.3% (n: 19) (Table 2).

The diagnostic criteria of the Turkish Endocrinology and Metabolism Society were taken into account in the evaluations related to Metabolic Syndrome (Table 3). The frequencies of Metabolic Syndrome among women and men were 32.97 % (n:31) and 32.43 % (n:24), respectively. According to the results of our study, we did not find any difference between men and women in terms of MetS frequency ( $p = 0.32$ ), but we found that MetS is more common among unemployed people and those with less education ( $p = 0.023$ ;  $0.019$ ; respectively).

**Table 1.** Sociodemographic characteristics of the participants

	Groups	n	%
<b>Gender</b>	Male	74	55.9
	Female	94	44.1
<b>Mean age (years)</b>		54.2±11.7	
<b>Marital status</b>	Married	133	79.1
	Single	35	20.9
<b>Working status</b>	Employed	48	28.6
	Unemployed	120	71.4
<b>Smoking status</b>	Yes	51	30.3
	No	117	69.7
<b>Education</b>	Not educated	7	4.2
	Primary school	42	25.0
	Secondary school	44	26.2
	High school	59	35.1
	University	16	9.5
<b>Weight status</b>	Low weight (BMI≤18.5)	11	6.5
	Normal (18.5<BMI≤24.9)	46	27.4
	Overweight (25<BMI≤29.9)	66	39.3
	Obese (BMI≥30)	45	26.8

**Table 2.** Obesity frequency (BMI≥30) among participants

Gender	n	%	p*
Female	26	15.5	
Male	19	11.3	0.001
Total	45	26.8	

\*Comparison of values was performed using chi-square analysis with p-values calculated

\*\*BMI: Body Mass Index

**Table 3.** Distribution of Metabolic Syndrome criteria according to TEMD

	Gender				p*	Total	
	Female		Male			n	%
	n	%	n	%			
Abdominal obesity	56	59.57	41	55.40	0.089	97	57.73
Impaired Fasting Glucose	29	30.85	26	35.13	0.056	55	32.73
High Triglycerides	19	20.21	24	32.43	< 0.05	43	25.59
Low HDL-c	23	24.46	33	44.59	< 0.05	56	33.33
High Blood Pressure	31	32.97	24	32.43	0.726	55	32.73

\*Comparison of values was performed using chi-square analysis with p-values calculated

\*\*TEMED: The Turkish Endocrinology and Metabolism Society

When the participants with MetS were asked whether they were aware of being overweight/obese or not, only 41 (male/female: 16 / 25) of them stated that they were aware of their excess weight. In contrast, 26 participants with normal or low BMIs complained of being overweight.

Of the people who participated in the study, 77 (45.83 %) stated that they dieted without the help of health professionals at some point in their life, but none of them

have been permanently successful in maintaining their weight within the recommended normal range.

When the rates of going to a dietitian (n=26; 15.47 %) were evaluated according to BMI, the group that has gone to a dietitian the most is BMI ≥ 30 with 42.30 % (n=11). This is followed by the group with a BMI of 25 ≤ BMI < 30; the rate of going to a dietitian was 26.92 % (n=7).

## DISCUSSION

Being overweight and obese, as a part of MetS, are major risk factors for several chronic diseases. Because early detection of MetS is critical for timely interventions for reducing the overall risk on cardiovascular and other major chronic diseases, there are many studies related to obesity and Metabolic Syndrome held all over the world. The prevalence of MetS was found to be 39.9% in men and 38.1% in women, according to the research conducted by the IDF in the USA in 2005 (6). According to the TEKHARF study, which is a long-term cohort conducted in Türkiye, 9.2 million people aged 30 and over have MetS; and the prevalence of MetS has increased by 1.3% per aging in the last 12 years (7). Another important study in our country, METSAR, reported that the prevalence of MetS was 33.9% (39.6% in women; 28.0% in men)(8).

In our study, the frequencies of participants with MetS were lower than the results in the USA. Still, they were consistent with the results of METSAR, being 32.43% among male participants and 32,97% among females. The difference between the results of the USA and our country may be related to dietary habits and the use of technology, but it needs further investigation. Since our study population has a small number of participants, these results cannot reflect the whole country but can give an idea of the community we serve.

In our study, MetS was more common in people who were married, unemployed, and primary school graduates; however, when compared with the previous similar studies, there was no significant difference between the male and female participants in terms of MetS frequency. While MetS was found statistically significantly higher in women, married people, housewives, and people with lower educational status in the MetS study of Kutlu et al., Asik et al. reported that they could not find a significant difference in parameters other than educational status (9,10). Interestingly, Dinsa et al. reported that the more affluent and/or those with higher educational attainment tend to be more likely to be obese in the review assessing the association between socioeconomic status and obesity among low- and middle-income countries in 2012 (11).

In our study, women and men had similar results in terms of abdominal obesity, high blood pressure, and impaired fasting glucose levels, but men were more likely to have

higher levels of triglycerides and lower HDL-c levels. We assumed that the lower HDL-c levels could be related to higher smoking rates among men in our country, which should be further investigated as in previous studies (12,13).

According to the results of our study, when the participants with MetS were asked whether they were aware of being overweight / obese or not, 41 (74.5%; male / female: 16 / 25) of them stated that they were aware of their excess weight, which is a high rate of awareness on weight status; but as an interesting result, 26 participants with normal or low BMIs also complained of being overweight, pointing that people may also have problems with their body image.

## CONCLUSION

Metabolic Syndrome is a prevalent condition that leads to significant cardiovascular and metabolic disorders worldwide, including our country. Research has shown that the prevalence of MetS is higher among individuals with lower education levels in our country and other European countries (14). Notably, individuals with MetS are often conscious of their excess weight and seek remedies, suggesting that primary healthcare centers can initiate educational and screening programs to combat MetS. Such efforts could serve as a promising starting point for tackling this health issue.

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