The Metabolic Syndrome Risk and Related Factors who Admitted to the Cardiology Outpatient Clinic

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ABSTRACT

Objectives: This study was carried out to determine the metabolic syndrome risk and related factors of metabolic syndrome risk. **Material and Methods:** This descriptive study was conducted on three outpatient clinics of Cardiology at Adıyaman University Training and Research Hospital. The sample of the study consisted 268 patients who agreed to participate the study. Data was collected by questionnaire. The Statistical Package for the Social Sciences (SPSS, version 16.0 for Windows) were used the analyze data. Percentage and Chi-Square test were used to evaluate for data. **Results:** The 58.6% of patients were female, 86.6% of them were married. The 67.5% of patients had chronic disease and 32.1% of these patients first degree relatives had chronic disease. The 44.8% of patients were overweight and 26.9% of patients were obesite. 42.5% of the patients had the high risk, 48.5% of the patients had medium risk of metabolic syndrome. There was statistically significant relationship between metabolic syndrome risk and age, gender, marital status, having chronic diseases **(p<0.05)**. There was statistically significant relationship between metabolic syndrome risk body mass index and hypertension **(p<0.05). Conclusion:** The majority of patients who were admitted to the Cardiology outpatient clinics had medium and high MS risk. There was statistically significant relationship between MS risk and age, gender, marital status, education level, body mass indeks, chronic disease.

Key words: Metabolic Syndrome, risk, patients, outpatient clinic, cardiology

Introduction

Metabolic syndrome (MS) is the occurrence of cardiovascular risk factors like hypertension, dyslipidemia (especially high triglyceride, low high-density lipoprotein (HDL), low-density lipoprotein (LDL) increase), obesity (especially central or abdominal obesity), insulin resistance, glucose intolerance or Diabetes Mellitus [1]. MS is known since 1923 and has been called by various names. However, in 1998, World Health Organization (WHO) has suggested in a report issued to call it as MS [2].

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Many organizations have developed diagnostic criteria for MS. But because of its ease of application, the diagnostic criteria defined by National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) is the most widely accepted definition in practical life [3]. ATP III took as base the presence of at least three of the criteria as abdominal obesity, high blood pressure, hypertriglyceridemia, low HDL cholesterol and fasting hyperglycemia. ATP III proposed the limit values of waist circumference for male <102 cm and female <88 cm by emphasizing that abdominal obesity is an important element in the development of the syndrome. However, it was emphasized that these values of waist circumference derived from obese American society may be incorrect for adapting to different societies and even there are societies below these values as the MS can develop within. In addition, ATP III has stated that MS diagnosis can be made in existence of type 2 diabetes

mellitus [4]. As a result of rapid epidemiological and socio-economic transformation in Turkey, the changes in lifestyle and negative increase in MS risk factors lead to high prevalence of MS. According to the study conducted by Turkey Metabolic Syndrome Research Group (METSAR), in our country's urban areas MS prevalence is 33.9% [5]. In our country, as in many developed countries, coronary artery disease and cerebrovascular events are leading causes of death in adults. In a study conducted by World Health Organization (WHO), it was found that MS increase the risk of coronary artery disease and stroke 4 times more [6]. Nevertheless, the MS is the overall risk factor which can be controlled. Primary prevention in the fight against chronic diseases, includes recognition and practices related to the elimination of the risk factors of the disease. With the primary prevention which requires the important responsibility of nurses; the development of the individual and public health is possible with the significant prevention of the early death caused by vascular diseases and diabetes. Therefore, the identification of individuals at risk for MS, support of their healthy lifestyle behaviors (healthy diet, excercise and smoking cessation) are important contributions to public health [7].For diagnosis of MS, anthropometric measurements, blood pressure and some laboratory findings of patients should be evaluated together. Especially in rural areas where laboratory studies can not be done, to determine the individuals with medium and high-risk for MS with non-invasive techniques and to direct those people to health care services, can contribute early diagnosis and treatment of MS and thus can contribute to the prevention of the development of many diseases associated with MS. Therefore in this study, by using MS risk research form, it was aimed to determine the risk of MS of patients who admitted to the cardiology clinic and the factors associated with MS risk.

Materials and Methods

The purpose of this cross-sectional and descriptive study was to determine the MS risk and the factors that were related to MS risk of the patients who have admitted to the outpatient clinic of cardiology.

Population-Sample

The population of the research comprised the patients who had admitted to the cardiology outpatient clinic of the Adıyaman University Training and Research Hospital which is located to city center of Adıyaman, in 15th September-15th October 2013. The sample of the study comprised the 268 patients who have accepted to participate to the research.

Data Collection Tools

Research data was collected by employing the questionnaire form developed by the researchers and metabolic syndrome research form including 14 items which is developed by Erdoğmuş.

Questionnaire Form

Questionnaire form comprised 16 items related to patients' sociodemographic characteristics and medical history and record sheet of blood pressure, pulse, height, and weight and waist circumference

Metabolic Syndrome Research Form

It includes 14 items developed by specialist doctor Onur Erdoğmuş. The questionnaire items are answered as "Yes" or "No". This form is evaluated as low risk for MS at 0-4 scores, medium risk for MS at 5-8 score (it is suggested to be investigated) and high risk for MS at 9-14 scores (it is suggested to be investigated) [8].

Anthropometric Measures

The height of the patients was measured by the researcher by taking of the shoes of them to minimize the error rate. The weight of the patients was measured by standard bascule by taking of the additional clothes of the patients. After these measurement patients body mass index (BMI) was computed with the following formula, BMI=Wight (kg)/Height (m^2). The patients are evaluated according to their BMI scores: BMI score below 18.50 as thin, BMI score between 18.50 and 24.99 as medium weight, BMI score between 25.0 and 29.99 as overweight and BMI score over 30.0 as obese [9]. According to NCEP ATP III Criteria, the women having waist circumference>88 and men having waist circumference >102 were evaluated as pathologic. Blood pressure was measured in sitting position after the patient had a rest for 10 minutes. According to NCEP ATP III Criteria, patients having blood pressure <130/85 mmHg were evaluated as normal and patient having blood pressure ≥130/85 mmHg were evaluated as hypertensive [4].

Data Analysis

Data was analyzed by SPSS (Statistical Package for Social Sciences) 17.0 software. Percentages and Chi-Square test were used in statistical analysis.

Results

% 83.6 of the patients was 40 years old or above, % 58.6 of the patients was woman, %81.6 of the patients was married and %79.9 of the patients has been working. %41.8 of the patients was not literate. %81.0 of the patients did not smoke. According to BMI, % 44.8 of the patients was fat and %26.9 of them was obese. % 48.1 of the patients have scored MS research form between 5-8 showing medium risk for MS and

%42.5 of the patients have scored between 9-14 showing high risk for MS (**Table 1**).%67.5 of the patients had a chronic disease, %58.6 of the patients had hypertension, %41 of them had heart disease, %19.4 of them had diabetes, %8.6 of them had asthma, %4.1 of them had renal impairment and %1.1 of them had cancer. When the medical history of the patient' families were examined, %67.9 of the patients had chronic disease in their families. When other diseases were examined, %41.0 of the patients had hypertension, %43.3 of them had heart disease, %35.8 of them had diabetes and %9.7 of them had asthma in their families (**Table 2**).Age was the most important factor that affects MS risk. %98,2 of the patients older than 40 had high MS risk while %1.8 of the patients younger than 40 had high MS risks. According to age groups, the changes of MS risk was statistically significant (**p=0.001**). Gender is another important factor affecting MS risk. Woman having medium or high MS risk are statistically more than man having medium or high MS risk (**p=0.001**). The difference between patients' educational level and metabolic syndrome risks was statistically significant (**p=0.034**). The difference between patients marital status and MS risk was statistically significant (**p=0.001**). The difference between chronic disease existence and metabolic syndrome risk were statistically significant (**p=0.001**). When the chronic diseases affecting metabolic syndrome risks were examined, it was identified that hearth disease, diabetes, hypertension and asthma affect MS risk ($p<0.05$). The difference between MS risk and chronic disease existence in family is statistically significant ($p=0.019$). The existence of diabetes, hypertension, asthma in family medical history affect MS risk ($p<0.05$). Smoking condition of the patients did not affect their MS risk ($p>0.05$). The difference between BMİ and MS risk is statistically significant and patient having high MS risk were mostly fat or obese (**Table 3**). Statistically significant difference was identified between of waist circumference and MS risk at woman (**p=0.001**). However, the difference between man's waist circumference and MS risk was not statistically significant ($p=0.17$).

Table 1: Characteristics of sociodemographic, BMİ*, MS risk

Patient Characteristics	n(%)	Patient Characteristics	n(%)
Age		**Working status**	
40 ↓	44(16.4)	Yes	214(79.9)
40 and ↑	224(83.6)	No	54(20.1)
Gender		**Smoking**	
Female	157(58.6)	Yes	51(19.0)
Male	111(41.4)	No	217(81.0)
Marital status		**BKİ**	
Single	36(13.4)	Under weight	6(2.2)
Married	232(81.6)	Normal weight	70(26.1)
		Overweight	120(44.8)
Educational status		Obesity	72(26.9)
Illiterate	110(41.0)		
literate	48(17.9)	**Metabolic Syndrome Risk**	
Primary school	46(17.2)	Low risk	25(9.3)
Middle School	18(6.7)	Medium risk	129(48.1)
High school	25(9.3)	High risk	114(42.5)
University	21(7.8)		

***** Body mass index

Table 2: Patients and their family's disease history

Patient disease history	n(%)	Family disease history	n(%)
Chronic disease		**Chronic disease**	
No	87(32.5)	No	86(32.1)
Yes	181(67.5)	Yes	182(67.9)
Diabetes		**Diabetes**	
No	216(80.6)	No	172(64.2)
Yes	52(19.4)	Yes	96(35.8)
Hypertension		**Hypertension**	
No	111(41.4)	No	158(59.0)
Yes	157(58.6)	Yes	110(41.0)
Cardiac disease	158(59.0)	**Cardiac disease**	
No	110(41.0)	No	152(56.7)
Yes		Yes	116(43.3)
Renal disease	257(95.9)	**Renal disease**	
No	11(4.1)	No	260(97.0)
Yes		Yes	8(3.0)
Cancer	265(98.9)	**Cancer**	
No	3(1.1)	No	264(98.5)
Yes		Yes	4(1.5)
Asthma	245(91.4)	**Asthma**	
No	23(8.6)	No	242(90.3)
Yes		Yes	26(9.7)

Table 3: Patients' MS risk according to sociodemographic characteristics, habits, chronic disease, BMİ

Characteristics	Metabolic Syndrome Risk			p value
	Low risk n(%)	Medium risk n(%)	High risk n(%)	
Age				
40 ↓	12(48.0)	30(23.3)	2(1.8)	**p=0.001**
40 and ↑	13(52.0)	99(76.7)	112 (98.2)	X^2=40.43
Gender				
Female	12(48.0)	68(52.7)	77(67.5)	**p=0.034**
Male	13(52.0)	61(47.3)	37(32.5)	X^2=6.759
Educational status				
Illiterate- literate	8 (32.0)	70 (54.3)	80 (70.2)	**p=0.003**
Primary school-Middle School	11 (44.0)	31 (24.0)	22 (19.3)	X^2=16.395
High school University	6 (24.0)	28 (21.7)	12 (10.5)	
Marital status				
Single	9(36.0)	20(15.5)	7(6.1)	**p=0.001**
Married	16(64.0)	109(84.5)	107(93.9)	X^2=16.638
Smoking				
No	19(76.0)	104(80.6)	94(82.5)	p=0.574
Yes	6(24.0)	25(19.4)	20(17.5)	X^2=0.750
Chronic disease				
No	17(68.0)	41(31.8)	29(25.4)	**p=0.001**
Yes	8 (32.0)	88(68.2)	85(74.6)	X^2=16.993
Cardiac disease				
No	17(68.0)	47(36.4)	46(40.4)	**p=0.013**
Yes	8(32.0)	82(63.6)	43(59.6)	X^2=8.663
Diabetes				
No	24(96.0)	112(86.8)	80(70.2)	**p=0.001**
Yes	1(4.0)	17(13.2)	34 (29.8)	X^2=14.906

Hypertension				
No	23(92.0)	82(63.6)	52(45.6)	**p=0.001**
Yes	2(8.0)	47(36.4)	67(54.4)	X^2=20.728
Asthma				
No	25(100.0)	121(93.8)	99(86.8)	**p=0.042**
Yes	0(0.0)	8(6.2)	15(13.2)	X^2=6.321
Family chronic disease				
No	13(52.0)	45(34.9)	28(24.6)	**P=0.019**
Yes	12(48.0)	84(65.1)	86(75.4)	X^2=7.975
History of family diabetes				
No	20(80.0)	91(70.5)	61(53.5)	**p=0.005**
Yes	5(20.0)	38(29.5)	53(46.5)	X^2=10.640
History of family Hypertension				
No	18(72.0)	89(54.3)	51(44.7)	**p=0.001**
Yes	7(28.0)	40(45.7)	63(55.3)	X^2=16.653
History of family cardiac disease				
No	18(72.0)	70(54.3)	64(56.1)	p=0.258
Yes	7(28.0)	59(45.7)	50(43.9)	X^2=2.710
History of family asthma				
No	24(96.0)	122(94.6)	96(84.2)	**p=0.015**
Yes	1(4.0)	7(5.4)	18(15.8)	X^2=8.442
Body Mass İndex				
Under weight	2(8.0)	4(3.1)	0(0.0)	
Normal weight	13(52.0)	39(30.2)	18(15.8)	**p=0.001**
Overweight	10(40.0)	64(49.6)	46(40.4)	X^2=43.484
Obesity	0(0.0)	22(17.1)	50(43.8)	

Table 4: Female and male MS risk according to waist circumference

Gender	Waist Circumference	Low risk n(%)	Medium risk n(%)	High risk n(%)	p value
Female (n=157)	<88	8(17.8)	27(60.0)	10(22.2)	**p=0.001**
	>88	4(3.6)	41(36.6)	67(59.8)	$X^{2=}$21.7
Male (n=111)	<102	12(13.6)	50(48.4)	26(29.3)	p=0.17
	>102	1(4.3)	11(47.8)	11(47.8)	$X^{2=}$3.4

Discussion

This study aimed to identify the MS risks and related factors in the patients who applied to cardiology outpatient clinic. It was identified that %48 of the patients have medium risk while %42.5 of the patients have high risk. Karadeniz et al., (2007) conducted a study to determine MS risk in medical personnel. They identified that %14.3 of them have high risk and %54.8 of them have medium risk [10]. Mollaoğlu et al., (2010) have mentioned that %17.3 of the adults who applied to Family Health Center has high risk and %44 of them has medium risks [11]. In our study, the rate of patients having medium and high risks is more than other studies. The reason for this was thought as our sample had patients having a cardiovascular disease or complaints. Most of the studies in the literature mentioned that age is the most effective factor in MS frequency [5, 7, 12-17]. In our research the patients having high MS risk are older than 40 years old **(p=0.001)**, which is parallel to the literature. Kutlu and Çivi mentioned that when age increases the occurrence of MS increases and MS occurs frequently in people older than 50 [12]. Mollaoğlu et al., mentioned that when age increases the occurrence of MS increases and %87.8 of people who have high MS risk are at 50 or older (p=0.001) [11]. Soysal and colleagues conducted a study with young adults and results that when age increases, MS prevalence increases [18]. The studies in Turkey reported that MS prevalence is between %39.6-

49.0 in females and %28-31.2 in males [12, 14]. In our study, %67.5 of the people having high MS risk are female and gender was identified as an important factor that affects MS risk level (**p=0.034**). According to a study conducted in Russia reported that MS occurred in old female more than old males. However, they reported that there is no difference in MS prevalence between young males and females [16]. In our study, we have found statistically significant difference between educational level and MS risk (**p=0.003).** In our study, MS risk is higher in people who did not take formal education than the people who took formal education. Many study reported that education level affects MS prevalence and risk. These studies reported that MS prevalence and risk is higher in people who are not literate and primary school graduates [7, 11, 12]. This finding in our study is parallel with the literature. The increase in industrialization and sedentary life style increases obesity prevalence. Obesity, especially visceral obesity, has role in both the highness of lipolytic activities and pathogenesis of MS because of secreted cytokines [19]. In our study, it was reported that %84.3 of the people having high MS risks are fat and obese (**p=0.001**). Çelik et al., reported MS incidence as %55.6 in people having BMI ≥30 [13]. Karadeniz et al., mentioned that people having high BMI have high MS risks [10]. Kozan et al., reported that abdominal obesity and high blood pressure are the frequent components of MS in Turkish population [14]. Similarly, the studies conducted in other countries reported that obesity is an important factor that affects frequency of MS [15, 17]. A study conducted in Russia reported that center obesity prevalence is two times higher in females than males [16]. An epidemiological study conducted with medical students in Sudan reported that people having MS diagnosis, are not obese [17]. This situation explains the highness of MS prevalence in females and in older people. In our study,%59.9 of the females having waist circumference >88 cm and %47.8 of the males having waist circumference>102 cm have high MS risk. A study reported that %45.8 of the males having waist circumference>102 cm and %60.7 of the females having waist circumference>88 cm have MS frequencies [12]. However, waist circumference was identified a factor affecting MS risk in females in our study. In our study, we found that people having hypertension in themselves or in their families have higher MS risk (p=0.001). Kutlu and Çivi (2014) reported in their study that hypertension is the most frequent (%73) component of MS (12). Also, Soysal reported that blood pressure is the most frequent component of MS (18). Similarly a study conducted in China, reported hypertension as a risk factor for MS [20].The negative effects of smoking over cardiovascular diseases, cancer types and other health situations are known [21, 22]. Smoking causes decreases in HDL level and increases in LDL and triglyceride levels [22, 23]. In this study, it was revealed that smoking does not affect MS risk [p=0.574]. Similarly, there are studies showing that there is no relation between smoking and MS [24, 25]. For example, Kitiş et al., (2010) reported in their study that people who smoke have higher blood pressure, blood sugar and waist circumference than the people who do not smoke ($p<0.05$), but they also reported that there is no relation between smoking and MS occurrence [7]. However, a study conducted in Seoul reported that people having MS diagnosis have higher smoking prevalence [26].

Conclusion

Almost half of the patients who have applied to cardiology outpatient clinic have MS risks. Age, gender, marital status, smoking, chronic disease history, chronic disease history in family, BMI, waist circumference are that factors that affect MS risk. It was resulted that people, who are older, females, married, smoke, have chronic disease in themselves or in their family, have higher BMI and have higher waist circumference, have higher MS risk. It was suggested that non-invasive measurement devices should be developed to evaluate MS risks and studies should be conducted to determine high risk groups.

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Source of Support: Nil
Conflict of Interest: None