RESEARCH ARTICLE/ARAŞTIRMA MAKALESİ

ASSESSMENT OF ADHERENCE TO THE MEDITERRANEAN DIET IN ADULTS WITH METABOLIC SYNDROME

METABOLİK SENDROMU OLAN YETİŞKİNLERDE AKDENİZ DİYETİNE OLAN UYUMUN DEĞERLENDİRİLMESİ

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ABSTRACT

Objective: This study aimed to evaluate the level of adherence to the Mediterranean diet among individuals with metabolic syndrome.

Materials and Methods: The research was conducted between February and March 2025 with 120 participants (74 women, 46 men) aged 24–85 years, who attended the Internal Medicine Outpatient Clinic of Antalya Training and Research Hospital. Participation was voluntary, and written informed consent was obtained. Data collection was performed through face-to-face interviews using a structured questionnaire, which included sociodemographic information, dietary habits, and the "Mediterranean Diet Adherence Screener" (MEDAS). Anthropometric measurements were also taken.

Results: Among men, 11 participants were classified as having low adherence, while 16 showed high adherence. Among women, 15 demonstrated low adherence, whereas 30 had high adherence. Analysis of MEDAS responses revealed low consumption of legumes and fish/seafood, but higher intake of nuts and peanuts. None of the participants adhered to the criterion of wine consumption, while 73.3% reported preferring white meat over red meat, a behavior consistent with Mediterranean diet principles.

Conclusions: Recent evidence highlights the importance of evaluating Mediterranean diet adherence in relation to chronic diseases, including metabolic syndrome. The present findings suggest that nutrition education encouraging adherence to Mediterranean dietary principles may contribute to improving overall diet quality and reducing disease risk.

Keywords: Mediterranean diet, Metabolic syndrome, Dietary patterns

ÖZET

Amaç: Bu çalışma, metabolik sendromlu bireylerin Akdeniz diyetine olan uyum düzeylerinin incelenmesi amacıyla yapılmıştır.

Yöntem: Araştırma, Şubat 2025-Mart 2025 tarihleri arasında Antalya Eğitim ve Araştırma Hastanesi Dâhiliye Polikliniği'ne başvuran, 24-85 yaş aralığında olan 74 kadın ve 46 erkek birey ile yürütülmüştür. Gönüllülük esasına dayanarak, çalışmaya onam vererek katılmayı kabul edenler çalışmaya dâhil edilmiştir. Bireylere yüz yüze görüşme tekniği ile anket formu uygulanmıştır. Anket formu; katılımcıların bireysel ve sosyodemografik özellikleri, beslenme alışkanlıklarına yönelik sorulardan, Akdeniz Diyeti Bağlılık Ölçeği (MEDAS)' nden oluşmaktadır. Katılıcıların antropometrik ölçümleri alınmıştır.

Bulgular: Çalışmaya katılan metabolik sendromlu 46 erkek bireyden 11 kişi Akdeniz diyetine uyumsuz grupta yer alırken, 16 erkek birey Akdeniz diyetine sıkı uyum göstermektedir. Çalışmaya katılan 74 kadın hastadan 15'i Akdeniz diyetine uyumsuz grupta yer alırken 30 kadın bireyin Akdeniz diyetine sıkı uyum gösterdiği görülmüştür. Bununla birlikte MEDAS ölçeğine verilen cevaplar incelendiğinde, bireylerin kurubaklagil ve balık/deniz ürünü tüketimleri oldukça düşük düzeyde kalırken, fındık ve yer fıstığı tüketimi Akdeniz diyetine uyum açısından yüksek bulunmuştur. Çalışmaya dâhil olan bireylerin hiçbiri şarap tüketimi açısından Akdeniz diyetine uyumlu değildir. Bireylerin %73,3'ü beyaz eti kırmızı ete tercih ederek Akdeniz diyeti ölçeğinde 'uyumlu' olarak değerlendirilmiştir.

Sonuç: Son yıllarda Akdeniz diyetinin incelenmesine ve metabolik sendrom dahil olmak üzere belirli patolojilerle olan ilişkisine odaklanılmıştır. Akdeniz diyetine yönelik beslenme eğitimlerinin bireylerin diyet kalitesini artırmada önemli olabileceğini düşündürmektedir.

Anahtar Kelimeler: Akdeniz diyeti, Metabolik sendrom, Beslenme modeli

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INTRODUCTION

Metabolic syndrome (MetS) is defined as a cluster of conditions characterized by abdominal obesity, dyslipidemia, hypertension, and impaired glucose tolerance, all of which are recognized as risk factors for various chronic diseases (1). Several diagnostic criteria have been proposed for MetS. “In 2001, the National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) established the following criteria: abdominal obesity (waist circumference ≥102 cm in men and ≥88 cm in women), hypertriglyceridemia (serum triglyceride levels >150 mg/dL), reduced HDL cholesterol (serum HDL <40 mg/dL in men and <50 mg/dL in women), hypertension (systolic blood pressure ≥130 mmHg and/or diastolic blood pressure ≥80 mmHg), and hyperglycemia (fasting plasma glucose >110 mg/dL).” The diagnosis of MetS is made when at least three of these criteria are present (2).

Epidemiological studies have demonstrated that adherence to the Mediterranean dietary pattern significantly reduces the risk of developing obesity and type 2 diabetes mellitus, which are key components of metabolic syndrome (3). Particularly due to its well-established beneficial effects on cardiovascular health, the Mediterranean dietary model has gained increasing popularity in recent years. Broadly, this dietary pattern emphasizes the consumption of fruits and vegetables, cereals (primarily whole grains), nuts, legumes, olives, and olive oil. It also includes moderate to high intake of fish and seafood, moderate consumption of dairy products, poultry, and eggs, while red meat intake is maintained at a low level (4). Furthermore, as the Mediterranean dietary pattern restricts the intake of simple carbohydrates and saturated fats, it contributes to lowering the risk of developing chronic diseases (5). In addition, its richness in antioxidants and polyphenolic compounds supports the maintenance of a healthy lifestyle and facilitates the management or improvement of existing health conditions (6).

Studies have demonstrated that Mediterranean dietary model reduces the prevalence of metabolic syndrome and prevents related complications (7). Adopting this diet as a lifestyle increases the levels of anti-inflammatory and anticoagulant components in the body, helps to preserve cardiovascular health, and contributes to a reduction in the prevalence of cardiovascular diseases (8). In the ‘ATTICA Study’ conducted by Panagiotakos and colleagues on 3,042 participants, it was reported that greater adherence to the Mediterranean diet was associated with a 20% reduction in the risk of developing metabolic syndrome (9). In another cohort study conducted in the United States, 1,918 individuals were followed for a period of seven years. The findings demonstrated that individuals adhering to the Mediterranean diet had a lower incidence of metabolic syndrome. Among those following the this dietary pattern,

improvements were observed in several MetS components, including abdominal obesity, insulin resistance, and dyslipidemia (10).

This study was specifically designed to evaluate adherence to the Mediterranean diet among individuals with metabolic syndrome.

MATERIALS AND METHOD

This study was conducted between January and March 2025 with adult individuals who attended the Internal Medicine Outpatient Clinic of Antalya Training and Research Hospital and were diagnosed with Metabolic Syndrome by a physician. Among these adults, those who voluntarily agreed to participate and provided informed consent constituted the study sample.

A structured face-to-face interview technique was employed to collect data using a questionnaire. The questionnaire included participants' sociodemographic characteristics, anthropometric measurements and dietary habits. In order to establish dietary patterns in relation to the Mediterranean diet, "Mediterranean Diet Adherence Screener" (MEDAS) was administered as part of the survey. The research protocol was evaluated and deemed appropriate by the Ethics Committee for Non-Interventional Studies of Antalya Bilim University on December 30, 2024 (Project No: 2024/084).

Mediterranean Diet Adherence Screener (MEDAS)

In the PREDIMED trial, which examined the role of the Mediterranean dietary pattern in the primary prevention of cardiovascular diseases, Martínez-González et al. (11) developed and utilized a 14-item tool known as the MEDAS. Later, Schröder and his team (12) conducted the validation study of this instrument to confirm its reliability and applicability. Pehlivanoğlu et al. adapted the scale into Turkish and established its reliability, reporting a Cronbach's alpha of 0.829 (13). The MEDAS tool includes 14 questions, each scored dichotomously (0 or 1) according to dietary intake, and the responses are summed to yield a total adherence score. According to this scoring system, values ≤5 reflect low adherence, scores between 6 and 9 indicate moderate adherence, while scores ≥10 demonstrate high adherence to the Mediterranean diet.

Anthropometric Measurements

Body weight (kg), height (cm), body mass index (kg/m²), waist and hip circumference (cm), waist-to-hip ratio, body fat percentage (%), total body water (kg), and muscle mass (kg) were assessed. Height (cm) was measured using a non-stretchable measuring tape. Body weight (kg)

and fat mass (kg) of the participants were measured with a portable and regularly calibrated body composition analyzer.

The diagnosis of Metabolic Syndrome was established according to the criteria of the "National Cholesterol Education Program Adult Treatment Panel III" (NCEP ATP III, 2001) (14).

Statistical Analysis

All statistical analyses were performed using IBM SPSS Statistics version 23.0. For descriptive purposes, numerical variables were summarized with mean, standard deviation, median, minimum and maximum values, and interquartile ranges (25th and 75th percentiles), while categorical variables were expressed as counts and percentages. The distribution of the data was examined with the Shapiro–Wilk test to assess normality. When comparing two groups, the independent samples t-test was applied under the assumption of normality, and the Mann–Whitney U test was used when this assumption was not satisfied. In comparisons involving more than two groups, one-way ANOVA was performed when the data met the criteria for normal distribution, whereas the Kruskal–Wallis H test was employed otherwise. A significance threshold of $p<0.05$ was set for all statistical analyses.

RESULTS

The distributions of marital status, educational level, income status, occupation, and age of the participants according to gender are presented in Table 1. Of the participants, 38.3% were male and 61.7% were female. The mean age of the male participants was 51±12 years (range: 29–74), while that of the female participants was 51±12 years (range: 24–85). The relationships between gender and the categorical variables presented in Table 1 were assessed using the Pearson Chi-square test[1] and Fisher's Exact test[2]. Marital status did not differ significantly by gender, $\chi^2(2) = 1.21$, $p = .545$[1], with the majority of both male and female participants being married. Similarly, no significant differences were found in the distribution of educational levels, $\chi^2(4)=3.772$, $p=0.438$[1], and high school graduates represented the most common group in both genders. In the male group, only one participant held a master's degree, indicating limited representation of this educational level in the sample. The relationship between gender and income level was also not significant, $\chi^2(2)=1.858$, $p = 0.395$[1], with most participants in both groups reporting that their income exceeded their expenses. However, a significant difference was observed in the distribution of occupations by gender (Fisher's Exact test[2], $p<0.001$), with the proportions of retirees and laborers being higher among men compared to women.

Table 1. Comparison of age, marital status, educational level, income status, and occupational distribution of individuals by gender

	Gender			
	Male	**Female**	**Total**	
Variable	**n (%)**	**n (%)**	**n (%)**	**p-value**
Marital Status				
Married	33(71.7)	59(79.7)	92(76.7)	0.545[1]
Single	8(17.4)	8(10.8)	16(13.3)	
Divorced/Widowed	5(10.9)	7(9.5)	12(10)	
Total	46(100)	74(100)	120(100)	
Educational Level				
Primary school graduate	11(23.9)	21(28.4)	32(26.7)	0.438[1]
Secondary school graduate	8(17.4)	10(13.5)	18(15)	
High school graduate	18(39.1)	23(31.1)	41(34.2)	
University graduate	8(17.4)	20(27)	28(23.3)	
Master's degree	1(2.2)	0(0)	1(8)	
Total	46(100)	74(100)	120(100)	
Income Status				
Income exceeds expenses	33(71.7)	45(60.8)	78(65)	0.395[1]
Income equals expenses	2(4.3)	7(9.5)	9(7.5)	
Income below expenses	11(23.9)	22(29.7)	33(27.5)	
Total	46(100)	74(100)	120(100)	
Occupation				
Housewife	0(0)	30(40.5)	30(25)	
Civil servant	6(13)	8(10.8)	14(11.7)	
Worker	13(28.3)	8(10.8)	21(17.5)	
Retired	20(43.5)	17(23)	37(30.8)	<0.0001[2]
Self-employed	2(4.3)	5(6.8)	7(5.8)	
Other	5(10.9)	6(8.1)	11(9.2)	
Total	46(100)	74(100)	120(100)	

	Gender				
	Male (n=46)		**Female (n = 74)**		
	Mean±SD	**Median**	**Mean±SD**	**Median**	**p-value**

	(Min–Max)	(Q1–Q3)	(Min–Max)	(Q1–Q3)	
Age	51±12 (29-74)	52 (40-62)	51±12 (24-85)	52 (42-61)	0.897[1]

[1] Pearson Chi-square test, [2] Fisher's Exact test, SD: Standard deviation; Q1: 25th percentile; Q3: 75th percentile

The distribution of BMI categories by gender is presented in Table 2. When examining the relationship between BMI category and gender, a statistically significant difference emerged between the groups, $\chi^2(4) = 9.582$, $p = .048$[1]. While normal-weight individuals (n = 9) were present among women, no participants in this category were observed in the male group. In addition, the frequency of first -degree obesity was higher in men as opposed to women. Article information form should be written after the Conclusion section.

Tablo 2. Distribution of BMI categories of individuals by gender

	Gender			
	Male n(%)	**Female n(%)**	**Total n(%)**	**p-value**
BMI Category				
Normal weight	0(0)	9(12.2)	9(7.5)	0.048[1]
Overweight	15(32.6)	29(39.2)	44(36.7)	
Obese	18(39.1)	23(31.1)	41(34.2)	
Class I obesity	10(21.7)	7(9.5)	17(14.2)	
Class II obesity	3(6.5)	6(8.1)	9(7.5)	
Total	46(100)	74(100)	120(100)	

BMI:Body Mass Index, [1] Pearson Chi-square test

Table 3 presents the comparative statistics of various anthropometric characteristics of the participants by gender. Regarding body weight, the mean body weight of male participants was 97.19±16.16 kg, while that of female participants was 76.06±14.32 kg. Statistical testing with the independent samples t-test revealed that the difference reached significance, $t(118)=7.478$, $p<0.001$[1]. Thus, male participants had a higher body weight compared to females.

As evidenced by the results of the independent samples t-test for BMI averages, the mean BMI was 32.50±4.51 in male participants and 30.62±5.61 in female participants. This difference was statistically significant, $t(118)=1.92$, $p=0.022$[1], indicating that the mean BMI of men was higher than that of women.

The Mann–Whitney U test was used for the comparison of waist, hip circumference, waist-to-hip ratio, body fat percentage, muscle mass and total body water. The median waist circumference was 119 cm in male participants and 104.5 cm in female participants. This difference was found to be statistically significant, U=823.500, z= –4.61, p<0.001[2], with men having higher values than women. According to the results for hip circumference, no significant difference was found between both groups, U=1557.5, z= –0.589, p=0.556[2]. A significant difference was also found between genders in terms of the waist-to-hip ratio. The mean value was 1.05±0.07 in men and 0.91±0.15 in women. This difference was statistically significant, U=422, z= –6.81, p<0.001[2], with men having higher values than women.

Body fat percentage was also higher in men (44.65±3.79) compared to women (39.53±5.93). This difference was statistically significant, U=756.5, z= –5.23, p<0.001[2]. The total body water was 41.46±5.14 kg in men and 35.96±5.21 kg in women, and this difference was statistically significant, U=731.50, z= –5.23, p<0.001[2]. Finally, muscle mass was 49.95±8.2 kg in men and 42.08±7.74 kg in women. This difference was also statistically significant, U=765.50, z= –5.05, p<0.001[2].

Tablo 3. Comparison of various anthropometric characteristics of individuals by gender

	Gender				
	Male (n=46)		**Female (n=74)**		
	Mean ± SD (Min–Max)	**Median (Q_1-Q_3)**	**Mean ± SD (Min–Max)**	**Median (Q_1-Q_3)**	**p-value**
Weight (kg)	97.19±16.16 (69.85-149.9)	94.58 (84.8-108.2)	76.06±14.32 (54-127.8)	74.4 (65-83.55)	<0.0001[1]
Height (m)	1.73±0.07 (1.55-1.85)	1.73 (1.67-1.77)	1.58±0,07 (1.44-1,74)	1.58 (1.52-1.63)	<0.0001[1]
BMI (kg/m²)	32.5±4.51 (26.06-45.76)	31.94 (29.08-35.3)	30.62±5.61 (19.83-48.43)	29.78 (26.43-33.4)	0.022[1]
Waist circumference (cm)	120.09±13.41 (98-143)	119 (108-132)	106.61±14.21 (82-139)	104.5 (96-117)	<0.0001[2]

Hip circumference (cm)	114.96±11.33 (94-137)	112 (107-125)	114.11±14.15 (88-146)	111 (104-126)	0.556[2]
Waist-to-hip ratio	1.05±0.07 (0.89-1.24)	1.05 (0.98-1.07)	0.91±0.15 (0.09-1.1)	0.94 (0.89-0.96)	<0.0001[2]
Body fat (%)	44.65±3.79 (31.6-52.8)	45(45-45)	39.53±5.93 (24.3-48.6)	40.3 (35.6-45)	<0.0001[2]
Total body water (kg)	41.46±5.14 (32.5-56.3)	40.75 (38.5-44.5)	35.96±5.21 (27.4-49.7)	35.35 (32.2-39.2)	<0.0001[2]
Muscle mass (kg)	49.95±8.2 (36.9-78.4)	49.05 (42.6-56.3)	42.08±7.74 (30.8-66.3)	40.1 (36.1-44.8)	<0.0001[2]

BMI:Body Mass Index, [1] Pearson Chi-square test, [2] Fisher's Exact test, SD: Standard deviation; Q1: 25th percentile; Q3: 75th percentile

Table 4 presents the distribution of variables such as gender, marital status, educational level, occupation, smoking, and alcohol use according to the levels of regarding adherence to the Mediterranean diet (non-adherence – acceptable adherence – strict adherence). In these analyses, the Pearson Chi-square test[1] and Fisher's Exact test[2] were applied where appropriate. No significant association was found between gender and the level of adherence to the Mediterranean diet, $\chi^2(2) = 0.451$, $p=0.798$[1]. Both male and female participants were distributed across the three adherence groups in approximately similar proportions.

Marital status, educational level, income status, and occupation were also found not to be related to compliance with the Mediterranean diet (all $p>0.05$). In particular, high school graduates represented the most frequent category across all three adherence groups; nevertheless, the difference was not statistically meaningful, $\chi^2(4) = 2.37$, $p=0.685$[2].

It was observed that a higher proportion of individuals were in the non-adherence group to the Mediterranean diet (38.5%), whereas fewer participants were represented in the strict adherence group. Although this difference approached the threshold of statistical significance, it was not significant, $\chi^2(2) = 5.389$, $p=0.068$[1].

No significant association was found between smoking status and adherence to the Mediterranean diet, $\chi^2(4) = 5.629$, $p=0.229$[1]. However, it is noteworthy that the prevalence of smoking was higher in the non-adherence group (57.7%). No meaningful difference regarding

alcohol use was observed (Fisher's Exact test, p =0.448), and the prevalence of alcohol consumption appeared similar in all three groups.

Tablo 4. Comparison of sociodemographic characteristics of individuals according to their levels of adherence to the Mediterranean diet

	Adherence to the Mediterranean diet				
	Non-adherence n(%)	**Acceptable adherence n(%)**	**Strict adherence n(%)**	**Total n(%)**	**p-value**
Gender					
Male	11(42.3)	19(39.6)	16(34.8)	46(38.3)	0.798[1]
Female	15(57.7)	29(60.4)	30(65.2)	74(61.7)	
Total	26(100)	48(100)	46(100)	120(100)	
Marital status					
Married	18(69.2)	38(79.2)	36(78.3)	92(76.7)	
Single	6(23.1)	5(10.4)	5(10.9)	16(13.3)	0.625[2]
Divorced/Widowed	2(7.7)	5(10.4)	5(10.9)	12(10)	
Total	26(100)	48(100)	46(100)	120(100)	
Educational level					
Primary school	7(26.9)	11(22.9)	14(30.4)	32(26.7)	
Secondary school	2(7.7)	9(18.8)	7(15.2)	18(15)	0.685[2]
High school	11(42.3)	18(37.5)	12(26.1)	41(34.2)	
University	6(23.1)	9(18.8)	13(28.3)	28(23.3)	
Master's degree	0(0)	1(2.1)	0(0)	1(0.8)	
Total	26(100)	48(100)	46(100)	120(100)	
Occupation					
Housewife	3(11.5)	15(31.3)	12(26.1)	30(25)	0.33[2]
Civil servant	2(7.7)	3(6.3)	9(19.6)	14(11.7)	
Worker	6(23.1)	7(14.6)	8(17.4)	21(17.5)	
Retired	9(34.6)	16(33.3)	12(26.1)	37(30.8)	
Self-employed	2(7.7)	4(8.3)	1(2.2)	7(5.8)	
Other	4(15.4)	3(6.3)	4(8.7)	11(9.2)	
Total	26(100)	48(100)	46(100)	120(100)	

Smoking status					
Yes	15(57.7)	18(37.5)	17(37)	50(41.7)	
No	8(30.8)	26(54.2)	21(45.7)	55(45.8)	0.229[1]
Quit	3(11.5)	4(8.3)	8(17.4)	15(12.5)	
Total	26(100)	48(100)	46(100)	120(100)	
Alcohol consumption					
Yes	15(57.7)	18(37.5)	20(43.5)	53(44.2)	
No	11(42.3)	27(56.3)	23(50)	61(50.8)	0.448[2]
Quit	0(0)	3(6.3)	3(6.5)	6(5)	
Total	26(100)	48(100)	46(100)	120(100)	

[1] Pearson Chi-square test, [2] Fisher's Exact test

Table 5 presents the distribution of the scoring results for the 14 components of the Mediterranean diet according to adherence status. For each dietary item, the proportions of adherent and non-adherent individuals were evaluated.

The majority of participants were found to adhere to the Mediterranean diet in terms of olive oil use (76.7%). However, when the amount of olive oil consumed was considered, this rate decreased to 55%, indicating that although attention was paid to the quality of fat, the quantity consumed was insufficient. In terms of vegetable consumption, 69.2% of the participants were adherent, whereas this proportion decreased to 34.2% for fruit consumption. This difference indicates better adherence in vegetable consumption compared to fruit.Red meat consumption was limited to the recommended levels by 84.2% of the participants. In contrast, only 43.3% were found to be adherent in terms of butter/margarine use. With regard to sugar-sweetened beverage consumption, 85.8% of the participants were adherent, indicating that such drinks were consumed in limited amounts. However, adherence to wine consumption was evaluated as 'non-adherent' in all participants (100%). Legume consumption was relatively low, with 45.8% of participants being adherent, and particularly low adherence was observed for fish/seafood consumption, with only 1.7% meeting the recommended levels. In terms of processed sweets and pastries, 58.3% of the participants were found to be adherent. The adherence rate was 64.2% for nut and peanut consumption, 73.3% for the balance between white and red meat intake, and 97.5% for sauce use.

Tablo 5. Distribution of scoring results for the 14 components of the Mediterranean diet according to adherence status

Component	Non-adherent n (%)	Adherent n (%)
Olive oil use	28 (23.3)	92 (76.7)
Olive oil amount	54 (45.0)	66 (55.0)
Vegetable consumption	37 (30.8)	83 (69.2)
Fruit consumption	79 (65.8)	41 (34.2)
Red meat consumption	19 (15.8)	101 (84.2)
Butter/margarine use	68 (56.7)	52 (43.3)
Sugar-sweetened beverage consumption	17 (14.2)	103 (85.8)
Wine consumption	120 (100.0)	0 (0.0)
Legume consumption	65 (54.2)	55 (45.8)
Fish/seafood consumption	118 (98.3)	2 (1.7)
Processed sweets/pastries	50 (41.7)	70 (58.3)
Nut (peanut) consumption	43 (35.8)	77 (64.2)
White/red meat balance	32 (26.7)	88 (73.3)
Sauce use	3 (2.5)	117 (97.5)

DISCUSSION

"The prevalence of Metabolic Syndrome is rapidly increasing worldwide. This rise is also associated with the growing prevalence of obesity (15). In addition to increasing obesity, several environmental factors such as poor dietary habits, lack of physical activity, and tobacco use are linked to Metabolic Syndrome (16)." Epidemiological studies highlight the beneficial effects of the Mediterranean dietary pattern on the components of Metabolic Syndrome. In the present study, the adherence of individuals with MetS to the Mediterranean diet and its relationship with anthropometric measurements and sociodemographic characteristics were examined.

Erem and colleagues reported in a large-scale study of 4,809 participants conducted in Trabzon that metabolic syndrome was more prevalent among married individuals than in those who were single (17). In the current research, while marital status did not differ significantly by gender, it was noted that the majority of participants in both sexes (n = 92) were married.

A study conducted by Silventoinen et al. in Finland in 2005 revealed that the prevalence of metabolic syndrome was 2.6 times higher among individuals with only primary education compared to those with high school or university education (18). Consistently, findings from another study by Erem et al. indicated an inverse relationship between educational attainment and metabolic syndrome prevalence, with higher education levels associated with lower occurrence rates (17). In this study, it was observed that the majority of individuals with metabolic syndrome (n = 41) were high school graduates. However, no significant gender differences were found in the distribution of educational levels.

In the present study, the reason why high school graduates outnumbered individuals with lower educational levels, such as primary and secondary school graduates, is thought to be due to the study being more recent compared to the referenced studies.

In this study, the responses given by individuals with metabolic syndrome to the Mediterranean diet adherence scale indicated that 73% preferred white meat over red meat, while 98% consumed ≤3 servings of fish per week. It is considered that these results may be influenced by the participants' socioeconomic status and prevailing dietary habits in the society.

Monounsaturated fatty acids are recognized for their protective role in lowering the risk of cardiovascular disease, type 2 diabetes, and metabolic syndrome (19). Findings from this study indicated that while many participants showed adherence to the Mediterranean diet with respect to the type of fat consumed particularly olive oil the actual quantity of intake did not meet the recommended levels, and thus was evaluated as non-adherent based on the Mediterranean diet adherence scale.

When examining the fruit and vegetable consumption of the participants, vegetable intake was found to be consistent with the Mediterranean diet in 69.2% of individuals, whereas fruit intake was found to be non-adherent in 65.8% of the participants. Fruits and vegetables are rich in dietary fiber, antioxidant compounds, and minerals such as potassium and magnesium, which provide protective effects against metabolic syndrome (20).

In this study, no significant association was found between the levels of adherence to the Mediterranean diet and body composition or anthropometric measurements in individuals with metabolic syndrome. A study conducted in 2025 among prediabetic adults similarly reported no significant relationship between Mediterranean diet adherence and BMI (21). Conversely, another study indicated that greater adherence to the Mediterranean diet reduces the risk of obesity, suggesting that lower adherence is associated with higher BMI (22).

According to the meta-analysis conducted by Zheng et al., adherence to the Mediterranean diet in individuals with type 2 diabetes was associated with a significant reduction in diastolic blood

pressure. Improvements were also observed in HbA1c and fasting glucose levels, as well as a decrease in body weight (23). In the present study, however, no significant association was found between biochemical parameters and adherence to the Mediterranean diet among individuals with metabolic syndrome. This result was attributed to the small sample size.

In a study conducted among postmenopausal women in Poland, it was shown that even a one-point increase in Mediterranean diet adherence scores reduced the risk of central obesity by 33% and the risk of hypertension by 18%. However, no significant association was found with the presence of MetS (24).

In the study by Al Kudsee and colleagues, higher compliance with the Mediterranean diet was found to correlate with a significant decrease in body mass index, waist circumference, and blood pressure values (systolic and diastolic) (25). For patients diagnosed with metabolic syndrome, greater compliance with the Mediterranean diet (moderate or high) was associated with a marked decrease in cardiovascular mortality risk. Specifically, consumption of vegetables, legumes, nuts, and a higher MUFA/SFA ratio exerted beneficial influences (26). In Salma's investigation, every unit increase in the Mediterranean diet adherence score was associated with meaningful reductions in triglycerides, LDL cholesterol, HbA1c, fasting glucose, waist size, and waist-to-hip ratio (27). A meta-analysis provided evidence supporting the positive impact of the Mediterranean diet on metabolic syndrome criteria, indicating that adherence to this dietary pattern is associated with improvements in MetS components (28).

STUDY LIMITATIONS

The limitations of this study include the relatively small sample size and the exclusion of individuals who had difficulties in comprehension and response, those using statins or other medications that could influence biochemical parameters, as well as pregnant and lactating women.

CONCLUSION

Recent evidence highlights the importance of evaluating Mediterranean diet adherence in relation to chronic diseases, including metabolic syndrome. The present findings suggest that nutrition education encouraging adherence to Mediterranean dietary principles may contribute to improving overall diet quality and reducing disease risk.

Abbreviations

BMI: Body Mass Index

MetS: Metabolic Syndrome

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