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The Adaptation of Individuals with Coronary Heart Disease to the Mediterranean Diet, Its Relationship with Lipid Profile and Blood Pressure

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ABSTRACT

Objective: The aim of this study is to assess the adherence of individuals with existing coronary heart disease (CHD) to the Mediterranean Diet and to evaluate its association with blood parameters. **Materials and Methods:** This cross-sectional study enrolled 66 individuals aged 30-70 with CHD from a cardiology outpatient clinic between June and September 2022. To ensure sample homogeneity, patients with comorbid conditions such as cancer, kidney disease, liver disease, and pregnant women were excluded. Participants completed a detailed survey including sociodemographic data, biochemical parameters, a Food Frequency Questionnaire (FFQ), and 24-hour dietary recalls. Adherence to the Mediterranean diet was assessed using the Mediterranean Diet Score (MedDietScore). Statistical analyses were performed using SPSS, employing Independent Samples T-tests, Mann-Whitney U tests, ANOVA, and correlation analyses. **Results:** The mean Mediterranean Diet Score was 32.5 ± 5.7, indicating moderate adherence. Significant differences were observed in LDL cholesterol and triglyceride levels across different adherence levels (p= 0.006 and 0.02 respectively), with higher Mediterranean Diet Scores correlating with lower levels of these lipids. Additionally, a moderately positive correlation was found between diet scores and systolic blood pressure. **Conclusion:** Moderate adherence to the Mediterranean diet correlates with improved lipid profiles in CHD patients. These findings support the promotion of the Mediterranean diet for cardiovascular health. However, further studies are needed to validate these findings, particularly through randomized controlled trials focusing on the long-term effects of Mediterranean diet adherence on lipid metabolism, inflammatory markers, and endothelial function.

Keywords: Coronary Heart Disease, Mediterranean Diet, Lipid Profile, Blood Pressure.

Koroner Kalp Hastalığı Olan Bireylerin Akdeniz Diyetine Uyumu, Lipit Profili ve Kan Basıncı ile İlişkisi

ÖZ

Amaç: Bu çalışmanın amacı, mevcut koroner kalp hastalığı olan bireylerin Akdeniz Diyetine uyumunu değerlendirmek ve bu uyumun kan parametreleri ile olan ilişkisini incelemektir. **Gereç ve Yöntem:** Bu kesitsel çalışmaya, Haziran-Eylül 2022 tarihleri arasında bir kardiyoloji polikliniğinden 30-70 yaş aralığında, KKH tanısı almış 66 birey dahil edilmiştir. Örnek homojenliğini sağlamak için kanser, böbrek hastalığı, karaciğer hastalığı gibi eşlik eden hastalıkları olan hastalar ve hamile kadınlar hariç tutulmuştur. Katılımcılar, sosyodemografik veriler, biyokimyasal parametreler, Besin Tüketim Sıklığı Anketi ve 24 saatlik diyet hatırlatmalarını içeren ayrıntılı bir anket doldurmuşlardır. Akdeniz diyetine uyum, Akdeniz Diyeti Skoru (MedDietScore) kullanılarak değerlendirilmiştir. İstatistiksel analizler SPSS programı kullanılarak, Bağımsız Örneklem T-testi, Mann-Whitney U testi, ANOVA ve korelasyon analizleri ile yapılmıştır. **Bulgular:** Ortalama Akdeniz Diyeti Skoru 32.5 ± 5.7 olup, orta düzeyde uyumu göstermektedir. Farklı uyum seviyeleri arasında LDL kolesterol ve trigliserid seviyelerinde anlamlı farklılıklar gözlenmiş olup (sırasıyla p= 0.006 ve 0.02), daha yüksek Akdeniz Diyeti Skorlarının bu lipitlerin daha düşük seviyeleri ile ilişkili olduğu bulunmuştur. Ayrıca, diyet skorları ile sistolik kan basıncı arasında orta düzeyde pozitif bir korelasyon bulunmuştur. **Sonuç:** Akdeniz diyetine orta düzeyde uyum, KKH hastalarında iyileştirilmiş lipit profilleri ile ilişkilidir. Bu bulgular, kardiyovasküler sağlık için Akdeniz diyetinin teşvik edilmesini desteklemektedir. Ancak, bu bulguları doğrulamak için, özellikle Akdeniz diyetine uyumun lipid metabolizması, inflamatuar belirteçler ve endotel fonksiyonu üzerindeki uzun vadeli etkilerine odaklanan randomize kontrollü çalışmalara ihtiyaç vardır.

Anahtar Kelimeler: Koroner Kalp Hastalığı, Akdeniz Diyeti, Lipit Profili, Kan Basıncı.

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INTRODUCTION

Cardiovascular disease (CVD) encompasses a range of disorders affecting the heart and blood vessels, including conditions such as coronary heart disease (CHD), cerebrovascular disease, peripheral artery disease, rheumatic heart disease, congenital heart disease, deep vein thrombosis, and pulmonary embolism (WHO, 2022). CHD is among the most prevalent of these conditions (CDC, 2021). It results from cholesterol deposits on the walls of the coronary arteries, which supply blood to the heart. Over time, these deposits lead to the gradual narrowing of the arteries' inner lumen. This process, known as atherosclerosis, causes the vessel walls to harden, thereby obstructing blood flow (Jebari-Benslaiman et al. S, 2022). Atherosclerosis is a key precursor to CHD and is quite common. It is characterized by an impaired endothelial structure, lipid accumulation, and plaque formation within the arterial walls (Bauersachs et al., 2019).

CVD, including CHD and stroke, is estimated to have caused approximately 18.6 million deaths in 2019, making it the leading cause of mortality globally, accounting for about 37% of deaths from non-communicable diseases. CHD is the most common form of CVD, responsible for an estimated 9 million deaths in 2017. It has consistently been a leading cause of death and is most prevalent in Central Asia and Eastern Europe (Khan et al., 2020). According to the World Health Organization (WHO) data from 2019, CHD accounts for 16% of all deaths, reinforcing its status as the most common cause of death (WHO, 2022).

The Mediterranean Diet, prevalent in Greece and Southern Italy since the late 1950s and early 1960s, has been widely recognized for its health benefits over the past five decades (Sanchez-Tainta & Sanchez-Villegas, 2018). In Turkey, studies have also highlighted the Mediterranean diet's positive impact on lipid profiles and cardiovascular risk factors. These findings confirm its effectiveness as a dietary model for improving heart health, suggesting that adherence to the Mediterranean diet can positively influence cardiovascular health in various populations, including those in Turkey (Akbulut & Gönder, 2017).

This dietary model is characterized by high consumption of fruits, vegetables, salads, whole-grain products, potatoes, legumes, oilseeds, and moderate amounts of dairy products such as yogurt and cheese. It also includes fish, shellfish, poultry, and eggs up to four times a week, with low consumption of meat and processed meats. Herbs and spices are commonly used to reduce salt and fat intake. Additionally, moderate consumption of wine and other fermented foods is recommended. The diet is low in saturated fatty acids and rich in monounsaturated and omega-3 polyunsaturated fatty acids, with olive oil as the primary fat source. The Mediterranean Diet provides various nutrients with known health benefits, including antioxidants, phytochemicals, phenolic compounds, vitamins C and E, β-carotene, glutathione, resveratrol, selenium, and folate. It has demonstrated positive effects on inflammatory conditions such as CHD, obesity, and Type 2 diabetes (Mazzocchi et al., 2019).

Balanced nutrition, regular physical activity, ideal body weight and composition, moderate alcohol consumption, and avoidance of smoking can prevent approximately 80% of heart diseases (Houston, 2018).

The aim of this study is to assess the adherence of individuals with existing coronary heart disease to the Mediterranean Diet and to evaluate its association with lipid profile.

MATERIALS AND METHODS

This study was conducted with individuals previously or recently diagnosed with coronary heart disease (CHD) who presented to the Cardiology outpatient clinic of the hospital between June 2022 and September 2022. The study included individuals between 30 and 70 years of age. Patients with cancer, kidney disease, liver disease, and pregnant women were excluded. The sample size estimation was performed using the G*Power 3.1.9.7 software, considering an effect size of 0.5 and a power of 95%. Accordingly, the required sample size was calculated to be a minimum of 54 participants. By the end of the study, 66 participants were included. Ethics Committee approval was obtained for the study (details removed for blind peer review). Participants were informed about the study and provided written consent to participate.

Participants completed a survey that included sociodemographic characteristics, biochemical parameters, a food consumption frequency questionnaire (FFQ) (portion sizes included), and a 24-hour food consumption record, all administered through face-to-face interviews (Soykan, 2007). All participants answered all questions. The biochemical parameters were obtained from routine tests requested by the hospital cardiologist, which were included in the patient's medical records. The FFQ data and 24-hour food consumption records were analyzed.

Blood pressure, triglyceride, HDL-cholesterol, LDL-cholesterol, and fasting blood glucose measurements were examined to observe differences based on participants' adherence to the Mediterranean diet.

Participants' food consumption was determined using their responses to the FFQ and 24-hour food consumption records, analyzed for energy and nutrient intake using BeBiS software. The Mediterranean Diet Score (MedDietScore), developed by Panagiotakos et al., was used to determine adherence levels (Panagiotakos et al., 2006). The 11 components of the Mediterranean diet (unrefined grains, fruits, vegetables, potatoes, legumes, olive oil, fish, meat, chicken, whole milk products, and alcohol) were scored between 0 and 5. Higher consumption of unrefined grains, potatoes, fruits, vegetables, legumes, olive oil, fish, and alcohol was scored higher, while higher consumption of meat, chicken, and whole milk products was scored lower. The total score range was 0 to 55, with 0 indicating minimum adherence and 55 indicating maximum adherence.

Statistical analysis

Data were evaluated using the Statistical Package for the Social Sciences (SPSS) 16.0 software. Quantitative variables were expressed as mean ($\bar{X}$), standard deviation (SD), and minimum and maximum values, while qualitative variables were presented as number (n) and percentage (%). The Kolmogorov-Smirnov test was used to assess normal distribution. The Independent Samples T-test compared two independent groups with normal distribution, and the Mann-Whitney U test compared two independent groups with non-normal distribution. One-way ANOVA evaluated differences among three or more independent groups with normal distribution, and the Kruskal-Wallis test evaluated differences among three or more groups with non-normal distribution. The Pearson Correlation Test examined relationships between two numerical variables with at least one normally distributed variable, and the Spearman Correlation Test was used for non-normally distributed variables. A p-value of <0.05 was considered statistically significant.

Ethical considerations

Before the study, ethics committee approval was acquired from the Hamidiye Scientific Research Ethics Committee (Approval Number: 2022/14/8, Date: 12.05.2022).

RESULTS

The age and BMI distribution of individuals by gender is shown in Table 1. 30 women (45.5%) and 36 men (54.5%) between the ages of 30 and 70 participated in the research. The average age for men and women is 56.3±9.2 and 58.5±9.8 years, respectively. The age distribution of the two groups is similar to each other. Considering the measurements recorded in female individuals, BMI values were found to be 32.1±5.0 kg/m^2 and 29.1±4.8 kg/m^2 in male individuals. Looking at the Mediterranean diet scores, the mean value was found to be 32.6 ± 4.7 in female participants and 32.4 ± 6.5 in male participants. The mean values of both groups were similar to each other. When Mediterranean diet scores were classified as poor, moderate, and high fit, the number of moderately fit individuals was higher among both male and female participants (60.0% and 55.6%, respectively). No significant difference was found between the two genders (Table 1).

Table 1. General characteristics of individuals by gender.

	Female (n=30) x̄±SD Min-Max		Male (n=36) x̄±SD Min-Max		Total (n=66) x̄±SD Min-Max	
Age	56.3±9.2 38-69		58.5±9.8 35-70		57.5±9.5 35-70	
			p=0.29[a]			
BMI (kg/m^2)	32.1±5.0 24.3-46.1		29.1±4.8 18.5-42.5		30.5±5.1 18.5-46.1	
			p=0.02[b]			
Mediterranean diet score	32.6±4.7 23.0-39.0		32.4±6.5 20.0-48.0		32.5±5.7 20.0-48.0	
			p=0.88[b]			
	n	**%**	**n**	**%**	**n**	**%**
Mediterranean diet score classification						
Poor adherence (25 and under)	2	6.7	4	11.1	6	9.1
Moderate adherence (26-35)	18	60.0	20	55.6	38	57.6
High adherence (36 and above)	10	33.3	12	33.3	22	33.3
				p=0.87[c]		

[a]Mann Whitney U Test; [b]Independent samples T-test; [c]Fischer's Exact Test
BMI: Body Mass Index

The energy and nutrient intake of participants was examined based on their adherence levels to the diet. Individuals with low adherence had an energy intake of 2549.3±601.0 kcal, those with moderate adherence had an energy intake of 2020.1±735.9 kcal, and individuals with high adherence had an energy intake of 1862.8±429.5 kcal. The differences between the groups were statistically significant (p<0.05). Further analysis revealed that the differences were primarily observed between the low adherence and moderate adherence groups, as well as between the low adherence and high adherence groups (Table 2).

Table 2. Evaluation of energy and nutrient intake according to Mediterranean diet scores of individuals.

	Mediterranean Diet Score Classification			P	Total
	Poor adherence (n=6)	Moderate adherence (n=38)	High adherence (n=22)		
	x̄±SD Min-Max	x̄±SD Min-Max	x̄±SD Min-Max		x̄± SD Min-Max
Energy	2549.3±601.0 1885-3260	2020.1±735.9 1032-4064	1862.8±429.5 1238-2963	0.039[b†]	2015.8±655.6 1032-4064
Protein (g)	94.15±31.7 65-155	73.0±30.8 33-187	63.3±24.4 27-119	0.051[b]	71.7±29.7 27-187
Protein (%)	15.0±2.4 12-17	14.9±3.4 9-23	13.7±3.3 8-20	0.358[a]	14.5±3.3 8-23
Fat (g)	107.6±19.7 79-138	91.9±40.7 36-203	88.2±24.4 41-140	0.200[b]	92.1±34.6 36-203
Fat (%)	38.5±6.7 26-44	40.0±7.6 21-56	42.8±10.3 24-68	0.374[a]	40.8±8.5 21-68
Carbs (g)	284.0±115.0 191-506	220.8±84.4 108-464	200.0±69.6 60-407	0.148[b]	219.6±84.6 60-506
Carbs (%)	44.8±8.3 31-57	45.1±8.6 28-70	43.5±9.7 19-59	0.792[a]	44.6±8.9 19-70
Polyunsaturated fatty acid	21.9±7.2 13-31	21.3±13.3 4-58	18,3±7,6 6-36	0.599[b]	20.3±11.2 4-58
Monounsaturated fatty acid	43,5±12,6 31-65	34.4±15.2 9-77	37.1±13.9 18-82	0.169[b]	36.1±14.6 9-82
Saturated fatty acids	35.5±6.4 27-44	29.6±14.9 8-74	27.2±11.4 7-64	0.131[b]	29.5±13.3 7-74
Cholesterol	247.6±111.6 115-399	299.6±201.6 23-876	244.35±144.2 0-484	0.714[b]	276.4±177.7 0-876
Fiber	23.3±5.6 16-29	22.3±6.9 7-40	28.4±11.6 13-58	0.067[b]	24.4±9.0 7-58
Sodium	5320.6±1775.8 3614-7862	3914.5±1472.7 947-7196	4496.61±2028.7 1652-10400	0.223[b]	4326.4±1731.7 947-10400
Potassium	2414.8±474.2 1902-3089	2467.2±750.8 982-3872	2857.6±847.3 1810-4809	0.146[a]	2592.6±778.5 982-4809
Calcium	679.1±208.6 304-942	675.3±240.0 275-1296	739.3±297.9 415-1714	0.816[b]	697.0±256.4 275-1714
Magnesium	280.3±74.3 194-365	292.3±139.6 109-726	312.2±105.7 130-508	0.493[b]	297.8±123.5 109-726

[a]One Way ANOVA; [b]Kruskal-Wallis Test
[†]The significance is between the groups showing poor adherence-high adherence and poor adherence-moderate adherence (Mann Whitney U Test).

The biochemical parameters of the participants according to the Mediterranean diet scores were presented in Table 3. When the recorded values were examined, a statistically significant difference was observed between LDL cholesterol and triglyceride levels among the biochemical parameters according to the Mediterranean diet scores (p=0.006 and p=0.02, respectively). No significant difference was found in other parameters.

Looking at the groups with significant differences among the values with significant differences, a significant difference was found between the groups with moderate and those with high adherence in terms of LDL cholesterol, and between the groups with poor adherence and those with high adherence in terms of triglyceride (p=0.004 and p=0.02, respectively) (Table 3).

The correlation coefficients between the blood parameters of the participants according to the Mediterranean diet scores were presented in Table 4. According to the data obtained, a moderately positive correlation was found between the Mediterranean diet score and systolic blood pressure (r= 0.313; p= 0.01). A moderately negative correlation was found in LDL cholesterol values, and a weak negative correlation was found in triglyceride values (r= -0.320, p= 0.009, and r= -0.255, p= 0.039, respectively).

Table 3. Evaluation of biochemical parameters according to Mediterranean diet scores of individuals.

	Mediterranean Diet Score Classification				
	Poor adherence (n=6)	Moderate adherence (n=38)	High adherence (n=22)	P	Total
	x̄±SD Min-Max	x̄±SD Min-Max	x̄±SD Min-Max		x̄±SD Min-Max
Systolic blood pressure	125.7±6.3 120-135	133.2±20.5 98-178	144.9±23.7 94-188	0.06[b]	136.4±21.5 94-188
Diastolic blood pressure	75.8±7.6 68-87	81.4±13.1 37-103	83.9±15.7 55-130	0.44[a]	81.7±13.7 37-130
HDL Cholesterol	40.5±7.2 28.2-47	45.4±13.3 27.7-96.1	44±9.4 26.9-60	0.75[b]	44.5±11.6 26.9-96.1
LDL Cholesterol	121.1±36.4 79-177	128.9±40.9 48-204	93.7±36.5 30.6-172	0.006[a†]	116.5±41.9 30.6-204
Triglyceride	272.9±112.6 118-429	188.6±80.9 69-420	162±86.4 40-355	0.02[a† †]	187.4±89.5 40-429
Fasting blood glucose	127.7±35.7 84-178	117.4±29.3 81-216	122.7±37.5 90-262	0.76[b]	120.1±32.5 81-262

[a]One Way ANOVA; [b]Kruskal-Wallis Test
[†]The significance is between the groups showing moderate adherence and those with high adherence (Hochberg Test).
[† †]The significance is between the groups showing poor adherence and those with high adherence.

Table 4. Correlation of individuals' Mediterranean diet scores and biochemical parameters.

	Systolic blood pressure	Diastolic blood pressure	HDL Cholesterol	LDL Cholesterol	Triglyceride	Fasting blood glucose	Mediterranean diet score
Systolic blood pressure	[b]1.000	[b]0.662**	[b]0.210	[b]-0.220	[b]-0.092	[b]0.140	[b]0.313*
Diastolic blood pressure		[b]1.000	[b]0.222	[b]-0.022	[b]-0.170	[b]0.023	[b]0.113
HDL Cholesterol			[b]1.000	[b]0.048	[b]-0.373**	[b]-0.171	[b]0.222
LDL Cholesterol				[b]1.000	[a]0.205	[b]-0.032	[a]-0.320**
Triglyceride					b1.000	[b]0.342**	[a] -0.255*
Fasting blood glucose						[b]1.000	[b]-0.011
Mediterranean diet score							[b]1.000

[a]Pearson Correlation Test; [b]Spearman Correlation Test
*p<0.05
**p<0.01

DISCUSSION

Cardiovascular diseases are among the leading causes of death in the world. This prevalence may be attributed to various CVD risk factors, including smoking, hypertension, unhealthy nutrition, insufficient physical activity, and inadequate prevention strategies. The American Heart Association/American College of Cardiology (AHA/ACC) underscores that adopting a healthy lifestyle is the most effective way to prevent heart disease (Arnett et al., 2019). Some studies have demonstrated the positive effects of the Mediterranean diet on CVD risk factors; however, there is a lack of comprehensive studies examining its effects specifically on individuals with coronary heart disease (CHD) (Martinez-González et al., 2020).

A study investigating the relationship between different dietary models and CHD risk classified diets into the "Semi-Western model," the "Sugar-Fast Food Model," and the "Semi-Mediterranean Model." The study found a significant difference in CHD risk between the “Semi-Western model” and the “Sugar-Fast Food model,” with both increasing CHD risk in both men and women. Conversely, the "Semi-Mediterranean model" was associated with a reduced risk of CHD (Gholizadeh, Ayremlou, & Nouri Saeidlou, 2020). This aligns with findings from Martínez-González et al. (2020), who demonstrated that adherence to the Mediterranean diet is linked with a lower incidence of cardiovascular events.[13]

In a study conducted in Turkey, adherence to the Mediterranean diet was examined in 900 healthy individuals over 5.5 years, revealing an inverse relationship between Mediterranean diet adherence and CVD risk (Hoşcan, Yiğit, & Müderrisoğlu, 2015). Similarly, Estruch et al. (2018) reported that adherence to the Mediterranean diet was associated with a reduced risk of cardiovascular events in a large cohort (Estruch et al., 2018).

In our study, which focused on individuals with CHD, the mean Mediterranean diet score was 32.5 ± 5.7, indicating moderate adherence (Table 1).

The observed energy intake in our study was 2015.8 ± 655.6 kcal per day and it has been observed that energy intake decreases as compliance with the Mediterranean diet increases. Despite these differences, there was no significant variation in fiber, saturated fat, monounsaturated fat, polyunsaturated fat, calcium, magnesium, sodium, and potassium intakes. According to the Nutrition Guide of Turkey (TUBER), recommended macronutrient distributions are 45-65% carbohydrates, 20-35% fat, and 10-20% protein (TÜBER, 2022). Our study found that carbohydrate and protein intakes were close to recommended limits, but fat intake, especially among female participants, was relatively high.

The American Heart Association recommends a sodium intake below 2400 mg and a potassium intake above 4.7 grams for individuals with CVD (Güler, Fedai, & Demirbağ, 2021). Our findings indicate that participants' average sodium intake was 4326.4 ± 1731.7 mg, and potassium intake was 2592.6 ± 778.5, both significantly deviating from these recommendations. This highlights a potential area for improvement in dietary adherence among the participants.

High cholesterol levels significantly increase the CVD risk (Karr, 2017). Our study corroborates findings from Sacks et al. (2022), which suggest that dietary fat impacts cardiovascular risk factors (Sacks, 2022). Participants with high Mediterranean diet scores exhibited lower LDL-cholesterol and triglyceride levels, consistent with Estruch et al. (2018), which demonstrated that Mediterranean diet adherence positively affects lipid profiles (Estruch, 2018).

Unexpectedly, In our study, it was observed that as adherence to the Mediterranean diet increased, systolic blood pressure also increased (Table 3 and table 4). This finding contrasts with the general trend in the literature, where the Mediterranean diet is commonly associated with beneficial effects on heart health and a reduction in blood pressure. For instance, a study by Estruch et al. (2013) demonstrated the positive effects of the Mediterranean diet on cardiovascular disease and hypertension. Similarly, Martínez-González et al. (2019) noted that adherence to the Mediterranean diet improved cardiovascular health and regulated blood pressure.

However, some studies have reported different findings. Cross-sectional studies, in particular, may struggle to reflect the varying effects of the diet among individuals. Such studies should consider other factors, such as genetic predispositions, existing health conditions, medication use, and lifestyle variables (Trichopoulou et al., 2009). Therefore, the difficulty in establishing causal relationships in cross-sectional studies can complicate the accurate interpretation of the diet's effects on blood pressure.

Moreover, some research suggests that the Mediterranean diet may increase blood pressure in individuals sensitive to high sodium intake (Panza et al., 2017). This could be linked to the high consumption of olive oil and unprocessed foods in the diet, although individual metabolic responses and existing health conditions can shape this relationship differently.

In conclusion, the findings of our study suggest that further research is needed to more deeply investigate the relationship between adherence to the Mediterranean diet and systolic blood pressure. Specifically, more data is needed to explore the long-term effects of the diet and how individual factors influence this relationship. Future research should comprehensively examine the interactions between diet and blood pressure while considering various genetic, biochemical, and lifestyle factors.

The Mediterranean diet has been shown to reduce blood pressure, LDL cholesterol, and triglyceride levels while increasing HDL cholesterol (Gholizadeh, Ayremlou, & Nouri Saeidlou, 2020). It has been reported that a 2-point increase in the Mediterranean diet score is associated with a 33% decrease in deaths related to CVD (Trichopoulou et al., 2003). Studies have provided evidence that high adherence to the Mediterranean diet may help reduce inflammation, which plays a role in the development of atherosclerosis and CVD (Giugliano et al., 2006 & Mena et al., 2009). The PREDIMED study further supports these findings, showing that a Mediterranean diet improves blood pressure, insulin sensitivity, and lipid profiles (Ros et al., 2014).

In our study, LDL-cholesterol and triglyceride levels were significantly lower among those with high Mediterranean diet scores. The lower LDL-cholesterol levels in individuals with poor adherence compared to those with moderate adherence could be attributed to the small number of poor adherents, suggesting that results may differ with a larger sample size. We observed a moderately negative correlation between the Mediterranean diet and LDL-cholesterol, and a weak negative correlation with triglycerides (Table 4). High fasting blood glucose and triglyceride levels were also noted, consistent with the view that elevated blood sugar and triglyceride levels increase CVD risk (Mente et al., 2021).

In our study, the sample included both newly diagnosed and long-term patients, which may have influenced the distribution of adherence levels to the Mediterranean diet. Specifically, the number of participants with high adherence was higher, while those with low adherence were fewer. This uneven distribution could be a result of patients with longer disease duration being more accustomed to following dietary recommendations. Future studies with more balanced distributions of adherence levels might provide a clearer understanding of the relationship between diet adherence and cardiovascular health outcomes.

This study has several limitations. Data were collected from a single center, and the cross-sectional design prevents causal inferences. Multicenter studies with larger populations are needed to validate these findings and explore the long-term effects of Mediterranean diet adherence.

CONCLUSION

This study highlights the potential benefits of adhering to the Mediterranean diet for individuals with coronary heart disease (CHD). Our findings suggest that moderate adherence to this diet improves lipid profiles, particularly by lowering LDL cholesterol and triglyceride levels. However, the observed increase in systolic blood pressure among high adherents points to the need for further investigation into the underlying factors influencing this outcome.

Despite the limitations of a single-center, cross-sectional design, this study offers valuable insights into dietary patterns of CHD patients and their associations with key blood parameters. It underscores the importance of dietary interventions in managing cardiovascular risk factors. Health professionals should incorporate Mediterranean diet recommendations into clinical practice. Public health policies can further promote this diet through awareness campaigns, healthy school and workplace nutrition programs, and economic incentives such as subsidies for Mediterranean diet-friendly foods. These efforts, particularly those aimed at increasing access to healthy foods, could significantly contribute to reducing the global burden of cardiovascular diseases. Future studies should explore the long-term effects of Mediterranean diet adherence and address the factors contributing to the observed rise in systolic blood pressure, on the other hand, large-scale and multicentered trials will enhance the generalizability of these findings and offer more specific guidance for health professionals.

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Conflict of Interest

The author declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions

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Ethical Approval

Institution: Hamidiye Scientific Research Ethics Committee

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REFERENCES

Akbulut, G. Gönder, M. (2017). Current mediterranean diet and potential health effects: review. *Türkiye Klinikleri Journal of Health Sciences*, *2*(2), 110-120. http://doi:10.5336/healthsci.2016-51565.

Arnett, D. K., Blumenthal, R. S., Albert, M. A., Buroker, A. B., Goldberger, Z. D., Hahn, E. J. (2019). 2019 ACC/AHA guideline on the primary prevention of cardiovascular disease: A report of the American College of Cardiology/American Heart Association task force on clinical practice guidelines. *Circulation*, *140*(11), 596-646. http://doi:10.1161/CIR.0000000000000678.

Bauersachs, R., Zeymer, U., Brière, J. B., Marre, C., Bowrin, K., Huelsebeck, M. (2019). Burden of coronary artery disease and peripheral artery disease: A literature review. *Cardiovascular Therapeutics*, 8295054. https://doi:10.1155/2019/8295054.

Centers for Disease Control and Prevention. (2021). *About coronary artery diesese (CAD)*. https://www.cdc.gov/heartdisease/coronary_ad.htm

Estruch, R., Ros, E., Salas-Salvadó, J., Covas, M. I., Corella, D., Arós, F., Gómez-Gracia, E., Ruiz-Gutiérrez, V., Fiol, M., Lapetra, J., Lamuela-Raventos, R. M., Serra-Majem, L., Pintó, X., Basora, J., Muñoz, M. A., Sorlí, J. V., Martínez, J. A., Fitó, M., Gea, A., Hernán, M. A., Martínez-González, M. A. (2018). PREDIMED study investigators. Primary prevention of cardiovascular disease with a mediterranean diet supplemented with extra-virgin olive oil or nuts. *The New England Journal of Medicine*, *378*(25), 21. http://doi:10.1056/NEJMoa1800389.

Estruch, R., Ros, E., Salas-Salvadó, J., Covas, M. I., Corella, D., Arós, F., Gómez-Gracia, E., Ruiz-Gutiérrez, V., Fiol, M., Lapetra, J., Lamuela-Raventos, R. M., Serra-Majem, L., Pintó, X., Basora, J., Muñoz, M. A., Sorlí, J. V., Martínez, J. A., Martínez-González, M. A. (2013). "Primary Prevention of Cardiovascular Disease with a Mediterranean Diet." *New England Journal of Medicine*, *368*(14), 1279-1290. http://doi:10.1056/NEJMoa1200303.

Gholizadeh, E., Ayremlou, P., Nouri Saeidlou, S. (2020). The association between dietary pattern and coronary artery disease: A case-control study. *Journal of Cardiovascular and Thoracic Research*, *12*(4), 294-302. http://doi:10.34172/jcvtr.2020.48.

Giugliano, D., Ceriello, A., Esposito, K. (2006). The effects of diet on inflammation: emphasis on the metabolic syndrome. *Journal of American College of Cardiology*, *48*(4), 677–85. https://doi:10.1016/j.jacc.2006.03.052.

Güler, M. S., Fedai, H., Demirbağ, R. (2021). Kardiyovasküler hastalıklarda sağlıklı beslenme önerileri. *Harran Üiversitesi Tıp Fakültesi Dergisi*, *18*(2), 342-348.

https://doi.org/10.35440/hutfd.947849.

Hoşcan, Y., Yiğit, F., Müderrisoğlu, H. (2015). Adherence to Mediterranean diet and its relation with cardiovascular diseases in Turkish population. *International Journal of Clinical and Experimental Medicine*, *8*(2), 2860-2866.

Houston, M. (2018). The role of noninvasive cardiovascular testing, applied clinical nutrition and nutritional supplements in the prevention and treatment of coronary heart disease. *Therapeutic Advances in Cardiovascular Disease*, *12*(3), 85-108. https://doi:10.1177/1753944717743920.

Jebari-Benslaiman, S., Galicia-García, U., Larrea-Sebal, A., Olaetxea, J. R., Alloza, I., Vandenbroeck, K., Benito-Vicente, A., & Martín, C. (2022). Pathophysiology of Atherosclerosis. *International Journal of Molecular Sciences*, *23*(6), 3346. https://doi.org/10.3390/ijms23063346

Karr, S. (2017). Epidemiology and management of hyperlipidemia. *The American Journal of Managed Care*, *23*(9), 139-148.

Khan, M. A., Hashim, M. J. , Mustafa, H., Baniyas, M. Y., Al Suwaidi, S. K. B. M. , AlKatheeri, R., Alblooshi, F, M. K., Almatrooshi, M. E. A. H., Alzaabi, M. E. H., Al Darmaki, R. S., Lootah, S. N. A. H. (2020). Global epidemiology of ischemic heart disease: Results from the global burden of disease study. *Cureus*, *12*(7), e9349. https://doi:10.7759/cureus.9349.

Martínez-González, M. A., Gea, A., Ruiz-Canela, M. (2019). The Mediterranean diet and cardiovascular health. *Circulation Research*, *124*(5), 779-798. http://doi:10.1161/CIRCRESAHA.118.313348.

Mazzocchi, A., Leone, L., Agostoni, C., Pali-Schöll, I. (2019). The secrets of the Mediterranean diet. Does [Only] olive oil matter? *Nutrients*, *11*(12), 2941. https://doi:10.3390/nu11122941.

Mena, M. P, Sacanella, E., Vazquez-Agell, M., Morales, M., Fitó, M., Escoda, R., Serrano-Martinez, M., Salas-Salvado, J., Benages, N., Casas, R., Lamuela-Raventos, R., Masanes, F., Ros, E. Estruch, R. (2009). Inhibition of circulating immune cell activation: a molecular anti-inflammatory effect of the Mediterranean diet. *The American Journal of Clinical Nutrition*, *89*(1), 248–256. https://doi:10.3945/ajcn.2008.26094.

Mente, A., O'Donnell, M., Rangarajan, S., McQueen, M., Yuan, X., Gupta, R., Teo, K., Yusuf, S. (2021). Effect of dietary sodium and potassium intake on cardiovascular disease and mortality: A systematic review and meta-analysis of randomized trials. *British Medical Journal*, 372, n123.

Panagiotakos, D. B., Pitsavos, C., Arvaniti, F., Stefanadis, C. (2007). Adherence to the Mediterranean food pattern predicts the prevalence of hypertension, hypercholesterolemia, diabetes and obesity, among healthy adults; the accuracy of the MedDietScore. *Preventive Medicine*, *44*(4), 335-340. https://doi:10.1016/j.ypmed.2006.12.009.

Panza, F. (2017). Sodium Intake, Blood Pressure, and Cardiovascular Risk in the Mediterranean Diet. *Hypertension*, *70*(4), 819-826.

Ros, E., Martínez-González, M.A., Estruch, R., Salas-Salvadó, J., Fitó, M., Martínez, J.A., Corella, D. (2014). Mediterranean diet and cardiovascular health: Teachings of the PREDIMED study. *Advances in Nutrition*, *5*(3), 330S-6S. https://doi:10.3945/an.113.005389.

Sacks, F.M., Lichtenstein, A. H., Siri-Tarino, J. A., Appel, L. J., Kris-Etherton, P. M., Mozaffarian, D., Nicholls, S. J. (2022). Effects of dietary fat on cardiovascular disease risk: A systematic review and meta-analysis. *Journal of the American College of Cardiology*, 79, 1711-1722.

Sanchez-Tainta, A., Sanchez-Villegas, A. (2018). *The prevention of cardiovascular disease through the Mediterranean diet*. Academic Press.

Soykan, A. U. (2007). Validity and reliability of diet frequency surveys (Master's thesis). Adana, Çukurova University.

T. C. Ministry of Health. (2022). *Public Health Institution of Türkiye, TÜBER 2022*. https://hsgm.saglik.gov.tr/depo/birimler/saglikli-beslenme-ve-hareketli-hayat-db/Dokumanlar/Rehberler/Turkiye_Beslenme_Rehber_TUBER_2022_min.pdf

Trichopoulou, A., Costacou, T., Bamia, C., Trichopoulos, D. (2003). Adherence to a Mediterranean diet and survival in a Greek population. The *New England Journal of Medicine*, *348*(26), 2599-2608. https://doi:10.1056/NEJMoa025039.

Trichopoulou, A., Costacou, T., Bamia, C., Trichopoulos, D. (2009). Adherence to a Mediterranean Diet and Survival in a Greek Population. *New England Journal of Medicine*, *348*(26), 2599-2608.

WHO. (2021). *Cardiovascular Diseases*. WHO FactSheets. https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds).

WHO. (2022). *The Tops 10 Causes of Death*. WHO FactSheets. https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death