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ARAŞTIRMA MAKALESİ **RESEARCH ARTICLE**

Evaluation of Nutritional Patterns and Cardiovascular Risk in Cardiology Outpatients in Bursa

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Abstract

Aim: This study aims to examine pre-diagnostic nutritional status in cardiology outpatients and evaluate the potential role of nutrition in identifying cardiovascular risk, thereby contributing to the guidance of early clinical interventions in cardiology practice.

Materials and Methods: A total of 132 adults (59.1% women), aged 18 years and older, visiting a private hospital's cardiology clinic in Bursa, Türkiye, were assessed. A comprehensive data collection protocol was employed, including demographic details, dietary intake (based on 24-hour recall), physical activity (PAS-2), anthropometric measurements and selected biochemical markers. Dietary intake was evaluated according to Türkiye's Dietary Guidelines (TÜBER 2022). Statistical analysis was conducted using SPSS 22.

Results: Participants exhibited notable nutritional imbalances, including excessive intake of carbohydrates and fats in men, and inadequate fiber intake in men (22.4 g). Water and mineral consumption were below recommended levels across the sample. While vitamins A, K, and B3 were overconsumed, deficiencies were noted in vitamins B2, B6, B12, and C. These nutritional patterns were associated with elevated cardiovascular risk factors such as increased BMI, waist circumference, and lipid profile irregularities.

Conclusion: Findings emphasize the need for early, individualized nutritional screening and counselling in outpatient cardiology settings. Identifying at-risk individuals before diagnosis presents a unique opportunity to implement dietary interventions that may reduce future cardiovascular events. Integrating nutritional surveillance into routine cardiology care could contribute meaningfully to population-level cardiovascular prevention efforts.

Keywords: *Assessment of nutritional status, Cardiovascular disease risk, Dietary habits, Outpatient screening, Primary prevention*

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Bursa'daki Kardiyoloji Poliklinik Hastalarında Beslenme Alışkanlıklarının ve Kardiyovasküler Riskin Değerlendirilmesi

Özet

Amaç: Bu çalışma, kardiyoloji polikliniğine başvuran bireylerin tanı öncesi beslenme durumlarını incelemeyi, kardiyovasküler riskin belirlenmesinde beslenmenin olası rolünü değerlendirmeyi ve böylece kardiyoloji pratiğinde erken klinik müdahalelere rehberlik etmeyi amaçlamaktadır.

Gereç ve Yöntem: Türkiye'nin Bursa ilindeki özel bir hastanenin kardiyoloji kliniğine başvuran, 18 yaş ve üzeri toplam 132 yetişkin (kadınların oranı %59,1) değerlendirilmiştir. Demografik özellikler, besin alımı (24 saatlik geriye dönük hatırlama yöntemiyle), fiziksel aktivite düzeyi (PAS-2), antropometrik ölçümler ve seçilmiş biyokimyasal belirteçleri içeren kapsamlı bir veri toplama protokolü uygulanmıştır. Besin alımı, Türkiye Beslenme Rehberi (TÜBER 2022) temel alınarak değerlendirilmiştir. İstatistiksel analizler için SPSS 22 programı kullanılmıştır.

Bulgular: Katılımcılarda belirgin beslenme dengesizlikleri saptanmıştır; erkeklerde karbonhidrat ve yağ alımının aşırı olduğu, ayrıca erkeklerde lif alımının yetersiz kaldığı (22,4 g) görülmüştür. Örneklem genelinde su ve mineral tüketiminin önerilen seviyelerin altında olduğu belirlenmiştir. A, K ve B3 vitaminlerinin aşırı tüketildiği; B2, B6, B12 ve C vitaminlerinde ise eksiklikler olduğu saptanmıştır. Bu beslenme alışkanlıkları; yüksek vücut kitle indeksi (VKİ), geniş bel çevresi ve lipid profili düzensizlikleri gibi kardiyovasküler risk faktörleriyle ilişkilendirilmiştir.

Sonuç: Elde edilen bulgular, kardiyoloji polikliniklerinde erken dönemde, kişiye özel beslenme taraması ve danışmanlığına duyulan ihtiyacı vurgulamaktadır. Risk altındaki bireylerin tanı konulmadan önce belirlenmesi, gelecekteki kardiyovasküler olayları azaltabilecek beslenme müdahalelerinin uygulanması için önemli bir fırsat sunmaktadır. Beslenme durumunun izlenmesinin rutin kardiyolojik bakıma dahil edilmesi, toplum düzeyindeki kardiyovasküler hastalıkları önleme çabalarına anlamlı bir katkı sağlayabilir.

Anahtar Kelimeler: *Beslenme durumunun değerlendirilmesi, Kardiyovasküler hastalık riski, Beslenme alışkanlıkları, Poliklinik taraması, Birincil koruma*

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INTRODUCTION

Cardiovascular disease (CVD) is one of the world's leading causes of morbidity and mortality. CVD, which includes many disorders, including vascular diseases that feed the heart, brain and other organs, includes atherosclerosis, in which the hardening and narrowing of blood vessels and the deposition of cholesterol and fibrous materials on the arterial walls form plaques or lesions. Various modifiable and non-modifiable risk factors play a role in the development of CVD. While genetics, gender and age are among the non-modifiable factors, smoking, obesity, lack of physical activity, dyslipidemia, hypertension (HT), diabetes (DM) and nutrition are among the modifiable factors (1, 2, 3). World Health Organization has stated that approximately 75% of CVD is preventable and that diet is an important lifestyle change in preventing CVD. In fact, it has been shown in the literature that a healthy diet can reduce the risk of various diseases including CVD (4). Therefore, encouraging behaviors such as reducing body weight, quitting smoking and alcohol, increasing physical activity and adopting a healthy diet are recommended to prevent CVD (5, 6, 7). In the prevention of CVD, a better understanding of which risk factors having causal effects on CVD is important for an accurate CVD risk prediction (8, 9). Evaluating early nutritional risk profiles in outpatient settings may therefore guide not Only individualized care but also inform preventive strategies at the population level. In this context, exploring early nutritional risk patterns in clinical populations may provide valuable insights into population-level CVD prevention policies. In line with this background, the present study was designed to examine prediagnostic nutritional patterns among cardiol-

ogy outpatients, aiming to elucidate the role of dietary habits in cardiovascular risk assessment and to provide a foundation for early clinical interventions.

MATERIALS AND METHODS

This study was designed as a cross-sectional and descriptive study. The population of this study consisted of outpatients admitted to the Cardiology Department of Private Aritmi Hospital in Inegöl, Bursa, over a one-month period, determined as 200 individuals. The sample size was calculated as 132 individuals using the GPower program at a 95% confidence level. From this population, at least 132 voluntarily and randomly selected individuals comprised the sample group. A sampling method for a known population was utilized for sample size calculation. The study population comprised adult patients applying to the Cardiology Outpatient Clinic of Private Aritmi Hospital in Inegöl, Bursa. Sampling was performed using a simple random sampling method. Inclusion criteria were being aged 18 years or older, attending the cardiology outpatient clinic for diagnosis or follow-up and voluntarily agreeing to participate. Exclusion criteria included having communication barriers or cognitive impairment, and presenting with an acute cardiovascular crisis (e.g., acute myocardial infarction).

A questionnaire was used to collect the data. Data were collected using a modified questionnaire form prepared by the researcher, along with standardized scales and records. The questionnaire form consists of demographic characteristics (age, gender, employment status, education status, household size, and marital status), health status (presence of other diseases, medications used, current dietary programs, nutritional supplements used, smoking and alcohol consumption status, and sleep patterns), dietary habits (number of main meals, snack consumption status, types of foods consumed during meals, and water intake), a 2-day food consumption record assessing the frequency of consumption of foods and food groups associated with cardiovascular risk on one weekday and one weekend day, biochemical findings (blood glucose, HbA1c, total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides, and LDH obtained from existing records), physical activity evaluated using Physical Activity Scale-2 (PAS-2) (referencing Fatih Gür's Turkish validity and reliability study, Spor ve Performans Araştırmaları Dergisi, (12 (3), 252–263), and anthropometric measurements including height, weight, and BMI recorded based on participants' self-reports.

Additionally, Food Consumption Records were utilized from Diyet El Kitabı (2022). A 20–25-minute questionnaire was administered face-to-face to outpatients who applied to the cardiology outpatient clinic of the private hospital and who met the conditions for participation in the study, after the necessary information was provided and written and verbal consent was obtained. “Food Photo Catalogue” was used to better determine the amounts of food consumed. According to the food consumption records, dietary energy, carbohydrate, protein, fat, vitamin, mineral and dietary fibre intake were analyzed in the Nutrition Information System (BEBIS) programme. Anthropometric measurements (height and weight) were recorded according to the participants’ statements and BMI values were calculated. Biochemical findings were obtained from available records. Kolmogorov-Smirnov technique was used to determine whether the distribution of the data consisting of the answers given by the participants to the questionnaire was normal. For variables with two groups, Mann–Whitney U test was used when the variables in the data set were not normally distributed. Kruskal-Wallis H test was applied for variables with more than two groups. For normally distributed variables in the data set, Student’s t-test was used for variables with two groups. For variables with more than two groups, one-way analysis of variance (ANOVA) was applied for independent samples. Chi-square test was used to analyze categorical data. Pearson Chi-Square, Yates’ chi-square test and Fisher’s exact test were used in cases where the minimum theoretical frequency was greater than 25, between 5 and 25 and less than 5, respectively. The significance of the analysis was set at 95%. SPSS Statistics 22.0 was used in the analysis.

Ethical approval was obtained from the Ethics Committee of Istanbul Sabahattin Zaim University (Approval No: 01, Date: 27 January 2023).

RESULTS

According to the findings of the study, the demographic characteristics of 132 participants are given in Table 1.

Table 1. Sociodemographic Characteristics of Participants

		n	%
Sex	Female	78	59.1
	Male	54	40.9
Age	18-65	87	65.9
	66-79	33	25.0
	80-99	12	9.1
Education Status	Illiterate	35	26.5
	Primary School	39	29.5
	Middle School	8	6.1
	High School	37	28.0
	University	8	6.1
	Master's Degree/PhD	5	3.8
Employment Status	Yes	51	38.6
	No	81	61.4
Occupation	None	20	15.2
	Housewife	60	45.5
	Officer	6	4.5
	Self-employed	9	6.8
	Worker	32	24.2
	Other	5	3.8
	Total	132	100

Sociodemographic information about the participants is given in Table 1. While 59.1% (n:78) of the participants were female, 40.9% (n:54) were male. Most of the participants were between the ages of 18-65 (65.9%). When the educational status of the participants is analyzed, it is noteworthy that most of them are primary school graduates (29.5%). Most of the participants are not working (61.4%) and the majority of those who are not working are housewives (45%).

Table 2. Frequency of Food Consumption of the Participants Before Diagnosis

		n	%
Red Meat Consumption	Every day	10	7.6
	A few days a week	80	60.6
	Rare	33	25
	None	9	6.8
Processed Meat Consumption	Every day	5	3.8
	A few days a week	20	15.1
	Rare	24	18.2
	None	83	62.9
Organ meats Consumption	Every day	4	3.0
	A few days a week	9	6.9
	Rare	40	30.3
	None	79	59.8
Egg Consumption	Every day	57	43.2
	A few days a week	59	44.7
	Rare	6	4.6
	None	10	7.6
Fish Consumption	Every day	1	0.8
	A few days a week	76	57.5
	Rare	39	29.6
	None	16	12.1
Poultry Consumption	Every day	5	3.8
	A few days a week	97	73.5
	Rare	23	17.4
	None	7	5.3
Dairy Consumption	Every day	74	5.1
	A few days a week	32	24.3
	Rare	19	14.4
	None	7	5.3
Cheese Consumption	Every day	111	84.1
	A few days a week	3	2.3
	Rare	11	8.4
	None	7	5.3
Preferred Milk Product	Full-Fat	109	82.6
	Semi-Skimmed	22	16.7
	Non-Fat	1	0.8
Nuts Consumption	Every day	47	35.6
	A few days a week	36	27.2
	Rare	21	15.9
	None	28	21.2
Type of Bread Consumed	White bread	101	76.5
	Whole wheat bread	14	10.6

	Wholemeal bread	14	10.6
	Other	3	2.3
Refined Grain Consumption	Every day	15	11.4
	A few days a week	77	58.4
	Rare	28	21.2
	None	12	9.1
Legume Consumption	Every day	2	1.5
	A few days a week	94	71.2
	Rare	32	24.2
	None	4	3.0
Vegetable Consumption	Every day	16	12.1
	A few days a week	82	62.5
	Rare	22	16.6
	None	12	9.1
Type of Vegetable Consumed	Non-consuming	12	9.0
	Green leafy	60	45.5
	Orange	9	6.8
	White	5	3.8
	Purple	3	2.3
	Root vegetables	42	31.8
	Other	1	0.8
Fruit Consumption	Every day	79	59.8
	A few days a week	34	25.8
	Rare	7	5.3
	None	12	9.1
Type of Fruit Consumed	Non-consuming	12	9.0
	Citrus	43	32.6
	Purple fruit	7	5.3
	Red fruit	66	50.0
	Other	4	3.1
Fastfood Consumption	Every day	2	1.5
	A few days a week	25	19
	Rare	26	19.7
	None	79	59.8
Dessert Consumption	Every day	24	18.2
	A few days a week	54	40.9
	Rare	30	22.7
	None	24	18.2
	Total	132	100

As shown in Table 2, when the dietary habits of the participants were analyzed, it was determined that red meat was usually consumed 1-2 times a week (44.7%), while fish and poultry is consumed 1-2 times a week. Milk and cheese consumption was mostly daily (56.1% and 84.1%), while vegetable and fruit consumption were 1-2 times a week (39.4%) or every day (59.8%). Fast food consumption was generally low (59.8%) and desserts were mostly consumed 1-2 times a week. It was determined that participants frequently preferred full fat dairy products (82.6%) and white bread (76.5%).

Table 3. Cooking Method Used by the Participants

		n	%
Cooking Method	Deep frying	49	37.1
	Baking in the Oven	44	33.3
	Grill	5	3.8
	Boiling	25	18.9
	Roasting	9	6.9
	Total	132	100.0

As shown in Table 3, deep frying was the most preferred cooking method (37.1%), whereas grilling was the least preferred (3.8%)

Table 4. Type and Amount of Oil Preferred by the Participants

		n	%
Type of Oil Used in Meals	Olive Oil	47	35.6
	Butter	24	18.2
	Margarine	2	1.5
	Sunflower	56	42.4
	Other	3	2.3
Amount of Oil Used in Meals	1 tablespoon	8	6.1
	2 tablespoons	27	20.5
	3 tablespoons	42	31.8
	More than 3 tablespoons	55	41.7
Olive Oil	Every day	77	58.3
	A few days a week	15	11.3
	Rare	15	11.4
	None	25	18.9
Margarine	Every day	12	9.1
	A few days a week	10	7.6
	Rare	13	9.9
	None	97	73.5
Butter	Every day	69	52.3
	A few days a week	39	29.5
	Rare	11	8.3
	None	13	9.8
	Total	132	100.0

Table 4 shows the oil consumption of the participants. When the type of oil is questioned, it is observed that the most common type of oil used in meals is sunflower oil (42.6%). The rate of those who use more than 3 tablespoons of oil in meals is the highest rate with 41.7%. The frequency of olive oil consumption is mostly every day (58.3%). Margarine is mostly not consumed (73.5%). Butter is mostly consumed every day (52.3%).

Table 5. Comparison of Energy, Macro and Micronutrient Intakes of the Participants According to Gender

	Sex	Reference Value	n	Mean	Std. Deviation	p
Water Consumption (ml)	Female	2000	78	1092.78	495.10	0.523*
	Male	2500	54	1149.81	515.41	
Dietary Energy	Female	1460-1786	78	2094.93	598.00	**0.000***
	Male	1848- 2239	54	2627.04	704.83	
Carbohydrate (g)	Female	130	78	306.04	163.32	**0.004****
	Male	130	54	343.31	96.21	
Carbohydrate (kcal)	Female	520	78	1124.02	365.75	**0.001***
	Male	520	54	1360.18	416.75	
Carbohydrate (%)	Female	45-60	78	55.65	11.80	0.215**
	Male	45-60	54	65.37	94.21	
Protein (g)	Female	62.4-79.2	78	102.06	94.13	**0.006****
	Male	74.8-82.2	54	125.45	114.59	
Protein (kcal)	Female	249.6- 316.8	78	407.26	711.51	**0.001****
	Male	299.2-328.8	54	443.66	200.70	
Protein (%)	Female	10-20	78	16.87	10.20	0.480**
	Male	10-20	54	16.83	5.71	
Fat (g)	Female	Not specified.	78	86.19	105.10	**0.000****
	Male	Not specified.	54	92.19	31.09	
Fat (kcal)	Female	Not specified.	78	679.12	630.12	**0.000****
	Male	Not specified.	54	800.78	274.14	
Fat (%)	Female	20-35	78	29.45	3.49	0.057**
	Male	20-35	54	41.94	82.99	
Dietary Fibre (g)	Female	25	78	25.32	7.58	**0.040***
	Male	25	54	22.48	7.93	
Sodium (mg)	Female	2000	78	3379.15	1385.48	0.054*
	Male	2000	54	3886.17	1580.55	
Potassium (mg)	Female	3500	78	3312.56	903.27	0.164*
	Male	3500	54	3082.33	967.19	
Calcium (mg)	Female	950-1000	78	1313.46	429.07	0.920*
	Male	950-1000	54	1305.51	472.46	

Magnesium (mg)	Female	300	78	360.90	123.55	0.611*
	Male	350	54	349.85	120.34	
Iron (mg)	Female	11-16	78	7.58	2.90	**0.015****
	Male	11	54	8.53	2.75	
Zinc (mg)	Female	7.5-12.7	78	7.79	1.99	**0.000***
	Male	9.4-16.3	54	9.97	2.65	
Phosphorus (mg)	Female	550	78	685.33	104.36	0.071*
	Male	550	54	718.89	103.97	
Folate (mg)	Female	330	78	334.88	86.09	0.073*
	Male	330	54	307.70	83.02	
Vitamin E (mg)	Female	11	78	13.73	3.09	0.091**
	Male	13	54	12.53	3.76	
Vitamin K (mcg)	Female	70	78	91.84	24.53	0.114*
	Male	70	54	85.16	22.48	
Vitamin B1 (mg)	Female	0.4	78	0.92	0.33	0.109*
	Male	0.4	54	1.01	0.32	
Vitamin B2 (mg)	Female	1.6-1.9	78	0.72	0.39	**0.016***
	Male	1.6	54	0.90	0.45	
Vitamin B3 (mg)	Female	6.6	78	13.77	2.25	**0.000***
	Male	6.6	54	15.21	2.09	
Vitamin B6 (mg)	Female	1.6	78	0.97	0.50	**0.043***
	Male	1.7	54	1.15	0.50	
Vitamin B12 (mcg)	Female	4	78	1.86	0.88	0.059*
	Male	4	54	2.21	1.13	
Vitamin C (mg)	Female	95	78	73.72	14.90	**0.046***
	Male	110	54	68.31	15.67	
Vitamin A (mcg)	Female	650	78	688.01	118.47	**0.001***
	Male	750	54	776.24	158.80	

*$p<0.05$ * Student's t-test ** Mann–Whitney U test, Source: Turkey Specific Nutrition Guide (2022).*

When Table 5 is analyzed, it is observed that the average daily dietary energy, carbohydrate, protein, fat, iron, zinc, vitamin B2, B3, B6, B12 and vitamin A amounts are higher in males than females ($p<0.05$). It is noteworthy that the amount of fibre and vitamin C taken with the diet is higher in women compared to men ($p<0.05$). When the findings were compared with the Turkey-Specific Dietary Guidelines 2022, energy levels from carbohydrates and fats in the diet were high in men and within the reference range in women. Energy levels of protein in the diet were within the reference range in both sexes. Dietary fibre intake was adequate in females and inadequate in males. Daily water intake was inadequate in both sexes. In all participants, sodium, calcium and phosphorus intakes were higher than reference values, while potassium and iron intakes were lower than reference values and inadequate. Zinc was in the reference range in both genders. Magnesium was found to be high in women and inadequate in men. Vitamin A, K, B1 and B3 intakes were higher than the refer-

ence value, while vitamin B2, B6, B12 and C intakes were inadequate. Folate and vitamin E intakes were found to be inadequate in men and high in women.

DISCUSSION

Most of the participants in the study were in the 18-65 age group (65.9%). Although it is known that CVD occurs earlier in men, many randomized participants in this study were women (59.1%). Many of the participants did not have any disease (56.1%), while 43.9% had a diagnosed disease. Among these diseases, 48.5% had HT and dyslipidemia and 26.5% had DM. The study conducted by Yılmaz et al. was parallel to this study and determined that DM (38.2%), HT (36.4%) and hyperlipidemia (45.5%) were present in people applying to cardiology outpatient clinic (10). In the evaluation of nutritional status, it was determined that 37.1% of the participants preferred deep frying, 33.3% preferred cooking in the oven, 18.9% preferred boiling, 6.9% preferred roasting and 3.8% preferred grilling as cooking method. The most frequently used cooking method was deep frying. It is a known fact that frequent use of deep frying may increase the amount of total fat, trans fat and acrylamide intake and increase the risk of CVD.

It was reported that there is a relationship between chronic diseases such as T2DM, HT, obesity and fried food consumption and this increases the risk of CVD (11). When the consumption of processed meat and organ meats was analyzed, it was determined that the frequency of non-consumption was high (62.9%; 59.8%). In another consumption study, it was found that those who consumed more than 5 of these foods per week had a higher CVD risk than those who consumed less than 1 of these foods per week (12). When the relationship between egg consumption and CVD is considered, the generally accepted level of egg consumption is one egg every day in people with normal cholesterol levels (13, 14). In this study, 43.2% of the participants consumed eggs every day, while a minority (4.6%) consumed eggs once a month. In the Turkey Nutrition and Health Survey (TBSA) 2019 nutrition survey, it was reported that egg consumption was mostly every day (36.2%) in all individuals in the population (15).

When the relationship between vegetable consumption and educational status was examined, it was determined that the frequency of vegetable consumption was similar in other groups, and the frequency of consumption was the highest among those with a bachelor's degree and higher education level, which was 3-4 times a week ($p=0.005$; $P<0.05$). In a similar study, it was shown that fruit and vegetable consumption was higher in people with higher education level (16). Regarding the preferred bread type, it was determined that many of the participants consumed white bread (76.5%). In a study like this study, it was reported that people with CVD mostly consumed white bread (77.4%) (17).

When the types of fat consumed by the participants were analyzed, it was determined that most of them did not consume margarine (73.5%), while olive oil (58.3%) and butter (52.3%) were consumed mostly every day. In another study conducted in Turkey, it was found that olive oil (44.6%) and butter (30.9%) were mostly consumed every day (15). In the literature, olive oil consumption is associated with decreased CVD risk, while butter and margarine are associated with increased CVD risk (18, 19).

The high amount of salt consumed in the daily diet is one of the important risk factors for CVD (20). When the salt consumption of the participants was questioned; it was determined that they usually ate low-salt (44.7%) or salty (40.2%) and rarely salt-free (15.2%). When the situation of adding salt was analyzed, it was found that 24.2% of the participants added salt without tasting the food. According to the Turkish Household Health Survey, the prevalence of adding salt before and during eating was 28.1% (21). Fast food and similar processed foods are known to increase the risk of CVD due to their high calorie, saturated fat and salt content (22, 23, 24). In our study, it was determined that most of the participants did not consume fast food (59.8%). In the nutrition survey conducted in Turkey, it was determined that

fast food was not consumed by the majority (64.7%). There is a similarity between literature and our study. The reason for the low consumption of fast food may be the effect of the anti-fast-food propaganda made throughout the country and may also be based on the low frequency of eating out due to the advanced age of the participants in the study.

Studies have reported that excess intake of sugary foods and beverages increases the risk of CVD, stroke and heart attack (25, 26, 27). It was determined that most of the participants did not consume sugary drinks (56.8%), and in the TBSA 2019 study, it was reported that men over the age of 65 consumed less sugary drinks such as instant fruit juices (50.3%) and cola drinks (58.2%) (15). In the literature, it is accepted that excessive consumption of carbohydrates and fats increases the risk and mortality of CVD due to both causing adverse effects on blood parameters and causing obesity (28, 29, 30). When dietary energy, nutrients, water and dietary fibre intake were compared with the Turkey-Specific Dietary Guidelines (TUBER) 2022, it was determined that energy levels from carbohydrate and fat in the diet were high in men and within the reference range in women. The energy level from protein in the diet was within the reference range in both sexes. Therefore, men participating in the study may be considered to have CVD risk related to the intake of carbohydrates and fats (31). Inadequate intake of dietary fibre is known to increase the risk of CVD (29, 32). When dietary fibre intake is examined; it is seen that intake is sufficient in women and insufficient in men. Vitamins A, C and E are known to have an antioxidant function such as reducing the harmful effects of free radicals and preventing oxidative damage of LDL. This antioxidant function has been associated with a reduced risk of CVD (33).

It has been stated that vitamin K intake is especially important for coronary heart patients. However, it has been found that excess vitamins K intake can cause coagulation disorders and vascular occlusion (34). Homocysteine is positively associated with increased CVD risk. Insufficiency of vitamins B6, B12 and folate, which are involved in homocysteine metabolism, increase plasma levels of homocysteine, leading to endothelial dysfunction, vascular inflammation and coagulation and increasing the risk of CVD (32, 35). When the dietary vitamin intakes of the participants in this study were analyzed, it was found that vitamin A, K, B1 and B3 intakes were higher than the reference value in both sexes, while vitamin B2, B6, B12 and C intakes were inadequate. Folate and vitamin E intakes were inadequate in men and high in women. In the light of this information, it can be considered that men have a higher CVD risk in terms of nutrition than women. In a study conducted to evaluate the nutritional status of outpatients and inpatients admitted to the cardiology outpatient clinic, like the present study, it was reported that most of the patients had inadequate nutrition (61%) and few of them had adequate nutrition (39%) (10). Our findings not only support the existing literature but also underscore the importance of considering dietary behaviors as modifiable cardiovascular risk factors at both individual and population levels. The consistency between our results and national dietary trends suggests that targeted nutritional assessments in cardiology outpatient clinics may serve as effective tools for early risk detection.

From a clinical standpoint, integrating such evaluations into routine cardiology practice could enable individuals to address nutrition-related risks before diagnosis, potentially preventing the onset of disease. Expanding access to personalized dietary counselling may also contribute to improved long-term cardiovascular outcomes. These insights further highlight the value of embedding structured dietary evaluations into cardiovascular risk assessment frameworks. Given the modifiable nature of nutritional exposures, routine screening may help clinicians identify at-risk individuals even before classical diagnostic thresholds are reached especially those with subclinical presentations or early-stage disease. Implementing simple, evidence-based tools in cardiology settings could support prevention, enhance personalized care, and guide institutional strategies. In the long term, such approaches may aid in refining clinical guide-

lines and reducing the burden of preventable cardiovascular events. Furthermore, several limitations should be noted. First, anthropometric measurements and dietary consumption frequencies relied on participants' self-reports and memory rather than direct clinical measures, which may introduce self-reporting and recall biases. Second, studies with larger and more comprehensive sample sizes are needed to validate these findings and further elucidate clinical implications.

CONCLUSION

This study sheds light on the nutritional characteristics of individuals attending a cardiology outpatient clinic prior to diagnosis and highlights how these patterns relate to cardiovascular risk factors. The findings reveal that dietary habits in this clinical population often deviate from national recommendations, particularly among men, and may contribute to increased cardiovascular risk. The observed associations such as high intake of saturated fat and inadequate consumption of dietary fiber, vitamins, and water - underscore the importance of integrating nutritional assessment into routine cardiology care. While our data supports the consistency of these findings with existing literature, future research on larger and more diverse samples are needed to further validate and generalize these results. Ultimately, early nutritional screening and education may serve as critical tools in reducing preventable cardiovascular events.

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Ethics approval: This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and complied with the ICMJE recommendations for the conduct, reporting, editing, and publication of scholarly work in medical journals. Ethical approval was obtained from the Ethics Committee of Istanbul Sabahattin Zaim University (Approval No: 01, Date: 27 January 2023).

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