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ARAŞTIRMA / RESEARCH

Gender related differences in dietary behaviors, cardiometabolic risks, unhealthy lifestyle factors, and their effect on cardiovascular morbidity in primary care

Beslenme davranışları, kardiyometabolik riskler ve sağlıksız yaşam tarzı faktörlerinde cinsiyete bağlı farklılıklar ve birinci basamakta kardiyovasküler morbidite üzerine etkileri

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Abstract

Purpose: This study aims to evaluate gender differences in dietary behaviors, cardiometabolic risks, related lifestyle factors, and their effect on cardiovascular morbidity in primary health care services.

Materials and Methods: The sample size of this population-based cross-sectional study was 930 adult individuals chosen by population-proportional cluster sampling. The researchers administered the questionnaires, anthropometric measurements, and blood drawing procedures. The effect of diet and lifestyle habits on the presence of cardiovascular diseases by gender was examined.

Results: The prevalence of cardiovascular diseases was 11.7% in men and 9.0% in women. Being over 50 years old, MetS contributed to the presence of heart disease while tea had a protective effect on both genders. Smoking and butter use were associated with heart disease in men.

Conclusion: This study showed that there is a relationship between gender and various risk factors for cardiovascular morbidity in primary care. These findings suggest that health care professionals should design gender-specific strategic programs for CVD prevention.

Keywords:. Cardiovascular morbidity, dietary behaviors, gender-related differences, primary care.

Öz

Amaç: Bu çalışmanın amacı, diyet davranışları, kardiyometabolik riskler, yaşam tarzı faktörleri ve bunların kardiyovasküler morbidite üzerindeki etkilerinde cinsiyet farklılıklarını birinci basamak sağlık hizmetlerinde değerlendirmektir.

Gereç ve Yöntem: Bu toplum temelli kesitsel çalışmanın örneklem büyüklüğü Nüfus orantılı küme örnekleme yöntemi ile 930 yetişkin birey seçildi. Anketlerin, antropometrik ölçümlerin ve kan alma prosedürlerinin uygulanması araştırmacılar tarafından gerçekleştirildi. Beslenme ve yaşam tarzı alışkanlıklarının cinsiyete göre kardiyovasküler hastalık varlığı üzerindeki etkisi incelendi.

Bulgular: Kardiyovasküler hastalık prevalansı erkeklerde %11.7 ve kadınlarda %9.0 idi. Her iki cinsiyette de 50 yaşın üzerinde olmak kardiyovasküler hastalık prevalansı ile iyi ilişkili iken, çay tüketimi koruyucu etkiye sahiptir. Ayrıca sigara ve tereyağı kullanımı erkeklerde kalp hastalığı ile iyi ilişkilidir.

Sonuç: Bu çalışma, birinci basamakta kardiyovasküler morbidite için cinsiyet ve çeşitli risk faktörleri arasındaki ilişkiye dair kanıtlar sağlamıştır. Bulgular, sağlık profesyonellerinin kardiyovasküler hastalık önleme için cinsiyete özel stratejik programlar tasarlaması gerektiğini göstermektedir.

Anahtar kelimeler: Kardiyovasküler morbidite, diyet davranışları, cinsiyete bağlı farklılıklar.

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INTRODUCTION

Cardiovascular diseases (CVDs) are one of the major causes of death worldwide[1,2]. CVD prevention aims at reducing morbidity and mortality, improving quality of life, and increasing life expectancy[3]. Modest lifestyle alterations can significantly reduce cardiovascular risk[3,4]. Conversely, unhealthy lifestyle habits increase the incidence of CVDs [5-8]. The most important way to improve health and reduce premature deaths is changing unhealthy behaviors, which cause approximately 40% of all deaths[9].

Because CVDs have been considered a "man's disease", studies are largely based on males. However, CVDs are also the leading cause of death in women worldwide, with ischemic heart disease and stroke accounting for approximately 30% of female deaths[10]. Therefore, to improve diagnoses and treatments for both men and women, scientific studies should address gender differences[11]. Over the past decade, scientists, health care providers, and policymakers have made substantial efforts to improve the understanding of gender differences in CVDs. However, while a marked gender difference in CVD risks has been identified, the reasons for this are not fully understood[12].

Previous research reveals that dietary habits, physical activities, and cigarette smoking are strongly associated with health, morbidity, and mortality[13]. Specific dietary factors influence cardiovascular risks,[14-17] such as high consumption of trans/saturated fats and salt[15] and low consumption of vegetables/fruits[16]. It is crucial to identify which people are at risk of cardiovascular problems due to unhealthy lifestyle behaviors in order to ensure that health care resources are used effectively and reduce the burden of disease on society and individuals[18].

Primary health care professionals currently lack gender-specific strategies and practices regarding CVDs and their associated risk factors. In addition, there is a lack of research on gender differences regarding the relationship of disease outcomes with dietary behaviors in low and middle-income countries[14]. Accordingly, this study examines gender differences in terms of dietary habits and CVD burden to determine whether lifestyle differences can explain gender differences in cardiovascular risk factors (CRFs) in Turkey. Based on its findings, several recommendations can be made regarding future community-based studies on gender and CVD design and analysis. The study aims to find out determination of the prrevalence of CRFs and chronic diseases differ by gender in Turkey, variations of nutrition and lifestyle behaviors by gender in Turkey and presence of a relationship between gender, cardiometabolic risks, diet and lifestyle behaviors, and cardiovascular morbidity.

MATERIALS AND METHODS

Design and sample of the study

In Turkey, Family Health Centers (FHCs) are primary care locations providing health promotion, preventive health services, and diagnosis, treatment, and rehabilitation services on one site. They thus enable individuals to access services easily and provide effective and widespread community-based health services. Family Health Centers affiliated to the provincial health directorate in Rize, Northeast Turkey, were treated as cluster units, with 30 clusters selected using a random numbers table and population-proportional systematic cluster sampling. For this population-based study, the sample size was determined using the formula $n=(t^2.p.q)/d^2$ for the main cluster cut-off [19]. The mean prevalence of CVDs was determined at a confidence level of 95% ($\alpha=0.05$) and a deviation of $d=0.03$[20]. The sampling identified 1,066 samples. However, 136 individuals were excluded for various reasons, specifically not wanting to donate blood or anthropometric measurements, time constraints (82 people), being over 80 years old (36 people), illiteracy (12 people), and communication problems (6 people). Thus, the study was completed with 930 participants. The design of the study is shown in Figure 1.

This study received approval (No:68/2012) from Recep Tayyip Erdoğan University Ethics Committee of the Faculty of Medicine. In addition, the necessary permissions for the study were obtained from the local health authority and the governors' office. The investigation conforms with the principles outlined in the Declaration of Helsinki[28]. Participants received oral and written information about the purpose of the study, and the procedures for anthropometric measurement and drawing blood. Their written consent was obtained. Regarding ethical responsibility, participants with high blood pressure, large waist circumferences, and/or cardiovascular complaints were referred to family doctors at the FHCs during the study. After the analysis, the

biochemical results were shared with the participants. Those with blood results outside the range of reference values (APG abnormal and dyslipidemia) were informed via telephone and referred to their family doctors.

Data collection

Data were collected by simple random sampling from patients visiting their family physicians. On the first visit to the FHCs, the researchers administered the questionnaires, took anthropometric measurements, and drew blood samples. Since the data were collected by the researchers, the institution's records were not used. Only patients who agreed to participate were included in the study. New patients were selected to replace non-participating patients from the list using randomized numbers table. Before answering the questionnaires, the participants were informed about the number of questions and their content. Ambiguous questions open to interpretation were avoided.

Instruments

The survey was prepared by the researchers and reviewed in accordance with the literature[1-14]. The American and European Guidelines were adopted for the definitions and practices regarding nutrition, diet, exercise, physical activity, chronic diseases, obesity, hypertension, diabetes mellitus, cholesterol level, smoking, and aspirin use[6,21-27]. Cardiometabolic risk factors and variables associated with cardiovascular health were defined as follows:

Age: Being at least 50 years old is a risk factor for both genders[21-27]

Physical activity was defined as taking a walk for 30 minutes at least 5 days (total = 150 minutes) a week[6]. Smoking and alcohol consumption was defined as the number of cigarettes per day and the number of glasses per week, respectively.

Blood pressure measurement and hypertension: Blood pressure was measured twice after 15 minutes of rest, with the mean of the two readings used in the analysis. Hypertension was identified in any of three ways: a systolic blood pressure (SBP) ≥130 mmHg; a diastolic blood pressure (DBP) ≥80 mmHg; use of any antihypertensive agent[21].

*Body Mass Index (*BMI): Values of 18.5 and lower were classified as "underweight", 18.5 to<25 as "normal weight", >25 as "overweight", >30 as "obese".

Obesity: A BMI ≥ 30 kg/m² was considered"obese" in both genders[22].

Waist circumference (WC): This was measured in cm at the superior border of the iliac crest. For waist circumference, males ≥102 cm and females ≥ 88 cm were accepted as high.

Hip circumference measurement: Hip circumference was measured in cm at the top of the hip.

Waist/hip ratio (WHR): Increased CVD risk was indicated by a ratio above 0.95 and 0.80 in males and females, respectively[23].

Presence of Diabetes: A diagnosis by a physician and/or having a fasting plasma glucose (FPG) level equal to or over 126 mg/dL indicated the presence of diabetes (yes/no)[24].

Presence of Heart Disease: A diagnosis by a physician and/or use of heart medicine indicated heart disease (yes/no)[25].

Presence of Metabolic Syndrome (MetS)(yes/no): This was defined according to the diagnostic criteria of the International Diabetes Federation (IDF). In addition to the above waist circumference criteria, the other diagnostic criteria were a high fasting blood pressure (≥100 mg/dL) or Type 2 diabetes, high tension ≥130/85mmHg or hypertension, low HDL-C (<40mg/dL in men;<50mg/dL in women), and high triglyceride (≥150 mg/dL)[26].

Lipid Profile: This was defined according to the diagnostic criteria of the American College of Cardiology/American Heart Association on clinical practice guidelines. According to the guideline, total cholesterol (TC ≥ 200 mg/dL), triglyceride (TG ≥150 mg/dL), high density lipoprotein HDL-C (Men<40 mg/dL, women<50 mg/dL) and low density lipoprotein (LDL-C ≤130mg/dL) were admitted as high[27].

Dietary behaviors: Oil consumption was defined as the regular use of oil in cooking (yes/no) while saturated fat consumption was defined as the regular use of saturated fat in cooking and eating (yes/no). Adding salt consumption was defined as "yes" or "no" while other food consumption was defined quantitatively: animal protein (chicken, fish, meat, egg), legumes, vegetables, and fruits, and processed food (… times a week), water, and tea consumption (... glasses/cups per day).

Other lifestyle behaviors related to cardiac health: The following non-dietary lifestyle behaviors were

measured: weight gain/loss (….kg/ in the last week); exposure to stress (yes or no in the last week); awareness of health-related changes, such as cardiological, blood pressure, and/or diabetes-related issues (yes or no in the last week); receiving regular checkups by a physician (yes/no); use of medications, including antihypertensives, antidiabetics, statins, and/or aspirin (yes/no).

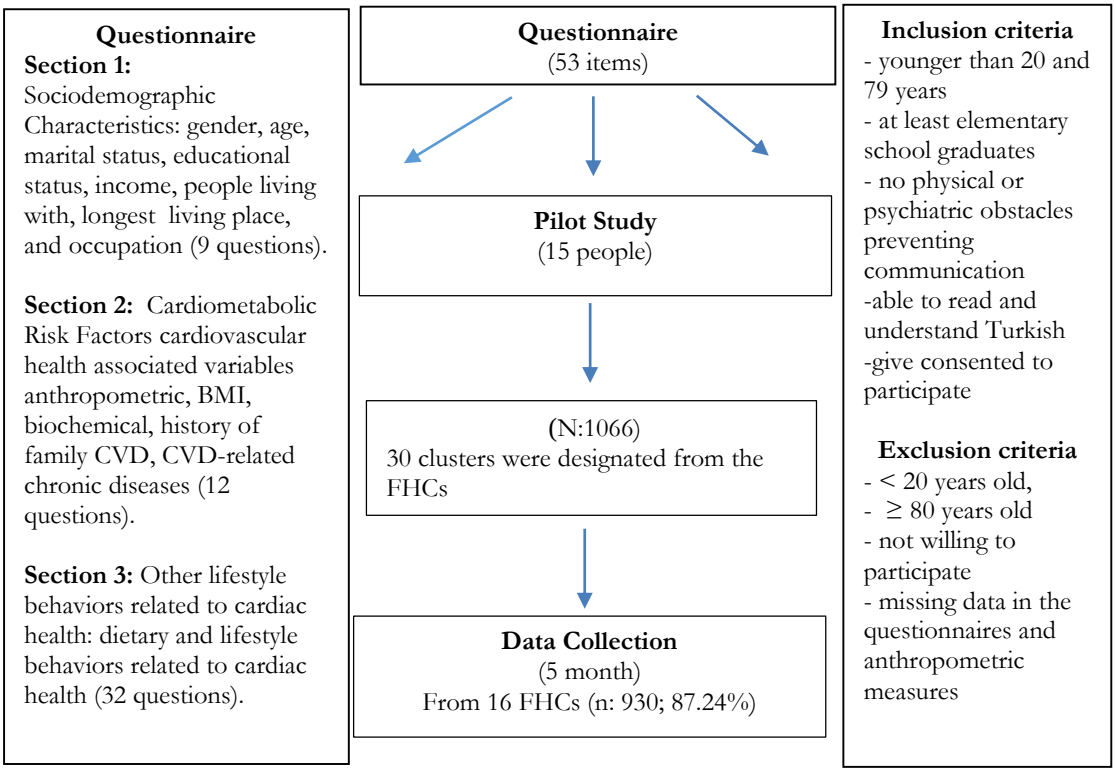

Figure 1. Study design

Laboratory assay

The participants' fasting blood samples (5-mL, fasting ≥ 10 hours) were collected in a vacutainer tube on the same day as the interviews. Concentrations of Fasting Plasma Glucose (FPG), total cholesterol (TC), triglycerides (TG), high and low-density lipoprotein (HDL-C and LDL-C) were measured using an Architect 1600 (Abbott, USA) device at Recep Tayyip Erdoğan University Training and Research Hospital. Both the system and the laboratory were certified.

Statistical analysis

The data were analyzed using SPSS software (v. 25.0). Continuous variables are presented as mean±SD or median and range (minimum-maximum), depending on the normality of distribution. Categorical variables are presented as percentages and counts. Continuous variables were compared using Student's t-test and categorical variables with Chi-square analysis or Fisher's exact test, as appropriate. The dependent variable was heart disease (present/not present). Prior to the analysis, all data about lifestyle habits (independent variables) were recorded as numbers, frequencies, or categories. Pearson's χ^2 and Student's t-tests were used to test the relationships between the dependent variable and the independent variables of age, family history, chronic diseases (hypertension, diabetes, dyslipidemia, thyroid disease, PAD, MetS, depression), lifestyle habits, and use of medication. Only risk factors with a p-value of <0.05 were included in the multiple logistic regression analysis. The risks for males and females were analyzed both separately and together. The odds ratio (OR) shows

the statistical significance of the independent variables as risk factors and the estimated relative risk, and gives the confidence interval for each variable (95% CI). The Hosmer-Lemeshow test was used to test goodness of fit, with p>0.05 considered as a good fit. Nagelkerke's R^2 was examined for the pseudo R^2 assessment of effect.[20]

RESULTS

Regarding the sample's sociodemographic characteristics, 90.0 % of the men were married while 74.5% of the women had ≤ 8 years of education. Most men (89.6%) and women (82.5%) had nuclear families (with spouses and children). Men (98.4%) were much more likely to be working than women (24.0%) (Table 1). Table 2 shows gender-based differences in CRFs and chronic diseases. Mean WC, SBP, and DBP levels were significantly higher in male participants than in females (p<0.001) whereas mean BMI averages and obesity prevalence were significantly higher in the women than the men (p<0.05). Mean TG level was significantly higher in women (p <0.005), although HDL-C levels did not differ significantly by gender. Heart disease was indicated in 11.7% of the men (n = 40) and 9.0% of the women (n = 53). Finally, women were significantly more likely to have comorbidities, including thyroid disease (21.1%), PAD (16.3%), metabolic syndrome (38.1%), and depression (20.6%) (p<0.001).

Table 1. Gender-based differences in sociodemographic characteristics

	Men n (%) 342 (36.8)	**Women n (%) 588 (63.2)**	**χ 2 / *t value***	***P***
Age	48.99±13.25	46.46±14.49	t: 2.64	0.008
Marital Status				
Married	311 (90.9)	505(85.9)	χ 2:5.13	<0.05
Single	31 (9.1)	83(14.1)		
Education				
≤ 8 years (Elementary + Middle School)	195 (57.0)	438(74.5)	χ 2:30.36	<0.001
≥ 9 years (High School and over)	147 (43.0)	150(25.5)		
Income				
Income < Expense	13 (3.8)	36(6.1)	χ 2:2.79	0.248
Income = Expense	294 (86.0)	485(82.5)		
Income > Expense	35 (10.2)	67(11.4)		
Household form				
Single	15 (4.4)	23(3.9)	χ 2:17.67	0.001
Nuclear family	308 (89.6)	484(82.3)		
Extended family	19 (5.6)	81(13.8)		
Longest living place				
Village	49 (14.3)	91(15.5)	χ 2:2.64	0.267
District	160 (46.8)	243(41.3)		
Province	133 (38.9)	254(27.3)		
Occupational				
Not working	7 (2.0)	447(76.0)	χ 2:473.56	<0.001
Working	335 (98.0)	141(24.0)		

As Table 3 shows, there were also significant gender-based dietary and lifestyle differences. Male participants more frequently consumed chicken (1.96±1.33), fish (2.07±1.44), legumes (2.52±1.89), vegetables (4.86±4.28), and tea (7.95±5.35 cups) (p<0.05). Men were also significantly more likely to consume water (6.78±4.51 glasses) (p<0.001). On the other hand, regarding negative factors, men were significantly more likely to smoke (31.0%) and consume alcohol (6.4%) (p<0.001) whereas the women were significantly more likely to report physical inactivity (80.6%), exposure to maximal stress (67.2%), perceiving oneself as unable to cope with stress (34.0%), and having had cardiac complaints in the last week (12.9%) (p<0.05). Finally, men were significantly more likely to use aspirin

(19.3%) ($p<0.05$). The regression analysis indicated that three factors were significantly related to CVD in men: being ≥ 50 years old (OR:5.9; 95% CI: 2.54-14.10); smoking (OR: 2.9; 95% CI: 1.05-8.22); and consuming butter (OR: 4.3; 95% CI: 1.31-14.21). Hosmer-Lemeshow's χ^2 was not significant ($p=0.434$) while Nagelkerke's R^2 was 0.26.

Table 2. Gender-based differences in CRFs and chronic diseases

	Men (n:342) n (%)	**Women (n:588) n (%)**	**χ 2 / t value**	***p***
Anthropometric				
Waist circumference (cm)	99.79 ±12.38	95.01±15.99	t: 4.67	<0.001
Waist/Hip ratio	0.90±0.10	0.90±0.11	t: -7.16	0.470
BMI	28.10±4.23	28.84±5.96	t: -2.014	<0.005
SBP	122.50±19.20	117.34±19.64	t: 3.88	<0.001
DBP	77.72±11.05	74.81±11.46	t: 3.76	<0.001
Obesity (BMI≥30 kg/m²)	114(33.3)	236(40.1)	χ^2 :4.26	<0.005
Biochemical #				
FPG≥100 mg/dL	68(40.7)	99(59.3)	χ^2 : 1.29	0.255
TC≥200mg/dL	217(59.5)	365(65.4)	χ^2 : 2.75	0.097
TG≥150 mg/dL	184(53.8)	375(63.8)	χ^2 : 8.97	<0.005
HDL-C (Men<40 mg/dL, women<50 mg/dL)	183(53.5)	341(58.0)	χ^2 : 1.768	0.184
LDL-C≤130mg/dL	172(50.7)	324(55.7)	χ^2 : 2.097	0.172*
History of family CVD #	156(45.6)	284(48.3)	χ^2 : 0.429	0.679*
CVD #	40(11.7)	53(9.0)	χ^2 : 1.729	0.189
Chronic diseases related to CVD#				
Hypertension	92 (26.9)	173(29.4)	χ^2 : 0.675	0.411
Diabetes Mellitus	39(11.4)	66(11.2)	χ^2 : 0.007	0.934
Thyroid Diseases	23(6.7)	124(21.1)	χ^2 : 33.52	<0.001
Peripheral Artery Disease	23(6.7)	96(16.3)	χ^2 : 17.86	<0.001
Metabolic Syndrome	107(31.3)	224(38.1)	χ^2 : 4.37	<0.005
Depression	21(6.1)	121(20.6)	χ^2: 34.84	<0.001

The column percentage was taken.; BMI: Body mass index SBP: systolic blood pressure, DBP: Diastolic blood pressure, TC: Total cholesterol FPG: Fasting plasma glucose, TG: Triglyceride, HDL-C: High-density lipoprotein, LDL-C: Low-density lipoprotein, CVD: Cardiovascular diseases

For the women, the significant CVD factors were being at least 50 years old (OR:8.4; 95% CI: 3.76-18.87), CVD in family (OR: 2.07; 95%CI: 1.11-3.87), and tea consumption (OR:0.34; 95%CI: 0.124-0.93). Hosmer-Lemeshow's χ^2 was not significant ($p=0.303$) while Nagelkerke's R^2 was 0.234.

For the overall sample, two factors predicted CVD: being at least 50 years old (OR: 6.86; 95% CI:3.87-12.14), MetS (OR:1.99; 95%CI: 1.24-3.20), and tea consumption (OR:0.36, 95% CI: 0.15-0.86). Hosmer-Lemeshow's χ^2 was not significant ($p=0.932$) while Nagelkerke's R^2 was 0.321 (Table 4).

Table 3. Gender-based differences in dietary and lifestyle behaviors

	Men (n:342) n (%)	**Women(n:588) n (%)**	**χ^2 / t value**	***p***
CVD-related nutritional habits				
Oil consumption[#] (regular use in cooking/yes)				
Sunflower seed oil	187(54.7)	338(57.5)	χ^2: 0.692	0.406
Olive oil	134(39.2)	226(38.4)	χ^2: 0.051	0.822
Hazelnut oil	42(12.5)	82(13.9)	χ^2: 0.519	0.471
Corn oil	89(26.0)	167(28.4)	χ^2: 0.613	0.434
Saturated fat consumption[#] (regular use in eating and cooking/yes)				
Margarine	94(27.5)	142(24.1)	χ^2: 1.271	0.260
Butter	320(93.6)	539(91.7)	χ^2: 1.108	0.293
Salt consumption (yes)				
Use of added salt	63(18.4)	131(22.3)	χ^2: 1.949	0.163
Animal protein consumption (….times/week)				
Chicken	1.96±1.33	1.71±1.21	t: 2.789	<0.005
Fish	2.07±1.44	1.87±1.40	t: 2.245	<0.005
Meat	2.68±2.19	2.55±2.10	t: 0.907	0.365
Eggs	3.18±2.24	3.14±2.28	t:0.256	0.796
Vegetable protein consumption (….times/week)				
Legumes	2.52±1.89	2.03±1.58	t: 3.991	<0.001
Processed food	1.37±1.57	1.16±1.67	t: 1.664	0.097
Vegetables	4.86±4.28	4.22±3.42	t: 2.469	<0.005
Water consumption (... cups/day)	6.78±4.51	5.68±3.89	t: 3.912	<0.001
Tea consumption (.... cups/day)	7.95±5.35	4.61±3.60	t: -2.017	<0.005
Fruit (... pieces/week)	11.05±9.56	10.39±8.86	t: 1.051	0.294
Other CVD-related lifestyle habits				
Smoking (current user)	106 (31.0)	84 (14.3)	t: 143.36	<0.001
Smoking (number/day)	1.11±2.74	0.07±0.41	t: 4.71	<0.001
Physical inactivity (≤5 times per week, over 30 min/No)	251(73.4)	474(80.6)	t: 7.707	<0.005
Alcohol consumption (current user)	22 (6.4)	1 (0.02)	Fisher Exact χ^2:83.93	<0.001
Alcohol consumption (…glasses/week)	1.11±2.74	0.410±0.41	t: 2.298	<0.005
Losing weight (kg/last week)	2.23±1.47	2.81±2.20	t: -1.114	0.269
Gaining weight (kg/last week)	1.91±0.75	1.92±1.05	t: -0.051	0.959
Exposure to stress (Last 1 week/yes)	206(60.2)	395(67.2)	χ^2: 1.925	<0.005
Unsuccessful in coping with stress (yes)	49(23.4)	128(32.3)	χ^2: 5.210	<0.05
Awareness of health-related changes (Last 1 week/yes)				
Noticing cardiac problems	23(6.8)	75(12.9)	χ^2: 8.185	<0.005
Noticing blood pressure problems	20(5.9)	47(8.1)	χ^2: 1.431	0.232
Awareness of diabetes	28(8.3)	45(7.7)	χ^2: 0.094	0.760
Regular checkups with doctor/yes (n:920)	154(45.0)	288(49.0)	χ^2: 1.353	0.245
Use of medicines(yes)				
Antihypertensives	92(26.6)	173(29.4)	χ^2: 0.675	0.411
Antidiabetics	38(11.1)	63(10.7)	χ^2: 0.035	0.851
Statins	40(11.7)	60(10.2)	χ^2: 0.501	0.479
Aspirins	66(19.3)	83(14.1)	χ^2: 4.317	<0.05

[#]More than one type of oil and fat are consumed, The column percentage was taken.

Table 4. Effects of cardiometabolic risks, dietary and lifestyle behaviors to cardiovascular morbidity by gender

	β	SE	Wald	OR	95%CI	*p*
Men (n: 40)						
Age (≥ 50 years)	1.790	0.437	16.770	5.988	2.543 – 14.104	<0.005
Smoking	1.080	0.524	4.255	2.946	1.055 – 8.222	<0.005
Exercise	0.055	0.503	0.012	1.057	1.057-0.394	0.993
MetS	1.068	0.379	7.934	2.911	1.384-6.122	0.005
Thyroid Diseases	1.135	0.622	3.330	3.110	0.919-10.519	0.068
CVD in family	0.331	0.381	0.757	1.393	0.660-2.939	0.384
Tea consumption	-1.045	1.034	1.021	0.352	0.46-2.669	0.312
Butter consumption	1.464	0.607	5.813	4.323	1.315- 14.211	<0.005
PAD	-0.795	0.761	1.092	0.451	0.102-2.006	0.296
Constant	-3.753	1.184	10.041			
Women (n:53)						
Age (≥ 50 years)	2.132	0.411	26.889	8.431	3.766-18.874	<0.005
Smoking	0.372	0.649	0.329	1.451	0.407-5.175	0.566
Exercise	0.156	0.466	0.112	1.168	0.469-2.910	1.168
MetS	0.542	0.329	2.706	1.719	0.901-3.279	0.100
Thyroid diseases	-0.230	0.373	0.380	0.794	0.382-1.651	0.538
CVD in family	0.732	0.318	5.308	2.079	1.115-3.874	<0.005
Tea consumption	-1.079	0.513	4.416	0.340	0.124-0.930	<0.005
Butter consumption	0.038	0.581	0.004	1.039	0.333-3.242	0.948
PAD	0.402	0.371	1.178	1.496	0.723-3.093	0.278
Constant	-3.634	0.847	18.429	0.026		
Both genders (n:93)						
Age (≥ 50 years)	1.926	0.291	43.732	6.864	3.878-12.148	<0.005
Smoking	0.718	0.395	3.299	2.050	0.945-4.450	0.069
Exercise	0.168	0.332	0.256	1.183	0.617-2.668	0.613
MetS	0.692	0.240	8.302	1.998	1.248-3.200	<0.005
Thyroid diseases	-0.006	0.297	0.000	0.994	0.555-1.781	0.984
CVD in family	0.621	0.238	6.793	1.860	1.166-2.966	0.009
Tea consumption	-1.018	0.445	5.237	0.361	0.151-0.864	<0.005
Butter consumption	0.567	0.393	2.084	1.763	0.816-3.809	0.149
PAD	0.158	0.319	0.243	1.171	0.626-2.189	0.622
Constant	-3.749	0.624	36.124	0.024		0.000

OR: Odds Ratio. 95% CI: Confidence interval.
MetS: Metabolic Syndrome, CVD: Cardiovascular Diseases, PAD: Peripheral Arterial Diseases

DISCUSSION

This study investigated the gender-based differences in the effects of diet, cardiometabolic factors, and unhealthy lifestyle habits on cardiovascular diseases. The prevalence of positive and negative lifestyle habits differs by gender. In men, being at least 50 years old, smoking, and butter consumption contribute to heart disease. In women, being at least 50 years old and having a family history of heart disease contribute to the presence of CVD. Men's dietary habits were healthier than women's. Physical inactivity, obesity, and high TG levels were more important risk factors for women than men. For the whole population, age and MetS increased CDV risk whereas tea consumption had a protective effect.

Current guidelines strongly recommend a healthy diet prioritizing fruits and vegetables, whole grains, nuts, fish, and lean animal protein[14-17]. The PURE study of 18 countries showed that higher consumption of fruits, vegetables, and legumes decreased CVD prevalence[29]. Unfortunately, our study showed that women consumed fewer healthy foods, such as

chicken, fish, legumes, water, fruit, and vegetables, than men, which helps explain their higher obesity rates, in line with the literature[14,30]. Dietary plans to combat this prioritize fruits and vegetables, low-fat protein sources, and whole-grain cereals over exact total energy intake from major macronutrients[30-33].

Additionally, urgent dietary interventions are needed regarding overconsumption of sugar, fat, and salt, in addition to other dietary-related CVD risk factors associated with diet[14-15]. Men in our study use more added salt than women, which should be restricted. Another major CVD risk factor is saturated fat consumption, which is associated with uncontrolled diabetes, obesity, and high blood pressure[14,17]. Researchers disagree regarding whether consumption of animal fats is good or bad for the heart[31,32]. One study reported that butter consumption increased myocardial infarction risk in women (1.34 times)[33] whereas our study found that it increased CVD in men (4.3 times). To reduce morbidity, saturated and trans fats consumption should be limited, specifically through a Mediterranean diet rich in monounsaturated oils.[5-8] However, the evidence for the role of butter with a high saturated milk fat content for cardiovascular disease remains unclear[34].

Being at least 50 years old increases CVD risk and morbidity in both genders[35]. While the participants in our study were not very old, those aged 50 or more were more likely to have CVD. This can be conceptualized as "risk age", which redefines a person's age in comparison to a person (same gender) without risk factors. Thus, a 50-year-old individual with risk factors may have a "risk age" equivalent to a healthy individual aged 60 (e.g., non-smoker; BP =120 mmHg)[35, 36]. For this reason, risks, as well as age, can have an effect on the health-related age of the person.

Smokers have a higher incidence of chronic diseases, including CVDs[37]. Additionally, one in five smoking-related deaths is caused by heart disease.[12] Smoking contributes significantly to CVD morbidity (2.9 times) in men. However, smoking is much lower in women, which protects them. Consistent with previous findings from Iran and other Middle Eastern countries, smoking rates were also significantly higher (31% and 14.3% respectively) in men than in women in this study. The prevalence of smoking in Iran is estimated to be between 19.8% and 21.7% in men, and between 0.94% and 3.6% in women.[37] Similarly, smoking rates in Turkey are higher in men than in women, which increases men's CVD risk (OR:2.9).

Evidence-based studies show that consuming more than three cups of black or green tea per day for three to six months reduces CVD risk[38,39]. In our study, both men and women report high daily black tea consumption (men: 7.9; women: 4.61 glasses/day). Tea consumption was higher in men than in women, although it appears to have a protective effect against CVD in both genders.

More than half of the sample had LDL-C, TG, TC levels above lipid guideline values[40,41]. The EPIC-Norfolk study of 22,451 participants (10.147 men and 12,304 women) found higher triglyceride levels in males but higher HDL-C and LDL-C levels in females[41]. Similarly, we found higher TG levels in the women and low HDL-C levels for both genders. These results show that the population is at risk for CVD due to dyslipidemia.

ACC/AHA and European guidelines recommend low-dose aspirin use (75 mg-100 mg per day) for CVD prevention in individuals aged 40-70, particularly for those already with CVD, or at moderate or high risk[6-8]. In this study, aspirin use is more common in men than in women. Luepper et al. (2021) showed that the rate of aspirin use for primary prevention of CVD in men (38.3%) was higher than in women (25.4%),[42] and considerably higher than the rate for men in our study (Men: 19.3%, women:14.1%, respectively). Although it was not possible to evaluate the use in primary prophylaxis in this study, aspirin is also used to prevent secondary conditions. Several large randomized controlled trials have demonstrated the aspirin's efficacy in secondary prevention of CVDs, such as myocardial infarction and ischemic stroke. In both primary and secondary prevention trials, the proportional reductions in the aggregate of all serious vascular events are similar for men and women[43,44]. Moreover, in a study conducted with adults with low CV risk, awareness and compliance with aspirin use were better in men. In addition, aspirin use was low in women, who do not receive optimal treatment due to poor compliance with drug prescriptions[44–45]. We think that similar factors may explain the higher rate of aspirin use among males in our study.

CVD patients generally have more than one comorbidity (e.g., hyperlipidemia, diabetes, PAD, MetS, and thyroid disorders) and often experience anxiety and depression problems[46-48]. High LDL-C

and hypertension have a dominant role in CVD development in this population. According to the American Heart Association (AHA), hypertension prevalence (45.6%) is closely similar in men and women.[6] Previous studies in Turkey found that hypertension is more prevalent in women,[9,14] which indicates that women are more prone to cardiovascular morbidity due to hypertension. In our study, hypertension was found at similar rates in both genders. Similarly, Mikkola et al. (2013) reported that hypertension affected both genders[36].

Thyroid disease, PAD, MetS, and depression are also associated with CVD[47-49]. While there was no difference in terms of HT and DM by gender in our study, MetS, PAD, thyroid diseases, and depression are more common in women. Some studies evaluating the prevalence of MetS by gender show that MetS is more common in women[46-50] whereas PAD is in men[51]. In group our sample, abdominal obesity, BMI, high TG, and presence of diabetes in women play an important role in the development of MetS. HT, DM, and dyslipidemia contribute to the development of MetS, although the contributions of these different components may vary between genders in CVD improving[48]. MetS increases CVD risk similarly (1.9 times) for both genders. In contrast to our findings, previous studies report higher PAD prevalence in men[51]. This may reflect women's high BMI and TG levels, and differences in lifestyle factors related to societies and gender.

Although our study provided evidence regarding the effects of gender-specific risks on CVD morbidity, it has a number of limitations. First, since this study was a prevalence study, the size of the male and female populations differs. Second, although individuals can have more than one risk factor simultaneously, our study did not consider concurrent risk factors. Third, DM, HT, and dyslipidemia were used as diagnostic criteria for MetS. However, because they were correlated, only MetS was included in the logistic analysis because their inclusion might reduce its effectiveness. Fourth, carbohydrate consumption was not evaluated, and recently identified CVD risk factors, including C-reactive protein, microalbuminuria, homocysteinemia, and coagulation factors (fibrinogen, factor VII), were not examined because of financial constraints. Future research should therefore assess carbohydrate consumption and new CVD risk factors in relation to gender.

In conclusion, the cardiometabolic risks, dietary and lifestyle habits that contribute to CVD morbidity may show both similarities and differences by gender. Therefore, all aspects of cardiometabolic, dietary, and lifestyle risks that affect CVD morbidity should be addressed according to gender. It is important for health care professionals to design gender-specific strategic programs for CVD prevention in primary care.

Local health care systems should reevaluate their strategies for reducing CVD risk and take effective precautions via primary health care services to provide the public with education and training activities regarding butter consumption, weight control, increasing physical activity, and decreasing hypertension. We suggest that health care professionals should base the design of strategic programs for CVD prevention on gender-specific CVD risk factors and public health care needs. In addition, thyroid disease, PAH, and depression should be diagnosed early as they have a high prevalence. Finally, healthcare professionals should play an active role in these strategic programs while a healthcare tracking system with effective feedback should also be established for individuals in primary care.

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