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Relationship Between Cardiovascular Disease Risk with Depression and Retirement in the Turkish Population

Türk Popülasyonunda Kardiyovasküler Hastalık Riski ile Depresyon ve Emeklilik Arasındaki İlişki

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ABSTRACT

Objective: The present study identifies the factors that can be linked to coronary artery disease, and evaluates the effect of retirement on the development of cardiovascular diseases in the Turkish population. **Methods:** This cross-sectional study was carried in the Family Health Centers between March and July 2019. The data was collected using the Beck Depression Inventory and Framingham general cardiovascular disease risk assessment tool, sociodemographic form. **Results:** The mean Framingham risk score of the respondents was 6.440±7.509. A statistically significant relationship was identified between the Framingham risk score and income perception, monthly net income, occupation, educational status, marital status and employment ($p<0.05$). When the factors related to the Framingham risk score were evaluated, retirement was found to increase the Framingham risk score 13.991 fold ($p<0.05$). **Conclusion:** It is worthy of note that the risk of cardiovascular disease is high in the Turkish population. Retirement was found to be the most influential variable on the risk of developing cardiovascular disease. It is important to organize health training programs on the prevention of heart disease and to develop appropriate health policies.

Keywords: Cardiovascular disease, depression, retirement

ÖZET

Amaç: Bu çalışmada koroner arter hastalığına bağlanabilecek faktörler tanımlanmış ve emekliliğin Türk popülasyonunda kardiyovasküler hastalıkların gelişimine etkisini değerlendirmiştir. **Yöntem:** Bu kesitsel çalışma Mart ve Temmuz 2019 tarihleri arasında Aile Sağlığı Merkezleri'nde yapıldı. Veriler, Beck Depresyon Envanteri ve Framingham genel CVD risk değerlendirme aracı sosyodemografik formu kullanılarak toplandı. **Bulgular:** Ankete katılanların ortalama Framingham risk skoru 6.440 ± 7.509 idi. Framingham risk skoru ile gelir algısı, aylık net gelir, meslek, eğitim durumu, medeni durum ve istihdam arasında istatistiksel olarak anlamlı bir ilişki tespit edildi ($p <0,05$). Framingham risk skoruna ilişkin faktörler değerlendirildiğinde, emeklilik Framingham risk skorunu 13.991 kat arttırdığı tespit edildi ($p<0.05$). **Sonuç:** Türk popülasyonunda kardiyovasküler hastalık riskinin yüksek olduğu unutulmamalıdır. Emekliliğin, kardiyovasküler hastalık gelişme riskinde en etkili değişken olduğu bulundu. Kalp hastalığının önlenmesi konusunda sağlık eğitimi programları düzenlemek ve uygun sağlık politikalarını geliştirmek önemlidir.

Anahtar Kelimeler: Kardiyovasküler hastalık, depresyon, emeklilik

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INTRODUCTION

Non-infectious diseases are showing an increasing trend worldwide while developing countries face the dual burden of infectious and non-infectious diseases. It is estimated that non-infectious diseases will account for seven out of ten deaths by 2020 in the developing world, and among these, cardiovascular diseases are the leading cause of death in the world, particularly in low- and moderate-income countries.[1] Cardiovascular diseases are witnessing a global increase in line with the growth of urbanization and changing lifestyles. An estimated 2 million people have coronary heart disease.[2]

Coronary heart disease is the most common cause of all deaths linked to cardiovascular diseases, and one of the leading causes of disease burden. Determining the risk factors for coronary heart diseases is important in preventing the occurrence of new cases. Nutritional habits, smoking, hypertension, diabetes, physical immobility, and advanced age are all known as risk factors in cardiovascular disease.[3]

In Turkey, it is estimated that people aged 65 years and older will constitute 10.2% of the population by 2023, and this rate is expected to reach 20.8% by 2050. There have been studies indicating that increasing age is the strongest indicator of the increased mortality associated with cardiovascular diseases. According to the 12-year follow-up data of the Study of Heart Diseases and Risk Factors in Turkish Patients (TEKHARF) that has been conducted since 1990 under the guidance of the Turkish Association of Cardiology, it is estimated that in Turkey 2 million people have coronary heart disease, and 160,000 will die of coronary heart disease. It is reported in TEKHARF that in the period between 1990 and 2008, the rate of deaths related to coronary artery disease (CAD) in the 45–74 years age group was 7.64 in males and 3.84 in females, putting the country highest among 30 European countries.[4]

The Framingham risk score calculator (FRS) is the most widely used tool for the prediction of cardiovascular disease. The FRS calculator, which is in use in many countries, estimates the 10-year risk of patients. The use of the FRS calculator in and its adaptability to the Turkish population has been supported by numerous previous studies (Onat et al. 2001; Can et al. 2009; Uğur et al. 2012; Çevik et al. 2015; Aksu et al. 2017). The Framingham risk model includes factors such as diabetes, hypertension, lipid levels, weight, age, gender, and smoking status, and is used to estimate the development of cardiovascular disease (CVD) and to determine the treatment targets to prevent disease progression.[5]

The elderly population is growing rapidly in Turkey. The age of obligatory retirement in Turkey is 65 years for males and 58 years for females.[6] There is a need to investigate the relationship between retirement and cardiovascular disease, with the aim in the present study being to determine the factors related to the risk of coronary artery disease and to evaluate the effect of retirement on the development of cardiovascular disease in the Turkish population.

MATERIAL AND METHODS

This cross-sectional study was carried out on patients applying to the Family Health Centers located in the city center between March and July 2019. The study population was determined to be 150 participants using the G-power program considering an impact size of 0.20, an α of 0.05 and a power (1-β) of 0.80 within a 95% confidence interval. The study included 361 patients aged 30 years and older who applied for any reason to the family health centers in the Aydin city center located in the western part of Turkey, and who provided their consent to participate in the study.

The inclusion criteria were as follows: Age 30 years and older, having applied to the Family Health Center in Aydin city center and consented to take part in the study.

The study was approved by the Aydın Adnan Menderes University Faculty of Nursing Ethics Committee [code number: 2019/101], and additional permission to conduct the study at the relevant family health centers was granted by the Public Health Directorate. A validated and reliable self-administered, structured questionnaire was used for data collection, with further data collected using a questionnaire that was developed by the authors based on an extensive review of literature, and the Turkish version of the Beck Depression Inventory (BDI) that was validated by Tuglu et al. (2005). The Framingham CVD risk score of all the participants was calculated from blood pressure (BP), height, weight, and body mass index (BMI). The Framingham general CVD risk score calculation tool for primary care was developed in 2008.[5] The use of FRS calculator and its adaptability to the Turkish population has been supported by previous studies.[4,7-10]

A BDI score of 10 points and higher was classified as high BDI (HBDI), and a score below 10 points was classified as low BDI (LBDI). Additionally, patients were divided into two groups according to the Framingham CHD risk score as “low” and “high”.

Beck Depression Inventory (BDI): BDI is a 20-item scale in which each item is rated from 0 to 3 points: a score of 10 points or higher indicates depression, and a score of less than 10 points is considered to be normal.[11]

Framingham Risk Score: The Framingham Risk Score calculation tool is a risk calculation method that estimates the absolute 10-year risk of CHD events, based on age, gender, total cholesterol, LDL cholesterol, HDL cholesterol, systolic BP, diastolic BP, and diabetes. A Framingham risk score below 10% indicates very low risk, a score of 10–15% indicates low risk, a score of 15–20% indicates moderate risk and a score of 20% indicates high risk.[5]

After obtaining the written and verbal consent of the patients, they were briefly informed of the objectives and benefits of the study. The patients included in the study were visited in each family health center, and all the participants filled out the questionnaire on their own. No problems occurred while filling out the questionnaire, which took approximately 15 minutes.

Statistical Analysis

The Statistical Package for Social Sciences (SPSS, Inc., Chicago, IL, USA) for Windows 22 was used for the statistical analysis. In the analysis of data, descriptive statistics were presented as numbers and percentages. A logistic regression analysis was performed to determine the risk factors affecting the Framingham risk score. A Chi-square test was used to determine the variables to be included in the logistic regression analysis. The negative effects resulting from the error margins were avoided by excluding any irrelevant variables and those with a low representation rate from the model. The findings obtained were assessed within a 95% confidence interval and at a 5% significance level.

RESULTS

Of the patients, 237 (65.7%) were female and 124 (34.3%) were male, with a mean age of 43.98±10.8 (30–74) years. Of the total, 45 (12.5%) patients had hypertension and 37 (10.2%) had diabetes mellitus. When evaluated according to BMI, 171 (47.4%) patients were of normal weight, 133 (36.8%) were overweight and 57 (15.8%) were obese. In the evaluation of smoking status, 110 (30.5%) were smokers and 251 (69.5%) were non-smokers. When the monthly income level was evaluated, 159 (44%) patients had a monthly income of 3,001 TL or higher. Furthermore, 167 (46.3%) were civil servants, 147 (40.7%) were university graduates, 282 (78.1%) were married and 273 (75.6%) were employed (Table 1).

Table 1. Socio-demographic Characteristics of Participants (n=361)

Groups	Frequency (n)	Percentage (%)
Age Mean: 43.98±10.8 (Minimum:30, Maximum:74)		
Gender		
Female	237	65.7
Male	124	34.3
Hypertension		
Yes	45	12.5
No	316	87.5
Diabetes Mellitus		
Yes	37	10.2
No	324	89.8
BMI		
Normal weight (<25 kg/m2)	171	47.4
Overweight (25-<30 kg/m2)	133	36.8
Obese (30 kg/m2 or higher)	57	15.8
Smoking		
Yes	110	30.5
No	251	69.5
Income level		
3,001 and Higher	159	44.0
1,001–3,000 TL	141	39.1
1,000 TL and Lower	61	16.9
Occupation		
Civil Servant	167	46.3
Worker	46	12.7
Self-employed	52	14.4
Retired	26	7.2
Housewife	70	19.4
Education Status		
Primary School	110	30.5
Secondary School	34	9.4
High school	70	19.4
University	147	40.7
Marital status		
Married	282	78.1
Single	79	21.9
Employment Status		
Employed	273	75.6
Unemployed	88	24.4

Of the participants, 86.4% were found to be low risk and 13.6% to be high risk according to the Framingham risk assessment tool. The mean Framingham risk score of the respondents was 6.440±7.509 (Min=0, Max=30). The relationship between the Framingham risk score and certain sociodemographic characteristics was evaluated, and a statistically significant relationship was noted between Framingham risk score and income perception, monthly net income, occupation, educational status, marital status and employment ($p<0.05$). In the perception of income, participants reporting a higher income than expenses scored lower in the Framingham risk score calculator ($X^2=9.324$, $p=0.009$). The Framingham risk score

was lower in participants reporting a monthly income of 3,001 TL and higher than in participants in the other income categories (X^2=34.756, p=0.000). The Framingham risk score was higher in the retired participants than in the employed participants (X^2=97.955, p=0.000). The Framingham risk score was the lowest in the university graduate participants and highest in the primary school graduates (X^2=43.795, p=0.000). The Framingham risk score was significantly higher in the married participants than in the single participants (X^2=6.243, p=0.007). The Framingham risk score was significantly higher in the unemployed participants than in the employed participants (X^2=21.833, p=0.000). Alcohol use (X^2=0.393 p=0.352), family history of heart disease (X^2=0.374 p=0.323), sleep duration (X^2=0.157 p=0.454) and depression levels (X^2=0.232, p=0.630) were not related to the Framingham risk score (Table 2).

Table 2. Distribution of Independent Variables According to the Framingham Risk Score

		Low		High		p
		n	%	n	%	
Alcohol	Yes	49	15.7	6	12.2	*0.352
	No	263	84.3	43	87.8	
Perceived Level of Income	Income More than Expenses	110	35.3	7	14.3	***0.009**
	Income Equal to Expenses	136	43.6	31	63.3	
	Income Less than Expenses	66	21.2	11	22.4	
Income level	3,001 and Higher	156	50.0	3	6.1	***0.000**
	1,001–3,000 TL	106	34.0	35	71.4	
	1,000 TL and Lower	50	16.0	11	22.4	
Occupation	Civil Servant	163	52.2	4	8.2	***0.000**
	Worker	44	14.1	2	4.1	
	Self-employed	38	12.2	14	28.6	
	Retired	8	2.6	18	36.7	
	Housewife	59	18.9	11	22.4	
Education Status	Primary School	76	24.4	34	69.4	***0.000**
	Secondary School	30	9.6	4	8.2	
	High school	63	20.2	7	14.3	
	University	143	45.8	4	8.2	
Marital status	Married	237	76.0	45	91.8	***0.007**
	Single	75	24.0	4	8.2	
Employment Status	Employed	249	79.8	24	49.0	***0.000**
	Unemployed	63	20.2	25	51.0	
Family History of Heart Disease	Yes	107	534.3	19	38.8	*0.323
	No	205	65.7	30	61.2	
Sleep Duration	8 hours and fewer	274	87.8	44	89.8	*0.454
	More than 8 hours	38	12.2	5	10.2	
Depression Level	Low	264	84.3	40	81.6	*0.630
	High	49	15.7	9	18.4	

*Chi-square test

A logistic regression analysis was performed to determine the variables affecting the Framingham risk score. When the factors related to the Framingham risk score were evaluated, retirement was found to increase the Framingham risk score 13.991 fold (p=0.037). The effect of other variables on the Framingham risk score was not found to be significant (p>0.05) (Table 3).

Table 3. Logistic Regression Analysis of the Factors Related with the Framingham Risk Score						
	B	**S.Error**	**p**	***OR**	**95%ConfidenceInterval**	
					Lower	**Upper**
Perceived Level of Income			0.322			
Perceived Level of Income(1)	-0.251	0.593	0.672	0.778	0.244	2.486
Perceived Level of Income(2)	-0.891	0.703	0.205	0.410	0.104	1.627
Income level			0.329			
Income level(1)	1.522	1.257	0.226	4.583	0.390	53.804
Income level(2)	2.238	1.505	0.137	9.375	0.491	179.102
Occupation			0.000			
Occupation(1)	-1.046	1.301	0.421	0.351	0.027	4.497
Occupation(2)	0.972	1.121	0.386	2.644	0.294	23.771
Occupation(3)	2.638	1.268	**0.037**	13.991	1.166	167.912
Occupation(4)	-0.502	1.317	0.703	0.605	0.046	8.003
Education Status			0.207			
Education Status(1)	-1.033	0.655	0.115	0.356	0.099	1.285
Education Status(2)	-0.687	0.582	0.238	0.503	0.161	1.574
Education Status(3)	-1.328	0.828	0.109	0.265	0.052	1.343
Marital status(1)	-0.794	0.626	0.205	0.452	0.132	1.542
Employment Status(1)	-0.142	0.538	0.792	0.868	0.303	2.488
Constant	-2.428	0.412	0.000	0.088		
Cox & Snell R^2=0.226; Nagelkerke R^2=0.411						

*Logistic Regression

DISCUSSION

Cardiovascular diseases continue to be the leading cause of death among males aged above 40 years in European countries. In the TEKHARF study, involving a large population in Turkey, the rate of coronary heart disease was 6% in the 45–54 years age group, 17% in the 55–64 years age group, and 28% among individuals aged 65 years and older.[4]

It is estimated that approximately 160,000 people die annually due to cardiovascular disease in Turkey and that cardiovascular mortality is higher in Turkey than in the European countries. It is estimated, furthermore, that coronary morbidity and mortality increases by 4–5% every year.[2] The mean cardiovascular disease risk in the present study was 6.440±7.509 (Min=0; Max=30). The mean Framingham risk score in a study involving patients living in Iran was found to be 3.7±5 (males: 5±5.6; females: 0.63±0.6). Compared to the results of the present study, the risk of the cardiovascular disease seems to be lower in the Persian patient group.[12] Studies in Asia and Tunisia showed a high 10-year cardiovascular risk in 30% of the population. It was found that cardiovascular disease risk in Turkey is as high as in other countries, despite the high proportion of young people.[13]

There was a statistically significant relationship between Framingham risk score and income perception, monthly net income, occupation, educational status, marital status, and employment. Studies evaluating the relationship between educational level and Framingham risk score show lower cardiovascular disease risk in individuals with a higher educational level.[14-18] Consistent with the literature, the results of the present study support that an increasing level of education decreases cardiovascular disease risk.

A significant relationship was found between the monthly level of income and the Framingham risk score. Cardiovascular disease risk was found to be lower in participants with a higher monthly income than in participants with a lower monthly income. A study conducted in the United States involving adults in the 30–74 years age range found that participants with a low educational level had an increased Framingham risk score and a higher risk of developing cardiovascular disease in the future.[17] In a study of adults in India, individuals with a higher income level were found to have a lower risk of cardiovascular disease.[18] The results of the present study are similar to those reported in the literature.

A statistically significant relationship was found between marital status and Framingham risk score. Married participants were found to be at greater risk of cardiovascular disease than single participants. In another study conducted in the Turkish population, cardiovascular disease risk assessed by the Framingham risk score was reported to be higher in married individuals than in single individuals.[19]

A relationship was found between employment status and Framingham risk score, and that retired individuals were at greater risk of

cardiovascular disease. Similarly, Tekin and Koç (2018) reported significantly higher Framingham risk scores in unemployed individuals.[19] It was found that unplanned pensions prepare the ground for negative health behaviors. The increase in alcohol and cigarette use of compulsory retirees has been associated with the stress caused by leaving a paid job due to unplanned retirement. The increase in participation rates in physical activity as individuals' leisure activity after the retirement seems to be a preventive factor for physical activity.[20]

When the variables affecting the Framingham risk score were evaluated using logistic regression analysis in the present study, retirement was found to cause a 13.991-fold increase in the risk of developing cardiovascular disease. Spending long hours at home after the end of working life, advanced age, switching from active working life to a sedentary life, and changes in nutritional habits may increase the risk of cardiovascular disease.

CONCLUSION

It is a spectacular finding that the risk of cardiovascular disease is increasing gradually in the Turkish population. Perceived income level, monthly net income, occupation, educational status, marital status, and employment status were all found to be related to cardiovascular disease risk. Retirement was found to be the most prominent variable on the risk of developing cardiovascular disease. It is important to evaluate the relationship between lifestyle and the risk of developing cardiovascular disease in the Turkish population, as well as in other populations, to organize healthcare training to prevent factors affecting cardiovascular disease risk and to develop proper health policies. Furthermore, interventions aimed at reducing the unfavorable effects of retirement on the risk of developing cardiovascular disease can be recommended. Further interventional studies should be carried out to evaluate the effects of reducing cardiovascular disease risk.

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