

Cardiovascular Disease Risk: A Cross-Sectional Research on a Group of Adults

Background: Cardiovascular diseases is important in terms of being preventable. The presence of more than one risk factor in an individual increases the risk of future Cardiovascular diseases. The Framingham Heart Study has played an important role in defining these risk factors. **Objective:** It was to determine the 10-year risk of developing coronary heart disease in a group of adults. **Methodology:** The cross-sectional research was conducted on adults over 30 years old who had applied to a primary health care service located in the western part of Turkey between April and May 2018. The research sample consisted of 110 individuals. **Results:** The ten-year risk of coronary heart disease of the individuals participating in our study was found to be 16.4%. The distribution of individuals at high risk in terms of ten-year coronary heart disease risk was higher in males (35.8%). This finding shows the importance of Cardiovascular diseases as a health problem, especially in men, and that a comprehensive risk assessment should be performed at the individual level in order to prevent it. **Conclusions:** It is vital that health professionals working in primary health care services determine the risk of heart disease and prevention programs targeting healthy lifestyle behaviors for individuals in high-risk groups.

Keywords: Framingham risk scoring, coronary heart disease, risk

Introduction

Cardiovascular diseases (CVD) are the most important cause of death globally (Joseph et al., 2017; WHO, 2020; Cardiovascular Diseases), taking an estimated 17.9 million lives each year (WHO, 2020; Cardiovascular Diseases). Death data of the Turkish Statistical Institute show that the share of heart diseases in total deaths is showing a gradual increase. Heart diseases ranked first among all causes of death with 40% in 1989, 45% in 1993, 40% in 2009, 39.6% in 2013, and 40.4% in 2014 (Republic of Turkey Ministry of Health, 2015). According to the World Health Organization (WHO), deaths due to CVD in Turkey constitute 34% of all causes of death (WHO, 2018) and deaths due to cardiovascular diseases are estimated to rise to 22.2 million in 2030 (Republic of Turkey Ministry of Health, 2015).

CVD is important in terms of being preventable (Eray et al., 2018). The presence of more than one risk factor in an individual increases the risk of future CVD (Dülek et al., 2019, Malla et al., 2021). Among cardiovascular disease risk factors, as well as non-modifiable factors such as age, gender and family history of CVD, there are also modifiable risk factors such as hyperlipidemia, hypertension, smoking, diabetes mellitus, alcohol consumption, obesity, physical inactivity and unhealthy diet. These can all be easily measured in primary care facilities. Identifying those at highest risk of CVDs and ensuring they receive appropriate treatment can prevent premature deaths.

1 Access to essential noncommunicable diseases and basic health technologies in
2 all primary health care facilities is essential to ensure that those in need receive
3 treatment and counseling (WHO, 2020).

6 **Literature Review**

8 To address the rising burden of non-communicable diseases, in May 2000
9 the 53rd World Health Assembly adopted the WHO Global Strategy for the
10 Prevention and Control of Noncommunicable Diseases. In doing so, it placed
11 non-communicable diseases on the global public health agenda. Since then,
12 WHO has strengthened its efforts to promote population-wide primary
13 prevention of noncommunicable diseases, through the Framework Convention
14 on Tobacco Control and the Global Strategy for Diet, Physical Activity and
15 Health. These activities target common risk factors that are shared by CVD,
16 cancer, diabetes and chronic respiratory disease, and their implementation is
17 critical if the growing burden of noncommunicable diseases is to be controlled.
18 These measures should make it easier for healthy people to remain healthy, and
19 for those with established CVD or at high cardiovascular risk to change their
20 behavior (WHO, 2007).

21 Many national treatment guidelines report that it is more beneficial to
22 determine the diagnosis and treatment of high cholesterol and blood pressure
23 according to the ten-year CVD risk of individuals (Sözmen et al., 2016).
24 Studies on when and in which patient primary prevention measures should be
25 initiated from CVD, which includes coronary heart disease and stroke, have
26 coined the term "risk factor". Modifiable and non-modifiable risk factors have
27 been identified and it has been suggested that necessary measures be taken
28 without delay in order to eliminate modifiable risk factors (Bilir et al., 2016).
29 The Framingham Heart Study has played an important role in defining these
30 risk factors. The Framingham scoring reflects the risk in people without
31 clinical evidence of coronary heart disease. Therefore, the scoring is valid only
32 in primary prevention (Bilir et al., 2016; Dülek et al., 2019).

33 **Aim** The aim of the study was to determine the 10-year risk of developing
34 coronary heart disease in a group of adults.

37 **Methods**

39 *Research Design and Sample*

41 The cross-sectional research was conducted on adults over 30 years old
42 who had applied to a primary health care service located in the western part of
43 Turkey between April and May 2018. During the data collection process, 110
44 individuals provided samples of the research.

1 *Data Collection and Instruments*

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3 Data were collected using an individual identification form and the
4 Framingham Risk Score.

5 **The Individual Identification Form:** This included questions such as on
6 age, gender and smoking status (D'Agostino et al.; Balci et al., 2018).

7 **Framingham Risk Score:** This is used to determine the 10-year risk of
8 coronary heart disease in individuals. Six risk factors (gender, age, cholesterol,
9 high density lipoprotein (HDL), systolic and diastolic blood pressure, and
10 smoking) are included in the calculation. The blood test results in the primary
11 health care service were examined for total cholesterol and HDL values, which
12 were used in calculating the risk score. A risk score of less than 10% indicates
13 low risk, 10-20% moderate risk, and more than 20% probable high risk
14 (D'Agostino et al.; Balci et al., 2018).

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16 Data Analysis

17 For data analysis, descriptive statistics (numbers, percentage distribution,
18 means and standard deviation) and chi-square analysis were used with SPSS 16
19 for Windows. Statistical significance was defined as $p < 0.05$.

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21 Ethical Considerations

22 Written permission to carry out the research was obtained from the
23 primary health care service and from the University Medical Research Ethics
24 Committee. The purpose of the research was explained to the participants,
25 after which they were invited to the study.

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28 **Results**

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30 *Sociodemographic and health characteristics of the participants*

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32 The participants' mean age was 65.55 ± 12.43 (min=31, max=85) and
33 51.8% were females. It was found that 28.1% of women and 28.3% of men had
34 been diagnosed with diabetes ($\chi^2=0.001$, $p>0.05$); 43.6% of individuals smoked
35 and 28.2% were obese (Table 1).

36 Based on the cut-off values of Cholesterol-T >200 mg/dl, HDL-C <40
37 mg/dl in women and <50 mg/dl in men HDL-C, it was found that 43.6% of all
38 individuals had high cholesterol-T levels: this rate was 32.1% in men and
39 54.4% in women, and there was a statistically significant difference ($\chi^2=5.558$,
40 $p=0.018$). Low HDL-C levels were seen in 54.7% of men and 14% of women.
41 The proportion of individuals with systolic blood pressure ≥ 130 mmHg and
42 diastolic blood pressure ≥ 85 mmHg was 45.5%. This rate was 47.4% for
43 women and 43.4% for men ($\chi^2=0.175$, $p=0.676$).

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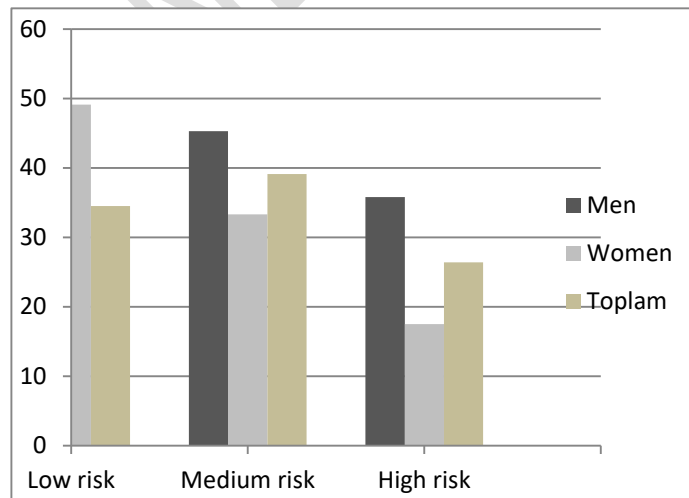
1 **Table 1. CVD Risk Factors and Framingham Risk Score by Gender of**
 2 **Individuals**

Risk factors	Female	Male	Total	Test
	n - %	n - %	n - %	
DM	16 - 28.1	15 - 28.3	31 - 28.2	$\chi^2=0.001$ $p=0.978$
Smoking	16 - 28.1	32 - 60.4	48 - 43.6	$\chi^2=11.655$ $p=0.0001$
Obesity	42 - 73.7	43 - 81.1	85 - 77.3	$\chi^2=0.867$ $p=0.352$
Cholesterol-T > 200 mg/dl	31 - 54.4	17 - 32.1	48 - 43.6	$\chi^2=5.558$ $p=0.018$
HDL-K (female: < 40 – male: < 50mg/dl)	8 - 14.0	29 - 54.7	37 - 33.6	$\chi^2=20.362$ $p=0.000$
Systolic blood pressure ≥130mmHg Diastolic blood pressure ≥ 85mmHg	27 - 47.4	23 - 43.4	50 - 45.5	$\chi^2=0.175$ $p=0.676$
Framingham Risk Score	11.49±8.62	21.57±14.50		$t=4.389$ $p=0.000$

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 4 **CVD Risk of the Participants**

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 6 The ten-year risk of coronary heart disease in all individuals was 16.4%
 7 (min=1%, max=53%). This risk was 11.5% in women and 21.6% in men
 8 ($t=4.389$, $p=0.000$). The distribution of individuals at high risk in terms of ten-
 9 year coronary heart disease risk was 35.8% in men and 17.5% in women.
 10 While the proportion of men at moderate risk was 45.3% and that of women
 11 was 33.3%, the proportion of participants at low risk was 18.9% of men and
 12 49.1% of women (Figure 1). There was a significant difference between risk
 13 groups according to gender ($\chi^2=11.771$, $p=0.003$, Table 1).
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15 **Figure 1. Individuals' 10-Year Risk of Coronary Heart Disease**



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1 Discussion

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3 The ten-year risk of coronary heart disease of the individuals participating
4 in our study was found to be 16.4%. The distribution of individuals at high risk
5 in terms of ten-year coronary heart disease risk was higher in males (35.8%).
6 This finding shows how important CVD is as a health problem, especially in
7 men, and that a comprehensive risk assessment should be made at the
8 individual level in order to prevent it. As a result of a study conducted by
9 Tekkeşin et al. (2011), the ten-year risk of coronary heart disease among 3169
10 participants was found to be 9.4% in men and 4.6% in women, and this
11 difference was found to be significant (Tekkeşin et al., 2011). According to the
12 results of the Turkish Household Health Survey (2017), it was determined that
13 men (13.8%) have higher risks than women (7.8%) (Republic of Turkey,
14 Ministry of Health, 2017). According to the results of the Turkish Chronic
15 Diseases and Risk Factors Survey (2013) history of acute myocardial
16 infarction, the risk is 2.3% in men and 2.3 % in women. The results of the
17 Health Survey for England (2017) are similar to our study. According to the
18 results of this study, 15% of men and 13% of women in 2017 were diagnosed
19 with some kind of CVD. It was determined that, compared to women, men had
20 more ischemic heart disease (6% and 3% respectively) and stroke (3% and 2%
21 respectively) (Health Survey for England, 2017).

22 HT is the most common global public health problem among chronic
23 diseases. It is a known risk factor for morbidity and mortality due to CVD
24 (Eray et al., 2018; Heart Disease and Risk Factors in Turkish Adults Study,
25 2017). In the Heart Disease and Risk Factors in Turkish Adults 2017 study, it is
26 stated that the trend of increase in blood pressure has been reversed since 2000
27 as a result of the widespread use of antihypertensive treatment in adults.
28 However, in our study, approximately half of the individuals (45.5%) had
29 systolic blood pressure ≥ 130 mmHg and diastolic blood pressure ≥ 85 mmHg.
30 Eray et al. (2018) found that 25% of men and 40.7% of women had HT.
31 According to the results of a study conducted by Ghosh et al. (2016) among 27
32 589 adult individuals aged ≥ 18 years in India, more than 39% of men and more
33 than 25% of women were identified as prehypertensive, and approximately
34 12.5% of men and 11.3% of women were diagnosed as hypertensive. These
35 results show that the probability of hypertension in the community is high. The
36 prevalence of hypertension varies according to regions and country income
37 groups: the WHO Africa Region has the highest prevalence of hypertension
38 (27%), while the WHO Americans Region has the lowest prevalence (18%).
39 The number of adults with hypertension increased from 594 million in 1975 to
40 1.13 billion in 2015. This increase is mainly due to the increase in hypertension
41 risk factors in these populations (WHO, 2021).

42 According to the results of our research, lower HDL-C levels were more
43 common in men. Sözmen et al. (2016) found that the mean HDL cholesterol
44 was significantly higher in women than in men. It was determined that 43.6%
45 of all individuals participating in our study had high cholesterol-T levels, and
46 this rate was 32.1% in men and 54.4% in women. This difference was

1 statistically significant ($p=0.018$). Bilir et al. (2016) found that the rate of
2 having a lipoprotein (a) level of 30 and above was higher in women than in
3 men. As a result of studies by Eray et al. (2018), HDL cholesterol and
4 triglyceride levels were found to be within normal limits, while the average of
5 LDL cholesterol was 138 mg/dL in men and 140 mg/dL in women, which is
6 borderline high. High cholesterol-T levels were found in approximately 44% of
7 the participants in our study. The most important reason may be the increasing
8 overweight-obesity rates in our society, and not having a healthy lifestyle due
9 to the decreasing level of physical activity. In this regard, it is important first of
10 all to raise social awareness and to mobilize education, health and related
11 policies.

12 According to the results of our research, the distribution of individuals at
13 high risk in terms of ten-year coronary heart disease risk was 35.8% in men
14 and 17.5% in women. Eray et al. (2018) found that, while high and very high
15 risk was determined in approximately 41% of men, these rates were determined
16 in 33.3% of women. In our study, the rate of men with low risk was 18.9%, and
17 the rate in women was 49.1%. Dölek et al. (2019) found that the rate of males
18 with a Framingham score at a high risk level was statistically significantly
19 higher than females ($p=0.001$). Eray et al. (2018) found that in terms of
20 cardiovascular risk levels, 6.3% of men were at low risk, while 20.3% of
21 women were at low risk. As a result of our study, a significant difference was
22 found between risk groups according to gender. While the results of much
23 research in Turkey and in the rest of the world are similar to our results, some
24 are different. Selvarajah et al. (2014) found that cardiovascular risk factors
25 were higher in women than in men, while in Turkey, Eray et al. (2018) found
26 no statistically significant difference between cardiovascular risk levels by
27 gender. The fact that CVD was higher in men than in women was considered to
28 be compatible with the literature (Kappert et al., 2012; Finegold et al., 2013).

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30 Limitations of the Research

31 The results of the research cannot be generalized to the whole society
32 because the sample of the study consisted of people who applied to a primary
33 health care service.

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35

36 **Conclusion**

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38 In conclusion, approximately one in six of the individuals participating in
39 our study were in the high-risk group in terms of ten-year risk of coronary heart
40 disease, and this risk was approximately twice as high in men as in women. It
41 is recommended that health professionals working in primary health care
42 services should determine the risk of heart diseases in the adult population in
43 the areas where they provide health services, and that preventive programs
44 targeting healthy lifestyle behaviors for individuals in the high-risk group
45 should be organized and implemented.

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