### Section: Medical Science

# Determination of Risk Factors of the Youth for Coronary Heart Disease Based on Gender

**Running Head: Risk Factors of the Youth for Coronary Heart Disease**

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**Abstract:**

**Objective:** This study was conducted to determine the risk factors of the youth for coronary heart disease.

**Methods:** This cross-sectional study was completed with 216 students who were studying in a university located in Kayseri and selected for the sample by using the stratified simple random sampling method.

**Results:** In the study, 40.3% of the university students were 20-21 years old, 69% were female, and 21.3% had the history of heart disease in their family. 47.8% of the male students were smoker, 17.9% were drinking alcohol, 22.4% did not do physical exercise and no significant difference was determined compared to the female students (p<0.05). More than 65% of the university students described themselves as stressed. 20.1% of the female students and 35.8% of the male students were eating fast food. It was found that BMI and body fat percentage of the male students were significantly higher than female students. On the other hand, waist-to-hip ratio of the female students was significantly higher than the male students. In addition, the male students had higher systolic (p = .001) and diastolic blood pressures (p = .004).

**Conclusion:** This study showed that young people were at risk for coronary heart disease. This reveals the importance of recognizing risky behaviors among young people and conducting studies to encourage young people for lifestyle change.

**Keywords:** Young, Heart Disease Risk Factors, Health Protection

## Introduction:

Health promotion can be defined as a combination of organizational, economic and environmental supports through health education for bringing behavior. This concept includes protection from the

diseases that are frequently seen in the community, are the most common cause of death and disability, and preventable and avoidance from some risk behaviors which is known to prolong the healthy life expectancy (1,2).

Risky health behaviors, which are one of the leading causes of diseases and deaths in adults, often develop during youth period and continue in adulthood as well. One of the diseases associated with these risky behaviors is coronary heart disease. Being the epidemic of our age, coronary heart disease (CHD) is the primary cause of death in adults in both Turkey and worldwide. It is estimated that 400,000 people would die per year by 2020 in Turkey due to cardiovascular diseases, which means that one in every two deaths in Turkey will be caused by cardiovascular diseases. The rate of mortality caused by cardiovascular diseases is higher in women than men and this mortality rate is higher than deaths associated with breast cancer. Coronary heart diseases in women develop 10 years later compared to men (2-4).

According to the Euroaspire III study in which twenty-two European countries participated, it has been determined that Turkey is the country where acute myocardial infarction or sudden cardiac death is most frequently seen without symptoms in young people (5). The reason for the increased incidence of cardiovascular diseases in Turkey compared to European countries is the increased rate of smoking cigarettes and tobacco products, increased weight gain, inactivity, unhealthy diet, and increased diabetes.

Knowing, preventing and early diagnosing the risk factors of coronary heart diseases are very important. The risk of coronary heart disease can vary depending on age, genetic characteristics, and gender. In addition, other risk factors also play an important role in the development of the disease. These factors are determined as hypertension, hypercholesterolemia, hyperlipidemia, tobacco use, sedentary life, stress, obesity, and diabetes (6-7). The guidelines of the European Society of Cardiology (ESC) states that mortality and morbidity of cardiovascular disease can be reduced especially in individuals with high risk by controlling the risk factors (8). Determining risk factors at young ages and supporting young people to take precautions can reduce coronary heart disease and the associated deaths that may occur at older ages. Thus, young people can acquire healthy lifestyle habits and live a healthy life and also both labor loss and deaths can be reduced.

## Materials and methods:

This cross-sectional study was conducted to determine the risk factors, which lead to coronary heart disease among university students, in terms of gender. Since the age of incidence of cardiovascular diseases decline gradually and universities have young people from different cities of the country, university students were selected as the target group. The population of the study consisted of 1100 university students. The sample size was determined as 300 students by using a certain sampling method. In the study conducted in Spring semester of 2015-2016 Academic Year, the departments were stratified and a total of 216 (70%) students selected via the simple random sampling method were included in the study. 70 students who refused to participate in the study and 14 students who completed the questionnaire incorrectly were excluded from the study. The data obtained from the study were evaluated in the SPSS 21.0 package program. In order to conduct the study, Approval from University Deanship of Medical Faculty Drug Trials Local Ethics Committee (2015/118) and institutional permission from University was obtained. Written and verbal consents of the students participating in the study were obtained. Because there is no scale to assess cardiovascular risk in people aged 30 years or younger, the questionnaire was prepared in the accordance with the literature (1-9). The questionnaire has a total of

35 questions including socio-demographic characteristics, CHD risk factors, and physical examinations of the students. To test the functionality of the questionnaire, a preliminary application was conducted with 10 university students. The students, to whom the preliminary application, was performed were not included in the study. The data of the study were collected by the researchers using questionnaire and anthropometric measurements.

**Systematic Examination Measurement Criteria:**

**Height:** A fixed stadiometer was used to measure the height of the students. The height measurement was performed by ensuring that the students stood on their bare feet by pressing flat on the floor with touched toes, back of the head, back, hips and shoulders were in contact with the height meter, the head was straight in the position of looking straight and by pressing the scale on the hairs.

**Body Weight and Body Fat Percentage:** In these measurements, bioelectrical impedance analysis (Tanita SC 330 model body fat analyzer) was used. In the measurement, the shoes of the students were taken off and the students were ensured to be in their light clothes. Bioelectrical impedance analysis is a measurement method used to objectively calculate the body fat mass based on the principle that the resistance of the fat tissues to the electric current passed through the body is different from other tissues.

**Body Mass Index (BMI):** The body mass index is an easy-to-apply index that best represents slimness and obesity based on weight- height relationship in adults. It is calculated by dividing the weight into the square of the height of the body (BMI=kg / m$^2$). According to the assessment by World Health Organization, BMI is evaluated as normal for 20-24.9, mildly obese for 25-29.9, first degree obese

for 30-34.9, and second degree obese for 35-39.9 (9-11). The height and weight measurements of the individuals were made by the researcher and their mean values were taken.

**Waist and Hip Circumference:** Waist and hip measurements were conducted with the help of a rigid tape measure while the arms of youths were on both sides, their feet were close to each other and balance was equal on each leg. The waist circumference was measured from the right side of the individual to the lowest rib bone with the midpoint of iliac bone spur in the midaxillary line; whereas, the hips circumference was measured from symphysis pubis in the front and from the prominent part of the gluteal region at the back. It was considered normal that Waist-to-hip ratio was 0.85 for women and 0.90 for men (9-10).

**Blood pressure:** Blood pressure measurements were made indirectly using an age-appropriate sphygmomanometer. The young people were rested before the measurement, the sphygmomanometry's sleeve was attached to the upper part of the arm so that the right arm's elbow remained uncovered by sitting the youth down during the measurement and the measurement was made without putting the diaphragm of the stethoscope under the sleeve. Values of 90/60 – 140/90 mmHg were considered as normal. (12).

**Heart Rate:** After the procedure to be performed was explained and the young people rested, thumb was placed on the wrist by putting the sign, middle and ring fingers on the radial artery, the heart rate was measured from radial artery by holding for one minute.

**Respiration:** After the heart rate measurement, the respiratory rate was counted for one minute by observing the movements of the rib cage without being noticed by the youth.

**Table 1: Distribution of Descriptive Characteristics**

| Characteristics | n | % |
|---|---|---|
| **Age** | | |
| 18-19 years | 78 | 36.1 |
| 20-21 years | 87 | 40.3 |
| 22-23 years | 36 | 16.7 |
| 24 years and older | 15 | 6.9 |
| **Gender** | | |
| Female | 149 | 69.0 |
| Male | 67 | 31.0 |
| **Employment Status** | | |
| Yes | 16 | 7.4 |
| No | 200 | 92.6 |
| **Status of Chronic Disease** | | |
| No | 202 | 93.5 |
| Endocrine System Disease (Diabetes) | 1 | .05 |
| Cardiovascular Disease | 6 | 2.8 |
| Nervous System Disease | 2 | 0.9 |
| Respiratory System Disease (Asthma) | 3 | 1.4 |
| Blood Disease | 2 | 0.9 |
| **Status of Heart Disease in Family** | | |
| Yes | 46 | 21.3 |
| No | 170 | 78.7 |
| Total | 216 | 100.0 |

**Table 2: Distribution of Basic Risk Factors in Terms of Gender**

| | Female | | Male | | *p* |
|---|---|---|---|---|---|
| Risky Behaviors | n | % | n | % | |
| **Smoking** | | | | | |
| Yes | 3 | 2.0 | 32 | 47.8 | **0.000** |
| No | 143 | 96 | 33 | 49.3 | |
| I quit | 3 | 2.0 | 2 | 3.0 | |
| **Alcohol Use** | | | | | |
| Yes | 2 | 1.3 | 12 | 17.9 | **0.000** |
| No | 147 | 98.7 | 55 | 82.1 | |
| **Physical Activity Level** | | | | | |
| No | 74 | 49.7 | 15 | 22.4 | **0.001** |
| Once a week | 47 | 31.5 | 36 | 53.7 | |
| 2-4 times a week | 28 | 18.8 | 16 | 23.9 | |
| **Status of being Stressed** | | | | | |
| Yes | 100 | 67.1 | 52 | 77.6 | 0.079 |
| No | 49 | 32.9 | 15 | 22.4 | |
| **Consumed Grain Type** | | | | | |
| White bread | 111 | 74.5 | 60 | 89.6 | **0.011** |
| Whole wheat, rye, oats and etc. | 38 | 25.5 | 7 | 10.4 | |
| **Oil Consumption** | | | | | |
| Butter | 37 | 24.8 | 25 | 37.3 | **0.001** |
| Margarine | 0 | 0.0 | 5 | 7.5 | |
| Olive oil | 66 | 44.3 | 20 | 29.9 | |
| Vegetable oil | 46 | 30.9 | 17 | 25.4 | |
| **Daily Vegetable-Fruit Consumption** | | | | | |
| No | 17 | 11.4 | 21 | 31.3 | **0.001** |
| Yes | 132 | 88.6 | 46 | 68.7 | |
| **The Most Commonly Consumed Meal** | | | | | |
| Homemade food | 119 | 79.9 | 43 | 64.2 | **0.029** |
| Fast food | 30 | 20.1 | 24 | 35.8 | |

## Table 3: Distribution of anthropometric measurements in terms of gender

| Measurements | Female n | Female % | Male n | Male % | p |
|---|---|---|---|---|---|
| **BMI** | | | | | |
| Slim | 13 | 8.7 | 3 | 4.5 | **0.059** |
| Normal | 101 | 67.8 | 39 | 58.2 | |
| Overweight | 31 | 20.8 | 19 | 28.4 | |
| 1st degree obese | 3 | 2.0 | 6 | 9.0 | |
| 2nd degree obese | 1 | 0.7 | 0 | 0.0 | |
| **Body Fat Percentage** | | | | | |
| Low | 12 | 8.1 | 2 | 3.0 | **0.000** |
| Normal | 102 | 68.5 | 30 | 44.8 | |
| High | 29 | 19.5 | 14 | 20.9 | |
| Very high | 6 | 4.0 | 21 | 31.3 | |
| **Waist-to-Hip Ratio** | | | | | |
| Normal | 99 | 66.4 | 48 | 71.6 | 0.529 |
| Risky | 50 | 33.6 | 19 | 28.4 | |
| **Systolic Blood Pressure** | | | | | |
| Low | 24 | 16.1 | 4 | 6.0 | **0.001** |
| Normal | 124 | 83.2 | 57 | 85.1 | |
| High | 1 | 0.7 | 6 | 9.0 | |
| **Diastolic Blood Pressure** | | | | | |
| Low | 4 | 2.7 | 0 | 0.0 | **0.004** |
| Normal | 142 | 95.3 | 59 | 88.1 | |
| High | 3 | 2.0 | 8 | 11.9 | |
| **Heart rate** | | | | | |
| Low | 0 | 0.0 | 0 | 0.0 | 0.607 |
| Normal | 137 | 91.9 | 60 | 89.6 | |
| High | 12 | 8.1 | 7 | 10.4 | |
| **Respiration** | | | | | |
| Low | 0 | 0.0 | 0 | 0.0 | **0.004** |
| Normal | 148 | 99.3 | 61 | 91.0 | |
| High | 1 | 0.7 | 6 | 9.0 | |

## Results:

It was found that 40.3% of the university students were 20-21 years old, 69% were female, and 21.3% had heart disease in their family (Table 1). 47.8% of the male students were smokers, 17.9% were using alcohol, 22.4% did not make physical exercise, and they had significant differences in these variables compared to the female students (Table 2). 20.1% of the female students and 35.8% of the male students consumed fast food type. BMI and body fat percentage of the male students were significantly higher than the female students (Table 3). On the other hand, waist-hip ratio of the female students was significantly higher compared to the male students. In addition, the male students had higher systolic (p = .001) and diastolic blood pressure (p = .004) (Table 3).

## Discussion:

Coronary heart disease (CHD) is the leading cause of mortality. For this reason, it is very important to know the heart disease risk factors and diagnose them in the early period. Despite the fact that heart diseases are rooted in childhood and adolescence, the disease usually occurs in the adulthood period. Therefore, even though the scientific studies focus on adults, it is important to assess the young people in terms of the risk factors for heart disease in order to ensure a lifestyle change.

It is stated in the studies that young people in the age group of 18-24 years, which is known as period of transition to adulthood, do not obey healthy nutrition recommendations, have poor diet, skip meals, and constitute a risk group for cardiovascular diseases in this regard (13,14). However, the age period of 18-24 years is considered as a period of opportunity for acquiring healthy eating habits and healthy lifestyles. Obesity and inadequate physical activity are two important cardiometabolic risk factors and play a role in the development of heart diseases. According to the study by Framingham, obesity increases the risk of developing cardiovascular diseases by 1.5 times (15). In the

study on Frequency of Chronic Diseases and Risk Factors of Turkey -2013, 22% of men and 19.9% of women aged between 15 and 24 years in Turkey were evaluated as overweight and obese (16). In their studies, Yıldız et al., (17) and Vançelik et al., (18) found that the prevalence of obesity in male students was higher than female students. Similar to the literature, the overweight and obesity rates of the university students were found to be high in this study (Table 3). According to the estimates by the WHO, 8-16% of the disease burden in Turkey is associated with inadequate physical activity. In the study on Frequency of Chronic Diseases and Risk Factors of Turkey -2013, 44.1% of men and 65.1% of women aged between 15 and 24 years were found to do inadequate physical activity (16). In their study, Savcı et al., (19) determined that only 18% of young people did enough level of physical activity. Similar to the literature, it was determined in this study that 18.8% of the female students and 23.9% of the male students did sufficient physical activity (Table 2) (p = 0.001). Physical activity needs to be done for 30 minutes or more every day or most days of the week in order for physical activity to provide benefits for health (20). When considering the results of the study, it was remarkable that severe and moderate activities were done very little by the youths. However, concerning the age period, this group is expected to allocate more time to sport and exercise. Soyuer et al., (21) noted that obesity was associated with physical inactivity. In another study, it was determined that there was a negative correlation between physical activity and lipoidosis (22). It is thought that today's technological developments have led people to be sedentary starting from the childhood and this situation causes obesity and physical inactivity.

In this study, waist-to-hip ratios, which are determinants of body fat percentage and abdominal fat mass for young people, were measured. Epidemiological studies have shown the relationship of waist-to-hip ratio with chronic diseases. In this study, waist-to- hips of 33.6% of the female students and 28.4% of the male students were involved in the risk group. It is estimated that approximately 31% of ischemic heart diseases are associated with inadequate vegetable and fruit consumption. In the National Household Survey, it was found that individuals who were older than 18 in Turkey consumed averagely 1.64 portions of fruits and 1.57 portion of vegetables a day (23). In this study, 11.4% of the female students and 31.3%

of the male students did not consume any fruit and vegetables. This result indicated that young people had low vegetable and fruit consumption. For this reason, in order to increase fruit and vegetable consumption in young people, it is considered that vegetable-fruit service/sales should be increased in places like cafeteria, canteen and in those where convenience foods are sold.

It was found that as the whole grain consumption decreased, the risk of getting cardiovascular diseases increased; hypertension was higher in those who consumed white bread and lower in those consuming whole wheat bread (24). It was seen in this study that the majority of the university students preferred white bread (89.6 in males and 74.5% in females, respectively) (Table 2). The results are similar to the other studies conducted on young people (25,26).

Smoking is a strong and independent risk factor for heart diseases (27). In the National Heart Health Policy, it is indicated that coronary heart disease increases 2-3 times more in those who smoke 20 or more cigarettes per day (2). Savcı et al., (19) stated in their study that 40% of the young people smoked. It was determined in this study that 47.8% of the male students and 2% of the female students were the smoker and there was a significant difference between the genders (Table 2) ($p$=0.000). These results showed that young people were at risk in terms of heart disease. It was thought that the high difference between the female and male students in Turkey was caused by the gender role.

Hypertension is both a preventable cause of death and an important risk factor for heart disease. In the study by Dursun and Aytekin, it was determined that 70.5% of the group with coronary heart disease had hypertension (28). In the Turkish Hypertension Prevalence study, the prevalence of hypertension in the population over 18 years was 31.8% (29). Especially the importance of systolic blood pressure was emphasized in "Framingham" Heart Study (30). Elevated systolic and diastolic blood pressure increases the risk of heart disease by 2 times. In this study, systolic and diastolic blood pressures of the male students were found to be significantly higher than the female students (Table 3) (p <0.05). This result showed that male students were at higher risk in terms of heart disease.

When all the results are evaluated, it can be said that young people are a vulnerable group in terms of

heart disease risk factors. It is seen that there is a need for making behavioral changes by informing the young people about the protection from heart diseases and for increasing individual awareness. With the awareness of the young people, it could be possible for health problems and chronic illnesses especially heart problems in the adulthood and old age period to occur in older ages or less frequently.

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