Available online at **www.ijmrhs.com**

ISSN No: 2319-5886

International Journal of Medical Research & Health Sciences, 2018, 7(8): 16-33

Cardiovascular Disease Risk Behaviors of Nursing Students in Nursing School

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ABSTRACT

Objective: *The aim of the study is to assess the risk assessment data in terms of students' individual and health behavior characteristics in relation to cardiovascular diseases among nursing students.* ***Methods:*** *The population of this study, which had a descriptive and correlational design, comprised of 587 university students in a nursing school and the sampling group was formed by 351 university students who were willing and volunteered to participate. The data was collected via the Structured Questionnaire Form and Risk Assessment Data Form.* ***Results:*** *It was found that most of the students (77.2%) were female, and 57.8% were in the 20-22 age groups. For the male students, the mean BMI was 23.62, while it was 22.55 for female students. When risky health behaviors of the students were examined, it was observed that 84.6% were non-smokers, 84.3% did not exercise regularly, 76.4% did not have alcohol abuse, 89.7% had the habit of drinking tea, while 52.7% had the habit of drinking coffee, and finally 66.7% did not have the habit of putting spread for bread in the breakfast. It was determined that the smoker students smoked on an average 12.36 cigarettes daily, drank black tea around glasses of 3.24 and approximately 1.36 cups of coffee in a day.* ***Conclusions:*** *Female students' cardiovascular risk factors were found to increase. The results highlight the urgency of promoting preventive knowledge and practices against cardiovascular diseases among nursing students.*

Keywords: Cardiovascular disease, Anthropometric measurements, Nursing, Health behaviors

INTRODUCTION

Cardiovascular diseases (CVDs) are one of the most common causes of deaths and diseases around the world. A recent increase has been observed in CVD-related deaths among the youngsters [1,2]. CVDs constitute the group of diseases such as coronary heart diseases, stroke, rheumatic heart diseases, cerebrovascular diseases, peripheral artery disease, hypertensive diseases and arrhythmia [3-5]. About 30% of the deaths are caused by CVDs all over the world including developing countries. According to the World Health Organization (WHO) statistics, 36% of mortality is predicted to be caused by CVDs by 2020 [6]. It is on top of the list in Turkey, Coronary heart disease (CHD) is the most widespread one in this category. Compared with other European countries, Turkey has a quite high rate of morbidity despite having a relatively younger population [7].

Among risk factors of CVDs come the age (male ≥45, female ≥55 or early menopause), CVD history in the family, hypertension, dyslipidemia, obesity, diabetes, smoking and alcohol consumption, undernourishment, profession, sedentary lifestyle, and physical inactivity [1,6-8]. Moreover, factors such as menopause, hormonal replacement and use of oral contraceptive among women, alcohol abuse and stress for both genders contribute to the development of CVDs [3]. Reduction of risk factors in women has gained as much importance as in men in terms of protection against CVDs [6]. Although CVDs are traditionally regarded as a disease the male suffers from, the latest research shows that CVDs are on top of the list of the causes of death among the female and contrary to common belief, breast cancer ranks the second [6,9-12]. Despite these problems, it is good news that CVDs are at a "preventable" level. Besides, WHO reports that the prevalence of heart and coronary diseases can be reduced by half by keeping blood pressure, obesity, cholesterol, and cigarette consumption in check. In this regard, it has been reported that more than three-fourths of CVD-related deaths can be prevented if a proper lifestyle is pursued [4,13].

Managing CVDs requires the participation of healthy/sick individuals and their families as well as multidisciplinary team cooperation [7]. Nurses assume great responsibilities when it comes to preventing CVDs, identifying individuals at risk, reducing potential complications, individual adaptation to the available care and treatment and adopting healthy life behaviors [4,7,14,15]. Of all health care team members, nurses have a special place in preventing CVDs. However, there is no study to determine nurses' behaviors toward risk factors related to cardiovascular diseases, especially during their education.

Purpose

The aim of the study is to determine the risk assessment data of nursing students studying at a nursing school in relation to their individual and health behavior characteristics.

Research questions are as follows:

- What are students' characteristic features, health behaviors and risk management data?
- Do students' individual characteristics and health behaviors affect arterial blood pressure, blood glucose, and cholesterol and triglyceride levels?
- Do male students' individual characteristics and health behaviors affect body-mass index (BMI), waist-hip ratio, and body fat percentages?
- Do female students' individual characteristics and health behaviors affect body-mass index (BMI), waist-hip ratio, and body fat percentages?

PATIENTS AND METHODS

Study Design

This study was conducted as a descriptive and a correlational type from September 01, 2010 to May 01, 2011 in Nursing School.

Setting and Sample

The study population consisted of 587 nursing students at the Nursing Students in the academic year 2010-2011 whereas the sample group included 351 volunteer and willing students to participate (59.8 % of the population).

Ethical Considerations

This study constitutes one part of the project titled (6885) "Effects of the Knowledge Level of Cardiovascular Diseases Risk Factors of Nursing Students in a Nursing School on Risk Assessment Results" and supported by Scientific Research Projects Office of İstanbul University (İstanbul University Cerrahpaşa Faculty of Medicine Clinical Research Ethical Board of Assessment, Date: 12.01.2010, Item No: D-002). Required information form including the aim and scope of the study was submitted to the Directorate of the school where data collection was conducted and written consent was granted. Students in the sample group were informed about the purpose and benefits of the study as well as their roles. Then their verbal consent was obtained as part of the principle of willingness and volunteerism.

Measurements/Instruments

Data of the study were collected by using "Structured Questionnaire Form" and "Risk Assessment Data Form".

Structured Questionnaire Form

The form that was designed by the researchers in line with the literature includes individual characteristics (gender, age, length of education, the region where participant has spent most of his life in Turkey [4,6,16], marital status, financial status, family type, person he/she lives with, employment, having a relative in the immediate family diagnosed with a heart disease, having a relative in the immediate family who died due to heart disease) and questions inquiring variables concerning health status (smoking, how long quitters of smoking smoked, the amount smokers consume, regular exercise, alcohol abuse, tea, and coffee consumption, amount of tea and coffee intake, putting spread for bread in breakfast, the type of spreads people with such habits use).

Risk Assessment Data Form

Developed by the researchers in line with the literature, the form recorded height, weight, and levels of the waist and hip circumference, arterial blood pressure, pulse, breathing, blood glucose, cholesterol, and triglyceride [16-19].

Calculations

Weighing Scale with Height Rod: It measures the height and weight levels, body fat percentage according to height and weight and BMI based on gender, and it shows results on electronic screen. Also, body weight between 0-200 kg with an error margin of ±50 g can be computed and height between 90-200 cm can be calculated with an error margin of ±1 mm [17,20].

Tape Measure: It was used to measure waist and hip circumferences. The aim of waist-hip ratio test was to observe the rate of the waist-hip circumference, which is related to coronary heart disease. In this test, waist and hip circumferences are measured and waist measurement is divided by hip measurement [20].

Digital Artery Blood Pressure Monitor: It measures on the brachial artery and it has been designed to measure blood pressure accurately and comfortably. For an accurate measurement, the best fitting cuff needs to be chosen for brachial artery (small/medium cuff=23-33 cm, arm circumference, large cuff=33-43 cm, arm circumference). Basic steps in blood pressure measurement were followed to measure. The measurement result is screened in units of "mmHg" on systolic and diastolic screen. Besides, the number of pulses per minute of the person whose blood pressure is measured can be seen on the screen. Students' artery blood pressure data were assessed in systolic and diastolic. In categorizing such data, systolic arterial blood pressure levels at 130 mmHg and over and diastolic arterial blood pressure levels at 80 mmHg and over were considered to be high [17].

Glucometer: It determines the concentration of glucose in the blood taken from the tip of a finger. If it is lower than 20 mg/DI, the screen shows "Low" and "High" for levels higher than 500 mg/DI. Neither low nor high levels were witnessed in this study. Students' blood glucose was measured regardless of whether they were hungry or full. However, they were asked about when they last ate the meal and blood glucose levels were analyzed depending on the duration of being hungry or being full. Students who were hungry for over 12 hours were re-tested for their blood glucose after they ate something. About 140 mg/DL was taken to be the upper limit while categorizing blood glucose and data analysis was conducted in line with this [17,20].

Cholesterol and Triglyceride Measurement Instrument: A device used for this measurement provides total cholesterol and triglyceride measurements through capillary blood and cholesterol and triglyceride strips exclusive to this device. It uses a reflectance photometer method. Measurement range for cholesterol is 150-300 mg/dl and 70-600 mg/dl for triglyceride. Levels lower than the measurement range of the device are shown by signals of "low" on the screen and higher levels as "high". Participant students showed neither high cholesterol nor high triglyceride levels. Cholesterol levels that were collected as lower than 150 mg/dl were inserted into the database as 149 for measurements to be done. Similarly, triglyceride levels collected as "low" were saved as 69. Measurement duration was 180 seconds and 45-174 seconds for cholesterol and triglyceride, respectively. Students' cholesterol levels were categorized as 'lower than 200 mg/dl, 200-239 mg/dl and over 240 mg/dl'. Triglyceride levels were classified as 'lower than 200 mg/dl, 200-400 mg/dl and over 400 mg/dl' [20].

Data Collection/Procedure

Students who agreed to participate in the study were taken into a room specifically designed for this study. First, "Structured Questionnaire Form" was completed by the researchers in face-to-face interaction. Then their weight, height, artery blood pressure, pulse, breathing, blood glucose, cholesterol, and triglyceride measurements were done by the researchers, which were saved into risk assessment data form. Completion of the questionnaire and measurements took 15-20 minutes per student.

Data Analysis

Data collected from the questionnaire form were saved into the database created by using Statistical Package for Social Science for Windows version 17.0 (SPSS) package program and data analysis was performed with this program. Ordinal variables were considered as arithmetic mean, standard deviation, minimum and maximum levels whereas nominal variables were taken as frequency and percentage. Spearman's rho correlation techniques were used

to determine the relationship between ordinal variables. Also, Mann-Whitney U was used to determine discrepancy among two groups while Kruskal Wallis method was utilized to determine discrepancy among groups more than two. Finally, Bonferroni adjusted Mann-Whitney method was employed in situations in which there was a significant difference. Results were evaluated at 95% confidence range and $p<0.05$ significance level.

RESULTS

In this section, findings regarding students' individual and health behavior characteristics, artery blood pressure, blood glucose, cholesterol, and triglyceride levels, BMI, waist-hip ratio and body fat percentages are presented under five sub-headings.

Findings Related to Students' Individual and Health Behavior Characteristics and Risk Assessment Data

When participant students' individual characteristics are considered, the following can be seen from Table 1: 77.2% of the participants were female and 57.8% were in the age group of 20-22 years. About 98.6% were single, 39.6% spent a considerable amount of their lives in the Marmara region, 73.8% could make both ends meet, 85.5% came from a nuclear family type, 41.6% stayed at dormitories, 86.3% did not have a job outside the school, 68.7% did not have anybody with a heart disease in the immediate family, and 86.9% did not have any relative in the immediate family who died of a heart disease. Students' average age was 20.77 (SS=1.98, minimum=17, maximum=30) (Table 1).

Table 1 Distribution of students' artery blood pressure, blood glucose, cholesterol, and triglyceride levels (N=351)

Individual Characteristics	n (%)	Artery Blood Pressure (systolic)	Artery Blood Pressure (diastolic)	Blood glucose	Cholesterol	Triglyceride
		Avg. ± SD	Avg. ± SD	Avg. ± SD	Avg. ± SD	Avg. ± SD
Gender						
Male	80 (22.8%)	115.85 ± 17.21	72.40 ± 13.67	96.64 ± 20.14	150.65 ± 6.46	81.04 ± 44.81
Female	271 (77.2%)	105.25 ± 13.98	69.41 ± 13.30	101.92 ± 19.66	152.76 ± 10.28	83.25 ± 47.57
		Z=-5.01 p=0.00	Z=-1.67 p=0.10	Z=-1.98 p=0.05	Z=-2.13 p=0.03	Z=-1.13 p=0.26
Age Groups (years)						
17-19	95 (27.1%)	106.27 ± 15.79	70.11 ± 14.27	97.43 ± 21.50	150.89 ± 6.59	85.77 ± 60.13
20-22	203 (57.8%)	107.74 ± 15.72	70.00 ± 13.39	101.08 ± 17.79	152.70 ± 10.65	82.62 ± 43.84
23 and ↑	53 (15.1%)	109.85 ± 13.40	70.40 ± 12.18	105.21 ± 23.48	153.17 ± 9.64	77.81 ± 27.58
		x^2=3.07 p=0.22	x^2=0.14 p=0.94	x^2=5.22 p=0.07	x^2=5.25 p=0.07	x^2=0.00 p=0.99
Age (Avg.±SD)	20.77±1.98	r=0.05 p=0.32	r=0.00 p=0.92	r=0.13 p=0.02	r=0.13 p=0.01	r=-0.03 p=0.58
(Minimum-Maximum)	(17-30)					
Grade						
1st year	99 (28.2%)	105.28 ± 14.77	68.37 ± 13.09	95.96 ± 21.52	150.99 ± 6.75	78.94 ± 34.59
2nd year	105 (29.9%)	108.59 ± 17.21	72.55 ± 13.35	105.64 ± 19.55	152.88 ± 11.68	88.84 ± 59.75
3rd year	81 (23.1%)	109.90 ± 15.54	70.59 ± 14.08	99.80 ± 16.94	152.96 ± 10.16	82.93 ± 46.52
Senior	66 (18.8%)	107.02 ± 12.73	68.12 ± 12.80	101.15 ± 19.69	152.44 ± 8.70	78.55 ± 39.54
		x^2=5.78 p=0.12	x^2=8.30 p=0.04	x^2=13.22 p=0.00	x^2=8.44 p=0.04	x^2=4.19 p=0.24
Region of Residence in Turkey						
Marmara	139 (39.6%)	106.55 ± 15.02	69.39 ± 12.14	103.04 ± 20.31	152.25 ± 10.49	80.09 ± 40.51
Aegean	25 (7.1%)	103.92 ± 13.01	70.04 ± 13.41	101.68 ± 24.06	153.60 ± 9.59	84.08 ± 54.63
Mediterranean	40 (11.4%)	109.15 ± 16.06	70.93 ± 10.44	98.43 ± 20.96	152.00 ± 8.46	84.00 ± 48.16
Central Anatolia	19 (5.4%)	109.05 ± 16.88	68.26 ± 13.35	96.05 ± 19.03	151.84 ± 8.39	74.32 ± 10.69
Karadeniz	69 (19.7%)	106.43 ± 14.33	68.78 ± 15.80	97.70 ± 17.68	152.58 ± 9.98	75.26 ± 22.62
Eastern Anatolia	23 (6.6%)	108.74 ± 15.39	71.78 ± 14.45	104.22 ± 21.80	154.70 ± 12.11	94.00 ± 50.20
Southeastern Anatolia	33 (9.4%)	114.15 ± 18.15	74.58 ± 15.79	100.94 ± 16.57	150.00 ± 2.69	100.39 ± 87.88
Abroad	3 (0.9%)	110.33 ± 20.50	71.00 ± 13.89	85.67 ± 8.62	149.00 ± 0.00	123.00 ± 93.53
		x^2=8.87 p=0.26	x^2=5.31 p=0.62	x^2=10.12 p=0.18	x^2=4.34 p=0.74	x^2=6.15 p=0.52
Marital Status						
Married	5 (1.4%)	107.00 ± 12.41	69.60 ± 15.45	105.00 ± 12.49	149.00 ± 0.00	74.40 ± 12.07

Single	346 (98.6%)	107.67 ± 15.46	70.10 ± 13.42	100.66 ± 19.96	152.33 ± 9.64	82.87 ± 47.21
		Z=-0.22 p=0.82	Z=-0.09 p=0.93	Z=-0.87 p=0.39	Z=-1.14 p=0.25	Z=-0.14 p=0.89
Financial Status						
Ends Meet	259 (73.8%)	107.26 ± 14.72	69.83 ± 13.41	99.63 ± 18.82	152.40 ± 9.11	83.12 ± 48.80
Ends not Meet	92 (26.2%)	108.80 ± 17.24	70.80 ± 13.49	103.77 ± 22.38	151.96 ± 10.82	81.71 ± 41.30
		Z=-0.36 p=0.72	Z=-0.45 p=0.65	Z=-1.42 p=0.16	Z=-1.99 p=0.05	Z=-0.68 p=0.50
Family Type						
Extended	40 (11.4%)	109.83 ± 15.66	70.55 ± 14.49	100.18 ± 17.24	154.05 ± 14.85	92.98 ± 65.52
Nuclear	300 (85.5%)	107.42 ± 15.38	70.14 ± 13.36	100.45 ± 19.61	152.06 ± 8.75	81.73 ± 44.64
Separated	11 (3.1%)	106.45 ± 16.19	67.09 ± 11.77	110.09 ± 32.56	151.91 ± 6.61	73.36 ± 10.07
		x^2=1.35 p=0.51	x^2 x^2=0.59 p=0.75	x^2=0.13 p=0.94	x^2=0.16 p=0.92	x^2=0.01 p=0.99
Person Who They Live With						
Alone	6 (1.7%)	112.67 ± 23.10	74.83 ± 12.61	97.83 ± 15.03	149.00 ± 0.00	72.50 ± 8.57
Family/relative	110 (31.3%)	107.37 ± 15.72	68.11 ± 12.66	102.37 ± 21.30	151.05 ± 6.22	80.95 ± 46.40
Friend	89 (25.4%)	108.52 ± 17.13	71.69 ± 14.93	97.79 ± 18.04	152.54 ± 10.77	85.08 ± 53.40
Dormitory	146 (41.6%)	107.16 ± 13.76	70.41 ± 12.96	101.38 ± 19.95	153.18 ± 10.92	83.10 ± 44.13
		x^2=1.60 p=0.66	x^2=3.33 p=0.34	x^2=4.40 p=0.22	x^2=2.83 p=0.42	x^2=0.78 p=0.85
Work Status						
Yes	48 (13.7%)	108.79 ± 14.40	70.65 ± 13.72	99.00 ± 16.76	153.85 ± 13.24	79.17 ± 34.13
No	303 (86.3%)	107.49 ± 15.58	70.00 ± 13.40	100.99 ± 20.33	152.03 ± 8.86	83.31 ± 48.63
		Z=-0.72 p=0.47	Z=-0.55 p=0.58	Z=-0.50 p=0.62	Z=-0.77 p=0.44	Z=-0.11 p=0.91
Having a first-degree relative with heart disease						
Yes	110 (31.3)	106.97 ± 14.54	70.30 ± 13.89	101.77 ± 19.85	151.65 ± 8.86	75.29 ± 24.68
No	241 (68.7)	107.98 ± 15.81	69.99 ± 13.23	100.24 ± 19.89	152.57 ± 9.89	86.15 ± 53.79
		Z=-0.71 p=0.48	Z=-0.20 p=0.85	Z=-0.42 p=0.68	Z=-1.57 p=0.12	Z=-1.48 p=0.14
First-degree relative died of a heart disease						
Yes	46 (13.1)	105.20 ± 12.76	69.02 ± 13.53	103.28 ± 15.95	152.93 ± 11.75	76.28 ± 25.44
No	305 (86.9)	108.04 ± 15.76	70.25 ± 13.42	100.33 ± 20.39	152.18 ± 9.22	83.72 ± 49.29
		Z=-1.02 p=0.31	Z=-0.45 p=0.65	Z=-1.47 p=0.14	Z=-0.49 p=0.62	Z=-0.76 p=0.45

When Table 2 is considered in terms of students' health behavior characteristics compared to the majority of participants, the following findings can be seen: 84.6% of them did not smoke, 84.3% did not exercise regularly, 76.4% did not consume alcohol, 89.7% were in the habit of drinking tea, 52.7% drank coffee, and 66.7% did not put spreads for bread in breakfast. On the other hand, students who quit smoking were found to have smoked for 40 months on average (SD=35.11, minimum=6 months, maximum=120 months), while those smoking currently smoke 12.36 pieces on average per day (SD=6.80, minimum=2 pieces, maximum=30 pieces). Tea drinkers consume 3.24 glasses on average per day (SD=2.27, minimum=1 glass, maximum=15 glasses) whereas coffee drinkers consume 1.36 cups on average per day (SD=0.70, minimum=1 cup, maximum=5 cups) (Table 2).

Table 2 Distribution of students' arterial blood pressure, blood glucose, cholesterol, triglyceride levels based on health behaviors (N=351)

Health Behaviors	n (%)	Arterial blood pressure (systolic)	Arterial blood pressure (diastolic)	Blood glucose	Cholesterol	Triglyceride
		Avg. ± SD	Avg. ± SD	Avg. ± SD	Avg. ± SD	Avg. ± SD
Smoking						
Yes	45 (12.8%)	112.38 ± 15.24	71.71 ± 12.19	99.56 ± 14.41	151.02 ± 5.15	84.87 ± 48.66
No	297 (84.6%)	106.74 ± 14.77	69.86 ± 13.37	100.65 ± 20.61	152.52 ± 10.19	82.84 ± 47.35
Quit	9 (2.6%)	114.56 ± 28.91	69.67 ± 20.84	108.89 ± 17.83	150.89 ± 3.62	69.00 ± 0.00
		Z=3.93 p=0.14	Z=0.79 p=0.68	Z=2.19 p=0.33	Z=1.17 p=0.56	Z=1.89 p=0.39
If quit. How Long Smoked*						
12 months and ↓	3 (33.3%)	106.33 ± 26.16	63.67 ± 3.51	109.67 ± 31.66	149.00 ± 0.00	69.00 ± 0.00
12 months ↑	6 (66.7%)	118.67 ± 31.67	72.67 ± 25.64	108.50 ± 10.35	151.83 ± 4.22	69.00 ± 0.00

		Z=-0.26 p=0.80	Z=-0.26 p=0.80	Z=-0.65 p=0.52	Z=-1.38 p=0.17	Z=0.00 p=1.00
Quitters' length of smoking (months)(Ave. ± SS) (Min.-Max.)*	40.00 ± 35.11 (6-120%)	r=0.01 p=0.98	r=-0.04 p=0.91	**r=0.23 p=0.56**	r=0.14 p=0.73	Cannot be computed§
Smokers' Consumption Amount**						
2-8 pieces	12 (26.7%)	103.33 ± 9.05	66.50 ± 9.70	101.17 ± 13.98	150.33 ± 4.62	77.75 ± 30.31
9-15 pieces	18 (40.0%)	110.39 ± 13.06	73.67 ± 12.57	94.33 ± 9.93	152.50 ± 6.55	81.72 ± 38.31
16 pieces and ↑	15 (33.3%)	122.00 ± 16.84	73.53 ± 13.01	104.53 ± 17.76	149.80 ± 3.10	94.33 ± 69.17
		x^2=9.98 p=0.007	x^2=3.68 p=0.16	x^2=2.70 p=0.26	x^2=3.27 p=0.20	x^2=0.90 p=0.64
Smokers' cigarette amount (pieces) (Ave. ± SS) (Min.-Max.)**	12.36 ± 6.80 (2-30%)	r=0.48 p=0.001	r=-0.22 p=0.16	r=0.11 p=0.47	r=-0.06 p=0.71	r=0.06 p=0.72
Regular Exercise						
Yes	55 (15.7%)	106.91 ± 17.25	68.58 ± 13.44	97.20 ± 20.74	153.11 ± 11.12	80.27 ± 32.56
No	296 (84.3%)	107.80 ± 15.07	70.37 ± 13.42	101.37 ± 19.67	152.13 ± 9.27	83.21 ± 49.13
		Z=0.12 p=0.73	Z=1.26 p=0.26	Z=0.73 p=0.39	Z=0.08 p=0.78	Z=0.08 p=0.78
Alcohol Abuse						
Yes	83 (23.6%)	107.43 ± 13.44	70.01 ± 12.44	99.94 ± 18.35	152.67 ± 10.55	82.05 ± 41.40
No	268 (76.4%)	107.74 ± 15.99	70.11 ± 13.73	100.96 ± 20.34	152.16 ± 9.27	82.96 ± 48.54
		Z=-0.32 p=0.75	Z=-0.07 p=0.95	Z=-0.16 p=0.87	Z=-0.53 p=0.60	Z=-0.05 p=0.96
Drinking Tea						
Yes	315 (89.7%)	107.77 ± 15.51	70.06 ± 13.62	100.29 ± 19.83	152.16 ± 9.35	82.46 ± 46.93
No	36 (10.3%)	106.69 ± 14.69	70.36 ± 11.71	104.44 ± 20.10	153.33 ± 11.46	85.22 ± 47.17
		Z=-0.22 p=0.83	Z=-0.29 p=0.77	Z=-1.16 p=0.25	Z=-0.68 p=0.50	Z=-0.55 p=0.59
Amount of Tea***						
1-3 glasses	208 (66.0%)	107.15 ± 15.13	70.13 ± 13.52	100.63 ± 19.39	152.59 ± 10.39	82.95 ± 49.41
4-6 glasses	81 (25.7%)	109.54 ± 15.39	69.85 ± 13.54	98.63 ± 20.00	150.81 ± 5.22	79.20 ± 40.48
7 glasses and ↑	26 (8.3%)	107.23 ± 18.81	70.15 ± 15.13	102.73 ± 23.00	152.96 ± 10.44	88.77 ± 46.17
		x^2=1.52 p=0.47	x^2=0.01 p=0.99	x^2=0.76 p=0.68	x^2=2.06 p=0.36	x^2=0.30 p=0.86
Amount of Tea (glasses) (Ave. ± SS) (Min.-Max)***	3.24 ± 2.27 (1-15)	r=0.05 p=0.38	r=0.00 p=0.99	r=0.04 p=0.48	r=-0.10 p=0.09	r=-0.02 p=0.74
Coffee Intake						
Yes	185 (52.7)	107.71 ± 15.62	69.38 ± 13.73	99.95 ± 19.84	152.61 ± 10.55	85.89 ± 53.28
No	166 (47.3)	107.61 ± 15.22	70.88 ± 13.06	101.57 ± 19.92	151.92 ± 8.37	79.25 ± 38.42
		Z=-0.38 p=0.71	Z=-1.24 p=0.22	Z=-0.52 p=0.61	Z=-0.22 p=0.83	Z=-0.46 p=0.65
Coffee Intake****						
1-2 cups	176 (95.1%)	107.22 ± 15.68	69.08 ± 13.61	99.65 ± 20.05	152.48 ± 10.41	85.12 ± 52.78
3 cups and ↑	9 (4.9%)	117.22 ± 11.41	75.22 ± 15.69	105.78 ± 14.78	155.11 ± 13.42	100.89 ± 63.88
		Z=-2.23 p=0.03	Z=-0.98 p=0.33	Z=-1.16 p=0.25	Z=-0.33 p=0.74	Z=-0.54 p=0.59
Amount of Coffee (Cups) (Ave. ± SS) (Min.-Max.)****	1.36 ± 0.70 (1-5%)	r=0.14 p=0.06	r=0.07 p=0.33	r=0.11 p=0.14	r=-0.06 p=0.42	r=0.04 p=0.58
Putting spreads for Bread in Breakfast						
Yes	117 (33.3%)	104.50 ± 12.95	69.13 ± 13.09	101.50 ± 19.40	153.34 ± 11.89	78.42 ± 35.55
No	234 (66.7%)	109.24 ± 16.30	70.57 ± 13.59	100.33 ± 20.13	151.75 ± 8.15	84.91 ± 51.58
		Z=-2.51 p=0.01	Z=-0.82 p=0.41	Z=-0.82 p=0.41	Z=-1.11 p=0.27	Z=-0.34 p=0.73
Type of Spreads*****						
Butter	87 (74.4%)	105.99 ± 13.08	69.38 ± 12.91	103.11 ± 19.77	152.54 ± 10.43	79.75 ± 39.28

Margarine	26 (22.2%)	98.88 ± 11.77	68.96 ± 13.51	97.42 ± 18.46	154.35 ± 13.73	75.42 ± 22.92
Olive oil	4 (3.4%)	108.75 ± 7.81	64.75 ± 17.27	92.75 ± 13.65	164.25 ± 24.30	69.00 ± 0.00
		x^2=5.87 p=0.06	x^2=0.21 p=0.90	x^2=2.27 p=0.32	x^2=3.08 p=0.21	x^2=0.83 p=0.66
*9 students who quit smoking answered this; **45 students who currently smoke answered this; ***315 students who reported to drink tea answered this; ****185 students who reported to drink coffee answered this; *****117 students who reported to put spreads for bread answered this; §because at least one of the variables is constant						

When students' risk assessment data is considered in terms of averages, the following findings were gathered on average, respectively: systolic arterial blood pressure as 107.66 mmHg (SD=15.41, minimum=66, maximum=173); diastolic arterial blood pressure as 70.09 mmHg (SD=13.42, minimum=42, maximum=105); pulse as 84.18 per min (SD=13.06, minimum=51, maximum=150); breathing as 20.03 (SD=2.08, minimum=14, maximum=26); blood glucose as 100.72 mg/dl (SD=19.87, minimum=38, maximum=166); cholesterol as 152.28 mg/dL (SD=9.57, minimum=149, maximum=221) and triglyceride as 82.75 mg/dl (SD=46.90, minimum=69, maximum=458). Averages of male students for each measurement were as follows: BMI as 23.62 (SD=3.16, minimum=16, maximum=39), waist-hip ratio as 0.84 (SD=0.55, minimum=0.71, maximum=1), body fat as 15.18 (SD=5.92, minimum=1, maximum=29), and fattiness rate as 107.75 (SD=13.58, minimum=85.70, maximum=176.00). As for the female students, the following averages were observed: BMI as 22.55 (SD=3.25, minimum=16, maximum=34), waist-hip ratio as 0.78 (SD=0.16, minimum=0.63, maximum=0.96), body fat as 29.12 (SD=7.73, minimum=12, maximum=49), and fattiness rate as 107.23 (SD=14.99, minimum=78.30, maximum=154.50) (Table 2).

Findings Related to the Effects of Students' Individual and Health Behavior Characteristics on the Level of Arterial Blood Pressure, Blood Glucose, Cholesterol and Triglyceride

Gender is a variable that significantly affects systolic arterial blood pressure ($p<0.001$), blood glucose ($p\leq0.05$) and cholesterol ($p<0.05$) levels. Accordingly, male students' levels of systolic arterial blood pressure were higher compared to those of the female students, whereas their blood glucose and cholesterol levels were lower as compared to those of the female participants (Table 1).

A positive and statistically significant correlation was found between students' age and blood glucose ($p<0.05$) and cholesterol ($p\leq0.01$) levels and the older students get, the higher their blood glucose and cholesterol levels increase (Table 1).

The grade of the students was found to affect diastolic arterial blood pressure, blood glucose and cholesterol levels in a statistically significant way (Table 1). On the other words, 2nd year students' diastolic arterial blood pressure levels were statistically higher than those of 1st year ($Z=-2.48$, $p=0.013$) and the 4th year students ($Z=-2.32$, $p=0.02$). Also, the 2nd year students' blood glucose levels were statistically higher as compared to the 1st year ones ($Z=-3.54$, $p=0.000$). The 1st year students' cholesterol levels were lower than those of the 3rd year ($Z=-2.77$, $p=0.006$) and 4th year students ($Z=-2.16$, $p=0.03$) (Table 1).

Students' financial status was observed to have a statistical effect on cholesterol levels ($p\leq0.05$). That is students who reported to make both ends meet had higher cholesterol levels compared to those who reported otherwise (Table 1).

The following variables were found to have no statistically significant impact on students' arterial blood pressure, blood glucose, cholesterol, and triglyceride levels: the region they spent most of their lives, marital status, family type, the person they live with, work status, having a first-degree relative with a heart disease or having such relative who died of a heart disease ($p>0.05$, Table 1).

The number of cigarettes that smokers (N=45) smoke were found to be a variable that affects systolic arterial blood pressure at a statistically significant level. The effect of the number of cigarettes on systolic arterial blood pressure was examined by both classifying the number of cigarettes (nominally) and considering the number of cigarettes (ordinally) and by their relationship to systolic arterial blood pressure. When the number of cigarettes was examined nominally, level of systolic arterial blood pressure was seen to be 16 pieces maximum a day and it was seen more among those who smoke more. The next group in line was the one who smoked 9-15 pieces and the lowest level was witnessed among those who smoked 2-8 pieces a day. The discrepancy between group scores was statistically significant ($p<0.01$) (Table 2). When this discrepancy was analyzed with advanced statistical analysis (Bonferroni Adjusted Mann-Whitney), those who smoked 16 and more pieces a day were found to have higher systolic arterial

blood pressure levels compared to the ones who smoked 2-8 pieces a day (Z=-2.96, p=0.003). This difference was found to account for the fact that groups of cigarette amounts showed the statistically significant discrepancy. Analysis of the correlation between the number of cigarettes and arterial blood pressure levels revealed that the number of cigarettes smoked in a day increased arterial blood pressure and this correlation was found to be statistically significant (p≤0.001) (Table 2).

The amount of coffee that students with coffee intake consumed (N=185) was seen to affect arterial blood pressure levels in a statistically significant way (p<0.05). That is students who drank more than 3 cups a day had higher levels of arterial blood pressure as opposed to those who consumed 1-2 cups a day (Table 2).

Students who had the habit of putting oil on their bread in breakfast (N=117) reported lower levels of arterial blood pressure than students who did not have such a habit, which was statistically significant (p≤0.01) (Table 2). It was found out that students' behaviors such as smoking, regular exercise, alcohol abuse, tea and coffee intake, and habits of putting oil on bread in breakfast had no statistically significant impact on arterial blood pressure, blood glucose, cholesterol and triglyceride levels (p>0.05) (Table 2).

Findings Related to the Effects of Male Students' Individual and Health Behavior Characteristics on their BMI, Waist-Hip Ratio, and Body Fat Percentages

In Table 3, it can be seen that the male students' age was correlated with BMI levels at a statistically significant level (p<0.05). That is, male students aged 23 and over had higher BMI levels as compared to those in the 20-22 age group (Z=-2.53, p=0.011).

Table 3 Distribution of male students' levels of BMI, waist-hip ratio, and body fat in terms of their individual characteristics (N=80)

Individual characteristics	n (%)	Body Mass Index	Waist-hip ratio	Body fat percentage	Fattiness ratio
		Avg. ± SD	Avg. ± SD	Avg. ± SD	Avg. ± SD
Age Groups (years)					
17-19	9 (11.3%)	24.67 ± 4.18	0.87 ± 0.06	18.89 ± 6.45	112.03 ± 17.56
20-22	55 (68.8%)	22.98 ± 2.48	0.84 ± 0.06	14.71 ± 5.60	105.56 ± 10.76
23 and ↑	16 (20.0%)	25.25 ± 4.01	0.85 ± 0.05	14.69 ± 6.31	112.85 ± 18.29
		x^2=6.75 p=0.03	x^2=1.84 p=0.40	x^2=4.51 p=0.11	x^2=3.36 p=0.19
Age (Avg ± SD)	21.20 ± 1.60	r=0.12 p=0.30	r=0.03 p=0.79	r=-0.07 p=0.52	r=0.08 p=0.48
(Min.-Max.)	(18-25%)				
Grade					
1st year	17 (21.3%)	23.71 ± 3.87	0.84 ± 0.06	16.53 ± 6.16	108.93 ± 15.32
2nd year	24 (30.0%)	23.25 ± 2.11	0.84 ± 0.05	15.33 ± 5.83	105.98 ± 9.11
3rd year	33 (41.3%)	23.73 ± 3.67	0.84 ± 0.06	14.15 ± 6.25	107.93 ± 16.41
Senior	6 (7.5%)	24.33 ± 1.21	0.85 ± 0.04	16.33 ± 3.27	110.47 ± 5.62
		x^2=1.65 p=0.65	x^2=0.30 p=0.96	x^2=1.62 p=0.65	x^2=1.67 p=0.64
Region of Residence in Turkey					
Marmara	7 (8.8%)	25.14 ± 2.67	0.86 ± 0.07	18.43 ± 5.19	115.46 ± 10.39
Aegean	5 (6.3%)	24.00 ± 4.74	0.84 ± 0.04	16.20 ± 5.17	111.68 ± 19.26
Mediterranean	13 (16.3%)	24.00 ± 3.11	0.84 ± 0.05	14.54 ± 6.68	109.45 ± 11.66
Central Anatolia	3 (3.8%)	28.00 ± 9.54	0.89 ± 0.10	22.67 ± 7.09	128.53 ± 41.32
Karadeniz	10 (12.5%)	23.70 ± 2.36	0.85 ± 0.08	15.70 ± 8.49	107.26 ± 10.25
Eastern Anatolia	16 (20.0%)	22.81 ± 2.23	0.83 ± 0.05	13.13 ± 5.33	103.22 ± 9.16
Southeastern Anatolia	25 (31.3%)	22.68 ± 1.97	0.84 ± 0.05	14.52 ± 4.33	103.61 ± 9.37
Abroad	1 (1.3%)	29.00 ± 0.00	0.86 ± 0.00	17.00 ± 0.00	130.20 ± 0.00
		x^2=11.09 p=0.14	x^2=3.51 p=0.83	x^2=8.45 p=0.29	x^2=12.20 p=0.09
Marital Status					
Married	1 (1.3%)	27.00 ± 0.00	0.87 ± 0.00	20.00 ± 0.00	120.90 ± 0.00
Single	79 (98.8%)	23.58 ± 3.15	0.84 ± 0.06	15.11 ± 5.93	107.58 ± 13.59

		Z=-1.44 p=0.15	Z=-0.85 p=0.40	Z=-0.98 p=0.33	Z=-1.36 p=0.17
Financial Status					
Ends Meet	51 (63.8%)	23.88 ± 3.65	0.85 ± 0.06	15.73 ± 6.07	109.06 ± 15.63
Ends not Meet	29 (36.3%)	23.17 ± 1.98	0.84 ± 0.05	14.21 ± 5.61	105.43 ± 8.72
		Z=-0.65 p=0.52	Z=-0.81 p=0.42	Z=-1.11 p=0.27	Z=-0.84 p=0.40
Family Type					
Extended	17 (21.3%)	22.18 ± 1.88	0.83 ± 0.04	12.71 ± 5.19	100.48 ± 7.56
Nuclear	60 (75.0%)	24.05 ± 3.39	0.85 ± 0.06	15.72 ± 6.01	109.80 ± 14.51
Separated	3 (3.8%)	23.33 ± 1.53	0.85 ± 0.02	18.33 ± 5.13	107.90 ± 6.72
		x^2=7.08 p=0.03	x^2=1.31 p=0.52	x^2=4.37 p=0.11	x^2=8.83 p=0.01
Person who they live with					
Alone	1 (1.3%)	25.00 ± 0.00	0.92 ± 0.00	25.00 ± 0.00	113.90 ± 0.00
Family/relative	13 (16.3%)	24.23 ± 2.39	0.85 ± 0.04	17.54 ± 4.24	110.59 ± 9.53
Friend	43 (53.8%)	23.23 ± 2.53	0.84 ± 0.06	14.02 ± 5.82	105.47 ± 11.27
Dormitory	23 (28.8%)	23.96 ± 4.44	0.85 ± 0.06	15.57 ± 6.38	110.13 ± 18.66
		x^2=2.43 p=0.49	x^2=2.87 p=0.41	x^2=6.12 p=0.11	x^2=3.40 p=0.33
Work Status					
Yes	11 (13.8%)	23.64 ± 1.69	0.84 ± 0.04	13.27 ± 4.27	13.27 ± 4.27
No	69 (86.3%)	23.62 ± 3.34	0.84 ± 0.06	15.48 ± 6.11	15.48 ± 6.11
		Z=-0.50 p=0.62	Z=-0.64 p=0.52	Z=-1.38 p=0.17	Z=-0.41 p=0.69
Having a first-degree relative with heart disease					
Yes	21 (26.3%)	23.38 ± 1.75	0.85 ± 0.05	16.43 ± 4.99	107.27 ± 8.50
No	59 (73.8%)	23.71 ± 3.53	0.84 ± 0.06	14.73 ± 6.19	107.92 ± 15.05
		Z=-0.06 p=0.95	Z=-0.23 p=0.82	Z=-1.01 p=0.31	Z=-0.37 p=0.71
First-degree relative died of a heart disease					
Yes	8 (10.0%)	23.25 ± 2.05	0.84 ± 0.06	14.88 ± 6.66	106.68 ± 8.62
No	72 (90.0%)	23.67 ± 3.26	0.84 ± 0.06	15.21 ± 5.88	107.86 ± 14.07
		Z=-0.24 p=0.82	Z=-0.02 p=0.99	Z=-0.02 p=0.98	Z=0.00 p=1.00

Also, the family type had a significant effect on their BMI ($p<0.05$) and fattiness ratio ($p\leq0.01$) (Table 1). Students from nuclear families had statistically higher levels of BMI (Z=-2.61, p=0.009) and fattiness ratio (Z=-2.90, p=0.004) than those coming from extended families (Table 3).

The following variables had no effect at a statistically significant level on male students' levels of BMI, waist-hip ratio and body fat: the type of region they spent most of their school life, marital status, financial status, the person they lived with, job status, having a first-degree relative diagnosed with a heart disease and having a relative in the immediate family who died of a heart disease ($p>0.05$) (Table 3).

According to Table 4, regular exercise is a variable that had a statistically significant impact on male students' (N=45) levels of waist-hip ratio and body fat percentage. Male students who did not exercise on a regular basis reported lower levels of the waist-hip ratio ($p<0.01$) and body fat percentage ($p\leq0.01$) than those who did otherwise and this difference was statistically significant.

Table 4 Distribution of male students' BMI, waist-hip ratio and body fat percentage in terms of their health behaviors (N=80)

Health Behaviors	n (%)	Body Mass Index	Waist-hip ratio	Body fat percentage	Fattiness ratio
		Avg. ± SD	Avg. ± SD	Avg. ± SD	Avg. ± SD
Smoking					
Yes	21 (26.3)	23.43 ± 1.81	0.86 ± 0.05	15.38 ± 5.44	106.31 ± 9.02
No	54 (67.5)	23.59 ± 3.55	0.84 ± 0.06	14.87 ± 6.31	107.82 ± 15.07
Quit	5 (6.3)	24.80 ± 3.35	0.87 ± 0.03	17.60 ± 2.70	112.96 ± 13.57
		x^2=1.01 p=0.61	x^2=5.05 p=0.08	x^2=1.73 p=0.42	x^2=1.04 p=0.56
If quit, how long smoked*					
12 months and ↓	1 (20.0)	29.00 ± 0.00	0.86 ± 0.00	17.00 ± 0.00	130.20 ± 0.00

12 months ↑	4 (80.0)	23.75 ± 2.75	0.88 ± 0.03	17.75 ± 3.10	108.65 ± 11.03
		Z=-1.41 p=0.16	Z=0.00 p=1.00	Z=0.00 p=1.00	Z=-1.41 p=0.16
Quitters' length of smoking (months) (Avg. ± SD) (Min.-Max.)*	54.00 ± 41.13 (6-120)	r=-0.29 p=0.63	r=-0.42 p=0.49	r=0.12 p=0.85	r=-0.36 p=0.53
Smokers' Consumption Amount**					
2-8 pieces	2 (9.5)	24.50 ± 2.12	0.86 ± 0.00	19.50 ± 0.71	110.30 ± 10.32
9-15 pieces	10 (47.6)	23.10 ± 1.91	0.86 ± 0.05	16.80 ± 4.92	106.10 ± 9.02
16 pieces and ↑	9 (42.9)	23.56 ± 1.74	0.86 ± 0.05	12.89 ± 5.75	105.66 ± 9.70
		x^2=1.32 p=0.52	x^2=0.11 p=0.95	x^2=3.38 p=0.19	x^2=0.58 p=0.75
Smokers' cigarette amount (pieces) (Avg ± SD) (Min.-Max.)**	14.81 ± 6.56 (2-30)	r=-0.06 p=0.81	r=0.02 p=0.92	r=-0.36 p=0.11	r=-0.12 p=0.62
Regular Exercise					
Yes	19 (23.8)	23.11 ± 2.81	0.81 ± 0.04	12.32 ± 4.85	105.52 ± 10.44
No	61 (76.3)	23.79 ± 3.26	0.85 ± 0.06	16.07 ± 5.97	108.44 ± 14.43
		Z=-0.45 p=0.65	Z=-3.08 p=0.002	Z=-2.48 p=0.013	Z=-0.65 p=0.52
Alcohol Abuse					
Yes	26 (32.5)	23.31 ± 1.76	0.86 ± 0.05	15.62 ± 5.85	106.40 ± 8.12
No	54 (67.5)	23.78 ± 3.65	0.84 ± 0.06	14.96 ± 5.99	108.39 ± 15.58
		Z=-0.10 p=0.92	Z=-1.33 p=0.19	Z=-0.46 p=0.64	Z=-0.01 p=0.99
Drinking Tea					
Yes	77 (96.3)	23.71 ± 3.18	0.84 ± 0.05	15.09 ± 5.98	108.13 ± 13.64
No	3 (3.8)	21.33 ± 1.16	0.88 ± 0.08	17.33 ± 4.16	97.80 ± 7.93
		Z=-1.61 p=0.11	Z=-1.02 p=0.31	Z=-0.67 p=0.50	Z=-1.46 p=0.15
Amount of Tea***					
1-3 glasses	33 (42.9)	23.27 ± 2.97	0.83 ± 0.06	13.45 ± 6.61	105.69 ± 12.19
4-6 glasses	34 (44.2)	24.50 ± 3.56	0.85 ± 0.05	16.82 ± 5.17	111.83 ± 15.62
7 glasses and ↑	10 (13.0)	22.50 ± 1.65	0.84 ± 0.06	14.60 ± 5.17	103.61 ± 7.24
		x^2=4.09 p=0.13	x^2=2.68 p=0.26	x^2=4.87 p=0.09	x^2=4.26 p=0.12
Amount of Tea (glasses) (Avg ± SD) (Min.-Max)***	4.22 ± 2.48 (1-12)	r=-0.07 p=0.54	r=0.15 p=0.18	r=0.16 p=0.17	r=-0.05 p=0.69
Coffee Intake					
Yes	43 (53.8)	24.19 ± 2.80	0.84 ± 0.04	15.26 ± 5.31	110.26 ± 11.56
No	37 (46.3)	22.97 ± 3.45	0.84 ± 0.07	15.08 ± 6.63	104.83 ± 15.26
		Z=-3.00 p=0.003	Z=-0.07 p=0.94	Z=-0.12 p=0.91	Z=-2.81 p=0.005
Amount of Coffee****					
1-2 cups	40 (93.0)	24.20 ± 2.88	0.85 ± 0.04	15.68 ± 5.25	110.40 ± 11.76
3 cups and ↑	3 (7.0)	24.00 ± 1.73	0.79 ± 0.02	9.67 ± 1.53	108.30 ± 10.19
		Z=-0.17 p=0.87	Z=-2.43 p=0.015	Z=-2.06 p=0.04	Z=-0.29 p=0.78
Amount of Coffee (Cups) (Avg ± SD) (Min.-Max.)****	1.51 ± 0.80 (1-5)	r=0.06 p=0.69	r=-0.21 p=0.17	r=-0.23 p=0.13	r=0.05 p=0.76
Putting spreads for Bread in Breakfast					
Yes	17 (21.3)	23.41 ± 2.58	0.82 ± 0.05	12.24 ± 6.31	105.87 ± 10.34
No	63 (78.8)	23.68 ± 3.31	0.85 ± 0.06	15.97 ± 5.60	108.25 ± 14.36
		Z=-0.15 p=0.88	Z=-1.84 p=0.07	Z=-2.16 p=0.03	Z=-0.44 p=0.66
Type of Spreads***					
Butter	15 (88.2)	23.60 ± 2.67	0.83 ± 0.04	13.13 ± 6.15	106.57 ± 10.69
Margarine	2 (11.8)	22.00 ± 1.41	0.76 ± 0.06	5.50 ± 2.12	100.60 ± 6.79
Olive oil		Z=-0.69 p=0.49	Z=-1.49 p=0.14	Z=-1.79 p=0.07	Z=-0.60 p=0.55

*5 students who quit smoking answered this; **21 students who currently smoke answered this; ***77 students who reported to drink tea answered this; ****43 students who reported to drink coffee answered this; *****17 students who reported to put spreads for bread answered this

Coffee intake among male students affected their BMI ($p<0.01$) and fattiness ratio ($p<0.01$) at a statistically significant level. Those who drank coffee had higher levels of BMI and fattiness ratio compared to the non-drinkers. Also, the amount of coffee they consumed affected male students' (N=43) waist-hip ratio ($p<0.05$) and body fat percentage ($p<0.05$). Students who drank 1-2 cups of coffee a day had higher levels of waist-hip ratio and body fat percentage than those with 3 cups of coffee consumption (Table 4).

Students who had the habit of putting spreads for bread (N=17) in breakfast were observed to have lower levels of body fat percentages than those who did not have such a habit and this difference was statistically significant ($p<0.05$) (Table 4).

It was found out that male students' health behaviors such as smoking, alcohol abuse, and tea intake did not have statistically significant effects on BMI, waist-hip ratio and body fat percentage ($p>0.05$((Table 4).

Findings Related to the Effects of Female Students' Individual and Health Behavior Characteristics on their BMI, Waist-Hip Ratio, and Body Fat Percentages

When Table 5 is considered, the grade of the female students can be seen to have a statistically significant effect on their waist-hip ratio ($p\leq0.01$) and body fat percentages ($p<0.01$). Accordingly, female students at the 1st and 2nd grades had statistically higher levels of waist-hip ratios and body fat percentage compared to the 3rd and 4th-year female students. (Difference between 1st and 3rd years Z=-2.48, p=0.013; 2nd and 3rd year Z=-2.48, p=0.013; 1st and 4th year Z=-2.48, p=0.013; the 2nd and the 4th year difference Z=-2.48, p=0.013).

Table 5 Distribution of female students' levels of BMI, waist-hip ratio and body fat in terms of their individual characteristics (N=271)

Individual characteristics	n (%)	Body Mass Index	Waist-hip ratio	Body fat percentage	Fattiness ratio
		Avg. ± SD	Avg. ± SD	Avg. ± SD	Avg. ± SD
Age Groups (years)					
17-19	86 (31.7%)	22.62 ± 3.22	0.79 ± 0.06	30.40 ± 6.76	107.60 ± 14.87
20-22	148 (54.6%)	22.40 ± 3.27	0.78 ± 0.06	28.32 ± 8.17	106.50 ± 15.15
23 and ↑	37 (13.7%)	23.03 ± 3.28	0.79 ± 0.06	29.35 ± 7.84	109.25 ± 14.77
		x^2=2.04 p=0.36	x^2=3.79 p=0.15	x^2=4.42 p=0.11	x^2=2.24 p=0.33
Age (Avg. ± SD)	20.59 ± 1.97	r=0.08 p=0.20	r=-0.01 p=0.85	r=-0.05 p=0.40	r=0.07 p=0.23
(Min.-Max.)	(17-30%)				
Grade					
1st year	82 (30.3%)	22.48 ± 3.35	0.79 ± 0.06	30.41 ± 7.40	107.17 ± 15.55
2nd year	81 (29.9%)	22.59 ± 3.40	0.79 ± 0.06	30.33 ± 7.94	106.86 ± 15.68
3rd year	48 (17.7%)	22.69 ± 2.79	0.77 ± 0.05	26.69 ± 6.61	108.60 ± 13.05
Senior	60 (22.1%)	22.50 ± 3.32	0.77 ± 0.06	27.65 ± 8.18	106.69 ± 14.98
		x^2=0.63 p=0.89	x^2=11.21 p=0.01	x^2=11.75 p=0.008	x^2=2.06 p=0.56
Region of Residence in Turkey					
Marmara	132 (48.7%)	22.52 ± 3.21	0.79 ± 0.07	29.72 ± 7.92	107.16 ± 14.43
Aegean	20 (7.4%)	21.30 ± 3.25	0.78 ± 0.07	27.15 ± 7.77	100.63 ± 15.50
Mediterranean	27 (10.0%)	23.41 ± 3.30	0.78 ± 0.06	29.15 ± 8.29	110.49 ± 15.61
Central Anatolia	16 (5.9%)	23.13 ± 3.69	0.75 ± 0.05	25.25 ± 6.82	110.38 ± 17.34
Karadeniz	59 (21.8%)	22.29 ± 3.03	0.79 ± 0.05	29.17 ± 7.05	106.01 ± 14.37
Eastern Anatolia	7 (2.6%)	21.86 ± 2.61	0.79 ± 0.06	30.14 ± 8.28	106.27 ± 11.55

Southeastern Anatolia	8 (3.0%)	24.63 ± 4.44	0.78 ± 0.06	28.75 ± 8.61	116.75 ± 20.48
Abroad	2 (0.7%)	23.00 ± 1.41	0.86 ± 0.04	36.00 ± 4.24	109.70 ± 8.20
		x^2=10.16 p=0.18	x^2=8.76 p=0.27	x^2=7.72 p=0.36	x^2=10.97 p=0.14
Marital Status					
Married	4 (1.5%)	21.50 ± 1.73	0.78 ± 0.08	28.00 ± 12.33	106.98 ± 10.38
Single	267 (98.5%)	22.57 ± 3.26	0.78 ± 0.06	29.13 ± 7.68	107.23 ± 15.06
		Z=-0.65 p=0.51	Z=-0.40 p=0.69	Z=-0.60 p=0.55	Z=-0.20 p=0.84
Financial Status					
Ends Meet	208 (76.8%)	22.74 ± 3.30	0.78 ± 0.06	28.95 ± 7.50	108.17 ± 15.18
Ends not Meet	63 (23.2%)	21.95 ± 3.03	0.79 ± 0.06	29.67 ± 8.51	104.11 ± 13.99
		Z=-1.89 p=0.06	Z=-1.01 p=0.31	Z=-0.65 p=0.52	Z=-2.14 p=0.03
Family Type					
Extended	23 (8.5%)	23.39 ± 3.63	0.82 ± 0.06	32.00 ± 7.50	110.51 ± 16.79
Nuclear	240 (88.6%)	22.45 ± 3.18	0.78 ± 0.06	28.85 ± 7.76	106.80 ± 14.65
Separated	8 (3.0%)	23.13 ± 4.12	0.80 ± 0.04	28.88 ± 6.79	110.73 ± 19.76
		x^2=3.02 p=0.22	x^2=7.01 p=0.03	x^2=2.75 p=0.25	x^2=2.46 p=0.29
Person who they live with					
Alone	5 (1.8%)	23.00 ± 2.35	0.75 ± 0.03	24.00 ± 6.00	108.66 ± 11.08
Family/relative	97 (35.8%)	22.59 ± 3.32	0.79 ± 0.06	29.88 ± 7.77	107.57 ± 15.04
Friend	46 (17.0%)	23.11 ± 3.47	0.78 ± 0.06	28.78 ± 7.53	109.79 ± 15.91
Dormitory	123 (45.4%)	22.30 ± 3.14	0.78 ± 0.06	28.85 ± 7.82	105.94 ± 14.74
		x^2=2.67 p=0.45	x^2=2.28 p=0.52	x^2=3.14 p=0.37	x^2=3.03 p=0.39
Work Status					
Yes	37 (13.7%)	22.89 ± 3.38	0.79 ± 0.06	29.00 ± 8.04	108.40 ± 14.92
No	234 (86.3%)	22.50 ± 3.23	0.78 ± 0.06	29.14 ± 7.70	107.04 ± 15.02
		Z=-0.92 p=0.36	Z=-0.10 p=0.92	Z=-0.36 p=0.72	Z=-0.84 p=0.40
Having a first-degree relative with heart disease					
Yes	89 (32.8%)	22.69 ± 3.53	0.78 ± 0.06	29.11 ± 8.10	108.12 ± 16.59
No	182 (67.2%)	22.49 ± 3.11	0.78 ± 0.06	29.12 ± 7.57	106.79 ± 14.16
		Z=-0.03 p=0.97	Z=-0.15 p=0.88	Z=-0.02 p=0.99	Z=-0.14 p=0.89
First-degree relative died of a heart disease					
Yes	38 (14.0%)	22.71 ± 3.76	0.79 ± 0.06	29.87 ± 8.12	108.71 ± 18.01
No	233 (86.0%)	22.53 ± 3.16	0.78 ± 0.06	29.00 ± 7.68	106.99 ± 14.46
		Z=-0.11 p=0.91	Z=-0.22 p=0.83	Z=-0.37 p=0.71	Z=-0.08 p=0.94

Female students' financial status was found to have a statistically significant effect on fattiness ratio ($p<0.05$). In this respect, students who reported to make both ends meet had higher levels of fattiness ratio than those who reported otherwise (Table 5).

Female students' family type affected the waist-hip ratio with statistical significance ($p<0.05$) (Table 1). Female students from nuclear families reported lower waist-hip ratio (Z=-2.52, p=0.012) compared to the one who came from extended families.

There was no statistical significance in terms of the effects of following variables on waist-hip ratio and body fat percentages: age, the region in Turkey where they spent most of their life, marital status, person they live with, work status, having a relative in the first degree with a heart disease and having such a relative whose cause of death was a heart disease ($p>0.05$) (Table 5).

Table 6 reveals that regular exercise is a variable that had a statistically significant impact on female students' levels of waist-hip ratio and body fat percentage (N=45). Male students who did not exercise regularly had lower levels of the waist-hip ratio ($p<0.01$) and body fat percentage ($p<0.05$) than those who did otherwise and this difference was statistically significant.

Female students with the habit of drinking coffee (N=142) showed a statistically significant correlation between their amount of coffee and waist-hip ratio. The more coffee they consumed, the higher their waist-hip ration becomes (Table 6).

Table 6 Distribution of female students' BMI, waist-hip ratio and body fat percentage in terms of their health behaviors (N=271)

Health Behaviors	n (%)	Body Mass Index	Waist-hip ratio	Body fat percentage	Fattiness ratio
		Avg ± SD	Avg ± SD	Avg ± SD	Avg ± SD
Smoking					
Yes	24 (8.9)	21.96 ± 3.83	0.77 ± 0.06	26.29 ± 8.72	104.85 ± 17.51
No	243 (89.7)	22.62 ± 3.18	0.78 ± 0.06	29.37 ± 7.59	107.45 ± 14.70
Quit	4 (1.5)	22.00 ± 4.40	0.81 ± 0.07	30.75 ± 9.07	108.00 ± 19.65
		x^2=1.02 p=0.60	x^2=2.68 p=0.26	x^2=3.22 p=0.20	x^2=0.77 p=0.68
If quit, how long smoked*					
12 months and ↓	2 (50.0)	22.00 ± 7.07	0.82 ± 0.03	30.50 ± 9.19	108.40 ± 30.26
12 months ↑	2 (50.0)	22.00 ± 2.83	0.80 ± 0.11	31.00 ± 12.73	107.60 ± 15.56
		Z=0.00 p=1.00	Z=0.00 p=1.00	Z=0.00 p=1.00	Z=0.00 p=1.00
Quitters' length of smoking (months) (Avg. ± SD) (Min.-Max.)*	22.50 ± 17.23 (12-48)	r=-0.26 p=0.74	r=-0.80 p=0.20	r=-0.55 p=0.45	r=-0.34 p=0.66
Smokers' Consumption Amount**					
2-8 pieces	10 (41.7)	20.80 ± 2.94	0.76 ± 0.08	25.30 ± 9.37	99.11 ± 12.55
9-15 pieces	8 (33.3)	23.00 ± 4.84	0.78 ± 0.05	28.25 ± 9.45	110.10 ± 22.16
16 pieces and ↑	6 (25.0)	22.50 ± 3.78	0.76 ± 0.05	25.33 ± 7.55	107.42 ± 17.95
		x^2=1.35 p=0.51	x^2=0.80 p=0.67	x^2=0.41 p=0.81	x^2=1.83 p=0.40
Smokers' cigarette amount (pieces) (Avg. ± SD) (Min.-Max.)**	10.21 ± 6.37 (2-20)	r=-0.16 p=0.45	r=-0.01 p=0.96	r=-0.03 p=0.89	r=0.18 p=0.41
Regular Exercise					
Yes	36 (13.3)	21.83 ± 2.15	0.81 ± 0.06	31.56 ± 8.57	104.53 ± 8.91
No	235 (86.7)	22.66 ± 3.37	0.78 ± 0.06	28.74 ± 7.55	107.64 ± 15.68
		Z=-0.72 p=0.47	**Z=-2.68 p=0.007**	**Z=-2.03 p=0.04**	Z=-0.33 p=0.74
Alcohol Abuse					
Yes	57 (21.0)	22.32 ± 3.44	0.77 ± 0.07	28.28 ± 8.67	106.08 ± 15.86
No	214 (79.0)	22.62 ± 3.20	0.79 ± 0.06	29.34 ± 7.47	107.53 ± 14.77
		Z=-0.61 p=0.54	Z=-0.98 p=0.33	Z=-0.71 p=0.48	Z=-0.78 p=0.44
Drinking Tea					
Yes	238 (87.8)	22.45 ± 3.23	0.78 ± 0.06	28.90 ± 7.78	106.80 ± 14.90
No	33 (12.2)	23.27 ± 3.30	0.80 ± 0.06	30.70 ± 7.32	110.31 ± 15.47

		Z=-1.50 p=0.13	Z=-1.72 p=0.09	Z=-1.26 p=0.21	Z=-1.32 p=0.19
Amount of Tea* **					
1-3 glasses	175 (73.5)	22.35 ± 3.22	0.78 ± 0.06	28.94 ± 7.70	106.19 ± 14.73
4-6 glasses	47 (19.7)	22.57 ± 3.24	0.78 ± 0.07	27.89 ± 7.82	107.62 ± 14.99
7 glasses and ↑	16 (6.7)	23.19 ± 3.47	0.79 ± 0.06	31.38 ± 8.42	111.03 ± 16.67
		x^2=1.08 p=0.58	x^2=0.63 p=0.73	x^2=1.72 p=0.42	x^2=1.76 p=0.42
Amount of Tea (glasses) (Avg. ± SD) (Min.-Max)***	2.93 ± 2.11 (1-15)	r=0.10 p=0.13	r=0.09 p=0.17	r=-0.07 p=0.27	r=0.12 p=0.07
Coffee Intake					
Yes	142 (52.4)	22.60 ± 3.28	0.78 ± 0.06	29.23 ± 7.85	107.38 ± 14.99
No	129 (47.6)	22.50 ± 3.23	0.78 ± 0.06	29.00 ± 7.63	107.06 ± 15.04
		Z=-0.45 p=0.65	Z=-0.15 p=0.88	Z=-0.21 p=0.83	Z=-0.38 p=0.70
Amount of Coffee**					
1-2 cups	136 (95.8)	22.51 ± 3.26	0.78 ± 0.06	29.17 ± 7.72	107.06 ± 14.91
3 cups and ↑	6 (4.2)	24.67 ± 3.27	0.81 ± 0.07	30.50 ± 11.26	114.65 ± 16.33
		Z=-1.58 p=0.12	Z=-1.13 p=0.26	Z=-0.28 p=0.78	Z=-1.12 p=0.26
Amount of coffee (Cups) (Avg. ± SD) (Min.-Max.)****	1.32 ± 0.66 (1-5)	r=0.07 p=0.39	r=0.20 p=0.02	r=0.14 p=0.09	r=0.06 p=0.50
Putting spreads for Bread in Breakfast					
Yes	100 (36.9)	21.75 ± 2.90	0.78 ± 0.06	28.00 ± 7.85	103.34 ± 13.53
No	171 (63.1)	23.02 ± 3.35	0.79 ± 0.06	29.77 ± 7.61	109.50 ± 15.36
		Z=-3.30 p=0.001	Z=-1.51 p=0.13	Z=-1.74 p=0.08	Z=-3.60 p=0.000
Type of Spreads***					
Butter	72 (72.0)	21.71 ± 2.71	0.77 ± 0.06	27.36 ± 7.63	102.84 ± 13.04
Margarine	24 (24.0)	21.58 ± 2.84	0.78 ± 0.06	28.42 ± 7.01	103.03 ± 12.52
Olive oil	4 (4.0)	23.50 ± 6.14	0.86 ± 0.09	37.00 ± 12.73	114.29 ± 25.46
		x^2=1.20 p=0.55	x^2=4.08 p=0.13	x^2=3.15 p=0.21	x^2=1.35 p=0.51

Female students who had the habit of putting spreads for bread (N=100) in breakfast were observed to have lower levels of BMI ($p \leq 0.001$) and fattiness ratio ($p < 0.001$) than those who did not have such a habit and this difference was statistically significant (Table 6).

It was observed that female students' health behaviors of smoking, alcohol abuse, and tea intake did not impact their BMI, waist-hip ratio and body fat percentage with statistical significance ($p > 0.05$) (Table 6).

DISCUSSION

Cardiovascular diseases (CVDs) are major causes of mortality and morbidity around the world. Industrial and technological advances and related economic and social transitions in the last two centuries have caused considerable changes in the rates of diseases responsible for deaths. World Health Organization (WHO) states that more than three-fourths of deaths can be prevented by changes in our lifestyles. Such prevention should not be restricted to individuals at high risk and it should encompass the whole society. It needs to be a lifelong process. Meanwhile, it is highly essential that nurses are informed about CVDs, they protect themselves from CVDs, maintain their regular controls and have access to necessary care and treatment in the presence of CVDs [17,21]. The current study, which has a descriptive and correlational design, was conducted to determine risk assessment data of nursing students at a Nursing School in relation to their individual and health behavior characteristics.

Most of the students were found not to smoke, nor did they consume alcohol. Smoking and alcohol consumption

are among the most serious social problems that have an impact on every part of the society and require immediate action. Habits of smoking and alcohol are considered to be a contagious disease that frequently causes morbidity and mortality [22,23]. During university education, school and family control on students fades away to a great degree and they get more freedom in spending money compared to high school students. These factors may contribute to the habit formation of smoking and drinking alcohol among university students. Findings of the studies conducted with university students in Turkey about smoking and alcohol abuse are more unfavorable than those of this current study [24,25]. Nurses assuming an important place in a healthcare team aim to protect and improve the health of individuals, families and the society at large. In the case of diseases, their aim is to cure and rehabilitate them and increase their quality of life [26]. In this respect, nurses play a great role and have responsibilities in resolving health problems related to smoking and alcohol abuse. This study showed that nursing students will be good role models for healthy/sick individuals and their families in terms of smoking and alcohol abuse and they could raise awareness in the society. This finding is taken to be the good news.

A considerable number of nursing students were found not to be exercising regularly, a finding that reflects the habit of exercising in Turkey [27]. Exercise on a regular basis has positive impacts on the prevention of CVDs, body build, blood pressure, blood lipid and protein levels, and harmonization of heart [28]. People with regular exercise habits were found to be at a lower risk of death by 30% compared to those with a sedentary lifestyle [29].

University students constitute the majority of the young adult population in Turkey. The level of exercise of this group is correlated with the prevalence of preventable diseases like CVDs in the future [30]. In this respect, nursing students as representatives of young adults are required to maintain regular exercise against CVDs risks. In addition, there is an elective course titled “Exercise for a healthy life” in the institution where the study was conducted. In conclusion, that nursing students do not do regular exercises should be considered as a problem and necessary strategies should be put into practice to solve this problem.

Nursing students were found to be in the habit of drinking tea and coffee (at a lower rate, though). Tea has protective effects against heart diseases, coronary heart diseases in particular, and various cancer types because of being rich in flavonoid that can be found in vegetables and fruits [31]. The observation that students have the habit of consuming tea and coffee, the former being more common is consistent with existing studies [31-33], which is a reflection of Turkish people’s tradition of tea consumption. On the other hand, consumption of coffee has been on the rise all over the world. A cup of coffee has 66-146 mg caffeine on average, which can vary depending on the type and preparation of coffee. Caffeine gives vitality and reduced fatigue in addition to triggering oscillation of sugar stored in the liver. However, the side effects of caffeine outnumber its benefits. It damages B vitamins, inositol, in particular, vitamin C and minerals like zinc, potassium and so on. Individuals who consume more than 5 cups of coffee are 5 times more prone to heart attacks compared to non-drinkers [34]. In the recent years, coffee consumption has been increasing just like other countries and it has been taking its places on the list of drinks university students consume. This finding of the study indicates that Turkey has its share of consumption of coffee that has accelerated with globalization. What is pleasing about this is that the rate of consumption of coffee more than 3 cups a day is quite low and there is no student who drinks more than 5 cups of coffee in a day.

Female students in this study reported to put spreads for bread in breakfast, but it did not affect BMI and fattiness ratio. The daily diet should include consumption of fats, which are necessary for the intake of fatty acids that cannot be synthesized in the body as well as vitamins that melt fat. The rate of intake of fat should be equal to 30% of the total energy. However, overconsumption of fat is health-damaging [35]. An increase takes place in the prevalence of cardiovascular diseases in the post-menopause period. One of the pathogenic phenomena that are proposed to explain changes in plasma lipid levels following menopause is that central body fatness occurs with menopause. That is the amount of fat in the abdomen increases [36]. This finding can be attributed to the life stage the female students live because the effects are observed just now despite their consumption of spreads for bread.

In this study, reference frequencies vary depending on gender and that’s why variables like BMI, waist-hip ratio, and body fat percentage were analyzed in terms of gender. Male gender is among risk factors that cannot be changed in terms of cardiovascular diseases (CVDs). Prevalence of CVDs is 4% among male students while it is 3.8% for the female [17,37]. Women are prone to the risk of CVDs in their reproductive stage 2.5-4.5 times less than their male counterparts. However, as they get older especially after the age of 50, with menopause such risk can reach up to the

same level as men [17,38]. The risk of development of cardiovascular diseases is associated with BMI among men and with age among women [39]. The rate of male students who are categorized as overweight and obese in the sample group was 18.8% as opposed to 22.1% in female students. The rate of male students with unacceptable waist-hip ratio equals 16.3% whereas it was 35.8% for the female. No male student belonged to a high-risk group in terms of BMI regarding body fat percentage. However, 16.6% of the female students were categorized in the high-risk group in terms of CVDs. Such findings give rise to the thought that the difference between men and women in terms of the prevalence of cardiovascular diseases will disappear in the near future. One explanation for this situation is that women are equally even more exposed to stress, which plays a great role in the development of CVDs. Changes taking place in lifestyle, diet and physical activity level are also at play.

CONCLUSION

Most of the nursing students were observed not to smoke, abuse alcohol, or exercise regularly, but they had habits of drinking tea and, at lesser rates, coffee.

Students differ from each other depending on their gender in terms of BMI, waist-hip ratio, body fat percentage and female students' risk factors increased in terms of CVDs. For this reason, it is of great importance to fighting against risk factors and risk behaviors to be able to mitigate/eliminate complications related to the disease and mortality and reduce the prevalence and incidence of cardiovascular diseases. It is essential that cardiac risk factors and preventive strategies are allocated more importance in curriculums of nursing schools in order that awareness about this issue can be raised. Educating the members of the healthcare of the future to inform the society about cardiac risk factors and risk behaviors will both encourage individuals to pursue a healthy lifestyle and contribute to primary health services substantially, which will financially support hospitals and the country at large.

LIMITATIONS

Volunteer students took part in the study since this survey included invasive enterprises. For this reason, the sample group was not included in the study through randomization.

DECLARATIONS

Acknowledgement

We thank Istanbul University Unit of Scientific Research Projects for their support for this Project [BEK-56248].

Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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