Original Article

University Students' Knowledge Levels about Cardiovascular Risk Factors and Assessment of their Health Behaviours in Turkey

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Abstract

Aims: To evaluate university students' knowledge levels about cardiovascular risk factors and assessment of their health behaviours.
Methods: The study was conducted between April and June 2015 to assess their health behaviours and knowledge levels about cardiovascular risk factors, using the face-to-face interview for Cardiovascular Disease Risk Factor Knowledge Scale and Healthy Lifestyle Behaviour Scale II.
Result: This study was found low knowledge levels of cardiovascular disease risk factors of university students.There is significant relationship between positive health behaviours and cardiovascular disease risk factor knowledge levels.
Conclusions: The students should be informed about the cardiovascular risk factors and positive health behaviours during the academic education.

Keywords: university students, cardiovascular risk factors, health behaviours

Introduction

Cardiovascular diseases (CVDs) are one of the major causes of disabilities, morbidity, mortality, labour loss and rising health care costs in the World (WHO, 2016; Levi et al. , 2009). According to the 2015 statistics of the World Health Organization (2016), CVDs constitute the primary cause of death, causing 17.7 million incidence of mortality. This figure is expected to increase to 22.2 million in 2030 unless necessary measures are taken. Similar to the global trend, mortality rates caused by CVDs have been rapidly increasing in Turkey (Tokgozoglu, Kaya, Erol, & Ergene et al., 2010; Abaci 2011; Unal et al., 2013; Onat et al., 2013; TUİK, 2016). The 2016 statistics of the Turkish Statistical Institute show that CVDs constitute the primary cause of death in Turkey.

CVDs are common among all age groups. Factors such as smoking, alcohol consumption, physical immobility, malnutrition and stress contribute to the development of CVDs (Abaci 2011; Bazzano, Serdula, & Liu, 2003). University life is a period that students face with various changes in their lives. During this period, students may suffer from malnutrition caused by economic difficulties and improper housing conditions. Besides, stress caused by uncertainties about employment , smoking and alcohol consumption, and physical immobility owing to spending too much time on computer may be additional negative factors (Abaci 2011;

Bazzano et al.,2003; Ilhan, Batmaz, & Akhan,2010). Existing studies show the impact of unhealthy lifestyle and social environment over CVDs (Abaci 2011; Bazzano et al., 2003). In order to prevent CVDs, students should acquire positive health behaviours, including having adequate and balanced nutrition, weight control, coping with stress, physical mobility, quitting smoking and alcohol.

The ESC/ESC (European Society of Hypertension/European Society of Cardiology) guidelines for the management of arterial hypertension suggest that more research on youth should be carried out for effective planning of programs for CVDs' prevention (Mancia et al., 2014). Therefore, in order to prepare effective education programs to prevent CVDs' risk factors, determination of the risk factors contributing to the development of the CVDs in the young, their knowledge levels about the CVDs' risk factors and positive health behaviours, and the extent to which the young people implement positive health behaviours preventing CVDs should be assessed.

Methods

This descriptive and cross-sectional study has been conducted to determine university students' knowledge on CVDs' risk factors, their health behaviours, the factors that contribute to the development of CVDs, and the relationship between the knowledge on CVDs' risk factors and health behaviours. 29085 undergraduate students studying at faculties and vocational high schools during the 2014-15 academic year of a university located at the north-west Turkey constitute the universe of the study.

The data on the number of the students and their gender has been obtained from the university's registrar's office. The Sample size of the study was calculated by using the formula that is used when the total size of the universe is known (Z=1, 96, d=2, pq: 0.5 for 95% confidence interval) and the minimum sample size was calculated to be 800.

Random stratified sampling was used to select the students. The students were stratified based on the faculties and the vocational schools that they studied at. The number of students were weighted according to their grades and gender. Simple random sample was used to determine the students at each departments.

In order to collect data, we reviewed the literature and used the "Student Description Form", the "Cardiovascular Disease Risk Factor Knowledge Level Scale" (CARRF-KL), and the "Healthy Lifestyle Behaviour Scale II" (HLBS II).

Student Description Form is a form consisting eight questions that are constructed after reviewing the relevant literature. The form is used to find the participants' gender, department, chronic diseases, smoking and drinking habits, family history regarding chronic diseases, , type of residence, and if they have health insurance (Vural & Bakir, 2015; Aksoy & Uçar, 2014; Murathan, Yetis, Murathan, Aktug, & Dundar 2013; Simsek et al., 2012; Tambag, 2011).

Healthy Lifestyle Behaviour Scale II (HLBS II) has been developed by Walker et al. in 1987 and The scale was revised again in 1996 and the Healthy lifestyle Behavioral Scale-II of nursing students (Walker & Hill-Polerecky 1996).

The Healthy lifestyle Behavioral Scale-II scale was adapted into Turkish by Bahar et al. in 2008. The minimum score to be obtained is 52, and the maximum is 208. The scale consists of the following 6 subscales with the minimum and maximum scores to be obtained indicated in parentheses: self-realization (9-36), health responsibility (9-36), physical activity (8-32), nutrition (9-36), interpersonal relations (9-36) and stress management (8-32).

Cronbach's alpha coefficient of the scale was .92, indicating high confidence level.

For the subscales; the reliability coefficient was .77 for health responsibilities, .79 for physical activity, .68 for nutrition, .79 for self-realization, .80 for interpersonal relations, and.64 for stress management.

Higher scores indicate that the participant has a high attitude towards positive health behaviours (Bahar, Beser, Gordes, Ersin, & Kissal, 2008).

Cardiovascular Disease Risk Factor Knowledge Level Scale (CARRF-KL) is used to measure the knowledge level about risk factors for CVDs. The scale developed and assessed for its validity and reliability by Arikan et al in 2009. The maximum score to be obtained is 28 and higher scores indicate higher knowledge level. Cronbach's alpha coefficient of the scale was 0.76 (Arikan, Metintas, Kalyoncu, & Yildiz, 2009).

During data collection, a written permission was obtained from the rectorate and the research ethics committee of the university. The students were informed about the study and their verbal consent was obtained. The *Student Description Form, HLBS II, and CARRF-KL* were conducted in face-to-face interviews.

The study was conducted between April andJune2015. After completing the surveys, hight, weight and waist circumference of the participants were measured by the same researcher in order to prevent measurement errors that may stem from the researcher. The weight scale was calibrated prior to the study.

The students were weighed standing on the scale with their shoes off. When measuring the height, the students were made to stand straight with their shoes off. The height measurement was taken with a slim bar horizontal to the floor from the crown of the head and the sole on deep aspiration.

Data Analysis

Statistical analysis of the data obtained was conducted by using SPSS 18 statistical software. Frequency tables and descriptive statistics were used to evaluate the findings. In order to determine the analysis methods for the scales, whether the variables in the scales were normally distributed was evaluated by using the Kolmogorov-Smirnov test based on the sample size (n>30). Since the data on variables of all scales were not normally distributed, non-parametric methods were used. For non-parametric methods, Mann-Whitney U test was used to compare the scale values with the two independent groups. Kruskal-Wallis H test was used to compare three and more groups with the scale values. Spearman correlation coefficient was used to analyse the relationship between the scales.

Results

Identifying Characteristics of University Students

61.5% of the participants were male and 38.5% were female. 73.4% of the participants did not have any chronic diseases, 90.1% had health insurance, 54.9% did not smoke, 68.1% did not consume alcohol, 54.1% lived at houses, 47.5% went to hospital for medical screening and 72.5% had normal weight (Table1).

Mean Score of Students on CARRF-KL According to Some Variables

Mean score obtained from the students from the CARRF-KL was 13, 97 ± 5, 2. Table 2 demonstrates the analysis of the CARRF-KL according to some of the variables. Accordingly, there was no statistically difference in terms of the CARRF-KL according to the variables of gender, health insurance and the type of residence (p>0, 05).

Statistically significant difference was found in terms of CARRF-KL according to the variable of regular doctor visit (χ^2=18,224; p=0,000). To determine which group means differed according to the variable of regular doctor visit, Bonferroni corrections were used to correct for multiple comparisons. The comparison reveals a significant difference between the participants that visited doctor in the last 1 year and those that never visited a doctor (p<0, 05). Besides, it was found that the participants that never visited a doctor scored higher in the CARRF-KL test, compared to those that visited a doctor in the last 1 year.

We also found a statistically significant difference in terms of CARRF-KL scores according to the chronic disease variable (Z=-2,374; p=0,018). The CARRF-KL scores of those without a chronic disease were higher compared to those with a chronic disease, indicating a higher knowledge level for the participants without a chronic disease. Regarding the smoking and alcohol consumption variables, no statistically significant difference was found in terms of CARRF-KL (p>0, 05). On the other hand, statistically significant difference was found in terms of CARRF-KL according to the variable of Body-Mass Index Category (χ^2=22,284; p=0,000).

To determine which group means differed according to the variable of Body-Mass Index, Bonferroni corrections were used to correct for multiple comparisons. The comparison showed statistically significant difference in terms of CARRF-KL for the participants with normal weight and the students that were underweighted, overweighed or obese (p<0, 05).

The participants that were underweighted, overweighed or obese scored higher in CARRF-KL compared to the students with normal weight.

Mean score of Students on HLBS II and* Subscales *According to Some Variables

The mean score obtained by the students from the HLBS II was 126, 72 ± 19, 1. The scores obtained by the students from the subscales were 23, 33 ± 4, 5 for self-realization; 21,10 ± 4,04 for nutrition; 18,71 ± 7,09 for physical activity; 21,53 ± 4,2 for health responsibility; 22,9 ± 4,2 for interpersonal relations; and, 19,33 ± 3,6 for stress management.

Table 3 shows the analysis of the HLBS II according to some of the variables. Accordingly, no statistically significant difference was found in terms of the HLBS II according to the gender, social security protection and the type of residence (p>0,05). According to the variable of regular doctor visit, there was a significant difference in terms of HLBS II (χ^2=14,288; p=0,003).

To determine which group means differed according to the variable of regular doctor visit, Bonferroni corrections were used to correct for multiple comparisons. The comparisons revealed a statistically significant difference between those that visited a doctor in the last 1 year and those that never visited a doctor in terms of the HLBS II (p<0, 05). The participants that visited a doctor in the last 1 year performed more positive health behaviour compared to those that never visited a doctor.

According to the variable of smoking habits, statistically significant difference was found in terms of the HLBS II (Z=-3,110; p=0,002). The participants that did not smoke scored higher from the HLBS II compared to those that smoked, indicating that those who did not smoke performed more positive health behaviour.

According to the variable of alcohol consumption, no significant difference was found in terms of the HLBS II (p>0, 05). Also, according to the variable of body-mass index category, no significant difference was found in terms of the HLBS II (p>0, 05).

Table 4 demonstrates the analysis of the subscales of the HLBS II according to some of the socio-demographic characteristics of the students. According to the chronic disease variable, there is no statistically significant difference in terms of self-realization, health responsibility, physical activity, nutrition, interpersonal relations and stress management subscales (p>0,05).

According to the alcohol consumption variable, there is no statistically significant difference in terms of self-realization, health responsibility, physical activity and stress management subscales (p>0,05).

On the other hand, a statistically significant difference was found in terms of the nutrition subscale according to the alcohol consumption variable (Z=-2,260; p=0,024). Those who did not consume alcohol scored higher from the nutrition subscale compared to those who consumed alcohol. The finding indicates that those that did not consume alcohol performed more positive health behaviour in terms of nutrition.

Besides, a statistically significant difference was also found in terms of interpersonal relations according to the alcohol consumption variable (Z=-2,551; p=0,011). Those who did not consume alcohol scored higher from the interpersonal relations subscale compared to those who consumed alcohol. This finding indicates that those who did not consume alcohol performed more positive health behaviour in terms of interpersonal relations.

Regarding the smoking variable, no statistically significant difference was found in terms of the physical activity, nutrition and interpersonal relations subscales (p>0, 05). On the other hand, a statistically significant difference was found in terms of the self-realization subscale according to the smoking variable (Z=-3,076; p=0,002).

The participants that do not smoke scored higher from the self-realization subscale compared to those who smoke. This finding shows that the non-smoker participants performed more positive health behaviour in terms of self-realization compared to the smokers. Furthermore, a statistically significant l difference for the health responsibility subscale according to the smoking variable was found (Z=-2,059; p=0,040). Those that did not smoke scored higher for the health responsibility subscale compared to those that smoked.

The finding indicates that the non-smokers performed more positive health behaviour in terms of health responsibility compared to the smokers. Finally, a statistically significant difference in terms of the stress management subscale according to the smoking variable was

found(Z=-2,354; p=0,019). The non-smoker participants scored higher from the stress management subscale compared to the smoker participants. This finding meant that the non-smokers performed more positive health behaviour in terms of stress management than other participants.

Table 1. Descriptive Characteristics of the Participants

Variable	n	%
Gender		
Female	308	38.5
Male	492	61,5
Chronic Disease		
Yes	213	38.5
No	587	61.5
Health insurance		
Yes	721	90.1
No	79	9.9
Doctor Visit		
Last 1 Year	380	47.5
Last 2 Years	108	13.5
Last 3 Years	63	7.9
Never Visited	249	31.1
Body-Mass Index		
Underweight	41	5.1
Normal Weight	580	72.5
Overweight	166	20.8
Obese	13	1.6
Smoking		
Yes	369	46.1
No	431	54.9
Alcohol Consumption		
Yes	255	31.9
No	545	68.1
Type of Residence		
Dormitory	365	45.6
House	433	54.1
Other	2	0.3

Table 2. The Analysis of the CARRF-KL according to the Variables

Variable	n	CARRF-KL Score Statistical Analysis * Median Probability
Gender		
Female	308	14.00 Z=-0.660
Male	492	14.00 p=0.509
Social Security		
Yes	721	14.00 Z=-0.241
No	79	14.00 p=0.810
Type of Residence**	365	14.00 Z=-1.286
Dormitory	433	14.00 p=0.198
House		
Doctor Visit	380	13.00
Last 1 Year	108	14.00 **χ^2=18.224**
Last 2 Years	63	14.00 **p=0.000**
Last 3 Years	249	15.00 **(1-4)**
Never Visited		
Chronic Disease	213	13.00 **Z=-2.374**
Yes	587	14.00 **p=0.018**
No		
Alcohol Consumption	255	14.00 Z=-1.066
Yes	545	14.00 p=0.286
No		
Smoking Habits		
Yes	369	14.00 Z=-0.190
No	431	14.00 p=0.849
Body-Mass Index		
Underweight	41	16.00 **χ^2=22.284**
Normal Weight	580	13.00 **p=0.000**
Overweight	166	16.00
Obese	13	18.00

* Mann-Whitney U (Z value); **Kruskal-Wallis H (χ^2 value)

Table 3. Analysis of the HLBS II according to the Variables

Variables	n	HLBS II Median	Statistical Analysis * Probability
Gender			
Female	308	124.50	Z=-1.240
Male	492	126.00	p=0.215
Social Security			
Yes	721	125.00	Z=-0.352
No	79	126.00	p=0.725
Type of Residence**			
Dormitory	365	125.00	Z=-0.385
House	433	125.00	p=0.700
Doctor Visit			
Last 1 Year	380	127.00	
Last 2 Years	108	125.00	**χ^2=14.288**
Last 3 Years	63	127.00	**p=0.003**
Never Visited	249	122.00	
Chronic Disease			
Yes	213	125.00	Z=-0.345
No	587	125.00	p=0.730
Alcohol Consumption			
Yes	255	126.00	Z=-0.958
No	545	125.00	p=0.338
Smoking Habits			
Yes	369	124.00	**Z=-3.110**
No	431	127.00	**p=0.002**
Body-Mass Index			
Underweight	41	128.00	
Normal Weight	580	125.00	χ^2=1.251
Overweight	166	127.00	p=0.741
Obese	13	123.00	

* Mann-Whitney U (Z value); **Kruskal-Wallis H (χ^2 value)

Table 3. Analysis of the HLBS II according to the Variables

Variables	n	HLBS II Median	Statistical Analysis * Probability
Gender			
Female	308	124.50	Z=-1.240
Male	492	126.00	p=0.215
Social Security			
Yes	721	125.00	Z=-0.352
No	79	126.00	p=0.725
Type of Residence**			
Dormitory	365	125.00	Z=-0.385
House	433	125.00	p=0.700
Doctor Visit			
Last 1 Year	380	127.00	
Last 2 Years	108	125.00	**χ^2=14.288**
Last 3 Years	63	127.00	**p=0.003**
Never Visited	249	122.00	
Chronic Disease			
Yes	213	125.00	Z=-0.345
No	587	125.00	p=0.730
Alcohol Consumption			
Yes	255	126.00	Z=-0.958
No	545	125.00	p=0.338
Smoking Habits			
Yes	369	124.00	**Z=-3.110**
No	431	127.00	**p=0.002**
Body-Mass Index			
Underweight	41	128.00	
Normal Weight	580	125.00	χ^2=1.251
Overweight	166	127.00	p=0.741
Obese	13	123.00	

* Mann-Whitney U (Z value); **Kruskal-Wallis H (χ^2 value)

Table 4. Analysis of the Subscales of the HLBS II According to the Variables

Variable	n	Self-Realization Median	Health Responsibility Median	Physical Activity Median	Nutrition Median	Interpersonal Relations Median	Stress Management Median
Chronic Disease							
Yes	213	23.00	22.00	19.00	21.00	23.00	19.00
No	587	23.00	21.00	18.00	20.00	23.00	19.00
Statistical Analysis		Z=-0.176	Z=-1.573	Z=-0.230	Z=-1.474	Z=-0.870	Z=-0.168
Probability		p=0.860	p=0.116	p=0.818	p=0.141	p=0.385	p=0.867
Alcohol Consumption							
Yes	255	23.00	21.00	18.00	20.00	22.00	19.00
No	545	23.00	21.00	18.00	21.00	23.00	19.00
Statistical Analysis			Z=-1.104	Z=-1.442	Z=-2.260	Z=-2.551	Z=-0.715
Probability			p=0.269	p=0.149	p=0.024	p=0.011	p=0.475
Smoking							
Yes	369	23.00	21.00	18.00	20.00	23.00	19.00
No	431	24.00	22.00	18.00	21.00	23.00	20.00
Statistical Analysis		**Z=-3.076**	**Z=-2.059**	Z=-0.510	Z=-1.585	Z=-1.875	**Z=-2.354**
Probability		**p=0.002**	**p=0.040**	p=0.610	p=0.113	p=0.061	**p=0.019**
Bady Mass İndex							
Underweight	41	23.00	21.00	16.00	20.00	25.00	18.00
Normal Weight	580	23.00	21.00	18.00	21.00	23.00	19.00
Overweight	166	24.00	22.00	19.00	21.00	23.00	20.00
Obese	13	24.00	21.00	16.00	19.00	25.00	18.00
Statistical Analysis		χ^2=3.401	χ^2=0.773	**χ^2=11.995**	χ^2=3.446	χ^2=3.343	χ^2=4.395
Probability		p=0.334	p=0.856	**p=0.007**	p=0.328	p=0.342	p=0.222
Gender							
Female	308	23.00	21.00	17.00	20.00	23.00	20.00
Male	492	23.00	21.00	19.00	21.00	23.00	19.00
Statistical Analysis		Z=-1.103	Z=-1.069	**Z=-4.461**	**Z=-2.655**	Z=-0.943	Z=-0.408
Probability		p=0.270	p=0.285	**p=0.000**	**p=0.00**	p=0.346	p=0.683

* Mann-Whitney U (Z Value); **Kruskal-Wallis

Table 5. The Relationship between the CARRF-KL and the HLBS II and its Subscales

CORRELATION* (n=800)	CARRF-KL

HLBS II		
Self-Realization	r=0.104	p=0.003
Health Responsibility	r=0.254	p=0.000
Physical Activity	r=0.008	p=0.829
Nutrition	r=-0.033	p=0.346
Interpersonal Relations	r=0.266	p=0.000
Stress Management	r=-0.005	p=0.887

***Spearman Correlation Coefficient**

According to the Body-Mass Index Category variable, no statistically significant difference was found in terms of self-realization, health responsibility, nutrition, interpersonal relations and stress management subscales (p>0,05). On the other hand, according to the Body-Mass Index Category, a statistically significant difference in terms of the physical activity subscale was found (χ^2=11,995; p=0,007). To determine which group means differed according to the variable of Body-Mass Index, Bonferroni corrections were used to correct for multiple comparisons. The comparisons showed statistically significant difference between the participants at underweight and normal weight categories and those at overweight category in terms of physical activity (p<0, 05). The finding indicates that the participants at overweight category perform more positive health behaviour in terms of physical activity compared to those at underweight and normal weight categories.

Regarding the gender variable, the study found no statistically significant difference in terms of the self-realization, health responsibility, interpersonal relations and stress management subscales (p>0, 05). On the other hand, a statistically significant difference for the gender variable in terms of physical activity subscale was found (Z=-4,461; p=0,000). The study showed that the male participants scored higher from the physical activity subscale compared to the female participants. This finding indicates that the male participants perform more positive health behaviour in terms of physical activity compared to the female participants. A statistically significant difference for the nutrition subscale in terms of the gender variable was also found (Z=-2,655; p=0,008). The male participants scored higher from the nutrition subscale compared to the female participants. This shows that the male participants perform more positive health behaviour in terms of nutrition compared to the female participants.

The Relationship Between the CARRF-KL and the HLBS II and İts Subscales

Table 5 shows the relationship between the CARRF-KL and the HLBS II scales and the latter's subscales. The findings show a positive and statistically significant relationship between the CARRF-KL and the HLBS II mean scores but the relationship is very weak (r=0,104; p=0,003). A positive and statistically significant relationship between the scores of the CARRF-KL and the self-realization subscale of the HLBS II was found. However, this relationship was very weak (r=0,254; p=0,000). This finding indicates that a weak increase in knowledge level about the cardiovascular disease risk factors leads to a weak increase in more positive health behaviour about self-realization. Furthermore, a positive and statistically significant relationship between the CARRF-KL mean score and the interpersonal relations subscale of the HLBS II was found. However, this relationship was very weak. (r=0, 66; p=0,000). This finding means that a weak increase in knowledge level about the cardiovascular disease risk factors is associated with a weak increase in more positive health behaviour about interpersonal relations.

Discussion

Cardiovascular diseases constitute an important health problem not only in Turkey but around the world, which is rapidly increasing in number and causing morbidity and mortality. World Health Organization has declared that the most important risk factors for the development of noncommunicable chronic diseases, including the cardiovascular diseases were smoking, having an unhealthy diet, doing inadequate physical activities and alcohol consumption. These unhealthy practices prepare the ground for cardiovascular diseases by leading to metabolic or physiologic changes such as hypertension, overweight or obesity, diabetes and dyslipidaemia (WHO, 2016) .Nearly half of the

participants in present study have smoking habits (46.1%), 31.9% consumed alcohol, 20.8% were overweight, 1, 6% were obese and 26.1% had chronic diseases.

The study found that the mean score obtained from the HLBS II scale was 126, 72 ± 19, 1. Other studies conducted over university students in Turkey found the mean HLBS II score ranging between 121.92±1.10 and 136.12 ± 19.16 (Vural & Bakir, 2015; Aksoy & Uçar, 2014; Murathan et al.,2013; Simsek et al., 2012; Tambag, 2011; Ozbasaran, Çetinkaya, & Gungor,2004). Therefore, it could be stated that university students had a moderate level of healthy lifestyle behaviors. Doing regular exercise and heaving a healthy diet are essential to prevent cardiovascular diseases. American Heart Association (AHA) and European Heart Network (EHN) suggest adults between 18 and 84 to perform 150 minutes of medium-intensity exercise and 75 minutes of high-intensity exercise per week (Pearson et al., 2013; European Heart Network Summary Report, 2012). According to the results of this study, the highest mean score of the subscales of the HLBS scale belonged to the self-realization subscale (23, 33 ± 4, 5), whereas the lowest mean score belonged to the physical activity subscale (18, 71 ± 7, 09). The other HLBS subscales with a score that was lower than the total mean score were the stress management (19, 33 ± 3, 6) and the nutrition (21, 10 ± 4, 04) subscales. Furthermore, the stress management mean score of the smoker participants, the nutrition and interpersonal relation mean scores of the participants that consumed alcohol, and the physical activity mean score of the obese participants were lower in a statistically significant manner ($p<0.05$). These findings show that participant students do not perform positive health behaviours in terms of exercise, nutrition and stress management. Low physical activity and long hours of sedentary work was also reported in other studies carried out among university students (22%–62%) (Gurdogan, Kurt, & Unsar, 2014, Brandao, Pimentel, Silva, & Cardoso,2008; Irwin, 2007).

The mean CARRF-KL scores obtained from the participants in this study is 13.97 ± 5.2. Findings from related studies in the literature are consistent with those in the present study. In a study on students of health sciences by Gurdogan et al.(2014) the mean score was 17.86 ± 2.83 (Gurdogan et al., 2014). In a study by Arikan et al. (2009) on health professionals found the score as 19.3±3.2 (Arikan et al.,2009). Similarly, in study of Tan et al.(2013) on women living in rural areas found the mean score as 13.05±6.93 (Tan, Dayapoglu, Sahin, Z, Curcani, & Polat, 2013). This study found a positive and significant relationship between the scores obtained from the CARRF-KL and the HLBS II scales. A positive and significant relationship between the self-realization subscale of the HLBS scale and the CARRF-KL scores was also found. This finding shows the importance of positive health behaviours to prevent cardiovascular diseases. This is supported by previous studies (Amruth, Mullick, Balakrishna, & Prabhudeva, 2015; Ammouri et al., 2016; Arikan et al.,2009; Baig et al., 2015; Khan et al., 2006; Awad, & Al-Nafisi 2014; Giri et al., 2012). Ammouri et al. (2016) reported that low knowledge levels of CHD risk factors were observed among the studied community sample in Oman; this is likely to limit the participants' ability to engage in preventative practices (Ammouri et al., 2016). In study conducted by Baig et al. (2015) on university students found that most of the participants had a CARRF-KL level of 42% and that the participants did not have adequate knowledge, attitude and behaviours (Baig et al.,2015). Furthermore, they also found that most of the participants believed that smoking, obesity, hypertension and increase in LDL cholesterol level were the primary causes of the development of cardiovascular diseases. The participants of the study of Baig et al. (2015) thought that regular exercise and control of blood glucose, cholesterol and blood pressure levels are important to prevent cardiovascular diseases. Additionally, most of the participants did not do exercise and have a healthy diet to prevent cardiovascular diseases (Baig et al., 2015). In the studies of Khan et al. (2006), and Vanhecke et al. (2006), it was shown that the participants did not have adequate knowledge levels about risk factors of cardiovascular diseases (Khan et al. 2006; Miller, Franklin,Weber, & McCullough, 2006) . In Kuwaiti, in study of Awad & Al-Nafisi (2014) on public knowledge of cardiovascular disease and its risk factors found that there are deficiencies in CVD knowledge among Kuwaiti population, which could turn into insufficient preventative behaviours and suboptimal patient outcomes. Also, the commonest risk factors identified by over four-fifths of respondents were smoking, obesity, unhealthy diet and physical

inactivity (Awad & Al-Nafisi, 2014). In study of Giri et al. (2012) showed high prevalence of cardiovascular risk behaviours among the medical students and they found a very high prevalence of physical inactivity, smoking, heavy alcohol consumption, inappropriate fruit and vegetable consumption and a high level of perceived stress (Giri et al., 2012).

In Turkey, the study of Badir et al. (2015) on students studying at the school of nursing showed that more than half of the participants were unaware of the fact that cardiovascular diseases constitute the primary cause of mortality and morbidity in Turkey and around the world. 35.3% of the participants were not aware of the fact that cardiovascular diseases may be prevented and nearly half of the participant students (50.4%) did not know about the proper exercises required to prevent cardiovascular diseases, thinking that walking slowly and strolling may prevent cardiovascular diseases. Although the majority of the participants knew that hypertension and hyperlipidaemia are risk factors, only 46.4% knew that the treatment of hypertension continues for a life time.

Furthermore, 35.4% of the participants expressed that they did not know the fact that low HDL levels constitute a risk for heart diseases (Badir, Tekkas, & Topcu, 2015). This study found that the CARRF-KL mean scores of the participants with chronic diseases were significantly lower compared to those without chronic diseases ($p<0.05$).The study of Baig et al. (2015) found that the knowledge levels of the participants with diabetes (30.3%) and chronic renal failure (17.9%) about the risk factors of cardiovascular diseases were significantly lower (Baig et al.,2015). Unlike the findings of this study, various studies found no significant difference between the existence of chronic disease and the knowledge level regarding the risk factors of cardiovascular diseases (Gurdogan et al., 2014; Awad & Al-Nafisi, 2014).

Conclusions

The evaluation of the knowledge levels of the participants in this study about the risk factors of cardiovascular diseases show that the participants did not have adequate knowledge and that there is a positive and significant relationship between positive health behaviours and cardiovascular disease risk factor knowledge levels.

Due to this, the students should be informed about the cardiovascular risk factors and positive health behaviours to prevent cardiovascular diseases during the academic education. Training programs may be in the form of seminars, conferences or courses. In this way, awareness about the fact that the cardiovascular diseases are preventable may be increased.

This study showed that the existence of chronic diseases and regular doctor visit have an impact over the knowledge level about the cardiovascular disease risk factors. Therefore, it may be concluded that studies and screening on chronic diseases and regular doctor visits may prevent cardiovascular chronic diseases.

Limitations

There were potential limitations to this study.The questions that assess some cardiovascular disease risk factors (hypertension, raised blood glucose, diabetes, cholesterol / lipids, genetic predisposition, etc.) are not included in the questionnaire used in the study.

The questionnaire contains a small number of questions, as students from different departments and at grade level participated in the study.

The sample used in the present study used students from Karabuk, Turkey; more geographically diverse data are needed to enable nation or worldwide generalizations of Turkish university students' knowledge levels about cardiovascular risk factors and health behaviors.

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