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RESEARCH ARTICLE

DETERMINATION OF MULTIPLE CANCER RISK BEHAVIORS AMONG ADULT POPULATION IN TURKEY: A CROSS-SECTIONAL STUDY

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ABSTRACT

Purpose: Modifiable cancer risk behaviors are general not seen alone but in combination in individuals. This study aims to investigate the factors associated with combinations of cancer risk behaviors, including tobacco use, obesity, and low physical activity that cause cancer in adults.
Material and Methods: A total of 720 adults were selected using the multi-stage cluster sampling method. Data were collected using the World Health Organization STEP-wise protocols.
Results: It was found that 46.9% of the participants showed one, 46.3% two or more types of risk behavior. The percentage of married individuals was higher among those who engaged in one, two, or three risky behaviors than those who did not engage in risky behaviors. Among participants with two risk behaviors, the percentage of those who rated their health as very good was lower than those without risk behaviors; those who had friends or relatives with cancer were high. Those who engaged in three risk behaviors were less educated and had lower incomes than those who did not engage in risk behaviors.
Conclusion: Health intervention strategies should be increased in primary health care institutions for individuals who are married, has low level of education and income and has weak perception of health.

Keywords: Cancer risk, cluster sampling method, modifiable cancer risk behavior

INTRODUCTION

Globally, around 19.3 million people were diagnosed with new cancer types, and 10 million died from those in 2020 (1). It is reported around 21.9 million people worldwide and 267 thousands people in Turkey will be affected by cancer in 2025 (1). Cancer is not a single disease but a group of interrelated agents. Various factors such as people's genes, lifestyles, nutrition, and environment may affect cancer risks (1,2).

Between 30% and 50% of cancer deaths could be prevented in the community by modifying or avoiding key risk factors and implementing existing evidence-based prevention strategies (1). In a study conducted in the America, it was found that the most important causes of cancer cases and deaths were smoking, excessive body weight and alcohol intake, respectively (3). In another study conducted in China, the prevalence of cancer risk factors were found to be 45.3% for overweight or obesity, 24.1% for smoking and 16.2% for alcohol consumption (4). The literature emphasizes that those risk factors do not usually occur alone, but in combination. It is also declared that possessing a risk factor brings about other risk factors (5,6). A study conducted in Canada discovered that the prevalence of modifiable

behavioral risk factors was 21.5% (5). In a study conducted in Brazil, 59.0% of individuals were found to have two or more risk behaviors (7). In a study conducted in China, it was determined that 98.6% of the participants showed at least two risk factors (4). A study in Canada found that the frequency of modifiable multiple risk behaviors was higher than the frequency of zero or one risk behavior (8). In two separate cohort studies, cancer death rates were found to decrease by avoiding modifiable risk behavior combinations (9,10).

The incidence of modifiable risk factors was found to be slightly higher in Turkey than in the United States (US) and European datas (1). These rates were reported in Turkey as 49.4% for physical inactivity, 28.0% for tobacco use, and 21.1% for obesity. Alcohol consumption (14.0%) is lower due to cultural values (11). Cancer prevention is a critical public health concern because it reduces new cancer cases, the burden of care, and cancer-related deaths (12). The modifiable risk factors if timely controlled could prevent the emergence of future noncommunicable diseases (10,13). For this reason, public health professionals have important roles in identifying, reducing, and preventing cancer risks in society and in encouraging individuals to adopt healthy lifestyles (14).

In Turkey, studies that analyze modifiable cancer risk behaviors independently of one another have been published (15,16); however, studies addressing multiple risk behaviors and the factors influencing those risk behaviors have not been performed. This cross-sectional study aims to investigate combination of risk behaviors that cause cancer, such as tobacco use, obesity, lack of physical activity, as well as the relationship between those risk behaviors and demographic features and health history.

MATERIAL AND METHODS

Study Design, Population, and Sampling

The cross-sectional study was conducted between November 1 and 30, 2019, in Konyaalti district of Antalya province. Voluntary individuals between the ages of 25-64, who were determined by considering adulthood and maturity stages from Erikson's (17) stages of psychosocial development, spoke Turkish, had no physical disability for BMI measurement, and were not pregnant, participated in the study. Sample size was calculated using the formula $n=Z^2 P(1-P)/e^2$ according to World Health Organization (WHO) STEPS guidelines (18). In calculating the sample size, the low physical activity value (p=50%) (19), which has the highest prevalence among risk behaviors in cancer in Turkey, was used and the sample size was found to be 384 at the 95% confidence interval (level of confidence [Z]=1.96; margin of error [e]=0.05) (18). And also, the sample size was calculated as 720, considering the design effect (d=1.5) and the non-response factor (20%) (18).

In this study the two-stage cluster sampling technique was used. This technique is a sampling plan used to provide heterogeneous groupings within the cluster and homogeneous groupings between clusters since the population of the study was covering a large geographical area (20). The household size in Konyaaltı district was 2.86, and the population percentage of 25-64-year-olds was 57.3%. Using this data and assuming that two people from the target population could be reached in each household, the target number of households was calculated to be 360. Consistent with this calculation, the plan was to randomly target 20 households in each cluster, and the total number of clusters was set at 18. All neighborhoods in Konyaalti district are listed according to their adult population size (21). Then, 18 clusters were selected according to probability proportional sample to size of the neighborhood population, and the cluster size (sample size/cluster numbers=720/18) was determined to be 40 (22).

After the map of each selected neighborhood was taken from "Google Maps", the starting address of each cluster was determined as the center of the cluster. Adult individuals from each household were listed and two eligible individual randomly with the Sealed Envelope method invited to participate in the study were included. The number of households in each cluster was completed by passing to the household with the nearest front door to the cluster starting address. Finally, 720 adults from 18 clusters were included in the analysis.

Measures

The data collection form consisted of demographic characteristics and a health history form.

Demographics Characteristics Form

This form consists of six questions: age, gender, educational level, marital status, income status, and employment status. Age was asked as open-ended; gender, marital status, employment, education, and income as categorically.

Health History Form

BMI: This variable was calculated with the formula weight (kg)/[height (m)]^2 using digital measuring instruments (23). Those with a BMI of 30 or more were considered to be obese (1).

Physical activity: This variable was assessed with the International Physical Activity Questionnaire (IPAQ). There were seven questions in the form, which asked about the physical activity performed in the last seven days. According to IPAQ guidelines for data processing and analysis, the total amount of physical activity is converted to metabolic equivalents (METs), where one MET corresponds to energy expenditure at rest. Based on the values obtained, the physical activity level of the subjects was classified as inactive, less active, and sufficiently active (24,25). In this study, individuals with ≤3000 MET-min.g/wk were defined as having low physical activity.

Tobacco use: The question on tobacco use evaluated in this study was assessed with the T1-coded question from the Turkish version of the WHO STEPS document (15). "Do you currently use tobacco products such as cigarettes, cigars, or hookahs?" The questions were evaluated as 'Yes' or 'No.'

General perceived health status: The general perceived health status was assessed using a single question from the SF-12 Quality of Life Scale (26). General health assessment question: "How would you rate your general health: Excellent (1), Very Good (2), Good (3), Fair (4), or Poor (5)."

Presence of cancer disease: Cancer disease was asked with the questions, "Have you ever been diagnosed with cancer?", "Has a first-degree relative in your family been diagnosed with cancer?" and "Has anyone in your immediate environment (e.g., a neighbor or friend) been diagnosed with cancer?". Responses were evaluated as 'Yes' or 'No.'

Using healthcare services: The question for this section is, "Can you indicate how often you consulted a physician in the last six months?" was asked as an open-ended question.

Data Collection

Data were collected according to the first two steps of the WHO STEP-wise approach. In STEP (1), the subjects' demographic characteristics and health history were questioned, and in STEP (2), the height and weight of the subjects were measured (18). Participants were asked to wear light clothes without shoes, and their height and weight were measured using a 0.1 kg precision digital scale (Jadever) calibrated every ten measurements and an automatic hanging tape measure (UGR Tape Measure Three m h-378w) (23). Data were collected in participants' homes by four interviewers who received one-hour training on the study and its methodology. Data collection time for each participant took approximately 15-20 minutes.

Ethical Aspect of the Study

Official approval for the study was granted by the Clinical Research Ethics Committee of Akdeniz University Faculty of Medicine (No: 70904504/134, Date: 10.07.2019) and the Antalya Provincial Health Directorate (No: 83299781-806.01.03, Date: 21.08.2019). Informed consent was obtained from the participants.

Data Analysis

The analysis included data on three risk behaviors (tobacco use, obesity, and low physical activity) from a total of 720 individuals. Risk behavior groups were scored as 0, 1, 2, or 3. The SPSS 23.0 package program was used for all analyses. The conformity of the variables to the normal distribution was examined using histograms, Q-Q plots, and the Kolmogorov-Smirnov test.

The Chi-Square test and Kruskal-Wallis H test were used to compare the relationship between the number of risk behavior groups and demographic characteristics and health history variables. The numerical variables of risk behavior were determined as class variables instead of ordinal variables to perform the multi-group difference test. If the multi-group difference test was significant, pairwise tests were performed to compare each risk behavior group with the zero-risk behavior group.

The combinations of risk behavior were compared using pairwise tests. To assess risk behaviors and risk behavior combinations with demographic and health history variables, the Chi-Square test, Fisher's Exact test, and t-test were used. Risk behavior combinations (Tobacco Use+Obesity, Tobacco Use+Low Physical Activity, Low Physical Activity+Obesity, Tobacco Use+Obesity+Low Physical Activity) were identified to form risk behavior groups. $p<0.05$ was considered statistically significant in all analyses.

Table 1. Demographic factors and health history of participants (n=720)

Variable	Subgroups	mean±SD
Demographic		
Age (years)		42.3±10.5
		n (%)
Gender		
	Women	420 (58.3)
	Men	300 (41.7)
Education		
	High school and below	343 (47.6)
	High school higher	377 (52.4)
Marital status		
	Single / divorced	206 (28.6)
	Married / partnership	514 (71.4)
Income		
	2500 TL below	64 (8.9)
	2500-4000 TL	153 (21.3)
	4200-6000 TL	207 (28.7)
	6500 TL and above	296 (41.1)
Employment status		
	Yes	431 (59.9)
	No	289 (40.1)
Health history		
Perceived health status		
	Excellent	15 (2.1)
	Very Good	104 (14.4)
	Good	350 (48.6)
	Moderate	223 (31.0)
	Poor	28 (3.9)
Have a history of cancer		
	Yes	34 (4.7)
	No	686 (95.3)
Cancer family history		
	Yes	354 (49.2)
	No	366 (50.8)
History of cancer in the immediate enviroment		
	Yes	448 (62.2)
	No	272 (37.8)
Consulting a physician in the past six months		
	Under five	679 (94.3)
	Five and above	41 (5.7)

TL: Turkish lira.

Table 1. Continue

Health history	Subgroups	n (%)
Risk behaviors (n=720)		
	Low physical activity	592 (82.2)
	Tobacco use	363 (50.4)
	Obesity	78 (10.8)
Number of risk factors (n=720)		
	0	49 (6.8)
	1	338 (46.9)
	2	308 (42.8)
	3	25 (3.5)
Distribution of individuals with at least two risk behaviors (n=333)		
	Low physical activity + Tobacco use	261 (78.4)
	Obesity + Low physical activity	37 (11.2)
	Obesity + Tobacco use	10 (3.0)
	Low physical activity + Tobacco use + Obesity	25 (7.5)

RESULTS

Demographics and Health History

It was found the mean age of participants was 42.3±10.5 years, 58.3% were female, 71.4% were married/partnered, and 41.1% had an income of 6500 Turkish lira (TL) and above (In November 2019, 1 USD is equivalent to 5.76 TL). It was found about 35% of people were rated their health status as moderate or poor, and 62% had a history of cancer in immediate environment (Table 1).

It was found 82.2% of participants had lower physical activity, 50.4% used tobacco, and 10.8% were obese. It was also found 6.8% of individuals had no risk behaviors, 46.9% had one risk behavior, 42.8% had two risk behaviors, and 3.5% had three risk behaviors (Table 1).

Among those with at least two risk behaviors, 78.4% had a combination of lower physical activity and tobacco use, 11.2% had a combination of obesity and low physical activity, 3.0% had a combination of obesity and tobacco use, and 7.5% had a combination of three risk behaviors (Table 1).

The Relationship Between Demographic and Health History Factors and the Number of Modifiable Risk Behaviors in Adults, Including Tobacco Use, Obesity, and Low Physical Activity

It was determined that there was a significant difference between the participants' risk behavior groups and their educational background (p=0.028), marital status (p=0.008), income level (p=0.020), perceived health status (p=0.000), and history of cancer in the immediate environment (p=0.015). The rate of married ones was lower among those who reported no risk behavior when compared to those with one risk behavior (51.0% vs. 72.5%, p=0.002). The rate of those who were married (74.0% vs. 51.0%, p=0.001) and had cancer history in their immediate environment was lower (46.9% vs. 67.2%, p=0.006) and the rate of those who had a very good perceived health was higher among those reporting no risk behaviors when compared to those reporting two risk behaviors (7.1% vs. 28.6%, p=0.000). Among those who reported no risk behaviors, the rate of those having college education (59.2% vs. 24.0%, p=0.001) and higher was higher and the rate of those who were married (51.0% vs. 64.0%, p=0.000) and earned the minimum wage and lower income (16.0% vs. 2.0%, p=0.000) was lower compared to those reporting three risk behaviors (Table 2).

Demographic and Health History Factors Most Strongly Associated with Combinations of Modifiable Risk Behaviors in Adults

Among individuals with one risk behavior, the rate of tobacco use is higher than the rate of obesity among men (2.3% vs. 97.7%, p=0.019), singles (100.0% vs. 0.0%, p=0.043), and workers (1.7% vs. 98.3%, p=0.000). Among individuals with one risk behavior, the mean age of those who do low physical activity is higher than those who use tobacco (44.4±10.8 vs. 37.0±9.8, p=0.000). Women (12.4% vs. 87.6%, p=0.000), married people (16.8% vs. 83.2%, p=0.013), unemployed people (6.7% vs. 93.3%,

Table 2. Comparison of the relationship between cancer risk behavior groups and individuals' demographic and health history factors (n=720)

Variable		Risk Behaviors				p-values			
		0 (n=49)	1 (n=338)	2 (n=308)	3 (n=25)		pairwise		
						Statistics	0 vs. 1	0 vs. 2	0 vs. 3
Demographic factors									
Age	Age (years) mean±SD	38.6±11.0	42.9±11.0	42.0±9.7	43.8±11.4	χ^2=7.634[a] 0.054			
		n (%)	**n (%)**	**n (%)**	**n (%)**				
Gender	Women	29 (59.2)	208 (61.5)	170 (55.2)	13 (52.0)	χ^2=3.104 0.376			
	Men	20 (40.8)	130 (38.5)	138 (44.8)	12 (48.0)				
Education	High school and below	20 (40.8)	158 (46.7)	146 (47.4)	19 (76.0)	χ^2=9.091 0.028*	0.436	0.391	0.001[b]**
	High schoolhigher	29 (59.2)	180 (53.3)	162 (52.6)	6 (24.0)				
Marital status	Single / divorced / widowed	24 (49.0)	93 (27.5)	80 (26.0)	9 (36.0)	χ^2=11.869 0.008**	0.002**	0.001**	0.000***
	Married / partnership	25 (51.0)	245 (72.5)	228 (74.0)	16 (64.0)				
Income	2500 TL below	1 (2.0)	35 (10.4)	24 (7.8)	4 (16.0)	χ^2=19.662 0.020*	0.211	0.440	0.000***
	2500-4000 TL	10 (20.4)	62 (18.3)	72 (23.4)	9 (36.0)				
	4200-6000 TL	17 (34.7)	88 (26.0)	100 (32.5)	2 (8.0)				
	6500 TL and above	21 (42.9)	153 (45.3)	112 (36.4)	10 (40.0)				

χ^2: Chi-Square Test; a: Kruskal-Wallis Test; b: Fisher's Exact Test; SD: Standard Deviation; TL:Turkish lira; *p<0.05; **p<0.01; ***p<0.001.

Table 2. Continue

Variable		Risk behavior group				p-values			
		0 (n=49)	1 (n=338)	2 (n=308)	3 (n=25)		pairwise		
		n (%)	n (%)	n (%)	n (%)	**Statistics**	0 vs. 1	0 vs. 2	0 vs. 3
Demographic factors									
Employment status	Yes	27 (55.1)	198 (58.6)	195 (63.3)	11 (44.0)	χ^2=4.837 0.184			
	No	22 (44.9)	140 (41.4)	113 (36.7)	14 (56.0)				
Health history									
Perceived health status	Excellent	0 (0)	7 (2.1)	7 (2.3)	1 (4.0)				
	Very Good	14 (28.6)	65 (19.2)	22 (7.1)	3 (12.0)	χ^2=64.185			
	Good	24 (49.0)	186 (55.0)	129 (41.9)	11 (44.0)	0.000***	0.466	0.000***	0.089
	Moderate	9 (18.4)	71 (21.0)	133 (43.2)	10 (40.0)				
	Poor	2 (4.1)	9 (2.7)	17 (5.5)	0 (0)				
Have a history of cancer	Yes	4 (8.2)	17 (5.0)	12 (3.9)	1 (4.0)	χ^2=1.857			
	No	45 (91.8)	321 (95.0)	296 (96.1)	24 (96.0)	0.603			
Cancer family history	Yes	24 (49.0)	171 (50.6)	143 (46.4)	16 (64.0)	χ^2=3.400			
	No	25 (51.0)	167 (49.4)	165 (53.6)	9 (36.0)	0.334			

χ^2: Chi-Square test; a: Kruskal-Wallis H test; b: Fisher's Exact test; SD: Standard Deviation; TL:Turkish lira; *p<0.05; **p<0.01; ***p<0.001.

Table 2. Continue

Variable		Risk behavior group				p-values			
		0 (n=49)	1 (n=338)	2 (n=308)	3 (n=25)		pairwise		
		n (%)	n (%)	n (%)	n (%)	**Statistics**	0 vs. 1	0 vs. 2	0 vs. 3
Health history									
History of cancer in the immediate environment	Yes	23 (46.9)	206 (60.9)	207 (67.2)	12 (48.0)	χ^2=10.511			
	No	26 (53.1)	132 (39.1)	101 (32.8)	13 (52.0)	0.015*	0.062	0.006**	0.555
Consulting a physician in the past six months	Under five	46 (93.9)	322 (95.3)	289 (93.8)	22 (88.0)	χ^2=2.578			
	Five and above	3 (6.1)	16 (4.7)	19 (6.2)	3 (12.0)	0.461			

χ2: Chi-Square Test; *p<0.05; **p<0.01; ***p<0.001.

p=0.000), and people with cancer in their immediate environment (14.4% vs. 85.6%, p=0.001) have higher rates of low physical activity than tobacco users. Among those with the two risk behaviors, the combination of obesity and low physical activity had a higher mean age than those with a combination of obesity and tobacco use (50.0±10.5 vs. 39.9±7.6, p=0.007). The proportion of unemployed with a combination of obesity and low physical activity was higher than those with a combination of obesity and tobacco use (10.3% vs. 89.7%, p=0.030). Those with a combination of low physical activity and tobacco use had a lower mean age than those with a combination of obesity and low physical activity (41.0±9.1 vs. 50.0±10.5; p=0.000). The rate of men with a combination of low physical activity and tobacco use (6.7% vs. 93.3%, p=0.006), those with an academy degree or above (95.5% vs. 4.5%, p=0.000), those with an income of 6500 TL or more (6.5% vs. 93.5%, p=0.000), those who are employed (5.9% vs. 94.1%, p=0.000), those without a history of cancer (88.8% vs. 11.2%, p=0.009), and those with fewer than five physician visits in the past six months (90.4% vs. 9.6%, p=0.000) were higher than those with a combination of obesity and low physical activity. Among those with fewer than five physician visits in the past six months, the rate of those with a combination of low physical activity and tobacco use was higher than the rate of those with a combination of obesity and tobacco use (2.7% vs. 97.3%, p=0.003).

Among those with three risk behaviors, the rate of those with an academy degree or above (96.2% vs. 3.8%, p=0.001), those with an income of 4200-6000 TL (97.8% vs. 2.2%, p=0.008), those who are employed (94.1% vs. 5.9%, p=0.017), and those with less than five physician visits in the past six months are lower than those with the two most common risk behaviors (92.1% vs. 7.9%, p=0.035) (low physical activity and tobacco use).

DISCUSSION

Tobacco use, obesity due to an unhealthy diet, and low physical activity are among the important risk factors that cause cancer worldwide (1,2). In this study, it was determined that the rates of low physical activity and tobacco use were higher than the studies conducted in different countries and Turkey, and the obesity rate was lower (1,5,15,27). The negligence of physical activity concerning cultural values can explain why low physical activity is seen at higher rates than other risk behaviors in Turkey compared to other countries. The reason for the low obesity rate in this study can be explained by the high level of education of the participants. This result was observed to be compatible with other studies (28–30). In this study, those with at least two risk behaviors had higher rates of low physical activity and tobacco use than other risk behavior combinations, and this result was similar to a study conducted in Canada (5). In a study conducted in a rural areas in the US., it was found the rates of obese people and people with low physical activity were higher than the rates for other combinations of cancer risk behaviors (31). Another study found that the rates in combination of tobacco and alcohol use were higher than other cancer risk behaviors (6). This study hypothesizes that the higher rate of the combination of low physical activity and tobacco use compared with other modifiable risk behaviors is due to the negative factors caused by tobacco use that lead individuals to engage in low physical activity.

In the present study, the average age of those who engage in low physical activity (44.4 ±10.8) is higher than those who use tobacco (37.0 ± 9.8) among individuals with one risk behavior. Those with two risk behaviors, obesity, and low physical activity (50.0 ± 10.5), have a higher mean age than those with a combination of two other risk behaviors (obesity combined with tobacco use: 39.9 ± 7.6; low physical activity and tobacco use: 41.0 ± 9.1). Literature shows that the rate of tobacco use (32,33) and obesity (34) is higher in people aged 30-54 years. From the results of this study, it appears that special efforts are needed to increase healthy eating and physical activity in people of advanced age.

In this study, the rate of tobacco use in men is higher than that of obesity, and the rate of low physical activity in women is higher than that of tobacco use. In men, the rate of low physical activity combined with tobacco use is higher than obesity combined with low physical activity. Similarly, there are studies in the literature showing that the rate of tobacco use is higher in men (35) and the rate of obesity (36,37) and low physical activity (28) is higher in women. According to the results of this study, it is necessary to reduce tobacco use among men in primary care in Turkey and increase education and initiatives for low physical activity among women.

In our study, the rate of risk behaviors was found to decrease in individuals with higher levels of education, which is consistent with the findings of

other study (28). Two different studies found that the rate of lower physical activity was higher in individuals with higher levels of education (12,38). It is an expected outcome of this study that the rate of risk behavior is lower among those with higher levels of education.

According to this study, the rate of married persons is higher in those who engage in modifiable risk behaviors than in those who do not engage in risk behaviors. A significant relationship was found between obesity, low physical activity, tobacco use risk behaviors, and being married. Similarly, other studies have found that being married/partnered is positively associated with low physical activity, and obesity (39,40). In Tanzania (41) and South Africa (42), studies indicated that the rate of risk behaviors is higher among singles. According to this study, the increase in obesity and decrease in physical activity among married people can be explained by diet change after marriage especially in traditional Turkish family structure, as well as an inability to devote enough time to physical activity.

In the present study, the proportion of low-income individuals is higher among those with three risk behaviors than those without risk behaviors. Similarly, three studies showed that tobacco use (43), low physical activity (44), and obesity rates (45) increased among low-income individuals. On the other hand, the study conducted in South Africa found tobacco use decreases among low-income individuals (46). It is an expected result in this study that risk behaviors decreased as income level increased.

This study found a significant relationship between being employed and tobacco use only, and low physical activity and tobacco use combinations. The proportion of unemployed individuals with a combination of obesity and low physical activity was found to be higher than the proportion of individuals with a combination of obesity and tobacco use. Matthews et al. study found that low physical activity rates were lower among workers than unemployed people (46). Similarly, two studies found that rates of tobacco use were higher (32,33) among employed than unemployed individuals. In this study, it was thought that the high rate of tobacco use in employed individuals was associated with environmental factors such as working conditions. Moreover, the symptoms seen in these individuals due to tobacco use negatively affected physical activity.

In our study, the rate of those who reported their perceived health status as "very good" was higher among those with no risk behaviors than among those with two risk behaviors, consistent with the results of the two studies (31,47). On the other hand, a study conducted in Korea found that the proportion of those with "good" perceived health status was higher than those with "poor" perceived health status among tobacco users (48). In the present study and international studies, it is an expected result that the rate of conducting risk behaviors decreases in those who perceive their health status as good.

The rate of those with cancer in their immediate environment was higher in those with two risk behaviors than in those without risk behaviors. Among individuals with risk behaviors, the rate of low physical activity is higher than the rate of tobacco use among individuals with a history of cancer in their immediate environment. Several studies have found that people with a history of cancer in their immediate environment have lower levels of physical activity (49), tobacco use (50), and obesity (51). The reason why the result of our study differs from the expectations is probably the higher educational level of those who do not show risk behaviors.

Lastly in this study, among those who visited a physician less than five times in the past six months, the proportion of those engaged in low physical activity, and tobacco use was higher than the proportion of those with two and three other risk behaviors. In a study conducted in England, it was found that women who were not obese had higher utilization of health services than obese women (52). On the other hand, a study conducted by Wang et al. found that the rate of those who visited more than one physician in the past two weeks was higher in those whose did not use tobacco than those who used tobacco (53). The reason why the outcome of our study was different than expected suggests that the very good perceived health status of those who do not have risk behaviors discourages people from seeking health services.

The limitation in this study is the health history of the participants is not based on the physician's diagnosis, but on the statements of the individuals themselves. Another limitation is the possibility of individuals giving false answers to the questions asked about their risk behaviors.

CONCLUSION

In the city of Antalya, the rate of those with one risk behavior was found to be higher than the other risk behavior groups. The number of risk behaviors was

found to increase with being married/partnered, education level, income level, and low perceived health status, and having a history of cancer in the immediate environment. It was found that the rate of lower physical activity was higher than the rate of tobacco use in women who were married or partnered and in those who had cancer in their immediate environment. Rates of the combination of obesity and low physical activity were found to be higher in elderly and unemployed than rates of the other risk behavior combinations. Rates of the combination of low physical activity and tobacco use were found to be higher among those who had fewer physician visits than rates of other combinations of modifiable risk behaviors.

In order to reduce the number of risk behaviors among people who are married/partnered, have low levels of education, low-income levels, and poor health status, it is recommended that health professionals organize education programs on tobacco use, obesity, and low physical activity, as well as health screenings to identify risk behaviors in primary care to raise social awareness. In addition, older people, women, married/partners, and people with a history of cancer should be introduced to healthy diet and exercise habits in their immediate environment. Priority should be given to follow-up of individuals with a low number of visits to the physician to increase awareness about health education. There is a need to plan qualitative studies to determine the factors that increase risk behaviors in those who are married, from middle and advanced age groups, and have a history of cancer in their immediate circle. Moreover, it is recommended to plan further studies with different sample groups, because there are many studies that have examined risk behaviors independently from each other in the literature, but the number of studies to explain multiple risk behaviors and the factors affecting these behaviors is very limited.

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