

## RESEARCH COMMUNICATION

# Health-promoting Lifestyle Behaviour for Cancer Prevention: a Survey of Turkish University Students

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### Abstract

**Background:** Health risks associated with unhealthy behaviours in adolescent and university students contribute to the development of health problems in later life. During the past twenty years, there has been a dramatic increase in public, private, and professional interest in preventing disability and death through changes in lifestyle and participation in screening programs. The aim of the study was to evaluate university students' health-promoting lifestyle behaviour for cancer prevention. **Method:** This study was carried out on university students who had education in sports, health and social areas in Celal Bayar University, Manisa, Turkey. The health-promoting lifestyles of university students were measured with the "health-promoting lifestyle profile (HPLP)" The survey was conducted from March 2011 to July 2011 and the study sample consisted of 1007 university students. T-test, ANOVA and multiple regression analyses were used for statistical analyses. **Results:** In the univariate analyses, the overall HPLP score was significantly related to students' school, sex, age, school grades, their status of received health education lessons, place of birth, longest place of residence, current place of residence, health insurance, family income, alcohol use, their status in sports, and self-perceived health status. Healthier behaviour was found in those students whose parents had higher secondary degrees, and in students who had no siblings. In the multiple regression model, healthier behaviour was observed in Physical Education and Sports students, fourth-year students, those who exercised regularly, had a good self-perceived health status, who lived with their family, and who had received health education lessons. **Conclusion:** In general, in order to ensure cancer prevention and a healthy life style, social, cultural and sportive activities should be encouraged and educational programmes supporting these goals should be designed and applied in all stages of life from childhood through adulthood.

**Keywords:** University students - health promoting lifestyle profile - health behaviours - adolescents - health promotion

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### Introduction

A significant number of the causes of mortality and morbidity in relation to cancer experienced by the population today are preventable and controllable through changes in behaviour (Geçkil and Yıldız, 2006; Reuben, 2010). The US Department of Health and Human Services set a goal of a 21% reduction in cancer mortality by 2010 through prevention and control efforts focused, in large part, on lifestyle and genetic factors (Reuben, 2010). Primary prevention attempts to reduce the probability of cancer onset by decreasing risk. For women and men, it is estimated that as much as 50% or more of cancer cases can be prevented through smoking cessation and improved dietary habits, such as reducing fat consumption and increasing fruit and vegetable consumption, physical activity, and weight control and these have, therefore, been a major focus of prevention efforts (Reuben, 2010; Sullivan et al., 2010).

The incidence of cancer in Turkey has been steadily increasing in recent years and it is listed as the second

leading cause of death after cardiovascular diseases (Çoban et al., 2010). Therefore, young people are very important in promoting health in the community and are considered to be at a relatively healthy stage of life and, as such, are not viewed as a priority in health-promoting efforts throughout the world (WHO, 1998; Lee and Loke, 2005). One of the critical periods in youth is the university age, which is known to be a dynamic transition period that functions as a bridge from childhood to adulthood (Lee and Loke, 2005; Can et al., 2008; Tuğut and Bekar, 2008; Wang et al., 2009). At this stage of physical, psychological, and sexual development, young people gradually assume responsibility for their own health. Their health-promoting practices and psychosocial well-being not only affect their immediate health status but also have long-term health consequences. Many young people engage in a wide range of unhealthy habits (such as inadequate nutritional intake, rest, and exercise) and risk behaviours (such as tobacco and drug use) that lead to adverse health outcomes. Many of these are associated with serious health problems such as cardiac or respiratory diseases, cancer, complicated

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pregnancies or deliveries, and psychological disorders in later life (Lee and Loke, 2005; Karadeniz et al., 2008; Wang et al., 2009; İlhan et al., 2010 ).

World Health Organization defines health development as “increasing individuals’ control over their health” and points out that 60% of the quality of an individual’s health and life depends on his/her behaviour and lifestyle (Lee and Loke, 2005; Wang et al., 2009). Nutrition, which is a one of the lifestyle factors that can be controlled and that plays a role in the development of cancer, has been reported to have an association with 35% of cancer cases (Çoban et al., 2010). It has long been known that the location of major universities in big cities, university students’ economic problems, and the dominance of the fast-food culture among young people have been influencing youths’ health. Especially university students’ fast-food habits, irregular snacking patterns, eating out habits lead to unhealthy nutritional (Bektas et al., 2010). It has been determined that cancer cases have been increasing in groups and cultures where the rate of obesity and nutritional disorders is high (Elmubarek et al., 2005). University students experience a new environment that generally involves increased workload and stress, altered sleeping patterns and dining halls with a great variety of fast food, which are significant contributors to weight gain (Ulla Díez and Pérez-Fortis, 2009). In this respect, students’ acquisition of healthy nutritional behaviours will be a significant factor in decreasing the rate of cancer. Furthermore, rapid urbanization and technological advances have been influencing the contemporary youth’s lives. For instance, devices like computers, an indispensable part of life, encourage the youth to lead a sedentary life and exhibit unhealthy nutrition behaviours, as a result of which cancer rates have been increasing rapidly (Mota et al., 2006; Bektas et al., 2010).

Therefore, it is essential to understand and evaluate health-promoting behaviours among university students in order to promote their healthy growth and decrease cancer cases. It is far more difficult for adults to change unhealthy habits adopted in their youth. If health professionals are to enhance health-promoting behaviours and well-being in the community, then health-promoting efforts should be targeted at young people. Many of the factors that contribute to health risks in older adults are preventable if identified and changed at an early stage. Early interventions can alter behaviour patterns that are likely to place young people at health risk in later life. As for the future generations, health of students influences not only their own health but also the health of future populations. Promotion of healthy behaviours among young people is therefore essential (Lee and Loke, 2005). The primary aim of the study was to evaluate different parts of university students’ health-promoting lifestyle behaviours in the following dimensions: self-actualization, health responsibility, nutrition, exercise, stress management, and interpersonal relations (interpersonal support). The second aim of the study was to determine the relationship between university students’ socio-demographic characteristics and health-promoting lifestyle behaviours, and what the strength of the relationship is. This data would provide helpful

information to healthcare care providers in the planning, prioritizing, and implementation of health promotion programs.

## Materials and Methods

### *Design and participants*

This study was carried out on university students in Celal Bayar University, Manisa, Turkey, which has 5 faculties, 4 colleges, 15 occupational colleges, 3 institutes, 6 research and practice centres and 1 search and practice hospital composed of 34 departments (<http://www.bayar.edu.tr/english.php>). The university does not have a campus and the departments are far from each other. We selected three departments of Celal Bayar University located in the centre of Manisa.

This is a cross-sectional and descriptive study which aimed at identifying the similarities in and differences between the health practices in School of Physical Education and Sports, School of Applied Sciences, and School of Health students.

The study was intended to identify the usual pattern of university students’ health practices and to avoid the confounding effects of seasonal holidays and the stressful period when the exams are given; the survey was conducted from March to July 2011, in the middle of the semester, via a self-administered questionnaire. We were able to reach 1052 university students between these dates and invited them to the study, 20 students did not want to participate in and 25 students did not fully complete the questionnaire. These students were excluded from the study. The sample of the research consisted of 1007 university students.

### *Socio-demographic characteristics questionnaire*

The first section included questions on the university student’s characteristics that might affect health-promoting behaviours such as; age, gender, marital status, perceived family income level, the department of the university, educational levels of parents, health insurance, and the presence of a chronic disease. These parameters are given in Table 1.

### *Health-promoting lifestyle profile*

The health-promoting lifestyles of university students were measured with the “health-promoting lifestyle profile” (HPLP) developed by Pender et al. (1987). The HPLP measures how frequently respondents engaged in 48 health-promoting behaviours. The four-point response format to each item (1 = never and 4 = routinely) measures the respondent’s self-reported health promoting behaviours with higher scores indicating more frequent performance of the health-promoting behaviours. The lowest total score is 48, the highest 192. The items are categorized into six subscales: self-actualization (13 items) which measures attitudes and expectations from life; health responsibility (10 items) which assesses paying attention to and accepting responsibility for one’s own health, being educated about health, and seeking professional assistance when necessary; exercise (5 items) which measures regular exercise patterns; nutrition (6

**Table 1. Characteristic of University Students (n=1007)**

Characteristics	No. (n)	(%)	
Age:	≤ 20	410	40.7
	≥21	597	59.3
Sex:	Female	627	62.3
	Male	380	37.7
Marital status:	Single	995	98.8
	Married	12	1.2
University department:	Health school	375	37.2
	Physical Education&Sports school	344	34.2
	Applied Sciences school	288	28.6
Grade (year):	1 <sup>st</sup>	310	30.8
	2 <sup>nd</sup>	235	23.3
	3 <sup>rd</sup>	235	23.3
	4 <sup>th</sup>	227	22.5
Received health education lesson:	Yes	505	50.1
	No	502	49.9
Place of birth:	City	634	63
	Town	275	27.3
	Village	79	7.8
	Foreign country	19	1.9
Longest place of residence:	City	621	61.7
	Town	275	27.3
	Village	111	11
Current place of residence:	In a house with friends	398	39.5
	In a student dormitory	287	28.5
	In a house with family	322	32
Number of siblings:	0	80	7.9
	1	465	46.2
	2	255	25.3
	≥3	207	20.6
Family type:	Nuclear	828	82.2
	Extended	149	14.8
	Separated family	30	3
Education level of mothers:	Primary school or less	555	55.1
	Secondary school	452	44.9
Education level of fathers:	Primary school	386	38.3
	Secondary school	621	61.7
Health insurance:	Yes	858	85.2
	No	149	14.8
Perceived of family income level:	Low	97	9.6
	Medium	699	69.4
	High	211	21
Cigarette use	Yes	217	21.5
	No	790	78.5
Alcohol use	Yes	333	33.1
	No	634	66.9
Being engaged in sportive activities:	Yes	770	76.5
	No	237	23.5
Chronic disease	Yes	31	3.1
	No	976	96.9
Mental illness	Yes	16	1.6
	No	991	98.4
Self-perceived health status:	Excellent	81	8
	Very good	272	27.1
	Good	512	50.8
	Moderate	134	13.3
	Bad	8	0.8

items) which assesses meal patterns and food choices; interpersonal support (7 items) which is concerned with a sense of intimacy and close relationship; and stress management (7 items) which quantifies ability to cope with stress (Pender, 1996). The Turkish version of the HPLP was prepared by Esin (1997). In Esin's study, the instrument was found to have a high internal consistency with alpha coefficient 0.91 for the total instrument.

#### Ethical consideration

Ethical approval was obtained from the Celal Bayar University Ethic Committee. The study protocol and consent procedure were approved by the administrative authorities of Celal Bayar University. The aims of the study were explained to university students. Students who volunteered were included in the survey, and upon the completion and return of the questionnaire informed consents were obtained from all the participating university students. To ensure anonymity, no name was required on the questionnaire. Questionnaires were administered to the students in their classrooms. The students filled in the questionnaires by themselves. The researchers on the site explained any unclear questions without inducement, if necessary.

#### Analysis

The data were analysed using the Statistical Package for Social Sciences (SPSS, Inc., Chicago, IL, USA). Basic descriptive statistics and frequency calculations were performed on all variables. To analyse the relationship between socio-demographic characteristics and health behaviours, we computed t-test for dichotomized variables and one-way ANOVA's for dimensions with more than two categories. To analyse whether the combined effects of the socio-demographic variables predict health behaviour, we performed multiple regression analyses over the total score of HPLP. The variables that were significant in the univariate analyses were used as predictors. A p-level of <0.05 was considered statistically significant.

## Results

#### Characteristics of university students

The characteristics of the study population are presented in Table 1. The 1007 university students ranged in age from 17 to 32 years [mean 21.2 years, Standard deviation (SD) 2.1]; 40.7% were ≤ 20 years old and 59.3% of university students were ≥ 21 years old. The majority of the students (98.8%) were single, 62.3% were female,

**Table 2. Descriptive Statistics and Correlations (Pearson) of the Variables Under Study (n=1007)**

	*Correlation coefficients						Descriptive statistics				
	1	2	3	4	5	6	Min	Max	Mean	SD	Cronbach alpha
Overall HPLP score	0.83	0.79	0.675	0.684	0.65	0.834	56	186	126.1	19.6	0.93
HPLP sub-scales											
1. Self-actualization		0.478	0.416	0.405	0.624	0.62	16	52	38.2	6.1	0.85
2. Health responsibility			0.497	0.569	0.301	0.601	10	39	22.2	5.6	0.84
3. Exercise				0.389	0.259	0.541	5	20	11.1	3.8	0.83
4. Nutrition					0.314	0.64	6	24	15.5	3.4	0.67
5. Interpersonal support						0.456	11	28	21.7	3.5	0.73
6. Stress management							7	28	17.7	3.7	0.70

\*Correlation is significant at the 0.01 level (2-tailed)

**Table 3. Comparison of Subscale Scores of the Health Promotion Lifestyle Behavior Scale (n=1007)**

Variables	Self-actualization		Health responsibility		Exercise		Nutrition		Interpersonal support	
	Mean ±SD	Test	Mean±SD	Test	Mean± SD	Test	Mean ±SD	Test	Mean±SD	Test
Sex		t = -3.25		t=1.75		t = -11.34		t= 0.27		t= -1.34
Female	37.7±6.1	df=1005	22.4±5.4	df=728.4	10.1±3.4	df=746.8	15.6 ±3.1	df=697.9	21.1±3.4	df=1005
Male	38.9±6.1	p=0.001	21.8±6.0	p=0.080	12.7±3.7	p=0.000	15.5±3.7	p=0.788	21.4±3.6	p=0.180
Age		t=-2.665		t=-1.663		t=-5.438		t=-1.093		t=-1.356
20 ≤	37.5±6.2	df=1005	21.8±5.4	df=1005	10.3±3.6	df=916.0	15.4±3.3	df=1005	21.0±3.4	df=1005
21 ≥	38.6±6.0	p=0.008	22.4±5.7	p=0.097	11.6±3.8	p=0.000	15.6±3.4	p=0.275	21.3±3.5	p=0.175
Marital status										
Single	38.1±6.1	MU=4788	22.1±5.6	MU=3692	11.0±3.8	MU=3237	15.5±3.4	MU=4441	21.2±3.5	MU=5213
Married	39.6±6.3	p=0.237	25.6±4.6	p=0.023	14.0±3.3	p=0.006	17.3±3.5	p=0.125	20.4±3.7	p=0.448
School	37.0±6.1	F= 20.055	22.6±5.4	F= 32.930	9.4±3.0	F= 229.745	15.7±3.2	F= 20.263	20.9±3.4	F= 8.178
Physical & Sports	39.8±5.9	p=0.000	23.5±5.6	p=0.000	14.0±3.2	p=0.000	16.2±3.5	p=0.000	21.8±3.5	p=0.000
Applied Sciences	37.7±5.9		20.1±5.3		9.8±3.2		14.5±3.2		20.8±3.4	
Grade										
1 <sup>st</sup> year	36.8±6.0	F= 9.096	21.1±5.3	F=7.826	9.8±3.2	F=31.363	15.2±3.2	F=3.266	20.7±3.5	F= 5.223
2 <sup>nd</sup> year	38.2±6.2	p=0.000	21.9±5.5	p=0.000	11.7±4.1	p=0.000	15.5±3.4	p=0.021	21.3±3.2	p=0.001
3 <sup>rd</sup> year	38.6±5.6		22.7±5.9		10.6±3.5		15.5±3.3		21.1±3.4	
4 <sup>th</sup> year	39.5±6.2		23.3±5.8		12.6±3.7		16.1±3.6		21.8±3.6	
Received health education lesson		t=4.857		t= 6.283		t=5.813		t=5.490		t=2.542
Yes	39.1±5.9	df=1005	23.3±5.6	df=1005	11.7±4.0	df=987.0	16.1±3.2	df=1005	21.4±3.4	df=1005
No	37.2±6.2	p=0.000	21.1±5.4	p=0.000	10.4±3.4	p=0.000	15.0±3.5	p=0.000	20.9±3.5	p=0.011
Place of birth City	39.0±5.9	KW=33.35	22.6±5.7	KW=14.61	11.6±3.8	KW=47.06	15.6±3.3	KW=7.96	21.4±3.4	KW=12.38
Town	36.9±6.1	df=3	21.5±5.5	df=3	10.2±3.6	df=3	15.4±3.4	df=3	20.8±3.5	df=3
Village	35.8±6.7	p=0.000	20.6±5.4	p=0.002	9.4±3.3	p=0.000	14.8±3.6	p=0.047	20.2±3.8	p=0.006
Foreign country	38.8±6.4		23.6±5.6		12.9±3.9		17.0±3.1		22.1±3.9	
Longest place of residence										
City	39.1±5.8	F=20.55	22.6±5.6	F=6.76	11.6±3.8	F=25.51	15.7±3.4	F=4.88	21.5±3.4	F=6.34
Town	36.9±6.4	p=0.000	21.7±5.6	p=0.001	10.6±3.7	p=0.000	15.4±3.5	p=0.008	20.8±3.5	p=0.002
Village	36.0±6.0		20.8±5.2		9.1±3.1		14.7±2.8		20.5±3.5	
Current place of residence										
In a house with friends	37.9±6.3	F=12.38	21.8±5.9	F=12.14	11.2±3.8	F=59.54	15.2±3.5	F=14.03	21.0±3.7	F=4.98
In a student dormitory	37.0±6.3	p=0.000	21.3±5.5	p=0.000	9.3±3.0	p=0.000	15.1±3.3	p=0.000	20.8±3.4	p=0.007
In a house with family	39.4±5.4		23.4±5.1		12.5±3.8		16.3±3.1		21.7±3.2	
Number of siblings										
0	38.0±5.8	F=1.941	23.4±5.9	F= 2.543	12.2±3.6	F= 8.326	16.0±3.6	F=6.701	20.7±3.3	F=1.593
1	38.6±5.9	p=0.121	22.4±5.4	p=0.055	11.5±3.7	p=0.000	15.9±3.2	p=0.000	21.4±3.4	p=0.189
2	37.5±6.2		21.7±5.7		10.5±3.6		14.9±3.3		20.9±3.5	
≥3	38.0± 6.4		21.7±5.9		10.4±3.9		15.2±3.5		21.2±3.6	
Family type										
Nuclear family	38.2±6.1	F=0.590	22.3±5.6	F= 1.988	11.0±3.7	F= 2.432	15.60±3.3	F= 2.859	21.2±3.5	F= 1.193
Extended family	37.8±6.2	p= 0.554	21.4±5.9	p=0.137	11.3±4.0	p=0.088	14.9±3.6	p=0.058	20.8±3.4	p=0.304
Separated family	37.5±7.2		21.5±5.5		12.4±3.8		16.1±3.7		21.6±3.3	
Education level of mothers		t = -3.033		t= -3.658		t = -8.965		t = -4.069		t = -0.704
Primary school	37.6±6.2	df=1005	21.6±5.7	df=1005	10.1±3.7	df=1005	15.1±3.4	df=1005	21.1±3.5	df=1005
Secondary school	38.8±5.9	p=0.002	22.9±5.5	p=0.000	12.2±3.6	p=0.000	16.0±3.2	p=0.000	21.3±3.4	p=0.482
Education level of fathers (df=1005)										
Primary school	37.8±6.1	t = -1.598	21.7±5.7	t= -1.878	10.3±3.7	t=-5.188	15.4±3.4	t=-1.287	21.1±3.5	t=-0.660
Secondary school	38.4±6.1	p=0.110	22.4±5.5	p=0.061	11.5±3.7	p=0.000	15.6±3.3	p=0.198	21.2±3.4	p=0.509
Health insurance (df=1005)										
Yes	38.4±6.0	t=2.797	22.4±5.6	t=3.150	11.2±3.8	t=1.700	15.5±3.4	t=0.471	21.3±3.4	t=1.838
No	36.9±6.4	p=0.005	20.8±5.6	p=0.002	10.6±3.7	p=0.089	15.4±3.2	p=0.638	20.7±3.7	p=0.066
Perceived of family income										
Low	36.8±6.6	F=10.78	21.0±5.9	F=3.349	10.3±3.4	F=10.04	15.1±3.4	F=4.112	20.8±3.8	F=1.361
Middle	37.8±6.0	p=0.000	22.1±5.4	p=0.036	10.9±3.8	p=0.000	15.4±3.3	p=0.017	21.1±3.4	p=0.257
High	39.8±6.0		22.8±6.1		12.0±3.8		16.1±3.6		21.5±3.4	
Health insurance (df=1005)										
Yes	38.4±6.0	t=2.797	22.4±5.6	t=3.150	11.2±3.8	t=1.700	15.5±3.4	t=0.471	21.3±3.4	t=1.838
No	36.9±6.4	p=0.005	20.8±5.6	p=0.002	10.6±3.7	p=0.089	15.4±3.2	p=0.638	20.7±3.7	p=0.066
Cigarette use		t=0.335		t=-2.996		t=3.292		t=-5.081		t=0.834
Yes	38.3±6.6	df=1005	21.2±6.0	df=1005	11.8±3.8	df=1005	14.4±3.6	df=316.2	21.3±3.7	df=1005
No	38.1±6.0	p=0.722	22.4±5.5	p=0.003	10.9±3.7	p=0.001	15.8±3.2	p=0.000	21.1±3.4	p=0.405
Alcohol use		t=3.827		t=-0.106		t=8.095		t=-1.318		t=3.078
Yes	39.2±6.1	df=1005	22.1±5.7	df=1005	12.4±3.7	df=1005	15.3±3.6	df=591.3	21.7±3.7	df=605.1
No	37.6±6.1	p=0.000	22.2±5.6	p=0.916	10.4±3.6	p=0.000	15.6±3.2	p=0.188	20.9±3.3	p=0.002
Being engaged in sportive activities		t=4.855		t=4.010		t=16.483		t=4.123		t=2.520
Yes	38.7±6.0	df=1005	22.6±5.6	df=1005	11.9±3.6	df=539.3	15.8±3.3	df=1005	21.3±3.5	df=1005
No	36.5±6.2	p=0.000	20.9±5.6	p=0.000	8.3±2.6	p=0.000	14.7±3.3	p=0.000	20.7±3.4	p=0.012
Chronic disease (df=1005)										
Yes	37.9±6.1	t=-0.195	24.7±5.7	t=2.503	10.3±3.9	t=-1.109	15.9±3.0	t=0.587	22.1±3.6	t=1.515
No	38.2±6.1	p=0.845	22.1±5.6	p=0.012	11.1±3.8	p=0.268	15.5±3.4	p=0.557	21.1±3.5	p=0.130
Mental illness										
Yes	34.6±8.0	MU=5978	22.1 ±6.5	MU=7699	10.6±3.3	MU=7588	13.1±3.9	MU=4460	20.9±4.1	MU=7576
No	38.2±6.1	p=0.091	22.2±5.6	p=0.842	11.1±3.8	p=0.768	15.6±3.3	p=0.003	21.2±3.5	p=0.760
Self-perceived health status (df=4, p=0.000)										
Excellent	40.8±6.4	KW= 113.24	23.1±6.5	KW= 23.25	13.8±3.5	KW=107.57	16.6±3.4	KW= 44.44	22.6±3.7	KW= 43.81
Very good	40.3±5.6		23.0±5.8		12.2±3.8		16.2±3.6		21.8±3.3	
Good	37.8±5.5		22.1±5.3		10.5±3.5		15.4±3.1		21.0±3.4	
Moderate	34.1±6.4		20.2±5.3		9.4±2.9		14.1±3.2		19.8±3.6	
Bad	31.8±7.8		21.6±6.3		11.1±5.9		14.9±0.8		21.5±2.1	



**Table 4. Comparison of Subscale Scores of Stress Management and Health Promotion Lifestyle Behavior**

Variables	Stress management		Total health-promoting behaviors of scale	
	Mean±SD	Test	Mean±SD	Test
Sex		t=-2.96		t=-3.30
Female	17.4±3.5	df=717.4	124.5±18.6	df=727.1
Male	18.2±4.0	p=0.003	128.8±21.0	p=0.001
Age		t=-1.065		t=-2.987
20 ≤	17.5±3.6	df=1005	123.9±19.0	df=1005
21 ≥	17.8±3.7	p=0.287	127.6±19.9	p=0.003
Marital status				
Single	17.7±3.7	MU=5088	126.0±19.7	MU=4039
Married	18.8±3.4	p=0.377	136.4±15.8	p=0.054
School	17.4±3.5	F= 20.374	123.2±18.8	F= 50.153
Health				
Physical & Sports	18.7±3.7	p=0.000	134.2±19.1	p=0.000
Applied Sciences	17.0±3.7		120.3±18.3	
Grade 1 <sup>st</sup> year	17.3±3.6	F= 2.336	121.1±18.3	F= 13.508
2 <sup>nd</sup> year	17.9±3.8	p=0.072	126.9±20.1	p=0.000
3 <sup>rd</sup> year	17.7±3.8		126.5±19.2	
4 <sup>th</sup> year	18.1±3.7		131.7±19.8	
Received health education lesson		t=4.845		t=6.683
Yes	18.3±3.6	df=1005	130.2±19.2	df=1005
No	17.1±3.7	p=0.000	122.1±19.2	p=0.000
Place of birth City	18.0±3.7	KW=24.63	128.5±19.2	KW=37.76
Town	17.4±3.5	df=3	122.5±19.1	df=3
Village	16.0±3.6	p=0.000	117.4±20.2	p=0.000
Foreign country	19.0±4.1		133.7±21.0	
Longest place of residence				
City	18.1±3.8	F=12.78	128.9±19.1	F=20.16
Town	17.3±3.5	p=0.000	123.0±19.9	p=0.000
Village	16.3±3.5		118.0±18.5	
Current place of residence				
In a house with friends	17.5±3.9	F=11.45	125.0±21.5	F=24.62
In a student dormitory	17.1±3.6	p=0.000	121.2±19.0	p=0.000
In a house with family	18.5±3.3		131.9±16.8	
Number of siblings				
0	18.4±3.9	F=3.284	128.9±20.6	F=4.375
1	17.9±3.6	p=0.020	128.0±18.8	p=0.005
2	17.2±3.6		123.1±19.3	
≥3	17.6±3.9		124.6±21.1	
Family type				
Nuclear family	17.7±3.7	F= 0.863	126.5±19.4	F= 1.153
Extended family	17.3±3.8	p= 0.422	123.9±20.7	p= 0.316
Separated family	17.6±3.6		127.2±21.2	
Education level of mothers		t =-4.810		t =-5.308
Primary school	17.2±3.7	df=1005	123.2±20.0	df=1005
Secondary school	18.3±3.6	p=0.000	129.7±18.6	p=0.000
Education level of fathers (df=1005)				
Primary school	17.3±3.6	t=-2.687	123.9±19.3	t=-2.846
Secondary school	17.9±3.8	p=0.007	127.5±19.7	p=0.005
Health insurance (df=1005)				
Yes	17.8±3.7	t=1.783	126.8±19.4	t=2.833
No	17.2±3.7	p=0.075	121.9±20.6	p=0.005
Perceived of family income				
Low	17.2±3.9	F=3.00	121.8±20.5	F=8.72
Middle	17.6±3.6	p=0.050	125.3±19.1	p=0.000
High	18.2±3.8		130.7±20.2	
Health insurance (df=1005)				
Yes	17.8±3.7	t=1.783	126.8±19.4	t=2.833
No	17.2±3.7	p=0.075	121.9±20.6	p=0.005
Cigarette use		t=-2.175		t=-1.040
Yes	17.2±4.0	df=1005	124.9±21.4	df=1005
No	17.8±3.6	p=0.030	126.5±19.1	p=0.299
Alcohol use		t=-1.864		t=3.511
Yes	18.0±3.8	df=1005	129.2±20.2	df=1005
No	17.5±3.6	p=0.063	124.6±19.2	p=0.000
Being engaged in sportive activities		t=5.610		t=7.452
Yes	18.1±3.6	df=1005	128.6±19.2	df=1005
No	16.5±3.7	p=0.000	118.0±19.0	p=0.000
Chronic disease (df=1005)				
Yes	17.7±3.9	t=0.067	128.9±21.1	t=0.822
No	17.7±3.7	p=0.946	126.0±19.6	p=0.411
Mental illness				
Yes	16.7±3.9	MU=6542	118.7±24.8	MU=6236
No	17.7±3.7	p=0.228	126.2±19.5	p=0.143
Self-perceived health status (df=4, p=0.000)				
Excellent	19.5±3.7	KW= 82.69	136.8±19.5	KW=109.20
Very good	18.8±3.8		132.6±19.3	
Good	17.3±3.3		124.3±17.6	
Moderate	16.1±3.8		113.9±19.7	
Bad	15.9±3.4		117.4±23.7	

46.2% had one sibling and 82.2% had a nuclear family. Fifty-five point one per cent of the students' mothers and 38.3% of the students' fathers had graduated from primary school or had a lower education level, 14.8% of the students had no health insurance and 69.4% of the university students reported that their family's income level was moderate. The majority (96.9%) had no chronic diseases and 98.4% had no mental illnesses.

As to the students' university departments, 37.2% of the students were at the School of Health, 34.2% of the students were at the School of Physical Education and Sports and 28.6% of the students at School of Applied Sciences. In more detail, 63.0% of the university students reported that their place of birth was a city and 61.7% of them came from a city for the university. Of the students, 39.5% said that they lived in a house with friends or alone during their education.

About half of the students (50.1%) said that they received health education lessons. As to the self-perceived health status during the previous year, about half of the students (50.8%) stated that they had good health status. In the examination of students' health-promoting behaviours, it was determined that 66.9% did not drink alcohol, 78.5% did not smoke cigarettes and 76.5% of the students exercised regularly.

#### Health-promoting Lifestyle behaviours of the students

Table 2 summarizes the means and standard deviations for each of the six subscales of the HPLP and overall. The internal reliability of the HPLP scale was measured by Cronbach's  $\alpha$  coefficient. The instrument showed high internal consistency ( $\alpha=0.93$ ) overall. Five of the six HPLP dimensions (self-actualization, interpersonal support, exercise behaviour, health-responsibility, and stress management) had  $\alpha$  coefficients higher than 0.7, the exception being nutrition behaviour ( $\alpha = 0.67$ ). The HPLP total mean score for the university students was found as 126.1±19.6.

All the dimensions of the HPLP were significantly correlated with the other components. The overall HPLP score maintained significant relations with all of the dimensions (rxy from 0.650 physical activity to 0.834 stress management) (Table 2).

#### Factors related to the Health-promoting behaviours

The relationship between the student's characteristics and HPLP scores and subscales were given in Tables 3 and 4. Overall, the health-promoting lifestyles of the female students were poorer than those of the male students were, and the difference was statistically significant ( $p<0.05$ ). The male students scored slightly higher on self-actualization, exercise behaviour and stress-management than did females, and the difference was statistically significant ( $p<0.05$ ). Female students also scored slightly higher than did male students on health responsibility and nutrition, but these differences were not significant ( $p >0.05$ ).

The older participants achieved a better self-actualization, a higher level of exercise behaviour and a better total score for HPLP. An analysis of the enrollment level also supported this as the fourth-year

**Table 5. Factors Related to Health Promotion Lifestyle Behavior in Multiple Regression Analysis**

	Unstandardized Coefficients		Standardized Coefficients		t	p-value	95% Confidence Interval for B	
	B	Std. Error	Beta	t			Lower Bound	Upper Bound
(Constant)	150.168	7.286		20.61	0	135.870	164.460	
Sex of students	1.510	1.382	0.037	1.093	0.275	-1.201	4.222	
Age of students	-1.228	1.536	-0.031	-0.799	0.424	-4.241	1.786	
School	-2.344	0.756	-0.960	-3.102	0.002	-3.827	-0.861	
Grade	1.811	0.682	0.105	2.656	0.008	0.473	3.148	
Received health education lesson								
	-5.318	1.187	-0.135	-4.482	0	-7.647	-2.990	
Place of birth	-0.799	0.961	-0.029	-0.831	0.406	-2.686	1.088	
Longest place of residence	-1.979	1.062	-0.069	-1.862	0.063	-4.063	0.106	
Current place of residence	1.765	0.711	0.076	2.481	0.013	0.369	3.161	
Number of siblings	0.032	0.691	0.001	0.046	0.964	-1.324	1.387	
Education level of mothers	1.619	1.499	0.041	1.080	0.28	-1.322	4.560	
Education level of fathers	0.086	1.443	0.002	0.059	0.953	-2.747	2.918	
Health insurance	-1.856	1.672	-0.034	-1.110	0.267	-5.136	1.425	
Perceived of family income	1.691	1.115	0.047	1.517	0.129	-0.496	3.879	
Being engaged in sportive activities								
	-7.120	1.441	-0.154	-4.942	0	-9.948	-4.293	
Alcohol use	-0.027	1.381	-0.001	-0.020	0.984	-2.737	2.683	
Self-perceived health status	-9.095	1.555	-0.175	-5.850	0	-12.146	-6.040	

students had higher scores in all subscales for HPLP except stress management compared to the lower-year students. Physical education and sports students had highest scores for HPLP and the subscales. However, applied sciences students had poorer health responsibility, nutrition, interpersonal support, stress management and total scores for HPLP. The students' total HPLP mean score was found as 134.2±19.1 for the physical education and sports students, 123.2±18.8 for the health students and 120.3±18.3 for the applied sciences students. The students who had received health education lessons had significantly higher scores compared to the students who had not received health education lessons. The self-actualization scores of the students, who were born in a city, were higher than those of the students who were born in rural areas. The health responsibility, exercise, stress management, interpersonal support, stress management and total scores for HPLP scores of the students who were born in foreign countries, were higher than those of the students who were born in rural areas.

When evaluated statistically, the difference between the total HPLP and overall subscales appeared highly significant among the students who lived with their family. No significant difference was found between HPLP scores according to family type. Students who had no siblings achieved better exercise, nutrition, stress management and total scores for HPLP.

In the univariate analysis, mother's level of education was significantly related to all of the dimensions of HPLP except for interpersonal support, and father's level of education was significantly related to stress management and the total HPLP score. Self-actualization, health responsibility, and HPLP total scores were found higher among students who had health insurance.

Students who did not smoke achieved higher scores for health responsibility, exercise nutrition, stress management compared with students who smoked. As an unexpected result, the self-actualization, exercise, interpersonal support, and total HPLP scores increased among the students who used alcohol. Furthermore, the

higher scores for HPLP and subscales among the students who had exercise were found statistically significant. The health responsibility scores were found higher among the students with chronic diseases, while the scores of nutrition behaviour were lower among the students with physiological diseases.

When we looked at the relationship between the students' scores obtained by the HPLP scale and self-perceived health status, statistically significant differences were found between the variables and their scores on all the scale.

*Significant factors related to HPLP according to multiple linear regression*

The correlation between overall HPLP score and independent variables which were found significant for the tests was examined using multiple linear regression analysis. In the models, the error term analysis showed that the hypotheses of data normality, linearity and constant variance (homoscedasticity) were supported. In addition, no autocorrelation was seen between the data in the depression model Durbin-Watson=1.487.

The findings indicated 16 extreme values in the HPLP model. In examining the data that showed effect, no variables excluded to the multiple regression analysis because strong correlation was not found between other variables and the data were therefore kept in the model. The multiple linear regression analysis showed the six factors that affect the HPLP as follows: School, grade, received health education lesson, current place of residence, being engaged in sportive activities and self-perceived health status. The descriptive strength of this model was determined to be R=0.415 (Table 5).

**Discussion**

Health-promoting lifestyle among adolescents and university students has become a research focus worldwide. Life in a university is a transitional period, offering good opportunities for establishing health-promoting lifestyles. This study is among the first to compare the health-promoting behaviours of students from different disciplines (sports, health and social science) in Manisa, Turkey. In the study findings, which were similar to the earlier studies, students' Healthy Lifestyle Behaviours were determined as 125.9±17.4 for the faculty of education students in Manisa (Karadeniz et al., 2008), 124.8±19.9 for the School of Health in Manisa (Çoban et al., 2010), 127.3±18.6 for the School of Nursing, Science-Literature Faculty, Conservatoire, Architecture Faculty, Faculty of Business Administration and Computer Engineering in İstanbul (İlhan et al., 2010), 117.9±19.5 for university students in Sivas (Tuğut and Bekar, 2008), 121.75±18.86 in Elazığ (Cihangiroğlu and Deveci, 2011), 124.1±22.2 for nursing students in İstanbul, (Kocaakman et al., 2010). The similar scores for university students, even though they are in different cultures, suggest that students in the same age groups display similar health behaviours.

In our study, physical education and sports students had better scores in overall HPLP and in all the subcategories

of HPLP. The second highest score was achieved by the health school students. Similarly, Can et al (2008) stated that nursing students had better HPLP score than did social science students. Çoban et al (2010) stated that students who regularly exercised had better HPLP score compared to those who did not. Similar findings were reported in Elazığ School of Health Sciences (Cihangiroğlu and Deveci, 2011). A sedentary lifestyle is a common and serious problem among university students. Compared to young adults in general, the pressure of work is so severe for university students that much of their time and energy is likely to be occupied with their studies. On the other hand, the popularization of computers and the Internet provides more choices of entertainment and reduces interest in exercise. Lack of exercise facilities is also a major reason why university students do not participate in exercise actively. On the other hand, access to exercise facilities is not easy, it is difficult to exercise on the streets, and fitness centres or swimming pools demand rather high charges.

In line with our results, a previous research reported a positive correlation between age and students' health-promoting behaviours (Kocaakman et al., 2010), although some did not find any relationship between age and HPLP (Can et al., 2008; Karadeniz et al., 2008). There is a great deal of evidence that adolescents, particularly those in the 15-24 age group, engage in health-risk behaviours such as smoking, drinking, having unprotected sexual intercourse, and adopting poor eating habits. These behaviours lead to a variety of adverse health outcomes, including major morbidities and mortalities among the members of that age group which are likely to be carried into adulthood and jeopardize their health status in later life. Many effects of health-risk factors among adults are avoidable if these behaviours are identified and changed at an early stage (Wang et al., 2009). In this period of physical, psychological, social and sexual development, young people gradually assume responsibility for their own health. In addition to these developmental changes and newfound responsibilities, university students have greater autonomy and control over their lifestyle than adolescents. This transition period is the time to establish healthy lifestyle behaviours (Ulla Díez and Pérez-Fortis, 2009; Tuğut and Bekar, 2008; Can, Ozdilli et al., 2008). Therefore, it is essential to understand and evaluate health-promoting behaviours among adolescents in order to promote their healthy growth. In particular, this is an ideal time to conduct health education for adolescents in a higher education environment in terms of cost-effectiveness.

In the study, a larger number of years spent in university education had a positive effect on students' health-related behaviours. Similar results were reported in other studies (Cihangiroğlu and Deveci, 2011; İlhan et al., 2010; Kocaakman et al., 2010; Can et al., 2008). One study indicated that healthy lifestyle behaviours of nursing students changed over time, between the start and the end of their nursing education each year in İstanbul (Alpar et al., 2008). Wang et al (2009) stated that junior undergraduates scored lower than did senior students on the nutrition behaviour dimension.

Nutritional status and healthy lifestyle are important factors not only in cancer etiology but also in the prevention of cancer. Good nutritional status of persons is one of the important factors in living a healthy life with high economic, social and cultural level. Breast, colon and gastric cancers are the cancers among whose etiological factors are the nutritional status and lifestyle. Some improper nutritional behaviours also play an important role in the development of mouth, larynx, lung, and breast and liver cancers (Can et al., 2008). Health education is a lifelong process. Because of this reason, university education should include education programs about health promoting lifestyle behaviours to promote maintaining and improving health for prevention diseases.

Gender is another factor associated with health-promoting behaviours. In our study, the male students had higher scores for self-actualization, exercise behaviour, stress-management and overall HPLP than did females. According to previously reported findings which are similar to our findings, male students exercised more than female students and students who regularly participated in exercise had a better health status (Kocaakman et al., 2010; Ulla Díez and Pérez-Fortis, 2009; Wang et al., 2009; Lee and Loke, 2005). We did not find any relationship between gender and nutrition dimensions. Other studies indicated that female students had higher scores for nutrition than did male students (İlhan et al., 2010; Karadeniz et al., 2008; Wang et al., 2009). Contrary to our findings, Kocaakman et al (2010) determined that self-actualization scores were higher in girls. A study in China found that female undergraduates scored slightly higher on stress-management than did males (Wang et al., 2009).

The students whose longest place of residence was a village had a lower mean score than the students who lived in towns, cities or the province centres. This finding is consistent with the results of previous investigations (Çoban et al., 2010). A study in İstanbul determined that students who lived in big cities had better health responsibility and self-actualization scores than did students who lived village (Kocaakman et al., 2010).

Another personal characteristic associated with health promotion was the place of residence. In the study, there was a difference between the place of residence and health promotion for the students in all aspects of the HPLP. Living with the family during university education contributes to students' such aspects of health-promoting lifestyle as nutrition, exercise, stress management, self-actualization and health responsibility. The family is a social support system that provides an individual with psychological, social, and economic support. In meeting an individual's basic needs for love and belonging, the family has a direct positive effect on physical and emotional health and gives vital support for coping with life's difficulties. According to the traditions and customs of the Turkish culture, relationships with the family and friends are very strong (Can et al., 2008) and, in our study, students living with their families had better health-promoting behaviours. It is not surprising to see health promotion behaviours were found lower the students reside on campus with schoolmates or with friends, and the students are less likely to pay attention to their own



health than students who live with their parents .

Moreover, university life adds more stress and requires more independent decision-making by young people. They are also challenged to attain the personal growth and perseverance necessary to cope with life stress and to establish healthy interpersonal relationships. All this is probably reflected in the finding that students considered themselves not to be doing well enough in interpersonal support, self-actualization and stress management. A similar tendency was reported by other studies (Can et al., 2008; Wang et al., 2009).

The HPLP score, self-actualization, and health responsibility means were found to be higher at a statistically significant level for students who had health insurance compared to those who did not. The finding is similar to that of Çoban et al's (2010) study. We found students who had good income level had better HPLP scores and the findings were consistent with those in several previous studies (Ulla Díez and Pérez-Fortis, 2009; Karadeniz et al., 2008; İlhan et al., 2010).

The mother's role in the Turkish family is vital and the health promotion scores of the students whose mothers were more educated were significantly higher than those of the students whose mothers were less educated. As in several other previous studies (Ulla Díez and Pérez-Fortis, 2009; Tuğut and Bekar, 2008), in our study too, the higher the mothers' educational level was the higher the student's health behaviour was. The association between parents' educational level and students' healthier behaviours was not determined in other studies (Karadeniz et al., 2008).

According to World Health Organization data, 5% of the deaths in young people aged 15–29 years are alcohol-related and half of the young people who start smoking and continue to smoke will die from cigarette-related diseases (Can et al., 2008). In another study, it was found that, of the university students, 21.5% smoked cigarettes and 33.1% used alcohol. Cigarette use is one of the indicators of unhealthy behaviours (Cihangiroğlu and Deveci, 2011; Çoban et al., 2010; Keller et al., 2008; Can et al., 2008) and the individuals in our study who had smoking habits had lower scores for health-promoting lifestyle behaviours, health responsibility, exercise, nutrition and stress management.

The self-perceived health status correlated well with the total HPLP score and almost all the subcategories. Good self-perceived health status might be a natural outcome when students are aware of health promotion and try to practice it in their daily life. The finding is consistent with the findings in other studies (Can et al., 2008; Tuğut and Bekar, 2008).

In conclusion, the physical education and sports students, and health school students had better HPLP than did the applied sciences students. Furthermore, the fourth-year students had higher scores in many of the subscales of the HPLP than did the lower-year students. The higher scores of the male students show that gender issues should be taken into consideration in establishing educational programs. Living with the family and having an educated mother had a positive effect on health-promoting behaviours in university students. Those findings which imply the importance of health education and autonomy in

creating healthy behaviours deserve attention, particularly from educators expected to meet young people's emotional and psychosocial needs. Health-promoting behaviours and psychosocial wellbeing that influence young people's health are the major concerns for health professionals, university officials, government, and all others who are concerned with the health of our future generation. Campus-wide health education programs should promote the health of the overall university community. Health education programs should address not only curative health but also disease prevention and health promotion (Lee and Loke, 2005; Rimer and Gierisch, 2005).

The study has a number of implications. In Turkey, an effort needs to be made to create environments for students that are conducive to a healthy lifestyle. In the curricula of non-health-related schools, additional courses and seminars or campaigns about health promotion should be given. As young people spend almost one-third of their day on the campus, on-campus exercise facilities should be developed: physical activity could be encouraged through a well-equipped and well-organized fitness centre with a reasonable price, and some simple outdoor facilities. Nutrition is another area that could be improved easily; for example, healthy foods should be sold in school canteens instead of junk foods. For stress management, a counselling service with an open-door policy and professional staff could address students' personal problems. In addition, career-counselling services should be offered to graduate candidates. Through these kinds of practical arrangements, university students could be encouraged to adopt healthier lifestyles (Can et al., 2008; Çelik et al., 2009).

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