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Trends and determinants of quality of life and self-rated health in the course of medical education among medical students

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Abstract

The aim of this study is to determine the change in the self-rated health and quality of life of students of a school of medicine during the course of their education and the predictive factors of health and quality of life such as socioeconomic factors, health status and healthy lifestyle, social relationships and social support, and academic burden. The study is a cross-sectional study that aimed to reach the entire registered students of Manisa Celal Bayar University School of Medicine in 2016-2017. Dependent variables in this study are the overall quality of life, self-rated health and annual self- rated health transition About 10.1% of the students stated their overall quality of life as poor or very poor whereas nearly 10.9% were dissatisfied about their health and 20.3 % of them stated their current health as worse than the previous year. There is a linear trend in a year in medical school in terms of quality of life. The logistic regression Model suggested that having a non-depressed mood is the best predictor of a better quality of life. Lower BMI, being healthy, taking care of their health and having a nuclear family are found the most important variables that affect self-rated health positively. The final term students (interns) perceived the worse overall quality of life than the first and second-year students. Additionally, the majority of the 3rd, 4th, and 5th term students reported their health worse than the previous year. These facts in self-rated health and QOL may be regarded as pieces of evidence that may lead the university authorities to take measures especially in clinical terms of medical education.

Keywords: Quality of life, self-report, health, young adults

Introduction

Self-rated health (SRH) and perceived quality of life are widely used to assess the general health and life satisfaction of the young populations. It has been reported that the perception of poor health in youth is associated with an increase in mortality in later life. [1]

There are multiple views on the definition of quality of life. WHO defines Quality of Life (QOL) "as individuals' perception of their position in life in the context of the culture and value systems in which they live and concerning their goals, expectations, standards, and concerns. "[2]. Health statuses, environmental factors –physical and social-, social relations, personal beliefs, physical and spiritual well-being affect Quality of life [3]. Older age, female gender, low socioeconomic status, low educational attainment, and poor health are the main negative determinants of quality of life in adult populations. In addition to these known variables, some other important factors such as health-promoting behaviors, arise in young adults and adolescents, affect the health and quality of life of the person. Recent literature findings showed that these health-promoting behaviors and their results, such as physical inactivity [4], obesity [5], tobacco use, and drug addiction [6], sleep problems [7] affect the quality of life negatively. Healthy life behaviors may be considered more important in young adults than in adults since these would persist in the life-course of a person. Moreover, healthy lifestyle behaviors to be established during the university period affect a person's health perception and quality of life in the future [4].

University education is an important life period in which individuals begin to establish their lifestyle in their life. There are several papers about tobacco use, nutrition, physical activity, obesity among university students in Turkey [8-11]. Medical School students face many obstacles that prevent doing exercise, having healthy food and increase the likelihood of exposure to tobacco, alcohol and other addictive drugs [12]. The time trends of self-rated health, annual Health Transition Item (HTI), and quality of life of medical faculty students may show the evidence of this academic

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burden in different periods of the education course that may lead to faculty managers taking preventive measures. However, research on the change of quality of life and health perception during the full course of education among medical school students in Turkey is scarce, and the annual health transition of the students was never questioned before.

The aim of this study is to determine the change in the self-rated health and quality of life of students of a school of medicine during the course of their education and the predictive factors of health and quality of life such as socioeconomic factors, health status and healthy lifestyle, social relationships and social support, and academic burden.

Materials and Methods

The study is a cross-sectional study that aimed to reach the entire registered students of Manisa Celal Bayar University School of Medicine in 2016-2017. This study is a part of the "Health promotion behaviors and their causality in medical faculty students [officially approved under the title: "Tıp Fakültesi Öğrencilerinin Sağlığı Geliştirme Davranışları ve Nedenselliği"]. This study examines the self-rated health, quality of life and annual change of their health status (health transition) of students of a school of medicine during their education.

Verbal informed consent was obtained from all of the participants, and the Ethical Committee approved this study of Celal Bayar University Faculty of Health Sciences (ref no: 47114).

The questionnaires were collected from the participants who agreed to participate in the study, just following the information given to the students about this project. The population of all medical students enrolled in Celal Bayar University Medical School is 1154 from 2016 to 2017, and 53.4% of these students are female. It is aimed to include all students studying in medical school. So no sample selection was required. The overall participation rate in this study was 58.08%, whereas the participation rate was 87.4% for first-year students, 57.1% for second-year students, 61.7% third-year students, 58.3% fourth-year students, 32.6% fifth-year students; and 40.6% for senior students (interns).

Dependent variables in this study are the overall quality of life, self-rated health, and annual self- rated health transition. All items have five-point Likert type response options.

The overall quality of life item is "How would you rate your quality of life?" and its response scale is: very poor (1), Poor (2), neither poor nor good (3), good (4), very good (5). Self-rated health item is "How satisfied are you with your health?" and its response scale is: very dissatisfied (1), dissatisfied (2), neither satisfied nor dissatisfied (3), satisfied (4), very satisfied (5).

The global health transition question of the SF-36 scale is used as a stand-alone item in this study, and we named this item as "Health Transition Item (HTI)." Its wording is, "Compared to one year ago, how would you rate your health in general now?" and its response scale is: Much better now than one year ago (1) Somewhat better now than one year ago (2), About the same (3), Somewhat worse now than one year ago (4), Much worse now than one year ago (5).

The "Annual Health Perception Variation Value (AHVV), proposed by Eser et al. [13]," is a group based value, developed by using the health transition item. This AHVV is calculated as: For each group of participants (age group, gender group, social group etc.), "The percentages of the two options "Much better now than one year ago" and "Somewhat better now than one year ago" are summed and then subtracted from the sum of the percentages of "Somewhat worse now than one year ago" and "Much worse now than one year ago" for each of the age group. The method may be formulated as:

AHVV= [(Much better ... %) + (Somewhat better … %)] – [(Somewhat Worse ...% + Much Worse...%)]. The middle descriptor of the response scale (i.e., "About the same...") is considered as a neutral option and is omitted from this formula.

The independent variables of the study are academic grade level (1 to 6), age, family type, marital status, living condition (with peers, alone, dormitory, with family), having own room, number of siblings, educational level of mother and father, family income status, having a chronic disease, existence of a person who have chronic disease in the family, self-assessment of take care of own health and own oral health, spirituality/personal beliefs, being hopeful about future, presence of an intimate friend ,daily average study time, time spent on social media and internet; vacation length in the last year, membership of a society or an association or a social group; participation of an art or an entertainment group ; body mass index, body image perception, watching own weight, frequency of skipping meal, weekly fruit consumption, being on diet in the last year, frequency of drinking alcoholic beverage; addictive substance use (except smoking/alcohol intake) and frequency of any sleep problems.

Self-reported weight and height data is obtained from the students. Body mass index is calculated by dividing the weight by the square of the height.

Physical activity is assessed by the WHO's definition for physical activity item: "How often do you do daily physical activity that lasts for at least 30 minutes that sweats your underwear?" WHO suggested adequate physical activity as "Adults aged 18–64 should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week" [14].

Smoking status evaluated by the two questions. The first question is, "Have you smoked at least one cigarette per day or more during the previous six months?" [15] With a dichotomous response yes/no. The second question is, "Do you smoke currently?" with an ordinal response scale: Yes, I am currently smoking at least once a day; I smoke occasionally; I have quitted smoking; No, I have never smoked.

World Health Organization Well-Being Index (WHO5) is used to assess the depressive mood of the students [16]. WHO5 is a five-item scale and detects depressive mood and the validity and reliability of this index (scale). Turkish validity results were published by Eser et al. [17, 18].

Analyses

Chi-square and univariate logistic regression analyses were conducted in univariate analyses. Multivariate stepwise (Backward Wald) logistic regression models were established by including the variables that were found significant in univariate analysis. All analyses were performed using SPSS 23.0 statistical package program. Type 1 error was accepted as 0.05 in the statistical analysis.

Results

The mean and median ages of the students are 21.25±2.18 and 21.0 (min-max:17-33). 670 of the 1152 students participated in the study, as a coverage rate of 58.06%. The socio-demographic characteristics of the respondents are presented in Table 1.

Table 1. Socio-demographic characteristics of the study population

Variables	Categories	Frequency (%)
Academic grade level (terms)	1	181 (27.0)
	2	126 (18.8)
	3	129 (19.3)
	4	109 (16.3)
	5	56 (8.4)
	6	69 (10.2)
Marital status	Single	658 (98.3)
	Married	5 (0.7)
	Missing	7(1.0)
Living situation	With family	226 (33.7)
	Dormitory	162 (24.3)
	With peers	202 (30.1)
	Alone	80 (11.9)
Having his/her own room	Yes	595 (88.8)
	No	73 (10.9)
	Missing	2(0.3)
Family Type	Extended family	49 (7.3)
	Nuclear family	582 (86.9)
	Fragmented family	39 (5.8)
Number of siblings	None	65 (9.7)
	One or two	523 (78.1)
	Three or more	73 (10.9)
	Missing	9(1.3)
Educational status of the mother	Illiterate	17 (2.5)
	Primary school graduate	111 (16.6)
	Middle school graduate	43 (6.4)
	High school graduate	165 (24.6)
	College degree or more	333 (49.8)
	Missing	1(0.1)
Educational status of the father	Illiterate	9 (1.3)
	Primary school graduate	71 (10.6)
	Middle school graduate	30 (4.5)
	High school graduate	116 (17.3)
	College degree or more	441 (65.9)
	Missing	3(0.4)
Family income status	Higher than family expenditure	304 (45.4)
	Lower than family expenditure	50 (7.5)
	Equal to family expenditure	313 (46.7)
	Missing	3(0.4)

Table 2. Medico-social characteristics of the respondents

Variables	Categories	Frequency (%)
Having a chronic disease	Yes	68(10.1)
	No	597(89.2)
	Missing	5(0.7)
Existence of a person has a chronic disease in the family	Yes	222(33.2)
	No	448(66.9)
The mood in last the two weeks*	Depressed	292 (43.6)
	Non-depressed	370 (55.2)
	Missing	8(1.2)
Taking care of general Health	None	16 (2.4)
	Very little	106 (15.8)
	Not bad	402 (60.0)
	Quite well	146 (21.8)
	None	7 (1.0)
Taking care of oral health	Very little	57 (8.6)
	Not bad	315 (47.0)
	Quite well	288 (43.0)
	Missing	3(0.4)
Spirituality/Personal beliefs	Very strong(excellent)	171(25.5)
	Fairly strong(good)	31(47.3)
	Slightly strong(Not good)	113(16.9)
	Not strong(poor)	62(9.3)
	Missing	7(1.0)
Being hopeful about future	Very unhopeful	24(3.6)
	Fairly(quite) hopeful	50(7.5)
	Neither hopeful nor unhopeful	267(39.9)
	Fairly(quite) hopeful	240(35.8)
	Very hopeful	86(12.8)
	Missing	3(0.4)
Presence of intimate friendship	I have	570(85.0)
	I haven't(absent)	36 (5.4)
	Uncertain	60 (9.0)
	Missing	4(0.6)
Daily average study duration	0-4 hours	549(81.9)
	More than 4 hours	94 (14.1)
	Missing	27(4.0)
Spending time with friends after school	Never	59 (8.8)
	One or two days a week	294 (43.9)
	Three days or more a week	317 (47.3)
Time spent on social media in a day	0-2 hours	234 (34.9)
	2-4 hours	216 (32.3)
	4 hours or more	159 (23.7)
	Uncertain	61(9.1)
Vacation length in last year	0-10 days	308 (46.0)
	More than ten days	362 (54.0)
Membership of non-governmental organization or of a social group	Yes	184 (27.5)
	No	475 (70.9)
	Missing	11(1.6)
Participation of organization as music band theater group, dance group, except sport organizations	Never	233(34.8)
	Seldom	317(47.3)
	Sometimes	84(12.5)
	Often	24(3.6)
	Missing	12(1.8)

*According to WHO 5 wellbeing index cut off point 13

The study population has a gender balance (female/male: 1.15). The majority of the students are the members of the middle-high class families. Only 7.5% of the students are relatively poor, and only 33.7% of the students are living with their families.

10.1% of the respondents reported that they have a chronic illness, and 33.1% reported having a chronic illness in his/her family (Table 2). 43.6% of the students reported that they are in a depressed mood. General health and oral health attention rates are in acceptable limits. 25.5% of respondents reported that they have strong spiritual beliefs, and only half of them are hopeful about their future. 14.1% of the respondents study more than four hours a day, and 23.7% of them spend more than four hours a day on the internet and social media. 85.0% of the students have an intimate friend and 47.3% go out for leisure three days or more a week. 34.8% of students did not have any relations with music or dance or any social activities; 25.8% are members of any authorized society or associations, and 54.0% of students have had a vacation in the last year (Table 2).

Table 3. Frequency of the healthy lifestyle (health promotion) variables in the study population

Variables	Categories	Frequency (%)
Anthropometry/Nutrition and Physical activity		
BMI	Less than 18.0	39 (5.8)
	18.0-24,99	455 (67.9)
	25.0-29.99 and over	86 (12.9)
	30 and over	23 (3.4)
	Missing	67(10.0)
Body image perception	Too thin	9 (1.3)
	Thin	68 (10.6)
	Just right	352 (52.4)
	Fat	206 (30.6)
	Too fat	31 (4.5)
	Missing	4(0.6)
Do you watch your weight?	Never	72(10.7)
	Seldom	227 (33.9)
	Sometimes	264 (39.5)
	Often	106 (15.8)
	Missing	1(0.1)
Frequency of skipping a meal	Never	164 (24.5)
	Seldom	307 (45.8)
	Sometimes	156 (23.3)
	Often	41 (6.1)
	Missing	2(0.3)
How many days do you consume fruit in a week?	Never or 1 day	90 (13.4)
	2 or 3 days	285 (42.6)
	4 or 5 days	154 (23.0)
	6 or 7 days	130 (19.4)
	Missing	11(1.6)
Diet in the last year	Yes	206 (30.7)
	No	452 (67.5)
	Missing	12(1.8)
Physical activity frequency	Never	85 (12.7)
	Occasionally	332 (49.6)
	1-2 days in a week	137 (20.4)
	3-4 days in a week	80 (11.9)
	5-6 days in a week	14 (2.1)
	Every day	22 (3.3)
Smoking/Alcohol/Substance use		
Current smoking status	Every day	122 (18.2)
	Not every day but occasionally	46 (6.9)
	Quit,	90 (13.4)
	don't smoke	412(61.5)
Frequency of drinking	Never	307 (45.8)
	alcoholic beverage	138 (20.6)
	One time or more a month	133 (19.9)
	One time or more a week	77 (11.5)
	Every day	11 (1.6)
	Missing	4(0.6)
Ever used addictive substances use during lifetime (except smoking/ alcohol intake)	Yes	43 (6.4)
	No	622 (92.9)
	Missing	5(0.7)
Sleep problems		
Frequency of any sleep problems	Never	138 (20.6)
	A Little	228 (34.0)
	Somewhat	153 (22.8)
	Much	89 (13.4)
	A great deal	55 (8.2)
	Missing	7(1.0)

The healthy lifestyle behaviors of the students have presented in Table 3. 16.3% of the students are overweight or obese, whereas 35.1% of the students find themselves as fat or too fat. 30.7% of the respondents reported that they applied a strict diet for the past year, and 6.1% of the students often skip a regular meal. Only 42.4% of the students consume fruit more than four days and over a week. Physical activity levels are rather worse among the students. Only 3.3% do regular daily physical activity, and 12.7% never do. 18.2% of the students are regular smokers, and just about 13.1% take alcohol regularly, and 6.4% of students have tried drugs at least once (Table 3).

10.1% of the students stated their overall quality of life as poor or very poor whereas 10.9% were dissatisfied with their health, and 20.3 % of them stated their current health as worse than the previous year (Table 4).

Table 4. Quality of life and Self-rated health

Variables	Categories	Frequency (%)
Quality of life perception	Very poor	21(3.1)
	Poor	47(7.0)
	Neither poor nor good	262(39.2)
	Good	301(44.9)
	Very good	36(5.4)
	Missing	3(0.4)
Self-rated health perception	Very dissatisfied	23(3.4)
	Dissatisfied	50(7.5)
	Neither satisfied nor dissatisfied	236(35.2)
	Satisfied	301(44.9)
	Very satisfied	58(8.7)
	Missing	2(0.3)
Annual health transition in self-rated health	Much worse now than one year ago	23(3.4)
	Somewhat worse now than one year ago	113(16.9)
	About the Same	322(48.1)
	Somewhat better now than one year ago	168(25.1)
	Much better now than one year ago	43(6.4)
	Missing	1(0.1)

The overall quality of life, self-rated health, and annual change in self-rated health of the students according to the terms are presented in Table 5. There is a linear trend in the academic grade level in terms of quality of life. The best percentages were obtained for the first two terms whereas the worse ones were calculated for the 5th and 6th terms. On the other hand, annual health transition (better health than one year ago) percentage is higher for the term five students and interns (term 6) than the students in term one to four (p=0.020), but self-rated health percentages do not significantly differ among terms. (Table 5).

Table 5. Perceived quality of life, self-rated health and annual change in self-rated health according to the terms in the school of medicine

	Perceived QOL n(good +Neither poor nor good %)	Self-rated health n(good+ Neither satisfied nor dissatisfied %)	Annual transition in self-rated health n(about the same+ better %)	AHVV* (%)
Term 1	167(93.3)	155(86.1)	138(76.7)	12.3
Term 2	118(93.7)	118(93.7)	106(84.1)	18.2
Term 3	114(88.4)	111(86.7)	98(76.0)	7.8
Term 4	97(89.0)	95(87.2)	82(75.2)	-0.9
Term 5	49(89.1)	54(96.4)	49(87.5)	3.6
Term 6	54(78.3)	62(89.9)	60(87.0)	27.6
p values	0.001	>0.05	0.020**	

*Annual Health Variation/Transition Value

**Terms are dichotomized as terms 1-4 vs. terms 5-6

The effects of socio-demographic variables on the quality of life are presented in Table 6. Students living in a fragmented family have poorer self-rated health. Income and father's education are inversely related to annual self-rated health transition. Senior students (interns) reported worse quality of life than the other terms, and students who live with their peers have a worse self-rated quality of life than those living with their family or living in a dormitory. The only interesting results are the higher quality of life status in students who are members of families with balanced income-expenditure compared to those who belonged to a wealthier family. Another important finding is the obvious quality of life difference between the first two terms and the seniors (interns): perceived overall quality of life is 4.0 (CI 95%: 1.9-8.2) times worse in the interns compared to the medical students in terms one and two (Table 6).

Table 6. Univariate analyses of Socio-demographic variables

Variables	QOL (poor and very poor) OR (95% CI)	SRH (dissatisfied and very dissatisfied) OR (95% CI)	Annual HT (somewhat worse and much worse) OR (95% CI)
Socio-demographic variables			
Academic grade level(ref: Term1 and 2)	1	1	1
Term 3, 4, and 5	1.8(1.1-3.2)*	1.1(0.6-1.8)	1.1(0.8-1.7)
Term 6 (Intern)	4.0(1.9-8.2)***	0.9(0.4-2.2)	0.5(0.2-1.2)
Family type: (ref: nuclear family)	1.0	1.0	1.0
Extended	1.3(0.5-3.2)	1.5(0.7-3.6)	0.7(0.4-1.7)
Fragmented	1.7(0.7-4.4)	2.7(1.2-6.1)*	1.5(0.7-3.2)
Income status: (ref: income higher than expenditure)	1.0	1.0	1.0
Equal to expenditure	0.5(0.3-0.9)*	0.9(0.6-1.5)	1.5(1.1-2.3)*
Less than expenditure	0.9(0.4-2.2)	1.1(0.4-2.7)	2.4(1.3-4.8)*
Father's Low Education (ref: high school and over)	1.6(0.9-3.0)	1.2(0.7-2.4)	2.0(1.3-3.2)**
Living situation(ref: with family)	1.0	1.0	1.0
Dormitory or alone	1.3(0.7-2.6)	0.9(0.5-1.7)	0.8(0.5-1.3)
With peers	2.3(1.2-4.3)*	1.2(0.7-2.2)	0.9(0.6-1.5)

Chi square: *= p<0.05; **= p<0.01; ***= p<0,001

Univariate analyses of health and health promotion variables are presented in Table 7. Students who have chronic disease perceive their health 3.6 times worse than healthy students. Also, those who have chronic diseases perceived their health 2.3 times worse than the previous year.

Additionally, taking care of their general health is associated with a better quality of life, better health perception and better health transition compared to one year ago. Students who take care of their oral health have a better quality of life and health perception than students who don't take care of their oral health. Students with depressive moods have 6.3 and 2.8 times poorer quality of life and health perception, respectively. The group of students who have a body mass index higher than 30.0 has a poorer quality of life (OR=3.2) and poorer health perception (OR=5.9). Participants whose perception of their body image is fat and too fat have poorer self-rated health, and their health perception is worse compared to one year ago. The group of students who are watching their weight perceives their quality of life better than others (Table 7).

Table 7. Univariate analyses of Health and Health promotion variable

Variables	QOL (poor and very poor) OR (95% CI)	SRH (dissatisfied and very dissatisfied) OR (95% CI)	Annual HT (somewhat worse and muchworse) OR (95% CI)
Health and Health promotion variable			
Having chronic illness (ref: healthy)	1.4(0.7-3.1)	3.6(2.0-6.6)***	2.3(1.3-3.9)**
Take care of general health :	2.2(1.4-3.9)**	3.8(2.3-6.4)***	2.0(1.3-3.1)**
None or very little (ref: not bad or quite good)			
Take care of oral health :	2.2(1.1-4.5)*	2.9(1.5-5.4)**	1.8(1.0-3.1)
None or very little (ref: not bad or quite good)			
Depressed mood (ref: nondepressed mood)	6.3(3.4-11.9)***	2.8(1.7-4.8)***	2.3(1.5-3.3)***
BMI is more than 30 (ref: lower than 30)	3.2(1.2-8.5)*	5.9(2.4-14.2)***	2.3(0.9-5.4)
Watching body weight, never and seldom(ref: often)	2.0(1.2-3.4)**	1.2(0.8-2.0)	1.1(0.8-1.7)
Body image perception: (ref: just right)	1.0	1.0	1.0
Fat and too fat	1.2(0.7-2.0)	2.3(1.4-3.9)*	2.3(1.5-3.5)*
Thin and too thin	0.4(0.1-1.2)	1.7(0.7-3.7)	1.1(0.6-2.2)
No physical activity at all (ref: at least once a week)	1.9(1.1-3.4)*	1.6(0.9-2.7)	0.9(0.6-1.4)
Frequently skipping meal (ref: never or seldom)	0.6(0.3-1.1)	2.0(1.2-3.4)**	1.3(0.9-1.9)
Drinking alcohol at least once a week (ref: never or seldom)	0.4(0.1-1.1)	1.9(1.1-3.4)*	1.2(0.7-2.0)
Does not have an intimate friend (ref:have an intimate friend)	2.6(1.5-4.7)**	2.4(1.4-4.3)**	2.3(1.4-3.6)**
Spirituality and beliefs:	1.4(0.8-2.4)	2.0(1.2-3.3)**	1.4(0.9-2.1)
Slightly strong or Not strong (ref: strong)			
Having a sleep problem (ref: never or slight problem)	0.7(0.4-1.2)	1.3(0.8-2.1)	1.9(1.3-2.9)**
Going vacation less than 10 days(ref:10 days or more)	3.2(1.9-5.5)***	1.0(0.6-1.7)	1.2(0.8-1.8)
Being hopeful for the future: (ref: hopeful)	1.0	1.0	1.0
Nor hopeful neither hopeless	1.8(1.0-3.3)	2.8(1.6-4.9)*	2.0(1.3-3.0)*
Hopeless	5.6(2.8-11.2)*	4.1(2.0-8.5)*	2.92(1.6-5.2)*
Spending time with friends after school: (ref one or two days a week)	1.0	1.0	1.0
3 or more times a week	1.2(0.7-2.0)	1.3(0.8-2.2)	1.0(0.7-1.5)
Never	2.7(1.3-5.8)*	2.0(0.9-4.4)	1.5(0.8-2.9)

Chi square: *= p<0.05; **= p<0.01; ***= p<0,001

Drinking alcohol at least once a week is found a risk factor for the poor perception of health. Those students who frequently skipped meals were almost twice as risky in terms of poor health perception. Doing adequate physical activity increased the quality of life of medical students. Participants who have gone on vacation for more than ten days in the past year have a better quality of life. The students who do not have any intimate friends have a poor quality of life, poor health perception, and worse self-rated health compared to one year ago. Furthermore, the existence of personal beliefs and spirituality has a positive effect on students' health perception. Being hopeless for the future is associated with poorer quality of life, poorer health perception, and deterioration of health perception compared to last year. Students who don't spend their time with their friends after school have a poorer quality of life than students who spend their time with their friends (Table 7).

Table 8. Regressions of quality of life, self-rated health and annual perceived health transition (Logistic regression, reduced final models)*

Variables	Model 1 QOL(poor and very poor) OR (95% CI)	Model 2 SRH (dissatisfied and very dissatisfied) OR (95% CI)	Model 3 Annual HT (somewhat worse and much worse) OR (95% CI)
Negelkerke R2	0.265	0.258	0.155
Age	p>0.05	0.85(0.74-0.98)*	p>0.05
Depressed mood	5.2	2.0	1.7
(ref: nondepressed mood)	(2.7-11.2)***	2.0	(1.1-2.6)*
Take care of general	2.0	3.5	p>0.05
health: None or very poor	(1.1-3.8)*	(1.9-6.5)***	
(ref: not bad or quite good)			
Take care of oral health :	2.4(1.1-5.5)*	2.7(1.2-5.9)*	-
None or very poor			
(ref: not bad or quite good)			
Does not have an intimate friend (ref: have an intimate friend)	2.3(1.1-4.4)*	2.1(1.1-4.1)*	p>0.05
Income status: (ref: more than expenditure)	1.0	1.0	1.0
Equal to expenditure	0.4(0.2-0.7)**	-	1.48(1.0-2.3)
Less than expenditure	0.5(0.2-1.6)	-	2.1(1.1-4.4)*
Having chronic illness	-	3.3(1.5-7.1)**	1.8(1.0-3.4)
(ref: healthy)			
Being hopeful for the future: (ref: hopeful)	1.0	1.0	1.0
Nor hopeful neither hopeless	p>0.05	2.0(1.1-3.9)*	1.8(1.2-2.9)*
Hopeless	p>0.05	2.7(1.1-6.7)*	2.5(1.3-4.8)**
Going vacation less than 10 days(ref:10 days or more)	2.6(1.4-5.0)**	-	-
Spending time with friends after school: (ref one or two days a week)	1.0	-	-
3 or more times a week	0.9(0.5-1.7)	-	-
Never	2.8(1.2-6.8)*	-	-
Father's Low Education	-	-	1.8(1.1-3.0)*
(ref: high school and over)			
Having a sleep problem	-	-	1.8(1.2-2.8)**
(ref: Never or slight problem)			
Body image perception: (ref: just right)	-	1.0	1.0
Fat and too fat	-	p>0.05	1.9(1.2-2.9)**
Thin and too thin	-	p>0.05	0.8(0.4-1.6)
Family type:	-	1.0	-
(ref: nuclear family)			
Extended	-	1.2(0.4-3.3)	-
Fragmented	-	3.3(1.2-8.9)*	-
BMI is more than 30	p>0.05	5.2	-
(ref: lower than 30)		(1.7-15.7)**	

"-" Not included in the multivariate analyses. *=p<0.05; **= p<0.01; ***= p<0,001

Only the variables that were found significant in the univariate analyses (see Table 7) were included in the multivariate logistic regression models presented in Table 8. The logistic regression Model suggested that having a non-depressed mood is the best predictor of a better quality of life. Besides, quality of life is negatively affected by not care of general and oral health, the absence of an intimate friend, unbalanced income-expenditure of the family, not having a vacation, and not spending adequate time with friends. (Table 8)

Lower BMI, being healthy, taking care of their health and having a nuclear family are found the most important variables that affect self-rated health positively. The results also revealed that younger age, having a nondepressed mood, taking care of oral health, presence of an intimate friend, being hopeful about future positively associated with better health perception.

As for the Annual Health transition, low-income status, father's low education, depressed mood, having any chronic disease, having a sleep problem, perception of self-body image as fat or too fat; having no hope for future increase the risk of deterioration of self-rated health compared to that of the previous year.

Discussion

Self-rated health and quality of life may not always link to a diagnosed disease. Many young people may report feeling unhealthy, although they don't have a diagnosed disease. The overall quality of life perception in university students varies in different regions of Turkey and different countries. Poor and very poor cumulative QOL frequency is about 10.1% in this study. This is a similar rate that was reported for a medical faculty in Turkey [19] but higher than the results of Lebanon study (2.5%) conducted on university students [20]. The trends of quality of life scores in this study presented a special pattern. QOL was better in the first two years students than the students of the following years and this trend sharpened in the final year in medical education (internship term). The 3rd-year and 4th-year students also reported worse SRH and QOL. Our results are consistent with a Brazilian study that presents worse QOL in 3rd term [21]. The 3rd term is the period of the highest theoretical and 4th term, both theoretical and practical academic burden of the school. Interns have significantly lower QOL than those studying in the first two terms. This deterioration trend is observed in other studies such as China [22], Thailand [23], USA [24] and Brazil [25]. In only one study conducted on Pakistani medical students reported contradictory results rendering worse QOL in the second year of medical education [26]. Then the question is "why interns perceive the worse quality of life than others." This trend may be explained by the increasing academic responsibility of the students as education evolves. Additionally, the specialty board examination called (TUS) in Turkey, loads a very heavy theoretical academic burden on the interns.

As for the self-rated health, poor and very poor self-rated health percentage is similar to the quality of life figures of our study (10.9%). Poorer self-rated health scores were found in medical students compared to other university students in several studies. Hence, the results of two Turkish studies that were conducted on nonmedical students reported better self-rated health scores than ours [27, 28].

Univariate and multivariate analyses for quality of life (model 1), self-rated health (model 2) and annual health transition (model 3) as dependent variables, revealed that, family income and father's education; physical (e.g., having chronic illness and obesity) and mental health problems (e.g., sleep problems and depressive mood); social relations and peer support and hope about future are the variables that predict QOL and self-rated health. We will first discuss both QOL and SRH concurrently since QOL and SRH may have similar risk factors, and subsequently, we will continue with the discussion on HTI.

The term and age of the students were not entered in the same logistic model due to potential collinearity problems, and different models are employed. The term (although significant in the univariate analyses) was not found significant in the final logistic regression model whereas advanced age was found protective in model 2 (SRH). The advantage of advanced age on SRH may be attributed to the professional development and maturation of the student. Similarly, a study from Lebanon, advanced aged students, has better SRH than that of younger [20]. QOL was sensitive to family income as expected. Several studies support this fact in the literature [29]. Health status, depressed mood and taking care of their health and oral health were also sensitive to QOL and SRH.

Furthermore obesity is found associated with QOL. Although the presence of chronic illness is rare amongst students, it stayed in the final regression model (Model 2, SRH), similar to obesity. On the other hand, depressive mood affects QOL and SRH with very high odds ratios. So depression is one of the highest predictors of QOL and SRH in our study. Not surprisingly, several literature findings support our results [29-32]. The depressive mood is probably due to the long hours of studying and social isolation of the students resulting inability to self-actualize. Taking care of your health can be expressed as a self-responsibility of health. The students who are taking care of their health and oral health reported better self-rated health and better QOL. A few previous studies support our findings [33,34] indicating that self-health responsibility is very close to the feeling of health and being happy in life.

Social relationships and social support consist of another major group of variables that are very influential on SRH and QOL. Having intimate friends and time spent with friends are crucial variables for good health perception and QOL in this study. Numerous national and international studies agree with these findings [35-38] in the literature. As it was mentioned above for the depressive mood, having an intimate friend and share time with friends may serve as a good way of overcoming social isolation and the pressure of heavy workload over the students. Having a vacation also increased the QOL of the students in this study. An Australian study confirms this finding, mentioning that vacations contribute to the quality of life in adults [39]. Vacation refers to leisure and peace of mind and mostly integrated with social relations. Family composition and relationships with family still play a great role in the life of students either in terms of social and economic support. In this study being a member of a fragmented study affects SRH negatively. Just one study conducted on a sample of Brazilian adolescents has similar results with ours [40]. Hopefulness about the future is very important for youth and motivated the young to be more active and happy in life. As expected, we found hope

for the future a very effective determinant of SRH, and this was supported by only one study conducted on high school students in west Turkey [41].

Assessment of annual perceived health transition is a relatively new approach that has been used in health inequality researches. Following the development of SF-36 as a health-related quality of life tool, its second item served as "health transition item - HTI" and some researchers isolate this item and have used it in the health management programs and research. This HTI was proposed to be used in population group comparisons, as well. Eser et al. suggested a new method, namely as "Annual Health Variation Value "(AHVV) as a "group-based value," as described in the Methods section above [13]. AHVV in our sample, in general, is less than that of the population-representative sample Eser et al. 's study in the same age groups. Also, AHVV for each of the years of education is presented in Table 5 and present a U shaped trend. It was rather good in the first two years and especially very low in years 3, 4 and 5. The poor quality of life levels in the 3rd and 4th terms is already discussed above, and so, this finding supports it differently.

Global health transition item is a brief retrospective item that can add value to cross-sectional surveys where there is no opportunity for follow-up by identifying groups of subjects who have experienced a recent change in health status [42]. So this item is very valuable for us since we could only conduct a cross-sectional study with a moderate level of participation of the medical students. Many descriptors affect annual health transition among adults and young people, such as socio-demographic variables and the presence of any illness or risk factors of illnesses and psychosocial factors.

Family income, father's level of education, the existence of any chronic disease, sleep problems, taking care of own health, depressed mood and hope for the future were the independent variables retained in the final reduced logistic regression model for health transition item. Not taking care of oneself properly, depressed mood and hope for the future is sensitive to all three dependent variables, including health transition in this study. Taking good care of oneself is an abstract variable that covers all health-promoting behaviors, and hope about the future for university students is naturally a very important one. Depression may associate with both self-care and hope for the future and may also be very predictive of health change. Family income and father's education both renders socio-economic status as one of the predictors of health transition.

The Annual Health Variation Value (AHHV) is higher in the first two years of education and the interns, whereas it is very low in especially 3rd and 4th term students. The AHVV for 3rd and 4th terms are less than that of found by Eser et al. [13], in a population-based sample. We found AHVV as 12.3 in the 1st term students and 18.2 in 2nd term students, which are lower than the reported AHVV of 30.3 in the 15-19 age group in Eser et al.' study. On the other hand, AHVV was reported as 11.2 in the 20-24 age group in Eser et al. study, whereas it was 7.8 in the 3rd term students and -0.9 in the 4th term students in this study, which are also lower than Eser et al.'s population-based figure for the same age group.

The final year students (interns) perceived the worse overall quality of life than the first and second-year students. Additionally, the majority of the 3rd 4th and 5th term students reported their health worse than the previous year. These facts in self-rated health and QOL may be regarded as pieces of evidence that may lead the university authorities to take measures especially in clinical terms of medical education.

Conclusion

Based on the hypothesis of this study, we can conclude that, all of the four hypotheses, namely: socio-demographic factors, health, healthy lifestyle, social relations, social support, and academic burden are the predictors of perceived overall quality of life and self-rated health. Low socioeconomic status of the family, poor health and poor health-promoting lifestyle, and inadequate social relations and social support have negative effects on quality of life and self-rated health. On the other hand, it was found that the medical school term, which is a representative of the academic burden, was also an effective factor.

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Competing interests
The authors declare that they have no competing interest.

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