Original Article

Exploration of mental health problems in association with health-promoting lifestyle profile in Iranian medical students: A cross-sectional study

Nilufar Safaie[1,2], Sara Ketabi[2], Naimossadat Kia[1,3], Majid Mirmohammadkhani[1,4], Mohammad Reza Moonesan[5], Fatemeh Paknazar[1,4]*

Abstract:

OBJECTIVE: The aim was to explore the relationship between mental health problems (MHPs) and health-promoting lifestyle (HPL) in the medical students.

METHODS: This cross-sectional study was carried out on medical students in 2017 at Semnan University of Medical Sciences applying a stratified random sampling. The Symptom Checklist-25 and the HPL profile scales were used. Logistic regression models were used to analysis.

RESULTS: Of the participants, 84 were male and 148 were female. The mean age was 22.69 years (±2.42). Most students (95.3%) were single and 40.1% were in the preclinical stage. The mean MHP score was 44.14 (±13.99), and 3% were in the severe category. The mean HPL score was 104.88 (±16.84); 95.7% and 4.3% of them had average and satisfactory lifestyles, respectively. The MHP score of the female ($P < 0.001$), younger ($P < 0.001$), single ($P = 0.045$), preclinical ($P < 0.001$), and who were away from home ($P = 0.009$) were significantly higher. The HPL score of female ($P < 0.001$), older ($P = 0.041$), and married students ($P = 0.028$) were significantly higher. The female gender (odds ratio [OR] = 4.45, $P < 0.001$) and studying in the clinical level (OR = 0.30, $P < 0.001$) were the most important associated factors with MHP. Adjusting for them, there was a significant relationship between an increase in the HPL score and a decrease in the likelihood of MHP (OR = 0.96, $P < 0.001$).

CONCLUSIONS: The mental health of medical students was shown to be in association with lifestyle independent of other important determinants, including gender and academic level. It seems that modifying the lifestyle to a healthier way can improve students' mental health.

Keywords:

Healthy lifestyle, medical, mental health, students

[1]Social Determinants of Health Research Center, Semnan University of Medical Sciences, [2]Department of Internal Medicine, Semnan University of Medical Sciences, [3]Department of Community Medicine, Semnan University of Medical Sciences, [4]Department of Epidemiology and Biostatistics, Semnan University of Medical Sciences, [5]Department of Emergency Medicine, Semnan University of Medical Sciences, Semnan, Iran

Address for correspondence:
Dr. Fatemeh Paknazar, Social Determinants of Health Research Center, Semnan University of Medical Sciences, Semnan, Iran. E-mail: paknazar2306@ yahoo.com

Introduction

Mental health is one of the dimensions of health.[1] According to the World Health Organization (WHO), mental health is "a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community."[2] Mental health is a requisite for the sustainability of social, occupational, and academic performance of people in society.[3,4] As many as 450 million people suffer from a mental or behavioral disorder, while one in four families has at least one member with a mental disorder.[2] These figures are not smaller in Iran as compared to the other countries, reflecting the considerable importance and prevalence of mental health problems (MHPs).[5]

A person's mental health can be shaped by various social, economic, and physical environments operating at different stages of life.[6] Medical education takes a longer time than many other academic fields. It comprises strenuous study and training for near 7 years in many countries like Iran. During this period, students should acquire adequate professional knowledge, skill, and attitudes to deal with life-long professional challenges.[7] Previous studies indicated that studying medicine can affect the mental health of students.[8] It has been reported that the prevalence of depression, anxiety, and stress among the medical students is excessively high.[9] In a systematic review between 2000 and 2015, it was shown that mental health issues affect a significant proportion of medical students and they are more prevalent in certain subpopulations of medical students.[10]

Lifestyle is associated with health.[11] The increase in many health problems including obesity, hypertension, cardiovascular diseases, and cancer is also linked to lifestyle changes.[12] Lifestyle awareness and its changes over time have been significantly valued by health and preventive medicine specialists.[13] Health-promoting lifestyle (HPL) is composed of various factors, such as wellness, personal fulfillment, and self-actualization, which are used to describe an individual's HPL profile.[14] The HPL includes behaviors that prevent diseases and promote health. Correcting the eating habits, controlling stress, physical activity and exercising, and stopping high-risk behaviors such as drug abuse are among the most important aspects of this lifestyle.[15] By 2020, the WHO predicts that 63% of all diseases and deaths worldwide will be related with unhealthy lifestyle.[16]

The lifestyle of each person is affected by personal and environmental factors.[17] One of the important environments that affect a person's life during his/her lifetime is the university environment. Students are important in society and their health is mutually correlated with society's health.[18,19] Although the personal lifestyle framework forms at the early ages under the influence of the family and school, many behaviors change during the university years.[15,20] Since medical students are the future health officials, it is very important to investigate their health status and health habits and to prepare them for the future lifestyle counseling.[16] Some studies have been conducted to explore the lifestyle of medical students.[21-23]

Research results have indicated that the behaviors that are linked to a healthy lifestyle, such as regular physical activities, avoiding drugs, and adequate sleep, are associated with mental health.[24-27] In a study conducted in 2012/2013 and that included 7937 participants representatives of the German population, lifestyle factors included frequency of physical activity, alcohol consumption, smoking, body mass index, as well as circadian and social regularity were assessed and the outcome variables were depression, anxiety, stress, and satisfaction with life. All lifestyle factors were shown to be associated with the mental health outcomes.[28] In a study carried out among European and Mediterranean older populations to evaluate the association between dietary patterns and anxiety symptoms, it was shown that promoting healthy dietary habits could reduce anxiety symptoms of the older adults.[29] In a study conducted in Japan to clarify the incidence of predictive lifestyle factors for poor mental health status in adolescents, the findings showed an association between some lifestyle behaviors (such as participating in sports activities and <2 h/day watching television) and the onset of poor mental health in senior high-school students.[26] In Iran, the results of a study carried out on 264 students from Sabzevar universities indicated that the better the lifestyle, the lower the anxiety and depression.[30]

Examination of scientific evidence shows relatively many studies conducted on each of the mental health and lifestyle issues in medical students separately. However, studies that deal with both issues simultaneously in medical students have not been enough. Hence, the present research conducted to evaluate MHPs and their dimensions in a sample of medical students in Iran and explore the relationship of these problems with the HPL.

Methods

Study design and recruitment of students

This descriptive-analytical research was carried out as a cross-sectional study in 2017 at Semnan University of Medical Sciences. The sample size, which was determined using the sample size formula for prevalence estimation in a finite population, was 289. The statistical population included all the medical students. A stratified random sampling procedure was carried out with the academic levels serving as the strata (the preclinical stage including the basic sciences course and physiopathology course and the clinical stage including the apprenticeship and internship courses).

Data collection and the questionnaire used

Data collection was carried out using an anonymous questionnaire after obtaining the informed consent of the students. The questionnaire composed of three sections: section one questioned the demographic and personal information including age, gender, marital status, living conditions (with or without the family), academic level, and grade point average (GPA). In addition to the demographic information questionnaire, the symptom checklist-25 (SCL-25) and health-promoting lifestyle profile (HPLP-II) scales were used to measure the prevalence of MHPs and the HPL.

The Persian version of the standard SCL-25 questionnaire, which is the truncated version of the SLC-90 questionnaire, consists of 25 questions. This questionnaire is designed to assess the symptoms of MHPs, and each question is ranked from 1 to 5 as follows: 1 – none, 2 – slightly, 3 – partly, 4 – highly, 5 – extremely highly. This questionnaire covers the following seven dimensions: somatization, obsession compulsion, interpersonal sensitivity, phobia, anxiety, psychoneuroticism, and depression. The scores of all questions are summed to obtain the overall score. The higher scores on each dimension reflect the higher severity of the problem in that dimension in the respondent. In this questionnaire, a total score smaller than 42, a total score between 42 and 83, and a total score between 84 and 125 show minor, moderate, and severe problems, respectively. Its validity is assessed through factorial analysis and convergent and divergent validity and reliability via internal consistency and test–retest. Cronbach's α was reported as 0.97 for women and 0.98 for men, and re-test coefficients after 5 weeks in total sample as 0.78 – women 0.77 and men 0.79.[31]

The Persian version of the standard HPLP-II questionnaire consists of 49 questions that measure the health-promoting behaviors in six dimensions: spiritual growth, health responsibility, interpersonal relations, stress management, physical activity, and nutrition. The answer to each question is selected from four options, viz., (1) never, (2) sometimes, (3) usually, and (4) always. The total score of the health-promoting behaviors ranges from 49 to 196, and a score is calculated separately for each dimension. In this questionnaire, scores lower than 66 are considered unsatisfactory, scores between 66 and 131 are considered average, and scores between 132 and 196 are considered satisfactory. The validity and reliability of the Farsi version of the HPLP-II in Iran were assessed. Cronbach's α was reported to be 0.82 for the total scale and ranged from 0.64 to 0.91 for the subscales. All items had acceptable item–total correlations. It was concluded that the Farsi version of the HPLP has demonstrated initial reliability and validity.[32]

Data analysis

For data analysis, the number and percentage of the students were reported for the qualitative variables, and the data mean and standard deviation (SD) values were reported for the quantitative variables. The scores of different subgroups were compared following the confirmation of the normality and homogeneity of variance assumptions through the one-way analysis of variance method. Bonferroni *post hoc* test was also conducted. The correlation between the MHPs and the HPL scores was analyzed by calculating the Pearson correlation coefficients for the different dimensions. The main analysis was carried out fitting of logistic

regression models and reporting the odds ratio (OR) estimates. The score on the HPLP-II questionnaire was one of the independent variables (in addition to the background demographic and personal information), and the presence of moderate or severe MHPs (a score higher than 42) was considered the dependent variable. Modeling was conducted in three steps to obtain the final model. First, the univariate simple models were fitted for each explanatory variable and the crude OR values were reported. Thereafter, a multiple model was fitted in the presence of all explanatory variables. In step three, the reduced model was derived from the multiple model by the backward method and the likelihood ratio test. In these two steps, the adjusted OR was reported for each variable, and the main interpretation was carried out based on the final model. Data were analyzed in SPSS software version 16 (Inc., Chicago, IL, U.S.A). $P < 0.05$ was considered statisticaly significant.

Results

Of the 289 selected students, 232 students (80.3%) completed the questionnaire. As regards gender, 84 were male (36.2%) and 148 were female (63.8%). The mean age of the respondents (±SD) was 22.69 years (±2.42). Most students (198 students or 95.3%) were single, while 93 students (40.1%) were studying in the preclinical level. More information of participants is presented in Table 1.

As shown in Table 1, the MHP score of the female students ($P < 0.001$), students aged 20 or lower ($P < 0.001$), single students ($P = 0.045$), students who were away from home ($P = 0.009$), and the students who were in the preclinical stage ($P < 0.001$) were significantly higher. The HPL score of female ($P < 0.001$) and married students ($P = 0.028$) were higher than others. It significantly increased with age ($P = 0.041$).

The mean MHP score of medical students was 44.14 (±13.99) out of 125, and only 7 students (3%) were in the severe MHPs category. The most and least prevalent problems were associated with the obsession–compulsion and psychoneuroticism areas based on the scores [Tables 2 and 3].

The mean HPL score was 104.88 (±16.84) out of 196. In general, 95.7% of the students lived the average lifestyle while 4.3% led a satisfactory lifestyle. None of the respondents fell into the unsatisfactory score category. The highest and lowest scores were also obtained by interpersonal relations and physical activity, respectively [Tables 2 and 3].

Table 4 presents the coefficients of correlation between the MHPs and the HPL, in general, and for each area. As seen, there was a reversed, weak, and significant correlation

Table 1: Mean and standard deviation of the scores of mental health problems and health-promoting lifestyle in medical students by their personal and academic information

Characteristics (*n*=232)	Frequency (%)	MHP score		HPLP score	
		Mean±SD	*P*	Mean±SD	*P*
Sex					
Male	84 (36.2)	39.67±8.96	<0.001	99.08±15.06	<0.001
Female	148 (63.8)	46.68±15.63		108.18±16.06	
Age group (year)					
≤20	50 (21.6)	52.80±18.23	<0.001	100.10±17.35	0.041
21-25	152 (65.5)	41.29±10.74		105.65±16.13	
>25	30 (12.9)	44.17±15.00		108.97±15.95	
Marital status					
Single	198 (85.3)	44.90±14.85	0.045	103.89±16.73	0.028
Married	34 (14.7)	39.71±5.52		110.65±14.25	
Living with the family					
No	204 (87.9)	45.03±14.56	0.009	104.64±16.38	0.541
Yes	28 (12.1)	37.64±5.53		106.68±17.81	
Academic level					
Preclinical	93 (40.1)	48.60±15.61	<0.001	104.09±16.81	0.549
Clinical	139 (59.9)	41.16±11.96		105.42±16.39	
GPA (0-20)					
≤15	91 (39.2)	42.40±9.79	0.127	102.25±17.22	0.051
>15	141 (60.8)	45.27±16.07		106.58±15.91	

MHP=Mental health problem, HPLP=Health-promoting lifestyle profile, SD=Standard deviation, GPA=Grade point average

Table 2: Frequency distribution of medical students according to the range of mental health problems and health-promoting lifestyle scores

Frequency (%)	MHP score			Total
	<42 (mild)	42-83 (moderate)	84-125 (severe)	
HPLP score				
<66 (undesirable)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
66-131 (medium)	124 (53.4)	89 (38.4)	7 (3.0)	220 (94.8)
132-196 (desirable)	9 (3.9)	3 (1.3)	0 (0.0)	12 (5.2)
Total	133 (57.3)	92 (39.7)	7 (3.0)	232 (100.0)

MHP=Mental health problem, HPLP=Health-promoting lifestyle profile

between the total scores ($r = -0.198$, $P = 0.003$). There was also a reversed, weak, and significant correlation between the total scores of the HPL and MHPs areas, except for phobia and psychoneuroticism. The largest correlation (considering its value) was observed between this area and depression ($r = -0.319$, $P < 0.001$). The highest coefficient of correlation belonged to the correlation between spiritual growth (from the lifestyle areas) and depression (from the MHPs dimension) ($r = -0.378$, $P < 0.001$).

The relationship between the HPL score and other demographic and personal information of the students with suffering from moderate to severe MHPs (scores higher than 42) is depicted in Table 5. According to the crude OR values, a lower HPL score, the female gender, being away from home, lower age, and the preclinical level are significantly linked to the presence of MHPs. The relationship between MHPs with GPA and marital status is not significant. In the multiple model, two variables, namely age and living condition, lose their significance. According to the final reduced model, the female gender is the most important risk factor (OR = 4.45, $P < 0.001$), while studying in the clinical level is the most important preventive factor (OR = 0.30, $P < 0.001$) for MHPs. There was a significant relationship between an increase in the lifestyle score and a decrease in the likelihood of MHPs adjusting for gender, living condition, and academic level. As a result, a unit increase in the lifestyle score results in a 4% decrease in the MHPs (OR = 0.96, $P < 0.001$).

Discussion

The results of a systematic review carried out to assess the mental health of medical students in Asian countries indicated that 11% of the medical students were suffering from depression, while the prevalence of depression was higher in students in the preclinical level and students residing at home.[10] In another systematic review conducted to analyze the mental health of medical students in Brazil, it was reported that the prevalence of depression and anxiety in the students was 30.6% and 46.1%, respectively.[33] The results of a meta-analysis in China also confirmed the relatively high prevalence of MHPs. This study revealed that 29% and 21% of medical students were suffering from depression and anxiety disorders, respectively.[34]

In a study conducted at Shiraz University of Medical Sciences in Iran, more than half of the medical students

Table 3: Mean and standard deviation of the scores of mental health problems and health-promoting lifestyle in medical students in general, and for each area

Scales and dimensions	Range		Mean±SD	
	Possible	Observed	Sum of scores	Range: 1-4
Health-promoting lifestyle profile	49-196	68-156	104.88±16.54	2.14±0.38
Spiritual growth	9-36	10-33	21.97±4.37	2.44±0.49
Health responsibility	13-52	17-40	26.81±4.77	2.06±0.37
Interpersonal relations	8-32	10-29	19.72±3.80	2.47±0.47
Stress management	5-20	5-19	10.57±2.23	2.11±0.45
Physical activity	7-28	7-28	12.18±3.47	1.74±0.50
Nutrition	7-28	7-24	13.63±3.13	1.95±0.45
Scales and dimensions	**Range**		**Mean±SD**	
	Possible	Observed	Sum of scores	Range: 1-5
Mental health problems	25-125	25-110	44.14±13.99	1.77±0.56
Somatization	7-35	7-32	11.44±4.48	1.64±0.64
Obsession compulsion	3-15	3-15	6.41±2.75	2.14±0.92
Interpersonal sensitivity	3-15	3-15	6.00±2.25	2.00±0.75
Phobia	3-15	3-12	5.21±1.85	1.74±0.62
Anxiety	3-15	3-15	5.59±2.22	1.87±0.74
Psychoneuroticism	4-20	4-19	5.82±2.47	1.46±0.62
Depression	2-10	2-10	3.67±1.52	1.83±0.76

SD=Standard deviation

had MHPs.[8] Our research also confirmed the relatively high prevalence of MHPs in medical students at Semnan University of Medical Sciences. According to our estimates, almost half the medical students (42.7%) are suffering from moderate to severe MHP. This finding was consistent with previous studies.

In Zabol Medical Sciences University of Iran, gender was the only demographic factor linked to general health (including mental health).[35] In some studies carried out in Iran at Urmia, Tehran, and Yazd Medical Sciences Universities, mental health had no association with age, gender, marital status, place of residence, and GPA.[36-38] Our study revealed that the MHPs among female students, students aged 20 or lower, single students, students living away from home, and students in the preclinical level were more prevalent than other students. The most prevalent problems were linked to the obsession–compulsion and interpersonal sensitivity dimensions, while anxiety and depression had the next ranks in the order mentioned. Iran is highly heterogeneous both geographically and socially. Hence, the difference in the results of these studies can be mainly attributed to the sociocultural differences as well as the difference in the research scales.

Very few and scattered studies have been carried out so far in Iran to study the lifestyle of Iranian students. In the study carried out at Tehran University of Medical Sciences, it was indicated that the lifestyle score of students was in the average range. The researchers did not report any relationship between this score and variables including gender, age, academic level, GPA, and marital status.[23] As regards the students of Ilam University of Medical Sciences, the total lifestyle score of students had a significant relationship with their field, but it had no relationship with age, gender, and locality of the students.[22] The study carried out on the students of Iran University of Medical Sciences in Tehran revealed the unsatisfactory condition of the students as regards physical activity and exercising.[39] The results of a national survey carried out in Iran on 13 medical sciences universities revealed that 37.3% of the students exhibited at least one of the six health-threatening behaviors including Internet addiction, smoking, drinking, drug abuse, unprotected sex, and suicidal attempts or thoughts. In general, 38.9% of the students had general health problems.[40]

The study carried out in Pakistan indicated that 30.7%, 62.3%, and 7% of the medical students had healthy, average, and unhealthy lifestyles, respectively.[41] A study was also conducted in Saudi Arabia on the HPL and related factors in medical students. The mean HPLP-II score in this study was 123.8, and there was a difference between the lifestyle scores of the two genders.[21] In our study, 95.7% of the students led the average lifestyle, while 4.3% had a satisfactory lifestyle. None of the participants was also in the unsatisfactory score range. The highest scores were obtained on the interpersonal relations and spiritual growth in the order mentioned. As for the HPL, female participants were in a better condition than males, while married students outperformed single students. Improvements were also observed with age.

Scientific evidence mostly supports the relationship of the healthy lifestyle with mental health. Velten

Table 4: The coefficients of correlation between the mental health problems and the health-promoting lifestyle, in general, and for each area

Scales and areas	Correlation coefficient and P							
	Mental health problems							
	Somatization	Obsession compulsion	Interpersonal sensitivity	Phobia	Anxiety	Psychoneuroticism	Depression	Total score
Health-promoting lifestyle profile								
Spiritual growth	−0.281** (<0.001)	−0.338** (<0.001)	−0.229** (<0.001)	0.019 (0.779)	−0.242** (<0.001)	−0.205** (0.002)	−0.378** (<0.001)	−0.309** (<0.001)
Health responsibility	−0.123 (0.061)	−0.198** (0.002)	−0.007 (0.910)	0.276** (<0.001)	−0.010 (0.874)	−0.051 (0.436)	−0.226** (0.001)	−0.049 (0.458)
Interpersonal relations	−0.177** (0.007)	−0.198** (0.003)	−0.175** (0.008)	0.028 (0.674)	−0.171** (0.009)	−0.106 (0.108)	−0.244** (<0.001)	−0.164* (0.012)
Stress management	−0.194** (0.003)	−0.182* (0.006)	−0.122 (0.064)	−0.075 (0.254)	−0.160* (0.015)	−0.084 (0.202)	−0.140* (0.033)	−0.190** (0.004)
Physical activity	−0.074 (0.260)	−0.088 (0.183)	−0.025 (0.701)	−0.036 (0.584)	−0.108 (0.100)	−0.032 (0.630)	−0.104 (0.115)	−0.102 (0.120)
Nutrition	−0.062 (0.345)	−0.109 (0.099)	−0.103 (0.119)	0.199** (0.002)	−0.066 (0.316)	−0.011 (0.869)	−0.242** (<0.001)	−0.062 (0.344)
Total score	−0.211** (0.001)	−0.263** (<0.001)	−0.143* (0.029)	0.097 (0.140)	−0.169* (0.010)	−0.110 (0.095)	−0.319** (<0.001)	−0.198** (0.003)

**Correlation is significant at the 0.01 level, *Correlation is significant at the 0.05 level

et al. indicated that most of the healthy lifestyle components including mental and physical activity, limited drinking, no smoking, a natural BMI, and a daily life rhythm improve mental health.[28] However, in a study conducted on Italian students to analyze the relationship of motivation and health-related lifestyles with the development of depression, depression was only linked to positive motivational attitudes. In other words, behaviors such as smoking, drinking, and BMI were not separately linked to depression.[42] The results of a study conducted in Tehran to determine the relationship of lifestyles with the general health of students at Iran University of Medical Sciences revealed that general health was related to exercising, nutrition, smoking, meeting safety standards, controlling stress, and gender. However, general health was not associated with age, faculty, and residence status.[39] Another study in Sabzevar city in Iran revealed that with an increase in the quality of students' lifestyle, their depression, and anxiety subside.[30] The finding of our study showed a significant relationship between lifestyle improvements and reduced MHPs. As regards the lifestyle and MHP areas, the largest correlations were observed between the spiritual growth dimension of the lifestyle and depression and obsession–compulsion dimensions of the MHPs.

Conclusion

It is concluded that the mental health of medical students can be determined partially by their lifestyle, and it seems important to correct the lifestyle of medical students to improve their mental health. The screening of students and related health interventions should be done for medical students as the current youth and future physicians. The results of this study should be generalized to other Iranian universities with caution due to its sociocultural diversity and ample scope. A national multicenter study on a generalizable sample of selected universities is recommended.

Conflicts of interest
There are no conflicts of interest.

Table 5: The relationship of the health-promoting lifestyle score and other demographic and personal information of the students with moderate-to-severe mental health problems

Variables	Simple models		Multiple model		Reduced final model		
	Crude OR	P	Adjusted OR	P	Adjusted OR	95% CI	P
Age group (year)*	0.57	0.018	1.43	0.286	-	-	-
Sex (female)	2.17	0.007	4.50	<0.001	4.45	2.23-8.87	<0.001
Marital status (married)	0.69	0.348	1.40	0.494	-	-	-
Living with the family (yes)	0.32	0.020	0.34	0.066	0.42	0.15-1.20	0.108
GPA (>15)	1.06	0.821	0.96	0.905	-	-	-
Academic level (clinical)	0.37	<0.001	0.22	<0.001	0.30	0.16-0.57	<0.001
HPLP score	0.97	0.002	0.95	<0.001	0.96	0.94-0.97	<0.001

*≤20:1, 21-25:2, >25:3, Clinical: Externship and internship courses. HPLP=Health-promoting lifestyle profile, CI=Confidence interval, GPA=Grade point average, OR=Odds ratio

References

1. Galderisi S, Heinz A, Kastrup M, Beezhold J, Sartorius N. Toward a new definition of mental health. World Psychiatry 2015;14:231-3.

2. World Health Organization. Promoting Mental Health: Concepts, Emerging Evidence, Practice: Summary Report. World Health Organization; 2004.

3. Matingwina T. Health, Academic Achievement and School-Based Interventions. London: IntechOpen: Health and Academic Achievement; 2018. p. 143.

4. Hsieh YC, Apostolopoulos Y, Hatzudis K, Sönmez S. Social, occupational, and spatial exposures and mental health disparities of working-class Latinas in the US. J Immigr Minor Health 2016;18:589-99.

5. Hajebi A, Damari B, Vosoogh Moghaddam A, Nasehi A, Nikfarjam A, Bolhari J. What to do to promote mental health of the society. Iran J Public Health 2013;42:105-12.

6. Allen J, Balfour R, Bell R, Marmot M. Social determinants of mental health. Int Rev Psychiatry 2014;26:392-407.

7. Kulsoom B, Afsar NA. Stress, anxiety, and depression among medical students in a multiethnic setting. Neuropsychiatr Dis Treat 2015;11:1713-22.

8. Farahangiz S, Mohebpour F, Salehi A. Assessment of Mental health among Iranian medical students: A cross-sectional study. Int J Health Sci (Qassim) 2016;10:49-55.

9. Iqbal S, Gupta S, Venkatarao E. Stress, anxiety and depression among medical undergraduate students and their socio-demographic correlates. Indian J Med Res 2015;141:354-7.

10. Cuttilan AN, Sayampanathan AA, Ho RC. Mental health issues amongst medical students in Asia: A systematic review [2000-2015]. Ann Transl Med 2016;4:72.

11. Kvaavik E, Batty GD, Ursin G, Huxley R, Gale CR. Influence of individual and combined health behaviors on total and cause-specific mortality in men and women: The United Kingdom health and lifestyle survey. Arch Intern Med 2010;170:711-8.

12. Fortin M, Haggerty J, Almirall J, Bouhali T, Sasseville M, Lemieux M. Lifestyle factors and multimorbidity: A cross sectional study. BMC Public Health 2014;14:686.

13. Olsen JM, Nesbitt BJ. Health coaching to improve healthy lifestyle behaviors: An integrative review. Am J Health Promot 2010;25:e1-e12.

14. Shaheen AM, Nassar OS, Amre HM, Hamdan-Mansour AM. Factors affecting health-promoting behaviors of university students in Jordan. Health 2015;7:1.

15. Nola IA, Jelinić JD, Matanić D, Pucarin-Cvetković J, Bergman Marković B, Senta A. Differences in eating and lifestyle habits between first- and sixth-year medical students from Zagreb. Coll Antropol 2010;34:1289-94.

16. Lee J, Mason D, Seals R, Jetpuri Z, Bridges K. Health Status, Healthy Lifestyle Practices, and Attitudes toward Lifestyle Counseling among Medical Students at the Osteopathic Medical School and Allopathic Medical School in DFW: A Cross-Sectional Analysis; 2018.

17. Hammar M. Comparison of Environmental Supports to a Healthy Lifestyle on the UNH Campus with Student Behaviors; 2017.

18. Hosseini M, Ashktorab T, Taghdisi MH, Khodayari MT. The interpersonal influences as a factor for health promoting life style in nursing students: A mixed method study. Glob J Health Sci 2017;9:196-205.

19. Alhakbany MA, Alzamil HA, Alabdullatif WA, Aldekhyyel SN, Alsuhaibani MN, Al-Hazzaa HM. Lifestyle Habits in Relation to Overweight and Obesity among Saudi Women Attending Health Science Colleges. J Epidemiol Glob Health 2018;8:13-9.

20. Amani R. Study of girl students nutritional status in Ahvaz dormitory. Sci Med J Ahvaz Jundishapur Univ Med Sc 2005;42:54-61.

21. Alzahrani SH, Malik AA, Bashawri J, Shaheen SA, Shaheen MM, Alsaib AA, *et al*. Health-promoting lifestyle profile and associated factors among medical students in a Saudi university. SAGE Open Med 2019;7:1-7.

22. Babanejad M, Zarin HK, Sayehmiri K, Delpisheh A. Lifestyle investigation and its associated factors in students of Ilam University of Medical Sciences. Pajoohandeh J 2012;17:252-7.

23. Goudarzi L, Nazari A, Vasokolaee RG, Salimi M, Raadabadi M. The lifestyle of allied medical students studying at Tehran University of medical sciences in 2012. Payavard Salamat 2014;8:294-304.

24. Jalleh G, Anwar-McHenry J, Brooks G, Donovan R, Lin C. Karratha Act-Belong-Commit Mentally Healthy WA Campaign: 2015 Intercept Survey Data; 2015.

25. Walsh R. Lifestyle and mental health. Am Psychol 2011;66:579-92.

26. Itani O, Kaneita Y, Doi K, Tokiya M, Jike M, Nakagome S, *et al*. Longitudinal epidemiologic study of poor mental health status in Japanese adolescents: Incidence of predictive lifestyle factors. J Clin Psychiatry 2018;79. pii: E1250.

27. Tanihata T, Kanda H, Osaki Y, Ohida T, Minowa M, Wada K, *et al*. Unhealthy lifestyle, poor mental health, and its correlation among adolescents: A nationwide cross-sectional survey. Asia Pac J Public Health 2015;27:NP1557-65.

28. Velten J, Lavallee KL, Scholten S, Meyer AH, Zhang XC, Schneider S, *et al*. Lifestyle choices and mental health: A representative population survey. BMC Psychol 2014;2:58.

29. Masana MF, Tyrovolas S, Kolia N, Chrysohoou C, Skoumas J, Haro JM, *et al*. Dietary patterns and their association with anxiety symptoms among older adults: The ATTICA study. Nutrients 2019;11:1-12.

30. Behdani F, Sargolzaei M, Ghorbani E. Study of the Relationship between Lifestyle and Prevalence of Depression and Anxiety in the Students of Sabzevar Universities; 2000.

31. Reshvanloo TF, Shamir SA. Construct validity and reliability of Symptom Checklist-25 (SCL-25). J Fundam

Ment Health 2015;18:48-56.

32. Mohammadi Zeidi I, Pakpour Hajiagha A, Mohammadi Zeidi B. Reliability and validity of Persian version of the health-promoting lifestyle profile. J Mazandaran Univ Med Sci 2012;21:102-13.

33. Pacheco JP, Giacomin HT, Tam WW, Ribeiro TB, Arab C, Bezerra IM, *et al*. Mental health problems among medical students in Brazil: A systematic review and meta-analysis. Braz J Psychiatry 2017;39:369-78.

34. Zeng W, Chen R, Wang X, Zhang Q, Deng W. Prevalence of mental health problems among medical students in China: A meta-analysis. Medicine (Baltimore) 2019;98:e15337.

35. Afshari Z, Rakhshani M. Factors related to mental health of students in Zabol University of medical sciences. J Neyshabur Univ Med Sci 2014;2:28-36.

36. Aghakhani N, Sharif Nia H, Eghtedar S, Rahbar N, Jasemi M, Mesgar Zadeh M. Prevalence of depression among students of urmia university of medical sciences (Iran). Iran J Psychiatry Behav Sci 2011;5:131-5.

37. Sorkhkalaee MM, Eftekhar H, Nejat S, Saeepour N, Shemirzadi ES. The state of mental health of students of Tehran medical sciences university in the academic year 2010-2011. Jorjani Biomed J 2012;1:16-22.

38. Tabrizizadeh M, Yasini ASM, Rostamzade P, Zare M. The mental health status of students of Medicine and Dentistry; a study in Shahid Sadoughi University of Medical Sciences, Yazd, Iran; 2012.

39. Samimi R, Rodsary DM, Hosseini F, Tamadonfar M. Correlation between lifestyle and general health in university students. Iran J Nurs 2007;19:83-93.

40. Poorolajal J, Mohammadi Y, Soltanian AR, Ahmadpoor J. The top six risky behaviors among Iranian university students: A national survey. J Public Health 2018; 41 (4): 788–797.

41. Nasir U, Farooq Butt A, Choudry S. A study to evaluate the lifestyle of medical students in Lahore, Pakistan. Cureus 2019;11:e4328.

42. Piumatti G. Motivation, health-related lifestyles and depression among university students: A longitudinal analysis. Psychiatry Res 2018;260:412-7.