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Research Article

Depression, Anxiety and Stress in Students of Various Fields of Medical Sciences: A survey at Babol University of Medical Sciences, North of Iran

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Abstract

Background: University students are particularly susceptible to anxiety and depressive disorders.

Objectives: The present study aimed to investigate the prevalence of depression, anxiety, and stress symptoms among students of medical sciences after the COVID-19 pandemic.

Methods: This cross-sectional study was carried out among students in different fields of medical sciences at Babol University of Medical Sciences, Iran. The Depression Anxiety Stress Scale-21 (DASS-21) was used to assess stress, depressive, and anxiety symptoms. The collected data were analyzed using SPSS version 22 software. A $P < 0.05$ was considered significant.

Results: A total of 356 students with a mean age of 21.74 ± 2.11 years were included. According to the DASS-21, 230 students (64.6%) had depressive symptoms, 157 (44.1%) had anxiety symptoms, and 179 (50.3%) had stress. Moderate to severe depression, anxiety, and stress had a frequency of 34.0%, 27.2%, and 30.0%, respectively. Ordinal logistic regression analysis revealed the significant effect of being single (OR = 2.12, P = 0.037) and a nursing student (OR = 2.23, P = 0.041) on the occurrence of depressive symptoms. Older age (OR = 1.15, P = 0.007), male gender (OR = 0.53, P = 0.001), being single (OR = 2.51, P = 0.006), and being a medical student (OR = 2.46, P = 0.004) had a significant association with the presence of anxiety symptoms. Older age (OR = 1.11, P = 0.05), male gender (OR = 0.49, P = 0.001), and singleness of the student (OR = 3.01, P = 0.003) had a significant association with the occurrence of stress in these students.

Conclusions: Psychological problems, including stress, depression, and anxiety symptoms, have a relatively high prevalence among students of medical sciences, predominantly female and single individuals. More attention should be paid to alleviate the incidence of these disorders.

Keywords: Mental Health, Medical Students, Depression, Anxiety

1. Background

Mental health of college students is an essential public health entity, especially in developing countries where they face considerable distress in school and family because of different factors, including economic, social, educational, and occupational demands (1). In recent years, as the global burden of the COVID-19 pandemic has decreased, more attention has been paid to mental health problems, including depression, anxiety, and burnout of college students, especially students of medical sciences, whom stigma related to mental disorders prevents from seeking help and interventional approaches (2, 3).

A recent systematic review and meta-analysis examined the global prevalence of depression and anxiety symptoms among college students. The pooled prevalence of depressive symptoms was reported at 33.6% (29.3 - 37.8%) and anxiety symptoms at 39.0% (34.6 - 43.4%). The highest prevalence of depressive (42.5%) and

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anxiety symptoms (54.2%) was observed in lower-middle-income countries and students of medical sciences (39.4% and 47.1% for depressive and anxiety symptoms, respectively). Additionally, the prevalence of depressive and anxiety symptoms was reported to be much higher in the studies carried out after the COVID-19 pandemic (4).

Multiple factors might be associated with anxiety and depression in students of medical sciences, including their age, gender, ethnicity, year of study, health status, personal characteristics, family issues, and socioeconomic factors (5, 6). Mental disorders in medical college students can negatively impact their physical well-being, academic performance, and future profession (4, 5, 7, 8).

2. Objectives

In recent years, especially during the COVID-19 outbreak, several cross-sectional studies assessed the prevalence of depression and anxiety in medical students in Iran (9-11). However, since the socioeconomic conditions, educational atmosphere, and other environmental factors affecting students' depression and anxiety differ across various regions, the present study aimed to investigate the current situation of depression and anxiety in students of different fields of medical sciences. The findings can be helpful in implementing proper interventional policies for the improvement of the current situation.

3. Methods

3.1. Study Design

This study was carried out as a cross-sectional study among students of different fields of medical sciences affiliated with Babol University of Medical Sciences, north of Iran, during 2022 - 2023.

3.2. Setting

By obtaining the list of academic fields available from the Education Deputy of Babol University of Medical Sciences and the list (including the name and phone number) of students studying in each academic field, 10 fields of medical sciences in this university that included clinical rotations in their educational curriculums, and the students of these fields were faced with true patients during their academic course were selected. The sample population was selected through cluster random sampling. For this purpose, the total population of students in each of the 10 mentioned fields was considered, and according to the proportion of each field to the total number of university students, the sample size was determined. The study questionnaires were provided to the participants online and in print.

3.3. Participants

The participants were undergraduate students studying at different levels of education in 10 academic fields of medical sciences (including medicine, dentistry, nursing, radiology, laboratory sciences, audiology, anesthesiology, nuclear medicine, health sciences, and operating room). Inclusion criteria were studying at Babol University of Medical Sciences and the person's consent for participating in this research. Students with a previous history of serious psychiatric disorders (such as psychosis, substance dependency, and major depressive disorder) based on the person's self-report were excluded.

3.4. Variables

Baseline information included gender, age, marital status, living in dormitories or not, field of study, level of education, self-reported history of psychiatric disorders in the participant or his/her family, history of comorbidities, and consuming drugs. These variables were collected through self-reporting of the participants.

3.4.1. Depression Anxiety Stress Scale-21

This scale is a 21-item self-report questionnaire used to measure the negative emotional states of depression, anxiety, and stress. The participant reads each statement and chooses a number 0 (did not apply at all-never), 1 (applied to some degree, or some of the time-sometimes), 2 (applied to a considerable degree, or a good part of the time-often), or 3 (applied very much, or most of the time-almost always), that indicates how much the statement applied to him/her over the past week. The scoring guide has been presented in Appendix 1 in Supplementary File (12). The Persian translation of this scale has been assessed among Iranian nurses, and its psychometric properties have been approved. The Cronbach's alpha coefficient was 0.93, the test-retest reliability of its Persian version was acceptable, and the intraclass correlation coefficient of all domains was adequate in a range from 0.75 to 0.86 (13).

3.5. Data Sources/Measurement

Baseline data and the Depression Anxiety Stress Scale-21 (DASS-21) were sent to the students of the selected

fields online and in printed form. The completed forms were analyzed, and the findings were reported.

3.6. Bias

To prevent selection bias, the research questionnaire was distributed among the study population, and the students of different fields of medical sciences in this university were invited to participate voluntarily. In addition, logistic regression analysis was used to control the effect of potential confounding factors.

3.7. Study Size

The sample size was calculated using the following formula. According to the previous evidence (14), the estimated prevalence of depression, anxiety, and stress among medical science students was considered P = 0.34. Considering the probability of type one error as 0.05 and the margin of error (d) as 0.05, the minimal required sample size was calculated as 345 students.

$$n = \frac{Z^2_{1-\frac{\alpha}{2}}\, p\left(1-p\right)}{d^2}$$

3.8. Statistical Methods

Data were analyzed using the SPSS version 22 software package. Chi-square, ANOVA, and *t*-test were used for data analysis. Furthermore, to assess the effect of different variables on the depression, anxiety, and stress categories of college students, an ordinal logistic regression analysis was used. All variables were entered into the model as potentially influential parameters, and then the variables that had the most influence were retained in the model using the backward method. Variables were removed from the model with a $P > 0.1$. Depression, anxiety, and stress were categorized as normal, mild, moderate, and severe. In this regression, these categories were considered as the dependent variable. A $P < 0.05$ was considered significant.

4. Results

In total, 391 students completed the research questionnaires; 157 individuals (40.15%) completed them online, and 234 (59.85%) in printed form. Out of them, 35 persons were excluded (27 students reported a serious psychiatric disorder, seven persons were from study fields other than the ten mentioned fields who completed the questionnaire online, and one person did not complete the questionnaires thoroughly). Data related to 356 students of medical sciences were analyzed.

The mean age of the participants was 21.74 ± 2.11 years. A total of 170 (47.8%) were male, and 186 (52.2%) were female; 313 students (87.9%) were single, and 43 (12.1%) were married. Additionally, 101 students (28.4%) were living in dormitories, and 255 (71.6%) were living with their families. Given the self-reported comorbidities, two participants (0.6%) had diabetes mellitus, three people (0.8%) had hypothyroidism, three (0.8%) had asthma, two (0.6%) had migraine, four (1.1%) had minor thalassemia, four (1.1%) reported polycystic ovarian syndrome, and two people (0.6%) had a history of allergies. The field of education and year of study are presented in Table 1. This table shows that medicine students (129 persons, 36.2%) and dentistry (67 persons, 18.8%) made up the largest study population. Also, most participants were students studying in the first three years of the academic course.

According to the DASS-21, 230 students (64.6%) had depressive symptoms, 157 (44.1%) had anxiety symptoms, and 179 (50.3%) had stress. The level of depression, anxiety, and stress of students has been presented in Table 2. This table shows that moderate to severe depression, anxiety, and stress in students had a frequency of 34.0%, 27.2%, and 30.0%, respectively. The association between depression, anxiety, and stress of students with gender, marital status, field and year of study, living place, and underlying disorders has been reported in Table 3. This table reveals a significant association between the field of study and depression, anxiety, and stress; the students of laboratory science had the highest prevalence of depression, anxiety, and stress. Also, the year of study showed this significant association; the students studying in the first academic year had the highest depressive symptoms; however, students in the fifth or higher year of study showed a higher frequency of anxiety or stress. Female gender had a significant association with anxiety ($P = 0.017$) and stress ($P < 0.001$). Furthermore, a significant association was found between living with family and anxiety symptoms ($P = 0.003$). Anxiety ($P = 0.009$) and stress ($P = 0.031$) had a substantial association with marital status; single students had higher anxiety and stress.

Ordinal logistic regression analysis with backward entering of selected variables was used to investigate the effect of different factors on depression, anxiety, and stress of the students (Table 4). Due to a lack of enough samples in the subgroups of audiology, radiology, laboratory sciences, anesthesiology, health sciences, nuclear medicine, and operating room, and convergence issues in the regression model, we

Table 1. Field, Level of Education, and Year of Study of the Participants

Variables	No. (%)
Fields of study	
Medicine	129 (36.2)
Nursing	41 (11.5)
Dentistry	67 (18.8)
Fields of paramedicine	
Radiology	18 (5.1)
Anesthesiology	18 (5.1)
Laboratory sciences	17 (4.8)
Operating room	16 (4.5)
Fields of health sciences	
Health sciences	26 (7.3)
Nuclear medicine	15 (4.2)
Audiology	9 (2.5)
Year of the study	
First	111 (31.2)
Second	68 (19.1)
Third	69 (19.4)
Forth	57 (16.0)
Fifth	19 (5.3)
Sixth	14 (3.9)
Seventh	18 (5.1)

Table 2. Level of Stress, Depressive, and Anxiety Symptoms in Students of Medical Sciences, According to Depression Anxiety Stress Scale-21 Scoring System [a]

Level of Stress, Depressive, and Anxiety Symptoms	Depression	Anxiety	Stress
Normal	126 (35.4)	199 (55.9)	177 (49.7)
Mild	51 (14.3)	19 (5.3)	47 (13.2)
Moderate	84 (23.6)	66 (18.5)	57 (16.0)
Severe	38 (10.7)	31 (8.7)	50 (14.0)
Extremely severe	57 (16.0)	41 (11.5)	25 (7.0)

[a] Values are expressed as No. (%).

combined these groups together as follows: Radiology, laboratory sciences, anesthesiology, and operating room as fields of paramedicine; audiology, health sciences, and nuclear medicine as fields of health sciences. Table 4 shows that being single (OR = 2.12, P = 0.025) and studying nursing (OR = 2.23, P = 0.041) were the only factors significantly affecting depressive symptoms. Older age (OR = 1.15, P = 0.007), male gender (OR = 0.53, P = 0.001), being single (OR = 2.51, P = 0.006), and studying medicine (OR = 2.46, P = 0.004) were factors affecting the presence of anxiety symptoms. Older age (OR = 1.11, P = 0.05), male gender (OR = 0.49, P = 0.001), and singleness of the student (OR = 3.01, P = 0.003) were some of the factors affecting the occurrence of stress in these students; however, having an underlying disease, the study field, the academic year, and level of education did not show a significant effect on the presence of depression, anxiety, and stress in students.

5. Discussion

Our findings revealed that nearly 65% of the students studying in different fields of medical sciences had depressive symptoms, 44% had anxiety symptoms, and 50% had stress. It was also observed that moderate to severe depression, anxiety, and stress in students had a frequency of 50.3%, 38.7%, and 37.0%, respectively. Comparing this finding with previous studies represents similarities and also opposite results. A cross-sectional study in Japan found that 28.5% of students suffered from mental disorders to a significant extent

Table 3. Association Between Stress, Depression, and Anxiety Symptoms of Students with Gender, Marital Status, Field and Year of Study, Living Place, and Underlying Disorders [a]

Characteristics	Depression	P-Value	Anxiety	P-Value	Stress	P-Value
Gender		0.089		0.017		< 0.001
Male	103 (60.0)		64 (37.6)		69 (40.6)	
Female	127 (68.0)		93 (50.3)		110 (59.5)	
Marital status		0.344		0.009		0.031
Single	205 (65.5)		146 (46.6)		164 (52.4)	
Married	25 (58.1)		11 (25.6)		15 (34.9)	
Field of study		0.003		< 0.001		< 0.001
Medicine	90 (69.8)		80 (62.0)		85 (65.9)	
Nursing	32 (78.0)		10 (24.4)		16 (39.0)	
Dentistry	30 (44.8)		24 (35.8)		24 (35.8)	
Fields of paramedicine						
Radiology	11 (61.1)		8 (4.4)		8 (44.4)	
Anesthesiology	8 (44.4)		5 (27.8)		7 (38.9)	
Laboratory sciences	15 (88.2)		11 (64.7)		13 (76.5)	
Operating room	12 (75.0)		4 (25.0)		6 (37.5)	
Fields of health sciences						
Health sciences	16 (61.5)		10 (38.5)		12 (46.2)	
Nuclear medicine	9 (60.0)		5 (33.3)		5 (33.3)	
Audiology	7 (77.8)		0		3 (33.3)	
Year of study		0.044		< 0.001		0.003
First year	84 (75.7)		60 (54.1)		63 (56.8)	
Second year	38 (55.9)		28 (41.2)		29 (49.6)	
Third year	37 (53.6)		27 (39.1)		29 (42.0)	
Fourth year	35 (61.4)		12 (21.1)		21 (36.8)	
Fifth year	13 (68.4)		12 (63.2)		13 (68.4)	
Sixth year	10 (71.4)		8 (57.1)		11 (78.6)	
Seventh year	13 (72.2)		10 (55.6)		13 (72.2)	
Living place		0.668		0.003		0.513
Living in dormitories	67 (66.3)		32 (31.7)		48 (47.5)	
Living with their families	163 (63.9)		125 (49.0)		131 (51.4)	
Underlying disorders in student		0.657		0.934		0.175
Yes	218 (64.9)		148 (44.0)		166 (49.4)	
No	118 (35.1)		188 (56.0)		170 (50.6)	

[a] Values are expressed as No. (%).

(15), while another study in Malaysia found that more than 50% of clinical undergraduate students experienced symptoms of mental disorders (16). In a study in Spain, it was observed that the prevalence of anxiety, depression, and stress was 21.3%, 34.2%, and 28.1%, respectively, and 50% of the participants experienced moderate to severe symptoms (17). In a study in Iran, it was observed that after the COVID-19 pandemic, about 28.4% of medical students had depression, 17.1% had stress, and 21.8% had anxiety symptoms (11). It seems that the symptoms of depression, anxiety, and stress in our research are higher than in most of the mentioned studies, which could be due to the difference in sampling method, the study population, the scale used for assessment, and different socioeconomic and cultural aspects of the studied people. Various factors, such as governmental support, in addition to family support, can affect the level of stress, anxiety, and depressive symptoms experienced by academic students (16).

The present study showed that symptoms of anxiety and stress were more common in female students than in males. A study in Brazil (18) and the United States (19) also found that women experienced more anxiety and depressive symptoms than men. Contrary to this result, in research in Malaysia, although anxiety, depression, and stress were more frequent in women than men, this

Table 4. Ordinal Logistic Regression Analysis and the Effect of Different Factors on Stress, Depression, and Anxiety Symptoms of Students

Characteristics	Depression Adjusted OR (95% CI)	P-Value	Anxiety Adjusted OR (95% CI)	P-Value	Stress Adjusted OR (95% CI)	P-Value
Age	1.07	0.190	1.15	0.007	1.11	0.050
Gender (male)	0.71	0.084	0.53	0.001	0.49	0.001
Single	2.12	0.025	2.51	0.006	3.01	0.003
Living in dormitories (not with family)	0.95	0.816	0.81	0.339	0.92	0.740
Not have an underlying disorder	1.13	0.759	0.60	0.234	0.83	0.655
Field of study						
Medicine	1.72	0.08	2.46	0.004	2.62	0.004
Nursing	2.23	0.041	1.48	0.317	1.10	0.818
Dentistry	0.67	0.258	0.88	0.720	1.04	0.910
Fields of paramedicine	1.35	0.375	1.18	0.622	1.27	0.509
Fields of health sciences [a]	-	-	-	-	-	-

[a] Fields of health sciences is the reference category.

difference was not statistically significant (16). Also, another study among medical students in Iran reported that the prevalence and severity of anxiety and depression in women and men did not have a statistically significant difference (9). The mentioned studies were carried out at different times during and following the COVID-19 outbreak, so the different findings can be justified. The atmosphere of medical universities was different during the coronavirus pandemic and after the termination of this outbreak. In addition, previous studies selected college students from different fields of study, various academic years, and different levels of education.

Anxiety and stress in single students were reported to be much higher than that of married people. However, the frequency of depressive symptoms was not statistically different between married and single people. In another study in Iran, the prevalence of stress, anxiety, and depression in single and married students did not show a statistically significant difference (9). Perhaps the support of the spouse and the positive effects of marriage on mood and subjective well-being (20) can justify the difference between single and married students.

In the current study, more anxiety symptoms were observed in students living with their families than in dormitory residents, but no statistically significant difference was observed between these two groups in terms of depression and stress. Miskulin et al.'s study also stated that being with family during the COVID-19 lockdown was not a protective factor for depression (18). Also, in another study in Iran, it was observed that the prevalence of anxiety and depression did not have a statistically significant difference between the college students who lived alone and the individuals who lived with their families (9). Multiple factors might have a positive or negative influence on the psychosocial well-being of students of medical sciences. Higher self-esteem, study-life balance, academic achievement, social support, better socioeconomic status, and sufficient pocket money are usually associated with better mental status, while adverse socioeconomic and educational environments negatively impact students' well-being (21, 22). Therefore, proper approaches to improving well-being services or educational, organizational, cultural, and economic resource provision for these students are essential.

The most important strength of this research is sampling the study participants among students from different fields of medical sciences. We could not compare the frequency of psychological disorders with the amounts during the COVID-19 pandemic. This comparison might be useful to investigate the impact of the outbreak on these disorders' prevalence. Also, we did not conduct a structured clinical interview with the participants. These points are the limitations of the present research.

5.1. Conclusions

Psychological problems, including stress, depression, and anxiety symptoms, have a relatively high prevalence among students of medical sciences, especially female and single individuals. More attention should be paid to alleviating the incidence of these disorders.

Supplementary Material

Supplementary material(s) is available here [To read supplementary materials, please refer to the journal

website and open PDF/HTML].

Footnotes

Authors' Contribution: M. S., R. H., H. S., and S. M. contributed in study design, study supervision, acquisition of data, drafting of the manuscript, and critical revision of the manuscript for important intellectual content. H. S. and S. M. performed the analysis and interpretation of data. All authors approved the final version of the manuscript for publication.

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Data Availability: The dataset presented in the study is available on request from the corresponding author during submission or after publication. The data are not publicly available.

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