ORIGINAL ARTICLE

Mental Health as a Determinant Factor in Academic Performance: A cross-sectional study among medical students of Mashhad University of Medical Sciences, Iran

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Background: Students' mental health has a strong relationship with their quality of life as well as their academic success. This study aims to assess the mental health of medical students throughout different educational courses including pre-clinical, externship, and internship, also its association with students' academic performance at Mashhad University of Medical Sciences as well.

Methods: This cross-sectional analytical study was performed on all medical students studying in the first semester of pre-clinical course, at the beginning of their externship and internship at Mashhad University of Medical Sciences in 2019. In this study, a general mental health questionnaire consisting of 12 questions (GHQ-12) was used. Data analysis was performed using chi-square and t-test using SPSS 16.

Results: The mean age of students was 22.61 + 1.79. In this study, approximately 40% of students scored higher than the threshold for the GHQ-12 questionnaire, indicating that they experienced more psychological distress than others. The highest score was related to interns and the lowest score was related to externs. In addition, although students with higher academic scores showed lower psychological stress and better mental health status than other students, these differences were not significant.

Conclusions: The results showed that nearly half of medical students based on the GHQ-12 questionnaire were subjected to psychological stress. These stresses not only affected their mental health but also their academic performance.

Key words: Mental Health, Medical Students, Medical Education, Academic Performance

الصحة النفسية كعامل محدد في الأداء الأكاديمي: دراسة مقطعية بين طلاب الطب في جامعة مشهد للعلوم الطبية ، إيران

الخلفية: ترتبط الصحة العقلية للطلاب ارتباطًا وثيقًا بنوعية حياتهم و نجاحهم الأكاديمي. تهدف هذه الدراسة إلى تقييم الصحة العقلية لطلاب الطب من خلال الدورات التعليمية المختلفة بما في ذلك ما قبل السريرية ، التدريب الداخلي و التدريب الخارجي و ارتباطها بالأداء الأكاديمي للطلاب في جامعة مشهد للعلوم الطبية.

الطرق: تم إجراء هذه الدراسة التحليلية المقطعية على جميع طلاب الطب الذين يدرسون في الفصل الدراسي الأول من دورة ما قبل السريرية ، بداية التدريب الخارجي و بداية التدريب الداخلي في جامعة مشهد للعلوم الطبية في عام ٢٠١٩. في هذه الدراسة ، تم استخدام استبيان عام للصحة النفسية يحتوي على ١٢ سؤالاً (GHQ-12). تم إجراء تحليل البيانات باستخدام اختبار chi-square و t-test باستخدام SPSS 16.

النتائج: كان متوسط عمر الطلاب **1.79 + 22.61**. في هذه الدراسة سجل ما يقرب من ٤٠ ٪ من الطلاب درجات أعلى من عتبة استبيان GHQ-12 ، مما يشير إلى أنهم عانوا من ضغوط نفسية أكثر من غيرهم. كانت أعلى درجة مرتبطة بالدرجة الأدنى وكانت الدرجة الأدنى مرتبطة بالعاملين الخارجيين. بالإضافة إلى ذلك ، على الرغم من أن الطلاب الحاصلين على درجات أكاديمية أعلى يعانون من ضغوط نفسية أقل وحالة صحية عقلية أفضل من الطلاب الآخرين ، إلا أن هذه الاختلافات لم تكن كبيرة.

الخلاصة: أظهرت النتائج أن ما يقرب من نصف طلاب الطب بشكل عام بناءً على استبيان GHQ-12 يتعرضون لضغوط نفسية. لا تؤثر هذه الضغوط على صحتهم العقلية فقط بل تؤثر أيضًا على أدائهم الأكاديمي.

الكلمات المفتاحية: الصحة النفسية ، طلاب الطب ، التعليم الطبي ، الأداء الأكاديمي

سلامت روان به عنوان یک عامل تعیین کننده در عملکرد تحصیلی: یک مطالعه مقطعی در بین دانشجویان پزشکی دانشگاه علوم پزشکی مشهد، ایران

زمینه و هدف: سلامت روان دانشجویان با کیفیت زندگی و موفقیت تحصیلی آنها ارتباط زیادی دارد. این مطالعه با هدف ارزیابی سلامت روان دانشجویان پزشکی در مقاطع تحصیلی فیزیوپاتولوژی، کارآموزی و کارورزی و ارتباط آن با عملکرد تحصیلی دانشجویان در دانشگاه علوم پزشکی مشهد انجام شد.

روش: این مطالعه مقطعی تحلیلی بر روی کلیه دانشجویان پزشکی که در ترم اول فیزیوپاتولوژی، شروع دوره کارآموزی و در ابتدا دوره کارورزی در دانشگاه علوم پزشکی مشهد در سال ۲۰۱۹ تحصیل می کنند، انجام شد. از پرسشنامه سلامت روان عمومی شامل ۱۲ سوال (GHQ-12) استفاده شد. تجزیه و تحلیل داده ها با استفاده از مجذور کا و آزمون t با استفاده از نرم افزار SPSS 16 انجام شد.

یافته ها: میانگین سنی دانشجویان ۲۲/۶۱ + ۱/۷۹ سال بود. در این مطالعه، تقریباً ۴۰٪ دانشجویان نمره بالاتر از آستانه پرسشنامه GHQ-12 را کسب کردند که نشان می دهد بیش از سایرین ناراحتی روانی را تجربه کرده اند. بیشترین امتیاز مربوط به کارورزان و کمترین امتیاز مربوط به کارآموزان بود. نمرات GHQ-12 در دانشجویان پسر ، متأهل و غیر بومی، به ویژه دانشجویان بین المللی بالاتر بود، اگرچه این تفاوت ها از نظر آماری معنی دار نبود. بطورکلی دانشجویانی که از نظر درسی نمرات بالاتری کسب کرده بودند نسبت به دانشجویان دیگر استرس های روانشناختی کمتر و سلامت روان مطلوب تری داشتند، اما این اختلاف معنادار نبود.

نتیجه گیری: تقریباً نیمی از دانشجویان پزشکی مبتنی بر پرسشنامه GHQ-12 در معرض استرس های روانشناختی قرار داشته و این استرس ها نه تنها سلامت آنها را تحت تاثیر قرار میدهد، بلکه بر عملکرد تحصیلی آنها نیز تاثیر گذار می باشد.

واژه های کلیدی: سلامت روان، دانشجویان پزشکی، آموزش پزشکی، عملکرد تحصیلی

ذہنی صحت تعلیمی کارکردگی کے طور پر: مشہد یونیورسٹی آف میڈیکل سائنسز، ایران کے میڈیکل طلباء کے درمیان ایک کراس سیکشنل مطالعہ

بیک گراونڈ: طلباء کی ذہنی صحت اور معیار زندگی اور تعلیمی کامیابیوں سے بہت زیادہ تعلق ہے۔ اس تحقیق کا مقصد فزیو تھراپی، انٹرن شپ اور انٹرن شپ میں میڈیکل کے طلباء کی ذہنی صحت اور مشہد یونیورسٹی آف میڈیکل سائنسز میں طلباء کی تعلیمی کارکردگی کا جائزہ لینا تھا۔

روش: یہ کراس سیکشنل تجزیاتی مطالعہ ان تمام میڈیکل طلباء پر کیا گیا جو فزیو پیتھولوجی کے پہلے سمسٹر، انٹرن شپ کے آغاز اور ابتدائی طور پر مشہد یونیورسٹی آف میڈیکل سائنسز میں ۲۰۱۹ میں زیر تعلیم ہیں۔ ۱۲ سوالات (GHQ-12) پر مشتمل ایک عمومی ذہنی صحت کا سوالنامہ استعمال کیا گیا تھا۔ ڈیٹا کا تجزیہ SPSS 16 سافٹ ویئر کا استعمال کرتے ہوئے chi-square اور t-ٹیسٹ کا استعمال کرتے ہوئے کیا گیا۔

نتیجے: طلباء کی اوسط عمر ۱٫۷۹ + ۲۲٫۶۱ سال تھی۔ اس مطالعہ میں، تقریباً ۴۰% طلباء نے GHQ-12 کے سوالنامے سے اوپر اسکور کیا، جو اس بات کی نشاندہی کرتا ہے کہ انہیں دوسروں کے مقابلے میں زیادہ نفسیاتی پریشانی کا سامنا کرنا پڑا۔ سب سے زیادہ اسکور انٹرنز سے متعلق تھا اور سب سے کم اسکور ٹرینیز سے متعلق تھا۔ GHQ-12 کے اسکور مرد، شادی شدہ، اور غیر مقامی طلباء، خاص طور پر بین الاقوامی طلباء میں زیادہ تھے، حالانکہ یہ فرق اعداد و شمار کے لحاظ سے اہم نہیں تھے۔ اعلیٰ تعلیمی اسکور والے طلبہ میں دوسرے طلبہ کے مقابلے میں کم نفسیاتی دباؤ اور بہتر ذہنی صحت تھی، لیکن یہ فرق اہم نہیں تھا۔

سفارش: GHQ-12 کے سوالنامے پر مبنی میڈیکل کے تقریباً نصف طلباء نفسیاتی دباؤ کا شکار ہیں اور یہ دباؤ نہ صرف ان کی صحت پر اثر انداز ہوتا ہے بلکہ ان کی تعلیمی کارکردگی کو بھی متاثر کرتا ہے۔

کلیدی الفاظ: ذہنی صحت، طبی طلباء، طبی تعلیم، تعلیمی کارکردگی

INTRODUCTION

Today mental health becomes a hot topic in both general and particular populations (1). Mental health is described by the World Health Organization (WHO) as a human's ability to communicate with others well done, to change and modify the individual and social environment, as well as to resolve conflicts and personal inclinations in a rational and proportional manner (2). In the other words, mental health is one's well-being of both personal and social dimensions of life and due to this situation people can do their best and will be satisfied with their characteristics and developments (3, 4). Although there are no clear reasons for most of the mental disorders, such as stress, depression, anxiety, etc, but some factors like working too much, having unrealistic expectations of oneself, social problems, etc can increase the risk of these kinds of disorders (5).

Studying medicine is one of the fields that is characterized by many psychological and emotional changes over the physiological effects in students, although the mental health of many students in different fields of study are threatened by too many factors such as living in dorms, being far from family, being alone, encounter a new environment in the university, and so on (6-8). Like other students, medical students encounter routine distresses that threaten their mental health, but in addition, due to their lifestyle, they are affected by more stressful situations which make them volunteer for mental health disorders and poor life quality (9, 10). Interestingly, in the study by Rosal MC et al, it was determined that medical students in comparison with the other students who have the same status of mental health, after a while become more depressed, more anxious, and suffer from other mental disorders (10, 11).

Reviewing previous studies about medical students' mental health indicates the high prevalence of these kinds of disorders among medical students in different countries. Taye et al indicated that the mental health status of medical students in one of the medical schools of Tehran, Iran was satisfactory and about 14% of students had some mental problems (12). On the other hand, Iqbal and et al observed a high prevalence of stress, depression, and anxiety among Indians medical students (13).

According to the importance of mental health and its effect on other dimensions of life, especially on educational performance and achievements, and as previous studies indicated contradictory results, the present researchers performed this study to have a clear view of the current situation of the mental health status of the students, as well as to find its association with the academic performance of medical students of Mashhad University of medical sciences, Mashhad, Iran.

METHODS

Study design:

The present study was a cross-sectional study to determine the mental health and academic performance status of medical students at Mashhad University of medical sciences, Mashhad, Iran in 2019. The medical education in Iran is a 7 years period and is divided into 4 courses; first 2.5 years of "basic science", second one year of "pre-clinical" in which the students are prepared to enter the hospital and face the patients, then two years of "clinical clerkship" which is called "externship" and eventually, one and half a year" internship". The medical students who were beginning the pre-clinical, clinical clerkship, and internship courses in a two-week period were included in this study. To maintain the purpose of the study, the self-rated questionnaire and demographic forms was distributed to the target population by the census sampling method. In order to distribute the questionnaire, the present researchers used class groups in different social networks such as telegram, WhatsApp, and teams. All procedures were in line with the ethics committee of the Mashhad University of Medical Sciences (no. IR.MUMS.fm.REC.1397.159) and all respondents provided informed consent.

Survey development:

The conducted survey consisted of demographic characteristics of the participants (including age, gender, marital status, residency situation, and educational course), academic performance/ educational status (including a score of comprehensive exam of basic sciences, comprehensive pre-internship exam, and the average score of the semester before the beginning of the externship course). The 12-item General Health Questionnaire (GHQ-12) was used to determine the mental health status and psychological distress of the participated medical students.

A GHQ-12 questionnaire is a short form of the mental health questionnaire that was conducted by Goldberg in 1970 in order to screening the non-psychotic psychological distress such as anxiety and depression (14-16). The reliability and validity (Cronbach's alpha coefficient = 0.87) of the Persian version of GHQ-12 were provided by Montazeri et al (17). This questionnaire assessed the general health status of the participants in a recent month. In this questionnaire, each item was scored based on a four-choice scale (less than usual, no more than usual, rather more than usual, or much more than usual). So, each item of the GHQ-12 scored 0, 0, 1 and 1 respectively, and the total score of the questionnaire was between 0 to 12. The higher score showed the worse psychological disorder and the lower mental health status. Moreover, according to the previous studies, the total score more than 3 showed the risk of mental disorders and need more evaluations (18-20).

Statistical analysis:

The statistical analysis was conducted using SPSS software version 16 (SPSS Inc., Chicago, USA – version 16). Descriptive statistics were calculated for demographic characteristics. According to the Kolmogorov-Smirnov test, the independent t-test and Mann–Whitney U test was used for normal and non-normal data, respectively. Furthermore, the frequency of people who scored higher than 3 was compared according to the studied variables using the Chi-square test or Fisher's exact test. In all statistics, P value < 0.05 was considered as statistically significant.

RESULTS

250 questionnaires were distributed among medical students with including criteria, and finally, 200 questionnaires were completed. So, response rate was 80%. Among participants, 95 (47.5%) were males, and 105 (52.5%) were females. The mean age of the participants was about 22.61+1.79 years old and they were categorized into three age subgroups according to table 1. Most of the participants were single (155, 77.5%) and others were married. Most of the participants (n=103) lived in the dormitory and the least of them lived in the student houses. About 23% (n=46) of the participants were Natives of Mashhad, 24.5% (n=24.5) were Native of Razavi-Khorasan province but not Native of Mashhad city, 34% (n=34) were from other provinces than Razavi-Khorasan and 5.5% (n=11) were from other parts. In terms of educational degree, the dispersions of the participated in the study were 75 (37.5%), 69(34.5%), and 56 (28%) in pre-clinical, clinical clerkship (externship), and internship courses, respectively. The detailed demographic characteristics were demonstrated in table 1.

The analysis of the GHQ-12 questionnaire demonstrated that 41.6% (n=83) of the students achieved more than 3 scores. Students who were in Internship course had the highest score among the others (mean= 3.40+3.61) and clinical clerkship students (externs) had the lowest score (mean=2.47+2.60), but there were no significant differences between them (p=0.41). Males were significantly achieved higher scores in comparison with females and among those who had higher scores than 3, the males were significantly more than females. Married students had higher scores in comparison to singles but these differences were not statistically significant. Respectively participants who were living with their parents (mean= 3.77±3.39), living with a partner (mean= 3.51±2.63), living in a student house (mean= 3.48±2.71), and finally living in a dormitory (mean= 2.78±2.72) achieved the highest to the least scores of the GHQ-12. Native Mashhad students (mean= 3.02±2.96) got lower scores among the other groups and the non-Iranian participants' scores (mean= 3.63±2.73) were higher than others. Differences in the GHQ-12 scores were not significant (p=0.91) between 27-30 and under 22 years old medical students age groups (table.2).

Table 3 indicated the scores of the comprehensive exam of basic sciences, comprehensive pre-internship exam, and the average grade of the semester before the beginig of the clinical clerkship course. Although more students with lower grades had been achieved higher scores of the GHQ-12, but there were no statistically significant differences in any groups.

Table 1. Demographic characteristics of the participated medical students in the study

Characteristics		N (%)
Age	≥22	123 (61.5)
	22-26	68 (34)
	27-30	5 (2.5)
	Mean±SD	22.61±1.79
	Min-max	21-28
Gender	Female	105 (52.5)
	Male	95 (47.5)
Marital status	Single	155 (77.5)
	Married	45 (22.5)
Course of study	Pre-clinical	75 (37.5)
	Clinical clerkship (Externship)	69 (34.5)
	Internship	56 (28)
Residency location status	Dormitory	103 (51.5)
	With parents	34 (17)
	With partner	32 (16)
	Student house	31 (15.5)
Residency status	Native of Mashhad	46 (23)
	Native of Razavi-Khorasan province	49 (24.5)
	Nonnative of Razavi-Khorasan province	68 (34)
	Non-Iranian	11 (55)

DISCUSSION

To maintain the aim of the study, the GHQ-12 questionnaire was distributed among medical students who were eligible according to our including criteria. Near 40% of the participants' score of GHQ-12 was higher than 3 which means that they have been experienced more mental distresses. Although the statistical analysis did not approve any significant differences between different educational courses, but students in externship and internship courses have achieved higher scores than students in pre-clinical course. This could be because of their stressful working environment in hospital and challenges related to patient's management. In line with this study, respectively Carson et al and Yusoff Bs et al conducted their studies in Edinburg Medical University and Sain's University of medical sciences. Malaysia in 2000 and 2010 indicated that the students in higher educational courses have experienced higher mental distresses (21, 22). Interestingly, studies in Pakistan, Turkey, India, and Thailand indicated a high prevalence of mental disorders among medical students, but the study by Sreeramareddy CT et al in Nepal reported lower mental disorders in medical students in comparison with other countries (23-27). Borjalilu et al in 2015 indicated that most of the medical students of Tehran University of Medical Sciences, suffer from severe mental health problems (28). Contrary to the present study, in a study done by Jafari et al conducted in Isfahan university of medical sciences, medical students in higher courses had lower mental distress in comparison to the students in the first years of their study (29). Differences in the results of these studies can be due to differences in the tools used to measure distress, as well as differences in the conditions and discipline of the educational environment in different universities. This issue limits the possibility of comparing different studies. Therefore, it seems that the results of each study should be interpreted based on environmental

Table 2. GHQ-12 analysis of the participants according to different demographic groups

Characteristics		GHQ-12		
		Mean±SD	Median (IQR)	Score > 3 N (%)
Age	≥22	3.04+2.46	3 (1-5)	50 (40.7%)
	22-26	3.22+3.31	2 (0-5)	25 (36.8%)
	27-30	3.60+3.04	3 (1-6.5)	2 (40%)
			P=0.91*	**P=0.87****
Gender	Female	2.79±2.82	2 (0-4)	35 (43.8%)
	Male	2.83±3.58	3 (1-5)	45 (56.3%)
			P=0.05*	**P=0.04****
Marital status	Single	2.92±3.02	2 (0-5)	57 (71.3%)
	Married	2.49±3.72	4 (2-5.75)	23 (28.8%)
			P=0.14*	**P=0.12****
Course of study	Pre-clinical	2.73±2.37	2 (0-5)	27 (34.2%)
	clinical clerkship (Externship)	2.47±2.60	3 (1-5)	32 (40.5%)
	Internship	3.40±3.61	2 (0-6)	20 (25.3%)
			P=0.41*	**P= 0.40****
Residency location status	Dormitory	2.72±2.78	2 (0-4.25)	34 (35.1%)
	With parents	3.39±3.77	3 (0.75-5)	14 (45.2%)
	With partner	2.63±3.51	3.5 (1.25-5)	16 (51.6%)
	Student house	2.71±3.48	3 (0-6)	15 (48.38%)
			P=0.29*	**P=0.28****
Residency status	Native of Mashhad	2.96±3.02	2 (0-5)	19 (41.3%)
	Native of Razavi-Khorasan province	2.60±3.08	3 (1-5)	19 (38.8%)
	Nonnative of Razavi-Khorasan province	3.22±3.36	2 (1-5)	28 (41.2%)
	Non-Iranian	2.73±3.63	4 (1-6)	6 (54.5%)
			P=0.88*	**P=0.82****

* Mann–Whitney U test / ** chi-squared test / P: p-value

Table 3. The comparisons of the GHQ-12 scores of the participants according to their educational status

	Comprehensive exam of basic sciences (mean±SD)[1]	Average grade of the semester before the beginning of the clinical clerkship course (mean±SD)[2]	Comprehensive pre-internship exam (mean±SD)[1]
Score≤ 3	111.18+15.43	15.80+1.73	120.94+18.77
Score > 3	107.93+12.40	15.37+1.59	119.65+16.60
P value*	0.33	0.34	0.80

** Mann–Whitney U test/ 1- Maximum score is 200/ 2- Maximum score is 20*

conditions and educational discipline in each university and college.

The study results showed that male students, older participants, non-Iranian and married students experienced more mental distress than their counterparts. This could be because of the more clinical contacts with patients at the final years of medical education, difficult and numerous exams during medical education period and also financial supports for students who have higher age and also being married. Jafari et al in their study determined the higher level of distress in older students but interestingly they found the students under 22 years old showed a high level of distress too. In their study and another study by Biro et al, females were considered as a group of participants with a lower level of mental distress. Contrary to these studies, other evidences had the same opinions as what the present researchers

observed about the relationship between marital status and mental distresses (29-31).

According to this study, the present researchers found that students living with their parents or partner experienced higher psychological distress than students living in dormitories or student house. On the contrary, Borjalilu et al showed that dormitory students reported 2.8 times more stress than non-dormitory students (28). Perhaps these differences could be justified by considering that in this study the first degree which entered in study was pre-clinical students, who have been studying for almost two years and have adapted to living away from family and in a dormitory environment. Also, students in the dormitory had a closer relationship with their peer group and could discuss stressful daily events with each other, which reduces the stress that they endure.

It is important to note that the students with higher grades in their exams had lower distress and most of them achieved questionnaire score less than 3. This issue indicates that interventions which reduce the anxiety level of the students and improve their mental health status could be very helpful and effective in their better functions and educational accomplishment.

This study was limited to the specific course of medical students in a single university of medical sciences, but as the high rate of participation in the current study, it seems to be reliable. According to the present limitations, more studies are suggested for further information about medical students' mental health status in medical universities all over the world which could be very helpful for required interventions to improve their situations.

The current study indicates that near half of the participated medical students are exposed to psychological and mental distresses, based on the GHQ-12 questionnaire. Also, the rate of these distresses in clinical courses students who enter the hospital setting may be higher due to dealing with patients compared to pre-clinical students whose most courses are offered in theory. Although the results of this study did not show significant differences in various groups, they need deep consideration. Moreover, educational performance and achievements are dependent on medical students' mental health; Furthermore, this issue may affect their future performance as a verified medical doctor. Therefore, it seems important for the managers to prepare effective interventions and policies.

Ethical considerations

Ethical issues including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc. have been completely observed by the authors. This study was approved by Mashhad University of Medical Sciences Ethics Committee (no. IR.MUMS.fm.REC.1397.159).

ACKNOWLEDGEMENT

We express our deep appreciation to all medical students participating in the present study.

Financial Support: The study was funded by Mashhad University of Medical Sciences, Mashhad, Iran, grant number 961306 .

Conflict of interests: The authors declare that they have no competing interests.

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