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Can a psychological-educational supportive intervention enhance the psychological well-being and academic performance of freshman medical students?

Background: Freshman medical students experience high levels of distress which may affect their learning ability. The present study assessed the effectiveness of a psychological-educational supportive package on the psychological well-being and the academic performance of freshman medical students.

Methods: All the first-year medical students of Mashhad University of Medical Sciences were included in the educational year of 2018-2019 in the present study, using the census method. The first-year medical students of autumn semester 2018 formed the control group and those in winter semester 2019 formed the intervention group. 102 students among the control and 129 students (divided into 13 groups) among the intervention group completed the study voluntarily. The intervention was a psychological-educational supportive package designed to provide a supportive environment for freshmen to enhance peer-group interactions, increase emotional intelligence, cope with problem-solving strategies. It consisted of 6 weekly group sessions for first-year medical students followed by follow-up sessions until the end of the first semester. The outcome measures were Grade Point Average (GPA) of the first and second semesters as the indicators of academic performance and the General Health Questionnaire-28 (GHQ-28) at the beginning of the first semester, as well as at the end of the semesters to quantify the level of psychological well-being.

Results: The mean GHQ-28 changes in the intervention group were significantly higher than the control group (pre-test/post-test: $P=0.013$, post-test/follow-up: $P<0.0001$). In the intervention group, GPA was significantly higher than the control group in both the first and second semesters ($P=0.016$, $P<0.0001$, respectively).

Conclusions: Psychological-educational intervention improved the level of psychological well-being and academic performance of freshman medical students.

Keywords: Mental Health; Students, Medical; Schools, Medical; Academic Performance

آیا مداخله روانشناختی آموزشی حمایتی می تواند بهزیستی روانی عملکرد تحصیلی دانشجویان پزشکی سال اول را افزایش دهد؟

زمینه و هدف: دانشجویان پزشکی در سال اول دانشگاه تنش زیادی را تجربه می کنند، که ممکن است بر توانایی یادگیری آنها تأثیر بگذارد. مطالعه حاضر جهت ارزیابی اثربخشی بسته حمایتی روانشناختی-آموزشی بر بهزیستی روانشناختی و عملکرد تحصیلی دانشجویان پزشکی سال اول انجام شده است.

روش: کلیه دانشجویان سال اول پزشکی دانشگاه علوم پزشکی مشهد در سال تحصیلی ۱۳۹۷-۹۸ با استفاده از روش سرشماری وارد مطالعه شدند. دانشجویان پذیرفته شده در نیمسال تحصیلی اول به عنوان گروه کنترل و دانشجویان نیمسال دوم گروه مداخله را تشکیل دادند. ۱۰۲ دانشجو در گروه شاهد و ۱۲۹ دانشجو (در ۱۳ گروه) در گروه مداخله به صورت داوطلبانه مطالعه را به پایان رساندند. مداخله یک بسته حمایتی روانشناختی-آموزشی بود که برای فراهم آوردن محیطی حمایتی برای دانشجویان جدیدالورود و تقویت تعاملات گروه های همتا، افزایش هوش هیجانی، تطابق و توانایی حل مسئله طراحی شده بود. این بسته شامل شش جلسه گروهی هفتگی بود و پس از آن جلسات پیگیری تا پایان نیمسال اول برگزار شد. پیامد بر اساس معدل پایان نیمسال اول و دوم به عنوان شاخص عملکرد تحصیلی و پرسشنامه سلامت عمومی (GHQ-28) ۲۸- (ابتدای نیمسال اول، در پایان نیمسال اول و دوم به عنوان شاخص سطح بهزیستی روانشناختی گزارش شد.

یافته ها: میانگین تغییرات GHQ-28 در گروه مداخله به طور قابل توجهی بالاتر از گروه کنترل بود. (پیش آزمون - پس آزمون: $P=0.013$ ، پس آزمون - پیگیری: $P<0.0001$) در گروه مداخله، معدل در هر دو ترم اول و دوم به طور معناداری بالاتر از گروه شاهد بود (به ترتیب $P=0.016$ / $P<0.0001$).

نتیجه گیری: مداخله روانشناختی - آموزشی باعث بهبود سطح بهزیستی روانشناختی و عملکرد تحصیلی دانشجویان سال اول پزشکی می شود.

واژه های کلیدی: بهداشت روان؛ دانشجویان پزشکی؛ دانشکده های پزشکی، عملکرد تحصیلی

هل يمكن للتدخل الداعم النفسي التربوي أن يعزز الصحة النفسية والأداء الأكاديمي لطلاب السنة الأولى في الطب؟

الخلفية: يعاني طلاب الطب الجدد من مستويات عالية من التوتر، مما قد يؤثر على قدرتهم على التعلم. أجريت الدراسة الحالية لتقييم فاعلية حزمة الدعم النفسي التربوي على الصحة النفسية والأداء الأكاديمي لطلاب الطب الجدد.

الطرق: قمنا بتضمين جميع طلاب السنة الأولى في كلية الطب بجامعة مشهد للعلوم الطبية في العام الدراسي ۲۰۱۸-۲۰۱۹ في الدراسة الحالية، وذلك باستخدام طريقة التعداد. شكّل طلاب الطب في السنة الأولى لفصل الخريف ۲۰۱۸ المجموعة الضابطة وشكّل طلاب الفصل الشتوي ۲۰۱۹ مجموعة التدخل. ۱۰۲ طالباً من بين المجموعة الضابطة و ۱۲۹ طالباً (مقسّمون إلى ۱۳ مجموعة) من بين مجموعة التدخل أكملت الدراسة طوعاً. كان التدخل عبارة عن حزمة داعمة نفسية تربوية مصممة لتوفير بيئة داعمة لطلاب الجدد وتعزيز التفاعلات بين الأقران و زيادة الذكاء العاطفي و استراتيجيات المواجهة و حل المشكلات، و تألفت من ۶ جلسات جماعية أسبوعية لطلاب السنة الأولى من كلية الطب، تليها جلسات متابعة حتى نهاية الفصل الدراسي الأول. كانت مقاييس النتائج هي متوسط نهاية الفصل الدراسي الأول و الثاني كمؤشر للأداء الأكاديمي و استبيان الصحة العامة (GHQ-28) ۲۸- في بداية الفصل الدراسي الأول و في نهاية الفصل الأول و الثاني كمؤشر على كميته الصحة النفسية.

النتائج: كان متوسط التغييرات GHQ-28 في مجموعة التدخل أعلى بكثير من المجموعة الضابطة (الاختبار القبي - الاختبار البعدي: $P=0.013$ ، الاختبار اللاحق - المتابعة: $P<0.0001$). في مجموعة التدخل كان المعدل التراكمي أعلى بكثير من المجموعة الضابطة في كل من الفصلين الأول و الثاني (على التوالي: $P=0.016$ ، $P<0.0001$).

الاستنتاجات: التدخل النفسي التربوي أدى إلى تحسين مستوى الصحة النفسية والأداء الأكاديمي لطلاب الطب الجدد.

الكلمات المفتاحية: الصحة النفسية؛ طلاب الطب؛ كليات الطب، الأداء الأكاديمي

کیا ایک نفسیاتی تعلیمی معاون مداخلت نئے طبی طلباء کی نفسیاتی بہبود اور تعلیمی کارکردگی کو بڑھا سکتی ہے؟

بیگ گروانڈ: فریش مین میڈیکل طلباء کو اعلیٰ درجے کی تکلیف کا سامنا ہے جو ان کی سیکھنے کی صلاحیت کو متاثر کر سکتا ہے۔ موجودہ مطالعے نے نفسیاتی فلاح و بہبود پر ایک نفسیاتی تعلیمی معاون پیکیج کی تاثیر اور نئے میڈیکل طلباء کی تعلیمی کارکردگی کا جائزہ لیا۔

طریقے: مشهد یونیورسٹی آف میڈیکل سائنسز کے پہلے سال کے تمام میڈیکل طلباء کو مردم شماری کا طریقہ استعمال کرتے ہوئے، موجودہ مطالعے میں ۲۰۱۸-۲۰۱۹ کے تعلیمی سال میں شامل کیا گیا تھا۔ خزاں سمسٹر ۲۰۱۸ کے پہلے سال کے میڈیکل کے طلباء نے کنٹرول گروپ تشکیل دیا اور ۲۰۱۹ کے سرمائی سمسٹر کے طلباء نے مداخلت گروپ تشکیل دیا۔ کنٹرول کے درمیان ۱۰۲ طلباء اور مداخلت گروپ کے درمیان ۱۲۹ طلباء (۱۳ گروپوں میں تقسیم) نے رضاکارانہ طور پر مطالعہ مکمل کیا۔ اس میں فرسٹ ایئر میڈیکل کے طلباء کے لیے ۶ ہفتہ وار گروپ سیشنز شامل تھے جس کے بعد پہلے سمسٹر کے اختتام تک فالو اپ سیشن ہوتے تھے۔ نتائج کے اقدامات پہلے اور دوسرے سمسٹر کے گریڈ پوائنٹ اوسط (GPA) تھے جو تعلیمی کارکردگی کے اشارے کے طور پر تھے اور پہلے سمسٹر کے آغاز میں جنرل ہیلتھ سولنامہ ۲۸ (GHQ-28) کے ساتھ ساتھ اختتام پر نفسیاتی بہبود کی سطح کو درست کرنے کے لیے سمسٹر

نتیجے: مداخلت گروپ میں GHQ-28 کی اوسط تبدیلیاں کنٹرول گروپ کے مقابلے میں نمایاں طور پر زیادہ تھیں (پری ٹیسٹ/پوسٹ ٹیسٹ: $P=0.013$ ، پوسٹ ٹیسٹ/فالو اپ: $P<0.0001$)۔ مداخلت گروپ میں، GPA پہلے اور دوسرے سمسٹر دونوں میں کنٹرول گروپ سے نمایاں طور پر زیادہ تھا ($P=0.016$ ، $P<0.0001$)، بالترتیب۔

سفرارش: نفسیاتی تعلیمی مداخلت نے نفسیاتی بہبود کی سطح اور نئے میڈیکل طلباء کی تعلیمی کارکردگی کو بہتر بنایا۔

کلیدی الفاظ: ذہنی صحت طلباء، میڈیکل سکول، میڈیکل تعلیمی کارکردگی

INTRODUCTION

Medical schools are known as stressful environments (1). Training in the field of medicine is usually considered as demanding (2,3), providing less time and space for medical students for relaxation or participating in joyful activities (4,5). Many studies in different countries, including Iran (6), have reported high levels of psychological distress (7), for example depression (8–10), anxiety (11,12), stress (12–14), or sleep difficulties (15), among medical students. In addition, the association between poor psychological health with impaired learning ability and poor academic functioning is reviewed in many studies (16,17). Students who are not psychologically fit usually have weaker academic performance (18).

The freshman students are a vulnerable group of students (2) and experience a lot of pressure (19). They need to cope with different role transitions including the second individuation (20) during adolescent development. In Iran, they usually leave the supportive environment of their homes and high schools, and enter the universities and dormitories, as well. Therefore, they face more independent life experiences, more social interactions, and less family support and supervision. Joining a university is often accompany with the first formal interaction with opposite-sex groups. In addition, first-year students usually lose their high-school friendships and should build up new social networks. Therefore, providing different programs for addressing the psychological needs of freshmen may be a priority for educational institutions.

In the present study, we examined the effectiveness of a psychological-educational supportive package on the psychological well-being and the academic performance of freshman medical students of Mashhad University of Medical Sciences (MUMS).

METHODS

The administrative office of vice-chancellor of education of MUMS divides first-year medical students of every educational year into 2 distinct groups, randomly. The first-year program of one group starts in September (autumn semester), while the other group starts their first-year program in February (winter semester). Therefore, the courses presented for these two groups are different in the winter semester of the first educational year, and the chance of communication between the students of autumn semester and winter semester is very low. The present researchers decided to perform a quasi-experimental study on first-year medical students of MUMS in the academic year of 2018-2019, using the census method. They included all the first-year medical students of autumn semester 2018 as the control group, while the first-year medical students of winter semester 2019 formed the intervention group. Also they described the study to the students in both groups and asked them to participate in the study voluntarily. Finally, 102 students among the control group and 129 students among the intervention group completed the study.

A psychological-educational supportive package was prepared according to the guidelines published by the Mental Health

Office of the Ministry of Health and Education of Iran. By preparing this package, the present researchers aimed to provide a supportive environment for students entering the university, facilitate the transition from high school to medical school, and enhance peer-group interactions. Therefore, the intervention group was divided into 13 groups, each had 8-12 participants, and announced for volunteer facilitators among 2nd/3rd-year medical students. As participants with different personality types may have differences in how to perceive and respond to external stimuli, communicate, and make decisions in different situations (21), the present researchers decided to match the personality types of participants of each group and the facilitator with Myers-Briggs Type Indicator. The volunteer facilitators were trained by expert psychologists affiliated to the Mental Health Office of MUMS. The training courses focused on improving the communication skills of facilitators and how to manage a discussion group. In addition, they were trained to recognise complicated emotional or behavioural problems in order to advise vulnerable students for mental health consultation with an expert. Trained facilitators run 6 weekly collaborative sessions for each group of first-year medical students, followed by face-to-face or virtual (for example via telephone or e-mail) follow-up sessions until the end of the first semester. Table 1 shows the main subjects discussed in each group session. The psychological-educational supportive package more focused on reducing stress related facing the new environment of university (sessions 1 and 2), enhancing coping with problem-solving strategies (sessions 1, 4, 6), increasing emotional intelligence (sessions 3 and 5), and strengthening peer group interactions (session 3 and by selecting facilitators among volunteer medical students).

The Grade Point Average (GPA) of the participants were considered as indicators of academic performance. GPA is calculated by dividing the sum of final grades by the total amount of credits attempted, and commonly used as an indicator of academic performance in different studies (22). The present study used the GPA of the first (post-test) and second semesters (follow-up) in this study. It used the General Health Questionnaire-28 (GHQ-28) to quantify the level of mental health of participants as well. Participants filled the GHQ-28 at the beginning of the first semester (pre-test), at the end of the first semester (post-test), and at the end of the second semester (follow-up).

GHQ-28: The General Health Questionnaire is a self-report psychological assessment tool, originally has 60 questions (23). There are other versions, including the 28-item version (GHQ-28), which is proved to be a valid instrument for research purposes (24). The GHQ-28 has four subscales: somatic symptoms (items 1-7), anxiety and insomnia (items 8-14), social dysfunction (items 15-21), and severe depression (items 22-28). Each item is rated on Likert scale of 0 to 3 (0: "not at all", 1: "no more than usual", 2: "rather more than usual", 3: "much more than usual") (25). GHQ-28 focuses on the new alterations in the current mental state compared to the usual state of respondents within the last few weeks. Researchers advised not to interpret the four subscales as independent measures. Rather, the use of the

Table 1. The main subjects of the psychological-educational supportive package, discussed during group sessions	
Session	Subject
First	How to adjust with the new environment of the university
Second	The academic expectations in the medical school and the differences with high school
Third	Effective communication skill, empathic responding
Forth	Problem solving skill
Fifth	Self-awareness skill
Sixth	How to effectively cope with different emotions

total score of GHQ-28 to report the possible psychological disorder of the respondents is recommended (26).

GHQ-28 is a valid questionnaire in different cultures and samples (27). It was used to evaluate the psychological well-being of medical students (28). The Persian translation of GHQ-28 has been frequently used in different studies in Iran, too (29).

Statistical analysis: In the present study the Kolmogorov-Smirnov test was used to assess the normality of data distribution. The normally distributed data compared with Independent-Samples T-test and Paired-Samples T-test. Non-normally distributed data compared with Mann-Whitney test. Categorical variables compared with Chi-Square test. The SPSS-16 was utilized for statistical analysis. Level of significance was defined as $P < 0.05$.

RESULTS

A total number of 231 first-year medical students voluntarily participated in the present study, 129 students in the intervention group and 102 in the control group. Table 2 shows the baseline characteristics of them.

Tables 3 and 4 show the outcome measures (GHQ-28 and

GPA) of the participants in the intervention and control groups. The mean baseline GHQ-28 scores (pre-test) were different between intervention and control groups (Table 2). Therefore, we compared the mean difference in GHQ-28 scores (pre-test and post-test, post-test and follow-up) between the intervention and control groups (Table 3). The results showed that the difference in consecutive GHQ-28 scores had a significant difference between the intervention and control groups. The mean GHQ-28 changes were significantly higher in the intervention group compared to the control group (pre-test/post-test: $P = 0.013$, post-test/follow-up: $P < 0.0001$). Comparing the GPA of the first and second semesters showed that in the intervention group, GPA was significantly higher than the control group ($P = 0.016$, $P < 0.0001$, respectively; Table 4). In addition, in the second semester, the GPA of the intervention group increased significantly compared to the first semester, while it decreased significantly in the control group ($P < 0.0001$, $P = 0.003$; Table 4).

DISCUSSION

In the present study, we assessed the effects of a psychological-educational supportive package on the

Table 2. Baseline characteristics of the participants of the study in the intervention and control groups			
Variable	Intervention Group (n: 129)	Control Group (n:102)	Significance*
Age (year)	19.6 \pm 2.1	19.4 \pm 1.9	0.78 [§]
Sex	Female	72	0.06 [†]
	Male	57	
GHQ-28 (pre-test)	21.9 \pm 10.1	17.3 \pm 10.8	<0.0001 [‡]

GHQ-28: General Health Questionnaire-28, * $P < 0.05$, [§] Independent-Samples T-test, [†] Chi-Square test, [‡] Mann-Whitney

Table 3. Comparison of the mean GHQ-28 difference of the participants in consecutive assessments in the intervention and control groups of the study			
Variable	Intervention Group	Control Group	Significance*
GHQ-28	Pre-test/post-test difference	-4.3 \pm 9.4	0.013 [‡]
	Post-test/follow-up difference	-6.1 \pm 9.0	<0.0001 [‡]

GHQ-28: General Health Questionnaire-28, * $P < 0.05$, [‡] Mann-Whitney

Table 4. Comparison of the participants' GPA in consecutive assessments in the intervention and control groups of the study

Variable		Intervention Group	Control Group	Significance*
GPA	First semester	17.2 \mp 0.9	16.8 \mp 1.0	0.016 [†]
	Second semester	17.5 \mp 1.1	16.4 \mp 1.2	<0.0001 [†]
Significance [‡]		<0.0001 [‡]	0.003 [‡]	

GPA: Grade Point Average, * P<0.05, [†] Independent-Samples T-test, [‡] Paired-Samples T-test

psychological well-being and academic performance of 129 freshman medical students in Mashhad, Iran. A group of first-year medical students received the supportive package during the first semester. The present researchers found out that in this group of first-year medical students the GHQ-28 scores decreased at the end of the first and second semesters compared to the baseline assessment at the beginning of the first semester. In addition, the GPA of this group of students was higher at the end of the first and second semesters compared to the other first-year medical students.

Many studies have described the association between the psychological well-being and academic performance in medical students. Poor psychological health negatively affects the learning ability of the students, while students with lower anxiety and depression usually have more academic achievements (30). The present study showed similar results on the association between psychological well-being and academic performance, too. Poor psychological health may impair the cognitive ability of the individual. The association between the depression, sleep problems, burnout, excessive anxiety and stress with impaired cognitive ability discussed earlier in different studies (5,22,31).

In 2013, Chew et al. reported that medical students with higher levels of emotional intelligence have better academic achievements (32). This finding was later reported in the broader population of undergraduate students (33). Emotional intelligence is defined as the ability to recognize and manage the emotions of self (self-awareness) and others (empathy) (33). Both skills of empathy and self-awareness were included in our supportive package (sessions 3 and 5, respectively). In addition, emotional intelligence is positively correlated with psychological well-being in different studies (34,35). The positive effects of higher emotional intelligence on academic performance and psychological well-being may partly explain the results of the present study.

The effects of peer group on psychological well-being of university students have been reviewed in different studies (36,37). It seems that students' perception of peer group support does not interfere with the sense of independence during the socialization process (38). Peer group interactions could increase knowledge on the psychological health and coping mechanisms among university students, resulting in higher mental well-being (39). Also, participating in a group of students expands the sense of trust among them; so, increases their psychological well-being (40). Most researchers showed a positive effect of peer group support on academic performance, too (37,41,42). Peer group support, for example support from classmates or senior students, could enhance the academic motivation,

engagement, and initiatives (43); therefore it helps university students better adjust to the new academic demands and deal more effectively with their academic challenges (40). Although some studies have focused on how peer support could affect academic performance on adolescents, the results could be generated to the university students, too (44).

Psychological-educational intervention was effective in promoting mental health and academic performance of freshman medical students. Promoting both psychological well-being and academic performance of first-year medical students is an important responsibility of medical schools (45). Generally, medical students experience higher levels of psychological distress than non-medical students (5). Besides, freshmen struggle with higher levels of stress compared to senior students, and may need more support, particularly from their peers (46).

To the best knowledge of the present researchers, this was the first study on the effectiveness of intervention on the peer group interactions targeting both educational and psychological needs of freshman medical students in Iran. However, this study had some limitations. Students in autumn and winter semesters had different baseline characteristics, particularly different mean baseline GHQ-28 scores. Some of the students did not participate in the study, specifically among the autumn semester group (control group). We did not include some baseline demographic characteristics of participants in the study, for example the academic level before admission at the university, the history of any mental health problems, new mental health problems during the study period, and the socio-economic status. Therefore, we recommend further research on the efficacy of supportive interventions on the mental well-being and academic achievements of medical students.

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. The ethics committee of Mashhad University of Medical Sciences approved this research, ethics code IR.MUMS.REC.1395.471.

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REFERENCES

- Puthran R, Zhang MWB, Tam WW, Ho RC. Prevalence of depression amongst medical students: a meta-analysis. *Med Educ.* 2016;50(4):456-68.
- Melaku L, Mossie A, Negash A. Stress among Medical Students and Its Association with Substance Use and Academic Performance. *J Biomed Educ.* 2015;2015:1-9.
- Abdulghani HM, AIKanhah AA, Mahmoud ES, Ponnampertuma GG, Alfaris EA. Stress and its effects on medical students: a cross-sectional study at a college of medicine in Saudi Arabia. *J Health Popul Nutr.* 2011;29(5):516-22.
- Bergmann C, Muth T, Loerbroks A. Medical students' perceptions of stress due to academic studies and its interrelationships with other domains of life: a qualitative study. *Med Educ Online.* 2019;24(1):1603526.
- Sohail N. Stress and academic performance among medical students. *J Coll Physicians Surg Pak.* 2013;23(1):67-71.
- Jafari N, Loghmani A, Montazeri A. Mental health of Medical Students in Different Levels of Training. *Int J Prev Med.* 2012;3(Suppl 1):S107-12.
- Aherne D, Farrant K, Hickey L, Hickey E, McGrath L, McGrath D. Mindfulness based stress reduction for medical students: optimising student satisfaction and engagement. *BMC Med Educ.* 2016;16(1):209.
- Moir F, Yelder J, Sanson J, Chen Y. Depression in medical students: current insights. *Adv Med Educ Pract.* 2018;9:323-33.
- Hill MR, Goicochea S, Merlo LJ. In their own words: stressors facing medical students in the millennial generation. *Med Educ Online.* 2018;23(1):1530558.
- Talaei A, Rezaei Ardani A, Saghebi A. A survey of depression among Iranian medical students and its correlation with social support and satisfaction. *J Pakistan Psychiatr Soc.* 2008;5(2):90-9.
- Quek TT-C, Tam WW-S, Tran BX, Zhang M, Zhang Z, Ho CS-H, et al. The Global Prevalence of Anxiety among Medical Students: A Meta-Analysis. *Int J Environ Res Public Health.* 2019;16(15).
- Fawzy M, Hamed SA. Prevalence of psychological stress, depression and anxiety among medical students in Egypt. *Psychiatry Res.* 2017;255:186-94.
- Ludwig AB, Burton W, Weingarten J, Milan F, Myers DC, Kligler B. Depression and stress amongst undergraduate medical students. *BMC Med Educ.* 2015;15:141.
- Heinen I, Bullinger M, Kocalevent R-D. Perceived stress in first year medical students - associations with personal resources and emotional distress. *BMC Med Educ.* 2017;17(1):4.
- Rezaei Ardani A, Talaei A, Borhani Moghani M, Nejati R, Sabouri S, Solooti S, et al. Assessment the rules of demographic variables and body mass index in sleep quality among medical students. *Journal of Fundamentals of Mental Health.* 2012;14(54):9-132.
- Selamu LG, Singhe MS. Mental health distress and academic performance of medical students: a review. *JPCPY.* 2018;9(6):675-8.
- Atkinson SR. Elevated psychological distress in undergraduate and graduate entry students entering first year medical school. *PLoS ONE.* 2020;15(8):e0237008.
- Rubaba Azim S. Mental distress among medical students. *Anxiety disorders* [working title]. IntechOpen; 2020.
- Dahlin M, Joneborg N, Runeson B. Stress and depression among medical students: a cross-sectional study. *Med Educ.* 2005;39(6):594-604.
- Blos P. The second individuation process of adolescence. *Psychoanal Study Child.* 1967;22:162-86.
- McCornack S. *Reflect and Relate: An Introduction to Interpersonal Communication.* 1st ed. Boston: Bedford/St. Martin's; 2006.
- Das SR, Biswas C. Anxiety and Academic Performance among Private Medical College Students. *J Curr Adv Med Res.* 2018;5(2):68-72.
- Goldberg DP, Hillier VF. A scaled version of the General Health Questionnaire. *Psychol Med.* 1979;9(1):139-45.
- Sterling M. General health questionnaire - 28 (GHQ-28). *J Physiother.* 2011;57(4):259.
- Hjelle EG, Bragstad LK, Zucknick M, Kirkevold M, Thommessen B, Sveen U. The General Health Questionnaire-28 (GHQ-28) as an outcome measurement in a randomized controlled trial in a Norwegian stroke population. *BMC Psychol.* 2019;7(1):18.
- Salter K, Campbell N, Richardson M, Mehta S, Jutai J, Zettler L, et al. Outcome Measures in Stroke Rehabilitation | EBRSR - Evidence-Based Review of Stroke Rehabilitation [Internet]. 2013 [cited 2021 Mar 29]. Available from: http://www.ebrsr.com/sites/default/files/Chapter21_Outcome-Measures_FINAL_16ed.pdf
- Kilic C, Rezaki M, Rezaki B, Kaplan I, Ozgen G, Sağduyu A, et al. General Health Questionnaire (GHQ12 & GHQ28): psychometric properties and factor structure of the scales in a Turkish primary care sample. *Soc Psychiatry Psychiatr Epidemiol.* 1997;32(6):327-31.
- Bíró E, Balajti I, Adány R, Kósa K. Determinants of mental well-being in medical students. *Soc Psychiatry Psychiatr Epidemiol.* 2010;45(2):253-8.
- Nourbala AA, Bagheri Yazdi SA, Mohammad K. The Validation of General Health Questionnaire- 28 as a Psychiatric Screening Tool. *Hakim Research Journal.* 2009;11(4):47-53.
- Yeh Y-C, Yen C-F, Lai C-S, Huang C-H, Liu K-M, Huang I-T. Correlations between academic achievement and anxiety and depression in medical students experiencing integrated curriculum reform. *Kaohsiung J Med Sci.* 2007;23(8):379-86.
- Richardson L, Adams S. Cognitive deficits in patients with depression. *J Nurse Pract.* 2018;14(6):437-43.e3.
- Chew BH, Zain AM, Hassan F. Emotional intelligence and academic performance in first and final year medical students: a cross-sectional study. *BMC Med Educ.* 2013;13:44.
- Suleman Q, Hussain I, Syed MA, Parveen R, Lodhi IS, Mahmood Z. Association between emotional intelligence and academic success among undergraduates: A cross-sectional study in KUST, Pakistan. *PLoS ONE.* 2019;14(7):e0219468.
- Carmeli A, Yitzhak-Halevy M, Weisberg J. The relationship between emotional intelligence and psychological wellbeing. *Journal of Managerial Psych.* 2009;24(1):66-78.
- Malinauskas R, Malinauskiene V. The Relationship between Emotional Intelligence and Psychological Well-Being among Male University Students: The Mediating Role of Perceived Social Support and Perceived Stress. *Int J Environ Res Public Health.* 2020;17(5).
- Zhao F, Guo Y, Suhonen R, Leino-Kilpi H. Subjective well-being and its association with peer caring and resilience among nursing vs medical students: A questionnaire study. *Nurse Educ Today.* 2016;37:108-13.
- Yamada Y, Klugar M, Ivanova K, Oborna I. Psychological distress and academic self-perception among

- international medical students: the role of peer social support. *BMC Med Educ.* 2014;14:256.
38. Wentzel KR, Battle A, Russell SL, Looney LB. Social supports from teachers and peers as predictors of academic and social motivation. *Contemp Educ Psychol.* 2010;35(3):193-202.
39. Ahorsu DK, Sánchez Vidaña DI, Lipardo D, Shah PB, Cruz González P, Shende S, et al. Effect of a peer-led intervention combining mental health promotion with coping-strategy-based workshops on mental health awareness, help-seeking behavior, and wellbeing among university students in Hong Kong. *Int J Ment Health Syst.* 2021;15(1):6.
40. Keren D, Lockyer J, Ellaway RH. Social studying and learning among medical students: a scoping review. *Perspect Med Educ.* 2017;6(5):311-8.
41. De Paola M, Scoppa V. Peer group effects on the academic performance of Italian students. *Appl Econ.* 2010;42(17):2203-15.
42. Filade BA, Bello AA, Uwaoma CO, Anwanane BB, Nwangburuka K. Peer group influence on academic performance of undergraduate students in Babcock University, Ogun State. *Afr Educ Res J.* 2019;7(2):81-7.
43. Danielsen AG, Wiium N, Wilhelmsen BU, Wold B. Perceived support provided by teachers and classmates and students' self-reported academic initiative. *J Sch Psychol.* 2010;48(3):247-67.
44. Saleem M, Adeeb M, Hafeez S, Siddique AR, Qasim A. Academic Support and Academic Achievement of University Students: Mediating Role of Academic Stress. *Journal of Research & Reviews in Social Sciences Pakistan.* 2018;1(1):62-70.
45. Kemp S, Hu W, Bishop J, Forrest K, Hudson JN, Wilson I, et al. Medical student wellbeing - a consensus statement from Australia and New Zealand. *BMC Med Educ.* 2019;19(1):69.
46. John NM, Page O, Martin SC, Whittaker P. Impact of peer support on student mental wellbeing: a systematic review. *MedEdPublish.* 2018;7(3).