Original Research Article

ASSOCIATION OF DEPRESSION, ANXIETY AND STRESS IN MEDICAL STUDENTS STUDYING IN MODULAR, SEMESTER AND ANNUAL EXAMINATION SYSTEM

Abstract:

Background: When there are high demands besides less resources, a person experiences a feeling of fear that is known as "Stress". Students of professional schools/colleges and universities are encounter more stress than the general population as they are in a transitory phase from adolescence to adulthood. It has been highlighted that medical education has greater association with stress. There are three examination systems that are been followed by medical colleges of Pakistan (modular, semester and annual systems). However, to the best of our knowledge, no data is available to show the association of stress with current examination systems in our country.

Aims: The objectives of our study were to find out the association of stress with different examination systems and to identify the frequency of stress causing and coping factors adopted by 1st, 2nd and 3rd year medical students studying in colleges having different examination systems i.e. modular, semester and annual.

Study design: Comparative cross-sectional study

Place & duration of study: This study was conducted from December 2018 to April 2019 in three medical colleges of Sindh having above mentioned examination systems.

Study population: Medical students of 1st 2nd and 3rd year.

METHODOLOGY: To assess depression, anxiety and stress among study population, **DASS scale** was used. To identify the stress causing and coping factors in the students **Likert scale** based proforma with 19 factors were given to the selected participants

Results: There was no significant association of examination system with depression, anxiety and stress, however various stress causing and coping factors were found significant in altering medical student`s life.

CONCLUSION: According to our study, the frequency of stress in the medial students has no association with the examination systems (modular, semester and annual), currently followed by the medical colleges in Sindh.

Key words: stress, stress causing factors, coping factors, medical education, different examination systems,

Introduction:

When demands exceed the available resources, a person experience a feeling of fear known as "Stress" [(1)]. Stress can act as a motivator and is indispensable for survival. Nevertheless, if this phenomenon is triggered readily or concurrently associated with multiple stressors, it can challenge a person's mental and physical health. Students in professional schools/colleges and universities are supposed to encounter stress, more than the general population as they are in a transitory phase from adolescence to adulthood [(2) (3)]. Stress is classified into three main areas: 1. Academic pressures 2. Social issues and 3. Financial problems [(4)]. Stressful condition can affect academic performance, social life and may lead to dementia[(5)], hypertension, aging, obesity [(6)], impaired immune system, suppressed fertility and various digestive problems [(7) (8)]. Furthermore, stress has been also linked to substances use and drug addiction [(9)].

It has been highlighted that medical education has greater association with stress [10] [11]. In a meta-analysis, prevalence of stress was found to be variable among medical schools and colleges of different regions; shown to be 20.9% among students of a Nepali medical school, 63.8% in students of Saudi Arabian medical college and 90% in a Pakistani medical college. Other relevant researches have revealed that stress may lead to increase tendency for suicide as was documented that 2.7% of medical students in Sweden made suicidal attempts on the account of stress. [12]. Studies have reported that factors causing stress in medical students are attendance system, curriculum, college environment, and the examination process [13] [14].

Qamar et.al elaborated that among all factors the conduction of exams was significantly associated with stress in students of a medical college in Islamabad [15]. In Pakistan, generally three examination systems are being followed by medical colleges including modular, semester and annual systems. However, to the best of our knowledge, no data is available to show the association of stress with current examination systems in our country. Hence the current study was undertaken to find out the association of stress with different examination systems and to identify the stress causing and coping factors used by medical students of 1st, 2nd and 3rd year studying in medical colleges having modular, semester and annual examination systems in the province of Sindh Pakistan.

METHODOLOGY:

Three medical colleges in the province of Sindh having different examination systems i.e. modular, semester and annual were selected. Students of 1st, 2nd, and 3rd year MBBS were targeted population. It was a comparative cross-sectional study conducted from December 2018 to April 2019. Sample size (n) was calculated using 50 percent proportion of selected population, the total calculated sample size was 390 but "n" was kept at 450 to overcome the attrition. Participants were recruited using multi stage sampling technique in which during 1st stage different medical colleges were selected randomly while in the 2nd stage students were selected conveniently.

To assess depression, anxiety and stress among study population, **DASS** was used. To identify the stress causing and coping factors in the students **Likert scale** based proforma with 19 factors were given to the selected participants. In the given proforma students were asked how frequently (never, sometimes or most of the times) the particular factor is responsible as stress causing or coping agent Prior to the handing over of proforma students were briefed about the purpose of study and their consents were also taken verbally and finally were asked to fill the proforma.

Data analysis:

Data was analyzed using SPSS version 20.

Chi square test was applied to analyze the association of depression, anxiety and stress among students with their examination systems as well as their academic year i.e 1st, 2nd and 3rd year.

The same test was applied again to associate the frequency of stress causing and coping factors in students studying in different universities and also with their academic year i.e 1st, 2nd and 3rd year.

P-value less than 0.05 was considered as significant.

Results:

Depression, anxiety and stress were not significantly associated with examination systems as well as academic year of MBBS students as shown in table 1 and 2.

Table 1. Association of depression, anxiety and stress in students of different examination system,N=

	Modular system n%					Semester system					Annual system					P value
Dass criteria*	N	M	Mo	S	ES	N	M	MO	S	ES	N	M	MO	S	ES	

Depression	3.6	2.1	12.9	13.6	67.9	3.8	1.9	10.5	13.3	70.5	3.3	1.6	9.8	9.8	75.4	0.975
Anxiety	1.2	1.2	1.2	2.4	94	2.4	3.3	9.1	4.3	80.9	1.4	0.0	4.1	8.1	86.5	0.064
Stress	7.9	11.8	22.0	23.1	26.3	81.6	52.9	56.1	53.8	53.9	10.5	35.3	22.0	23.1	19.8	0.074

(* N= normal, M = mild, Mo = moderate, S = severe and ES = extremely severe)

Table 2. Association of depression, anxiety and stress in 1st, 2nd and 3rd MBBS students

	1st year					**2nd year**					**3rd year**					**P value**
Dass criteria*	N	M	Mo	S	ES	N	M	MO	S	ES	N	M	MO	S	ES	
Depression	38.5	42.9	43.9	42.2	36.4	30.8	28.6	26.8	31.1	28.4	30.8	28.6	29.3	26.7	35.2	0.275
Anxiety	57.1	25.0	43.5	47.1	37.2	28.6	25.0	26.1	29.4	28.8	14.3	50.5	30.4	23.5	34.0	0.879
Stress	42.1	47.1	41.5	48.7	34.5	26.3	29.4	31.7	30.8	28.0	31.6	23.5	26.8	20.5	37.5	0.528

(* N= normal, M = mild, Mo = moderate, S = severe and ES = extremely severe)

However out of nineteen stress causing factors, homesickness, college environment, examination system, corruption in the environment and lack of health facilities were significantly associated with the prevalence of stress among medical students as shown in Table 3.

While among all coping factors adopted by medical students, well defined curriculum, feedback and motivational sessions, counseling and emotional support from family, walking, use of gym, shopping and use of social media (Facebook, WhatsApp, twitter) were found to be significant as displayed in table 4.

Table.3 Association of stress causing factors in medical students

Factors that causes Stress	**Modular system**			**Semester system**			**Annual system**			**p-value**
	Never	Some times	Most of the times	Never	Some times	Most of the times	Never	Some Times	Most of the times	

Homesickness	60.5%	27.9%	11.6%	26.7%	43.3%	36.0%	35.1%	44.6%	20.3%	0.000*
Pressure of studies	12.8%	29.1%	58.1%	10.6%	38.6%	50.0%	1.4%	35.1%	63.0%	0.053
Time table / study schedule	23.3%	30.2%	46.5%	29.0%	36.2%	33.3%	23.6%	41.9%	35.1%	0.438
Bullying / raging	75.6%	19.8%	4.7%	64.3%	24.8%	10.5%	59.5%	24.3%	16.2%	0.210
Language problem	67.4%	30.2%	2.2%	61.0%	30.5%	8.1%	52.7%	33.8%	13.5%	0.185
Physical health / weight issue	43.5%	32.9%	23.5%	38.9%	39.4%	21.6%	43.2%	35.1%	21.6%	0.858
College environment	46.5%	41.9%	11.6%	39.0%	42.4%	18.1%	47.3%	24.3%	28.4%	0.042*
Ethical conflicts	59.3%	24.4%	16.3%	55.2%	37.1%	7.6%	48.6%	40.5%	10.8%	0.061
Personal life events	29.1%	44.2%	26.7%	34.8%	47.1%	18.1%	32.4%	47.3%	20.3%	0.564
Waking time in the morning	47.7%	17.4%	34.9%	52.9%	26.2%	21.6%	60.8%	17.6%	21.6%	0.050
Event of Examination	22.1%	41.9%	36.0%	26.2%	43.3%	30.0%	16.2%	29.7%	54.0%	0.025*
Surprise test / continuous assessment	34.1%	36.5%	29.4%	31.9%	38.1%	30.0%	21.6%	35.1%	43.2%	0.211
Lack of extra-curricular activity	34.9%	33.7%	31.4%	34.3%	37.1%	28.6%	28.4%	41.9%	29.2%	0.818
High parental expectations	36.6%	37.2%	26.7%	30.5%	40.5%	29.0%	32.4%	32.4%	35.1%	0.634
Security / law and order	45.3%	32.6%	22.1%	40.5%	37.6%	21.9%	59.5%	27.0%	13.5%	0.081
Corruption in the environment	36.0%	38.4%	25.6%	22.0%	35.4%	42.6%	28.4%	24.3%	47.3%	0.011*
Lack of health facilities	37.2%	39.5%	23.3%	21.0%	41.9%	37.1%	23.0%	39.2%	37.8%	0.032*
Academic grading system	22.6%	42.9%	34.5%	21.5%	49.3%	29.2%	28.4%	40.5%	29.2%	0.588
Attendance system	18.6%	30.2%	51.2%	24.3%	26.7%	49.0%	13.5%	30.1%	51.4%	0.310

P-value < 0.05 is marked as *

Table 4. Association of coping factors adopted by students

Coping factors that helps to reduce stress	**Modular system**			**Semester system**			**Annual system**			**p-value**
	Never	Some Times	Most of the	Never	Some times	Most of the	Never	Some times	Most of the	

			times			times			times	
Good educational environment	22.1%	36%	40.7%	14.3%	32.9%	52.9%	17.6%	33.8%	48.6%	0.276
Well defined curriculum	19.8%	41.9%	38.4%	9%	48.6%	42.4%	21%	29%	48.6%	0.006*
Feedback & motivational session	26.7%	44.2%	29.1%	23.8%	30.0%	46.2%	16.4%	24.7%	58.9%	0.004*
Scholarships	42.4%	18.8%	38.8%	32.4%	30.0%	37.6%	32.4%	20.3%	47.3%	0.129
Extracurricular activities	17.4%	33.7%	48.8%	19.0%	45.2%	35.7%	16.2%	35.1%	48.6%	0.155
Self-efficacy	19.8%	27.9%	52.8%	15.2%	35.7%	49.0%	16.5%	34.6%	48.9%	0.576
Counseling/emotional support from family	17.4%	29.1%	53.5%	7.1%	29.6%	63.8%	16.2%	12.2%	71.6%	0.003*
Meditation / prayers	17.4%	18.6%	64.0%	9.0%	21.4%	69.5%	13.5%	16.2%	70.3%	0.290
Relaxed class room environment	22.1%	40.7%	37.2%	25.2%	37.6%	37.1%	29.7%	28.4%	41.9%	0.543
Alcohol / smoking / drug use	77.9%	12.8%	9.3%	85.2%	6.7%	8.1%	90.5%	2.7%	6.8%	0.141
Going out with friends	15.1%	37.2%	47.7%	14.8%	40.0%	45.2%	21.6%	43.2%	35.1%	0.449
Watching TV / Movie	15.1%	38.4%	46.5%	15.7%	42.4%	41.9%	23.0%	31.2%	31.8%	0.566
Reading books	29.1%	34.9%	36.0%	19.5%	43.3%	37.1%	24.3%	41.9%	33.8%	0.433
Taking a walk	11.6%	34.9%	53.5%	13.3%	48.1%	38.6%	23.0%	39.2%	37.8%	0.031*
Going to gym	29.4%	24.7%	45.9%	37.1%	35.7%	27.1%	64.9%	17.6%	17.6%	0.000*
Going to shopping	34.95	29.1%	36.0%	22.4%	44.3%	33.3%	29.7%	28.4%	49.9%	0.028*
Eating out	14%	27.9%	58.1%	15.2%	41.4%	43.3%	21.6%	37.8%	40.5%	0.083
Cocking	44.2%	24.4%	31.45	43.8%	35.2%	21.0%	55.4%	27.0%	17.6%	0.075
Use of social media like Facebook / whatsapp / twitter	27.9%	40.7%	31.4%	11.0%	32.9%	56.2%	18.9%	37.8%	43.2%	0.000*

P-value < 0.05 is marked as *

Results and Discussion:

Surveys conducted in the United States have displayed fairly high frequencies of depression and poor mental health amongst medical students due to stress, unsatisfactory coping strategies and inappropriate counselling [16] [17] [15]. In our study, though the frequency of stress among MBBS students was not significantly associated with different examination systems as well as with their academic years (1st, 2nd

and 3rd year). Nevertheless, when event of examination was considered as a variable, it was found to be one of the significant stress causing factors with a p-value (0.025), This finding of our study was similar to one of the study conducted on the students of medical college in Islamabad [15] and was also in accordance to other studies conducted across the globe including USA [16]. Homesickness was highly associated as a stress causing factor in the target population of our study, also highlighted by Rab et.al; he documented medical students residing in hostels were more prone to stress in comparison to the students living in their homes [18]. While considering the stress relieving factors, feedback and motivational sessions, counseling and emotional support from family is thought to be one of the best strategy to cope up with the stress as suggested by some studies [19]. This is in accordance to our study displaying that well defined curriculum, feedback and motivational sessions, counseling and emotional support from family are stress relieving factors for medical students. Furthermore, according to a study conducted in Saudi Arabia, the students overcome the stress by using different coping factors such as hang out with friends, use of social media, playing games and going to gym etc. [20]. Our study population also signified that walking, shopping, going to gym and use of social media on internet help them to cope up with the stress.

Since 1988 in United States and Canada, health promoting programs have been running in medical schools to facilitate the students about coping strategies against stress to reduce its negative effects on their physical and mental health with subsequent effects on academic results [21] [22]. Currently various stress management programs are available for medical students across the globe to enable them to cope up the stress [23].

CONCLUSION:

According to our study, the frequency of stress in the medial students has no association with the examination systems (modular, semester and annual), currently followed by the medical colleges in Sindh. Whereas, event of examination is one of the significant stress causing factor which can be managed by well-defined curriculum, positive feedbacks, family support and counseling sessions. It is evident that stress is one of the major predictor of poor academic performances in medical students that may affect their general, physical and mental health.

Limitations:

Questions regarding number of siblings, type of dwelling, whether parents are divorced/separated were not asked.

Recommendations:

The limitations should be addressed in further studies, we strongly suggest that stress management peer based counseling programs should be initiated at national level and should be regularly conducted as a part of MBBS curriculum in the initial academic years of medical colleges in Pakistan. This will help the students to be self-reliant to alleviate the stress, enhance their mental as well as physical health and ensure their good academic performances, with subsequent provision of better future doctors for our country.

Ethical approval

Study got approval from the Ethical Review Committee of Ziauddin university

Consent Disclaimer:

As per international standard, patient's written consent has been collected and preserved by the author(s).

References:

1. Heinen I, Bullinger M, Kocalevent R-DJBme. Perceived stress in first year medical students-associations with personal resources and emotional distress. BMC medical education 2017;17(1):4.
2. Abdulghani HM, AlKanhal AA, Mahmoud ES, Ponnamperuma GG, Alfaris EAJJoh, population,, nutrition. Stress and its effects on medical students: a cross-sectional study at a college of medicine in Saudi Arabia. Journal of health, population,. 2011;29(5):516.

3. Sarokhani D, Delpisheh A, Veisani Y, Sarokhani MT, Manesh RE, Sayehmiri KJDr, et al. Prevalence of depression among university students: a systematic review and meta-analysis study. J Depression research treatment 2013;2013.
4. Youssef FFJAP. Medical student stress, burnout and depression in Trinidad and Tobago. J Academic Psychiatry 2016;40(1):69-75.
5. Negrón-Oyarzo I, Aboitiz F, Fuentealba PJNp. Impaired functional connectivity in the prefrontal cortex: a mechanism for chronic stress-induced neuropsychiatric disorders. J Neural plasticity 2016;2016.
6. Scott SB, Graham-Engeland JE, Engeland CG, Smyth JM, Almeida DM, Katz MJ, et al. The effects of stress on cognitive aging, physiology and emotion (ESCAPE) project. J BMC psychiatry 2015;15(1):146.
7. Stewart SM, Betson C, Marshall I, Wong C, Lee P, Lam TJMe. Stress and vulnerability in medical students. J Medical education. 1995;29(2):119-27.
8. Graham JE, Christian LM, Kiecolt-Glaser JKJJobm. Stress, age, and immune function: toward a lifespan approach. J Journal of behavioral medicine 2006;29(4):389-400.
9. Melaku L, Mossie A, Negash AJJoBE. Stress among medical students and its association with substance use and academic performance. J Journal of Biomedical Education 2015;2015.
10. Dahlin M, Joneborg N, Runeson BJMe. Stress and depression among medical students: A cross-sectional study. J Medical education 2005;39(6):594-604.
11. Beiter R, Nash R, McCrady M, Rhoades D, Linscomb M, Clarahan M, et al. The prevalence and correlates of depression, anxiety, and stress in a sample of college students. J Journal of affective disorders 2015;173:90-6.
12. Abebe AM, Kebede YG, Mengistu FJPj. Prevalence of Stress and Associated Factors among Regular Students at Debre Birhan Governmental and Nongovernmental Health Science Colleges North Showa Zone, Amhara Region, Ethiopia 2016. Psychiatry journal. 2018;2018.
13. van Zyl PM, Joubert G, Bowen E, du Plooy F, Francis C, Jadhunandan S, et al. Depression, anxiety, stress and substance use in medical students in a 5-year curriculum. J African Journal of Health Professions Education. 2017;9(2):67-72.
14. Wahed WYA, Hassan SKJAJoM. Prevalence and associated factors of stress, anxiety and depression among medical Fayoum University students. J Alexandria Journal of Medicine. 2017;53(1):77-84.
15. Qamar K, Khan NS, Bashir Kiani MJJPMA. Factors associated with stress among medical students. J Pak Med Assoc. 2015;65(7):753-5.
16. Dyrbye LN, Thomas MR, Eacker A, Harper W, Massie FS, Power DV, et al. Race, ethnicity, and medical student well-being in the United States. J Archives of Internal Medicine. 2007;167(19):2103-9.
17. Thomas MR, Dyrbye LN, Huntington JL, Lawson KL, Novotny PJ, Sloan JA, et al. How do distress and well-being relate to medical student empathy? A multicenter study. J Journal of general internal medicine 2007;22(2):177-83.
18. Rab F, Mamdou R, Nasir SJEMhj. Rates of depression and anxiety among female medical students in Pakistan/Taux de depression et d'anxiete chez les etudiantes en medecine au Pakistan. J Eastern Mediterranean health journal. 2008;14(1):126-34.

19. Drageset JJSJoCS. The importance of activities of daily living and social contact for loneliness: a survey among residents in nursing homes. Scandinavian Journal of Caring Sciences 2004;18(1):65-71.
20. Shaikh BT, Kahloon A, Kazmi M, Khalid H, Nawaz K, Khan N, et al. Students, stress and coping strategies: a case of Pakistani medical school. J EDUCATION FOR HEALTH-ABINGDON-CARFAX PUBLISHING LIMITED-. 2004;17:346-53.
21. Wolf TM, Faucett JM, Randall HM, Balson PMJJoME. Graduating medical students' ratings of stresses, pleasures, and coping strategies. Journal of Medical Education 1988.
22. Wolf TM, Randall HM, Faucett JMJAJoHP. A survey of health promotion programs in US and Canadian medical schools. J American Journal of Health Promotion. 1988;3(1):33-6.
23. Shiralkar MT, Harris TB, Eddins-Folensbee FF, Coverdale JHJAP. A systematic review of stress-management programs for medical students. J Academic Psychiatry. 2013;37(3):158-64.