

Original article

Association of Burnout and Depression symptoms and their prevalence among medical students in Karachi, Pakistan

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Abstract: Background — The mental health of medical students has long been a concern. Symptoms of depression and burnout are common among medical students, but the overlap of symptoms of both diseases with risk factors remains unclear. The goal of this study was to determine the prevalence of burnout and depression symptoms' overlap in medical students.

Methods — This cross-sectional study was conducted among students of the clinical course (3rd, 4th and 5th years). A multistage stratified random sampling design was used to select 284 students that were offered a validated and structured questionnaire that included a modified Oldenburg Burnout Inventory and Patient Health Questionnaire-9 to assess their emotional burnout and depression, respectively. Chi-square and multinomial regression analyses were done to identify overlapping symptoms of burnout and depression with association of risk factors with dependent variable.

Results — Out of 284 students, 13% had symptoms of severe depression, 24% had high burnout symptoms, and 32% had overlapping symptoms of burnout and depression. In regression analysis, higher academic year more than 2 times (5th year, OR 2.03, 95% CI 1.42-7.96, p-value 0.004) and living at dormitory more than 3 times (OR 3.97, 95% CI 1.97-5.01, p-value 0.003) were more likely associated with more extensive overlap of burnout and depression symptoms.

Conclusion — There is a high prevalence of burnout and depression symptoms among medical students, with a strong association between the two disorders. Early burnout detection and psychiatric therapies given to affected students and these disorders management training at medical school, may help reduce negative consequences of these conditions.

Keywords: burnout professional, depression, academic training, medical student.

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Introduction

Concerns about the mental health among medical students have existed for a long time [1]. According to the International Classification of Diseases, 11th Revision (ICD-11), a *burnout* is the condition presumably caused by persistent occupational stress that has not been adequately controlled. It comprises three components: (1) feelings of fatigue or lack of energy; (2) increased mental distance from work, or feelings of negativity or cynicism about one's performance; and (3) reduced professional efficacy [2]. Mental wellbeing of medical students was a matter of concern at various medical schools in different countries. In addition to their educational pressure, these students are exposed to a huge responsibility because their profession is dedicated to taking care of people's health without making mistakes, which contributes to stress and anxiety [3]. It is estimated that every other medical student suffers from burnout [4].

Burnout and depression are associated with the prevalence of subjective somatization [5]. Burnout is also associated with an increased risk of hypertension, coronary disease, and cerebrovascular disease [5]. In addition, depression is a widespread debilitating psychological disorder that affects people worldwide and is a major source of disability due to devastating side effects [6]. Low mood, anhedonia, and fatigue are all signs of depression, and there is a clear link between them [7].

It is estimated that by 2030, depression is expected to overtake ischemic heart disease as the leading cause of disease burden worldwide [8]. Nearly 800 thousand people commit suicide every year, and suicide is the second leading cause of death among people 15 to 29 years of age [9].

In 2017, 264 million people worldwide were believed to be depressed [10]. According to published studies, about 27.2% of medical students have depression or depressive symptoms, and 11.1% of them have suicidal ideation [11]. It is disquieting that,

compared with the general population, medical students have higher rates of depression, suicidal ideation, and burnout [12]. Medical schools face the challenge of producing qualified compassionate physicians which ready to dedicate their lives to helping others, yet many studies over past decades have shown that much of the medical school experience can overwhelm and drain students rather than motivate and train them [13-14]. These studies suggested that burnout should be treated in clinical practice. Re-examining burnout and depressive symptoms may thereby serve as a foundation for further diagnosis and treatment. The outcomes of past study revealed that burnout prevalence among medical students ranged from 10% to 44%, due to inconsistency of their results [15]. It was established in some study that emotional burnout among medical students was associated with the load of medical courses in a medical college. Active learning process leads to mental stress in students [16]. Another study demonstrated that the burnout rate among students was 66%; medical students suffered from the burnout due to strenuous training in the hospital, to which they were not adapted [17].

Methods

Research setting and study design

This cross-sectional study was conducted in 2022 among students' study in their 3rd, 4th and 5th clinical years of study pursuing the MBBS degree at public sector medical college in Karachi, Pakistan. Medical students of clinical years were asked to fill a pre-tested self-administered questionnaire. To standardize the questionnaire, a pilot study was carried out to evaluate the validity of its content.

Sampling procedure and sample size

The study participants were selected via multistage stratified random sampling; the 3rd, 4th and 5th academic years were considered the strata, and then each year sample was collected through the simple random sampling procedure. A total of 284 students were included in the study, and sample size was calculated using the Epi Info software. The prevalence of depression and burnout among students from a previous study [18] was estimated using the value for depression at 25% with a confidence level of 95% and an error margin of 5%.

Data collection procedure

After approval from the college administration, students representing each year were approached, briefed on the goal of the study, and given self-administered questionnaires. Students submitted filled questionnaires to the study coordinator within a week.

Inclusion and exclusion criteria

The inclusion criterion was the age of the prospective participant (18-26 years old). The exclusion criteria for study participants were diagnosis and treatment for any psychological disorder, family history of psychological disorders, and lack of written informed consent.

Research concepts and tools

The *burnout* was measured using the Oldenburg Burnout Inventory (OLBI). OLBI has two dimensions (exhaustion and

disengagement from work) evaluated through 16 items: 8 items measure exhaustion, while other 8 items measure disengagement from work. Both dimensions were assessed by four positively worded items and four negatively worded items. Items were scored using a scale ranging from 1 to 4 points (Strongly agree, agree, disagree, strongly disagree) [19].

Depression was assessed via the Patient Health Questionnaire (PHQ-9). The PHQ-9 is a commonly used open-access depression screening tool in a variety of health care and community contexts. It was scored as follows: no depression (0-4 points), mild depression (5-9), moderate depression (10-14), or severe depression (15-21 points) [17].

Table 1. Characteristics associated with burnout and (or) depression symptoms in medical students (n=284)

Characteristics	Symptoms of burnout and depression				p-value
	B (-) and D (-) [37, 13%]	B (+) and D (-) [149, 52.5%]	B (-) and D (+) [7, 2.5%]	B (+) and D (+) [91, 32%]	
Age, years					0.005
18-20	5(13.5)	12(7.8)	2(28.5)	5(5.4)	
21-23	30(81)	127(85.6)	4(57.1)	82(90.1)	
24-26	2(5.5)	7(6.6)	1(14.4)	4(4.5)	
Gender					0.007
Male	4(10.9)	35(22.8)	2(28.5)	30(32.9)	
Female	33(89.1)	114(77.2)	5(71.5)	61(67.1)	
Academic year					0.002
3 rd Year	6(16.2)	37(24.1)	3(42.8)	29(31.8)	
4 th Year	29(78.3)	91(62)	3(42.8)	45(45)	
5 th Year	2(5.5)	21(13.9)	1(14.4)	17(23.2)	
Living venue					0.004
Home	34(91.8)	137(92.1)	6(85.6)	83(86.8)	
Dormitory	3(8.2)	12(7.9)	1(14.4)	8(13.2)	

Table 2. Multinomial analysis of burnout and/or depression symptoms among medical students

Variables	OR (95% CI)	p-value
B (-) and D (-)		
Gender		
Male	1.04(0.55-1.97)	0.892
Female	1	
Academic year		
5 th Year	1.97(1.27-5.01)	0.003
4 th Year	1.61(1.12-3.60)	0.002
3 rd Year	1	
Living venue		
Home	1.87(0.75-4.68)	0.006
Dormitory	1	
B (-) and D (+)		
Gender		
Male	2.52(0.411-15.52)	0.317
Female	1	
Academic year		
5 th Year	2.13(1.20-5.39)	0.004
4 th Year	2.06(1.01-4.97)	0.002
3 rd Year	1	
Living venue		
Home	1.82(0.73-4.67)	0.008
Dormitory	1	
B (+) and D (+)		
Gender		
Male	1.96(0.15-3.10)	0.564
Female	1	
Academic year		
5 th Year	2.03(1.42-7.96)	0.004
4 th Year	1.87(1.23-4.73)	0.005
3 rd Year	1	
Living venue		
Home	3.97(1.97-5.01)	0.003
Dormitory	1	

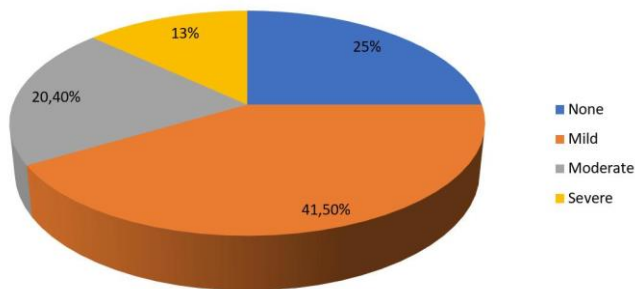


Figure 1. Prevalence of depression among study participants.

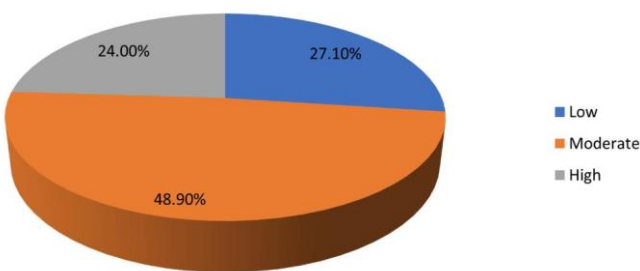


Figure 2. Prevalence of burnout among study participants.

After adjusting for negatively worded questions, both subscales of OLB were combined to yield a total score for the burnout syndrome. By splitting the scores into percentiles, we calculated the threshold values for *low*, *moderate*, and *high* levels of the burnout. These thresholds were used to calculate the prevalence of burnout syndrome.

Mild depression was rated 5-9, moderate depression was rated 10-14, severe depression was rated 15-21 points. These criteria were used to calculate the prevalence of depression among participants.

Study variables, data analysis and ethical consideration

The dependent variables were burnout and depression, and the independent variables were age, gender, academic year, and living venue of the participants. Data were entered and analyzed in SPSS 24. Frequency, mean, deviation and standard deviation were calculated for quantitative variables, whereas proportions were calculated for qualitative variables. The relationships between dependent and independent variables were determined using chi-square and multinomial regression analyses. In all tests, the level of statistical significance was set at $p < 0.05$.

The participation in the study was voluntary, and written informed consent was obtained from all participants prior to the study. All ethical considerations were observed while seeking legal permission of concerned authorities at the college to assess data. Research misconduct was avoided, and the rights and wellbeing of research participants were protected. The study was approved by the Institutional Review Board of Jinnah Sindh Medical University, JSMU (reference number JSMU/IRB/2020/-553).

Results

Descriptive analysis

We established that 52.5% of study participants suffered from the burnout, 2.5% suffered from depression, and 32% had depression and burnout symptoms simultaneously. Among risk factors, age groups, academic years and living venues were statistically significant (p -value ≤ 0.005) for different groups of variables ([Table 1](#)).

Inferential statistical analysis

Among the participants, solely 4th-year and 5th-year students had higher risk values of burnout symptoms alone, depression symptoms alone, and simultaneous burnout and depression symptoms, and these results were statistically significant: depression symptoms alone (OR=1.61, 95% CI 1.12-3.60, p -value 0.004 vs. OR=1.97, 95% CI 1.27-5.60, p -value 0.002, respectively); burnout symptoms alone (OR=2.13, 95% CI 1.20-5.39, p -value 0.003 vs. OR=2.06, 95% CI 1.01-4.97, p -value 0.002, correspondingly); and simultaneous symptoms of depression and burnout (OR=2.03, 95% CI 1.42-7.96, p -value 0.004 vs. OR=1.87, 95% CI 1.23-4.73, p -value 0.005, respectively) ([Table 2](#)).

Among the participants, 13% of the students had symptoms of severe depression ([Figure 1](#)), while 24% of students had symptoms of high level of the burnout ([Figure 2](#)).

Discussion

This is the first study to determine the overlap and difference between burnout and depression symptoms in Pakistani medical students. According to our findings, one-third of students suffered from simultaneous occurrence of burnout and depression symptoms, and different risk factors had common characteristics in these cases. Our study revealed that all students with depression symptoms had burnout symptoms as well. This outcome was consistent with results of other studies [20-21]. Most previous studies did not consider the categories of symptoms among students, while our study categorized the symptoms of both diseases and investigated their significant relationships with risk factors. Many students (48.9%) experienced moderate burnout, whereas 24% of them endured high burnout. Our findings are like many studies on the levels of burnout in medical students. A study conducted in Pakistan reported that about half of medical students (47%) met the criteria for moderate, high, or very high levels of the burnout [23]. Similarly, another research demonstrated 45% of burnout prevalence among Minnesota medical students [24].

Our study revealed high prevalence of depression symptoms (2.5%) among the participants. More than half of the respondents (51.3%) were affected by depression in an Indian study conducted among undergraduate medical students [25]. Another study established the depression prevalence of 30.6% in Cameroon medical students [26]. Even though depression incidence varies throughout the world, various studies consistently demonstrated that medical students have a high incidence of depression. The variation, however, is due to a number of causes, such as different durations of training program, different academic costs, use of different depression scoring methods, and cultural differences, to name a few [27].

In our study, the burnout syndrome correlated with depression. Similarly, in research performed in Cameroon, these two variables were shown to be associated: 66.34% of medical students suffered

from depression. The presence of a chronic disease, the occurrence of a life-changing crisis, and burnout syndrome, as measured by the total OLB score, are all independent correlates of depression [28]. A recent meta-analysis suggested that there was an association of burnout with depression, as well as between burnout and anxiety [29]. However, since a clear direction was not defined, the temporality of the relationship remains a matter of controversy. In 2017, Frank et al. revealed a bidirectional relationship in young elite athletes. Burnout and depression may exacerbate each other to some extent, although there is no clear direction of causality [30]. To achieve reliable conclusions, future research should preferably focus on the transmission of information between the two disorders. Various reasons may explain some of the discrepancies between the results of studies on the prevalence of burnout and related factors in medical students, such as differences in samples, course structure, use of different research instruments, differences in the burnout concept, level of participation and research approach. Furthermore, in other studies, different cut-off values were employed to identify burnout based on the same questionnaire [31]. It is a common practice that medical students are supposed to perform massive amount of work and are subjected to academic stress coupled with daily life challenges. This ongoing struggle causes them to succumb to exhaustion, which eventually leads to the development of burnout and/or depression [32]. Moreover, depression is associated with a higher prevalence of comorbidities than does burnout; hence, the consequences could be more severe.

Therefore, adequate prevention, prompt diagnosis and effective treatment could minimize the occurrence of comorbidities [33]. Inadequate treatment of any disease leads to deterioration in health, which can lead to interference in the fulfillment of the physical and mental needs of medical students. Such negative impact on their performance would further aggravate their depression.

Hence, the mental health of medical students should be frequently evaluated, and appropriate resources should be used for their treatment and subsequent follow-up. Thus, effective and healthy coping strategies can help preventing future deterioration in mental health.

Conclusion

There is a high prevalence of burnout and depressive symptoms among medical students, with a strong association between the two. Early burnout detection and psychiatric therapies, along with depression and burnout management training at medical school, may help diminish the negative consequences of these conditions.

Study advantages and limitations

To the best of our knowledge, it is the first study in Pakistan that described the association of burnout with depression. Further research on this topic is desired to ascertain the direction of the association.

There were a few limitations in our study that should be considered in future research. First, it was the cross-sectional study; hence, it is difficult to determine the causal relationships between outcome and risk factors. Second, the investigation was limited to a small sample size; future studies should employ a multicenter approach.

Conflict of Interest

The authors confirm that there are no conflicts of interest.

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