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Review Article

Prevalence and risk factors associated with mental health disorders among medical students

Alberto Sánchez-Navarro[1], María F. Macías[1], Eduardo Sánchez[1], José M. Zepeda[1]*, Felix Osuna[1], Miriam C. Pérez[2]

[1]Faculty of Medicine, Autonomous University of Guadalajara, Guadalajara, Jalisco, Mexico
[2]Faculty of Medicine, University of the Valley of Mexico, Guadalajara, Jalisco, Mexico

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***Correspondence:**
Dr. José M. Zepeda,
E-mail: josem.zepeda@edu.uag.mx

ABSTRACT

The mental health care of medical students is a complex process influenced by various innate or personal characteristics of the student, stressors related to medical training, social, economic, demographic and many other factors. Therefore, it is important to identify both the prevalence and the main risk factors that can trigger mental disorders in medical students, such as stress, burnout, anxiety, depression, suicidal ideation, suicide, among others. Specifically in these students, the prevalence of depression ranges between 2.9% and 38.2% respectively; likewise, exhaustion ("burnout") prevails in 28-45% of them. Most students do not seek the necessary support to solve such problems, which leads to serious consequences, such as the abuse of substances harmful to health, in addition to environments, situations or actions that lead to mental destabilization. The following paper is a review that emphasizes the prevalence and risk factors that can trigger these mental disorders, in order to make an early detection and timely intervention, such as attending psychiatric therapy and/or receiving support from the educational system itself.

Keywords: Anxiety, Stress, Depression, Exhaustion, Mental Health, Medical students

INTRODUCTION

Mental disorders have received increased worldwide attention due to their negative effects on people's work capacity and performance; depression and anxiety are the most commonly observed in the general population. It has been shown that a higher level of stress increases a person's likelihood of developing psychiatric disorders.[1-5]

Despite the growing interest in states of psychological stress or distress during medical training, the factors associated with them in medical students, particularly depression, are poorly understood and documented. Medical student mental health care is a complex process influenced by innate student characteristics, medical training-related stressors, and many other factors; specifically in these students, the prevalence of depression ranges from 2.9% to 38.2%, respectively.[1]

In recent years, the increasingly competitive nature of higher education has led to an exacerbation of common academic stressors among undergraduate students, some of whom end up suffering from mental health problems. According to the literature, undergraduate students in medical or health science streams were more likely to suffer from psychological distress such as anxiety, depression, and suicidal feelings. It is well known that health education has very high complexity and uniqueness, so students need to achieve academic excellence, clinical competencies, and good interpersonal skills; this requires many years of stressful study and persistent medical training. In addition to classroom

learning, they must also undergo a comprehensive assessment that includes theoretical and practical evaluations.[2]

Thus, such a complex learning environment and the constant struggle in training to become qualified healthcare professionals can lead to psychological stress or distress. Studies have shown that the mental and emotional well-being of students can be indirectly affected by certain components of training; according to many published studies, the performance of university students can be affected by mental health disorders such as stress, anxiety and depression, which are common among students. These factors have been associated with a negative impact on learning and academic performance, lower quality of life, and the development of many life-threatening diseases, such as cardiovascular diseases and cancers.[2]

Most authors suggest that depression increases during medical training and this increase is more pronounced in women. However, the increase in depression during medical training is not universally reported, as it is suggested that the prevalence varies according to the age of medical students, the stage of medical training, the methodology for assessing depression, and the specific location. In addition, several potential risk factors for depression have been identified, including financial burden, stress associated with exams, prolonged period of study in medical schools, among others; however, there were other factors that remained undocumented in the literature, such as students' motivation to study medicine, which should be given special emphasis. Likewise, depression in these students is related to substance abuse, suicide and deterioration of professional function, interpersonal skills, professionalism, and physical and mental health.[1,13]

Longitudinal studies have suggested that some students experience recurrent episodes of depression during medical education, but not many studies have investigated whether depression is persistent for a particular student. On the other hand, it is worth mentioning that anxiety is inversely proportional to emotional stability and directly proportional to vulnerability to stress, for medical students. The stress of medical school depletes the coping reservoir, but social and health-promoting activities can replenish it; medical students with a small coping reservoir or little positive input are at increased risk for distress or stress states, including burnout. A review of the literature on burnout reveals that burnout is 28-45% prevalent in medical students, and depression appears to be closely related to burnout. Given the importance of depression, anxiety, stress, burnout and their consequences, it is important to assess their temporal development over time in medical school, to identify their critical period and to reveal whether other conditions might also be related to these phenomena.[1]

For all these reasons, the present review article aims to determine the prevalence and main riskfactors that lead to the appearance of mental and/or psychiatric disorders or problems among medical students, as well as their change over time and the comparison with different studies, in order to establish early prevention, and timely detection and intervention, by the educational system itself and/or the respective psychiatric intervention.

LITERATURE RESEARCH

For this work, a search for articles in scientific journals on the prevalence and risk factors associated with various mental health disorders or problems in medical students was conducted as well as a review of the respective literature.

Theoretical framework

To understand the subject and focus it on the current framework of medical students, the available information is reviewed.

METHODS AND OBJECTIVES OF THE DIFFERENT STUDIES

Initially, the study by Fauzi et al aimed to determine the prevalence and risk factors associated with stress, anxiety and depression (SAD) in a cohort of undergraduate students in health sciences. For this purpose, a questionnaire containing sociodemographic factors and the short version of the depression, anxiety, and stress scale-21 (DASS-21) were used to assess the likelihood of psychological distress; also, a logistic regression analysis was performed to determine the risk factors for SAD.[2]

Similarly, the prospective longitudinal observational study conducted by Silva et al at the faculty of medicine of the university of Minho, Portugal, between the academic years 2009-2010 and 2012-2013, included 238 medical students who maintained their participation by completing annually a questionnaire including the beck depression inventory (BDI); in contrast, anxiety and burnout were assessed using the state trait anxiety inventory and the Maslach burnout inventory.[1]

On the other hand, the cross-sectional study of Pham et al in medical students with clinical experience at Hanoi medical university (HMU) in Vietnam, which was conducted from November 2015 to January 2016, used the patient health questionnaire 9 (PHQ-9), the academic motivation scale (AMS), and the international physical activity questionnaire short form (IPAQ) for the assessment of the prevalence and risk factors associated with depression.[3] In addition, in the examined study of Tadeo-Álvarez et al the use of the PHQ-9 scale was also chosen to assess depression, where they seek to find the cause of depression by correlating college career data together with a new risk factor.[8]

Therefore, Sacramento et al conducted a prevalence study with a probability sample of 1,339 students who regularly attended the 12 semesters of the medical course in January 2018, in which 458 students (34.2% of the total) participated in order to assess factors associated with depression; among them, the mean age for both sexes were 22 years.[7]

Likewise, the cross-sectional study conducted by Azad et al at foundation university medical college (FUMC), included 150 medical students who gave informed consent, excluding thosewith a known psychiatric history; they were evaluated on 3 non-consecutive occasions at the beginning, middle, and end of the course to find the effect of time on the rates of anxiety and depression, and with the aim of identifying the prevalence of these entities in the students. The BDI was used to assess depression, while the Beck anxiety scale (BAS) was used for anxiety.[4]

In turn, the cross-sectional study by Pokhrel et al at Maharajgunj medical campus (MMC), considered 651 medical students and residents randomly selected between December 2018 and February 2019, with the aim of determining the prevalence of depression, anxiety, burnout andtheir associated factors, and identifying their predictors among students and residents of a medical school in Nepal. For burnout the Copenhagen burnout inventory (CBI) assessment was used, for anxiety and depression the hospital anxiety and depression scale (HADS) tool.

Similarly, the systematic review by Mao et al examined the prevalence of depression and anxiety among medical students in China by conducting a systematic review system and a systematic research study on their determinants; moreover, it adopted the social determinants of health (SDH) framework to synthesize the results. "SDH are the conditions under which people are born, grow, work, live, and age, and the broader set of forces and systems that shape the conditions of everyday life. These forces and systems include economic policies and systems, development agendas, social norms, social policies, and political systems."[5]

In the study by Shao et al 2,057 medical students in China participated, 603 were male, while 1,454 were female; their age ranged from 17 to 25 years old. Methods used were: the Zung self-assessment depression scale (Zung SDS) which is used for the classification of depression, also the Zung SAS was used, with the aim of assessing stress and anxiety.[9]

PREVALENCE OF DEPRESSION

As reported by Rotenstein et al in the Mao et al study, 27.2% of medical students in 47 countries suffered from depression or depressive symptoms during their studies.[5] Regarding the study by Silva et al the prevalence of depression ranged from 21.5% to 12.7% (academic years 2009/2010 and 2012/2013), whereby BDI scores decreased during medical school. However, 19.7% of students recorded a sustained high BDI over time.[1]

In contrast, the cross-sectional study by Azad et al in the first evaluation of their students at the beginning of the academic year indicated that 35.76% of the students did not suffer from depression, while 40% had mild depression and 24% had moderate to severe depression. At the end of the course and having completed the three evaluations, a change was observed in the prevalence of depression in the students, being mild in 37.46% and moderate to severe in 14%, while 48% of the students had no depression. At the same time, females were found to be more depressed than their male counterparts.[4] Recent research in China, however, reports the opposite conclusion.[5]

In the study by Fauzi et al 449 students completed the questionnaire, of whom 51.4% had depression; it is worth mentioning that most cases of depression (66.2%) were of normal to mild level.[2] On the other hand, it was found that among 494 participants in the Pham et al study, the prevalence of self-reported depression was 15.2% and suicidal ideation was 7.7%.[3] According to Sacramento et al the prevalence was 36% overall, ranging from mild in 28.8% to moderate in 5.9% and severe in 1.3% of the students; symptoms were minimal in 56.6% andabsent in 7.4% of them.[7]

According to the research of Tadeo-Álvarez et al it was shown that the 255, out of the total of 757 enrolled student physicians, used in this study, the prevalence of depressive symptoms in medical students was 20.2%. Comparing the prevalence calculated by each different survey tool among the 15 studies, and using the PHQ-9 scale, a prevalence of 18.3% was found, which is very similar to the findings reported in the respective study.[8]

In contrast to the previous studies, the systematic review study by Mao et al showed that the prevalence of depression ranged from 13.1% to 76.21%, with the use of the respective assessments.[5] The study by Shao et al reported that 42.5% had no depression, 34.7% had minimal to mild depression, 18% had moderate to severe depression and 4.9% had severe depression.[9]

PREVALENCE OF STRESS AND ANXIETY

According to the study by Fauzi et al of the total number of students, 65% had stress and 85.1% had anxiety; most cases of stress (74.6%) were of normal to mild level, while 74.6% of them showed moderate to extremely severe anxiety.[2] Similarly, the systematic review by Mao et al. found a prevalence of anxiety between 8.54 and 88.3% in medical students.[5]

Contrasting information, Sacramento et al estimated that the prevalence of anxiety symptoms was 30.8% of all students, ranging from mild in 91 (19.9%) to moderate in 39 (8.5%) and severe in 11 (2.4%) students; in addition,

minimal symptoms were identified in 63.1% andabsent in 6.1% of the students. Likewise, the higher prevalence of anxiety and depression in female students was similar to that found in other studies consistent with mental health information, according to which anxiety disorders were present in 23.4% of women and 14.3% of men, this combined with greater gender violence in terms of machismo and unequal treatment in the university career.[7]

For anxiety status, the prevalence of each category was 69.2% (no anxiety), 23.9% (minimal to mild anxiety), 6% (moderate to marked anxiety), and 0.8% (severe anxiety). Meanwhile, the prevalence of depression and anxiety symptoms together among medical students in the Shao et al study was 57.5% and 30.8%, respectively.[9]

RISK FACTORS FOR DEPRESSION

Students with a sustained high BDI over time had high levels of anxiety and chose a career in medicine for the anticipated income and prestige, yet reported more relationship problems, cynicism, and lower satisfaction with social activities. On the other hand, students with high BDI scores at the initial assessment, low levels of anxiety, and a primary interest in medicine as a career tended to have improved mood and reported reduced burnout, few learning problems, and greater satisfaction with social activities at the last assessment. In addition, no differences were detected between men and women in mean BDI score over time.[1]

The findings suggest that personal factors (anxiety traits, career choice factor, relationship patterns, and academic burnout) are relevant to the persistence of high levels on the BDI during medical training. Likewise, problems with learning and academicineffectiveness are factors involved in the development of depressive symptoms.[1]

In the regression analysis of Fauzi et al poor sleep quality and fatigue were risk factors for the development of depression; in addition, stress, anxiety and depression scores as a whole were significantly higher among students studying medical imaging.[2,5]

In another study, self-reported depression was significantly associated with important risk factors such as perceived financial burden, physical inactivity, being a senior, perceived negative influence of night shifts, and non-self-determined motivation profile. Suicidal ideation was also significantly associated with perceived financial burden and non-self-determined motivation profile.[3]

In terms of lifestyle factors, one in five students reported drinking alcohol more than once a month (or more than twelve times a year). Ninety-eight percent of students had never smokedand the sixth-year cohort had more smokers than other cohorts. It was also found that more than 80% of students reported a moderate to vigorous level of activity in the past 7 days, and there were no differences with respect to physical activity between cohorts.[3]Similarly, the systematic review by Mao et al found higher depressive symptoms in medical students who used tobacco and alcohol, those who had difficulty adapting to their environment, and sleep deprivation.[5] Regarding the study by Pokhrel et al it was reported that 393 (60.4%) of the participants consumed alcohol and 241 (37.1%) consumed tobacco.[6]

An important and constant fact is that being a woman increases the risk of presenting depressive symptoms, a finding that is confirmed in other Latin American studies such as those conducted by Villacura et al in Chile, and Arce et al in Peru. On the other hand, there is a new risk factor with negative aspects of mental health or unhappiness, such as time spent in front of screen (electronic devices and social networks); consequently, increase in depression and unhappiness are noticeable.[8]

Academic stress is a risk factor for depression, but no significant relationship was found between the two in the study by Sacramento et al. However, it was also observed that belonging to the female sex was a risk factor for depression, but no significant relationship was found with the rest of the variables.[7]

RISK FACTORS FOR STRESS AND ANXIETY

In the study by Pokhrel et al it was observed that school stressors generated high degree stress in the participants, while stressors associated with other factors only reached the moderate degree of stress. At the same time, it was shown that depression, anxiety and burnout were significantly lower in the absence of these stressors.[6]

It is important to mention that there was a statistically significant association between stress score and year of study, with higher stress scores in students of more advanced years; also, those who were dissatisfied with the medical career were more anxious than the rest of their peers and likewise, students whose families had low economic resources, originated from rural areas and those who had siblings.[2,5]

Similarly, separation from pre-existing family or social support with which students were familiar, as well as the need to form new social interaction with students from other cultures, could be the reason behind the higher level of mental stress among undergraduate students. In addition, they also experience a high level of stress and stress-related illnesses as a result of heavy course workload, limited leisure time, lack of access to learning materials, and regular assessments.[2,5]

Likewise, the systematic review by Mao et al reported that poor interpersonal relationships, high academic pressure, dissatisfaction with the medical career, lack of interest in it, low academic grades and sleep deprivation had increased the likelihood of having anxiety.[5] Regression analysis by Fauzi et al agreed that poor sleep

quality and fatigue were risk factors for the development of anxiety, whereas low fever and frequent headaches were risk factors for both stress and anxiety.[2] On the other hand, a history of mental illness was also positively associated with anxiety.[6]

DISCUSSION

Compared with other countries, the prevalence of students reporting depression in the Pham et al study (15.2%) was comparable to that of studies conducted in Mexico (16.2%), the United States (14.3%), New Zealand (16.9%), and South Korea (13.8%), which also used the PHQ-9 value ≥10 to identify students with depression. Similarly, 19.6% of medical students surveyed at Hanoi Medical University were found to identify themselves as having non-self-determinedcareer motivation; this finding was supported by previous studies that family influences and social norms play an important role in the decision of Vietnamese students, and the world at large, to enroll in a university.[3] The results of the study by Azad et al reported that 51% of their student sample suffered from depression, and with respect to moderate to severe anxiety,only 13% and 87% of them did not.[4]

The study by Pokhrel et al revealed that residents suffered more burnout and depression (64.5% and 33.7%) than medical students (37.6% and 29.1%). However, medical students reported more anxiety symptoms compared to residents, 46.3% vs. 44%; thus, anxiety is identified as a significant predictor of depression.[6]

On the other hand, in the study by Fauzi et al the true role of gender in the development of stress, anxiety and depression (SAD) cannot be concluded, due to the small sample size of maleparticipants.[2] That women experienced persistent depression more likely than men is not completely clear from the results, which is consistent with what was described in the study by Fauzi et al.

However, other studies highlight that woman were twice as likely to be affected by anxiety disorders and depression.[8] It may be due to the fact that men are less likely to disclose psychological distress and seek help, compared to women.[6] The study by Azad et al showed a higher frequency of both mental disorders specifically in female senior students; likewise, the results of the study by Fauzi et al showed that students' advanced academic year was significantly associated with increased stress. What has been observed could be explained by another study mentioning that underlying hormonal and biochemical differences between males and females could influence mental health.[2,4] However, recent research in China reports the opposite conclusion, with a higher prevalence of depression and anxiety in males than females; this finding is thought to be a result of the higher expectations and responsibilities on male students in China, as they are perceived to be the responsible financial providers in the family, which places greater stress on them.[2,5]

Sleep quality was also found to be one of the most important factors predisposing to anxiety and depressive symptoms. Poor sleep quality is common among college students, especially during exam season. However, lack of sleep can lead to undesirable effects such as fatigue, impaired cellular repair, and impaired cognitive and psychomotor functions. As a result, they suffer from poor concentration, in addition to having difficulty remembering and understanding what they have studied and subsequently affecting overall academic performance.[2] The study by Pokhrel et al reported that the participating students usually slept an average of 7 hours per day.[6]

In relation to the above, the study by Pokhrel et al found that anxiety was unlikely in those who get enough sleep, which is consistent with several studies on sleep quality and psychological morbidity among university students. In the same position, Lemma et al found a strong correlation of depressive and anxiety symptoms with sleep quality; as poor sleep quality was associated with poor academic performance among medical students.[6]

On the other hand, with respect to depression, although the predominant literature suggests that depression worsens with academic training, the study by Silva et al found a statistically significant decrease in the mean BDI score. These findings reinforce other studies and open new perspectives on the subject, showing that, for the population studied, depression improves with continued academic training. The causal factors are unclear, and this difference may be explained in part by adaptation to the demands of the course, maturation of the participants, institutional changes, or external factors.[1]

In contrast, and regarding the frequency of depression and anxiety in the different years of the career, the study by Azad et al shows higher rates in 2nd year students. It was estimated that if students were dissatisfied with their results at university due to the high academic load, and changes in their lifestyle, they would be less satisfied with themselves, thus contributing to their stress, anxiety and depression.[4] In the Pokhrel et al study, 307 (47.23%) participants were dissatisfied with their academic performance.[6] At the same time, another possible cause is thefirst professional examination, highlighting that a higher level of stress increases the probability of developing psychiatric disorders.[4] On the other hand, the systematic review by Mao et al points out that the most depressed and anxious students were those in the second and last year of the degree program; the latter, due to facing the pressure of obtaining a job and being in a period of transition and future uncertainty. On the contrary, second year students experienced more academic pressure.[5]

In contrast, another important finding refers that the prevalence of depression is not maintained throughout the school years, so that the demand for an academic year in

medical school does not seem to fully explain the prevalence of depression in the groups studied.[1]

It is suggested in studies that the emotional state of students upon entering medical school resembles that of the general population. However, students who opt for medical schools before entering the career already have career concerns and are anticipating the necessary adjustment to the challenges ahead of them.[4] Meanwhile, it was also reported that 57% of Vietnamese medical students were dissatisfied with their academic performance, and 27.7% of them reported having doubts about a medical career; these students may be more likely to drop out or not pursue clinical practice after graduation and fall into depression compared with self- determined students. Likewise, some introverted physicians reported more symptoms of depression and anxiety, coupled with poor relationships with lovers, classmates, or friends. The frequency with which students had poor relationships with lovers was almost 7 times higher in those with severe anxiety than in those with minimal to mild anxiety.[3,9]

The family factor is also directly related to the subject; studies show that students who had siblings were more depressed and anxious than those who were only children, since the latter received more attention from their parents. Similarly, family income had a high impact, since the lower the income, the greater the predisposition to the development of both disorders, especially anxiety.[5] Students with high job pressure were more susceptible than those with low job pressure to report symptoms of anxiety; in addition, students with poor appetite and sleep reported more symptoms of depression and anxiety than those with good appetite and sleep. Consistent with previous studies, perceived financial burden was found to be an important factor associated with self-reported depression and suicidal ideation.[3,9]

Notably, medical students able to overcome depression show decreased levels of burnout and perceived learning problems, and greater satisfaction with social activities over time. Despite being depressed in the early stages of the course, these students appear to have adapted better to the demands of the course with fewer learning problems and levels of academic inefficiency; theappear to be able to establish healthier balance between academic activities and the restof areas of their lives, with greater satisfaction in social activities and decreased emotional exhaustion.[1]

CONCLUSION

In conclusion, the majority of health sciences students experience stress, anxiety and/or depression, the main symptoms of mental health disorders; of these, anxiety is the most frequently associated among participants, followed by depression and stress. Importantly, the burden of depression and suicidal ideation among medical students is much higher than that of the general population. Likewise, the findings suggest that personal factors (anxiety traits, career choice factor, relationship patterns and academic burnout) are relevant to the persistenceof the different mental disorders; furthermore, there is a high prevalence of depression and anxiety related to the predominant and high degree effect of academic stressors.

Specifically, the most prominent risk factors for both self-reported depression and suicidal ideation were non-self-determined motivation and financial burden. Similarly, due to the exponential factors, the high competitiveness factor for hospital and residency positions, and the very nature of the environments of illness, death, despair and anguish that are experienced within hospitals, students suffer from these types of conditions.

Future studies are necessary and should evaluate other factors such as the university environment (teaching-learning processes), because the psychological well-being of university medical students does not depend solely on personal characteristics. Finally, it was emphasized the immediate need for health professionals and university administrative staff to identify andprovide timely support and counseling, by promoting prevention and early detection programs focused on the vulnerable medical student population, who are at risk of presenting or who are presenting stress, anxiety, depression or any other mental health condition or disorder.

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