



## A NARRATIVE REVIEW OF SUICIDAL BEHAVIOR IN MEDICAL STUDENTS.

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**ABSTRACT**

Studies across different countries have consistently demonstrated high rates of several psychiatric disorders among medical students. These findings, in turn, may be correlated with the higher than expected rate of suicide in student doctors. We aimed to provide a narrative review of the literature concerning suicidality in medical students worldwide. A narrative review is not a systematic review. Using Pub Med, we identified articles including our defined search terms: ((suicide) OR self-harm) (attempted suicide, deliberate self-harm AND medical students) OR future doctors. Particular credence was given to review articles and original research conducted this decade. We find that medical student suicide is likely related to a number of social and environmental factors. Structural systems in medical schools may play a role, for example, curricula, accommodation, social support, and academic pressures. Interpersonal factors that may be implicated include social isolation, the competitive nature of learning, and being away from home at an early age. There may also be endemic factors unique to medical training, which may contribute to higher rates of depression and suicidality; these include simulation training, working with cadavers, and witnessing trauma throughout placements. The socio-cultural environment, for example, the role of ragging, expectations from teachers, and patients, may place extra pressure on vulnerable individuals. Rates have been shown to be higher among females, which raises further discussion on the nature of gender roles and gender role expectations within medicine. As the medical workforce of the future, today's students require a considerable emotional and financial investment. It is, therefore, crucial that educators and supervisors understand the needs of this student body while delivering the essential skills to be a doctor in a sensitive no stigmatizing manner.

**KEYWORDS :** Attempted suicide, burnout, medical students, suicidal behavior, suicide.**Introduction.**

Medical students are the medical workforce of tomorrow. When students join medical schools, often they are leaving home for the 1st time, and are likely to be of age more prone and vulnerable to mental illness. They are also likely to be individuating and creating their own identities and forming social networks. Medical schools can be extremely stressful and lonely places. The teaching and learning environments can be extremely pressured, and expectations for achievement are high from the students themselves, their teachers, and parents also. Furthermore, the high rates of psychiatric disorders in medical students maybe because three-quarters of psychiatric disorders in adulthood start below the age of 24, coinciding with the ages medical students are at the peak of their training.

**Method**

A narrative review is not a systematic review as papers selected vary in range and are focused on specific topics and rely on observations, recommendations, and conclusions from relevant articles. The terms used for search included: suicide, attempted suicide, self-harm, deliberate self-harm, medical students to identify articles which reported on guidelines, systematic reviews, and reviews.

**Common Mental Disorders.**

Medical students have consistently shown higher rates of depression in comparison with rates reported by the general population.[1],[2],[3],[4],[5] These higher rates have been attributed to environmental factors, such as stress, and the rigors of the medical curriculum.[2],[3],[4],[6]

Dyrbye et al.[3] in a systematic review of depression, anxiety, and other indicators of psychological distress among U.S. and Canadian medical students reported a higher than expected prevalence rates of depression and anxiety among

medical students. Levels of overall psychological distress were reported to be consistently higher than when compared with the general population and age-matched peers by the later years of training. Overall, the studies suggest psychological distress may be higher among female students. These authors conclude that medical school is a time of significant psychological distress for physicians-in-training. A cross-sectional study[2] of Swedish medical students in their 1st, 3rd and 6th year (n = 342) reported that, overall, 12.9% had depressive symptoms in the past 2 weeks (higher prevalence in women — 16.1%), which is significantly higher than the general population which in the US varies between 5.9% and 7.2%.[7] From two cohorts in the first 2 years of medical school, Levine et al.[5] found a statistically significant increase in beck depression inventory scores in the moderate and severe range from 5.1% to 5.8% and from 10.5% to 11.9% at the end of the 2nd year.

Rotenstein et al.[8] following a systematic review of 167 cross-sectional and 16 longitudinal studies from 43 countries, reported that medical students are at high risk for depression and suicidal ideation. They acknowledge that the studies largely used self-report questionnaires (which has problems related to diagnosis) with the overall pooled crude prevalence of depression or depressive symptoms at 27.2% (ranging from 9.3% to 55.9%). Although the prevalence of depressive symptoms remained relatively stable, the authors describe a very slight 0.2% increase per year; an interesting finding for a number of reasons, not least when considering potential interventions and follow-up services. Longitudinal studies reported a median increase in symptoms of 13.5% before medical school and after joining medical school, thus suggesting that factors in medical school may well play an important role. They also reported from 24 cross-sectional studies from 15 countries, a crude prevalence rate of suicidal ideation to be 11.1% (range of 7.4% to 24.2%).

Puthran et al.[9] in a meta-analysis of 77 studies with 62 728 medical students and 1845 non-medical students found a broadly similar prevalence of depression amongst medical students at 28%. Female, year 1 and Middle Eastern students were more likely to be depressed. Year 1 students had rates of around 33.5%, which fell to 20.5% by year 5 – a statistically significant decline. They also noted the prevalence of suicidal ideation to be around 5.8%. The number of students seeking treatment was around 13%. The reasons are likely to be multifaceted but may include poor awareness of their psychological health, a poor understanding of depression's treatability, or moreover, an increased perception of stigma, both from oneself and from external parties.

### Burnout

There are questions about the definitions of burnout.[10] Bhugra et al., in their survey report, high rates of burnout, which raises the possibility that different things maybe being measured.

From Minnesota, Dyrbye et al.[3] reported that the frequency of burnout increased throughout the years of medical school up to 45%. Similarly, high rates have been reported from other countries such as Hong Kong[11] and Turkey[12] indicating that this may be a major problem which is more recent as earlier observations reported by Dyrbye et al.[3] indicated absence of burnout. It is, therefore, important to explore and understand the possible reasons for such an increase. High rates have been reported among interns[13] and females[14] and doctors.[10]

A recent study stated that students that drop out of medical school probably have a higher level of depressive symptoms.[15] Depression is caused by multiple factors.[16],[17],[18] Medical students may have some additional factors at play. Among Pakistani medical students with a small sample, Rab et al.[19] found that being female, living in university dorms, experiencing adverse life events, and having fewer friends were all associated with depression. This may explain cultural differences in gender roles and gender role expectations. Akterkin et al.[12] found that inadequate social activity similar to that of Rab et al.[19] may lead to the development of psychological symptoms. Religion has been shown to be a protective factor.[20]

Studies from many countries including China,[21] India,[22],[23] Pakistan,[24] USA,[25] Canada,[26] Serbia,[27] Ireland[28] Turkey and Austria,[29] Egypt,[30] Norway,[31] Nepal,[32] South Africa[33] and Singapore[34] show remarkably similar findings and causes for both psychiatric disorders such as anxiety, depression, etc., but also for suicidal thoughts, self-harm and suicide. From mainland China, Sobowale et al.[21] found that 13.5% of students had moderate to severe depression and 7.5% reported suicidal ideation. One-third of students with depression had suicidal ideation. There were no differences between the different years of the study. These authors followed the survey up by qualitative approaches using focus groups and found that student counseling services were available only off-site, and the curricula had no accounts of well-being. About 39% of medical students in one medical school had depression case-ness, and there was no difference between pre-clinical and clinical years. However, 26% reported burnout in the pre-clinical year, but this went up to 35% in the clinical year. Burnout scores were strongly correlated with depression, indicating that emotional exhaustion and academic efficacy were linked as was the willingness to seek help.[28] Fan et al.[34] from Singapore also found that rates of depression and suicidal ideation were significantly increased in the 2nd-year medical students in comparison with the 1st-year medical students. These were also higher among students of lower socioeconomic status

who had physical symptoms such as non-inflammatory joint pain, headaches, and sleep disorders, and high rates of suicidal ideation. It is difficult to know whether these physical symptoms were psychosomatic. These have also been reported from Brazil[35] In an unusual and interesting approach in the USA, Hays et al.[36] conducted psychological autopsy using telephone interviews with a representative from each U.S. medical school, generally the dean of student affairs. In the manner of conducting a psychological autopsy, if a suicide had occurred, these authors collected information on demographic characteristics, psychiatric or substance abuse history, means suicide, month, and the presence of a suicide note was obtained. They managed to get information from 101 (80%) of the 126 U.S. medical schools. 15 suicides by medical students were reported in the period from August 1989 through May 1994 and 14 of these were men. Six suicides occurred in the 3rd year of medical school, and four in the 4th year. Six students had left suicide notes, and nine of 13 had psychiatric histories.

### Suicide and Attempted Suicide

Menon et al.[22] reported from an Indian medical school that unsurprisingly men were scoring higher in risk-taking, and women were scoring significantly higher levels of the perceived stress scale. Among women, 23.4% reported high stress, 63.5% had moderate stress, and only a small proportion of 13.1% reported low stress. Among men, these figures were 11.1%, 68.6%, and 20.3%, respectively significant differences. Osama et al.[23] from Pakistan reported on a cross-sectional survey on suicidal ideation. About 35.6% students had suicidal ideation the previous year with 13.9% of all the students having made a plan in their lifetime to commit suicide; 4.8% attempted suicide at some point in time in their life. More females than males and more 1st year students were likely to have these thoughts. Substance abuse, parental neglect, and previous psychiatric disorder were important factors. These are indeed very worrying findings because Islam proscribes suicide and suicidal acts are illegal in Pakistan: this may lead to under estimated numbers of suicides in these countries. In a cross-cultural comparison between Austrian and Turkish medical students, Eskin et al.[29] found that more Austrian (37.8%) than Turkish (27.3%) students reported lifetime, past 12-month, or current suicidal ideation, while more Turkish (6.4%) than Austrian (2.2%) students reported lifetime or past 12-month suicide attempts. Not surprisingly, Austrian students had more permissive and liberal attitudes toward suicide, while in line with their religious and cultural values, those of Turkish students were more rejecting. Paradoxically and interestingly, attitudes of Turkish medical students toward an imagined suicidal close friend were more accepting and supportive, which may reflect the impact of a sociocentric culture in comparison with that of the Austrian medical students.

Although an old study, the work of Okasha et al.[30] from Egypt is of interest due to the country's Muslim majority, where suicide is proscribed by religion. They observed that of their 516 final year medical students, 12.6% had reported some degree of suicidal feelings during the previous year. Interestingly and unusually these authors explored the intensity of suicidal feelings and noted that in 5.6% of the participants the maximum intensity was only a feeling that life was not worthwhile whereas 4% had thought of taking their life, 0.9% had seriously considered suicide or made plans, and 0.4% had made an actual suicide attempt. Those who had experienced suicidal feelings in the past year were more likely to have also had more minor psychiatric symptoms, particularly of depression, and had experienced more stressful events and somatic illness. From Nepal - a Hindu predominant country, Adhikari et al.[32] reported that medical student samples in their study showed high rates of psychiatric disorders. The prevalence rates were 29.2%

depression, 22.4% somatic symptoms, 4.1% panic disorder, 5.8% other anxiety disorders, 5% binge eating disorder, and 1.2% bulimia nervosa. These are interesting findings in that often rates of eating disorders are quite low in low-income countries. However, they observed that 4.7% of medical students had seriously considered committing suicide, and 15% reported the use of marijuana during medical school. It is not clear whether they were using marijuana as a calming/anti-anxiety agent.

Van Niekerk et al.[33] from their sample of medical students in three universities in South Africa found much higher rates of suicide at 32.3% and suicidal attempt at 6.9%. Suicidal ideation had a strong association with suicidal attempt, and its importance is emphasised by the finding that 50% of planned attempts occur within 1 year of suicidal ideation. They noted that as in many other studies, previous diagnosis of depression or psychiatric disorders, use of mood-enhancing medication, and symptoms of decreased life satisfaction and burnout were likely to contribute to both the ideation and attempted suicide. They caution that as they did not explore the timing of suicidal ideation and assert the role of medical school deserves further detailed attention. They recommend that the regulatory body's National Strategy on Impaired Providers, which emphasizes early identification of impaired students, and encourages preventive measures by training institutions, needs more and wider discussion. In addition, they suggest that training institutions must take on the responsibility of looking after student needs, especially in the areas of workload, relaxation, social adaptation, personal and financial matters, as well as provide adequate counseling.

Similar findings in relation to depression have been reported from Serbia where Miletic et al.[27] found that among Serbian medical students too, there was a correlation between symptoms and severity of depression and grade point average, age, relationship status, and gender. Reported history of suicide attempts was associated with levels of depression, grade point average, relationship status, gender, history of mental illness and drug use. They too note that as medical school students in Serbia may be "at-risk," preventative programs in the future should target symptoms of depression and should provide students with adequate mechanisms to cope successfully with school-related pressure. Alternative stress management strategies may also be useful, especially for younger students who seem to be at greater risk for depression and suicide.

From Canada, Zivanovic et al.[26] reported that from 16 medical schools that responded, six suicides among medical students had occurred, of which half were female. Thus, the estimated cause-specific mortality rate was 5.9–8.7/100,000 medical students/year. In a recent study from one medical school in Canada, Wilkes et al.[37] reported that a quarter (26%) of the students had been diagnosed with a mental health condition before medical school, while over one third (36%) reported currently seeing a professional regarding their mental ill-health, with anxiety disorders forming the most commonly reported conditions. A vast majority (83%) reported their studies as a significant source of stress. Although the number of students was small, these are indeed worrying findings.

Cheng et al.[38] in a national survey of suicide among medical students contacted all the medical schools in the USA. They found that between July 2006 and June 2011, a total of six suicides (four males, two females; five Caucasians, one Asian) had occurred with two deaths by suicide occurring in each of the first 3 years. Method used included gunshots in 2 cases, hanging in 2 and overdose in one. The method for the sixth suicide was not clear and only half had left a suicide

note. In cross-sectional and cohort studies.

In the National Mental Health Survey of Doctors and Medical Students (2013/2019)[39] from Australia, female medical students reported higher rates of minor psychiatric morbidity (47.2%) compared with 35.9% males. Indigenous medical students reported higher rates. 8.2% reported current depression compared to 6.2% in the general population, and lifetime prevalence was 18.2% again higher than the general population. More students than doctors were classified as having a high likelihood of a minor psychiatric disorder (43.0% and 27.2%, respectively). Reported anxiety diagnoses, both current and ever, were also higher in medical students than the general population. Students in rural areas had higher rates of anxiety. This report cautions that this variation may be due to differences in the survey question wording. 3.4% of male students and 4.6% of female students had attempted suicide previously. In the same survey, females also reported a slightly higher rate of burnout in all three domains (emotional exhaustion: 57.1%, cynicism: 26.4%, low professional efficacy: 31.2%) compared to male students (emotional exhaustion: 44.2%, cynicism: 24.4%, low professional efficacy: 25.6%). It is possible that some of these differences are due to variations in the year of training, as well as levels of professional efficacy between clinical and pre-clinical students may reflect differences in exposure to a professional setting. Only 18.7% of medical students felt comfortable seeking help for depression or anxiety. The explanations for not seeking help included embarrassment (50.3%) and concerns regarding lack of confidentiality or privacy (49.9%). A large proportion of students indicated that they did not want help from others (47.7%). Few students identified that difficulty identifying symptoms of mental health conditions posed a barrier to seeking help (14.2%). These reasons may be due to stigma, both external and internal (National Mental Health Survey of Doctors and Medical Students 2013/2019).[38] The reasons for stress included financial problems, the conflict between personal and professional activities, training stress, work-related burnout, and depressive symptoms.

Ragging among medical students was evaluated in a cross-sectional study of 149 medical students in Brazil,[40] and not surprisingly, there were key differences between two sexes. Males were generally ragged more often and also perhaps more aggressively, which may mean that ragging could be a significant stressor and an etiological factor of psychological diseases in males, but this needs to be explored. Similar findings have been reported from other parts of Brazil.[35] Ragging is practised all over the world, with different nomenclature like hazing, fagging; bapteme in French; doop in Dutch; and Mopokaste in Finnish.[41] It is difficult to explore the exact prevalence, but in some countries like India, it has caused attention by the authorities[42] and in many colleges, it is banned but carries on regardless. This finding was expected as medical students who live socially isolated social lives[42] confine their social activities and have difficulty in making friends have been linked to the presence of a common mental disorder.[43] Qualitative studies are needed to explore in detail various vulnerability factors to explore pre-morbid personality and predisposing factors. It has been shown that academic stress[44] is a cause and interventions to reduce this have been shown to improve mental state.[45]

### Suicidal Ideation

The Australian survey mentioned above also reported that the number of attempted suicides was high compared to rates reported by the general population. Suicidal ideation was reported by 17.1% of male medical students and 20.5% of female medical students compared with 1.9% and 2.7% Australian population. Coentre and Góis[46] rightly suggest that various factors related to medical school admission

procedures which are extremely competitive and medical school environments (teaching and learning both) are extremely stressful. These, in addition to other vulnerabilities, may well contribute to feelings of burnout, stress, distress, and suicidal ideation, which often in an impulsive act, can lead to self-harm. After conducting a systematic review, these authors report that the prevalence of suicidal ideation ranged from 1.8% to 53.6%. The range is certainly worrying. Not surprisingly, commonest associated factors were related to depression, history of a psychiatric disorder, lower socioeconomic status/financial difficulties, history of drug use, and experiencing parental neglect. Clearly, it is important to focus on intervention, but prevention and peer support in non-stigmatizing ways is of paramount importance. Schwenk et al.[47] assessed experiences of stigma by medical students who were depressed and comparing these with those who were not. They found that 14.3% students self-reported moderate to severe depression and not surprisingly in line with previous observations; women were more likely to report moderate to severe depression (18.0% vs. 9.0%). Third- and fourth-year students were more likely than 1st- and 2nd-year counterparts to report suicidal ideation (7.9% vs. 1.4%). Similar findings have been reported from Brazil.[35] There is no doubt that self-stigma plays an important role in recognizing symptoms and opening up about them to friends and family and then to the medical profession, whether it is a primary care physician or a specialist. Schwenk et al.[47] found that 56% had a degree of self-stigma, and in line with other studies, men had more negative perceptions than women. Furthermore, 1st- and 2nd-year students felt that that seeking help for depression would make them feel less intelligent in comparison with 3rd- and 4th-year students.

Dyrbye et al.[9],[25] assessed the frequency of suicidal ideation among medical students and explore its relationship with burnout. With over 4200 students from 7 medical schools, they reported burnout in 49.6% of students, with 11.2% reporting suicidal ideation within the past year. Using multivariable analysis, burnout, and low mental quality of life at baseline were seen as independent predictors of suicidal ideation over the following year. Interestingly on follow-up, they found that 26.8% of burnout cases had recovered, which was related to lower levels of suicidal ideation.

From Norway, Tyssen et al.[31] assessed a sample of 522 medical students for prevalence and predictors of suicidal ideation among medical students and young doctors. The participants were re-examined after the first postgraduate year, comparing prevalence of suicidal thoughts and attempts, perceived study stress, job stress, and personality. They reported that the prevalence of suicidal thoughts was 14% at both points of time. The lifetime prevalence was 43%, while 8% had planned suicide, and 1.4% had attempted suicide. The predictive factors for suicidal ideation included feelings of isolation, a sense of the lack of control, some personality traits, being single and not surprisingly negative life events and anxiety and depression. In the first postgraduate year, mental distress was the most important predictor, but before controlling for this variable, job stress, vulnerability (neuroticism), single status, and less working hours were independent predictors. They noted that levels of suicidal ideation were high, but the rates of actual self-harm were low.

Dyrbye et al.[15] explored in details prevalence of various forms of psychological distress in medical students in the USA and concluded that a vast majority (82%) of medical students had at least one form of distress with more than half (58%) having three or more forms of distress. These authors report a dose-response relationship between the number of manifestations of distress and recent suicidal ideation or serious thoughts of dropping out. For example, students with 2,

4, or 6 forms of distress were 5, 15, and 24-fold, respectively, more likely to have suicidal ideation in comparison with those who had no distress. The note that all forms of distress were independently associated with suicidal ideation or serious thoughts of dropping out on multivariable analysis. It is important to understand these stressors so that when designing prevention programs and intervention strategies, these can be taken into account.

### What Next?

Three levels of responses are needed to tackle ever-increasing problems of burnout, suicidal ideation, and suicidal behavior. At an institutional level, it is critical that those who need help get it promptly, appropriately, and in a sensitive and non-stigmatizing manner.[48] Training must include steps on looking after oneself, and also institutions need to ensure that structures for training are not stressful. At an individual level, students and trainees need to learn about how to look after themselves and their well-being. It is crucial that looking after oneself under stress should be a key part of the curriculum. The third level of regulation must look at support systems for those who need it.

### Conclusions

Although rates of burnout and suicidal ideation vary across studies and medical schools, there is little doubt that these are worrisome. Reasons for these vary according to age, year of medical school, support systems, and stressors, both acute and long term. The challenge for teachers and trainers is to help identify those who need help at an early stage and arrange for prompt, culturally appropriate interventions that will be both acceptable and accessible to medical students. As most medical students are in a psychologically vulnerable age group, perhaps more prone to develop common mental disorders, they deserve proactive support and preventive strategies, which will enable them to go on to learn and flourish in the medical field. This scope of this paper has not included the issues of drug and substance misuse among students, with these areas demanding further investigation.

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### Conflicts of interest

There are no conflicts of interest.

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