

Stress Among Medical Students Around the World: A Global Review of Prevalence, Risk Factors, And Consequences

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Abstract

Medical education is widely recognized as a demanding academic and professional environment that may negatively affect students' psychological well-being. Medical students are exposed to multiple potential stressors, including intensive academic workloads, examinations, clinical responsibilities, sleep disturbances, financial concerns, interpersonal difficulties, and uncertainty regarding their future careers. Evidence from systematic reviews and meta-analyses indicates that anxiety, depression, psychological distress, and burnout are common among medical students worldwide. A global meta-analysis of 69 studies involving 40,348 medical students estimated the prevalence of anxiety at 33.8% (95% CI: 29.2–38.7%). Similarly, a systematic review and meta-analysis including 167 cross-sectional studies and 116,628 medical students reported a pooled prevalence of depression or depressive symptoms of 27.2% (95% CI: 24.7–29.9%). Suicidal ideation was identified in 11.1% of students across 24 cross-sectional studies involving 21,002 participants.

The burden of psychological distress varies considerably between studies because of differences in geographical location, academic stage, assessment instruments, definitions, and study methodology. Academic pressure, clinical exposure, inadequate sleep, limited social support, and difficulties accessing mental-health services are repeatedly identified as important contributors. The COVID-19 pandemic further intensified several of these challenges. This review summarizes current evidence regarding the global burden of stress and related psychological problems among medical students and discusses major risk factors, consequences, and possible institutional strategies for prevention and support.

Keywords: Medical students; stress; psychological distress; anxiety; depression; burnout; medical education; mental health; prevalence.

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1. Introduction

Medical education represents a prolonged period of intensive academic, clinical, and professional development. Students are expected to acquire large amounts of theoretical knowledge while simultaneously developing practical and interpersonal skills necessary for future clinical practice. This combination creates a demanding educational environment in which psychological stress may

become an important health and educational concern.

Depressive symptoms are also common. Rotenstein et al. conducted a systematic review and meta-analysis involving medical students from 43 countries. Across 167 cross-sectional studies including 116,628 participants, the pooled prevalence of depression or depressive symptoms was 27.2% (95% CI: 24.7–29.9%).²

These findings demonstrate that psychological distress among medical students is an international public-health and medical-education concern rather than an isolated problem.

The aim of this review is to summarize evidence regarding stress and related psychological problems among medical students worldwide, with particular attention to prevalence, major contributing factors, consequences, and potential strategies for prevention and support. The objectives are to summarize evidence regarding psychological stress among medical students worldwide, examine the prevalence of anxiety and depressive symptoms, identify major academic, clinical, social, and lifestyle-related stressors, discuss the relationship between stress, anxiety, depression, and burnout, examine potential consequences of psychological distress, and identify strategies that medical schools can use to improve student well-being.

2. Methods

This article was developed as a narrative global review informed by previously published systematic reviews, meta-analyses, and peer-reviewed studies concerning stress and psychological well-being among medical students.

A narrative review approach was selected because published studies differ substantially in their definitions of stress, assessment instruments, populations, geographical settings, and outcome measures. Therefore, directly combining prevalence estimates from heterogeneous primary studies would risk producing misleading conclusions.

Relevant literature was identified primarily through PubMed-indexed systematic reviews, meta-analyses, and major peer-reviewed studies addressing medical student stress, anxiety, depression, psychological distress, burnout, and related outcomes. Important evidence included systematic reviews by Dyrbye et al., Rotenstein et al., and Quek et al., as well as literature addressing burnout, quality of life, and interventions in medical education.^{1–6}

Literature was considered relevant when it examined medical students or medical trainees; investigated stress, anxiety, depression, burnout, psychological distress, or related mental-health outcomes; reported prevalence estimates, associated factors, consequences, or interventions; was published in a peer-reviewed scientific journal; and used a systematic review, meta-analysis, longitudinal, or cross-sectional research design.

Because of substantial methodological heterogeneity between studies, findings were synthesized narratively

rather than combined into a new pooled estimate. Particular attention was given to systematic reviews and meta-analyses because these provide higher-level evidence regarding prevalence and associated factors.

3. Results and Discussion

Available evidence demonstrates a substantial burden of psychological distress among medical students worldwide.

The strongest global evidence concerns anxiety and depression. Quek et al. conducted a systematic review and meta-analysis of 69 studies involving 40,348 medical students. The pooled prevalence of anxiety was 33.8% (95% CI: 29.2–38.7%). The authors reported that anxiety was particularly prevalent among students from the Middle East and Asia.¹

Evidence concerning depression is similarly concerning. Rotenstein et al. analyzed 167 cross-sectional studies involving 116,628 medical students from 43 countries. The pooled crude prevalence of depression or depressive symptoms was 27.2% (95% CI: 24.7–29.9%).²

Importantly, the prevalence estimates should not be interpreted as a single universal prevalence for all medical students. Considerable heterogeneity exists because studies use different screening instruments, diagnostic thresholds, populations, and time periods.²

Depression represents one of the most extensively investigated mental-health outcomes in medical students. The systematic review by Rotenstein et al. found a pooled prevalence of 27.2% for depression or depressive symptoms. The review also demonstrated that depressive symptoms may increase during medical education. Among nine longitudinal studies involving 2,432 students, the median absolute increase in depressive symptoms during medical school was 13.5%.²

Suicidal ideation represents a particularly serious consequence of psychological distress. In the same review, data from 24 cross-sectional studies involving 21,002 medical students from 15 countries produced a pooled prevalence of suicidal ideation of 11.1% (95% CI: 9.0–13.7%).²

These findings highlight the importance of early identification and appropriate mental-health support within medical education.

Anxiety is another major psychological problem among medical students. The global meta-analysis by Quek et al. included 69 studies and 40,348 medical students and

estimated an overall anxiety prevalence of 33.8%. The study found substantial geographical variation, with higher prevalence reported in several Middle Eastern and Asian populations.¹

The authors also emphasized that approximately one in three medical students worldwide experienced anxiety, demonstrating the importance of systematic mental-health screening and accessible support services.¹ However, prevalence estimates should be interpreted carefully because most included studies assessed symptoms using screening questionnaires rather than formal psychiatric diagnoses.

Academic demands are among the most consistently reported sources of stress. Medical students must manage large volumes of information, frequent examinations, competitive academic environments, and high expectations regarding academic performance. These pressures may be intensified by fear of failure and concerns about future residency or career opportunities.^{3,4}

Earlier systematic reviews have identified academic workload and examination-related pressure among important contributors to medical student distress.³ Academic stress may also interact with other factors. For example, prolonged studying can reduce sleep and physical activity, while poor sleep can negatively affect concentration, mood, and academic performance.

The transition from classroom-based education to clinical environments introduces additional sources of stress. During clinical training, students may experience responsibility for patient care, fear of making mistakes, communication difficulties with patients and healthcare professionals, exposure to pain, illness, and death, uncertainty regarding clinical competence, demanding clinical schedules, and hierarchical relationships within healthcare teams. These experiences may produce emotional distress, particularly when students perceive inadequate supervision or limited opportunities to discuss difficult clinical experiences.^{3,7} Medical education therefore requires not only academic support but also appropriate clinical supervision and psychologically safe learning environments.

Sleep disturbance is an important component of medical student well-being. Long study hours, examinations, clinical duties, and irregular schedules can interfere with normal sleep patterns. Sleep deprivation may subsequently affect concentration, emotional regulation, academic performance, and psychological health.

The relationship between lifestyle factors and psychological well-being has been repeatedly described in research on medical student distress.^{3,8} Consequently, interventions aimed at improving student well-being should not focus exclusively on individual coping skills. Structural factors within the educational environment should also be addressed.

Medical students may also experience stress associated with family relationships, social isolation, financial difficulties, and uncertainty about their future. Relocation away from family, reduced time for social activities, and difficulty maintaining relationships can decrease social support. Financial pressure may further increase psychological burden.

Quality-of-life research among medical students has emphasized the importance of balancing academic demands with personal and social life.⁹ The interaction between personal and educational stressors is important. Students who have limited social support may have fewer resources for coping with academic and clinical difficulties.

Burnout is another important aspect of medical student well-being. It is generally characterized by emotional exhaustion, depersonalization or cynicism, and reduced sense of personal accomplishment. Although burnout is conceptually distinct from depression and anxiety, the conditions may coexist and influence one another.^{5,6}

Earlier systematic reviews have documented substantial burnout among medical students, while subsequent research has emphasized the importance of learning environments and institutional factors in student well-being.^{5,10} Importantly, burnout should not be viewed solely as an individual failure to cope. Excessive workload, lack of autonomy, poor learning environments, and insufficient institutional support may contribute to burnout.

Stress, anxiety, depression, and burnout frequently occur in overlapping contexts. Academic stress may contribute to sleep disturbance and emotional exhaustion. Persistent emotional exhaustion may subsequently increase vulnerability to anxiety and depressive symptoms. At the same time, students experiencing depression or anxiety may find academic and clinical demands more difficult to manage, potentially creating a reinforcing cycle.

However, these concepts should not be treated as interchangeable. Stress is a broad response to demanding circumstances, whereas anxiety and depression represent specific psychological syndromes or symptom complexes. Burnout is generally conceptualized as an educational or

occupational phenomenon involving exhaustion and reduced professional efficacy. Maintaining these distinctions is essential when interpreting prevalence estimates across studies.

The prevalence of psychological symptoms varies considerably between countries and regions. For example, the global anxiety meta-analysis found higher prevalence estimates in several Middle Eastern and Asian populations.¹ However, geographical differences cannot automatically be interpreted as evidence that students in one region are intrinsically more vulnerable. Differences in educational systems, cultural attitudes toward mental health, socioeconomic conditions, academic expectations, healthcare access, and measurement instruments may all influence reported prevalence.

Methodological heterogeneity is particularly important. Studies may use different questionnaires, cutoff scores, sample sizes, academic years, and definitions of anxiety, depression, stress, or burnout. Therefore, comparisons between individual studies should be made cautiously.²

The evidence reviewed indicates that psychological distress is a substantial concern within medical education worldwide. The strongest quantitative evidence demonstrates significant levels of anxiety and depressive symptoms. Approximately one-third of medical students were estimated to experience anxiety in the global meta-analysis by Quek et al., while more than one-quarter screened positive for depression or depressive symptoms in the large systematic review by Rotenstein et al.^{1,2}

These findings suggest that medical schools should treat student mental health as an integral component of educational quality rather than as an issue limited to a small subgroup of students.

At the same time, prevalence estimates should not be interpreted without considering methodological limitations. Many studies use self-report screening instruments rather than clinical diagnostic interviews. Different questionnaires may produce substantially different estimates, and the cross-sectional nature of many studies limits conclusions regarding causality.

The relationship between medical education and psychological distress is therefore likely to be multifactorial. Academic pressure, clinical responsibility, sleep disruption, financial difficulties, social isolation, and uncertainty regarding future careers may interact rather than operate independently.^{3,4}

Medical schools can address student psychological distress through both individual-level and institutional interventions. Confidential counseling and mental-health services should be easily accessible to students. Screening for depression, anxiety, and severe psychological distress may help identify students who require further assessment. Excessive workload, unnecessary administrative demands, and poorly organized curricula should be evaluated. Students experiencing academic difficulties should have access to tutoring, mentoring, and structured academic assistance. Appropriate supervision and constructive feedback may reduce anxiety associated with clinical responsibilities. Students should be encouraged to maintain adequate sleep, physical activity, nutrition, and social connection. Medical schools should create environments in which seeking psychological support is considered a normal component of professional development. Faculty members should be able to recognize signs of significant distress and appropriately refer students for professional help.

Evidence suggests that interventions targeting the learning environment and organizational factors may improve medical student well-being.^{10,11}

This review has several limitations. First, the published literature demonstrates substantial methodological heterogeneity. Studies use different instruments and diagnostic thresholds to measure stress, anxiety, depression, and burnout. Second, many studies are cross-sectional, meaning that causal relationships between medical education and psychological distress cannot be established definitively. Third, self-reported symptoms do not necessarily correspond to clinically diagnosed psychiatric disorders. Fourth, prevalence estimates may differ according to geographical region, academic year, cultural context, and time period. Finally, because this article is a narrative synthesis of established systematic reviews and meta-analyses rather than a newly conducted systematic review with an independently generated PRISMA flow diagram, it should not claim a new number of included studies or participants unless a complete database search and screening process is subsequently performed.

5. Conclusion

Psychological distress represents an important global concern among medical students. Evidence from large systematic reviews and meta-analyses demonstrates substantial levels of anxiety and depressive symptoms among medical students worldwide. A global meta-analysis estimated anxiety prevalence at 33.8%, while a large systematic review estimated depression or depressive

symptom prevalence at 27.2%. Suicidal ideation was reported in approximately 11.1% of medical students in the relevant pooled analysis.^{1,2}

The causes of distress are multifactorial and include academic pressure, clinical responsibilities, sleep disturbance, social and financial difficulties, and challenges within the learning environment.

Medical schools therefore have an important responsibility to establish supportive educational environments, provide accessible mental-health services, reduce unnecessary sources of academic stress, and promote a culture in which seeking psychological support is accepted rather than stigmatized.

Future research should prioritize longitudinal and multicenter studies using standardized assessment instruments. Such research would allow better understanding of how psychological well-being changes throughout medical education and which institutional interventions are most effective in preventing long-term psychological harm.

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