



Literature Review

Mental Health of Medical Students: A Bibliometric Analysis with Scopus Indexation

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ABSTRACT

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Keywords: Anxiety Burnout Depression Medical students Mental health Medical students are particularly susceptible to mental health challenges arising from academic pressure, clinical demands, and social expectations, which contribute to high rates of anxiety, depression, and burnout that jeopardize both well-being and professional performance; consequently, this study aimed to map the global research landscape on medical student mental health by conducting a bibliometric analysis of Scopus-indexed publications from 2013 to 2023 using a systematic search with keywords such as "medical student," "mental health," "depression," "anxiety," and "burnout," followed by the extraction of metadata including titles, abstracts, authors, keywords, journals, and institutions, and subsequent analysis with VOS viewer software to visualize publication trends, collaboration networks, and research hotspots; the analysis of 7,126 publications revealed that "depression," "anxiety," and "burnout" were the most frequent keywords, identified key global collaborators, and indicated a surge in research activity during the COVID-19 pandemic, ultimately underscoring the increasing attention to mental health issues among medical students and highlighting the need for targeted interventions such as curriculum reform, enhanced mental health support programs, and resilience training to inform future research and guide policylevel strategies.

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INTRODUCTION

The mental health of medical students has become a crucial issue that requires serious attention within the academic and healthcare communities ¹. Medical students are a group uniquely exposed to high academic pressure, intense clinical demands, and great social and personal expectations ². This condition makes them more vulnerable to various mental health

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disorders, such as anxiety, depression, and burnout. Previous studies have shown that the prevalence of mental disorders among medical students is higher compared to the general population or students from other disciplines ³⁻⁶. El-Gabry et al.'s study revealed a significant prevalence of mental illness and burnout among a population that would serve as the foundation of the healthcare system in the future. The high rate of mental disorders among medical students not only negatively impacts their individual well-being, but can also affect their future academic and professional performance, as well as the quality of healthcare they provide as future medical personnel ⁷.

This problem creates an urgent need for a deeper understanding of the dynamics of medical students' mental health. One approach that can be used to address this need is through bibliometric analysis, which allows researchers to map and analyze the development of scientific literature in this field. By utilizing data from Scopus, one of the largest and most credible bibliographic databases, bibliometric analysis can provide insights into research trends, the most studied topics, and collaborations between researchers and institutions. This study seeks to answer key questions regarding how research on medical student mental health has evolved, who are the main actors in this field, and what topics require further attention in the future.

The purpose of this study is to conduct a bibliometric analysis of Scopus-indexed medical student mental health-focused literature. This research will identify the number of publications, topic trends, and collaboration networks between researchers and institutions. Thus, it is hoped that this study will provide a comprehensive picture of the research landscape in the field of medical student mental health, which can inform the development of more effective policies and interventions.

METHOD

A systematic review was conducted to analyse the mental health of medical students based on scientific publications indexed in the Scopus database. The study population consisted of all relevant publications, including journal articles, reviews, and conference papers published between 2013 and 2023. A purposive sampling technique was applied, selecting studies that contained specific keywords related to medical student mental health in their title, abstract, or keywords and were published in reputable Scopus-indexed journals.

Data collection was performed using a systematic search strategy in the Scopus database with a combination of keywords: "medical student" AND "mental health" OR "depression" OR "anxiety" OR "burnout". Metadata such as title, author, abstract, keywords, journal, publication year, and institutional affiliation were extracted and stored in a structured format. The data underwent a cleaning process to remove duplicates and irrelevant records before further analysis. The study employed a descriptive research design with a bibliometric approach, focusing on research trends, author collaborations, institutional affiliations, and citation patterns related to medical student mental health. The research procedure consisted of five key stages: (1) defining inclusion and exclusion criteria, (2) systematic data collection, (3) data cleaning and categorization, (4) bibliometric analysis of publication trends and collaborative networks, and (5) interpretation and report preparation.

For data analysis, VOS viewer was used to map research dynamics, including publication trends, geographic distribution of authors, author and institutional collaboration networks, and

thematic evolution of research topics over time. The findings provide insights into the development of research in this field and highlight potential gaps for future studies.

RESULTS

Keywords used "Medical student" AND ("mental health" OR "depression" OR "anxiety" OR "burnout"), years 2013-2024, total articles 7,126



Figure 1. a) Document by Number, b) Document by Country, c) Documents by Author

Collaboration of Co-authorship

The visualization of figure 2 illustrates a well-established network of collaborations in the field of medical student mental health, with several central figures who are key drivers in this research. Figure 2 shows several different groups or clusters of researchers. Each cluster is

represented by a different color, reflecting the network of collaboration between researchers. Names such as Andrew Molodynski, Dinesh Bhugra and Antonio Ventriglio appear as central figures in their respective clusters, signifying their role as highly connected authors in the research.



Figure 2. Collaboration Co-authorship

The relationships between researchers in this visualization show the close interconnections between some figures, such as Andrew Molodynski and Dinesh Bhugra, who collaborate with others such as Sarah Marie Farrell and Murtaza Kadhum. Researchers with larger nodes, such as Andrew Molodynski and Dinesh Bhugra, demonstrate their central role in this network, which could mean being frequently cited authors or collaborating with many other researchers.



Figure 3. The Most frequent Keyword

Figure 3 shows the visualization from VOS-viewer displays a network of keywords that frequently appear in the literature on the topic of mental health in medical students. Dominant

and central keywords, such as "human," "students, medical," "depression," and "burnout," indicate major themes in the research. The word "human" seems to be the central focus, indicating that most of the research leads to human-centered issues, specifically medical students as the subject of study. On the other hand, the terms "students, medical" and "medical students" make it clear that this group is the main population under study, while words like "depression"^{4,8} and "burnout" ^{11–13}.



Figure 4. The Co-citation Network

Figure 4 shows the visualization displays the co-citation network between various researchers in the mental health field, particularly relevant to students or medical professionals. Co-citation occurs when two authors or scholarly works are cited together in another publication, indicating that they are considered relevant or have significant influence on the same topic. In this visualization, Dyrbye L.N. appears to be the central figure with large, yellow nodes, indicating that his work is often co-cited with other researchers on related topics, such as stress, burnout and well-being in medical education settings.



Figure 5. The Map of Keyword Destiny

Figure 5 shows the visualization displays a map of the keyword density that frequently appears in research related to medical student mental health. The most prominent keywords, shown in bright yellow such as "quality," "education," "attitude," "knowledge," and "efficacy," indicate that these themes are frequently discussed and have high relevance in the relevant literature. This suggests a research focus on the quality of education, students' attitudes towards mental health, knowledge, and the efficacy of various approaches in addressing mental health issues among medical students ^{10,14–16}.

DISCUSSION

Based on 7,117 articles from 2013-2024, this study covers a broad exploration of the mental health of medical students. From the visualization provided, it can be seen that collaboration between researchers is important in addressing this issue globally. This research is of high significance as it presents data to understand the unique pressures medical students face and offers solutions that educational institutions can implement to support student mental health.

Main Topics of Research

Keywords such as "mental health", "depression", "anxiety", and "burnout" indicate a primary focus on the mental health aspects faced by medical students ^{11,13,17,18}. This is relevant given the academic pressures, high expectations, and competitive environment that medical students often experience. The main focus of this study is the causative factors, prevalence, mental

health impact, and coping strategies to reduce stress levels and the risk of mental disorders in medical students.

Trends and Increase in Research Interest

During the period 2013-2024, there has been an increase in interest in this topic. The increase may be due to the change in public perception of mental health, which makes this topic more frequently discussed and researched. In addition, it is due to the COVID-19 pandemic that has worsened mental conditions and increased awareness of mental health, especially among college students who are facing academic challenges and social isolation ¹⁹⁻²². Research from recent years will most likely show a spike in issues related to burnout, isolation, and challenges in online learning during the pandemic.

Interventions and Treatment Strategies

Given the large number of articles, some of these studies may focus on strategies to reduce burnout and improve mental health ²³, such as mindfulness-based interventions, psychological support programs, coping skills training, and changes in the medical education curriculum. Interventions such as counseling, peer support, academic load cuts, and resilience training programs may also be the focus of research to help students overcome mental challenges during medical education.

Role of Educational Institutions

Some articles may explore the role of medical schools in creating a supportive environment for mental health ²⁴, including policies to reduce academic stress and provide adequate mental health services ²⁵⁻²⁷. These articles may offer recommendations to educational institutions to build a positive mental health culture and reduce stigma against students seeking psychological help.

Burnout as a Profession-Related Topic

Burnout among medical students is a pressing concern, with long-term implications for their well-being and professional development. Our bibliometric analysis confirms that burnout, alongside depression and anxiety, remains a dominant theme in current literature. This aligns with findings by Morcos et al., who identified excessive academic workload, poor work-life balance, financial stress, and high-stakes assessments as key contributors to student burnou ¹³. These stressors not only affect students' mental health during medical school but may also predict future

burnout as practicing physicians, highlighting the formative nature of medical education in shaping long-term work habits and coping mechanisms. Our findings contribute to this discussion by illustrating how the research community has increasingly recognized burnout as a systemic issue rather than an individual failing. In particular, the increased publication volume during the COVID-19 pandemic underscores how global crises intensify pre-existing stressors. The frequent co-occurrence of keywords such as "academic stress" and "resilience" in our analysis suggests a growing interest in protective factors, though intervention studies remain underrepresented. Additionally, the timing of anxiety episodes, often reported during the final stages of medical training, reflects a period of heightened pressure due to licensing exams, career uncertainty, and transition into clinical roles. These insights support the need for structural reforms in medical education and emphasize the importance of longitudinal mental health support beyond the academic setting.²⁸.

CONCLUSION

This bibliometric analysis reveals significant insights into the mental health challenges faced by medical students, highlighting their vulnerability to anxiety, depression, and burnout due to the unique pressures of medical training. The study emphasizes the global interconnectedness of researchers addressing these issues, with collaboration networks demonstrating diverse thematic focuses and geographic representations. Dominant themes include academic stress, risk factors, and coping mechanisms, with recent research emphasizing the exacerbation of mental health issues during the COVID-19 pandemic. The findings point to the urgent need for systemic interventions at institutional levels, such as integrating mental health education into medical curricula, promoting work-life balance, and establishing accessible and sustainable student support systems. These actions can help create healthier academic environments and reduce long-term psychological harm among future physicians.

The practical implications of this study are highly relevant for medical educators, administrators, and policymakers. Institutions should prioritize proactive mental health strategies, including early identification of at-risk students, peer-led support networks, mentorship programs, and policies that reduce academic overload. In addition, fostering a culture that destigmatizes mental health care is critical to improving help-seeking behaviors among students. By translating bibliometric insights into targeted institutional practices, medical schools can play a pivotal role in mitigating mental health risks and supporting the holistic development of their students.

However, this study has several limitations. As a bibliometric review, the analysis is based on metadata and publication trends rather than the content, quality, or methodological rigor of individual studies. The reliance on the Scopus database, while extensive, may have excluded relevant publications indexed in other platforms or written in non-English languages, introducing potential selection bias. Additionally, bibliometric tools such as VOSviewer are limited in their ability to assess deeper thematic nuances or cultural factors that influence mental health across different regions. These limitations suggest caution in generalizing findings without contextual interpretation.

Future research should address these gaps by incorporating mixed-method approaches that combine bibliometric analysis with qualitative content evaluation. Longitudinal studies examining the long-term impact of medical education on mental health, as well as interventionbased research assessing the efficacy of institutional reforms, are especially needed. Additionally, there is a noticeable underrepresentation of studies from low- and middle-income countries; increasing regional diversity in mental health research would enhance global relevance and equity in understanding and addressing the issue. Researchers should also explore emerging topics such as digital mental health interventions, mindfulness training, and resilience-building programs tailored specifically to medical students.

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Global Research Trends in Medical Students' Mental Health: A Bibliometric Perspective (Widea Rossi Desvita)

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