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# Exploring Physician Well-Being: A Bibliometric Analysis of Mental Health

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## Abstract

This bibliometric study examined the evolving research landscape on physician mental health from 2010 to 2023, analyzing key themes, publication trends, and global contributions. A total of 3,360 articles, including 3,137 original research and 223 reviews, were sourced from Web of Science and Scopus. Findings revealed a significant increase in research output, particularly during the COVID-19 pandemic, with burnout, depression, and anxiety emerging as dominant themes. The US accounted for most publications, while research from low- and middle-income countries remains limited, indicating a substantial global disparity. Thematic analysis highlighted variations in burnout assessment methodologies, underscoring the need for standardized evaluation tools. This study also identified systemic challenges, including excessive workload, hierarchical workplace structures, and inadequate institutional support, as major contributors to physician distress. Technological inefficiencies, particularly in electronic health record systems, exacerbated administrative burdens and physician dissatisfaction. Recommendations include developing standardized mental health assessment frameworks, expanding study in underrepresented regions, and implementing organizational policies to enhance physician well-being. This review provides critical insights for policymakers, healthcare institutions, and researchers, offering a foundation for targeted interventions and evidence-based reforms to improve physician mental health globally.

**Keywords:** burnout, COVID-19, mental health, physician, well-being

## Introduction

The physician profession has long been regarded as one of the most esteemed and fulfilling career paths. However, it is also associated with significant psychological stressors, many of which are unique to the profession, while others are common in high-pressure, highly specialized fields.<sup>1</sup> Mental health disorders, particularly burnout, depression, and anxiety, are widespread among physicians, with approximately 29% exhibiting depressive symptoms, up to 24% experiencing anxiety, and 4-16% suffering from post-traumatic stress disorder.<sup>1</sup> Suicide rates among physicians are disproportionately high, with male physicians in the United States facing a 40% increased risk.<sup>2</sup> In contrast, female physicians are nearly twice as likely to die by suicide compared to their non-physician counterparts.<sup>2</sup>

International data reflects this trend, with 25% of doctors in the United Kingdom reporting depressive symptoms and over 30% of Japanese physicians exhibiting severe burnout.<sup>3</sup> These alarming statistics have intensified the focus on physician well-being, prompting calls for comprehensive systemic reforms. The rising prevalence of mental health issues among physicians has drawn global attention, prompting major healthcare organizations to advocate for urgent reforms in physician training, workplace culture, and mental health support systems.<sup>4</sup> Physicians working in conflict zones face even greater psychological risks, including exposure to trauma, violence, and inadequate mental health resources.<sup>5</sup> Moreover, economic and cultural disparities further influence physician mental health, with doctors in lower-income countries often working under extreme resource constraints, while those in hierarchical work environments may experience higher levels of occupational stress and psychological distress.<sup>6</sup> These concerns extend beyond the altruistic goal of supporting physicians; they emphasize the essential role of physician well-being in maintaining an effective healthcare system.

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Beyond the medical field, mental health disorders are a growing global crisis, affecting over 450 million people worldwide, with projections indicating a sharp increase in disease burden in the coming decades.<sup>7</sup> These issues not only affect physical well-being but also have far-reaching social and economic implications.<sup>8</sup> In response, the 2013-2020 Mental Health Action Plan by the World Health Organization (WHO) outlines key objectives to mitigate mental illness-related morbidity and mortality.<sup>9</sup> These include promoting effective leadership for mental health, providing comprehensive care in community settings, implementing prevention strategies, and strengthening research and information systems. In Malaysia, for instance, mental health problems have risen significantly among adults, as indicated by the National Health and Morbidity Survey.<sup>10</sup> Various factors contribute to this trend, including biological, psychological, socioeconomic, and lifestyle elements.<sup>10</sup> Occupation-related stressors, particularly in high-demand, low-control jobs with inadequate support, are linked to adverse mental and physical health outcomes.<sup>10</sup>

Physicians, who often work in high-stress environments with heavy patient loads and long working hours, are at an increased risk of burnout, anxiety, and depression. A study indicates that physicians experience significantly higher levels of psychological distress compared to the general population, leading to adverse outcomes such as substance abuse and addiction.<sup>11</sup> These issues not only diminish physicians' quality of life and work performance but also compromise patient care and healthcare system efficiency.<sup>12</sup> The unique challenges faced by physicians in maintaining mental health are multidimensional, involving both the demands of their profession and the broader context of a global mental health crisis.<sup>12</sup> This situation underscores the urgent need for comprehensive strategies addressing mental health among physicians, ensuring their well-being and the effectiveness of the healthcare systems they serve.

This study conducted a bibliometric analysis of the study on physician mental health, identifying key trends, thematic evolution, and research gaps. To understand the research landscape, this study examined publication patterns, keyword co-occurrence networks, and country-wise contributions. The findings aimed to highlight underexplored areas and provide insights for future research and healthcare policy development. Ultimately, this bibliometric analysis seeks to contribute to the academic understanding of mental health issues among physicians and to inform strategies for improving mental health support within the medical community.

## Method

This bibliometric study systematically examined mental health research on physicians from 2010 to 2023, identifying trends, key contributors, and thematic evolution. The methodology followed a five-stage approach to ensure a comprehensive and structured analysis. Stage 1 involved the definition of search criteria, focusing on keywords encompassing a range of mental health topics ("mental health," "psychological well-being," "stress," "burnout," "depression," "anxiety") and their relevance to medical professionals ("doctors," "physicians," "medical practitioners," "healthcare professionals"). Additional terms related to coping mechanisms and job satisfaction, such as "resilience," "work-life balance," and "job satisfaction," were also incorporated.

Stage 2 entailed the selection of the Web of Science Core Collection and Scopus database, recognized for its extensive repository of scientific literature. This was followed by Stage 3, in which the criteria were adjusted to include only original research and reviews written in English between 2010-2023. This time frame was selected to reflect contemporary research trends and account for the increasing attention to physician mental health following the WHO's 2013-2020 Mental Health Action Plan and the COVID-19 pandemic's impact from 2020 onward. In Stage 4, the data exportation process began. This stage was crucial as it involved extracting the data from the database based on the specified search and filtration criteria. The exported data, which formed the foundation of this bibliometric analysis, included various articles that delved into the mental health aspects of physicians.

The final stage, Stage 5, was dedicated to analyzing and discussing the results. The bibliometric data was collected and analyzed in August 2023, ensuring the inclusion of the most recent publications available at the time of study execution. This comprehensive examination of the data encompasses various bibliometric parameters, including publication trends, authorship, geographical distribution, and thematic focus. The aim was to glean insights into the research landscape surrounding mental health among medical professionals, understand the evolution of topics, and identify key areas of interest and research gaps.

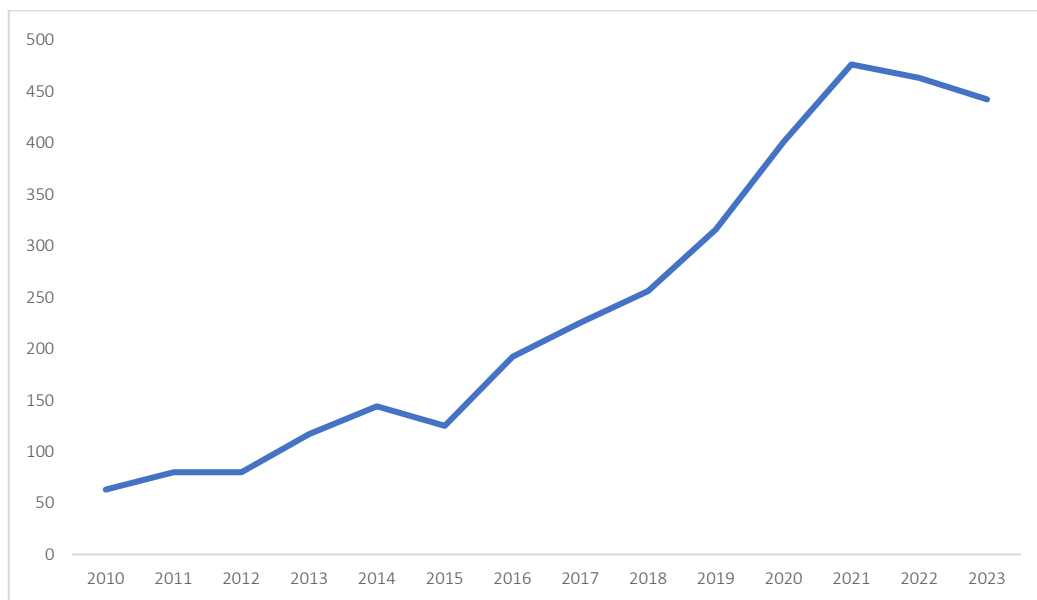
The search strategy for sourcing bibliometric data was meticulously designed to align with the study's objectives. The strategy focused on refining the search to include articles classified as "original research" or "review" published in English. This refined focus allows for a comprehensive examination of the current state of mental health research among

physicians. By downloading a substantial volume of relevant articles in plain text format, this study ensured a rich dataset for in-depth analysis to uncover trends, dominant themes, and potential directions for future studies in this field.

## Results

The bibliometric analysis identified 3,360 publications, including 3,137 original research and 223 reviews (Table 1). These studies were disseminated across 1,066 distinct journals and sources, demonstrating the extensive academic engagement with this topic. On average, each article received 8.03 citations, with an annual citation rate of 1.08 per article, underscoring the sustained relevance of research in this field. The mean publication age was 7.47 years, reflecting a substantial accumulation of scholarly work over the past decade. Collectively, these studies cited 27,140 references, highlighting the strong academic foundation underpinning physician mental health research. Furthermore, the dataset included 14,792 KeyWords Plus and 10,344 Author Keywords, illustrating the diverse themes explored within the literature. The authorship analysis indicated contributions from 14,619 researchers, with 268 single-authored articles and 3,112 collaborative works, emphasizing the high degree of research collaboration in this domain. Table 1 provides a detailed summary of these bibliometric indicators.

Description	Results
Timespan	2010-2023
Total articles	3,360
Average years from publication	7.47
Average citations per article	8.03
Average citations per year per article	1.08
Total references	27,140
Article type – original research	3,137
Article type – review	223
Dataset - KeyWords Plus	14,792
Dataset - Author Keywords	10,344
Total authors	14,619
Authors of single-authored articles	268
Authors of multi-authored articles	3,112



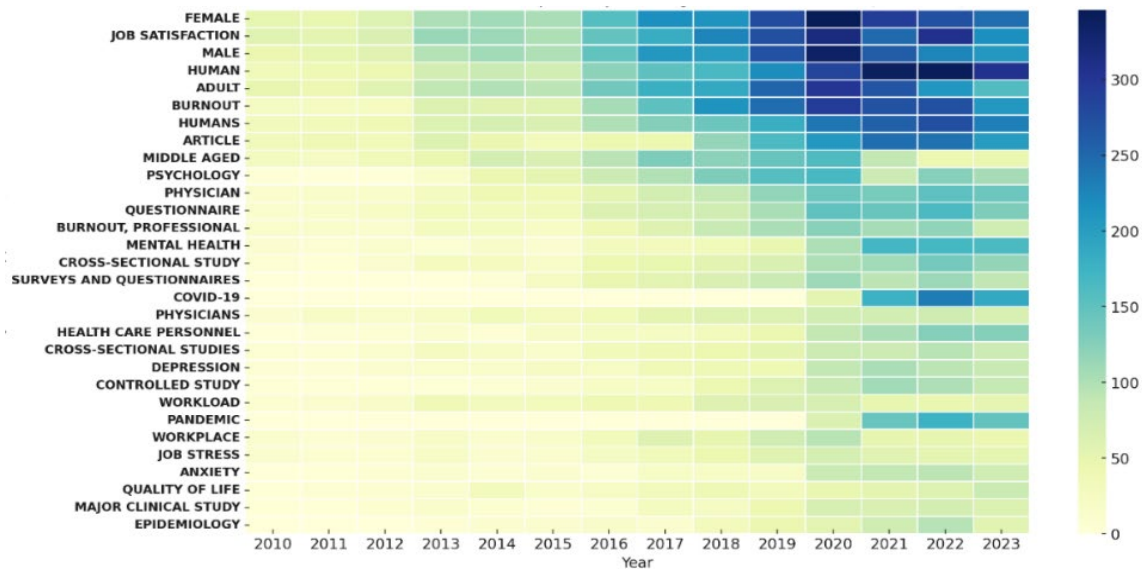
**Figure 1. Trends of Total Number of Publications**

Figure 1 displays a clear upward trend in the total number of publications on mental health among doctors and physicians from 2010 to 2023. Starting with 63 publications in 2010, there was a notable increase each year, peaking at 476 in 2021. Although there was a slight decrease in 2022 and 2023, with 463 and 442 publications, respectively, the overall trajectory suggests a growing academic focus on this critical area of healthcare research.

**Table 2. Global Citation of Mental Health Issues Among Doctors and Physicians**

Rank	Country	Total of Citation	Average Citations per Article
1	The United States	51,704	37.09
2	The United Kingdom	7,573	23.89
3	Canada	7,456	33.14
4	China	5,213	30.31
5	Australia	4,887	25.86
6	Italy	4,248	32.43
7	Germany	3,685	22.33
8	The Netherlands	2,823	28.23
9	France	1,751	25.38
10	Spain	1,707	18.76

For the total of citations by country, the United States ranks first by a fairly large margin, amassing 51,704 total citations and an average of 37.09 citations per article, indicating a significant impact on the global research community (Table 2). The United Kingdom and Canada follow with 7,573 and 7,456 total citations, respectively, and average citations per article of 23.89 and 33.14, denoting high engagement with their research outputs. Notably, Italy, with fewer total citations than Australia and China, exhibits a higher average citation rate, suggesting that while the research volume may be lower, the influence per article is substantial. The list concludes with Spain, which, despite its tenth position, reflects a commendable international research contribution.



**Figure 2. Heatmap of Thematic Evaluation**

The Thematic Evolution Map provides a compelling visualization of the shifting landscape of research emphasis in the field of mental health among healthcare workers from 2010 to 2023 (Figure 2). It captures the frequency of the top 30 keywords, with prominence given to terms such as "DEPRESSION," "BURNOUT," and "MENTAL HEALTH," signifying a strong research focus on these critical areas. The heatmap's gradation from light to dark hues corresponds to increased keyword occurrences, indicating growing scholarly attention. Notably, "COVID-19" has emerged sharply in recent years, reflecting the pandemic's significant impact on healthcare research. The term "BURNOUT" shows a sustained presence,

peaking around 2020, aligning with the global health crisis' peak years. "QUALITY OF LIFE" and "JOB STRESS" also feature prominently, underscoring the concern for healthcare professionals' well-being. The map reveals not only the prevalence of topics but also their interconnectedness and evolution, highlighting how global events and societal changes drive scholarly inquiry and discourse.

**Table 3. Top 10 Research Keywords**

Rank	Author Keywords	Frequency	Rank	KeyWords Plus	Frequency
1	Burnout	312	1	human	3,041
2	Resilience	183	2	Doctor	2,545
3	Stress	107	3	female	1,955
4	Physicians	87	4	questionnaire	1,290
5	Depression	55	5	male	1,210
6	Nurses	45	6	burnout, professional	1,204
7	Wellness	45	7	adult	994
8	Physician	41	8	article	898
9	Anxiety	39	9	survey	847
10	Junior Doctor	38	10	middle aged	764

The table contrasts the top 10 Authors Keywords with KeyWords Plus from bibliometric research, revealing prevalent themes in studies on mental health among medical professionals (Table 3). "Burnout" emerges as the most cited author keyword at 312 occurrences, mirroring its centrality in contemporary discourse. At the same time, "human" leads the KeyWords Plus category with 3,041 mentions, reflecting a broad humanistic focus in related research. Other prominent Author Keywords include "resilience" and "stress," indicating key research interests in adaptive strategies and psychological pressures, respectively. The presence of "physicians," "depression," "nurses," and "anxiety" underscores the diverse professional scope and psychological states examined. "Doctor," "female," and "questionnaire" are significant in KeyWords Plus, highlighting demographic specifics and methodological tools employed in the field. The data collectively underscored the critical emphasis on occupational burnout, sex-based perspectives, and evaluative methodologies in the literature.

Table 4 reflects a bibliometric analysis of the most cited research on mental health among physicians, with a focus on burnout, work-life balance, and systemic factors affecting well-being. Studies from the United States dominated, revealing a significant prevalence of burnout, especially among frontline physicians, compared to other workers. This study underscored the impact of burnout on patient care and healthcare costs, stressing the need for systemic solutions, including leadership involvement and comprehensive organizational strategies.

The rise in physician burnout between 2011 and 2014 was notable, as the wide range of burnout prevalence indicated a complex issue with varying definitions and measurements. The data also highlighted the psychological toll of the COVID-19 pandemic on healthcare providers, both in the United States and China, emphasizing resilience in the face of stress and the need for supportive measures. Issues with electronic health records and the work environment further influence satisfaction and stress-related disorders among physicians, suggesting that both technological and psychosocial workplace reforms are essential for improving mental health outcomes for physicians.

## Discussion

This comprehensive bibliometric analysis has shed light on the significant mental health struggles that physicians face, with a specific emphasis on burnout, work-life balance, and the systemic elements affecting their overall health. A review of the 10 most cited articles on physicians' mental health revealed critical research gaps and opportunities for future studies. A key finding was that studies on physicians' mental health were disproportionately concentrated in high-income countries, particularly the United States. In contrast, studies from low- and middle-income countries (LMICs) remain limited.<sup>23</sup> The limited literature from the LMICs may reflect less awareness, insufficient infrastructure of research, or underreporting of mental health issues among physicians. This raises concerns about whether similar challenges exist in these underrepresented areas but remain undocumented. Furthermore, there was a lack of longitudinal studies examining long-term mental health outcomes or the sustained impact of organizational reforms, making it imperative to conduct studies establishing causal relationships between systemic changes and physician well-being.

**Table 4. Characteristics of Top 10 Most Cited Articles**

Title	Year	Authors	Citation	Country	Key Points
Burnout and Satisfaction with Work-Life Balance Among US Physicians Relative to the General US Population <sup>13</sup>	2012	Shanafelt TD <i>et al.</i>	2,177	The United States	Nearly half of the physicians reported burnout symptoms. Those in primary care access specialties faced the highest burnout risk. Physicians had more burnout and work-life balance dissatisfaction than other workers.
From Triple to Quadruple Aim: Care of the Patient Requires Care of the Provider <sup>14</sup>	2014	Bodenheimer T <i>et al.</i>	2,141	The United States	Physician burnout affects patient care and healthcare costs. Staff burnout harms the healthcare system's overall efficacy. Provider work-life improvement is key to healthcare's Triple Aim.
Changes in Burnout and Satisfaction with Work-Life Balance in Physicians and the General US Working Population Between 2011 and 2014 <sup>15</sup>	2015	Shanafelt TD <i>et al.</i>	1,677	The United States	Physician burnout increased significantly over three years. Physicians' satisfaction with work-life balance worsened. The burnout issue is more pronounced in physicians than in the general working population.
Understanding the Burnout Experience: Recent Research and Its Implications for Psychiatry <sup>16</sup>	2016	Maslach C <i>et al.</i>	1,418	The United States	Burnout in psychiatry correlates with negative outcomes for patient care. Burnout is job-specific, distinct, yet related to depression. Social and organizational factors play a role in addressing burnout.
Executive Leadership and Physician Well-being: Nine Organizational Strategies to Promote Engagement and Reduce Burnout <sup>17</sup>	2017	Noseworthy JH <i>et al.</i>	967	The United States	Over half of the physicians experience burnout. Burnout is systemic, not just an individual issue. Nine strategies, including leadership and community, are proposed to combat burnout.
Prevalence of Burnout Among Physicians: A Systematic Review <sup>18</sup>	2018	Rotenstein LS <i>et al.</i>	963	The United States	Physician burnout prevalence varies widely across studies. Definitions and assessments of burnout are inconsistent. The exact prevalence rate of burnout among physicians is unclear.
The Experiences of Healthcare Providers During the COVID-19 Crisis in China: A Qualitative Study <sup>19</sup>	2020	Liu Q <i>et al.</i>	935	China	Providers faced emotional stress and felt powerless. Infection fears and psychological burdens were high among providers. Resilience was shown through self-management and social support.
Psychological Distress, Coping Behaviours, and Preferences for Support Among New York Healthcare Workers During the COVID-19 Pandemic <sup>20</sup>	2020	Shechter A <i>et al.</i>	655	The United States	Psychological distress was prevalent among healthcare workers. Sleep issues were common, but a sense of purpose increased. Resilience was noted despite the high levels of stress.
Relationship Between Clerical Burden and Characteristics of the Electronic Environment with Physician Burnout and Professional Satisfaction <sup>21</sup>	2016	Dyrbye LN <i>et al.</i>	644	The United States	Electronic Health Records (EHRs) and Computerized Physician Order Entry (CPOE) systems are linked to increased physician burnout. Clerical dissatisfaction is associated with EHRs and CPOE. Younger physicians were more satisfied with their electronic environment, but dissatisfaction was common across ages.
Psychosocial Work Environment and Stress-Related Disorders, A Systematic Review <sup>22</sup>	2010	Nieuwenhuijsen K <i>et al.</i>	569	The Netherlands	High job demands, low control, and low support are linked to Stress-Related-Disorders (SRDs). Lack of justice at work predicted the incidence of SRDs. Effort-reward imbalance was strongly associated with SRDs.

Another notable gap was the limited focus on specialty-specific challenges, as most studies assess physicians as a homogeneous group without considering the unique stressors associated with fields such as oncology, emergency medicine, and surgery. The increase in burnout, particularly among frontline physicians, who are facing rates higher than

seen in other professions, is concerning.<sup>24</sup> A key finding of this study was the increase in burnout rates among physicians in 2011-2014, followed by a further surge during the COVID-19 pandemic. This trend suggested structural changes in healthcare systems that warrant further investigation. Additionally, this study identified variations in how burnout was defined and measured across studies, highlighting the need for standardized assessment tools to improve comparability and intervention effectiveness.

Burnout among physicians is a critical issue threatening a physician's well-being and healthcare quality. Recognized by the WHO as a state of chronic occupational stress, burnout among medical professionals has reached alarming levels, with reports suggesting a prevalence rate between 27% and 75%.<sup>24</sup> This epidemic of exhaustion is not confined to practicing doctors but has roots traceable to the nascent stages of medical education and grows more acute throughout one's career. Studies indicate that American physicians experience burnout at significantly higher rates than the general population. At the same time, resident physicians in Tunisia and Sudan also report high burnout levels, suggesting a global crisis.<sup>25,26</sup> The implications of this condition are far-reaching and multifaceted, compromising not only the health and well-being of the physicians themselves but also the standard of patient care they are able to provide. The relationship between burnout and an array of negative outcomes, such as medical errors, a hostile attitude to patients, and difficulty in professional interactions, is well-established.<sup>17</sup> On a personal level, it contributes to depression, anxiety, and reduced job performance, highlighting the urgent need for comprehensive interventions.<sup>27</sup> The increasing workload, administrative burdens, and hierarchical workplace structures exacerbate these challenges, making organizational reforms essential.<sup>28</sup>

The COVID-19 pandemic significantly heightened awareness of mental health challenges among physicians, as evidenced by a surge in research publications during this period. Studies conducted during the pandemic highlighted the increased emotional strain, decision-making fatigue, and exposure to trauma faced by physicians, particularly those in emergency and critical care settings.<sup>27,29</sup> This study found that studies on mental health issues among physicians peaked in 2020–2021, reflecting a growing academic focus on burnout, anxiety, and depression among frontline healthcare workers. The exigencies of working in such an environment, as characterized by excessive protective gear, dehydration, lack of rest, and the constant threat of illness, have led to a marked increase in burnout symptoms.<sup>30</sup> Studies conducted during the pandemic reveal that physicians have reported heightened levels of burnout compared to pre-pandemic times.<sup>31</sup> During the pandemic, physicians encountered additional stressors exacerbating their burnout, including concerns about transmitting the virus to their families, increased childcare responsibilities due to extended work hours and school closures, apprehension regarding their organization's support for their personal and familial needs in the event of infection, and limited access to timely information and communication.<sup>32</sup> These findings underscored the need for urgent attention to the mental health crises precipitated by such global health emergencies. Despite the odds, they also pointed to the resilience exhibited by doctors, emphasizing the human capacity to adapt and endure even in the most trying circumstances.

The technological landscape within which doctors operate has also come under scrutiny, with electronic health records (EHRs) drawing particular concern.<sup>33</sup> While these systems were envisioned as tools to streamline patient care and foster shared decision-making, the reality has been less than ideal. Many physicians found themselves mired in increased administrative work, with EHRs contributing to the time burden rather than alleviating it.<sup>30</sup> Issues of poor user-friendliness, unreliable systems, and outdated hardware compound the problem, detracting from patient interaction and contributing to physician dissatisfaction. Furthermore, frequent interruptions from phone calls and other technological disruptions have been linked to significant adverse effects, such as medication errors.<sup>34</sup> The discord between the intended benefits of healthcare technology and the actual experience of doctors reflects a disconnect in innovation that fails to align with the practical needs of its users.<sup>35</sup> Co-creation, the collaborative development of technology involving its end-users from inception, emerges as a crucial strategy for bridging this gap and ensuring that technological advancements support rather than hinder healthcare delivery.

At the organizational level, factors such as work-life balance, job autonomy, and institutional support play a critical role in physician well-being. A previous study suggested that perceived organizational support is a key determinant of job satisfaction, professional performance, and employee retention.<sup>36</sup> However, a study on mental health support systems within healthcare institutions remains limited, particularly during crises.<sup>37</sup> The COVID-19 pandemic has highlighted the importance of organizational support in safeguarding mental health, encompassing the provision of protective equipment, psychological support, and involvement in decision-making processes. The dearth of empirical data on the impact of such support measures on healthcare workers' mental health, particularly concerning post-traumatic and depressive symptoms or perceived stress, calls for a concerted research effort.<sup>38</sup>

## Conclusion

This bibliometric analysis identifies critical gaps in physician mental health research, including the need for longitudinal studies, specialty-specific research, and expanded global coverage. The COVID-19 pandemic has intensified mental health challenges among physicians, necessitating targeted interventions for high-risk medical fields. Additionally, technological inefficiencies and workplace structures contribute significantly to burnout, underscoring the need for organizational reforms. Addressing these issues through standardized mental health assessments, stronger institutional policies, and evidence-based interventions will be essential for improving physician well-being and healthcare system sustainability. Specialty-specific studies are also crucial for addressing unique challenges faced by different medical fields.

## Abbreviations

WHO: World Health Organization; LMICs: low- and middle-income countries; EHRs: electronic health records.

## Ethics Approval and Consent to Participate

This bibliometric analysis did not involve primary research with human or animal subjects, hence obviating the need for an ethics approval or consent process. The investigation was conducted solely on the basis of previously published data, adhering to all relevant ethical standards for secondary data analysis.

## Competing Interest

The authors declare no competing interest in the preparation, analysis, or presentation of this study. This statement affirms that there have been no personal or financial relationships or affiliations that could have inappropriately influenced the work presented in this study.

## Availability of Data and Materials

The data supporting the conclusions of this study are derived entirely from publicly accessible sources. These sources include established academic databases such as ISI Web of Knowledge, PubMed, Scopus, Ovid Medline, and Google Scholar. A supplementary file, offering additional insights and specifics about the utilized datasets, is available for public scrutiny, ensuring transparency and replicability of the research findings.

## Authors' Contribution

The contributions to this research paper were equally multifaceted and collaborative.

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