

## Bibliometric Analysis on Mental Health of University Students

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**Abstract:** This study aimed to examine the research on mental health among university students through bibliometric analysis. The study was conducted using the Biblioshiny package in R-Studio. The study employs quantitative techniques and conceptual frameworks in knowledge discovery. On September 30, 2024, the screening process identified all references to "Mental Health," "University Students," and "Academic Performance" in the article titles inside the Web of Science (WOS). The analysis included 172 documents authored by 682 scholars in 133 journals published in the WOS database between 1996 and 2024. There were 476 affiliations between the universities or institutes where the authors served. However, more research is necessary to determine the effectiveness of interventions, such as setting-based strategies, and to identify risk factors and predictors of mental health among university students. By reviewing prior research, bibliometric analysis enables the researcher to identify the most significant author or article within their area of interest. It offers a comprehensive overview of the research field for academics and professionals interested in it. This study's cluster of mental health research will assist in directing future research areas through thematic maps, which serve as a tool for visualizing and categorizing research subjects based on trends in the literature. These maps assist researchers in comprehending the structure, evolution, and trends within the discipline by grouping similar topics, emphasizing main themes, and pinpointing emerging areas of interest. This will refine the selection and concentration of new research avenues with greater potential to advance the field of mental health studies considerably.

**Keywords:** *Biblioshiny, Conceptual structure, Mental Health cluster, University Students, Thematic map, Mental Health Bibliometric*

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### 1. Introduction

Mental health, encompassing emotional, psychological, and social well-being, influences individuals' ability to manage stress and make informed health decisions (Cleverley et al., 2022; Hyseni Duraku et al., 2023; World Health Organization, 2002, 2015). Adolescents between 15 and 24 years are at the greatest risk for mental health issues, with half of all enduring mental disorders initiated by age 14 and three-fourths by the mid-20s (Hyseni Duraku et al., 2023; Kessler et al., 2007; World Health Organization, 2022). The decline of mental health impairs a youth's skill acquisition, social interactions, financial autonomy, and personal affairs, while also hindering their ability to effectively handle academic responsibilities (Antaramian, 2015; Hyseni Duraku et al., 2023; World Health Organization, 2002, 2022).

Over the years, researchers from both global and regional perspectives have conducted numerous studies on mental health, with a particular focus on university students. The Scopus database demonstrates the establishment of research on mental health among university students since 1996. Previous research indicates that the mental health and well-being of university students have shown consistent growth over recent decades, particularly since 2010, as evidenced by a bibliometric analysis spanning 1975-2020 (Hernandez-Torrano et al., 2020). Consequently, it can be asserted that the issue of mental health has been extensively examined for a considerable duration and is not a novel topic within the research domain.

The main objective of this research is to review Web of Science (WOS) publications about mental health among university students. The bibliometric analysis aimed to determine the bibliometric profile of mental health, encompassing its annual scientific output, research trends, and conceptual framework. This assessment will determine the extent of the study conducted on mental health (Ruslan & Abdul Rasool, 2024).

## 2. Literature Review History of Mental Health

Early mental health services in higher education began at Amherst College in 1861. Princeton University hired a psychiatrist in 1910 to help students develop their personalities and establish the first mental health program. Meanwhile, the 1920 American Student Health Association annual meeting deemed "mental hygiene" essential for college campuses. After Princeton's initiative, college campuses began offering mental health and psychological counseling 40 years later. The American College Health Association created a Mental Health Section in 1957 for mental health practitioners. By the late 20th century, most schools and universities had student-sized mental health and counseling departments (Kraft, 2011).

### Current Trends

Since the early 2000s, there has been a notable rise in mental health issues among university students. A 2020 Insight Network survey involving students from 10 universities indicates that "1 in 5 students has a current mental health diagnosis" and that "almost half have experienced a serious psychological issue for which they felt they needed professional help," reflecting an increase from 1 in 3 in the 2018 survey (Campbell et al., 2022; Pereira et al., 2019). A UK cohort study indicates that psychological distress levels rise upon entering university (Bewick et al., 2010). Recent evidence shows an increasing prevalence of mental health issues among university students, including self-harm and suicide (Sivertsen et al., 2019; Storrie et al., 2010). This trend has led to heightened demand for mental health services, with some universities reporting a doubling in the number of students seeking support (Thorley, 2017). Consequently, inadequate mental health among youth has emerged as a global concern, especially in developing nations, where it represents the most prevalent and intricate psychological issue (Campbell et al., 2022; Pedrelli et al., 2015).

Furthermore, The Ministry of Health (MOH) conducted the National Health and Morbidity Survey (NHMS) in 2015 in Malaysia, revealing a 29.2% prevalence of mental health issues among those aged 16 and above. One in three Malaysians have mental health disorders, with the highest frequency observed among individuals aged 16 to 19 years and those from low-income families (Malaysian Ministry of Health, 2016). A previous study indicated that over half of the respondents (n=810) experienced moderate to high levels of psychological distress (68.9%), anxiety (72.7%), and depression (60.6%) (Arifin et al., 2023). The rise in the prevalence of mental disorders, especially anxiety and depression, has adversely impacted the quality of life among youths. This includes detrimental effects on academic performance, academic integrity, self-confidence, and interpersonal relationships, and may even result in thoughts of suicide (Babu et al., 2022; Duraku & Hoxha, 2022; Racine et al., 2021). The youth suicide rate has risen over the past six decades, making suicide the second leading cause of death in this demographic (Mowbray et al., 2006). Therefore, detecting and providing early deterrence of mental health issues among university students is essential (Shamsuddin et al., 2013). This issue warrants greater attention due to its potential negative implications, as university students are a crucial asset to the development of human capital in the country. Mental health is fundamental to university students' well-being and their capacity to navigate challenges both academically and in life (Pheng et al., 2019; Shahira et al., 2018).

### Bibliometric Analysis

The volume of scientific research articles using Bibliometric analysis is rising quickly, making it more and more challenging to stay up to date with everything that is released. The bibliometric analysis process gathers and quantifies data on scientific publications and their citations. Researchers then use this data to assess research impact, identify patterns in the literature, and track the advancement of research (Ruslan & Abdul Rasool, 2024). Bibliometric analysis serves as a significant instrument across various domains, including academia, governmental bodies, and private research institutions. Bibliometric analysis is a quantitative approach that employs mathematical and statistical techniques to assess the interconnections and influences of publications, authors, institutions, and nations within a certain study domain (Donthu et al., 2021; Fu et al., 2023). By extracting and analyzing the metrics of each publication, such as author, institution, country, and keywords, bibliometric analysis can identify development trends and potential future research directions (Fu et al., 2023). Furthermore, employing diverse visualization techniques allows for the presentation of results in more intuitive and understandable formats. This facilitates a comprehensive overview, aids in pinpointing knowledge gaps, reveals emerging trends, and enables exploration of the intellectual framework within a particular field (Fu et al., 2023).

Bibliometrics provides a systematic, transparent, and reproducible evaluation procedure grounded in statistical measurements of research, scientists, or scientific activities (Ruslan & Abdul Rasool, 2024). Bibliometrics provides a more objective and reliable study compared to alternative approaches (Aria & Cuccurullo, 2017). The application of bibliometrics has broadened across various fields; however, bibliometric analysis is challenging due to the multiple processes that utilize diverse analytical and mapping software tools, which are generally accessible only through commercial licenses (Guler et al., 2016). This study advocates for the implementation of an open-source R program that follows a standardized, replicable logical bibliometric workflow. Researchers developed an R tool for executing thorough bibliometric analyses. This study employed R programming utilizing the Biblioshiny library package for the analysis and visualization of the state and trends in mental health research (Ruslan & Abdul Rasool, 2024). This package offers a collection of functions for data acquisition, cleansing, and analysis, encompassing bibliometric metrics, co-citation and co-work networks, co-authorship evaluation, and journal impact factors. Moreover, Biblioshiny enables users without programming expertise to do bibliometric analyses through a graphical user interface (Aria & Cuccurullo, 2017).

### **Bibliometrics in Mental Health**

Prior researchers conducted a study on the mental health of university students, using metadata derived from 2,782 journal articles included in the Web of Science database from 1975 to 2020. This study employs bibliometric methods to delineate and visually illustrate the existing literature on mental health among university students, focusing on the growth trajectory, productivity, social structure, intellectual structure, and conceptual structure of the field over 45 years (Hernandez-Torrano et al., 2020). Furthermore, a detailed bibliometric analysis of 214 high-Scopus-indexed publications was done to examine worldwide cooperation and emerging trends in mental health research among higher education students. The primary aims were to identify the most productive contributors at the national, institutional, and author levels, and to reveal collaborations among them. The study aimed to identify significant themes and emerging trends in mental health research by keyword and citation analysis (Mohd Beta et al., 2024).

### **3. Method**

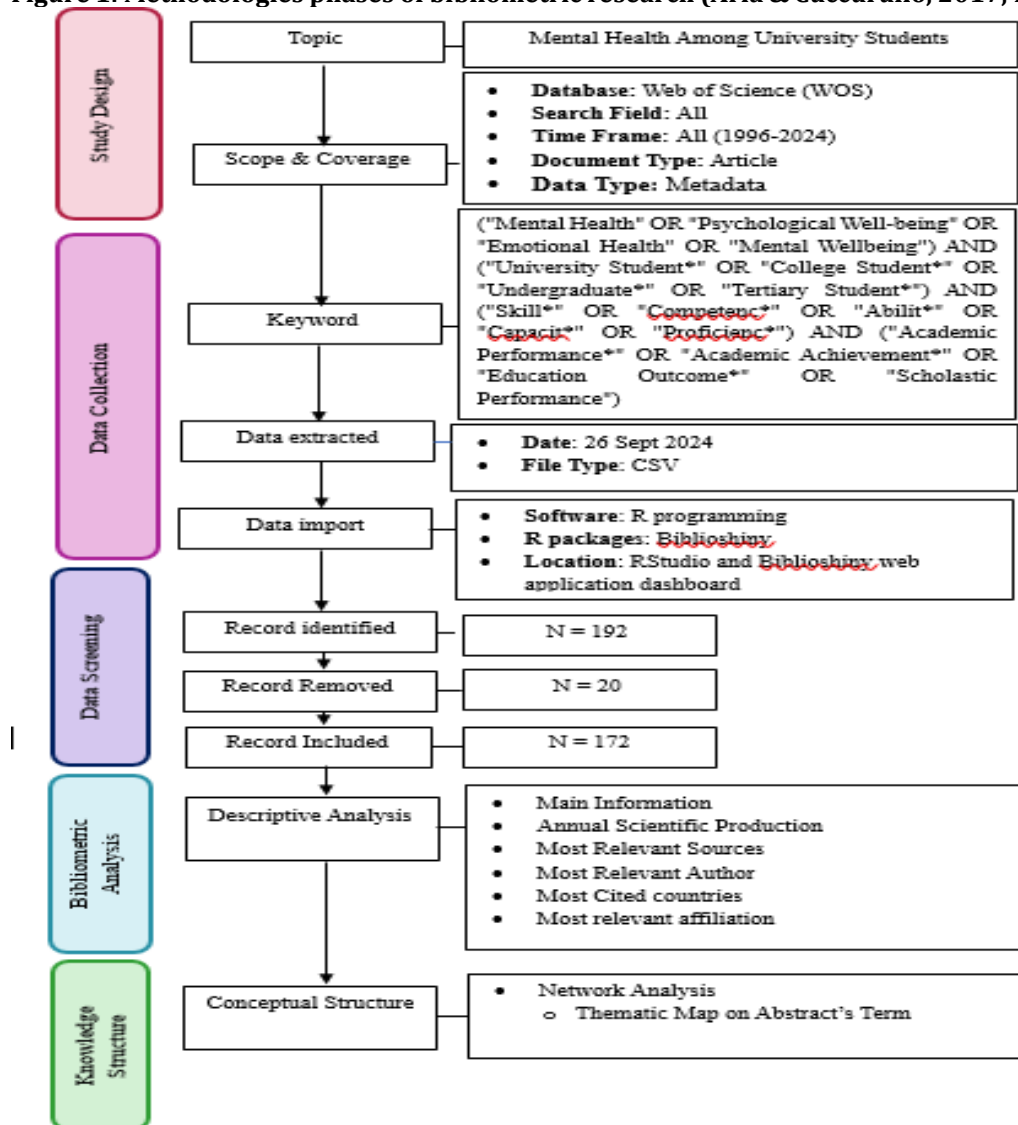
This study aims to investigate the status, trends, and conceptual framework of mental health research. The process consisted of five phases: Study Design, Data Collection, Data Screening, Bibliometric Analysis, and Knowledge Discoveries. All relevant keywords about mental health were meticulously examined (Ruslan & Abdul Rasool, 2024). The Web of Science (WOS) core collection database was utilized to retrieve and extract articles on mental health for bibliometric analysis. Moreover, WOS enables researchers to collect extensive bibliometric data by conducting searches for publications on topics using keywords, subject categories, authors, institutions, and other relevant criteria. Moreover, it can also obtain comprehensive metadata for each publication, encompassing authors, affiliations, citations, references, and abstracts, as well as exporting extensive datasets of bibliographic records for subsequent analysis. WOS facilitates diverse citation analyses, including the monitoring of citations accrued by publications, authors, or journals over time. It also can identify highly cited papers and authors within a field, along with the analysis of citation networks and patterns among publications. WOS can analyze collaboration patterns, identify research trends, and conduct journal and source analysis. WOS through bibliometric analysis could do visualization such as networks of co-authorship, co-citation networks, and maps illustrating the co-occurrence of keywords and distribution of research across geographical regions (Azanedo et al., 2022; Huang et al., 2022).

Following extensive deliberation, the terms ("Mental Health" OR "Psychological Well-being" OR "Emotional Health" OR "Mental Wellbeing") AND ("University Student\*" OR "College Student\*" OR "Undergraduate\*" OR "Tertiary Student\*") AND ("Skill\*" OR "Competenc\*" OR "Abilit\*" OR "Capacit\*" OR "Proficiency\*") AND ("Academic Performance\*" OR "Academic Achievement\*" OR "Education Outcome\*" OR "Scholastic Performance") were selected as keywords, with the Boolean operator OR utilized between the two keywords for metadata extraction. The operator OR was employed due to the existence of two distinct spellings of these sentences in the database. In constructing effective search queries for academic research, Boolean operators and wildcard symbols play a critical role in refining search results. Boolean operators such as "AND," "OR," and "NOT" enable researchers to combine or exclude keywords to enhance the relevance of their search results. In this query, "OR" is used to group synonymous terms related to mental health, such as "Mental Health,"

“Psychological Well-being,” “Emotional Health,” and “Mental Well-being,” allowing for a broader search that captures varied expressions of the concept. The “AND” operator is then utilized to combine this mental health category with phrases concerning university and college students, including “University Student\*,” “College Student\*,” “Undergraduate\*,” and “Tertiary Student\*.” Here, the asterisk (\*) serves as a wildcard that expands the search to include any variation of the root word, such as “student,” “students,” or “students.”

Additionally, the inclusion of terms like “Skill,” “Competence\*,” “Ability\*,” “Capacity\*,” and “Proficiency\*” demonstrates the searcher’s intention to encompass various competencies and skills, thereby enhancing the search’s breadth. Finally, the query concludes by targeting educational outcomes through terms like “Academic Performance\*,” “Academic Achievement\*,” “Education Outcome\*,” and “Scholastic Performance,” thus ensuring that the search captures a range of literature related to the academic achievements of students about their mental health. Overall, the strategic use of Boolean operators and wildcards enables a comprehensive exploration of the interplay between mental health, student demographics, skills, and academic performance (Bates, 1989). Integrating the research associated with these keywords is beneficial. The Biblioshiny library package utilized in R programming was employed for bibliometric analysis and knowledge discovery (Ruslan & Abdul Rasool, 2024), concentrating on the conceptual structure of mental health. Figure 1 depicts the study’s progression, aiming to enhance comprehension.

Figure 1: Methodologies phases of bibliometric research (Aria & Cuccurullo, 2017; Firdaus et al., 2019)



#### 4. Findings

##### Descriptive Analysis-Main Information

Table 1 illustrates Biblioshiny's primary characteristics of WOS-loaded articles. Documents from 1996 to 2024 are included. The table shows the number of periodicals, books and others from which the papers were obtained. The dataset contains 172 documents. Collection growth averages 9.28% annually. Documents published around the current year are an average of 4.37 years old. Each document averages 20.15 citations. All collection papers cite a total of 8,390 references.

**Table 1: Main Information of Retrieved Articles**

Description	Results
<b>MAIN INFORMATION ABOUT DATA</b>	
Timespan	1996:2024
Sources (Journals, Books, etc)	133
Documents	172
Annual Growth Rate %	9.28
Document Average Age	4.37
Average citations per doc	20.15
References	8390
<b>DOCUMENT CONTENTS</b>	
Keywords Plus (ID)	479
Author's Keywords (DE)	515
<b>AUTHORS</b>	
Authors	682
Authors of single-authored docs	13
<b>AUTHORS COLLABORATION</b>	
Single-authored docs	14
Co-Authors per Doc	4.08
International co-authorships %	21.51
<b>DOCUMENT TYPES</b>	
article	159
article; book chapter	1
article; early access	12

The table also includes the works of 682 authors, yet only 13 of them have released single-authored pieces. The collection has 14 single-author documents. Meanwhile, the average number of co-authors in a document is 4.08, and approximately 21.51% of these documents involve international collaboration. 159 articles, or most of the documents, fall under the term document classification. 1 document is both an article and a book chapter, and 12 are early access articles.

### Annual Scientific Production

Figure 2 demonstrates annual scientific production for a mental health article with % growth.

**Figure 2: Annual Scientific Production on Mental Health Research**

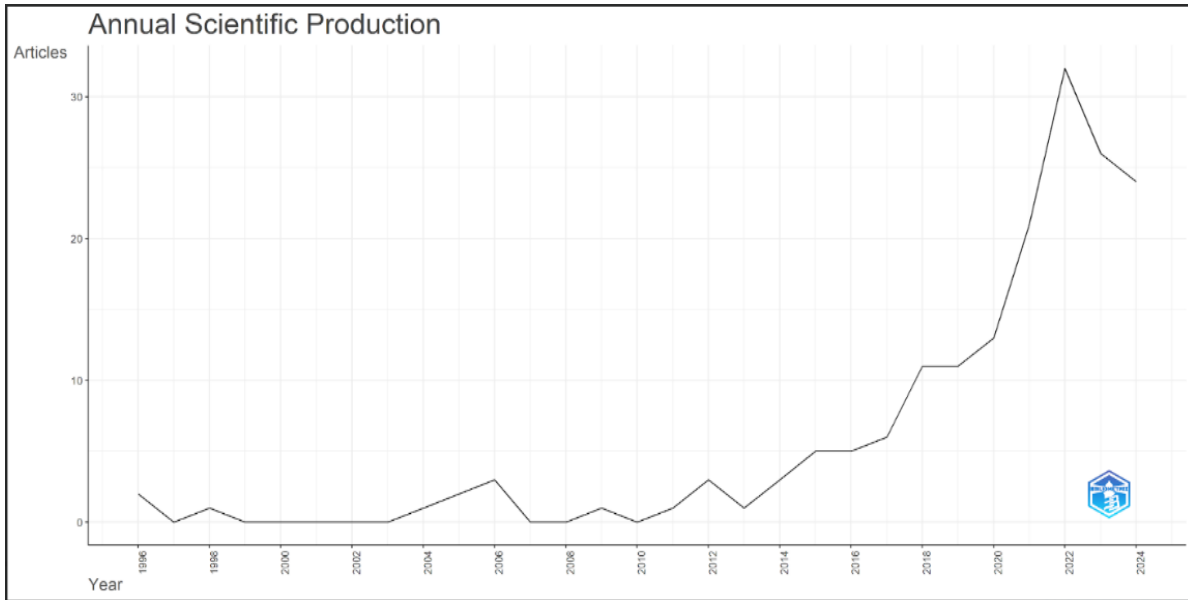
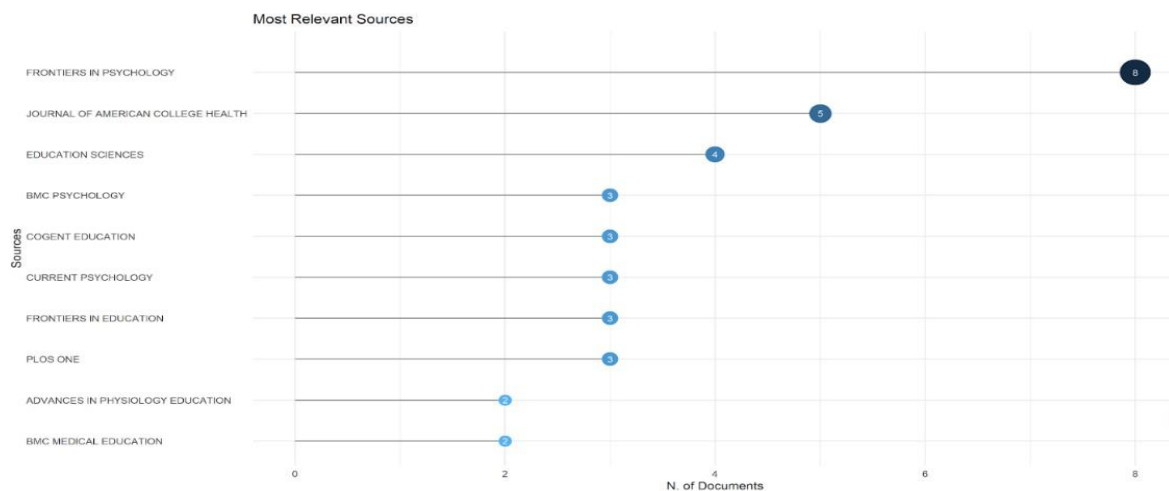


Figure 2 illustrates that the annual scientific production in the field of mental health was minimal, with certain years exhibiting no output. There are only a few years with notable publications: 1996 with 2 articles, 2006 with 3 articles, and 2012 with 3 articles. There is a consistent increase in publications from 2011 to 2018, reflecting a heightened emphasis on research. Since 2019, scientific production has experienced exponential growth, peaking in 2022 with 32 articles, followed by a modest decline in 2023 and 2024.

The COVID-19 pandemic's impact on mental health led to the publication of most papers in 2022, spurring further research and discussions. Students felt isolated, academically disrupted, and concerned about the future due to the pandemic. University students develop anxiety, depression, and stress due to these conditions. Researchers worldwide studied the pandemic's impact on student mental health, increasing research output.

### Most Relevant Sources

**Figure 3: Top 10 Most Relevant Sources in Publishing Research on Mental Health**



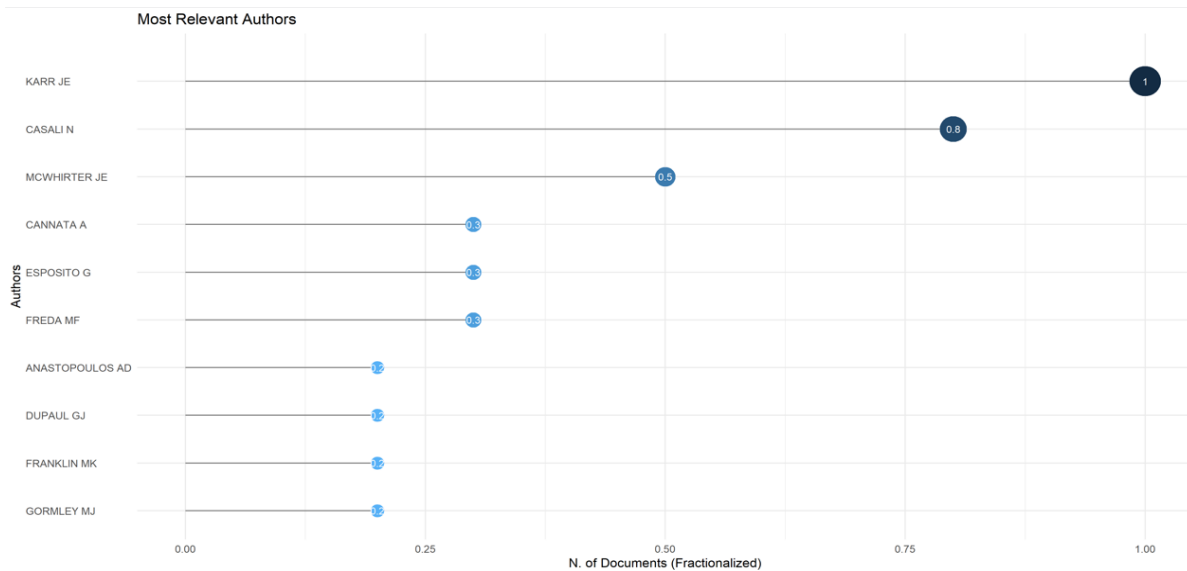


This graph illustrates the "Most Relevant Sources" for documents, showcasing the number of university student mental health publications in each source. The most prolific source is *Frontiers in Psychology*, with 8 related articles published between 1996 and 2024. The *Journal of American College Health* followed with 5 articles. *Education Sciences*, *BMC Psychology*, *Cogent Education*, *Current Psychology*, and *Frontiers in Education* also published 3 articles. *PLOS ONE*, *Advances in Physiology Education*, and *BMC Medical Education* also contributed 2 separate articles. The graph indicates a wide range of sources contributing to the research, with a focus on psychology, education, and health journals.

### Most Relevant Author

Figure 4 displays the most relevant authors, identified by Biblioshiny according to the quantity of authored papers, derived from the comprehensive data analysis.

**Figure 4: Most Relevant Author in Mental Health Research in terms of fractionalized frequencies**

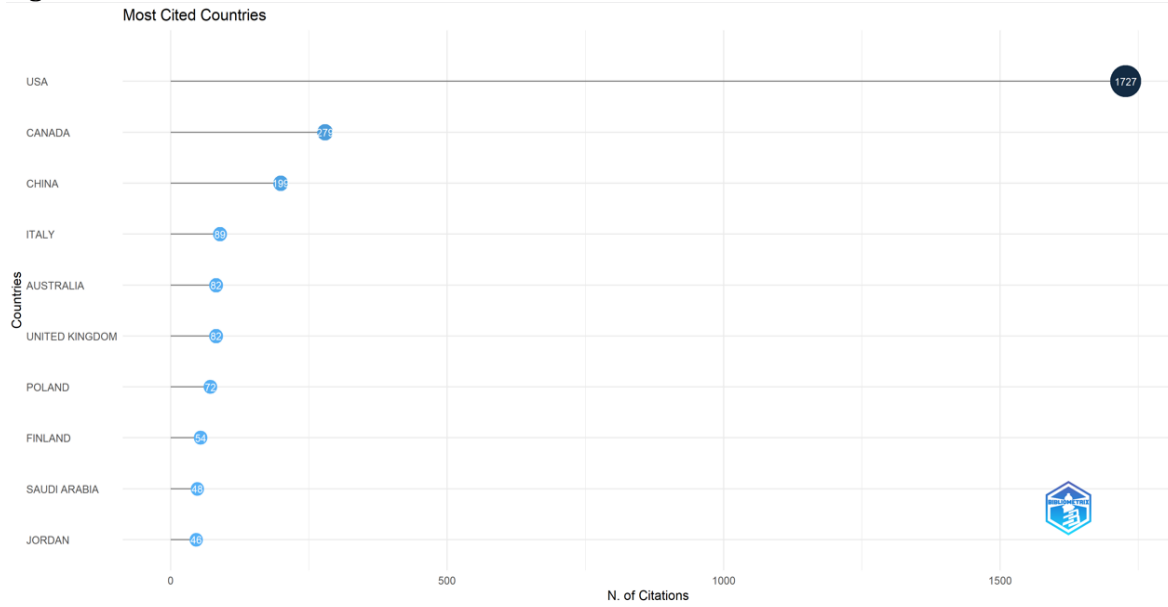


According to previous researchers, Biblioshiny produced fractionalized frequencies by dividing the total number of written articles by the total number of co-authors (Aria & Cuccurullo, 2017). A total of 682 authors contributed to 172 publications on mental health. KARR JE is the most relevant author, having provided the equivalent of 1 fractionalized article. Subsequently, Casali N provided 0.8 articles, while Mcwhirter Je, Cannata A, Esposito G, and Freda MF each contributed 0.3 articles. Anastopoulos Ad, Dupaul GJ, Franklin MK, and Gormley MJ made lesser contributions, each providing 0.2 papers. The fractionalized article count suggests that these authors may have collaborated with others, distributing credit proportionately.

### Most Cited Countries

Figure 5, "Most Cited Countries," illustrates the number of citations received for research contributions from different countries.

**Figure 5: Most Cited Countries**

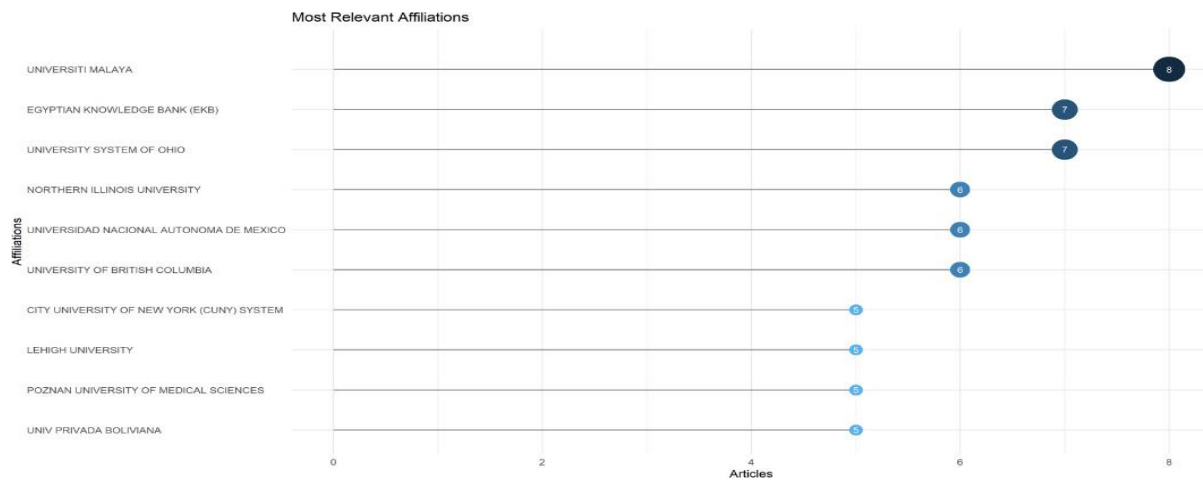


With 1,727 citations, the United States is by far the most cited country. This suggested that, in the field or study area under consideration, the USA has had the biggest influence. This demonstrated that the United States of America is a leader in this field of study, having produced the most significant and extensively cited research. With 279 citations, Canada is the second-most cited nation. Despite having slightly fewer citations than the USA, Canada still maintains a significant presence in the scientific community. With 199 citations, China is the third most referenced nation, a sign of its expanding stature in international research. Additional noteworthy nations are Poland with 72 citations, Australia and the United Kingdom with 82 citations, and Italy with 89 citations. Although Jordan, Finland, and Saudi Arabia have fewer citations—54, 48, and 46, respectively—they nevertheless have a significant impact.

**Most Relevant Affiliations**

Figure 5 illustrates the "Most Relevant Affiliations" according to the number of articles linked to each institution. Universiti Malaya is the leading contributor, with 8 articles.

**Figure 6: Most Relevant Affiliations**



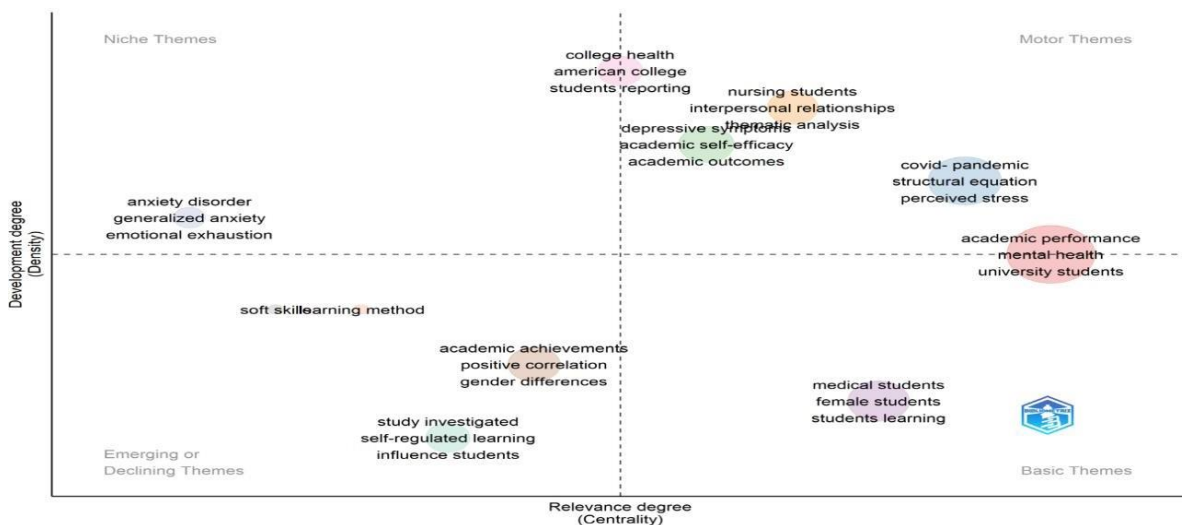


The Egyptian Knowledge Bank (EKB) followed, with the University System of Ohio contributing 7 papers. Northern Illinois University, Universidad Nacional Autonoma de Mexico (UNAM), and the University of British Columbia collectively submitted 6 articles. Meanwhile, the four lowest-ranked institutions—City University of New York (CUNY) System, Lehigh University, Poznan University of Medical Sciences, and Universidad Privada Boliviana—each produced 5 publications.

### Thematic Map

Figure 7 illustrates the various themes associated with the specified domain. The themes were identified based on their relevance and development. This illustrates a thematic map commonly employed in bibliometric analysis to categorize research themes into four quadrants. This also presents the mapping of the network cluster into four thematic quadrants: Motor Themes, Niche Themes, Emerging or Declining Themes, and Basic Themes (Cobo et al., 2011).

Figure 7: Thematic Maps



The themes were identified according to their relevance and development. The Upper-Right Quadrant, also known as the Motor Theme, stands out for its centrality and well-developed nature, underscoring its significance and establishment in the field of mental health research among university students. The relationship between academic performance and mental health among university students is a well-established area of research, indicating its centrality in academic discourse. Related themes such as perceived stress, the COVID-19 pandemic, and structural equation modeling indicate a significant emphasis on the impact of stressors, particularly during the pandemic, on students' mental health and academic performance. This category includes themes like "nursing students" and "interpersonal relationships," indicating a thorough examination of specific student groups and their interpersonal dynamics about their impact on mental health.

The Upper-Left Quadrant, referred to as Niche Themes, comprises well-developed nevertheless peripheral research areas in mental health. These themes represent specialized domains that lack broad applicability or integration with mainstream research. This quadrant categorizes anxiety disorder, generalized anxiety, and emotional exhaustion. Despite extensive research, anxiety-related themes remain a more specialized area within the broader context of mental health among university students, not serving as the central focus of wider research efforts. The terms "college health" and "American college students" indicate specificity to particular geographic or institutional contexts, rendering them less central but significant within their respective domains.

The Lower-Right Quadrant, referred to as the Basic Theme, encompasses concepts that are central to the research field but are still underdeveloped, indicating their essential nature despite limited exploration. The categories of "medical students," "female students," and "students learning" highlight important populations in

mental health research that require further study for comprehensive integration into the wider research framework. The identified themes underscore the need for focused research on the mental health of medical and female students, areas that are critical yet have not received enough attention.

Lower-Left Quadrant classified as either Emerging or Declining The research domain does not prominently feature or thoroughly explore the themes, suggesting their potential emergence or decline. The quadrant presents themes such as "soft skills," "learning method," and "self-regulated learning," implying that these concepts are either gaining prominence in the field or losing relevance in the broader discourse. Despite their relevance to students' learning and academic success, mental health may not have received extensive investigation in these areas.

## 5. Discussion and Conclusion

This study constitutes a bibliometric analysis of mental health publications from its inception in 1996 to the present, utilizing Biblioshiny. This study aims to comprehend and tackle the escalating issues related to students' mental health. It also emphasizes monitoring the progression of research that clarifies the growth of mental health understanding among university students throughout time. This study analyzes and describes the evolution of research subjects concerning mental health and its associated notions in the literature through bibliometric approaches and techniques. Researchers acquired bibliographic data from the WOS database for 192 papers authored by 682 published researchers, sourced from the metadata of the Web of Science (WOS) database. There were 476 affiliations among the universities or institutes where the authors were employed.

This study provides multiple contributions that facilitate the tracking of research topic evolution. Thematic maps enable researchers to analyze the temporal evolution of specific themes. This study contributes to understanding research priorities and gaps by mapping the centrality and density of themes. The thematic maps highlight well-researched areas and those that are underexplored. Themes concerning medical students' mental health and gender differences suggest that these are significant yet underexplored areas, highlighting the necessity for further investigation. This is essential for directing future research initiatives and ensuring that important subjects, such as the mental health of student demographics, receive adequate attention. Thematic maps also help universities, policymakers, and mental health practitioners in making the right decisions regarding resource allocation for research and intervention programs. For instance, if academic stress is a primary concern, universities may focus on establishing stress-relief programs or counseling services for students.

Additionally, the relationship between mental health and academic achievement is evident and crucial for comprehending the well-being of university students. The emergence of niche themes like anxiety disorders suggests an examination of more specialized mental health issues, but their integral linkage to broader academic discourse may not be evident. Research is emerging in the domains of self-regulated learning and pedagogical methods, potentially connecting these learning characteristics to mental health, but requiring further investigation. This thematic map presents a visual overview of the main research themes concerning university student mental health, organized by their current development and significance. The emphasis on academic achievement, stress, and the effects of the epidemic have served as drivers for the present research focus.

### Future Research and Limitations

The current literature on mental health among university students is a growing area of study. However, more research is necessary to determine the effectiveness of various interventions, such as comprehensive setting-based strategies that address the university environment, technology-mediated interventions like web-based and mobile applications, and preventive measures implemented before students' university enrollment (Osborn et al., 2022). Moreover, further research is required to ascertain risk variables and predictors, including elements that predispose students to mental health disorders and early indicators of declining mental health (Campbell et al., 2022; Limone & Toto, 2022).

This study's exclusive sourcing of data from the WOS database presents a limitation. It would be significantly beneficial for additional researchers to perform bibliometric analyses of mental health by integrating data from

Dimensions, PubMed, Scopus, the Cochrane Library, or alternative databases. Additionally, the study would benefit from incorporating Author and Source Impact, Lotka's Law, Bradford's Law, and other bibliometric elements for a more comprehensive descriptive analysis. The focus of this study was solely on the conceptual structure of knowledge about identifying invisible trends. It would be significantly more advantageous to also consider the psychological and social frameworks of knowledge (Ruslan & Abdul Rasool, 2024).

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