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Bibliometric Analysis of Mental Health in Athletes

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Abstract Mental health in athletes is crucial as it significantly impacts sports performance, overall well-being, and the daily lives of athletes. The importance of mental health in the athlete context indicates that attention to this aspect not only affects sports performance but also the overall well-being and lives of athletes. This research aims to understand publication trends related to mental health in athletes through bibliometric analysis. In this analysis, VOSviewer software and the bibliometric analysis application biblioshiny were used to graphically analyze bibliographic data. After filtering, 729 documents were analyzed from the Scopus database. The results show fluctuating trends in the number of publications, with the International Journal of Environmental Research and Public Health as the highest contributor with 125 documents. The USA ranks first in documents focusing on mental health in athletes, with 637 documents. Additionally, Ulster University is the most prolific affiliation, contributing the highest number of publications, each with 30 documents. The globally most cited document, published in the Journal of Science and Medicine in Sport, has been cited 177 times. Visualization of research trends reveals popular topics aligned with research and discussions, including mental health, male, human, female, athlete, adult, psychology. This research can significantly contribute to understanding and treating the mental health of athletes, as well as stimulate further research and interventions in the future.

Keywords: Mental health, Athlete. Bibliometric analysis

Introduction

Mental health is a complex and multifaceted aspect of overall well-being, encompassing cognitive, emotional, and social elements (Adam & Johnston, 1971; Richardson, 2020). It is not just the absence of mental illness, but also the ability to cope with life's challenges and contribute to one's community (Adam & Johnston, 1971). The promotion of mental health is crucial, particularly in the face of adverse conditions such as poverty and discrimination (Herrman, 2008). Factors such as stress, depression, and anxiety can significantly impact mental health, underscoring the importance of maintaining a balance in life activities and responsibilities (James, 2020). Research in the field of mental health in sport has highlighted the need for improved early intervention knowledge and confidence among elite sport staff (Sebbens et al., 2016). This is particularly important given the

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significant impact of mental health on sports performance (Yaffé, 1981). The growing momentum in this area is evident in the increasing research and commentary on mental health in sport (Vella et al., 2020). Elite athletes are at a comparable risk of mental health disorders as the general population, with factors such as injury, overtraining, and burnout contributing to these issues (Rice et al., 2016). Participation in sport, particularly team-based activities, has been associated with improved psychological and social health (Eime et al., 2013)

Mental health symptoms and disorders are common among elite athletes, with a need for evidence-based guidelines for diagnosis and management (Reardon et al., 2019). A study on Australian elite athletes found high levels of mental health problems, particularly in injured athletes, highlighting the need for support and access to mental health professionals (Gulliver et al., 2015). However, there is a need for further development of sports psychiatric care in competitive sports, including the promotion of mental health and the safe handling of mental problems and illnesses (Claussen et al., 2021). Research indicates that athletes, particularly elite and young athletes, are at a heightened risk for mental health concerns such as anxiety, depression, eating disorders, and substance abuse (Putukian, 2021). These issues are often exacerbated by the unique stressors and demands of the athletic environment, including the pressure to perform, injuries, and the transition from sport (Putukian, 2021).

The prevalence of these mental health problems in elite athletes is similar to that in the general population, with injured athletes reporting higher levels of symptoms (Gulliver et al., 2015). Furthermore, athletes are also at risk of suicide, with a review of the literature revealing a significant number of cases (Baum, 2005). These findings underscore the need for proactive mental health support and education tailored to the unique needs of athletes. The International Olympic Committee has recognized the need for proactive mental health education and tailored support services for this population (Reardon et al., 2019). However, there is a lack of evidence-based guidelines for diagnosis and management of mental health symptoms in elite athletes, highlighting the need for further research in this area (Reardon et al., 2019).

The mental health of athletes is a critical aspect of their overall well-being and performance. (Puri & Sood, 2018) emphasizes the importance of positive mental health in student athletes, while (Purcell et al., 2019a; Putukian, 2021) both underscore the need for early detection and intervention in elite athletes, particularly in the context of mental health concerns and injury risk. (Rogers et al., 2023) further highlights the bidirectional relationship between mental health and injury risk and outcomes in athletes, emphasizing the need for comprehensive support systems. These studies collectively underscore the significance of mental health in athletes and the need for proactive measures to support their well-being.

The primary objective of this study is to conduct a comprehensive examination of mental health in athletes, with a specific focus on various aspects such as publication trends, international collaboration, document sources, and research dissemination. By delving into these areas, we aim to achieve a thorough understanding of mental health in athletes and the broader research landscape surrounding this topic. To accomplish this overarching goal, we have devised a series of research questions that will guide our investigation:

1. Understanding Publication Productivity Trends: Through the utilization of VOSviewer analysis, we aim to unravel the trends in publication productivity pertaining to mental health in athletes. By employing this method, we aim to discern how research output in this area has evolved over time and identify any notable patterns or fluctuations.
2. Analyzing Publication Trajectories: By analyzing publication trajectories spanning the past decade, we aim to uncover patterns and fluctuations in the number of publications related to mental health in athletes. This analysis will provide insights into the trajectory of research in this field and highlight any significant shifts in focus or intensity over time.
3. Insights into International Collaboration and Knowledge Dissemination: We aim to explore the dynamics of international collaboration and the dissemination of knowledge among the global research community in mental health in athlete impact research. By examining collaboration patterns and knowledge-sharing networks, we seek to understand how researchers from different countries collaborate and disseminate their findings in this field.
4. Examining Document Sources and Journal Contributions: Our study will delve into the document sources and journal contributions in analyzing mental health amid athletes. Through this examination, we aim to identify the key sources of research and assess the contributions of different journals to the advancement of knowledge in this area.
5. Dispersal of Research across Disciplines: We will investigate the dispersal of research on mental health in athletes across various disciplines. This analysis will provide insights into the interdisciplinary nature of research in this field and shed light on the diverse perspectives and methodologies employed by researchers.

6. Identifying Leading Countries and Institutions: Our study aims to identify the leading countries and institutions in analyzing mental health in athletes and assess their contributions to the research. By identifying the most prolific countries and institutions, we aim to understand the global distribution of research activity in this field.
7. Key Authors and Their Contributions: We will map the landscape of mental health in athlete research by identifying key authors and assessing their contributions. This analysis will highlight the pivotal role played by individual researchers in shaping the direction and progress of research in this area.
8. Network Visualization and Cluster Analysis: Through network visualization and cluster analysis, we aim to gain a deeper understanding of research focuses and trends in the field of mental health in athletes. By visualizing the connections between key terms and concepts, we seek to uncover underlying patterns and thematic clusters within the research literature.
9. Overlay and Density Visualizations: We will track the evolution of research focuses and trends using overlay and density visualizations. These visualizations will enable us to identify changes in research interests over time and track the emergence of new areas of focus within the field.
10. Utilizing VOSviewer for Research Planning and Identifying Future Directions: Finally, we will explore how VOSviewer can be utilized for research planning and identifying future directions in the study of mental health in athletes. By leveraging this tool, we aim to identify gaps in the existing literature and pinpoint areas that warrant further investigation.

Through a comprehensive exploration of these research questions, we seek to contribute to a deeper understanding of mental health in athletes and provide valuable insights for future research directions in this rapidly evolving field.

Method

Data Source, Study Boundary and Search Strategy

Bibliometric analyses play a crucial role in systematic literature reviews, marked by their clarity, transparency, and reproducibility in constructing review databases. It is essential to clearly define the study's scope and elaborate on the methodologies used to identify relevant sources. In this study, bibliometric data is sourced from the Scopus database, known for its comprehensive coverage, including abstracts and citations of scholarly journal articles. (Ellegaard & Wallin, 2015). Scopus covers a wide array of academic fields, such as medical, technical, social, and scientific studies, all of which are highly pertinent to exploring and improving mental health among athletes. (Colangelo et al., 2023). Scopus provides more extensive coverage than Web of Science, with approximately 20% broader coverage. However, results from Google Scholar may vary in terms of accuracy. (Singh et al., 2021).

Bibliometric analysis techniques are employed to derive insights from bibliographic datasets. These methods unveil structural, social, and author networks, along with prevailing analytical interests within a particular research domain. (Lim & Buntine, 2016)). This method also entails examining statistics of published articles and their citations to assess their significance and scrutinize emerging gaps or subjects (Lim & Buntine, 2016). Additionally, bibliographic analysis utilizes pertinent data sourced from online databases, facilitating scientific investigations and offering a comprehensive outlook on related areas of interest from a global standpoint. (Blakeman, 2018). Figure 1 depicts the execution of these five steps, highlighting the utilization of bibliometric techniques.

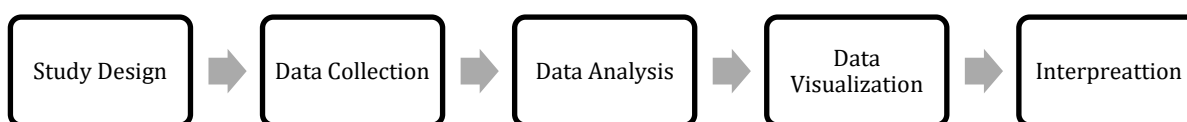


Figure 1. Bibliometric methodology

Study Design

The research design was developed by formulating research inquiries and choosing keywords and databases. It encompasses six investigations into the following aspects: annual publication trends, document sources, fields

of study, and countries; affiliations; most prolific authors; most cited documents; and potential future research opportunities regarding Mental Health in athletes. The design also confirms that the search keywords used were "Mental Health" AND "athletes," with the Scopus database selected as the bibliometric source.

Data Collection

A search strategy involving the title "Mental Health" AND "athletes" within the timeframe of 2018 to 2023 was employed during the data collection phase from the Scopus database. This yielded a total of 729 documents spanning the years 2018 to 2023, sourced exclusively from globally published journals and meeting the criteria of final publication stage and English language usage. Furthermore, the documents were acquired in Comma-Separated Values (CSV) and RIS formats to extract article titles, authors, references, and keywords.

Data Analysis

The data analysis began by importing CSV and RIS data from the Scopus database into Microsoft Excel and VOSviewer software. This step was essential for facilitating subsequent data processing. The analysis sought to identify and understand various prevailing trends, including characteristics of publication output, document sources, distribution of country and institution affiliations, dissemination of subject categories, as well as top authors and citations. This data was thoroughly examined and analyzed to gain a deeper understanding of the current research landscape, with a focus on the period from 2018 to 2023.

Data Visualization

After completing data processing and analysis, the next step entailed data visualization. Visualization was conducted using VOSviewer and Microsoft Excel software. With VOSviewer, processed RIS metadata was utilized to generate visual representations of networks, overlays, and densities. In parallel, Microsoft Excel was employed to present data in tables and diagrams, providing a more lucid and understandable depiction of the identified research trends.

Interpretation

Finally, the data visualized using VOSviewer underwent further analysis and interpretation. This involved examining the number of clusters formed, mapping both old and recent studies, and conducting density analysis to uncover insights about saturation and potential future research opportunities. Diligent interpretation of these visualizations is vital for extracting deeper insights into research patterns and directions within the field.

Results

The pattern of publication output spanning 5 years (2018-2023) sourced from the Scopus database reveals notable fluctuations. Specifically, the analysis of Mental Health in athletes across diverse disciplines displays varying trends throughout this period. There was a progressive increase in the number of documents from 2018 to 2022, with figures rising to 34, 50, 89, 160, and 206 publications, respectively. However, there was a downturn in 2023, with a decrease of 190 publications. Figure 1 provides a visual representation of the annual publication trend.

Main Source Document

The pattern of publication output over a span of 5 years (2018-2023) is primarily derived from journal articles. The majority of these sources center around the topic of mental health in athletes, covering a wide array of fields such as medicine, health professions, psychology, environmental science, and social sciences. Table 1 presents the top ten most prolific sources in terms of publishing articles pertaining to mental health in athletes. Table 1. Distribution of documents by relevant sources from 2018-2023

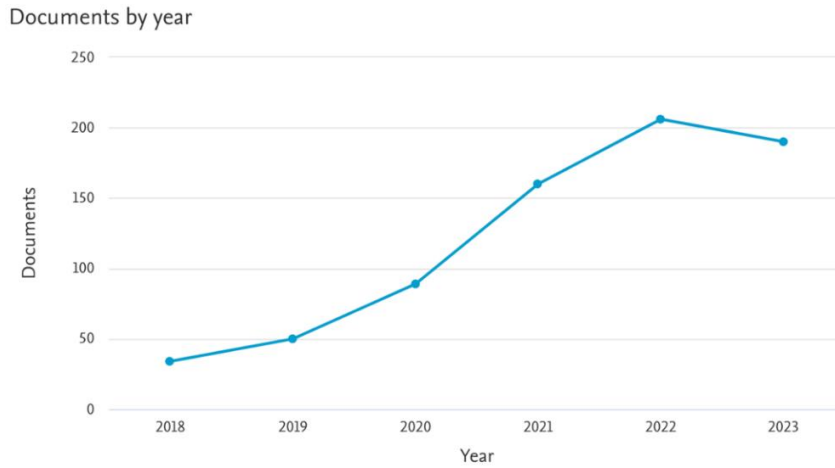


Figure 2. Annual publication trends for the period 2018-2023

Table 1. The top ten most prolific sources

Sources	Articles	SJR Index (Scimagojr 2022)
International Journal Of Environmental Research And Public Health	125	0.83 (Q2)
Frontiers In Psychology	64	0.89 (Q2)
Journal Of Athletic Training	35	1.43 (Q1)
Journal Of Clinical Sport Psychology	23	0.6 (Q2)
Frontiers In Sports And Active Living	22	0.6 (Q1)
Journal Of Physical Education And Sport	20	0.31 (Q3)
Bmj Open Sport And Exercise Medicine	18	1.25 (Q1)
Plos One	18	0.89 (Q1)
Psychology Of Sport And Exercise	15	1.35 (Q1)
Sustainability	12	0.66 (Q1)

Document Based on Subject Area

A collection of 729 publications focusing on mental health in athletes was compiled from documents covering the years 2018-2023, with a notable emphasis on subject areas within the mental health domain. This highlights contributions from various fields, with medicine, health professions, psychology, environmental science, and social sciences contributing 467, 211, 170, 142, and 81 publications respectively. Figure 3 provides a visual representation of the classification of documents highlighting subject areas.

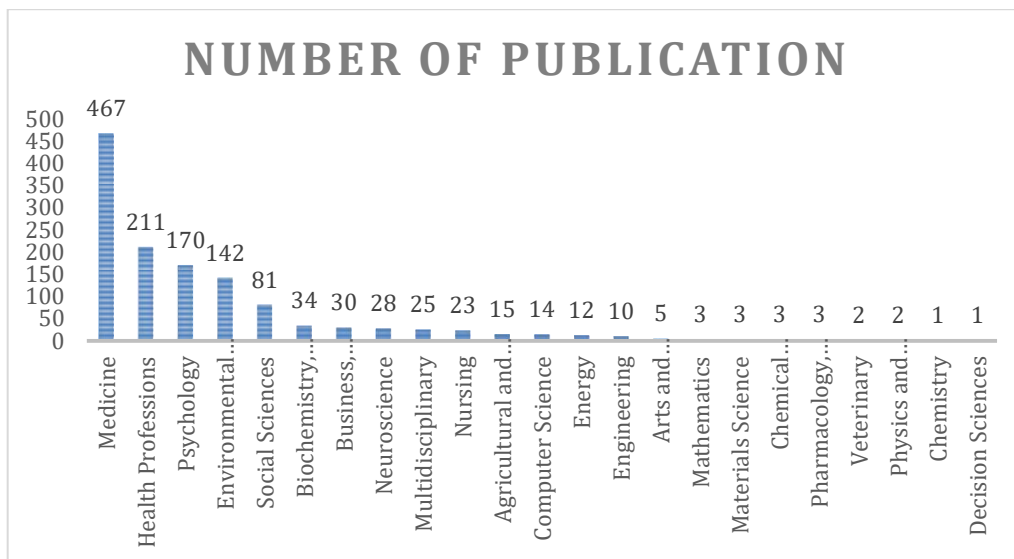


Figure 3. Document by subject area

Top Publications by Country

According to the country classification, a total of 729 documents were distributed, with 193, 139, 73, 62, and 62 articles originating from the United States, United Kingdom, Australia, Canada, and Spain respectively. Figure 4 presents a visual representation of the top 15 countries worldwide in terms of publications concerning Mental Health in athletes.

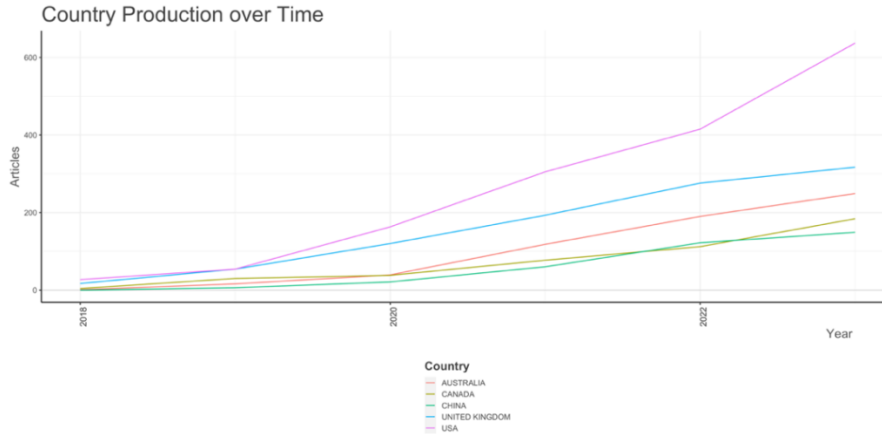


Figure 4. Country over time

University Affiliation

Documents by affiliation ⓘ

Compare the document counts for up to 15 affiliations.

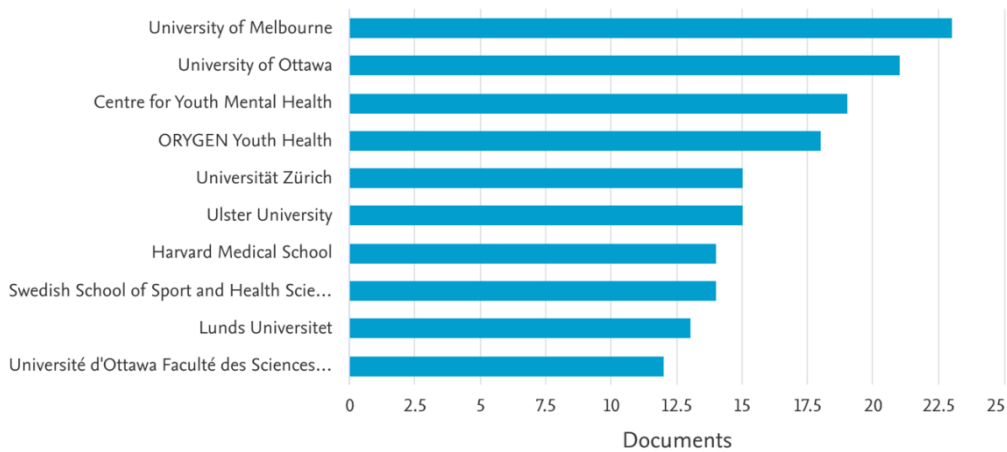


Figure 5. Most relevant affiliation

Figure 4 illustrates the distribution of the top 10 university affiliations focusing on mental health in athletes. The publication distribution spans various university affiliations, with the University of Melbourne emerging as the most productive institution with 23 documents published in the Scopus database. Following closely are the University of Ottawa with 21 documents and the Centre for Youth Mental Health with 19 articles.

Top 10 Authors

In terms of the most pertinent authors in this field, Purcell R leads with 16 documents, followed by Breslin G with 13, and Kentta G with 11 documents. The top 10 authors are depicted in Figure 6.

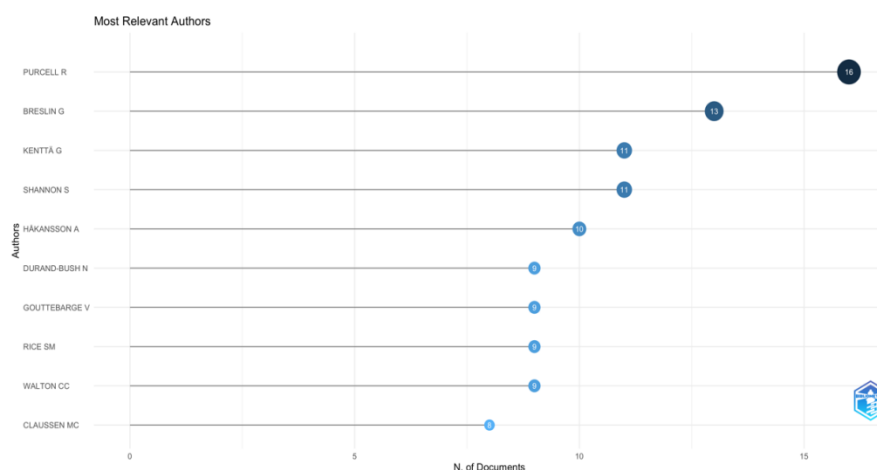


Figure 6. Top 10 Authors

Table 2. The top 10 most cited documents

Author/Year	Title	DOI	Total Citations	TC per Year
Pillay et al., (2020)	Nowhere to hide: The significant impact of coronavirus disease 2019 (COVID-19) measures on elite and semi-elite South African athletes	10.1016/j.jsams.2020.05.016	177	35,40
Purcell et al., (2019b)	Mental Health In Elite Athletes: Increased Awareness Requires An Early Intervention Framework to Respond to Athlete Needs	10.1186/s40798-019-0220-1	159	26,50
McGuine et al., (2021)	Mental Health, Physical Activity, and Quality of Life of US Adolescent Athletes During COVID-19-Related School Closures and Sport Cancellations: A Study of 13 000 Athletes	10.4085/1062-6050-0478.20	129	32,25
Gouttebarghe et al., (2021)	International Olympic Committee (IOC) Sport Mental Health Assessment Tool 1 (SMHAT-1) and Sport Mental Health Recognition Tool 1 (SMHRT-1): towards better support of athletes' mental health	10.1136/bjsports-2020-102411	125	31,25
Chang et al., (2020)	Mental health issues and psychological factors in athletes: detection, management, effect on performance and prevention: American Medical Society for Sports Medicine Position Statement-Executive Summary	10.1136/bjsports-2019-101583	121	24,20
Graupensperger et al., (2020)	Social (Un)distancing: Teammate Interactions, Athletic Identity, and Mental Health of Student-Athletes During the COVID-19 Pandemic	10.1016/j.jadohealth.2020.08.001	111	22,20
Hull et al., (2020)	Respiratory health in athletes: facing the COVID-19 challenge	10.1016/S2213-2600(20)30175-2	110	22,00
Bhatia et al., (2020)	Exercise in the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) era: A Question and Answer session with the experts Endorsed by the section of Sports Cardiology & Exercise of the European Association of Preventive Cardiology (EAPC)	10.1177/2047487320930596	95	19,00
Snedden et al., (2019)	Sport and Physical Activity Level Impacts Health-Related Quality of Life Among Collegiate Students	10.1177/0890117118817715	83	13,83
Gerber et al., (2018)	Effects of stress and mental toughness on burnout and depressive symptoms: A prospective study with young elite athletes	10.1016/j.jsams.2018.05.018	79	11,29

A total of 729 publications concerning mental health in athletes were collected spanning the years 2018-2023, accentuating the focus on mental health issues. This distribution showcases diverse contributions from various disciplines, with medicine, health professions, psychology, environmental science, and social sciences accounting for 467, 211, 170, 142, and 81 publications, respectively. The dissemination of publications across disciplines underscores the interdisciplinary character of mental health research in athletes, with each field offering distinct viewpoints and approaches to examine this intricate topic.

Moreover, the categorization by country demonstrates the dispersion of 729 documents, with 193, 139, 73, 62, and 62 articles originating from the United States, United Kingdom, Australia, Canada, and Spain, respectively. Figure 3 depicts the leading 15 countries worldwide in publications concerning mental health in athletes. The global spread of research output underscores the international importance and relevance of mental health issues among athletes, signaling widespread acknowledgment of the necessity to tackle these concerns on a global level.

Moreover, the examination showcases the top 10 university affiliations emphasizing mental health in athletes, led by the University of Melbourne, trailed by the University of Ottawa and the Centre for Youth Mental Health. The prominence of these institutions underscores their leadership in mental health research within the athletic community, potentially serving as hubs for collaboration and knowledge exchange among researchers and practitioners..

Prominent authors contributing significantly to this subject area include Purcell R, Breslin G, and Kentta G. Their extensive contributions suggest expertise and influence in the field of mental health in athletes, with their research likely influencing research agendas, interventions, and policy decisions. Additionally, the most cited documents per year, sourced from Scopus data, include works by Pillay, Purcell, McGuine, Goutteborge, Chang, Graupensperger, Hull, Bhatia, Snedden, and Gerber. These highly cited documents likely represent pivotal contributions to the field, providing foundational knowledge and shaping future research directions.

Conclusion

The comprehensive examination of mental health trends among athletes over the last five years, covering aspects such as publication output, interdisciplinary contributions, global representation, institutional affiliations, influential authors, and highly cited papers, offers valuable insights into the dynamic landscape of research in this area. The results highlight the multifaceted nature of mental health challenges faced by athletes, emphasizing the necessity for collaborative, interdisciplinary strategies to effectively address these issues. The prominence of specific countries, institutions, authors, and publications underscores their pivotal role in advancing mental health research within the athletic community, while fluctuations in publication output suggest evolving research priorities and emerging areas of interest. Overall, this study lays a strong foundation for future research endeavors, guiding efforts to enhance mental health outcomes and support athletes' well-being on a global scale.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPHELS journal belongs to the authors.

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