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Bibliometric Analysis of Sports Mental Toughness and Sports Self-esteem

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ABSTRACT

The purpose of the study. Participate in elite sports requires a well-prepared long term training under favourable and unfavourable environments, both physically and mentally preparation of an athlete. However, psychological aspects like sports self-esteem and mental toughness are often neglected in sports performance. The present study was conducted to find out whether the trends of two important psychological factors affect the athlete performance or not.

Materials and methods. The bibliometric data was collected from the Web of Science database by searching two keywords "sports mental toughness" and "sports self-esteem." The obtained data was then visualized through VosViewer 1.6.20. The study was conducted from 1991 to 2025.

Results. The result showed that there were 2071 and 526 publications on sports self-esteem and sports mental toughness, respectively. The publications were increased with time for both the keywords, indicating growing research interest in particular topics.

Conclusions. In order to enhance sports performance in relation to mental toughness and self-esteem, more research should be done nationally, to meet the gap of research study like content specific understanding, each other influences, and understanding of coach-athletes relationship.

Keywords: bibliometric analysis; mental toughness; self-esteem; vosviewer; network visualisation map.

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INTRODUCTION

General concept of sports psychology is the scientific knowledge of how people behave, think, and feel during physical and sports activities (Lochbaum et al., 2022; ÖNER, 2023). This field encompasses a wide range of psychological principles applied to enhance athletic performance, training adherence, and overall well-being in sports contexts. Recently, observations in sports psychology have gained more significance because of its proven role in enhancing sports performance (Latinjak & Hatzigeorgiadis, 2021; Reyes-Bossio et al., 2022). With increasing competitive demands in elite sports, athletes and coaches are recognizing that mental preparation is as critical as physical conditioning. Psychological ideas and theories, such as goal-setting, imagery, self-talk, and cognitive-behavioral techniques, are being applied to optimize athlete performance at the highest levels (Didymus, 2018; McCormick et al., 2015; Singh et al., 2023). These interventions help athletes manage pressure, maintain focus, and recover from setbacks, ultimately leading to superior outcomes in competitions.

Physical and motor skills serve as the basic indicators for good athletes, but psychological characteristics are also crucial for achieving and sustaining optimum performance (Huang, 2023; McCormick et al., 2015). For instance, factors like motivation, concentration, and emotional regulation can determine the difference between victory and defeat in high-stakes events. The development of personality, mental toughness, and performance represents three core areas of sport psychology, where mental

abode Authors' Contribution: a-Study design; b-Data collection; c-Statistical analysis; d-Manuscript preparation; e-Funds collection.

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toughness emerges as a key aspect that is often poorly understood and misinterpreted (Crust, 2007; YAZICI et al., 2022). Mental toughness is typically defined as a psychological edge that enables athletes to cope better than their rivals with the demands and pressures encountered in sport, including consistency under stress, unwavering commitment, and thriving on pressure (Cowden, 2017; Crust, 2007). Despite its importance, conceptual clarity remains elusive, with varying definitions leading to challenges in measurement and training.

An athlete's psychological makeup greatly impacts how well they perform, prompting coaches to incorporate psychological techniques into their training regimens (Reinebo et al., 2023; Swandana et al., 2025). Evidence from systematic reviews shows that interventions like psychological skills training, mindfulness-based approaches, and imagery can yield moderate improvements in athletic outcomes (Reinebo et al., 2023; Reyes-Bossio et al., 2022; Wang et al., 2025). A balance between both physical and psychological abilities is the prerequisite for effective athlete training programs. The most elite athletes have built their proficiency and prowess upon a foundation of mental toughness (Lan et al., 2025; Stamatis et al., 2020). Systematic reviews confirm that targeted interventions can cultivate mental toughness, with large effects observed in both observational and experimental studies (Fletcher & Sarkar, 2016). Even some of the most well-known youth sport organizations, such as national academies and Olympic development programs, have frequently and repeatedly emphasized the value and importance of developing mental toughness in their programs (Alvarez-Becerra et al., 2024; Şirin & Erdoğan, 2025). It is crucial for athletes to perform better in sports, cope with stress, maintain a positive attitude, and, in addition, enhance communication skills, self-belief, emotional management, and resilience (Crust & Clough, 2011). These attributes not only boost individual performance but also foster team cohesion and long-term career sustainability. Furthermore, integrating mental toughness training with self-esteem enhancement—another pivotal psychological factor—can create a synergistic effect, as low self-esteem may undermine resilience while high self-esteem amplifies toughness. Bibliometric trends indicate a surge in research on these topics, underscoring their relevance for future sports science advancements.

MATERIALS AND METHODS

Data collection

The data were collected from 1991 to 2025 by using the Web of Science database. Sports mental toughness and sports self-esteem are the variables used for search engine. Several publications appeared on the screen, followed by extraction was done as a plain-text file in full record format. After extraction, the data were saved in a folder. The other data collected from topic searches were year-wise publications, publication types, and country/region-wise publications, and they were exported to Excel. The saved data were further used for data analysis.

Data analysis

The extracted bibliographic data from Web of Science was visualized in the "VOSviewer" which is a freely available platform but it requires Java installation prior to download this tool. The extracted data was submitted to VOSviewer to make network visualization maps. For the network visualization map creation, keywords related to sports mental toughness and sports self-esteem were screened by taking the keywords that occurred a minimum of five times in a publication. The co-occurrences of keywords were searched in a full counting method. Then colourful network visualisation image was appeared on the screen and saved in the system. The bigger font size indicates more co-occurrences on that keyword. The connectedness between two keywords was represented by network. The bibliometric data for sports mental toughness and self-esteem was analysed on 17th April, 2025.

RESULTS

Research trends on sports mental toughness

Upon searching on the Web of Science, 526 results of sports mental toughness that are present globally appeared on the screen. This data search revealed that no Indian publications were present on sports mental toughness, clearly indicating the need for exploring the topic to enhance sports performance. Moreover, the extent of work published in the area of sports mental toughness is very limited and could be explored more globally and nationally. The exponential growth was found by searching the number of publications done over a period of time, i.e., the number of publications increasing with increasing time. Before 2015, very limited research was done on this particular topic. Nevertheless, after 2015 the number of publications increased drastically, as shown in Figure 1, indicating increasing interest in or requirement of conducting research in this particular area.

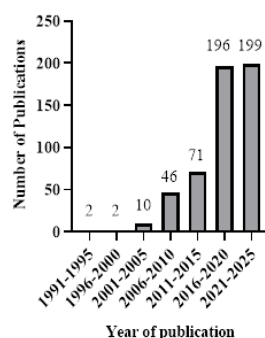


Figure 1. Number of publications on sports mental toughness over period of time

The exported data of publications types revealed that out of 526 publications, 85.93% publications are research articles and remaining



14.06% publications are falls under meeting abstract, review, early excess, editorial material, book review, proceeding paper and book chapter as shown in the Figure 2.

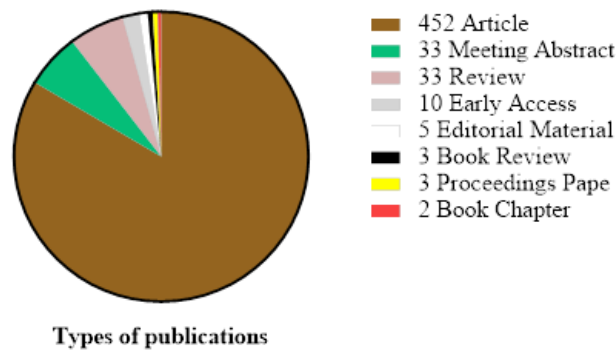


Figure 1. Types of publication on sports mental toughness

The top 20 countries involved in sports mental toughness are given in the Figure 3. England is the top most country involved in sport mental toughness research followed by USA, Australia, China, and Canada.

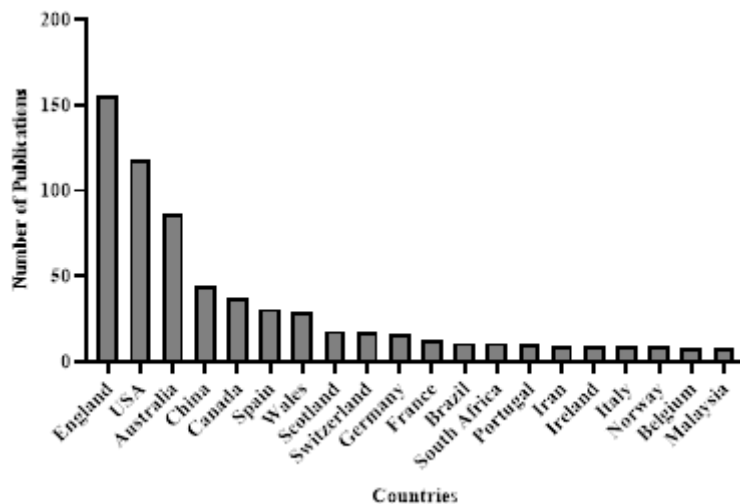


Figure 3. Top 20 countries involed in sports mental toughness research

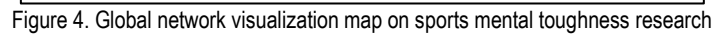
The most cited top 5 publications (As per Web of Science) on sports mental toughness with their journal name and citation score are presented in the Table 1.

Table 1. Most Cited publications on Sports mental toughness as per Web of Science

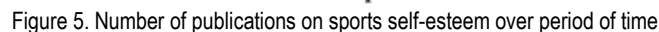
SL No	Publication Name	Journal Name	Citations
1	Psychological Characteristics and Their Development in Olympic Champions	Journal of Applied Sport Psychology	613
2	What Is This Thing Called Mental Toughness? An Investigation of Elite Sport Performers	Journal of Applied Sport Psychology	389
3	Psychological Resilience in Sport Performers: A Review of Stressors and Protective Factors	Journal of Sports Sciences	328
4	A Framework of Mental Toughness in the World's Best Performers	The Sport Psychologist	248
5	The Concept of Mental Toughness: Tests of Dimensionality, Nomological Network, and Traitness	Journal of Personality	237

VOSViewer data on Sports Mental Toughness

As shown in the Figure 4, the keywords related to sports mental toughness in different publications are personality, sports psychology, athlete, coping strategies, coping skills, self-efficacy, psychological skill, social support, health, toughness, motivation, mental health, goals, self-confidence, competition, talent identification, stress, anxiety, exercise, experience, well-being, emotional intelligence and many more.



Upon searching on the Web of Sciences, total 2071 publications of sports self-esteem were found globally and the number of publications on sports self-esteem increased exponentially. Whereas, only 8 results were found nationally on sports self-esteem which clearly shows though globally sports self-esteem are trending, it is not explored in India. Hence, research on sports self-esteem need to be done for the upcoming generation.



Types of Publications

Publication Type	Approximate Percentage
Article	85%
Review	10%
Meeting Abstract	2%
Proceedings Paper	1%
Early Access	1%
Book Review	1%

The top 20 countries involved in sports self-esteem are given in the Figure 7. USA is the top most country involved in sport self-esteem

research followed by England, Japan, Canada, and Australia. India holds 49th position for publishing on Sports self-esteem. This research calls for exploring the sports self-esteem in order to enhance the sports performance and success in India.

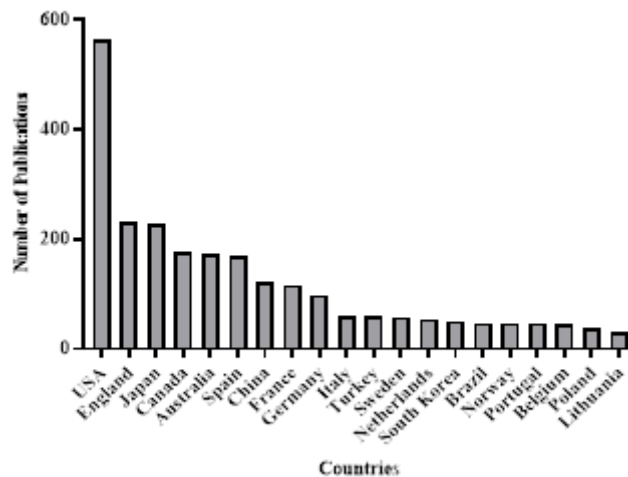


Figure 7. Top 20 countries involved in sports self-esteem research

The most cited top 5 publications (As per Web of Science) on sports self-esteem with their journal name and citation score are presented in the Table 2.

Table 2. Most Cited Publications on Sports Self-Esteem as per Web of Science

SL No	Publication Name	Journal Name	Citations
1	Physical activity and mental health in children and adolescents: a review of reviews	British Journal of Sports Medicine	1,479
2	A systematic review of the psychological and social benefits of participation in sport for children and adolescents: informing development of a conceptual model of health through sport	International Journal of Behavioural Nutrition and Physical Activity	1,395
3	Toward a psychology of positive youth development	American Psychologist	1,316
4	Reciprocal Effects of Self-Concept and Performance From a Multidimensional Perspective Beyond Seductive Pleasure and Unidimensional Perspectives	Perspectives on Psychological Science	867
5	The influence of physical activity on mental well-being	Public Health Nutrition	741

VOSViewer result on Sports self-esteem

The national network visualization map for sports self-esteem presented in the Figure 8. As shown in the Figure 8, the keywords related to sports self-esteem in different publications are Covid-19, self-efficacy, gym, exercise, lockdown, adherence, music, gym workout, esteem, life, social support, athletes, body image, sedentary behaviour, school, enrolment, coaching, participation and few more.

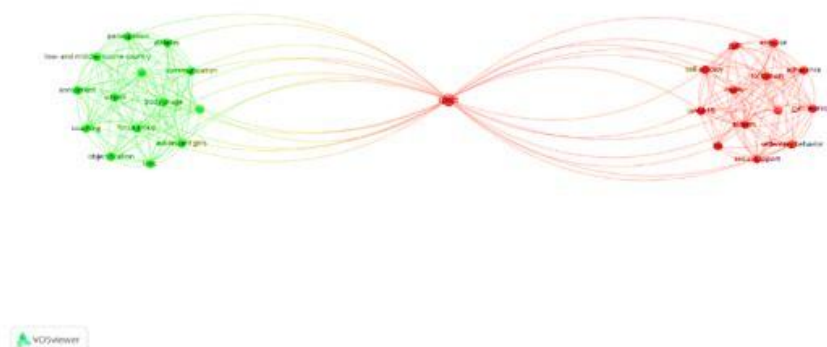


Figure 8. National network visualization map on sports self-esteem

The global network visualization map for sports self-esteem presented in the Figure 9; the keywords related to sports self-esteem in different publications are children, exercise, adolescents, esteem, health, personality, anxiety, gender, stress, obesity, perceptions, sports participation quality of life and many more.



DISCUSSION

In conclusion, although global trends show a significant increase in interest in sports mental toughness and sports self-esteem, there is an urgent need for Indian researchers to fill the national research gap. By conducting more studies in these areas, India can contribute substantially to the development of sports psychology and ultimately enhance the performance and well-being of its athletes on both national and international stages.

CONCLUSION

For a better understanding of athlete performance in relation to mental toughness and self-esteem, more research should be done as the bibliometric data showed very little work has been done nationally. This two psychological factors are very important for improving sports performance and achieving success in national and international level. The results assist athletes, coaches, and sports psychologists by emphasizing key areas of academic and emerging subjects, which can guide evidence-based practices and interventions designed to enhance athletic performance and well-being. Moreover a large percentage of youth is involve in sports

sector therefore youth development and public health may upgrad or promote by this research. The research work also inspire to young people to engage in sports field for fostering holistic and sustainable approach for athlete development. Furthermore, this analysis encourages collaboration among various disciplines and geographic areas, thereby fostering a more global and inclusive research community.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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