A Bibliometric Analysis Study on Sport Sciences: Trends and Recommendation for Athletes' Performance

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ABSTRACT

Background: Sports science is responsible for locating, approving, developing, and perfecting various strategies to improve athletic performance. New methods for assessing an athlete's technical and physical prowess are being created daily, and fresh training concepts are evolving impressively swiftly. If coaches had access to the most up-to-date techniques and knowledge to create the most effective training plans, athletes would gain significantly. This study aims to find patterns and make recommendations to stakeholders to enhance athlete performance. **Method:** A literature review of documents was conducted from 2018 to 2022, specifically focusing on "sports science" in 2023. 408 English-language documents in the area of medicine were identified using the Scopus database. Scopus search analysis and VOSviewer software were employed to analyze the bibliometric data. **Result:** The top three keywords' trends found in this study were health (1.41%), physical (1.15%), and sports (0.89%). The top results revealed a positive correlation between overall sports sciences scores on physical and activity (Pearson correlation score ± 0.74 - 0.73, P>0.50). Sports injury, types of sport, physical, epidemiology, basic science study, and physiotherapy are the six clusters our study on sports sciences has discovered. The trends analyzed in this study were sports sciences, sports performance, and sports injury. This study recommends enhancing the physical training performance of athletes for the sports they are playing. **Conclusion:** A sports science approach to evidence-based practice could effectively prevent athlete injuries and physiotherapy management. The coaches should be concerned about the health and safety of their athletes. The practice of sports medicine can improve sports science and athlete performance.

Key words: Athletic Performance, Athletic Injuries, Exercise, Sport Medicine

INTRODUCTION

Players and coaches must put forth tremendous work to improve performance. However, one must recognize the influence that science has today on their ability to perform better. New techniques for evaluating an athlete's physical and technical performance are being developed daily, and new training ideas are emerging remarkably quickly. Athletes would benefit significantly if coaches could access the most recent techniques and expertise to deliver the most efficient training programs (Talpey & Siesmaa, 2017). When applied to practice, sports science research strives to help coaches and athletes produce intended beneficial performance outcomes (Coutts, 2017). The interaction between sports science practitioners, researchers, and coaches is crucial due to its potential to influence player welfare, athlete/ team success, and a positive work environment (Fullagar et al., 2019).

The field of sports science is responsible for identifying, validating, creating, and honing numerous protocols and tactics to enhance athletic performance (Pyne & Etxebarria, 2019). Moreover, modern sports science includes sports medicine, physiology, strength and conditioning, biomechanics, sports nutrition, performance analysis, and skill acquisition (Pyne & Etxebarria, 2019). Sports science is still developing due to linked fields of evidence-based scientific inquiry. The scientific community generates knowledge quicker than the coaching and sports science communities can apply and take advantage of it (Pyne & Etxebarria, 2019).

Over the past few decades, the awareness and acceptance of sports science support in team sports have increased

dramatically. In conventional support organizations, a single sports scientist would serve in various capacities for a team, including physical trainer, nutritionist, and even sports psychologist (Malone et al., 2019). Substantial technology advancements and the greater availability of data have driven the rise of support roles within a team. Modern professional teams often hire multiple sports science professionals who specialize in physiology, biomechanics, nutrition, and psychology (Malone et al., 2019). Also supported by Krizkova et al. (2021) Stated that physical development, biomechanical aptitude, psychological preparedness, and tactical awareness (genetics, nutrition, general health, well-being, sociocultural factors, etc.) are needed to improve athletic performance. Moreover, typical practitioner roles include sports psychologist, data scientist, strength and conditioning coach, and rehabilitation fitness instructor (Malone et al., 2019).

Sports science can provide valuable insights that affect athletic performance and practice, significantly influencing the sports environment (Brink et al., 2018). Athletes in various sports have had greater access to technology, and performance analysis has evolved accordingly over the last several decades. Therefore, performance analysis has evolved into an essential component of the coaching process, an athlete's development, and a substantial competitive edge. Performance analysts constitute a cohesive strategy that evaluates the interplay among participants and their specific skill components despite employing only a subset of the available technologies (Krizkova et al., 2021). Performance analysis is an essential component of the mentoring process and cannot be successfully carried out without it. The general consensus is that psychological readiness, physical conditioning, biomechanical proficiency, and tactical acumen all play a role in sports performance (Krizkova et al., 2021).

Despite the significant advancements in sports science and its potential to enhance athletic performance, there is a noticeable gap between the new techniques and their practical application by coaches and athletes. The interaction between practitioners, researchers, and coaches is crucial for translating scientific knowledge into effective training programs. However, the inconsistent integration and reliance on traditional roles resulted in suboptimal training outcomes. There is an urgent need to bridge this gap to fully leverage the benefits of sports science in improving athlete performance and welfare. This study aims to identify current trends in the integration of sports science into athletic training programs and to provide recommendations for stakeholders to enhance athlete performance through evidence-based practices.

METHOD

Literature Sources and Search

A qualitative literature review methodology was applied in this study. An internationally recognized peer-reviewed journal was found by scanning the database at (https://www.scopus.com). Between 2018 and 2022, the terms "sport AND sciences" were used in the Scopus database. All data were gathered simultaneously in January 2023 to eliminate any bias introduced by the database's expansion. Scopus is a meticulously curated database where articles undergo a stringent selection process for inclusion. Submitted publications are reviewed and chosen based on stringent quality and scientific rigor criteria. This selection is conducted by an independent Content Selection and Advisory Board (CSAB), which comprises experts from various scientific fields. This rigorous vetting ensures that only high-quality content is indexed, thereby affirming Scopus's credibility (Baas et al., 2020). It is noteworthy that many sports science studies are published in the Scopus database.

Eligibility Criteria and Study Selection

The eligibility and study selection in this research are based on specific criteria. The following were the inclusion criteria for this systematic review: (1) the study had to be a research article focused on sports medicine, (2) it had to be published as an article, (3) it had to be in the final stage of publication, (4) it had to be published between 2018 and 2022, and (5) it had to be written in English. The exclusion criteria encompass the following: (1) articles that are not in the final stage of publishing, and (2) topics that do not pertain to medicine. The procedures employed in this investigation to generate a thorough study image are shown in (Figure 1).

Data Collection Process

The data were exported in RIS export file format to share information about study maps. The map was then created using three distinct modes of analysis: Scopus menu search, VOSviewer, and Nvivo 12 Plus. The descriptive approach was used to analyze Scopus search results based on the publication year, country, and research topic. In the interim, VOSviewer created a bibliometric map of research advancement based on the sports sciences' most pressing issue. Multiple refinements were performed on the collected data to obtain information on sports sciences. Utilizing the NVivo 12 Plus software, the correlation between indicators, variables, and keywords used in this study was determined. The purpose of this correlation was to evaluate the sports sciences. The terms most often used when exploring sports sciences were also mapped using VOSviewer software.

The context of sports sciences was established using the author's or title's keyword. The following search query are: TITLE-ABS-KEY (sport AND sciences) AND (LIMIT-TO (PUBSTAGE, "final")) AND (LIMIT-TO (PUBYEAR, 2022) OR LIMIT-TO (PUBYEAR, 2021) OR LIMIT-TO (PUBYEAR, 2020) OR LIMIT-TO (PUBYEAR, 2019) OR LIMIT-TO (PUBYEAR, 2018)) AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (SUBJAREA, "MEDI")) AND (LIMIT-TO (LANGUAGE, "English")) AND (LIMIT-TO (SRCTYPE, "j")) AND (EXCLUDE (SUBJAREA, "HEAL") OR EXCLUDE (SUBJAREA, "SOCI") OR EXCLUDE (SUBJAREA, "BIOC") OR EXCLUDE (SUBJAREA, "ENVI") OR EXCLUDE (SUBJAREA, "BUSI") OR EXCLUDE (SUBJAREA, "PSYC") OR EXCLUDE (SUBJAREA, "NURS") OR EXCLUDE (SUBJAREA, "NEUR") OR EXCLUDE (SUBJAREA, "ENGI") OR EXCLUDE (SUBJAREA, "PHAR") OR EXCLUDE (SUB-
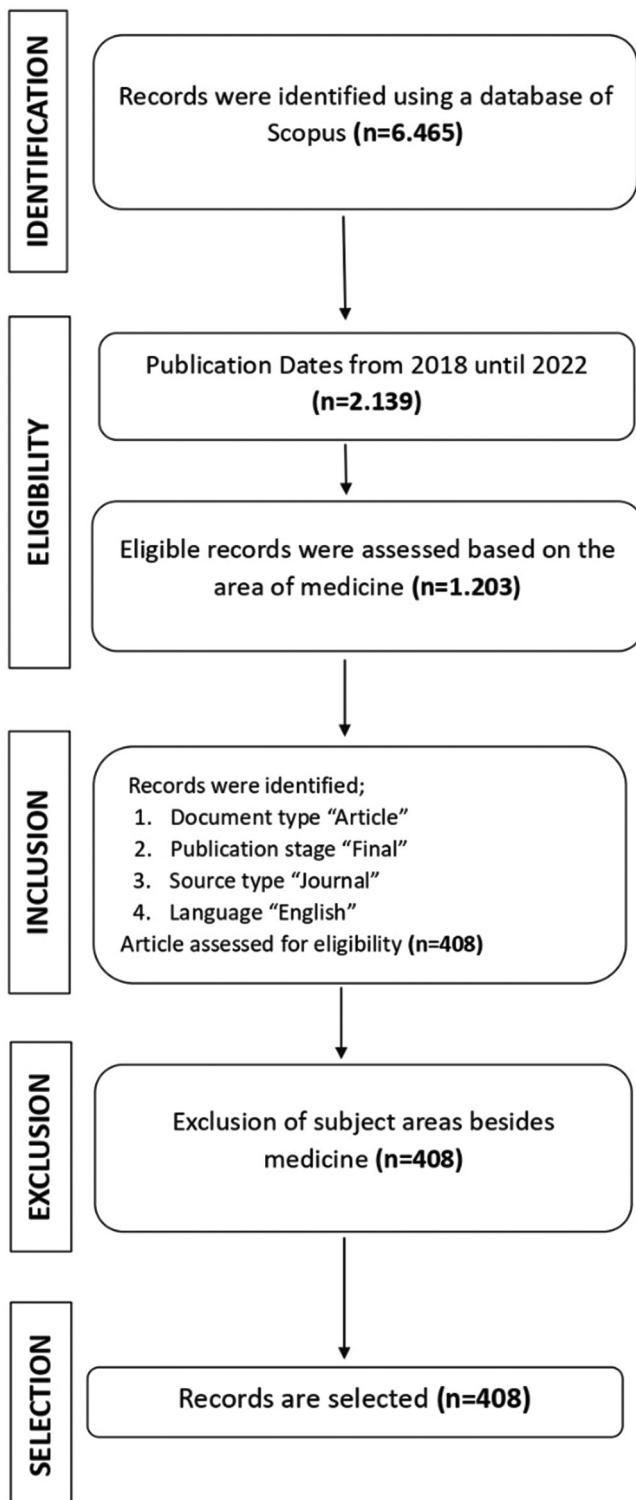
Figure 1. Flow diagram of sports sciences initiative selection process (adapted from Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., et al. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. BMJ, 372, n71. https://doi.org/10.1136/bmj.n71)

JAREA, "COMP") OR EXCLUDE (SUBJAREA, "ARTS") OR EXCLUDE (SUBJAREA, "CHEM") OR EXCLUDE (SUBJAREA, "DECI") OR EXCLUDE (SUBJAREA, "IMMU") OR EXCLUDE (SUBJAREA, "CENG") OR EXCLUDE (SUBJAREA, "MATH") OR EXCLUDE (SUB-

JAREA, "MULT") OR EXCLUDE (SUBJAREA, "AGRI") OR EXCLUDE (SUBJAREA, "DENT") OR EXCLUDE (SUBJAREA, "MATE") OR EXCLUDE (SUBJAREA, "VETE") OR EXCLUDE (SUBJAREA, "PHYS")). These results have 408 documents.

Co-authorships helped in studying the social structure of the research area. The study sorted the dimensions of analysis, the units using bibliometric searches, and mixed citations were utilized for the bibliometric study. Among the citations were co-occurrences to comprehend the document set patterns supporting the research, a bibliographic coupling that used several references shared by the two documents as a comparison measure, and co-citations that may assist in identifying the conceptual framework of the study's topic. The authors conducted a co-occurrence analysis of key-words, a co-authorship analysis of prominent authors and country distribution, a co-citation analysis of cited sources, a citation analysis of documents and organizations, and a co-citation reference network analysis. These methods were used to generate and produce figures and data from cited sources.

RESULTS AND DISCUSSION

Publication by Year

The 408 papers included in this study's analysis covered 2018 through 2022. According to research studies carried out over the previous fifteen years, more publications on sports sciences cover the past five years, especially in 2021. It shows that the trends in sports sciences grow yearly. Several papers served as the foundation for studies on sports sciences across 71 nations. It shows the geographical distribution of scientific production in the United States (83 papers), United Kingdom (53 papers), Italy (36 papers), China (34 papers), Germany (24 papers), Iraq (27 papers), Canada (24 papers), Japan (23 papers), Australia (21 papers), and Netherlands (20 papers). The yearly pattern in articles about sports sciences (Figure 2).

This study examines the annual publication rate and trends in research topics in this field. Research trends in 2018 were movement, treatment outcome, and health status. Incidence, procedure, and surgeon occur on 2019 trends. Between 2020 and 2021, the most notable trends occurred—2020 trends in sport science, exercise, and physical education. Research on sports medicine, injury, and lifestyle was conducted in 2021. In 2022, the trends were patient compliance, orthopedic surgery, and preoperative evaluation. Certain findings demonstrated how interest in these academic topics has grown each year. To improve athlete performance, one must explore the topics of sports medicine and science, injury, physical education, and exercise.

Trending Topics

The width or size of the circle represents the frequency of the author's keyword phrases by the bibliography periodicity requirements of at least five words per year. (Table 1). Table 1 shows the keywords like health (1.41%), physical

Figure 2. The keywords trends of sport sciences by year

Table 1. Trending topics of keywords using nvivo 12 plus

Word	Length	Count	Percentage (%)	Word	Length	Count	Percentage (%)
Health	6	11748	1.41	Outcome	7	2472	0.30
Physical	8	9580	1.15	Performance	11	2334	0.28
Sports	6	7418	0.89	Medical	7	2266	0.27
Exercise	8	7272	0.87	Life	4	2120	0.25
Activity	8	6498	0.78	Assessment	10	1980	0.24
Adult	5	3786	0.45	Quality	7	1940	0.23
Care	4	3598	0.43	Knee	4	1852	0.22
Medicine	8	3516	0.42	Pain	4	1840	0.22
Training	8	3410	0.41	Heart	5	1818	0.22
Muscle	6	3224	0.39	Shoulder	8	1782	0.21
Disease	7	3178	0.38	Treatment	9	1670	0.20
Injury	6	3136	0.38	Ligament	8	1586	0.19
Body	4	2800	0.34	Effect	6	1532	0.18
Patient	7	2566	0.31	Factors	7	1524	0.18
Risk	4	2526	0.30	Strength	8	1484	0.18

Length: the number of letters or characters in the word. *Count*: the number of times that the word occurs within the project items searched. *Percentage* (%): the frequency of the word relative to the total words counted

(1.15%), sports (0.89%), exercise (0.87), activity (0.78), adult (0.45), care (0.43), medicine (0.42), training (0.41), and muscle (0.39).

Keyword Analysis

VOSviewer was used to evaluate the retrieved keywords. A tool for building and displaying bibliometric networks is called VOSviewer. By varying the color code for each cluster, the network visualization of each cluster VOSviewer divided the bibliometric mapping of sports sciences into six clusters (Table 2). Hospital sports injuries are covered in Cluster 1, types of sports are covered in Cluster 2, physical

injuries are discussed in Cluster 3, epidemiology is discussed in Cluster 4, Cluster 5 discusses essential science studies, and Cluster 6 is about physiotherapy.

Keyword Relation

Table 3 was analyzed using Nvivo 12 Plus to present the Pearson correlation coefficient score in sports sciences keywords. The relationship in sports sciences between physical activity, physical, physical activity, program, performance, health, exercise, injury, and athletes has a strong correlation range ± 0.74 - 0.64 (p>0.50). Sports significantly correlate with physical (0.74) and activity (0.73).

Table 2. The Clusters' Themes of Keywords Analysis

Cluster	Items	Total	Percentage
Cluster 1: Sport injury	Anterior cruciate ligament, anterior cruciate ligament reconstruction, arthroscopy, clinical assessment, clinical feature, clinical outcome, conservative treatment, daily life activity, disease association, functional status, health status, knee, knee osteoarthritis, middle-aged, orthopedic surgery, orthopedics, osteoarthritis, osteoarthritis knee, pain, patient-reported outcome, physiotherapy, preoperative evaluation, proprioception, range of motion, reproducibility, return to sport, scoring system, sports injury, sports medicine, surgeon, surgery, thrombocyte rich plasma, treatment outcome, visual analog scale	34	29%
Cluster 2: Types of sport	Adult, athlete, athletes, basketball, education, female, football, hand, health education, human, implementation science, knowledge, male, performance, physical education, soccer, sport, sports, sports science, training,	20	17%
Cluster 3: Physical Performance	Anthropometry, athletic performance, body composition, body mass, body mass index, body weight, diet, endurance, exercise test, fat mass, fitness, gender, health promotion, leg, nutrition, patient compliance, physical fitness, physical performance, sex difference	19	16%
Cluster 4: Epidemiology	Aged, epidemiology, exercise, health, health science, incidence, lifestyle, lifestyle modification, low back pain, medical student, physical activity, practice guideline, prevalence, risk assessment, risk factor, risk factors, running, sex ratio, swimming	19	16%
Cluster 5: Basic science study	Baseball, basic science study, biomechanical phenomenon, biomechanics, elbow, elbow joint, injury, joint characteristics and functions, kinematics, movement, movement (physiology), orthopedic surgeon, physiology, range of motion articular, shoulder, shoulder joint, velocity	17	15%
Cluster 6: Sport Physiotherapy	Exercise therapy, gait, kinesiotherapy, muscle strength, muscle-skeletal procedures, resistance training, skeletal muscle	8	7%

Table 3. Relation of Sport Sciences Keywords

	Code A	Code B	Pearson Correlation Coefficient
Sports Sciences	Sports	Physical	0.74067
	Sports	Activity	0.73448
	Sports	Physical activity	0.69434
	Sports	Program	0.6912
	Sports	Performance	0.67292
	Sports	Health	0.6697
	Sports	Exercise	0.64819
	Sports	Injury	0.64692
	Sports	Athletes	0.64521

Discussion

The top ten countries that produce documents are the United States (83 papers), the United Kingdom (53 papers), Italy (36 papers), China (34 papers), Germany (24 papers), Iraq (27 papers), Canada (24 papers), Japan (23 papers), Australia (21 papers), and Netherlands (20 papers). According to Greatest Supporting Nation (2022), the top ten countries in all sports in the world are the United States, France, China, Great Britain, Canada, Italy, Australia, Japan, Germany, and the Netherlands. This means that countries that produce documents are also included in the top ten countries in the world. Sports science evidence-based practice may impact areas outside training, such as management, regulations, and education to improve sports performance. Exercise and sports scientists are increasingly required to demonstrate that their work is grounded in solid evidence and has a significant impact on professional practice and policy (Faulkner et al., 2006). The majority of athlete-centered research seeks to be implemented in practice, where it can be used to inform the development of better athlete preparation and performance (Coutts, 2017). Sports science has advanced evidence collection and evaluation principles, emphasizing the importance of reliable evidence for practitioners to ensure desired outcomes and assess the effectiveness of their practices (Levack-Payne, 2021). This process produces what is known as evidence-based or even evidence-informed practice.

Sports injury is a significant concern in sports science, as it affects athletes' performance and well-being and poses challenges for coaches, practitioners, and researchers. By examining the provided references, we can gain insights into the relationship between sports injury and sports science and how the field of sports science contributes to the prevention, management, and understanding of sports-related injuries. Bahr et al. (2020) Highlight the significance of documenting and reporting epidemiological information concerning injuries and illnesses related to sports. Their consensus statement provides guidelines for standardized data collection, which is crucial for understanding injury patterns and risk factors and developing evidence-based injury prevention strategies. This emphasizes the role of sports science in collecting and analyzing data to inform injury prevention practices.

Besides, hamstring injuries are a common concern in sports and shed light on the increasing rates of hamstring injuries in professional football (Ekstrand et al., 2020). This study underscores the need for research and intervention strategies to address this specific injury type. Sports science can play a vital role in investigating the mechanisms, risk factors, and rehabilitation approaches for hamstring injuries, enabling practitioners to develop effective prevention and treatment strategies (Ekstrand et al., 2022). The advancement of sports sciences is frequently mentioned since it can help improve sports personnel, which may then have a good impact on how sports are practiced and performed (Rees et al., 2016; Sandercock et al., 2016).

Epidemiology and basic science studies also advance our understanding of sports-related injuries and optimize athlete health and performance (Coutts, 2017; Malone et al., 2019; Talpey & Siesmaa, 2017). These research approaches provide valuable insights into the incidence, prevalence, risk factors, and mechanisms underlying sports injuries. By examining the provided references, we can explore how epidemiology and basic science studies contribute to the field of sports science and inform injury prevention strategies and interventions. Bahr et al. (2020) focus on the International Olympic Committee consensus statement on recording and reporting epidemiological data on sports-related injuries and illnesses while Ekstrand et al. (2022) present a study on the increasing rates of hamstring injuries in professional football over recent seasons (Bahr et al., 2020; Ekstrand et al., 2022). This reference highlights the significance of standardized approaches in collecting data to enhance comparability and facilitate evidence-based decision-making in sports injury prevention. It emphasizes the role of epidemiology in providing valuable information about the changing trends and prevalence of specific injuries, such as hamstring strains in elite athletes. Understanding these epidemiological patterns helps researchers and practitioners identify potential risk factors and develop targeted preventive strategies (Bahr et al., 2020; Ekstrand et al., 2022; Martin et al., 2022).

Sports physiotherapy plays a crucial role in preventing, treating, and rehabilitating sports-related injuries. It is a specialized field in sports science that optimizes athletes' physical health, function, and performance. Explores the role of sports physiotherapy in improving athletes' body composition, physical fitness, physical activity, and nutrition (López-Sánchez et al., 2020). This reference highlights the multifaceted approach of sports physiotherapy in addressing various aspects of athlete well-being, not just injury management. It emphasizes integrating physiotherapy interventions with other critical factors for optimal performance. The study conducted by Viana et al. (2019) also emphasizes the role of sports physiotherapy in enhancing athletic performance by focusing on near-peer teaching programs in sports and exercise science education (Viana et al., 2019). While not directly centered on physiotherapy, this reference highlights the importance of educating and training skilled sports physiotherapists who can deliver evidence-based interventions to optimize athletes' recovery and performance. Furthermore, sports physiotherapists are designing and implementing individualized treatment plans, including manual therapy,

therapeutic exercises, and functional rehabilitation, to facilitate optimal healing and a safe return to sport (Martin et al., 2022; Whiteley et al., 2018).

Injury prevention is a significant aspect of sports science. Malone et al. (2019) discuss the perspectives of collaboratively applied sports science research in professional team sports. They emphasize the importance of interdisciplinary collaboration, where sports scientists work closely with coaches, practitioners, and athletes to implement evidence-based injury prevention strategies. This collaboration allows for integrating scientific knowledge, training techniques, and injury monitoring to optimize athlete performance while minimizing the risk of injury (Franchini & Kokubun, 2019; Krizkova et al., 2021; Viana et al., 2019). Furthermore, Fullagar et al. (2019) highlighted the translation of sports science research into practice. Establishing a connection between research findings and practical application is crucial for effective injury prevention and management. Sports scientists need to communicate research findings to coaches, athletes, and practitioners in an easily understandable way that is applicable to real-world sports settings. This knowledge transfer ensures that evidence-based practices are implemented to reduce the occurrence and severity of sports injuries.

This finding also mentioned types of sports due to the athletes' performances. Different sports pose varying risks of injury due to their specific demands and characteristics. The study by Martin et al. (2022) provides insights into hamstring strain injuries, which are prevalent across a range of sports. Understanding the injury mechanisms specific to each sport, such as late swing or early stance in high-speed running, as discussed by Kenneally-Dabrowski et al. (2019), is essential within the realm of sports science, enabling researchers, coaches, and practitioners to customize training programs, strategies for preventing injuries, and protocols for rehabilitation according to the distinct demands of each sport. Taking into account the distinctive traits and injury susceptibilities linked to various sports, sports scientists can play a role in crafting successful interventions aimed at improving performance and lowering the occurrence of sports-related injuries.

Undoubtedly, physical performance is a crucial aspect of sports science as it directly influences an athlete's ability to excel in their chosen sport. By examining the provided references, we can gain insights into the importance of physical performance in sports and how it is studied and optimized through sports science. Bayköse et al., (2021) and López-Sánchez et al. (2020) shed light on the relationship between physical performance and other factors such as mental toughness, physical fitness, body composition, physical activity, and nutrition. These studies highlight the multidimensional nature of physical performance and emphasize the need for a holistic approach when assessing and enhancing an athlete's capabilities. In addition, ultrasound measures of muscle thickness can be used as a potential indicator of physical performance in individuals with knee osteoarthritis (Gellhorn et al., 2018). This study suggests that ultrasound measures may provide valuable insights into muscle health and strength, crucial components of physical performance.

Moreover, the study conducted by Viana et al. (2019) focused on employing a near-peer teaching approach to enhance the academic achievement of students studying sports and exercise science, particularly in the area of gross anatomy. Although this study does not directly address physical performance in sports, it emphasizes the significance of knowledge acquisition and educational interventions in enhancing overall performance in sports science-related disciplines. Sports science plays a critical role in studying, assessing, and enhancing physical performance in sports. By considering factors such as mental toughness, body composition, fitness, and nutrition, sports scientists can contribute to developing effective training programs and interventions to optimize physical performance and maximize athletes' potential. Overall, these findings demonstrate the multidisciplinary nature of sports science in understanding, preventing, and managing sports injuries. From epidemiology to essential science research and sports physiotherapy, the field of sports science plays a critical role in optimizing athlete performance, minimizing injury risks, and facilitating effective injury rehabilitation.

The interplay between sports injury, types of sports, physical performances, epidemiology, essential science study, and sports physiotherapy is essential for maximizing athletic performance, reducing injury occurrences, and supporting efficient rehabilitation. By incorporating the findings from the provided references, researchers, coaches, and practitioners can develop comprehensive strategies to enhance performance, reduce injury incidence, and support the overall well-being of athletes. Collaboration and integration between various disciplines within sports science are key to advancing our understanding and applying these principles. As supported by the cited references, ongoing research and knowledge exchange are critical for continuously improving sports science and sports physiotherapy practices.

The study underscores the importance of standardized data collection and reporting in understanding and preventing sports injuries, thereby facilitating evidence-based decision-making. The strength of this study lies in its comprehensive approach to examining how sports science can optimize athletic performance and its clear call for stakeholders to commit to implementing evidence-based practices. By focusing on the integration of research findings into practical applications, the study provides a robust framework for improving athlete preparation, performance, and injury management, ultimately advancing the field of sports science and its impact on sports practice. However, this study was restricted to a literature review as its primary methodology, and only one database was searched. More in-depth research is needed to improve sports science. Therefore, subsequent studies may incorporate and evaluate trends and tactics employed other than literature review to achieve a broader comprehension of prevalent practices within the field.

CONCLUSION

A sports science approach to evidence-based practice would be promising if stakeholders committed to improving athletes' performance in physical training regarding athletes and their type of sports. This evidence can prevent sports injury in athletes. Also, the management and treatment of physiotherapy regarding athlete's injuries. Integrating sports sciences is essential for long-term athlete teams. The results of this study also have shown that the athlete team, such as the trainer, should be concerned about the athlete's health. Sports medicine can support the sports sciences and increase athlete performance.

AUTHOR CONTRIBUTIONS

MF: concept development, data collection, data analysis, writing, and editing. MU: concept development, data collection, and data analysis. RAK: writing and data analysis. MZC: writing and data collection.

DATA AVAILABILITY

All data sets analyzed in this review are available from the corresponding author upon reasonable request.

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