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Bibliometric Analysis Of Studies On Fitness Between 2000-2024 On Web Of Science Database

Web Of Scıence Veri Tabanı Üzerinde 2000-2024 Yılları Arasında Fitness Üzerine Yapılmış Çalışmaların Bibliyometrik Analizi

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Abstract

This study was conducted in response to the need to comprehensively reveal the general trends and structural characteristics of the rapidly increasing scientific publications in the field of fitness in recent years. The aim of the study is to examine bibliometrically the contents of scientific studies on fitness published between 2000 and 2024 within the Sport Science category of the Web of Science, a scientific database. The study was carried out using bibliometric analysis, one of the quantitative research approaches, and a total of 14,934 articles obtained from the Web of Science database were included in the analysis. The research sample did not consist of individuals but of articles published within the specified years; the Web of Science database was used as the data collection tool, and the VOSviewer® software was employed as the data analysis tool. During the analysis process, publication years, co-authorship structures, most cited authors, countries, institutions, sources, and keywords were examined, and network, density, and linkage maps were generated. The findings showed that the highest number of publications in the field of fitness was produced in 2022; the most cited author, country, institution, and source were Barry A. Franklin, the USA, the University of South Carolina, and the Journal of Strength and Conditioning Research, respectively; and the most frequently used keyword was "exercise." In conclusion, the findings are considered to reveal the current state of scientific production in the field of fitness and to serve as an important reference and guide for future research in this area.

Keywords Bibliometric Analysis, Fitness, Athlete and Performance

ÖZ

Bu çalışma, fitness alanında son yıllarda hızla artan bilimsel yayınların genel eğilimlerini ve yapısal özelliklerini bütüncül biçimde ortaya koyma gerekliliğinden hareketle gerçekleştirilmiştir. Araştırmanın amacı, bilimsel bir veri tabanı olan Web of Science içerisinde 2000–2024 yılları arasında Sport Science kategorisinde fitness alanına yönelik yayımlanan bilimsel çalışmaların içeriklerini bibliyometrik açıdan incelemektir. Çalışma nicel araştırma yaklaşımlarından biri olan bibliyometrik analiz yöntemiyle yürütülmüş, Web of Science veri tabanından elde edilen toplam 14.934 makale analiz kapsamına alınmıştır. Araştırma grubu herhangi bir bireyden değil, belirtilen yıllar arasında yayımlanan makalelerden oluşmakta; veri toplama aracı olarak Web of Science veri tabanı, veri analiz aracı olarak ise VOSviewer® programı kullanılmıştır. Analiz sürecinde yayın yılları, ortak yazarlık yapıları, en fazla atıf alan yazarlar, ülkeler, kurumlar, kaynaklar ve anahtar sözcükler incelenmiş; ağ, yoğunluk ve bağlantı haritaları oluşturulmuştur. Bulgular, fitness alanında en fazla yayının 2022 yılında gerçekleştirildiğini, en çok atıf alan yazarın Barry A. Franklin, ülkenin ABD, kurumun University of South Carolina ve kaynağın Journal of Strength and Conditioning Research olduğunu, en sık kullanılan anahtar sözcüğün ise "exercise" olduğunu göstermiştir. Sonuç olarak elde edilen bulguların, fitness alanındaki bilimsel üretimin mevcut durumunu ortaya koyduğu ve bu alanda yapılacak gelecekteki araştırmalar için yol gösterici ve önemli bir başvuru kaynağı niteliği taşıdığı düşünülmektedir.

Anahtar Kelimeler Bibliyometrik Analiz, Fitness, Sporcu ve Performans

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Introduction

Physical activity is a broad concept that encompasses all bodily movements requiring energy expenditure through the contraction of skeletal muscles. In this context, in addition to planned and structured exercises such as walking, running, cycling, and swimming, activities including household chores, gardening, stair climbing, and movements performed during daily transportation are also considered physical activity. An increase in physical activity levels stimulates the respiratory and circulatory systems, elevating heart rate and respiratory capacity, and produces positive effects on the musculoskeletal system, metabolic processes, and neuromuscular functions. Accordingly, physical activity is regarded as a fundamental element in maintaining not only physical but also physiological and psychological well-being (Alp et al., 2024; Akın et al., 2024).

According to reports by the World Health Organization, regular physical activity plays a significant role in the prevention of and support for the treatment of non-communicable chronic diseases such as cardiovascular diseases, hypertension, type 2 diabetes, obesity, and breast and colon cancers. Moreover, there is strong scientific evidence indicating that physical activity enhances immune system function, increases bone mineral density, and exerts positive effects on mental health. However, under contemporary conditions, the sedentary nature of working life, technological advancements, ease of transportation, and increasing urbanization have markedly reduced physical activity levels; consequently, a physically inactive lifestyle has become a major global public health problem. Physical inactivity increases the prevalence of chronic diseases and places a substantial burden on healthcare systems (Can et al., 2014).

Closely related to the concept of physical activity, sport is a phenomenon whose origins date back to the earliest periods of human history and which has evolved over time through the attribution of various social, cultural, and religious meanings. In early periods, physical activities bearing the characteristics of sport were primarily performed for survival, hunting, displays of strength, and preparation for warfare. In ancient civilizations, these activities became integrated with ritualistic and ceremonial practices; particularly in Ancient Greece, sport acquired a regulated and organized structure by being associated with aesthetic, moral, and educational values. The Olympic Games stand as one of the most concrete examples of this understanding, demonstrating the social and cultural significance of sport. During the Middle Ages, sport persisted mainly in the form of chivalric games, folk entertainments, and competition-based activities; with the Renaissance, it was reconsidered within the framework of physical education. With the Industrial Revolution and the process of modernization, sport—especially centered in England—acquired clearly defined rules, an established organizational structure, and a universal character. Today, sport has become a multidimensional field of activity that generates not only physical performance but also social interaction, cultural identity, and economic value (Terlemez, 2022).

The concept of fitness, while related to physical activity and sport, represents a more distinct and comprehensive structure in terms of its historical development and objectives. The origins of fitness extend back to Antiquity; in Ancient Greece, physical

fitness was addressed through the gymnasion in conjunction with ideals of strength, endurance, and aesthetics. In the Roman period, fitness-like practices were employed primarily for military preparation and the enhancement of physical endurance (Berryman, 2010). Although this understanding largely declined during the Middle Ages, the renewed interest in the human body during the Renaissance led to the re-emergence of physical exercises within educational and health contexts (Park, 1989).

The foundations of modern fitness were laid in the nineteenth century with the emergence of the "physical culture" movement. During this period, the gymnastics systems developed by Friedrich Ludwig Jahn in Germany and the Swedish gymnastics approach introduced by Per Henrik Ling pioneered the scientific and systematic treatment of physical exercise. In the same era, Eugen Sandow's work in the field of bodybuilding highlighted the aesthetic dimension of physical fitness and contributed to the dissemination of fitness among the general public (Todd, 1995). These developments played a significant role in the acceptance of fitness not merely as an individual health behavior but as a planned and structured approach to bodily development.

From the twentieth century onward, advancements in exercise physiology, biomechanics, and sport sciences placed the concept of fitness on a scientific foundation. During this period, fitness ceased to be a concept associated solely with physical appearance and began to be addressed as a field directly linked to health, performance, and quality of life. The term fitness, of English origin, denotes a state of being healthy and strong; according to the Turkish Language Association, it is defined as "healthy living" (Yeler, 2021). In contemporary literature, fitness is defined as a process aimed at the planned and systematic development of multiple components, including cardiorespiratory endurance, muscular strength and endurance, flexibility, movement quality, and body composition (Garber et al., 2011; Eraslan et al., 2020).

This scientific perspective is supported by public health evidence demonstrating that regular physical activity reduces the risk of chronic diseases and enhances quality of life; consequently, fitness has evolved from an individual preference into a normatively recommended health behavior on a global scale. The World Health Organization recommends regular fitness-based exercise programs to enable individuals to maintain their physical fitness levels throughout the lifespan (WHO, 2020). This has led to the recognition of fitness not as an activity confined to fitness centers but as a strategic field that directly influences public health.

Modern fitness culture has become institutionalized through measurable performance outcomes, standardized exercise guidelines, and individualized training programs. At the same time, fitness has acquired a competitive and organizational dimension; international federations and competition organizations have developed competitive systems that evaluate the aesthetic, strength, and functional performance components of physical fitness across different disciplines (IFBB Pro League, 2024). In particular, the widespread adoption of competition formats based on functional training has enabled fitness to be conceptualized within a contemporary sporting framework that assesses multiple physical capacities simultaneously (CrossFit Games, 2010–).

In conclusion, while the concepts of physical activity, sport, and fitness are historically and conceptually interrelated, they are addressed today in line with different

purposes and functions. Physical activity constitutes the broadest framework, sport primarily refers to regulated and organizational structures, and fitness stands out as a contemporary form of physical activity and sport that has been restructured around the axes of health, performance, and lifelong physical fitness. The multidimensional and interdisciplinary nature of the fitness field necessitates the systematic examination of the thematic distributions, methodologies, and research trends of scientific studies produced in this area; therefore, analyzing scientific publications in the field of fitness is of great importance for revealing the dynamics of the field's development and guiding future research.

Material and Methods

Research Design

In this study, the bibliometric analysis technique, one of the quantitative research methods, was employed. Bibliometric analysis is a method that quantitatively reveals the relationships among studies published on a topic defined by the researcher within specified limitations (Kara & Özsarı, 2024).

Data Collection Method

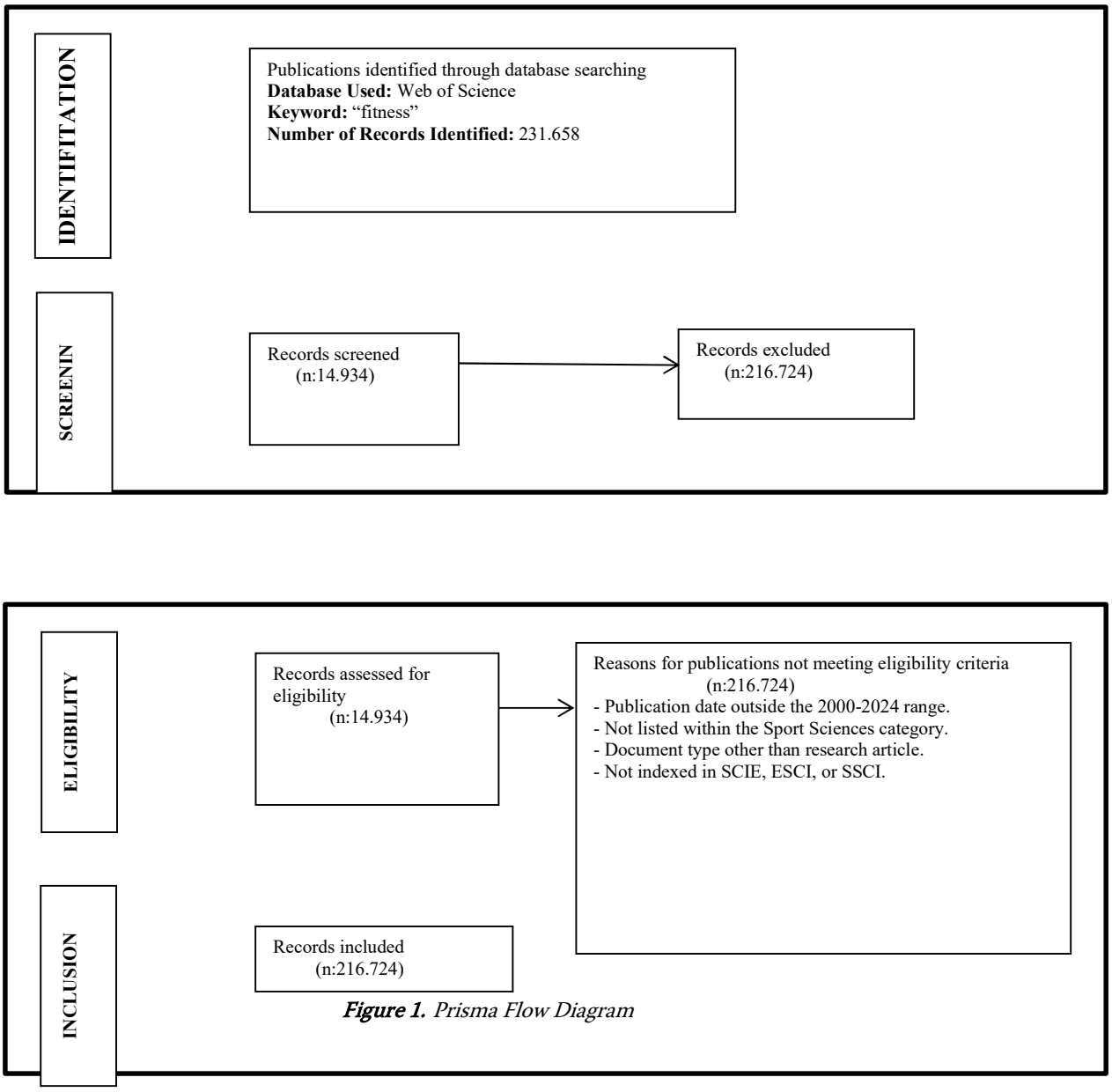

Figure 1. *Prisma Flow Diagram*

In this study, the data were obtained from the Web of Science database on December 15, 2025, by using the keyword "fitness" and applying filters for document type (article), indexes (Science Citation Index Expanded, Emerging Sources Citation Index, and Social Sciences Citation Index), category (Sport Sciences), and publication years (2000–2024). Accordingly, review articles, editorial materials, meeting abstracts, in-process publications, early access articles, book chapters, and retracted publications were excluded from the study. The initial dataset, which comprised 216,724 articles, was reduced to 14,934 articles following the evaluation process.

Data Analysis

The data obtained in the study were analyzed using the VOSviewer analysis software. VOSviewer is a program that helps visualize the collected data (Kara & Özsarı, 2024; VOSviewer, 2025).

Limitations of the Study

This study, in which the keyword fitness was examined in the Web of Science database using the VOSviewer software, has certain limitations. These limitations can be listed as follows:

•This study is limited to the Science Citation Index Expanded, Emerging Sources Citation Index, and Social Sciences Citation Index within the Web of Science database.

Findings

Table1. Percentage distribution of the number of publications by year (Web of Science, 2025)

Publication Years	Number of Publications	% of 14934
2024	998	6.68%
2023	973	6.51%
2022	1.063	7.12%
2021	1.044	6.99%
2020	1.036	6.93%
2019	1.014	6.79%
2018	837	5.60%
2017	825	5.52%
2016	774	5.18%
2015	683	4.57%
2014	615	4.12%
2013	580	3.88%
2012	539	3.61%
2011	559	3.74%
2010	538	3.60%
2009	469	3.14%
2008	393	2.63%
2007	330	2.21%
2006	305	2.04%
2005	261	1.75%
2004	238	1.59%
2003	248	1.66%
2002	205	1.37%
2001	209	1.40%
2000	198	1.33%

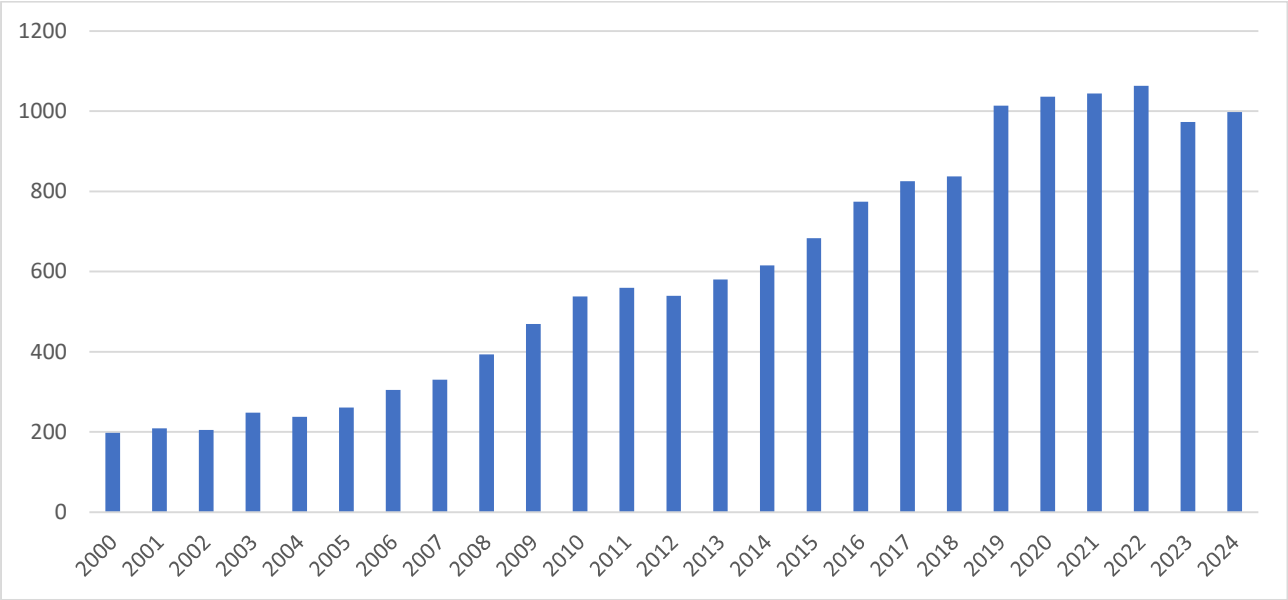

Figure 2. *Graphical representation of the distribution of the number of publications by year*

When the graph is examined, it is observed that the number of scientific publications in the field of fitness was limited in the early 2000s, showed a steady increase after 2010, and reached its peak particularly between 2019 and 2022. This trend indicates that academic interest in fitness and exercise sciences has increased markedly in recent years.

Research Model

In order to identify authors with the highest total link strength and the greatest level of collaboration, a co-authorship network map was generated based on the criterion of having at least 15 publications. The analysis revealed that the co-authorship network consisted of a total of 1,752 authors grouped into 41 clusters, with 8,229 links established among them.

The five authors with the highest citation counts were identified as Barry A. Franklin (13,424 citations), Steven N. Blair (11,700 citations), Russell R. Pate (6,573 citations), Carlo Castagna (4,693 citations), and Charles H. Hillman (3,721 citations). However, among these authors, Carlo Castagna was the only one occupying a clearly central position within the network in terms of total link strength.

The five authors with the highest number of publications were Carlo Castagna (88 publications), Peter Krustrup (77 publications), Rodrigo Ramirez-Campillo (62 publications), Francisco B. Ortega (60 publications), and Urs Granacher (53 publications). Among these authors, Rodrigo Ramirez-Campillo, Carlo Castagna, and Francisco B. Ortega were found to be among the strongest authors in the network in terms of total link strength, in line with their publication output (Figure 3).

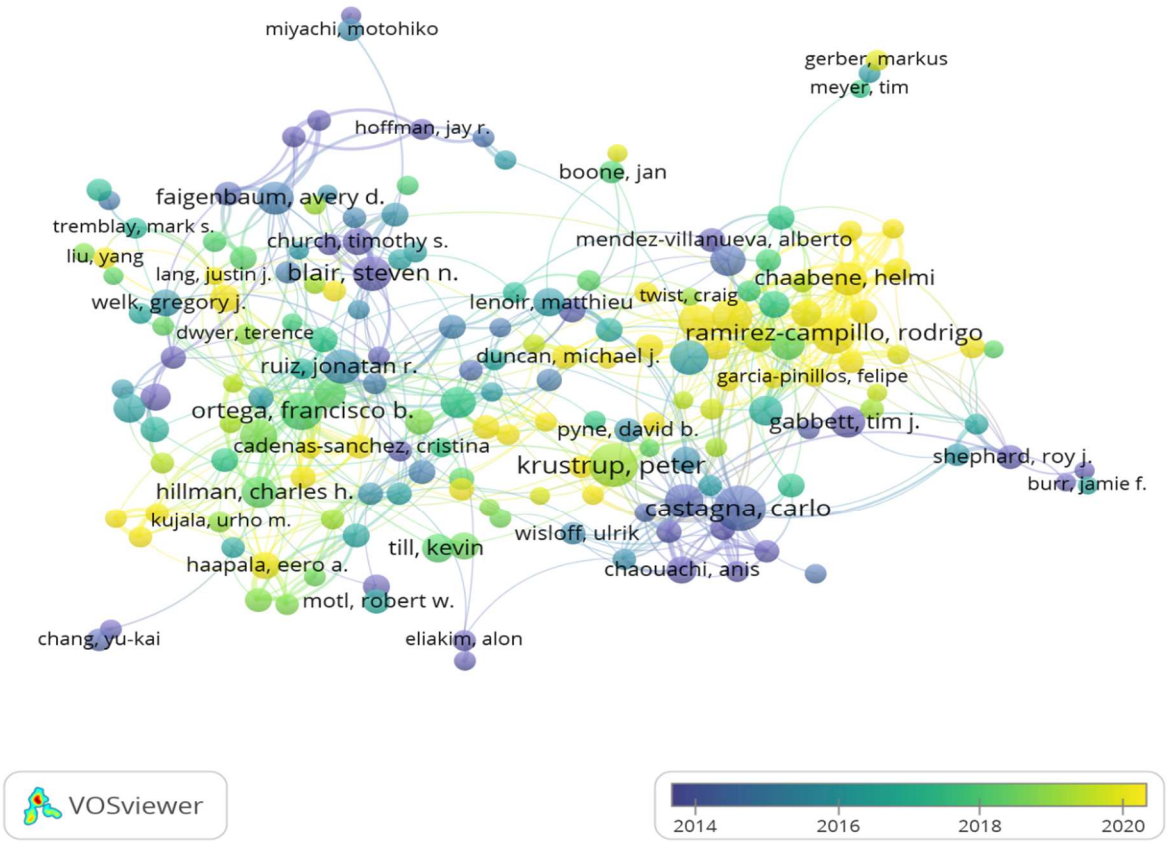

Figure 3. Co-Authorship Analysis of Authors

Research Model

Table2. The Top 10 Most Cited Researchers

No	Authors	Citation Count	Total Link Strength
1	Barry A. Franklin	13424	223
2	Steven N. Blair	11700	257
3	Russell R. Pate	6573	140
4	Carlo Castagna	4693	1515
5	Charles H. Hillman	3721	418
6	David F. Stodden	2778	444
7	Francisco B. Ortega	2760	561
8	Martin Buchheit	2619	587
9	Karim Chamari	2555	564
10	Jennifer L. Etnier	2469	173

Out of 46,183 researchers, a citation analysis was conducted for 206 authors based on the criterion of having at least 15 publications. The results of the analysis indicated that the citation relationships among authors were divided into six clusters, with 5,001 links identified within the network and a total link strength of 22,825.

Barry A. Franklin was identified as the author with the highest number of citations, totaling 1,324 citations. He was followed by Steven N. Blair, Russell R. Pate, Carlo Castagna, and Charles H. Hillman, respectively. However, despite Barry A. Franklin's high citation count, his total link strength was found to be relatively low, suggesting that this author has limited co-authorship relationships. In contrast, Carlo Castagna's high total link strength indicates that he not only has a high number of publications and citations but has also developed extensive and strong collaborative relationships with multiple research groups (Figure 4).

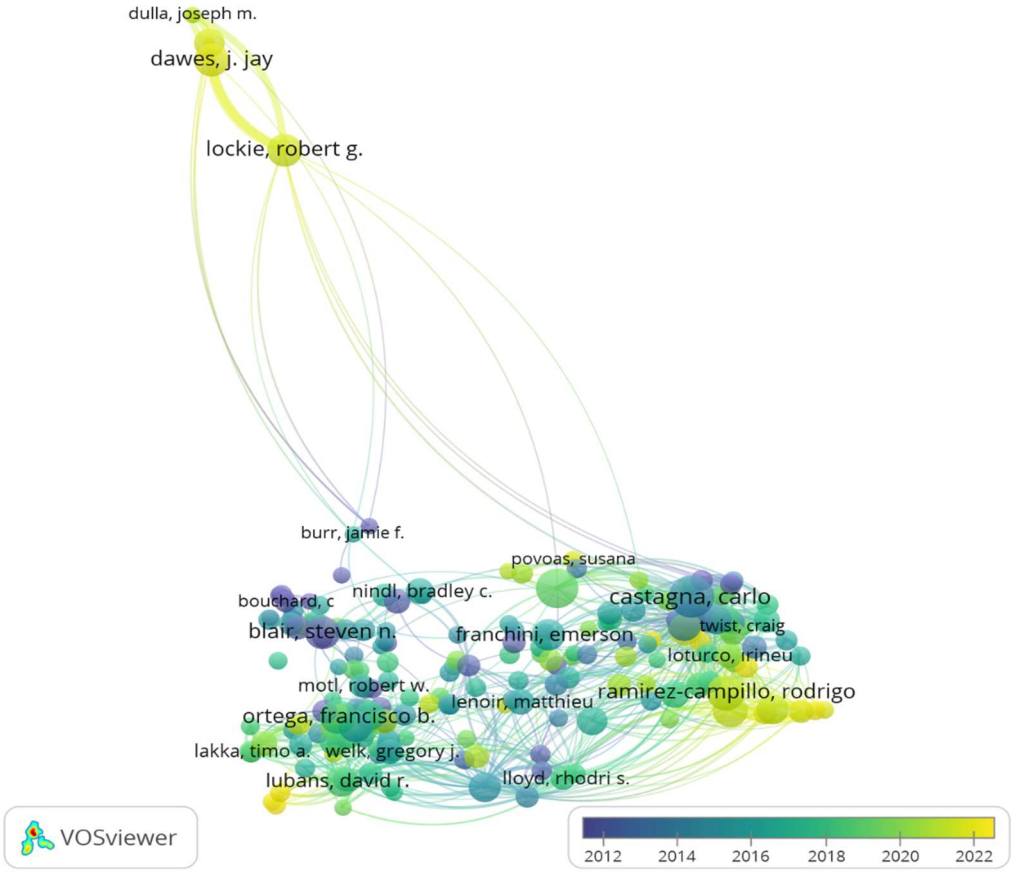

Figure 4. Co-Citation Analysis of Authors

Table 3. The Top 10 Authors with the Highest Number of Publications

No	Authors	Number of Publications	Total Link Strength
1	Carlo Castagna	88	1515
2	Peter Krustrup	77	615
3	Rodrigo Ramirez-Campillo	62	776
4	Francisco B. Ortega	60	561
5	J. Jay Dawes	53	905
6	Urs Granacher	53	618
7	Robert G. Lockie	52	933
8	Steven N. Blair	52	257
9	Karim Chamari	50	564
10	Jonatan R. Ruiz	49	379

The combined evaluation of Table 2 and Table 3 indicates that having a high citation count does not always coincide with a strong co-authorship network; however, it also shows that some authors occupy a central position in the field in terms of both citation count and total link strength.

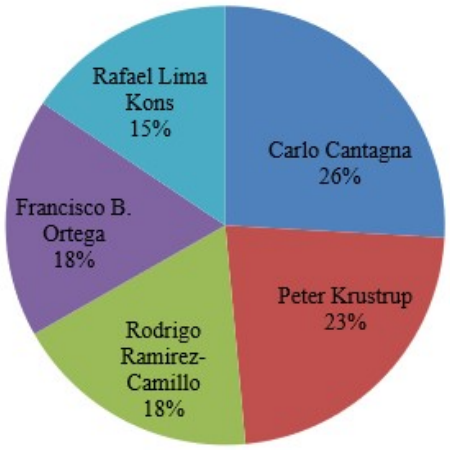

Figure 5. Graphical Representation of the Top 5 Authors with the Highest Number of Publications

Citation Analysis of Countries

Table 4. Countries Conducting Research on Fitness

Argentina	Australia	Austria	Belgium	Bosnia and Herzegovina
Brazil	Canada	Chile	China	Colombia
Costa Rica	Croatia	Cyprus	Czech Republic	Denmark
Egypt	Estonia	Finland	France	Germany
Greece	Hungary	India	Indonesia	Iran
Ireland	Israel	Italy	Japan	Lithuania
Malaysia	Mexico	Netherlands	New Zealand	Northern Ireland
Norway	Poland	Portugal	Qatar	Romania
Russia	Saudi Arabia	Scotland	Serbia	Singapore
Slovakia	Slovenia	South Africa	South Korea	Spain
Sweden	Switzerland	Thailand	Tunisia	Türkiye
Ukraine	United Arab Emirates	United Kingdom	United States	Wales

Table 5. The Top 10 Countries with the Highest Number of Citations

No	Authors	Citation Count	Total Link Strength
1	United States	143792	23465
2	Australia	56651	15624
3	United Kingdom	52103	17188
4	Kanada	40459	8094
5	Spain	35112	13882
6	Netherlands	19605	2722
7	Brazil	18511	8522
8	Italy	16713	8341
9	France	15425	6207
10	Denmark	15351	5119

Out of 131 countries, a citation analysis was conducted for 62 countries based on the criterion of having at least 15 publications. The results of the analysis indicated that the inter-country citation network was divided into five clusters, with 1,161 links identified within the network and a total link strength of 11,118.

The countries with the highest citation counts were the United States (143,792 citations), Australia (56,651 citations), the United Kingdom (52,103 citations), Canada (40,459 citations), and Spain (35,112 citations), respectively. In addition, the countries receiving the highest numbers of citations were also found to have high total link strength, indicating that these countries occupy central positions within international collaboration networks (Figure 6).

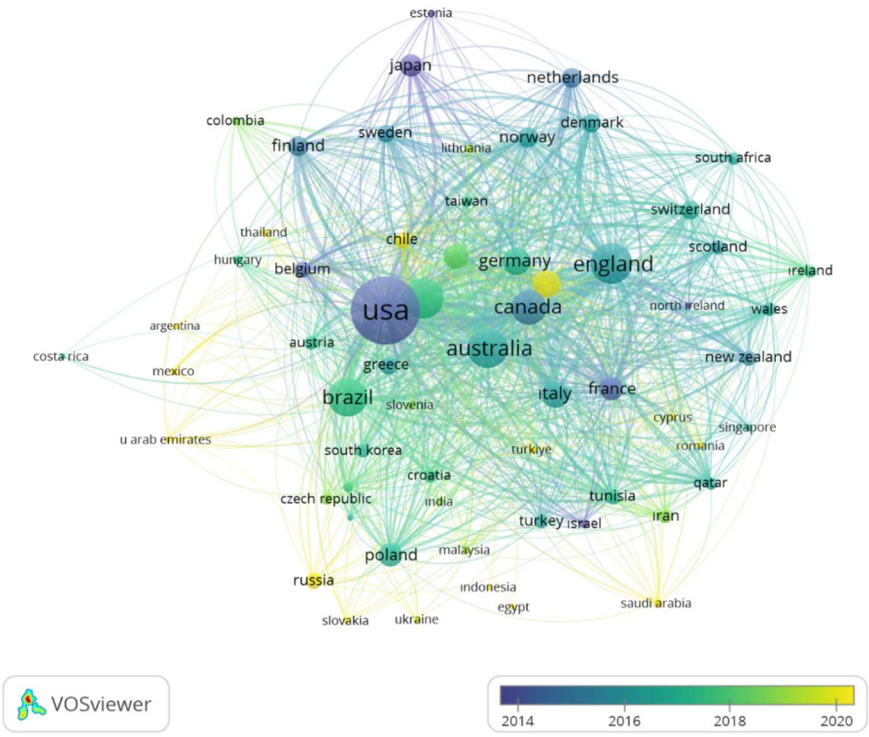

Figure 6. Citation Analysis of Countries

Table 6. The Top 10 Countries with the Highest Number of Publications

No	Authors	Number of Publications	Total Link Strength
1	United States	4016	23465
2	United Kingdom	1410	17188
3	Spain	1403	13882
4	Australia	1351	15624
5	Brazil	1270	8522
6	Canada	1064	8694
7	Italy	665	8341
8	Germany	636	5037
9	Chine	631	3704
10	Portugal	556	7310

An examination of Table 5 and Table 6 reveals that the United States is the country with the highest number of publications, citations, and total link strength in the field of fitness, with 4,016 publications, 143,792 citations, and a total link strength of 23,465.

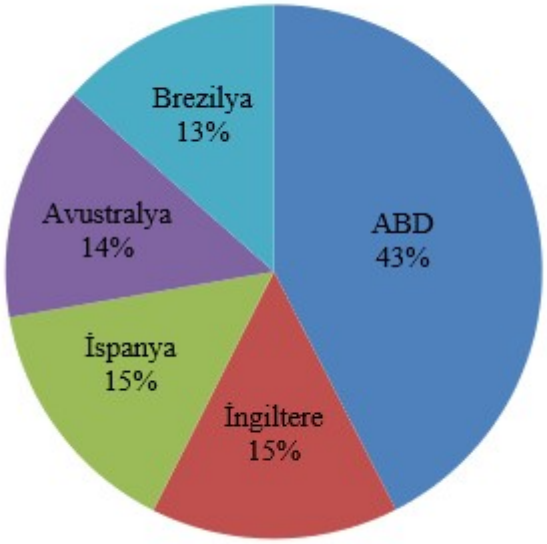

Figure 7. Graphical Representation of the Top 5 Countries with the Highest Number of Publications

Citation Analysis of Institutions

Table 7. The Top 10 Institutions with the Highest Number of Citations

No	Authors	Citation Count	Total Link Strength
1	Univ S Carolina	15093	2104
2	San Diego State Univ	11872	1074
3	Univ Sdyney	10897	1588
4	Stanford Univ	10241	796
5	Univ Copenhagen	9989	3303
6	Harvard Univ	9004	1321
7	Univ Tennessee	8834	590
8	Univ Granada	8797	4300
9	Univ Jyvaskyla	6949	3202
10	Univ British Columbia	6914	1171

Out of 10,460 institutions, a citation analysis was conducted for 505 institutions based on the criterion of having at least 15 publications. The analysis revealed a network consisting of seven clusters, with 39,390 links and a total link strength of 118,229. The institution with the highest number of citations was the University of South Carolina, with 15,093 citations. Following the University of South Carolina, the four institutions with the highest citation counts were San Diego State University (11,872 citations), the University of Sydney (10,897 citations), Stanford University (10,241 citations), and the University of Copenhagen (9,989 citations). Despite its high citation count, the University of South Carolina was found to have a relatively low total link strength, indicating more limited collaborative linkages within the network (Figure 8).

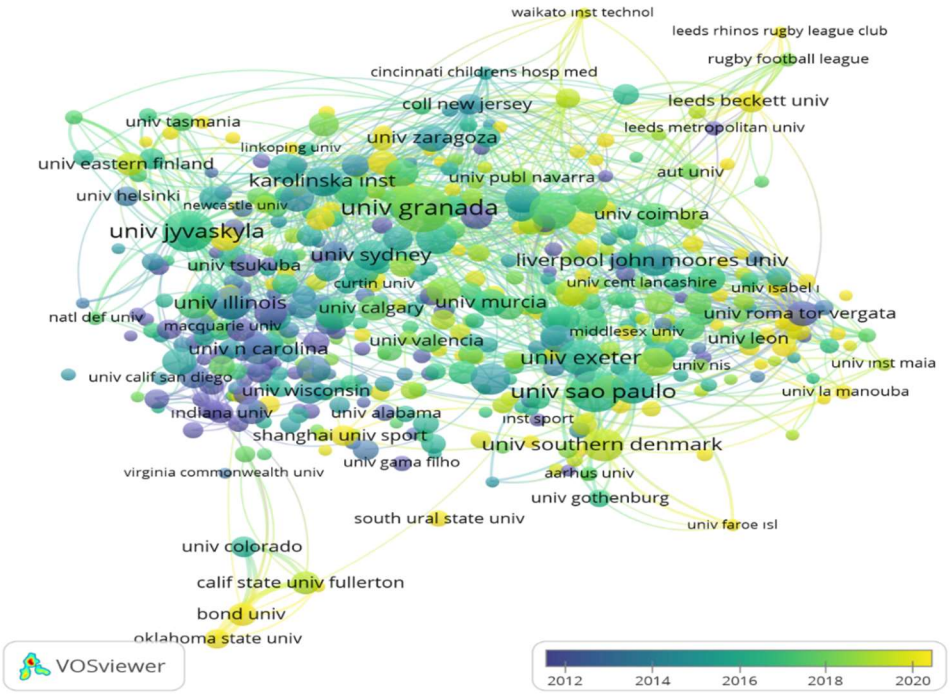

Figure 8. Institutional Citation Analysis

Table 8. The Top 10 Institutions with the Highest Number of Publications

No	Institution	Number of Publications	Total Link Strength
1	Univ Granada	275	4300
2	Univ Sao Paulo	220	2062
3	Univ Juvaskyla	215	3202
4	Univ Porto	171	2656
5	Univ Exeter	165	3006
6	Univ Copenhagen	146	3303
7	Univ Illinois	137	1213
8	Univ Southern Denmark	135	2212
9	Univ Queensland	131	1506
10	Univ British Columbia	127	1171

An examination of Table 7 and Table 8 indicates that some institutions achieve a high citation impact despite a limited volume of publications, whereas others occupy a

structural central position in the field due to their high publication output and strong collaboration networks.

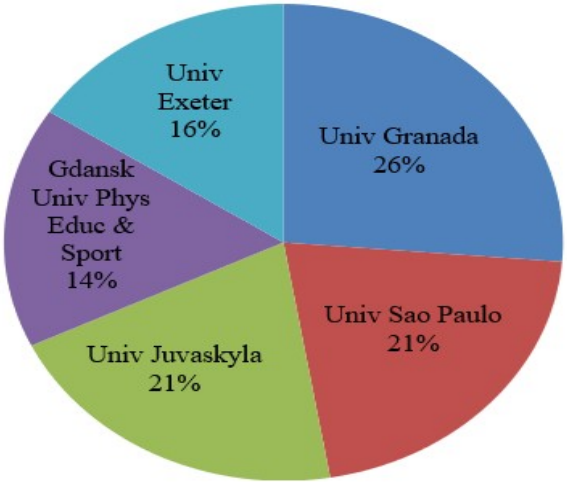

Figure 9. Graphical Representation of the Top 5 Institutions with the Highest Number of Publications

Source Citation Analysis

Table 9. The Top 10 Institutions with the Highest Number of Publications

No	Source	Citation Count	Total Link Strength
1	Journal of Strength and Conditioning Research	44794	9042
2	Medicine & Science in Sport & Exercise	43334	3532
3	Medicine and Science in Sports & Exercise	33116	3926
4	Journal of Sports Science	19880	4569
5	Scandinavian Journal of Medicine & Science in Sports	19437	2530
6	British Jorunal of Sports Medicine	15874	2034
7	European Journal of Applied Physiologhy	15841	2496
8	Journal of Science and Medicine in Sport	13451	2522
9	Journal of Applied Physiology	13012	903
10	İnternational Journal of Sports Medicine	12895	2802

Out of 154 sources, a citation analysis was conducted for 117 sources based on the criterion of having at least 15 publications. The analysis revealed a network consisting of 10 clusters, with 2,790 links and a total link strength of 34,829.

The five most cited sources were identified as the Journal of Strength and Conditioning Research (44,794 citations), Medicine & Science in Sports & Exercise (43,334 citations), Medicine and Science in Sports & Exercise (33,116 citations), Journal of Sports Science (19,880 citations), and Scandinavian Journal of Medicine & Science in Sports (19,437 citations). It was also observed that the sources receiving the highest number of citations likewise exhibited the highest total link strength, indicating their central role within the citation network (Figure 10).

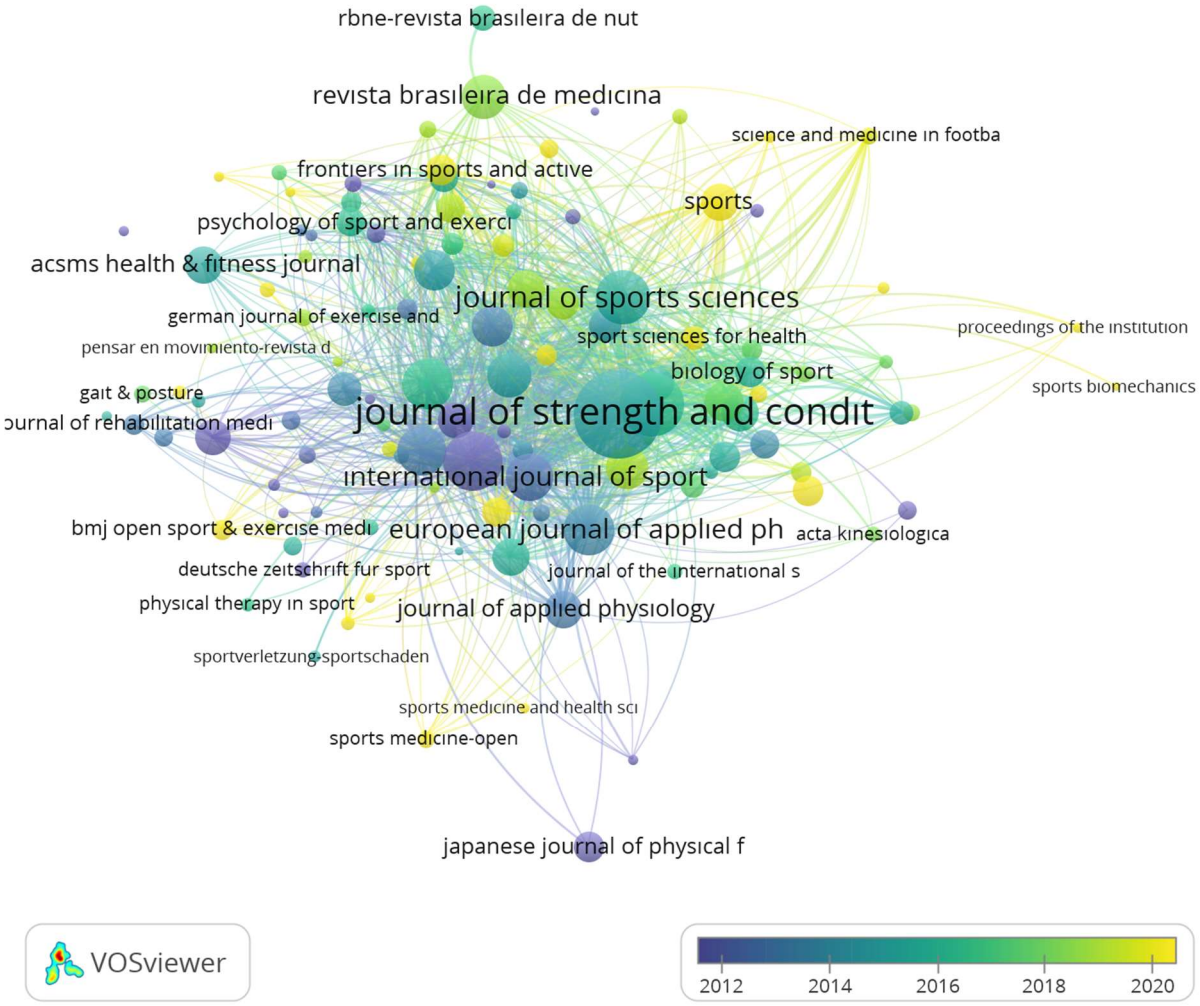

Figure 10. Source Citation Analysis

Table 10. The Top 10 Sources with the Highest Number of Publications

No	Institution	Number of Publications	Total Link Strength
1	Journal of Strength and Conditioning	1312	9042
2	Journal of Sports Medicine and Physical	726	2827
3	Medicine and Science in Sports and	594	3926
4	Journal of Sports Sciences	520	4569
5	Scandinavian Journal of Medicine &	458	2530
6	European Journal of Applied Physiology	456	2496
7	Medicine & Science in Sports & Exercise	410	3532
8	International Journal of Sports Medicine	388	2802
9	Revista Brasileira de Medicina do	351	432
10	Journal of Science and Medicine in Sport	334	2522

An examination of Table 9 and Table 10 indicates that, in the field of fitness, the Journal of Strength and Conditioning Research is the source with the highest number of

publications, citations, and total link strength, with 1,312 publications, 44,794 citations, and a total link strength of 9,042.

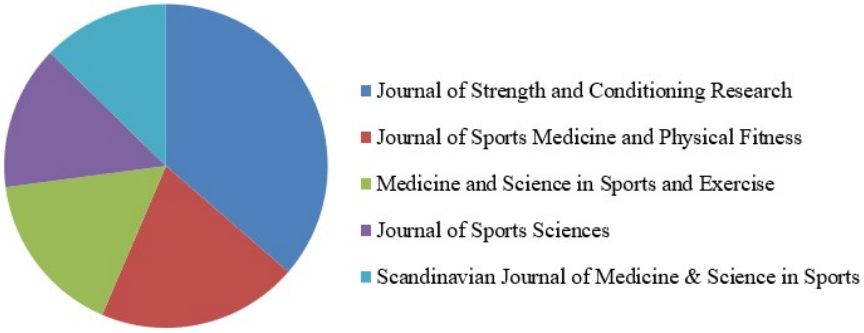

Figure 11. Graphical Representation of the Top 5 Sources with the Highest Number of Publications

Keyword Analysis

Keywords that appeared at least 15 times or more were included according to the search criteria. Based on the search results, out of 17,745 keywords, 557 keywords meeting this criterion were analyzed.

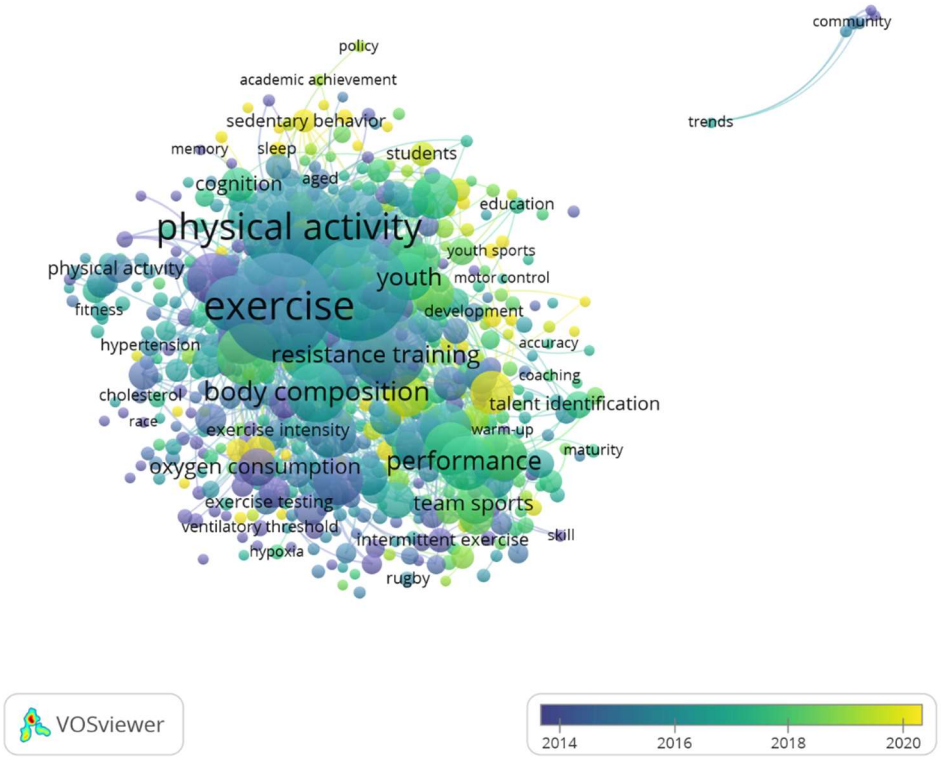

Figure 12. Keyword Link

The analysis revealed a total of 11 clusters, 16,501 links, and a total link strength of 37,221. The most frequently used keywords were exercise (n = 1,452), physical fitness (n = 1,296), physical activity (n = 1,214), fitness (n = 750), and cardiorespiratory fitness (n = 482). It was also found that the most frequently used keywords had the highest total link strength, indicating their central role within the keyword network (Figure 12).

Discussion and Conclusion

In this study, a total of 14,934 scientific publications addressing the concept of fitness and published between 2000 and 2024 in the Web of Science database were bibliometrically analyzed using the VOSviewer® software. The findings indicate a clear upward trend in scientific production within the field of fitness over time. In particular, the fact that studies published between 2016 and 2024 account for approximately 52% of all publications demonstrates that fitness has become an increasingly prominent research area over the past decade. The year with the highest publication output was 2022, representing 7.12% of the total, while the relatively high publication rates observed during the 2020–2021 period can be associated with the COVID-19 pandemic, during which research focusing on physical activity, home-based exercise, and health promotion gained increased importance. In contrast, the relatively low proportion of publications published between 2000 and 2004 (only 7.35% of the total) indicates that fitness research was addressed within a more limited framework in its early stages.

Author-based evaluations reveal that scientific influence in the fitness literature is concentrated around a limited number of researchers. The fact that the most highly cited authors also exhibit high total link strength suggests that these researchers have produced work that has significantly shaped the theoretical and methodological development of the field. Similarly, the observation that many of the most productive authors are involved in strong academic collaboration networks highlights a positive relationship between publication output and scientific visibility.

Country-level analyses clearly demonstrate that fitness research is concentrated in specific geographical regions. When publication and citation counts are considered together, a limited number of countries emerge as leading contributors in terms of both scientific production and impact. In particular, the dominant position of the United States in both publication output and citation counts can be attributed to the strength of its sport sciences infrastructure, research funding, and academic networks. Nevertheless, the increasing contributions of several European and Asian countries in recent years indicate that fitness research is gradually moving toward a more globally balanced distribution.

Institution-based findings show that scientific production and citation impact are concentrated in a limited number of universities. The fact that institutions with high publication output also demonstrate high citation counts and total link strength suggests a strong relationship between institutional research capacity and scientific impact. Universities specializing in sport sciences and exercise physiology, in particular, appear to play a central role in the development of the fitness literature.

Analyses of sources indicate that scientific knowledge in the field of fitness is largely concentrated within a limited number of journals. The journals with the highest numbers of publications and citations are predominantly focused on sport sciences and exercise physiology, suggesting that fitness research is primarily shaped around themes such as strength, endurance, performance, and health. This concentration implies that methodological standards and research trends within the field are largely guided by a small number of influential publication outlets.

In conclusion, the findings of this study demonstrate that scientific publications in the field of fitness have shown substantial growth in both quantitative and qualitative terms in recent years. The fact that a large proportion of publications have been produced within the last decade clearly reflects the contemporary relevance and research potential of the field. When author, country, institution, and source analyses are considered together, fitness research appears to be concentrated around specific academic centers, while simultaneously expanding across a broader geographical landscape. In this context, the findings of the present study are considered to contribute to a clearer understanding of the current state of fitness research and to serve as a valuable reference for guiding future scientific studies in the field.

Beyanlar / Declarations

Etik Onay ve Katılım Onayı / Ethics approval and consent to participate

Bu çalışmanın hazırlanma ve yazım sürecinde "Yükseköğretim Kurumları Bilimsel Araştırma ve Yayın Etiği Yönergesi" kapsamında bilimsel, etik ve alıntı kurallarına uyulmuş olup; toplanan veriler üzerinde herhangi bir tahrifat yapılmamış ve bu çalışma herhangi başka bir akademik yayın ortamına değerlendirme için gönderilmemiştir. Makale ile ilgili doğabilecek her türlü ihlallerde sorumluluk yazara aittir. Bu çalışma, Atatürk Üniversitesi Spor Bilimleri Fakültesi Etik Kurulu tarafından onaylanmıştır (Karar No: 2025/10; Tarih: 20.10.2025).

citation rules were followed in accordance with the 'Higher Education Institutions Scientific Research and Publication Ethics Guidelines'; no alterations were made to the collected data, and this study has not been submitted for evaluation to any other academic publication medium. The author is solely responsible for any violations that may arise in connection with this article. All participants voluntarily participated in this study. This study was approved by the Ethics Committee of the Faculty of Sports Sciences, Atatürk University (Decision No: 2025/10; Date: 20.10.2025).

Veri Ve Materyal Erişilebilirliği / Availability of data and material

Bu çalışmanın bulgularını destekleyen veriler, makul talepler üzerine sorumlu yazardan temin edilebilir. Veri seti yalnızca akademik amaçlar için erişilebilir olacak ve verilerin herhangi bir kullanımı, orijinal çalışmayı referans gösterecek ve katılımcıların gizliliğini koruyacaktır.

The data that support the findings of this study are available from the corresponding author upon reasonable request. The dataset will be accessible only for academic purposes, and any use of the data will recognize the original study and maintain the confdentiality of the participants.

Çıkar Çatışması / Competing interests

Yazarlar, bu makalede sunulan çalışmayı etkileyebilecek herhangi bir çıkar çatışması veya kişisel ilişkiye sahip olmadıklarını beyan etmektedirler.

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Yazar Katkıları / Authors' Contribution Statement

Y. E. Yücel: Araştırma tasarımı, veri toplama, veri analizi, makalenin hazırlanması, tartışma ve sonuç bölümlerinin yazımı. E. Ağgön: Araştırma tasarımı, veri analizi, makalenin hazırlanması. G. Kurt: Araştırma tasarımı, veri analizi, makalenin hazırlanması. Ö. Ağırbaş: Araştırma tasarımı, makalenin hazırlanması.

Y. E. Yücel: Study design, data collection, data analysis, manuscript preparation, discussion and conclusion. E. Ağgön: Study design, data analysis, manuscript preparation. G. Kurt: Study design, data analysis, manuscript preparation. Ö. Ağırbaş: Study design, manuscript preparation

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This Bu çalışma, kamu, özel veya kar amacı gütmeyen sektörlerdeki fon sağlayıcı kurumlardan herhangi bir özel destek almamıştır.

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