BRAZILIAN JOURNAL OF SPORTS MEDICINE: 10 YEARS OF INDEXATION ON THE WEB OF SCIENCE

REVISTA BRASILEIRA DE MEDICINA DO ESPORTE: 10 ANOS DE INDEXAÇÃO NA WEB OF SCIENCE

REVISTA BRASILEÑA DE MEDICINA DEL DEPORTE: 10 AÑOS DE INDEXACIÓN EN LA WEB OF SCIENCE

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ABSTRACT

Analyses of scientific production have attracted the interest of researchers, as they help to control the quality of what is published, identify relevant themes, and, thus enable scientific advances. Therefore, the objective of this study was to analyze the scientific production of the Brazilian Journal of Sports Medicine on the Web of Science database through a bibliometric analysis. The data were analyzed in relation to the publications, the authors, and the RBME. During the period of indexation on the Web of Science, which corresponds to the last decade, the RBME published 896 documents, most of which were original articles (801, 89.3%). The most cited keywords were exercise (117 studies), resistance training (37), and physical activity (34). Brazilian institutions had the highest number of publications, followed by Portugal and Spain, and there were also articles published in the USA, Canada, and the United Kingdom. USP and UNESP were the institutions with the greatest number of publications in the RBME over the last decade. Ten different collaboration clusters were identified, with researcher Edilson Serpeloni Cyrino standing out with the largest collaboration network. The ten years of indexation on the Web of Science reveal the consolidation of the RBME on the international scene, which has resulted in increasing views of and citations from the studies published, as well as attracting researchers from institutions of other countries to publish their work. ***Level of evidence II; Review.***

Keywords: Bibliometrics; Exercise; Sports medicine; Database.

RESUMO

*Análises sobre a produção científica têm despertado o interesse de pesquisadores, pois auxiliam no controle da qualidade do que é publicado, identificando temas relevantes, e assim, auxiliando avanços científicos. Diante disso, o objetivo do estudo foi analisar a produção científica da Revista Brasileira de Medicina do Esporte na Web of Science (WoS) por meio de uma análise bibliométrica. Os dados foram analisados com relação às publicações, aos autores e à RBME. No período de indexação na WoS, correspondente a última década, a RBME publicou 896 documentos, sendo a maioria artigos originais (801, 89,3%). Os descritores mais citados foram exercise (117 estudos), resistance training (37) e physical activity (34). Instituições do Brasil foram as que mais apresentaram publicações, seguidas de Portugal e Espanha, tendo ainda publicações nos EUA, Canadá e Reino Unido, entre outros. A USP e a UNESP foram as instituições com maior número de publicações na última década na RBME. Dez diferentes grupos de colaboração foram identificados, destacando-se o pesquisador "Edilson Serpeloni Cyrino", com a maior rede de colaboração. Os 10 anos de indexação da RBME na Web of Science revelam a consolidação do periódico no cenário internacional, repercutindo no aumento de visualizações e citações dos estudos publicados, além de atrair pesquisadores de instituições de outros países para publicarem seus trabalhos. **Nível de evidência II; Revisão.***

Descritores: *Bibliometria; Exercício físico; Medicina esportiva; Base de dados.*

RESUMEN

Los análisis sobre la producción científica han despertado el interés de investigadores, pues auxilian en el control de la calidad de aquello que es publicado, identificando temas relevantes y auxiliando así los avances científicos. Por lo tanto, el objetivo del estudio fue analizar la producción científica de la Revista Brasileña de Medicina del Deporte (RMBE) en la Web of Science (WoS) a través de un análisis bibliométrico. Se analizaron los datos relativos a las publicaciones, a los autores y a RMBE. En el período de indexación en la WoS, correspondiente a la última década, la RBME publicó 896 documentos, siendo la mayoría artículos originales (801, 89,3%). Las palabras clave más citadas fueron exercise (117 estudios), resistance training (37) y physical activity (34). Las instituciones de Brasil fueron las que más publicaciones presentaron, seguidas de Portugal y España, con publicaciones también en Estados Unidos, Canadá y Reino Unido, entre otros. La USP y UNESP fueron las instituciones con mayor número de publicaciones en RMBE en la última década. Se identificaron diez grupos de colaboración diferentes, destacándose el investigador "Edilson Serpeloni Cyrino", con la mayor red de colaboración. Los 10 años de indexación de la RBME en la Web of Science revelan

la consolidación de la revista en el escenario internacional, repercutiendo en el aumento de visualizaciones y citas de los estudios publicados, además de atraer a investigadores de instituciones de otros países para publicar sus trabajos. **Nivel de evidencia II; Revisión.**

Descriptores: Bibliometría; Ejercicio físico; Medicina deportiva; Base de datos.

INTRODUCTION

The modus operandi of science changes from time to time, however, generally these changes are slow and are only noticeable if a thorough analysis of the theme is carried out. Therefore, analyses of scientific production have aroused the interest of researchers, editors, and funding agencies[1]. These analyses help to control the quality of what is published, and identify hot topics and topics that need further investigation, aiding scientific advances and allowing planning by the editorial board of the journals.

The Brazilian Journal of Sports Medicine (RBME) from the Brazilian Society of Exercise Medicine and Sports is an open access journal with bimonthly publications. This journal has an inter and multidisciplinary approach, aiming to disseminate scientific production in the areas of exercise and sport sciences, mainly through original research. The scientific journal was inaugurated in 1995, publishing quarterly, and from 1999 it started to publish bimonthly. In addition to original articles, the RBME publishes review articles, systematic reviews, meta-analyses, and updates.

The Brazilian Journal of Sports Medicine is indexed in SciELO, Web of Science, ExcerptaMedica-EMBASE, Physical Education Index, LILACS, SIRC-SPORTDiscus, and Scopus. In the core collection of Web of Science (WoS), the RBME completed a decade of indexing, from 2008 to 2017 (volumes 14 to 23).

The recognition and evaluation of the development stage in an area or journal can be carried out based on bibliometric analyses and these have been published in different areas[2,3]. Bibliometrics is a method used to investigate and analyze quantitative data such as number of publications, research institutions, main authors, and countries that investigate the topic[2,3].

Considering the relevance of the RBME as a journal in Sport and Exercise Sciences and Medicine, the analysis of publications in the last decade through a bibliometric analysis becomes important because it enables the establishment of an overview of publications and evolution. In this sense, the objective of the study was to analyze the scientific production of the 10 years of the Brazilian Journal of Sports Medicine indexed in the Web of Science through a bibliometric analysis.

METHODS

This is a bibliometric analysis, carried out on the publications of the Brazilian Journal of Sports Medicine in the Web of Science database.

Search strategy

The search was carried out on February 23, 2018, in the Web of Science database - Main collection (Clarivate Analytics). In the advanced search mode, the term "REVISTA BRASILEIRA DE MEDICINA DO ESPORTE" was used in the search field. The indices SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI were utilized, and the time frame was all years.

Among the field labels, "SO" was used, which corresponds to the name of the publication, in this case the RBME. In the search results, the option "Analyze results" was selected.

Eligibility criteria

The time limit was established by the indexing date of the journal on the Web of Science, corresponding to a period of 10 years - from 2008 to 2017.

Study selection and data extraction

The search and selection procedures for the articles were carried out by two researchers (DC and FD). For analysis and discussion of the results, the following categories were defined and two researchers (DC and FD) extracted the following data, available in the database: in relation to publications: type of document, language, year of publication, funding, number of citations (from the Web of Science Main Collection), usage count, and theme through title and keywords; in relation to the authors: name of the authors, number of publications, collaboration networks, institutions, and countries; and in relation to the journal: impact factor (Journal Citation Reports - JCR) and H index.

The bibliometric mapping technique was used to present the results in relation to the theme and the authors. This allows visualization of the characteristics of scientific production through bibliometric maps[4]. The program VOSviewer version 1.6.6 (Leiden University, Netherlands) was used to make the maps.[5]

Usage count is a measure provided by WoS of the level of interest in a specific item on the platform. These data reflect the number of times that an article has met user information needs, and is updated daily.

RESULTS

The RBME presented an impact factor (JCR) of 0.294, in 2016 and has an h index = 12. During the WoS indexing period, corresponding to the last decade, the RBME published 896 documents in 10 volumes and 60 numbers, all with open access. Among the types of documents, the journal published mostly original articles (801/89.3%), followed by reviews (60/6.6%), editorial letters (14/1.5%), editorials (12/1.33%), and errata (8/0.89%). With respect to the language, most publications are available in Portuguese (n = 629), followed by English (n = 267). The studies published by the RBME in WoS had 1645 citations, with an average of citations per item of 1.83. The number of publications and citations of RBME studies per year in the last decade is shown in Table 1.

Only five agencies were cited as funders of RBME studies. The agencies that were most often mentioned in the studies were the National Council for Scientific and Technological Development (CNPq), in 26 studies, and the Coordination for the Improvement of Higher Education Personnel (CAPES), in 15 studies. In addition, the FAPESP (7), FAPERJ (3) and Basque Government (2) were mentioned as funding agencies. It is notable that the majority of publications (93.4%) did not present information regarding the funding agency.

Among the 896 publications, the most cited was the article by Hirschbruch, Fisberg and Mochizuki,[6] published in 2008 and featuring

Table 1. Number of publications and citations per year.

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Number of publications	87	90	91	89	85	92	92	91	88	91	896
Citations	5	44	91	89	133	185	198	261	288	351	1645

56 citations in the main WoS collection. This study aimed to evaluate factors related to the consumption of supplements in adolescents and young adults who attend gym centers in the city of São Paulo. In the year 2017 alone, this study was cited 13 times. The ten most cited studies in the RBME in the last decade are shown in Table 2.

The study by Brunetto, Ribeiro and Fayh (2010)[16] was the publication with the highest usage count among those published by the RBME in WoS. The aim of this study was to evaluate the effect of acute caffeine consumption on lipid oxidation and performance during aerobic exercise.

Figure 1 shows the density of the words that appear most often, based on the analysis of the title of the publications. It was found that the relevant terms that occurred most commonly were: "physical activity", "injury", and "soccer player". In all, 97 different terms appeared at least five times in the title, forming 11 different co-occurrence clusters.

In total, 2671 keywords were used in the studies and Figure 2 shows the keywords that were used in at least ten studies. The font size indicates that more studies cited the keyword, being that the smaller the font, the lower the number of studies. The most cited keywords were exercise (117 studies), resistance training (37), and physical activity (34).

The articles published in the RBME were developed by researchers from different institutions located in 18 countries. Brazilian institutions presented the most publications, followed by Portuguese and Spanish institutions. Figure 3 shows the number of publications in the RBME in the last ten years developed in each country. The darker the color, the greater the number of publications.

The University of São Paulo (USP) was the institution with the highest number of publications in the last decade in the RBME, with 135. Table 4 shows the institutions with the highest number of publications in the journal.

In total, 629 authors who published in the RBME in the last decade were observed. Researcher Gladson Ricardo Flor Bertolini was identified with the highest number of publications in the journal in the period analyzed, followed by Tales de Carvalho and Edilson Serpeloni Cyrino (Table 5).

Figure 4 presents the analysis of authors and their collaborator networks. Of the 3326 different authors who published in the 10 years of RBME indexing in WoS, 79 were present in at least five publications. Among these, 10 different collaboration clusters were identified, highlighting the researcher "Edilson Serpeloni Cyrino" with the largest collaboration network (12 different authors).

DISCUSSION

The results of the present study demonstrate an increase in RBME citations after indexation in WoS. The internationalization of the RBME in the last decade can be perceived and the number of citations of studies published in the main collection of WoS has increased year by year.
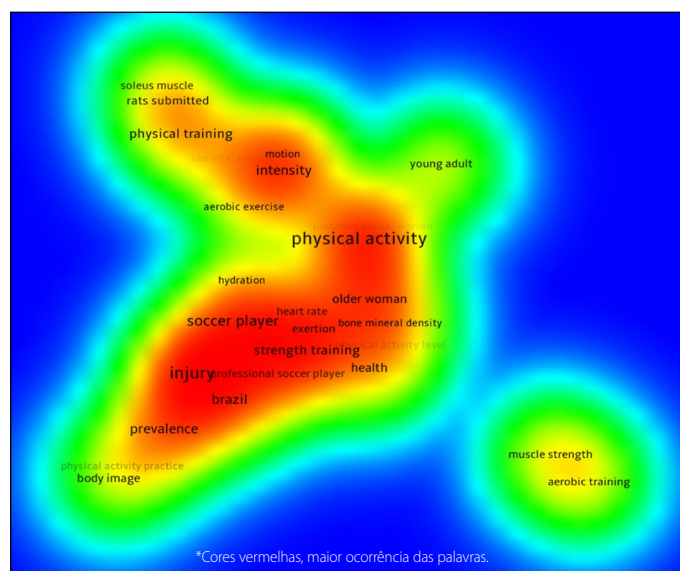

Figure 1. Density map of the title words of publications in the RBME in the last decade.

Table 3. Main publications in the RBME with highest usage count.

Title	Authors	Year	Usage count
Effects of caffeine acute consumption on the metabolic and performance parameters in male individuals	Brunetto, Ribeiro, Fayh[16]	2010	89
Exercise programs in the preventing injuries in football players: a systematic review	Cruz-Ferreira, et al.[17]	2015	77
Effects of creatine supplementation on strength and muscle hypertrophy: current concepts	Gualano et al.[18]	2010	74
Post-exercise recovery methods: a systematic review	Pastre et al.[19]	2009	58
Protein consumption by bodybuilding practitioners aiming muscle hypertrophy	Menon, Santos[8]	2012	54
Effect of proprioceptive training on balance of rhythmic gymnastics athletes	Lamb et al.[20]	2014	50
Estimated maximum oxygen uptake and agreement analysis between direct and predicted measurement by different field tests	Batista et al.[21]	2013	50
Nutritional knowledge and anthropometric status of university athletes	Rêgo et al.[22]	2015	47
Glycemic index of pre-exercise meal and glucose metabolism in aerobic physical activity	Faria et al.[23]	2014	47
Effect of diferents methods of recovery on the lactate removal and anaerobic performance in soccer players	Ferrari et al.[24]	2013	45

Table 2. Publications with highest number of citations in WoS.

Title	Authors	Year	Citations	Average of citations/year
Supplement Use Amongst Young Individuals in Sao Paulo's Fitness Centers	Hirschbruch, Fisberg, Mochizuki[6]	2008	56	5.09
Can thermography aid in the diagnosis of muscle injuries in soccer athletes?	Bandeira, et al.[7]	2012	16	2.29
Protein consumption by bodybuilding practitioners aiming muscle hypertrophy	Menon, Santos[8]	2012	15	2.14
Reasons for Physical Activity Practice and Body Image Among Health Clubs Users	Fermino, Pezzini, Reis[9]	2010	15	1.67
Nutritional Assessment and Body Self-Perception of Bodybuilders in Caxias do Sul - RS	Theodoro, Ricalde, Amaro[10]	2009	15	1.5
Nutrition Knowledge Scale Application in Professional and Amateur Track and Field Athletes	Nicastro et al.[11]	2008	15	1.36
Brunel Mood Scale (BRUMS): an Instrument for Early Detection of Overtraining Syndrome	Rohlfs et al.[12]	2008	14	1.27
Balance, Coordination and Agility of Older Individuals Submitted to Physical Resisted Exercises Practice	Silva et al[13]	2008	14	1.27
The Hand-Grip Forecasts the Functional Performance of Fragile Elder Subjects: a Multiple-Correlation Study	Geraldes, et al.[14]	2008	14	1.27
Isokinetic Assessment in Professional Soccer Players and Performance Comparison According to Their Different Positions in the Field	Weber et al.[15]	2010	13	1.44

It was observed that some of the most cited studies are available in Portuguese and English, extending the number of accesses and citations.

Despite the growth in scientific production in Brazil in recent years, it is known that this area is still under development and needs financial resources to reach greater potential. The results demonstrated that few studies cited funding agencies. This could demonstrate the low investment in research and the challenge of science in Brazil. CNPq and CAPES were the most commonly mentioned funding agencies. Cuenca et al.[25] presented similar results, highlighting these funding agencies as those that most financed the production journals and research in Brazil.

Through the analysis of the keywords and title of the publications it was possible to observe a predominance of research in the biodynamic area in relation to the pedagogical and sociocultural areas. The same results were verified in the studies by Coimbra et al.[2] and Zubcich et al.[26] The biodynamic area includes several sub-areas that aim to understand the effects of physical activity and physical exercise on the population.

Figure 2. Main keywords used in studies published by the RBME in the last ten years.

Table 4. Institutions with the highest number of publications in the RBME in the last decade.

| Institutions	Sigla	Publicações
University of São Paulo	USP	135
Paulista State University	UNESP	85
State University of Londrina	UEL	52
Federal University of São Paulo	UNIFESP	46
State University of Santa Catarina	UDESC	44
Federal University of Rio Grande do Sul	UFRGS	40
Campinas State University	UNICAMP	36
Federal University of Santa Catarina	UFSC	36
Federal University of Rio de Janeiro	UFRJ	32
Federal University of Paraná	UFPR	31
Federal University of Viçosa	UFV	27
Juiz de Fora Federal University	UFJF	25
Federal University of Pernambuco	UFPE	25
Federal University of Minas Gerais	UFMG	24
Universidade Metodista de Piracicaba	UNIMEP	24
Universidade Estadual do Oeste do Paraná	UNIOESTE	22
Universidade São Judas Tadeu	USJT	22
Universidade Católica de Brasília	UCB	21
Universidade do Estado do Rio de Janeiro	UERJ	21
Universidade Federal de São Carlos	UFSCar	20
Universidade Nove de Julho	UNINOVE	18
Universidade Federal de Mato Grosso do Sul	UFMS	17
Universidade Estadual de Maringá	UEM	16
Universidade Federal da Paraíba	UFPB	16
Universidade de Brasília	UnB	15
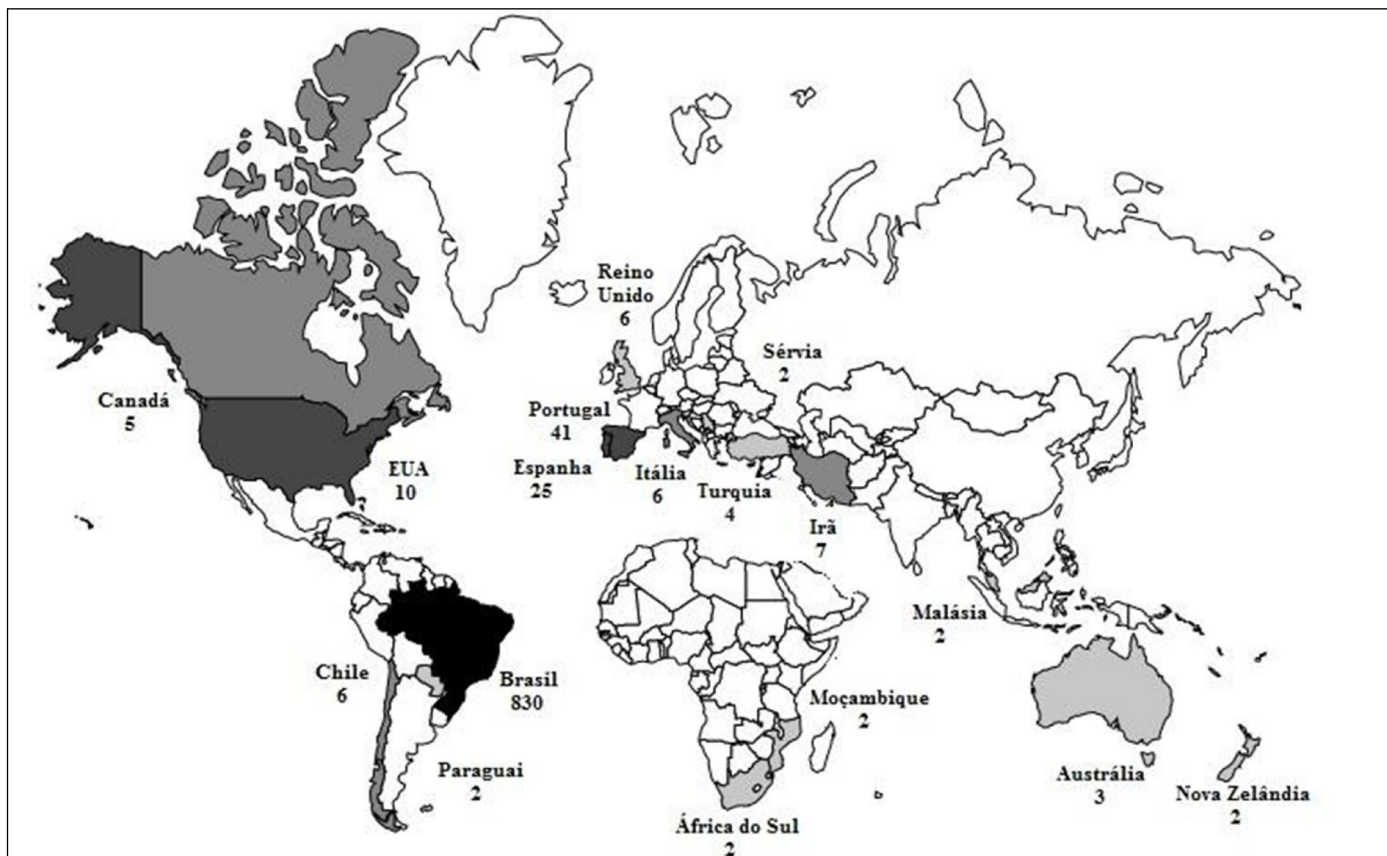
Figure 3. Geographical distribution of publications of the RBME in the last ten years.

When analyzing the themes published in the RBME, it was observed that resistance training was highlighted in the last decade. In fact, resistance training has been present among the top five global trends in the fitness area for more than ten years, as pointed out by the American College of Sports Medicine (ACSM), through the annual publication of the survey of worldwide fitness trends.[27]

Studies related to Nutrition showed a high count among those published by the RBME in WoS. These studies analyzed topics such as effects of creatine supplementation,[18] protein consumption by bodybuilders,[8] nutritional knowledge of university athletes,[22] and the glycemic index in aerobic exercise.[23] It was observed that the publications with the highest number of citations in the RBME and usage count in WoS, were related to the topic of supplementation. These studies used individuals, non-athletes, or practitioners of physical exercises in the samples. These studies have applications that support professional practice, demonstrating that the readers of the RBME are not only researchers, but also professionals who are concerned about evidence-based practices.

In relation to institutions, the results are in line with the Research in Brazil report,[28] made available by Clarivate Analytics to the Coordination for the Improvement of Higher Education Personnel (Capes), which presented the performance of science produced in Brazil in a global context in the years from 2011 to 2016. In this report it was observed that the knowledge produced comes from public universities of Brazil. In the current study, the University of São Paulo (USP) and State University Paulista (UNESP) were highlighted as having the largest number of publications in the main collection of Web of Science, followed by the State University of Londrina - UEL, Federal University of São Paulo - UNIFESP and Santa Catarina State University - UDESC. Institutions of São Paulo have shown greater productivity in the RBME in the last decade. The report data showed that more than 40% of Brazilian publications have an author affiliated with an institution in São Paulo. This geographic distribution of scientific production in Brazil has already been observed in other studies[29,30]. Although some authors have a good collaboration network, this network is mostly found in the southeastern and southern regions, despite the wide reach of the RBME throughout Brazil.

To our knowledge, this is the first bibliometric analysis study conducted with a focus on the RBME. However, as limitations, we indicate that the analysis was performed based on the words in the title and keywords. In addition, the analysis of citations and usage count of publications is also a limitation, since as these are retroactive parameters, more recent publications are less likely to be cited. Despite these limitations, the analysis of the 10 years of indexation of the RBME in WoS revealed the growth of the journal, the most cited publications, most investigated themes, and most productive countries, institutions, and authors of the RBME.

The evaluation of the 10 years of indexing of the Revista Brasileira de Medicina do Esporte in the Web of Science is positive, as there was an increase in the number of citations and, consequently, in the journal's Impact Factor. In addition, publications by authors from international institutions, demonstrate that the editorial policy is designed and oriented towards internationalization.

CONCLUSION

The analysis of the scientific production of the 10 years of the Revista Brasileira de Medicina do Esporte on the Web of Science through a bibliometric analysis, showed that the RBME is an important scientific journal in the area, being fundamental for dissemination and sharing of knowledge in the scientific community in Sport and Exercise Sciences and Medicine. This analysis revealed the consolidation of the journal in the international scenario, reflecting in the increase in views and citations
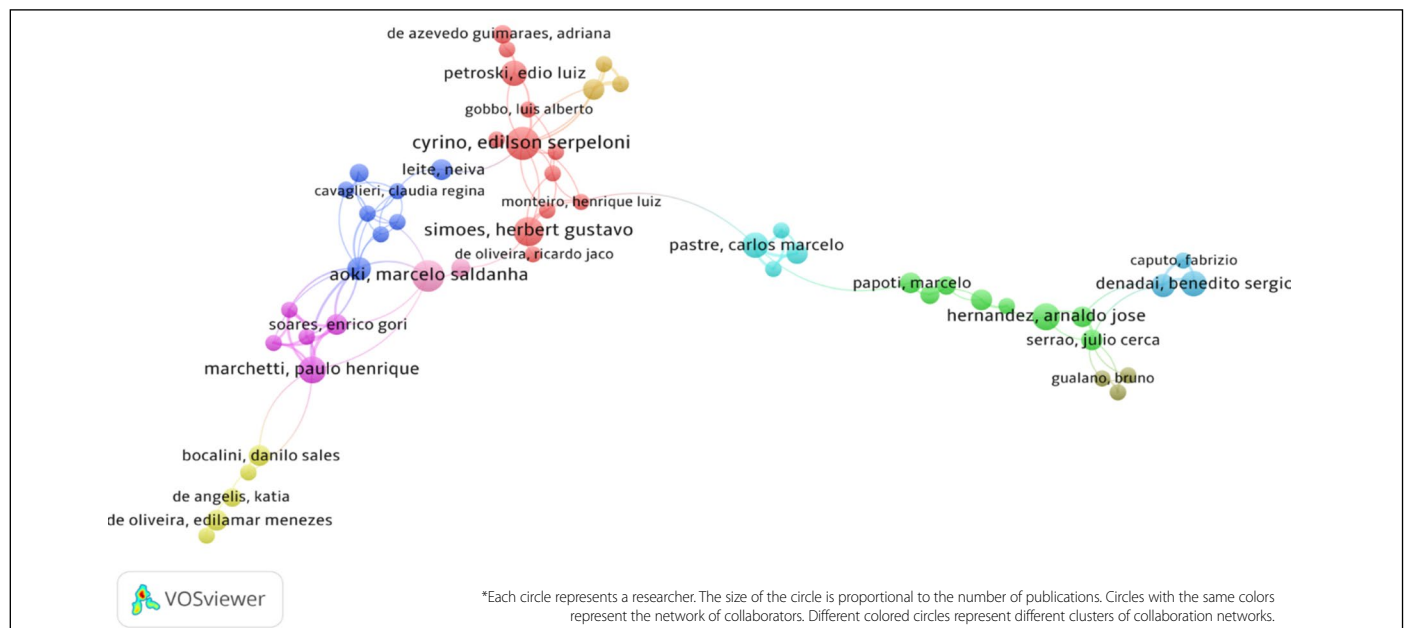
Table 5. Number of publications per author in the last decade in the RBME.

Number of publications	Authors
23	Bertolini GRF
18	De Carvalho T
14	Cyrino ES
12	Aoki MS, Dantas EHM, Natali AJ
11	Marchetti PH, Simoes HG
10	De Mello MT, Denadai BS, Hernandez AJ, Marins JCB
9	Kruel LFM, Pastre CM, Petroski EL
8	7 autores
7	10 autores
6	15 autores
5	39 autores
4	68 autores
3	124 autores
2	222 autores
1	129 autores

*Each circle represents a researcher. The size of the circle is proportional to the number of publications. Circles with the same colors represent the network of collaborators. Different colored circles represent different clusters of collaboration networks.

Figure 4. Authors and network collaboration.

of the studies published by the journal, besides attracting researchers from institutions from other countries to read and publish their works. The thematic analysis showed that most of the studies published in the RBME are related to exercise and physical activity, which corresponds to the aim and scope of the journal. Despite the observed predominance of Brazilian authors, we highlight the diversity of institutions in the country and abroad that have published in the RBME in the 10 years. Regarding the network of authors and collaborators, there were ten main groups that published in the RBME.

All authors declare no potential conflict of interest related to this article

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