

Bibliometrics of Physical Therapy in Brazil: an analysis based on the profession specialties

Bibliometria da fisioterapia no Brasil: uma análise baseada nas especialidades da profissão

Bibliometría de la fisioterapia en Brasil: análisis fundamentado en las especialidades de la profesión

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ABSTRACT | Physical therapy lacks bibliometric analyses that report the most relevant aspects of its scientific production, as well as the profile of publications of the several specialties of this profession. This bibliometric analysis aimed to evaluate the articles published in Brazilian journals in the field of Physical Therapy and verify their relationship with the profession specialties. This cross-sectional study involved 15 journals with a focus on Physical Therapy, considering articles published between 2011 and 2014. Data of the journals were collected in each home page. We analyzed articles classified among the specialties of Physical Therapy, recognized by the Federal Council of Physical and Occupational Therapy. The Southeast region presented the greatest number of journals and the largest scientific production. Qualis B1 and B4 were the most frequent ones. Among the 2,683 articles, 1,664 (62%) were linked to the area of Physical Therapy. The time between submission and acceptance was 157 (68-243) days, and, from acceptance to publication, 109 (60-177) days. Trauma-Orthopedic Physical Therapy concentrated the highest number of publications (34.3%). Quantitative (80.8%) and human subject research (83.9%), as well as inferential statistics (67.7%), were the most frequent ones and prevailed among the specialties. Physical Therapy remains on the rise regarding the quantity and quality of its research in Brazil, glimpsing the growth of evidence-based professional

practice in its various specialties. However, its articles still take a long time to be published. The higher prevalence of quantitative research and inferential statistics may promote substantial progress to the profession.

Keywords | Bibliometrics; Physical Therapy; Periodicals; Specialties.

RESUMO | A fisioterapia carece de análises bibliométricas que relatem os aspectos mais relevantes da produção científica, bem como o perfil das publicações das diversas especialidades da profissão. Esta análise bibliométrica objetivou avaliar os artigos publicados em periódicos brasileiros na área da fisioterapia e verificar sua relação com as especialidades da profissão. Este estudo transversal envolveu 15 periódicos com algum enfoque na área de fisioterapia, considerando os artigos publicados entre 2011 e 2014. Os dados dos periódicos foram coletados em cada *home page*. Foram analisados os artigos classificados dentre as especialidades da fisioterapia, reconhecidas pelo Conselho Federal de Fisioterapia e Terapia Ocupacional. A região Sudeste apresentou o maior número de periódicos e a maior produção científica. O Qualis B1 e B4 foram os mais frequentes. Dentre os 2.683 artigos encontrados, 1.664 (62%) estiveram vinculados à área de fisioterapia. O tempo entre submissão e aceite foi de 157 (68-243) dias e do aceite à publicação de 109 (60-177) dias. A fisioterapia traumato-ortopédica concentrou o maior

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número de publicações (34,3%). As pesquisas quantitativas (80,8%) e com seres humanos (83,9%), bem como a estatística inferencial (67,7%), foram as mais frequentes e predominaram dentre as especialidades. A fisioterapia permanece em ascensão quanto à quantidade e qualidade de suas pesquisas no Brasil, vislumbrando o crescimento da prática profissional baseada em evidência nas suas diversas especialidades. Porém, o tempo até a publicação dos artigos ainda é demorado. A maior prevalência de pesquisas quantitativas e de estatística inferencial pode promover avanços substanciais à profissão.

Descritores | Bibliometria; Fisioterapia; Publicações Periódicas; Especialidades.

RESUMEN | La fisioterapia precisa de análisis bibliométricas que plantean los aspectos más relevantes de la producción científica, así como el perfil de las publicaciones de las diversas especialidades de la profesión. En este análisis bibliométrica se pretende evaluar los textos publicados en revistas brasileñas en el área de fisioterapia y comprobar su relación con las especialidades de la profesión. En este estudio de tipo transversal se investigó 15 revistas con enfoque en fisioterapia, teniendo en cuenta los textos publicados entre 2011 y 2014. Se recolectaron

los datos de las revistas electrónicas en sus páginas iniciales. Se evaluaron los textos clasificados entre las especialidades de fisioterapia, reconocidas por el Consejo Federal de Fisioterapia y Terapia Ocupacional. La región Sudeste de Brasil fue la con mayor cantidad de revistas y mayor producción científica. El Qualis B1 y B4 fueron los más frecuentes. De los 2.683 textos encontrados, 1.664 (62%) relacionaban al área de la fisioterapia. El tiempo de presentación y aceptación fue de 157 (68-243) días, y el tiempo de la aceptación a la publicación fue de 109 (60-177) días. La fisioterapia traumatología y ortopedia fue la que más publicó (34,3%). Los estudios cuantitativos (80,8%) y con seres humanos (83,9%), así como la estadística inferencial (67,7%), fueron los más frecuentes y predominantes en las especialidades. La fisioterapia sigue creciendo en cuanto a la cantidad y calidad de sus estudios en Brasil, con crecimiento de la práctica profesional en evidencia en sus distintas especialidades. Sin embargo, todavía se lleva mucho tiempo para publicar los textos. La mayor prevalencia de estudios cuantitativos y de estadística inferencial puede promocionar avances sustanciales a la profesión.

Palabras clave | Bibliometría; Fisioterapia; Publicaciones en Revistas; Especialidades.

INTRODUCTION

Bibliometrics is defined as the study of quantitative aspects of the production, dissemination, and use of recorded information¹, performing a fundamental role in the analysis of a country's scientific production, since its indicators can portray the behavior and development of a field of knowledge. In addition, the analysis of scientific production allows to better understand the nature of research activities carried out in different areas of knowledge from different countries, institutions, and researchers². It is also known that the dissemination of research results can involve training for professionals and, consequently, social progress³.

In 2004, Brazil was ranked 17th among the countries that most produced knowledge, being one of the most productive in Latin America, totaling 1.7% of the world's publications in this period. This can be assigned to the modernization of institutions and changes in funding policies adopted by national funding agencies⁴.

Only recognized by the Ministry of Education and Culture (MEC) in 1963, Physical Therapy is still a

new area when compared with other health courses, but it presents advances in scientific knowledge production^{3,5}. Physical Therapy was regulated 47 years ago and stands out regarding professional training and knowledge innovation, requiring a better quantification and dissemination of evidence-based physical therapy practices³. A study conducted by Cavalcante et al.⁵ about the scientific evolution of Physical Therapy in 40 years of profession, and specifically about the years 2003 and 2008, verified that the Brazilian scientific production in Physical Therapy has significantly improved its position in the world ranking (from 25th to fourth placed).

With the advance in knowledge production, Physical Therapy lacks bibliometric analyses that report the most important aspects of its scientific production, as well as the profile of publications among the specialties of this profession. This research aimed to conduct a bibliometric analysis of Brazilian journals in the field of Physical Therapy, focusing on the profession specialties, from 2011 to 2014, aiming to present the current scenario and increase discussions regarding the scientific production in the area.

METHODOLOGY

This bibliometric analysis, with quantitative-descriptive method, was conducted on a sample of articles linked to Physical Therapy, published between 2011 and 2014 in 15 Brazilian journals with a focus on the area. First, we located, by WebQualis 2013 of *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* (Brazilian Coordination of Higher Education and Graduate Training) – CAPES, the journals classified in the evaluation area of “Physical Education” (area 21 of CAPES), comprising the subareas of Physical Education, Physical Therapy, Speech-Language Pathology, and Occupational Therapy.

We conducted the analysis in two stages: first the journals and then the articles. Through information gathered from the home pages of each journal, we included in the study those who presented, in their scope, policy, description, mission, presentation and/or objectives, the following keywords: “physiotherapy,” “rehabilitation,” or “physical therapy.” In addition, we considered as Brazilian journals those that had as maintainer an institution, society, association, or company located in Brazil. We excluded journals that had only printed version, with nonexistent (or in maintenance) home pages, and that did not provide free access to all issues or articles in full.

The variables collected from each journal were: International Standard Serial Number (ISSN), journal title, WebQualis CAPES of 2013, home institution, and State. After including a journal in the study, we individually analyzed all articles published between 2011 and 2014.

The articles’ search and download occurred in the home pages of the journals, by Portal de Periódicos da CAPES or in LILACS and SciELO databases. We only analyzed articles defined as original, review, or report, and excluded abstracts and/or letters to the editor from the analysis.

We collected the following information from each published article: article title; article type (original, review, or report); date of submission, acceptance, and publication; type of research (quantitative, qualitative, or quali-quantitative); statistics (descriptive or inferential); sample type (*in vitro*, animal, or human); and study design.

The Physical Therapy specialties in which the articles were classified are set according to the Federal Council of Physical and Occupational Therapy⁶

(COFFITO) up to July 2014. They are: Acupuncture, Cardiovascular Physical Therapy, Dermatofunctional Physical Therapy, Physical Therapy in Osteopathy, Physical Therapy in Chiropractic, Physical Therapy in Public Health, Physical Therapy in Women’s Health, Physical Therapy in Intensive Care, Sports Physical Therapy, Occupational Physical Therapy, Neurofunctional Physical Therapy, Oncological Physical Therapy, Respiratory Physical Therapy, and Trauma-Orthopedic Physical Therapy. Articles linked to other subareas of health or other fields were classified as “other” and excluded from the analysis. For placing each article in one of the specialties, we adopted the following criteria: 1. pathology, dysfunction, or pathophysiological profile of the studied subjects; 2. type of physiotherapeutic intervention; 3. variables or outcomes. Physical Therapy articles that did not fit in any specialty were placed in “General Physical Therapy.”

The studies designs were defined as described by Hulley et al.,⁷ being classified in: clinical trial, case-control, case series (before and after), case study, cases study, cross-sectional, experience report, cohort study, experimental study (with animal model), and systematic review with or without meta-analysis. We added the designs “development of product or process” and “validation” due to demand. The review articles were classified into integrative review or literature/narrative review. Qualitative articles were not classified regarding study design.

Data collection was conducted in pairs by independent and duly qualified evaluators. If there was no consensus between evaluators for any of the collected variables, a third evaluator was requested. All data were recorded in Excel spreadsheets with the same setting for all evaluators. Data are presented in absolute numbers, percentages, or median (25th–75th percentile).

RESULTS

Table 1 shows the ISSN, the titles of the 15 journals, the WebQualis/CAPES, and the States of each journal. The Brazilian Journal of Physical Therapy and Motriz: Revista de Educação Física (Online) presented the best WebQualis/CAPES, both in A2 (13.3%). The largest number of journals was in B1 and B4 strata (26.7% each). The largest number of journals (46.7%) is located in the State of São Paulo.

Table 1. Characterization of journals

ISSN	Journal title	Qualis	State
0104-7795	Acta Fisiátrica (USP)	B2	SP
1807-8648	Acta Scientiarum. Health Sciences (Online)	B1	PR
2177-9333	ASSOBRAFIR Ciência	B4	SP
1679-8074	Biomotriz (UNICRUZ)	B4	RS
1809-9246	Brazilian Journal of Physical Therapy	A2	SP
1809-2950	Fisioterapia e Pesquisa	B1	SP
0103-5150	Fisioterapia em Movimento (PUCPR. Printed)	B1	PR
1980-6574	Motriz: Revista de Educação Física (Online)	A2	SP
1984-4298	Movimenta	B4	GO
0104-7809	O Mundo da Saúde (CUSC. Printed)	B2	SP
1679-7930	RBCEH. Revista Brasileira de Ciências do Envelhecimento Humano	B4	RS
2236-5435	Revista Terapia Manual	B2	PR
2238-6149	Revista de Terapia Ocupacional da Universidade de São Paulo	B1	SP
0103-4499	Saúde (Santa Maria)	B3	RS
1678-5398	Universitas: Ciências da Saúde (UNICEUB. Printed)	B5	DF

We analyzed a total of 2,683 articles. The journal that published more articles was *Revista Terapia Manual*, with 425 articles (15.8%), and the one that published less was *Universitas: Ciências da Saúde (UNICEUB. Printed)*, with 54 (2%). Regarding the distribution of scientific production, most is concentrated in the Southeast region (47.8%).

Motriz: Revista de Educação Física (Online) presented the longest time between submission and

acceptance and *O Mundo da Saúde (CUSC. Printed)*, the shortest. *Acta Scientiarum. Health Sciences (Online)* presented the longest time between acceptance and publication and *ASSOBRAFIR Ciência*, the shortest (Table 2). Among all analyzed articles, the time between submission and acceptance was 157 (68-243) days and, between acceptance and publication, 109 (60-177).

Among the 2,683 published articles, 1,664 (62%) were originated or linked to the area of Physical Therapy. Table 3 shows that the highest number of publications focuses on Trauma-Orthopedic Physical Therapy (34.3%) and the lowest, on Physical Therapy in Chiropractic (0.1%). The original article format was more frequent in all specialties (88.8%). Regarding the type of study classified as original, review, and report, the human subject research was prevalent in all specialties (83.9%), and the use of animal experiment corresponded to only 2%. The remaining articles did not involve humans, animals, or *in vitro*.

Quantitative research showed a higher frequency (80.8%) than the others. The types of statistical analysis have been recorded among the original articles, and we identified a greater use of inferential statistics (67.7%) (Table 4).

The most common design was the cross-sectional (45%), while clinical trials and systematic reviews were less frequent. Among the 130 clinical trials, 100 (76.9%) did not report any record in official agencies (Table 5).

Table 2. Time between submission and acceptance

Journals	Time between submission and acceptance (days)	Time between acceptance and publication (days)
<i>Acta Fisiátrica (USP)</i>	69 (40-136)	54 (20-86)
<i>Acta Scientiarum. Health Sciences (Online)</i>	236 (156-357)	643 (502-740)
ASSOBRAFIR Ciência	148 (96-193)	31 (15-70)
<i>Biomotriz (UNICRUZ)</i>	NI	NI
Brazilian Journal of Physical Therapy	180 (102-240)	168 (145-196)
Fisioterapia e Pesquisa	240 (180-300)	90 (60-120)
<i>Fisioterapia em Movimento (PUCPR. Printed)</i>	188 (143-227)	185 (116-254)
<i>Motriz: Revista de Educação Física (Online)</i>	286 (194-441)	121 (74-167)
Movimenta	NI	NI
<i>O Mundo da Saúde (CUSC. Printed)</i>	44 (32-97)	93 (65-127)
RBCEH. Revista Brasileira de Ciência do Envelhecimento Humano	113 (45-240)	150 (60-270)
Revista Terapia Manual	65 (47-88)	67 (18-98)
Revista de Terapia Ocupacional da Universidade de São Paulo	136 (53-244)	46 (31-77)
<i>Saúde (Santa Maria)</i>	191 (100-260)	72 (30-105)
<i>Universitas. Ciências da Saúde (UNICEUB. Printed)</i>	240 (179-282)	79 (34-141)

Median values (25th-75th percentile). NI: not informed

Table 3. Article format and type of study by specialty

	Format				Type of study		
	Original	Review	Report	Total	Humans	Animals	In vitro
Acupuncture	5	4	0	9	4	1	0
Cardiovascular	109	11	0	120	106	1	0
Dermatofunctional	18	3	0	21	13	2	1
Sports	48	5	0	53	46	0	0
Neurofunctional	304	31	10	345	302	1	0
Oncological	14	0	2	16	15	0	0
Osteopathy	5	0	0	5	3	0	0
Chiropractic	2	0	0	2	1	0	0
Respiratory	165	15	2	182	161	1	0
Public Health	102	17	2	121	98	0	0
Women's Health	73	8	0	81	72	0	0
Intensive Care	33	3	0	36	27	0	0
Occupational	58	3	0	61	55	0	0
Trauma-Orthopedic	514	50	6	571	473	27	2
General Physical Therapy	28	14	0	42	19	0	0
Total	1,478	164	22	1,664	1,396	33	3

Values in n

Table 4. Types of research and statistics adopted in the different specialties

	Type of research			Type of statistics*	
	Qualitative	Quantitative	Both	Descriptive	Inferential
Acupuncture	4	5	0	2	3
Cardiovascular	12	107	1	11	97
Dermatofunctional	4	17	0	5	12
Sports	6	43	4	6	41
Neurofunctional	55	282	8	55	235
Oncological	1	14	1	3	12
Osteopathy	1	3	1	2	2
Chiropractic	0	1	1	2	0
Respiratory	19	159	4	16	147
Public Health	45	69	7	24	52
Women's Health	11	69	1	10	60
Intensive Care	6	29	1	13	17
Occupational	6	49	6	20	35
Trauma-Orthopedic	74	470	26	88	408
General Physical Therapy	12	28	2	24	6
Total	257	1,344	63	280	1,127

Values in n. *Only for quantitative and quali-quantitative original articles

Table 5. Types of design of the original articles in the different specialties

	Cross-sectional	Case-control	Case series	Case study	Cases study	Systematic review	Clinical trial	D. of products or processes	Cohort study	Experimental	Validation
Acupuncture	0	1	2	1	0	0	0	0	0	1	0
Cardiovascular	48	12	20	1	0	3	15	0	8	1	0
Dermatofunctional	1	0	5	0	1	1	5	0	1	3	0
Sports	20	8	8	1	0	3	4	0	2	0	1
Neurofunctional	124	36	46	21	6	22	18	1	11	1	4
Oncological	3	0	4	0	0	2	0	0	5	0	1
Osteopathy	1	0	0	0	0	1	1	0	0	0	0

continues...

Table 5. Continuation

	Cross-sectional	Case-control	Case series	Case study	Cases study	Systematic review	Clinical trial	D. of products or processes	Cohort study	Experimental	Validation
Chiropractic	0	0	1	0	0	0	0	0	0	0	0
Respiratory	72	21	24	5	1	6	20	0	13	1	0
Public Health	59	2	4	0	1	0	1	0	9	0	0
Women's Health	33	6	13	1	0	4	11	0	2	0	0
Intensive Care	15	1	3	0	0	5	2	1	3	0	0
Occupational	44	0	5	0	0	0	2	1	2	0	1
Trauma-Orthopedic	192	61	85	21	1	31	51	6	13	29	6
General Physical Therapy	20	0	1	0	1	1	0	2	5	0	0
Total	632	148	221	51	11	79	130	11	75	36	13

Values in n; D: development

DISCUSSION

Among our findings, it is possible to report that the Qualis B1 and B4 strata were the most frequent among the analyzed journals; the Southeast region presents the largest number of journals and the greatest concentration of scientific production; the specialty of Trauma-Orthopedic Physical Therapy concentrates the largest number of publications; most researches have been conducted in humans; quantitative research and inferential statistics were the most used; and the most used design was the cross-sectional study.

The Qualis classification is performed by the evaluation areas and passes through an annual process of updating, with these journals being put in strata that indicate quality. The same journal can receive different ratings when it is classified into two or more separate areas, and that does not mean inconsistency, but that the value assigned in each area is relevant to the disclosed content⁸. The strata that we most found were B1 and B4, showing that Physical Therapy must still progress regarding the reach of its best journals in better indexing databases, such as the international ones, which have wide access and dissemination, granting a higher rank in the Qualis/CAPES stratum. We highlight that, in 2014, there have been adjustments in WebQualis, causing some journals to be reclassified into new strata.

The predominance of scientific production in the Southeast region, more specifically in São Paulo, can be explained by the fact that 80% of the Country's researchers are located in this region⁹. Such datum corroborates with the disparity in the scientific production in the five regions of Brazil¹⁰, heavily

concentrated in the Southeast, while the North region occupies the opposite position. We highlight that the performance in quantity and quality is largely due to the tradition of promoting research and the favorable environment to competitiveness in scientific production¹¹. However, this issue does not relate only to the quantity of production, but also to different aspects that are involved in the publication and quality of articles, such as the policies for encouraging scientific activities and the training of masters and PhDs¹⁰.

Before the importance of the analysis time until publication, we analyzed the time between submission, acceptance, and publication of each article. The duration of this process is related to the editor's agility and availability of reviewers, as well as to the time for reply and adjustments that is available and used by authors until the final acceptance. We verified the need for greater agility in the review process of Brazilian journals in this field, to shorten the time until publication, aligning them with international consolidated journals¹².

In this study, Trauma-Orthopedic Physical Therapy concentrated the highest percentage of articles. Virtuoso et al.³ found a similar result, reporting that, historically, physical therapists have focused on hospitals, rehabilitation clinics, and charity organizations that were under the command of orthopedists, so much so that its first areas were orthopedics, with priority for sport injuries, and neurology, with greater focus on neuropsychiatry. Coury and Vilella¹³ conducted an analysis of the Curriculum Lattes of physical therapists with PhD and noted more studies on the "orthopedic area" in the year of 2008, possibly by the distribution of doctoral programs in Physical Therapy primarily in this area.

We verified the largest number of publications in the original format in all specialties, which could be expected, since journals tend to limit the number of review articles by published issue. Originality exerts an important role on contemporary knowledge, being potential for new concepts or new perspectives¹⁴. However, it is worth mentioning that the classification as original article format not necessarily confers originality to the study and information.

There is the idea that the best contributions occur in quantitative studies¹⁵, which were more widely used among the specialties of Physical Therapy. The paramount importance of quantitative research to support evidence-based practice is widely known, because it involves the development of studies with greater methodological rigor, seeking to deepen new research skills in the area¹⁶. The higher frequency of inferential statistics in most specialties reflects the adoption of statistical tools based on hypothesis testing. Such information involves advances in the quality of scientific knowledge and will strengthen the concept of evidence-based Physical Therapy.

The most common design among the articles of Physical Therapy specialties was the cross-sectional, characterized as inexpensive, relatively quick to perform, and widely used, but that present limitations regarding the difficulty to investigate conditions of low prevalence, disease exposure, and research period, not determining absolute risk nor the duration of the disease¹⁷. Clinical trials are the design accepted as scientific gold standard, because they provide the best evidence of effectiveness or ineffectiveness of therapy, being the basis for justifying the use of interventions¹⁷. However, this design was infrequent among the analyzed studies. Approximately 80% of clinical trials were not recorded, or their linking to the Brazilian Clinical Trials Registry or ClinicalTrials.gov was not informed in the publication. This record has been required and requested by the journals supporting the policies for registration of clinical trials of the World Health Organization and International Committee of Medical Journal Editors, recognizing the importance of these initiatives for the record and international dissemination of information on clinical studies in open access. Also, the lack of experimental studies shows that the processes and mechanisms of action in animal models are little studied in the Physical Therapy research of Brazilian journals.

This study was limited to Brazilian journals freely accessible, part of them being with outdated issues or

editions. COFFITO is constantly recognizing new specialties of Physical Therapy, which may generate other data distribution. Possibly, the best qualified scientific production of Brazilian Physical Therapy is concentrated in international journals, which also limits our inferences about the quality of the research produced in Brazil, since our search has been restricted to national journals.

CONCLUSION

Physical Therapy remains as an emerging and ascending field regarding quantity and quality of research and, consequently, regarding advances in scientific knowledge. In this study, some factors that need improvement stood out, such as the long time between submission, acceptance, and publication of articles and the low frequency of clinical trials or systematic reviews. However, the predominance of quantitative research and inferential statistics can show a tendency for development of the area. This profession should move forward in creating more graduate programs and encouraging research and publication of scientific texts with greater methodological rigor.

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