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Physical therapy: A worldwide overview

Terapia física: Una revision mundial

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Abstract

The current population rate has increasing the number of inhabitants with some kind of disability. In this work a proposal to determining trends, research groups, authors, countries, journals and organizations about Physical Therapy has done. The study is based on the Web of Science (WoS) database, where were found 77,960 documents regarding Physical Therapy; the category with most documents published is Rehabilitation with 13%; the most prolific author is PhD Julie Fritz from the University of Utah with more 10,000 citations; the organization with the greatest number of documents is the University of Toronto; a map of the countries with most documents is presented and shows that United States of America (USA) is the number one. The top 5 of journals is leaded by Physical Therapy journal. A clustering analysis to find out groups of researchers and main keywords show that there are 38 clusters where there is a high collaboration between authors; the collaboration between organizations shows that the University of Toronto interacted with several organizations; regarding keywords, the most used is Therapy, followed by rehabilitation, physical-activity and quality of life.

Physical Therapy, Disability, Web of Science

Resumen

La tasa de población actual ha aumentado el número de habitantes con algún tipo de discapacidad. En este trabajo se ha hecho una propuesta para determinar las tendencias, grupos de investigación, autores, países, revistas y organizaciones sobre Terapia Física. El estudio se basa en la base de datos de la Web of Science (WoS), donde se encontraron 77,960; la categoría con más documentos publicados es Rehabilitación con un 13%; la autora más prolífica es la doctora Julie Fritz de la Universidad de Utah con más de 10,000 citas; la organización con mayor número de documentos es la Universidad de Toronto; se presenta un mapa de los países con más documentos y se muestra que Estados Unidos de América (USA) es el número uno. La revista Physical Therapy lidera las cinco más importantes. Un análisis de clustering para averiguar los grupos de investigadores y las principales palabras clave muestra que hay 38 agrupaciones en las que hay una gran colaboración entre los autores; la colaboración entre organizaciones muestra que la Universidad de Toronto es la que más interactúa; la palabra clave más utilizada es Therapy, seguida de la rehabilitación, la actividad física y la calidad de vida.

Terapia física, Discapacidad, Web of Science

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Introduction

Physical therapy has demonstrated the versatility of its competencies according to the emergence of new Diseases, as well as the increase in life expectancy, Porterfield (Porterfield, 2018) shows the importance and relevance of measuring and improving the health of the population, especially in the case of chronic diseases, which also determine a prevailing need to save on care costs. (WHO, 1977) also estimated in 2011, that of the 7 billion individuals on the planet, approximately 1 billion live with some form of disability.

It has been found that according to the economic growth of each country the disability varies between 1% y 30% (Bindawas & Vennu, 2018), the United States Census Bureau (Bureau, 2020) in 2012, census that 19% (56.7 million) of the population had a disability, of which 53.9%, had mobility difficulties. Zhao (Zhao, 2019) emphasize the existence of disparity and severity of disability statistics in the same country, according to the level of urbanization and rural area, in addition they make evident the increase of disability, appearing in 61 400 million (25.7%) of the population.

Associated with these socio-economic and geographical differences in disability, Palmer y Harley (Palmer & Harley, 2012) explain the variability in disability rates between and within countries, by attributing it to different definitions, data collection systems, age ranges and included populations.

The above results coincide with those obtained by Zhao (Zhao, 2019), and the USA Census (Bureau, 2020), that the most prevalent disability worldwide is that which affects the function or mobility (*Disability in Mexico | Global Disability RightsNow!*, 2020; Mitra & Sambamoorthi, 2014; Sandoval et al., 2017) and that the more developed countries have a higher prevalence with about 25%. Smith in his study (*«Disability Issues» Everyone Should Consider Urgent In 2017*, 2020) points out needs that require urgent attention within the framework of disability and in the Convention on the Rights of Persons with Disabilities, recognizing that physical rehabilitation is one of the fundamental aspects in the inclusion and improvement of the care and quality of this population.

In response to this need, the physical therapy (*Becoming a Physical Therapist*, s. f.; *Guide to Physical Therapist Practice*, s. f.) deals with the process of developing, maintaining, and restoring an individual's maximum movement and functional capacity to promote not only optimal physical function, but also well-being and fitness, for a better quality of life in relation to movement and health.

Various studies such as those carried out by Mohammed et al. (Mohammed, 2019), Lisa et al. (Brown et al., 2019), or Stein (Stein et al., 2019) demonstrate the universality and versatility that allow physical therapy and White et al. (White et al., 2020) and (Tinetti et al., 1997) patent the ability of the physical therapist to work with patients at any stage of life.

The World Health Organization (WHO) described Rauch et al. [20] aims to achieve universal health coverage and within this, physical therapy is included within the Rehabilitation Intervention Package (RIP) 2030. According to this, it was thought necessary to perform a bibliometric analysis through the Web of Science (WoS) database such as the one performed by Zheng et al. (Zheng et al., 2017), in which he concludes that this platform is established as an important source for sharing research and promoting cooperation between institutions, in addition to supporting the development of cooperative networks between academics from different universities.

In the area related to physical therapy, Brown et al. (Brown et al., 2019), carries out a bibliometric study in 2019 using the WoS database, however this research focuses on occupational therapy and despite having outstanding results on the publications on the subject and the relationship of impact, institutions and collaborations, the results fall more on rehabilitation or physical medicine.

The main objective of the present work is to make known and report through a bibliometric analysis using the Web of Science data base the different groupings among countries, institutions and professionals that develop research around the Physical Therapy, showing leading countries as well as the most prolific authors in the subject of physical therapy, future trends and will also be made known the keywords and the most influential journals on this subject.

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Methodology

The bibliometric analysis as proposes (Orjuela, 2010) are created as an effect of the vast amount of scientific information; (Molina-Molina et al., 2020) point out that these types of studies have been highly developed according to their usefulness in research and technology, while Shen and Ho (Shen & Ho, 2020) emphasize the usefulness of this methodology to achieve a comprehensive understanding of a domain in research.

For the search of the articles, the keyword "Physical Therapy" was used, obtaining as a result 77,960 documents.

To avoid confusion in the conceptualization, the search was initiated in the Web of Science platform, using the following structure: BASIC SEARCH ({PHYSICAL THERAPY}), the publications obtained referring to the key word, during the period 1945 and February 2020 were analyzed in categories of subjects, types of publication (research articles, review, editorial, letter, etc.), authors, languages, distribution by country, entities that finance them, titles by associations, as well as the year of publication.

Data extraction:

The bibliometric record obtained was first analyzed using the refining function, in each of the filters in their order Publication years, Web of Science Categories, Documents Types, Organizations-Enhanced, Authors, Source Titles, Titles, Countries/Regions, and Web of Science Index. Figure 1 shows the methodology used for the analysis of the data obtained.

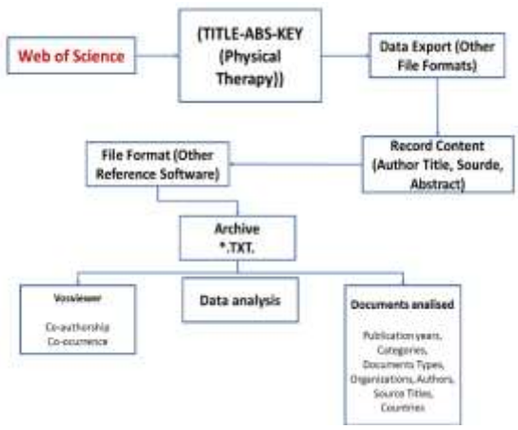

Figure 1 Methodological flowchart

The infrastructure and possibilities offered by the platform allows downloads of up to 500 files per request out of a total of 77,960 or 156 out of 500 the download files are of type *.txt (van Eck & Waltman, 2020).

The software VOSviewer as show Yeung et al. (Yeung et al., 2020) is a very useful tool to be able to relate key aspects of the various articles that are published.

Results and Discussion

The productivity of articles referring to physical therapy has shown a growth trend over the last 23 years, as can be seen in Figure 2. The behavior in the growth of publications year after year has been variable. For example, in 1997 there were 194 (22.6%) more documents than those reported in 1996, while in the year 1998, the development grew by 6.5%, that is, only 69 more documents than those reported in 1997.

Similarly, during 2014, there was a brief delay and even a decrease in production with respect to previous years, represented by -0.1% of 4 199 documents reported in 2013. Although in 2015 there was be another exponential growth of 27.9%, making it the most productive period in two decades.

These data show that, during the period in question, the average growth rate was 9.7% per year. A trend line was drawn, to identify a possible number of publications in the coming years, this line presents an R-square of 0.9922, which suggests that in the coming years the same growth will be maintained.

The five categories or areas of knowledge in which the most documents relationship physical therapy have been developed until 2019 are: rehabilitation, general medicine, neurosciences-neurology, orthopedics, and oncology, in the respective order as shown in figure 2.

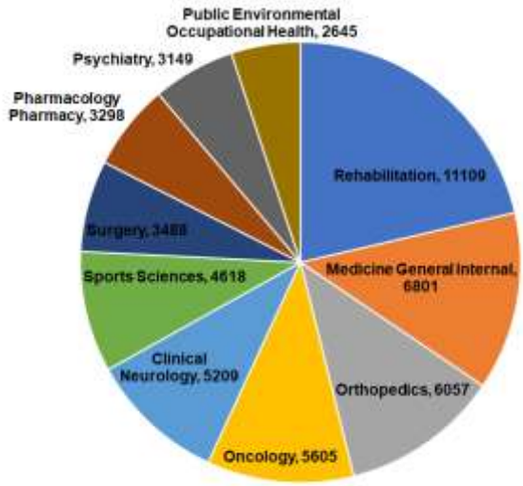

Figure 2 Documents by category

It should be noted that, considering the keyword used for this study (physical therapy) as an autonomous profession, no documents have been found that make up a category in this area. The most productive author, with 118 documents is Fritz JM, physiotherapist and Ph.D in Rehabilitation Science, researcher attached to the faculty of health of the University of Utah, USA, with more than 10,000 citations
In table 1, data of the top 5 most prolific authors and their relationship with Physical Therapy are presented.

Position	Author	Organization	Country	Number of documents in WoS	Times cited
1	Julie M. Fritz	University of Utah	USA	118	10 156
2	Kerry S. Courneya	University of Alberta	Canada	110	26 577
3	Yan Zhang	University Tiajin Medical	China	97	20
4	Joshua A. Cleland	Concord Hospital	USA	92	6 149
5	Yuan Liu	University Jiliang China	China	89	1 078

Table 1 Top 5 of most prolific authors

The University of Toronto, Canada, is the institution that reports more documents in the WoS.

Despite the fact that physical therapy has the possibility of acting in diverse areas and with a plurality of pathologies, the results of the research showed that of the 25 countries that publish the most, five have an outstanding majority, led by the United States as the country that publishes the most, Germany, England, Canada and Australia form the top 5 of publications with 65% of all records, see figure 3.

Figure 3 Ranking according countries

As shown in figure 3, the USA registered 30 315 documents representing 38.8% of the publications reported by the Web of Science, far below with several 6247 records Germany has 8% of publications, pointing out that the development of research is centralized in only one country.

The most widely used journals for the publication of physical therapy found in the registry are headed by The Physical Therapy Journal. The Physical Therapy Journal is supported by the University of Oxford and has an impact factor of 3.043 in the Journal Citation Reports (JCR), where it has maintained an average of the last five years reaching 3.599, in terms of its position within the rehabilitation ranking, it is presented as the magazine number 7 of 65 corresponding to quartile 1, which positions it as a leader in the area.

As shown in Table 2, these three leading journals in the publication of physical therapy, have a solid growth and recognized prestige within the field of global health.

It was observed during the investigation that another relationship shared by the first three places is the JCR Category, which corresponds to the area of Rehabilitation and in the case of the first and third places also correspond to Orthopedics, both areas being recognized as important contributors to physical therapy.

Position	Journal	Number of Documents	Impact Factor 2018	Impact Factor 5 years	JCR Category	Quartile	Country
1	Physical Therapy	1717	3.043	3.599	Rehabilitation 7 of 65	Q1, Q1	USA
2	The Archives of Physical Medicine and Rehabilitation Journal	935	2.697	3.618	Rehabilitation 10 of 65	Q1, Q2	USA
3	Journal of orthopedic sports physical therapy	616	3.958	3.951	Rehabilitation 6 of 65	Q1, Q1	USA
4	Cochrane database of systematic reviews	897	7.755	7.949	Medicine, general & internal 11 of 180	Q1	USA
5	Plos one	439	2.776	3.337	Multidisciplinary Science 24 of 69	Q2	USA

Table 2 Journal top 5

The bibliometric map of collaboration between co-authors is presented in figure 4, is distinguished by a formation of 38 clusters made up of a minimum of 3 and a maximum of 57 participants each, with an average of 21 and a total of 831 individuals on the map.

This map, made up of spheres and colored links, represents, according to its size and color intensity, the contribution of the authors in the various research groups with similes from all over the world.

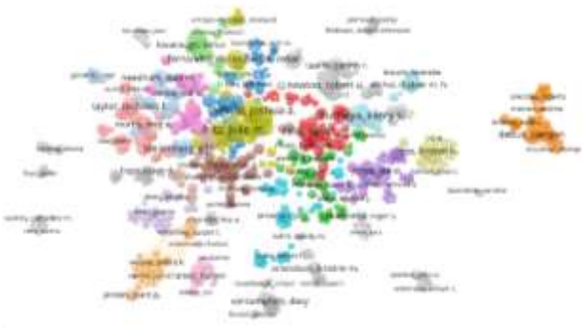

Figure 4 Co-authorship in Physical Therapy

In figure 4 the distribution of the clusters a discrete preference is observed towards the conformation of 12 members by group, this is perceived through the identification that 6 clusters have this characteristic which is equivalent to 16% of the 38, then 4 clusters of 37 and 9 individuals were identified respectively. The collaboration between institutions can be seen in figure 5, where it is distinguished that the University of Toronto and the University of Harvard, besides being the first places in the ranking of publications in the WoS, also are the universities that collaborate more with other organizations around the Physical Therapy.

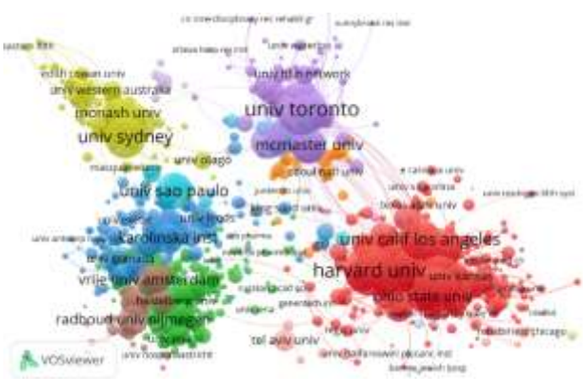

Figure 5 Collaboration for institutions

Although the trend of collaboration in physical therapy is increasing, dissemination and publication are still in a few collaborative groups, demonstrating the importance and need to expand links between institutions globally by creating more collaborative clusters.

This importance has been demonstrated in other bibliometric analyses such as that conducted by Guo et al, (Guo et al., 2019) [31], in which they do research on the publication of stem cells and spinal cord injury using WoS as the data base, for its part, Coronado R. et al. (Coronado et al., 2011) demonstrate the importance of this type of work through the study they carried out to find out about the existing publication on Physical Therapy, but taking into account only the journal of the same name and belonging to the American Physical Therapy Association (APTA).

A bibliometric map of collaboration between countries on Physical Therapy has been made, where United States, is the leader with 28 769 documents and 10 240 collaborative links as seen in figure 6.

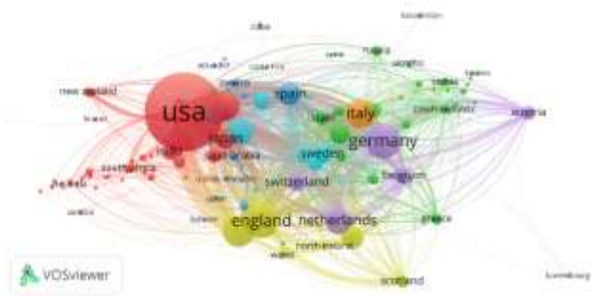

Figure 6 Map of collaborations

The analysis of author keywords (figure 7), identified that between 2009 and 2014, new concepts were accepted, or new terms were adopted that were applied in another area of knowledge and during this period they were related to Physical Therapy, in addition, it can be specified that in terms of the items which are most used and which are related according to Vosviewer, the first 1000 are grouped into 7 clusters composed of 252, 247, 226, 225, 36, 13 and 1 word, this distribution, allows us to deduce that the trend of this combination will have a continuous increase in the next years, identifying that 4 of the 7 clusters, are above 200 elements, while the other three are in much smaller ranges.

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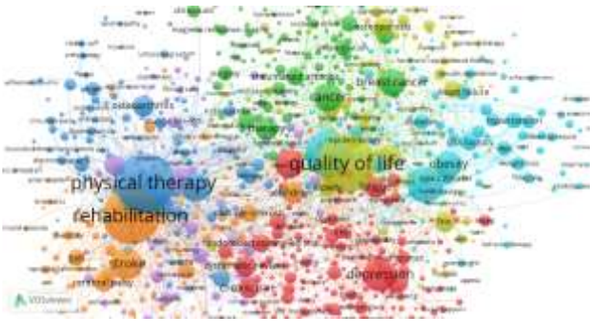

Figure 7 Keywords analysis

The keywords most used are rehabilitation, physical therapy and quality of life, this interaction is remarkable, because these disciplines act together most of the time.

Conclusions

Physical therapy is a versatile profession in its action against many pathologies and areas of medicine, which brings great benefits to the population.

Global organizations on health, disability and even economics have recognized the importance of this discipline by integrating it into global care plans. It is the responsibility of professionals and organizations to strengthen research, innovation and collaboration with peers from different countries to homogenize knowledge and have a greater growth.

According to the results obtained in this bibliometric study, developed countries such as USA, England or Canada, are leaders in publications, advances and innovation in the field of physical therapy, therefore, countries with less development, should seek a greater approach and government support in order to contribute and prosper in a more synchronized way to global trends and problems that concern them.

The different functional alterations that the world population suffers not only come from the direct affectation of the neuro-musculoskeletal systems, the affectation of all the apparatuses, systems or corporal structures including the mental illnesses, influence in the functional capacity of movement of the human being.

The most influential authors in the discipline particularly address growing global problems such as obesity, sedentary lifestyles, aging, cancer, among others. This leadership sets the stage for collaboration and exposes other colleagues who are leading the way and with whom, we dare say, they can collaborate.

Regardless of country, race, age group, sex or gender, there are health issues that concern everyone, such as the recent SARS-CoV-2 Coronavirus pandemic. This personifies not only the possibility and opportunity for closer collaboration and global resources for their solution, but also represents the responsibility and need for all health professions to work in inter-, multi- and trans-disciplinary teams that address not only a part of their condition, but the entire natural history of the disease (prevention, care, treatment and its likely consequences).

By virtue of this, physical therapy is reaffirmed as a discipline ready to support and research around this and the imminent new health problems that will arise in the world.

It remains as an emphatic responsibility, that the research, dissemination and dissemination of work done around physical therapy, will have a greater growth and its trend may be more significant to be reported in data bases of great global influence such as the Web of Science, as well as in journals with high quartiles and recognized impact.

It is committed and open the possibility to complement the present research, with emerging terms and according to a follow up on the behavior of the reported trends.

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