PROFILE OF SCIENTIFIC PRODUCTION ON LATENT TUBERCULOSIS INFECTION: A BIBLIOMETRIC STUDY

PERFIL DA PRODUÇÃO CIENTÍFICA SOBRE A INFECÇÃO LATENTE DA TUBERCULOSE: ESTUDO BIBLIOMÉTRICO

PERFIL DE LA PRODUCCIÓN CIENTÍFICA SOBRE LA INFECCIÓN TUBERCULOSA LATENTE: UN ESTUDIO BIBLIOMÉTRICO

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ABSTRACT

Objective: to analyze the bibliometric profile of scientific production on latent tuberculosis infection, available in the Web of Science database. **Methods:** bibliometric study, with a quantitative approach. A search strategy was organized with terms from the Medical Subject Headings vocabulary, including publications from January 2016 to August 2021. Descriptive statistical analysis was performed and the Bradford and Zipf Laws were applied. **Results:** the sample consisted of 2,460 publications, with a predominance of original articles, in English, from the years 2018 to 2020. 10 authors and 25 North American and British institutions stood out. The United States of America and England were the countries that published the most. The main area of research was that of infectious diseases. 25 most influential journals and 10 keywords with greater representation were identified. **Conclusions:** it was found that the scientific production on latent tuberculosis infection is extensive and diverse, and showed a tendency to increase in the period studied.

Keywords: Latent Tuberculosis; Bibliometrics; Scientific Publication Indicators; Nursing Research.

RESUMEN

Objetivo: analizar el perfil bibliométrico de la producción científica sobre la infección tuberculosa latente, disponible en la base de datos *Web of Science*. **Métodos:** estudio bibliométrico, con enfoque cuantitativo. Se organizó una estrategia de búsqueda con términos del vocabulario *Medical Subject Headings*, incluyendo publicaciones de enero de 2016 a agosto de 2021. Se realizó análisis estadístico descriptivo y se aplicaron las Leyes de Bradford y Zipf. **Resultados:** la muestra estuvo conformada por 2.460 publicaciones, con predominio de artículos originales, en inglés, de los años 2018 a 2020. Se destacaron 10 autores y 25 instituciones norteamericanas y británicas. Estados Unidos de América e Inglaterra fueron los países que más publicaron. La principal área de investigación fue la de las enfermedades infecciosas. Se identificaron las 25 revistas más influyentes y las 10 palabras clave con mayor representación. **Conclusiones:** se constató que la producción científica sobre la infección tuberculosa latente es extensa y diversa, y mostró tendencia a aumentar en el período estudiado.

Palabras clave: Tuberculosis Latente; Bibliometría; Indicadores de Producción Científica; Investigación en Enfermería.

RESUMO

Objetivo: analisar o perfil bibliométrico da produção científica sobre a infecção latente da tuberculose, disponível na base de dados *Web of Science*. **Métodos:** estudo bibliométrico, com abordagem quantitativa. Organizou-se estratégia de busca com termos do vocabulário *Medical Subject Headings*, incluindo publicações de janeiro de 2016 a agosto de 2021. Realizou-se análise estatística descritiva e aplicou-se as Leis de Bradford e Zipf. **Resultados:** a amostra se constituiu por 2.460 publicações, com predomínio de artigos originais, no idioma inglês, dos anos de 2018 a 2020. Destacaram-se 10 autores e 25 instituições norte-americanas e britânicas. Estados Unidos da América e Inglaterra foram os países que mais publicaram. A principal área de pesquisa foi a de doenças infecciosas. Identificaram-se 25 periódicos mais influentes e 10 palavras-chave com maior representatividade. **Conclusões:** constatou-se que a produção científica sobre a infecção latente da tuberculose é extensa e diversificada, e apresentou tendência de aumento no período estudado.

Palavras-chave: Tuberculose Latente; Bibliometria; Indicadores de Produção Científica; Pesquisa em Enfermagem.

INTRODUCTION

On the global stage, tuberculosis represents a major challenge to public health. According to the World Health Organization (WHO), the disease is the leading cause of death from diseases of infectious origin. Developing countries account for 95% of cases and deaths, with 50% of cases being concentrated in South Africa, Brazil, China, the Russian Federation and India[1-2]. In this context, Brazil also stands out among the 30 countries with the highest burden of the disease: the incidence coefficient, in 2020, was 31.6 cases/100,000 inhabitants[3]; in 2019, it was 35.0 cases/100,000 inhabitants, and, despite having reduced in the period from 2010 to 2016, it increased between 2017 and 2018[4]. An international study pointed out that, each year, 1.5 million deaths result from the pathology, whose agent is *Mycobacterium tuberculosis*[5].

The infectious condition, without clinical repercussions that signal the manifestation of the active form, is known as latent tuberculosis infection (LTBI). It is possible that immunocompetent individuals living with the infection remain healthy for several years and do not transmit the bacillus. It is known, however, that the greatest risk of reactivation and triggering of signs and symptoms occurs within two years after the primary infection. This risk increases according to the existence of factors that interfere with immune functions: age younger than two years or older than 60, co-infection with the human immunodeficiency virus (HIV), immunosuppressive treatments, diseases and other conditions, such as diabetes mellitus and malnutrition[6].

It is estimated that the infection affects a quarter of the world's population. However, despite the fact that the infected constitute themselves as reservoirs, not all of them will manifest the active form[6]. A review of the literature showed that, of a contingent of two to three billion infected in the world, about five to 15% will evolve from latency to the active form, and that LTBI accounts for significant numbers of tuberculosis cases, due to the process of reactivation[7].

These data reaffirm that diagnostic and treatment strategies are essential for effective control, especially in groups at higher risk of infection[7]. In view of the magnitude of the problem, the WHO launched, in 2015, the End TB Strategy, establishing goals for greater control of the disease by 2035[6,8]. Challenges loom large to reach such goals, as it is necessary to strengthen screening and other actions around LTBI. In Brazil, the Ministry of Health prepared, in 2017, based on that Strategy, the National Plan for the End of Tuberculosis as a Public Health Problem, structured under three pillars: prevention and care based on the integrality of the person with tuberculosis; policies and support systems; and strengthening of research and innovation[6].

Therefore, it is necessary to develop knowledge and technologies to strengthen the body of evidence on LTBI, since, despite the active form being an ancient disease, with wide geographic distribution and known control

actions, its repercussions strongly mark the lives of those affected, especially the most vulnerable. In addition to development, it is important to know and measure scientific production, on the international scene, in order to characterize it, since the panorama that results from this initiative allows the analysis of representative indicators of production, as well as the identification of priorities and gaps in research investment.

In this perspective, the approach to the theme was considered through the resources of bibliometrics, a set of quantitative techniques for measuring the indices of production and dissemination of knowledge. It was created at the beginning of the 20th century, given the need to evaluate production and communication activities. Currently, it appears as an alternative for investigating elements of the literature and other means by which knowledge is disseminated, aiming at the quantitative analysis of information[9-10].

Given the relevance of the issues at hand, this study aimed to analyze the bibliometric profile of scientific production on latent tuberculosis infection, available in the Web of Science database.

METHODS

A bibliometric study was carried out, with a quantitative approach, in view of the possibilities it offers for the mapping of scientific production, in order to generate metric indicators on a given topic[11]. Thus, employing statistical and mathematical techniques, it allows an objective analysis of production[12]. It is a product of the discipline Special Topics, developed in the context of the activities of the Postgraduate Program in Nursing, Academic Master's modality, at a public university in the state of Pará.

Data were collected in the fourth week of August 2021, using the international multidisciplinary database Web of Science, through the Portal of Periodicals of the Coordination for the Improvement of Higher Education Personnel (CAPES) – Ministry of Education. This provider was chosen because of its scope and relevance, as it brings together the production of researchers on the global stage, providing publication and citation information from journals, books, scientific events and other documentary sources. In view of this, it provides the identification of productions and their characteristics, in line with the objective of this study[13].

As a guide, the question was formulated: what is the bibliometric profile of scientific production on LTBI? By consulting the Medical Subject Headings (MeSH) vocabulary, prepared by the United States National Library of Medicine (NLM), a descriptor and nine entry terms were selected, namely: "Latent Tuberculosis", "Latent Tuberculosis", "Tuberculosis, Latent", "Tuberculosis, Latent", "Latent Tuberculosis Infection", "Infection, Latent Tuberculosis", "Infections, Latent Tuberculosis", "Latent Tuberculosis Infections", "Tuberculosis Infection, Latent" and "Tuberculosis Infections, Latent".

To search for information in the database, with the help of the Boolean operator OR, the following strategy was organized: ("Latent Tuberculosis" OR "Latent Tuberculosis" OR "Tuberculosis, Latent" OR "Tuberculosis, Latent" OR "Latent Tuberculosis Infection" OR "Infection, Latent Tuberculosis" OR "Infections, Latent Tuberculosis" OR "Latent Tuberculosis Infections" OR "Tuberculosis Infection, Latent" OR "Tuberculosis Infections, Latent").

Studies on LTBI, published from January 2016 to August 2021, were included, a period that covered both the production of the last five complete years and the current year of data collection. Considering that this study aimed to characterize and measure the available production on the subject, the adoption of other inclusion criteria was waived. Applying the search strategy, 5,734 results were generated, initially without choosing filters. The refinement by years of publication, according to the defined period, generated 2,460, representing the final sample.

Descriptive statistical analysis of nine variables was performed: document types, languages, years of publication, authorship, institutional affiliation of the authors, countries or regions of affiliation of the studies, research areas, journal titles and keywords. As for the last variable, Web of Science provides two types: the "author keywords" and the "keywords plus", however, it was decided to use only the first type. Additionally, among the Classical Laws of Bibliometrics, landmarks of its historical development[9], it was decided to apply Bradford and Zipf's Laws, to investigate the dispersion of scientific journals according to their productivity[14] and to assess the frequency and distribution of keywords[12], respectively.

The first makes it possible to identify three groups that are distinguished by the density of production of journals on a certain topic or phenomenon investigated, so that a small group, called the Nucleus, is responsible for the majority and more robust production. The other groups, known as Zones, comprise a greater number of journals and publish less frequently as they move away from the Nucleus[14-15]. The journals were tabulated using the Microsoft Office Excel program, version 2013, arranging them in descending order, according to the frequencies of individual publication. The separation of the groups occurred equally, by the total number of publications, so that each one constituted approximately one third of the production, equivalent to 33.33%.

To characterize the elements of the Nucleus, the Qualis classification was consulted, referring to the four-year period 2013-2016, prepared by CAPES and made available on the Sucupira Platform, in order to stratify the journals. The areas of nursing and interdisciplinary were considered, since the theme adds evidence for the work of nurses, such as the authors of this study, and for the academic community of different professions and branches of knowledge. The impact factor of journals was also consulted, referring to the year 2020, an indicator pointed out in the Journal Citation

Reports (JCR), published by Clarivate Analytics, accessed through the CAPES Periodicals Portal.

The second, in turn, expresses the relationship between the words of a text and the series order (count) that corresponds to them[9]. It points to the use of a small number of words, because, according to Zipf, this set obtains good representation of the content and is little dispersed. Its purpose is to find words with a high semantic content, which enhance indexing opportunities[15].

Thus, the keywords were submitted to similar tabulation, in descending order of occurrence. Starting from the nth value of the most frequent word and then the nth value generated, the words were divided into three groups: Trivial Zone, formed by the smallest number of words, which occurred more frequently; and the Interesting and Noise Zones, with more words and lower frequencies than the first Zone[16-17].

It should be noted that the collection took place on the basis of public access, safeguarding the current norms for the production and dissemination of scientific knowledge, which is why there was no appreciation by the Research Ethics Committee.

RESULTS

Production profile

It was found that the 2,460 publications were distributed in 15 types of document, with original articles predominating, with 1,682 (68.37%), and revisions, with 346 (14.07%). Ten languages of publication were identified: English (n=2,368, 96.26%), German (n=29, 1.18%), Spanish (n=28, 1.14%), French (n=15, 0.61%), Portuguese (n=9, 0.37%), Turkish (n=5, 0.20%), Russian (n=3, 0.12%), Japanese (n=1, 0.04 %), Korean (n=1, 0.04%) and Ukrainian (n=1, 0.04%).

In the period studied, the years 2018 to 2020 led the largest volume of productions on the subject, as shown in Figure 1. It was observed that the authorship consisted of a total of 12,723 researchers, among which 10 stood out, due to the number of documents published by them, as illustrated by the TreeMap chart in Figure 2.

Figure 1 – Distribution of absolute frequencies and percentages of publication per year, January 2016 to August 2021. Belém, PA, Brazil, 2021.
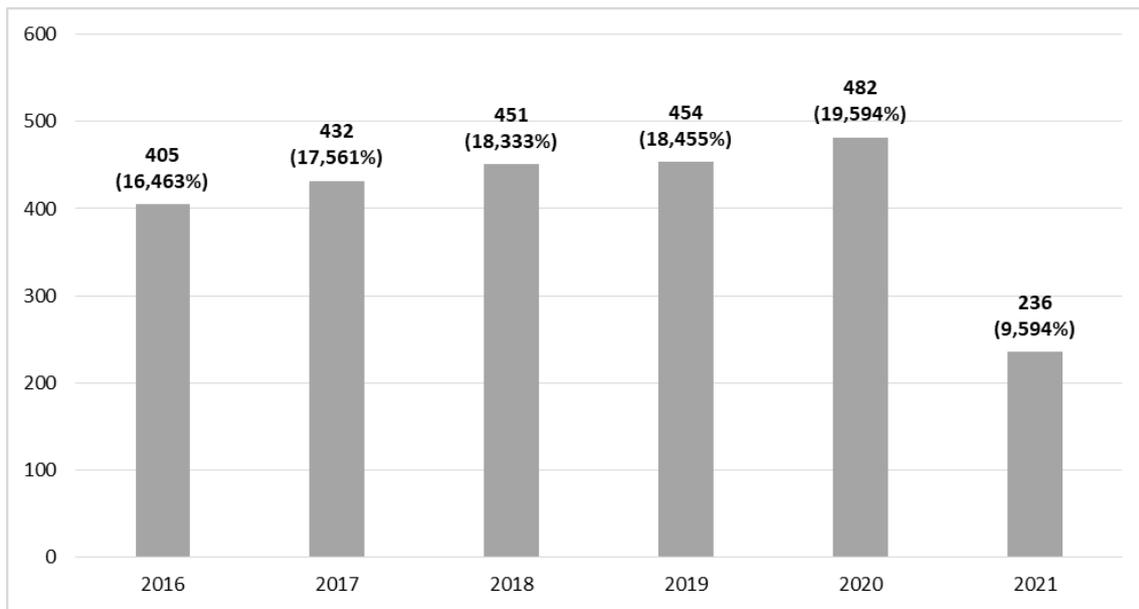
Source: Prepared by the authors (2021).

Figure 2 – Quantitative number of publications by the 10 authors who produced the most on LTBI from January 2016 to August 2021. Belém, PA, Brazil, 2021.

Source: Web of Science (2021).

Regarding the link among the authors, a total of 3,706 institutions were found, and 55 (2.24%) records did not contain this information.

Table 1 shows the occurrence and location data of the 25 majority institutions, in descending order.

Table 1 – Distribution of absolute frequencies and percentages of occurrence of the 25 main institutions and their respective countries/regions. Belém, PA, Brazil, 2021.

	Institution	Country/Region	Freq.*	%†
1	University of London	United Kingdom	141	5.73
2	University College London	United Kingdom	83	3.37
3	Centers for Disease Control and Prevention	USA	78	3.17
4	University of California System	USA	73	2.97
5	Imperial College London	United Kingdom	71	2.89
6	Harvard University	USA	69	2.80
7	McGill University	Canada	65	2.64
8	Johns Hopkins University	USA	64	2.60
9	University of Cape Town	South Afrika	60	2.44
10	London School of Hygiene & Tropical Medicine	United Kingdom	56	2.28
11	University of Sydney	Australia	50	2.03
12	Emory University	USA	43	1.75
13	Indian Council of Medical Research	Índia	42	1.71
14	National Taiwan University	Taiwan	40	1.63
15	National Institutes of Health	USA	39	1.59
16	*Fundação Oswaldo Cruz*	Brazil	38	1.54
17	Stanford University	USA	38	1.54
18	*Centro de Investigación Biomédica en Red*	Spain	36	1.46
19	National Institute for Research in Tuberculosis	Índia	36	1.46
20	Public Health England	United Kingdom	36	1.46
21	National Taiwan University Hospital	Taiwan	35	1.42
22	University of California San Francisco	USA	35	1.42
23	National Institute of Allergy and Infectious Diseases	USA	34	1.38
24	Fudan University	China	33	1.34
25	Johns Hopkins Bloomberg School of Public Health	USA	33	1.34

Note: *Freq. = frequency. †% = in relation to the sample (2,460), with rounding.
Source: Prepared by the authors (2021).

As for the countries or regions of affiliation of the studies, a total of 134 were found, from the six main continents: Africa, North America, South America, Asia, Europe and Oceania. Among those with more expressive production, the following stand out: United States of America (USA) (n=693, 28.17%), England (n=246, 10.00%), People's Republic of China (n=216, 8.78%), India (n=161, 6.54%), Italy (n=143, 5.81%), Canada (n=139, 5.65%), South Korea (n=134, 5.45%), Spain (n=129, 5.24%), Australia (n=118, 4.80%) and Brazil (n=117, 4.76%). It is noteworthy that 54 (2.20%) records did not present data on this variable.

83 research areas were identified, of which 10 prevalent ones, with their respective absolute frequencies and percentages of occurrence, were named as follows by the Web

of Science: Infectious Diseases (n=552, 22.44%); Respiratory System (n=462, 18.78%); Immunology (n=373, 15.16%); General and Internal Medicine (n=324, 13.17%); Microbiology (n=310, 12.60%); Public, Environmental and Occupational Health (n=251, 10.20%); Science and Technology – Other Topics (n=151, 6.14%); Pharmacology and Pharmacy (n=105, 4.27%); Rheumatology (n=88, 3.58%); and Pediatrics (n=75, 3.05%).

Focusing on the organization of results, aspects referring to the journals in which the studies were published will be addressed using Bradford's Law. The keywords will, in turn, be presented with Zipf's Law.

Dispersion of scientific knowledge

805 different journal titles were found and, in view of this, the analysis of the dispersion of knowledge, through Bradford's Law, made it possible to define three groups, according to the individual productivity of the journals: Nucleus, formed by 25 (3.11%) periodicals, where 816 (33.17%) documents were published; Zone 1, comprising 152 (18.88%), whose total number of publications was 819 (33.29%); and Zone 2, with 628 (78.01%) periodicals and 825 (33.54%) publications. Due to their representativeness, the elements of the Nucleus are detailed in Table 2.

Table 2 – Qualis/CAPES 2013-2016 classification for the nursing and interdisciplinary areas, impact factor available in the JCR for the year 2020, absolute frequencies and productivity percentages of journals from the Bradford's Nucleus. Belém, PA, Brazil, 2021.

	Periodics	Qualis Enf.[*]	Qualis Inter.[†]	FI[‡]	Freq.[§] n=816	%[‖]
1	PLoS ONE	A2	A1	3.240	103	12.62%
2	European Respiratory Journal	SQ[¶]	A1	16.671	75	9.19%
3	American Journal of Respiratory and Critical Care Medicine	A1	SQ[¶]	21.405	59	7.23%
4	BMC Infectious Diseases	A2	A2	3.090	53	6.49%
5	Tuberculosis	A2	A2	3.131	50	6.13%
6	International Journal of Tuberculosis and Lung Disease	A2	A2	2.373	46	5.64%
7	Clinical Infectious Diseases	A1	A1	9.079	40	4.90%
8	Frontiers in Immunology	SQ[¶]	A1	7.561	40	4.90%
9	International Journal of Infectious Diseases	NC[**]	NC[**]	3.623	39	4.78%
10	Respirology	SQ[¶]	SQ[¶]	6.424	37	4.53%
11	Scientific Reports	A1	A1	4.379	29	3.55%
12	Lancet Infectious Diseases	NC[**]	NC[**]	25.071	27	3.31%
13	Journal of Infection	SQ[¶]	A1	6.072	22	2.70%
14	BMC Public Health	A2	A2	3.295	21	2.57%
15	International Journal of Environmental Research and Public Health	B1	A2	3.390	21	2.57%

16	Annals of the Rheumatic Diseases	A1	A1	19.103	18	2.21%
17	Thorax	SQ¶	SQ¶	9.139	18	2.21%
18	BMJ Open	A2	A2	2.692	17	2.08%
19	Pediatric Infectious Disease Journal	SQ¶	SQ¶	2.129	16	1.96%
20	Transplant Infectious Disease	SQ¶	B1	2.228	16	1.96%
21	Frontiers in Microbiology	SQ¶	A1	5.640	14	1.72%
22	Journal of Clinical Microbiology	A1	A1	5.948	14	1.72%
23	Journal of Crohn's and Colitis	NC**	NC**	9.071	14	1.72%
24	Journal of Infection and Chemotherapy	SQ¶	SQ¶	2.211	14	1.72%
25	Annals of the American Thoracic Society	SQ¶	SQ¶	6.831	13	1.59%

Note: *Qualis Enf. = Qualis for the nursing area. †Qualis Inter. = Qualis for the interdisciplinary area. ‡FI = impact factor. §Freq. = frequency. ||% = in relation to the total publications of the Nucleus (816), with rounding. ¶SQ = no Qualis for the area. **NC = not registered in the Qualis classification.
Source: Prepared by the authors (2021).

Frequency and distribution of keywords

A total of 3,066 keywords were counted, used for indexing the materials, totaling 7,975 citations. By using Zipf's Law and observing the tabulation of words, ordered in descending order, according to the frequency in which they occurred, three groups can be defined: Trivial Zone, consisting of 10 (0.33%) words and 1,903 (23.86%) citations; Interesting Zone, by 134 (4.37%), with 1,980 (24.83%) citations; and Noise Zone, by 2,922 (95.30%), with 4,092 (51.31%) citations. Considering that the Trivial Zone gathers the words with the highest number of citations, it was chosen to demonstrate it in Table 3.

Table 3 – Distribution of absolute frequencies and citation percentages of the keywords of the Zipf's Trivial Zone. Belém, PA, Brazil, 2021.

	Key-words	Freq.*	%†
		n=1.903	
1	Tuberculosis	656	34.47%
2	Latent tuberculosis infection	332	17.45%
3	Latent tuberculosis	287	15.08%
4	*Mycobacterium tuberculosis*	162	8.51%
5	Tuberculin skin test	105	5.52%
6	HIV	80	4.20%
7	LTBI	74	3.89%
8	Isoniazid	73	3.84%
9	Interferon-gamma release assay	68	3.57%
10	Screening	66	3.47%

Note: *Freq. = frequency. †% = in relation to the number of citations in the Trivial Zone (1,903), with rounding.
Source: Prepared by the authors (2021).

DISCUSSION

Given the volume of materials that made up this research, the results demonstrate the scientific and social importance of studies on LTBI. This is reinforced by its prevalence in the global scenario and by the fact that its early detection and monitoring expand the possibilities for the prevention and effective control of new cases of tuberculosis, since the infection, in its latency state, is a collaborative factor for the current epidemiological panorama of the disease.

In this sense, an interesting fact refers to the types of documents that prevailed: original articles and reviews. It is understood that, in the case of the articles, this finding results from the work developed, above all, by groups that study the LTBI through investigations that collect primary and/or secondary data from, for example, basic research techniques or applied research. The purpose is to describe, explore or explain aspects, phenomena and trends that still lack understanding or robustness, in an approximate way to what was obtained in the analysis of original articles that composed a bibliometric study, led by researchers from three Brazilian states, on scientific production in online journals, about COVID-19 at the beginning of the pandemic[18].

While research of this nature is carried out, it is also necessary to seek, in the available literature, evidence that supports academic-scientific thinking and best practices around a theme, or even that indicate gaps to be overcome[19]. Thus, it is inferred that the number of literature reviews identified in this study is due to these needs, felt or observed by the researchers. Different publications, which used bibliometric resources, show that the prevailing document types were the same[14-15,20].

As for the languages, the English language stood out, present in almost all of the production, a finding that is supported by the scope of this language and its universality for science, as it is adopted by most researchers, expanding the communication and dissemination of knowledge, in addition to favoring the visibility and citation of documents, culminating in increasing the credibility attributed by the scientific community[21-22]. However, it is noteworthy that the Portuguese language occupies the fifth position in the list of 10 languages and, despite its somewhat reduced occurrence, it denotes the initiative of researchers in Portuguese-speaking countries in the production on the subject.

It was identified that the number of studies on LTBI, available on the Web of Science, showed an increasing trend in the period studied, with emphasis on the years 2018 to 2020, which lead the production, revealing the progressive interest of the scientific community around of the theme. However, it is mentioned that, until the moment of data collection, the production of 2021 did not reach half of what corresponds to 2020, even though it took place in August of that year. This can be justified by the redirection of part of researchers and institutions to other research interests, such as those investigating aspects of COVID-19, since this study was carried out at a historical moment,

with the occurrence of the pandemic, which caused the redirection of studies and large public and private investments for the development, production and distribution of vaccines, as well as other health measures of collective interest.

It was found that the number of authors was 12,723, equivalent to just over five times the sample size (2,460), confirming the importance of collaborative practice between authors and institutions in the production of science, technology and innovation. Among those who produced the most, the following stand out: Menzies, D.; Babu, S.; Goletti, D.; Abubakar, I.; and Ottenhoff, T. H. M.

Research entitled "Four months of rifampin or nine months of isoniazid for latent tuberculosis in adults" was published in 2018, in the prestigious New England Journal of Medicine, and had Menzies, D. as the first author. It consisted of a clinical trial, carried out in nine countries, in which adults with LTBI were randomly assigned to either a four-month prophylactic treatment regimen with rifampicin or a nine-month regimen with isoniazid. It was concluded that there was no inferiority in the comparison between both regimens and that the group treated with rifampicin had a higher rate of completion of treatment and fewer adverse effects[23].

In dialogue with this result, a bibliometric study, carried out by European researchers, analyzed the insecurity at work of nurses, focusing on the set of 128 articles extracted from the Web of Science. Among the findings, nine co-authorship networks were identified, bringing together 28 researchers, with varying levels of collaboration and linked to different institutions in the field of teaching, research and health care[24].

It is important to emphasize that, among the 25 most influential institutions in this study, 10 are North American and five are British, supported by the fact that their nations lead the production of knowledge on various topics, such as the LTBI, as observed. This is demonstrated by observing that large, internationally renowned research centers participate in the list, namely: Centers for Disease Control and Prevention, University of California System, Harvard University, Johns Hopkins University, Emory University and National Institutes of Health, among others, located in the USA; and University of London, University College London, Imperial College London, London School of Hygiene & Tropical Medicine and Public Health England, located in the United Kingdom. A Brazilian institution, *Fundação Oswaldo Cruz*, was found to be in 16th position.

Not coincidentally, the USA and England are the leading countries, with 28.17% and 10.00% of production, respectively. However, it should be noted that Brazil is also among the 10 that produce the most. Accordingly, the USA outperformed in a study carried out in the Northeast region of Brazil, which verified, in online journals, bibliometric indicators of production on moral harassment and nursing[14].

Considering that LTBI is included in the scope of infectious diseases, it is worth noting that, in addition to the leading role of these

institutions in the scientific production on the infection, researchers linked to several of them also co-participated in the development of studies that elucidated aspects of COVID-19, demarcating the relevance and their scientific and social responsibility[25-26], since, as in the LTBI, the effects of COVID-19 have significant repercussions on the social context. This generates demands on science and those who work in it, in order to develop and disseminate coping strategies that allow investigating/controlling diseases and health problems, among which LTBI is found.

Cooperation between researchers and institutions is a common practice in the health area, which strengthens discussions and raises the quality of investigations, as their results are submitted to third parties for appreciation. In addition, inter-institutional collaboration is crucial to establish multidisciplinary networks with research groups, encourage the involvement of organizations from different sectors and exchange knowledge from the diversity of its sources[18].

Observing the research areas in which the publications of this study were distributed, it was found that, among the 10 majority, three are strongly focused on the investigation of tropical diseases: Infectious Diseases; Immunology; and Microbiology, demarcating the importance of these areas in the context of the ILTB. However, it is important to note that others participate in the list: Respiratory System; General and Internal Medicine; Public, Environmental and Occupational Health; Science and Technology –

Other Topics; Pharmacology and Pharmacy; Rheumatology; and Pediatrics.

This data calls attention, as it highlights the magnitude of LTBI as a public health problem that affects individuals and groups in the biopsychosocial dimension and in different age groups[27-28]. Consequently, its impacts reverberate in the dynamics of social relations, mobilizing investments in multiple areas of research, aiming at the production of evidence, new alternatives and technologies that contribute, to some degree, to the resolution of this scenario.

It is understood that the application of bibliometric laws conferred greater robustness to this study, given the evidence that emerged from the analysis. The dispersion of scientific knowledge showed that the Bradford's Nucleus brings together a small group of journals, which explore the theme in an expressive way, and two Zones with greater volume, whose productivity is lower. It is observed that the predominant journal in the Nucleus is PLoS ONE, with an impact factor of 3.240 and Qualis/CAPES A2 and A1 for the nursing and interdisciplinary areas, respectively.

This demonstrates its prestige and credibility within the scope of international scientific production and the evaluation of productions linked to postgraduate programs in Brazil. Its scope has a multidisciplinary character and, among the types of contribution it receives, there are original articles, articles reporting new methods, systematic reviews and meta-analyses[29]. Despite the relevance of the theme

for nursing, a profession historically involved in care actions, the Center does not present journals organized by institutions in this area, and it is possible to affirm that investments and motivational strategies should be directed to nurse researchers, so that their productions are visible and competitive.

In the Brazilian scenario, studies have reflected on the fact that a good part of the researches, which appear as course conclusion works and monographs, do not progress to publication in article format, restricting the dissemination of their results. As they are synthetic and objective, articles favor the processes of reading, evaluation and dissemination[14-15]. However, it is worth noting, even in this scenario, that nursing has carried out research on different topics, including in the field of emerging, reemerging and neglected diseases, a nomenclature adopted by institutions such as the WHO and the Pan American Health Organization (PAHO), thus contributing to the advancement of science[30].

By analyzing the frequency and distribution of keywords, the most representative terms of production were identified, located in the Zipf's Trivial Zone. In this group, "Tuberculosis", "Latent tuberculosis infection", "Latent tuberculosis" and *"Mycobacterium tuberculosis"* prevailed, indicating the disease, the latent form and its etiological agent as terms that potentiate the indexing of publications on the topic. In addition, terms that point to the diagnosis also stood out: "Tuberculin skin test", "Interferon-gamma release assay" and

"Screening", as published in literature[31-32], as they are expressions that refer to alternatives and the case detection process.

CONCLUSIONS

By analyzing the bibliometric profile on the Web of Science, it was found that the scientific production on LTBI is extensive and diversified, and showed a tendency to increase in the period studied. It is mainly characterized by the publication of original articles, in English, with strong collaboration between authors, linked to North American and British institutions. As for the countries or regions of affiliation, studies from the USA and England predominated, inherent to the area of infectious diseases.

Through Bradford's Law, it is possible to know the most influential journals, whose productivity brings together a significant portion of publications. Applying Zipf's Law, the keywords that best represent the theme were identified. In view of this, the importance and feasibility of bibliometric resources for similar investigations in the health area, such as in nursing, is highlighted, as they favor the achievement of indicators relevant to decision-making processes that involve different participants, such as researchers, authorities and organizations within the scope of research investment priorities.

Considering that LTBI still represents an important public health problem, it is expected that this study will mobilize the development of others, aiming at the production of evidence and

the clarification of aspects lacking in investigation. Therefore, it is necessary for health professionals, especially nurses, to be actively involved in this context, to strengthen knowledge and overcome the challenges imposed by the LTBI.

The limitation of this study concerns the use of secondary data, as they are subject to indexing and disclosure errors, as well as omissions by those responsible for indexing or researchers when providing data related to production. For this reason, it is understood that part of the analyzed variables presented incomplete records. However, the study contributes to the advancement of knowledge about the state of scientific production around the LTBI.

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