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STATE OF CIENTIFIC ART RESEARCH ON COVID-19 AND WORKER HEALTH: A SURVEY IN THE SCOPUS ELSEVIER DATABASE

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Abstract – The world lives the COVID-19 pandemic outbreak, pathology capable of cause mild and severe breathing problems, which can be associate with complications in the respiratory system. The pandemic has directly affected the workers class, especially the workers in the health area. In view of this scenario, the present study deals with a bibliometric, exploratory research that forms a scenario based on the authors with the largest number of publications involving the terms COVID-19 and Occupational health, journals with the highest incidence of the term, areas and countries with the highest volume of research, type of dissemination, institutions that most financed studies on the subject and the main funding agencies. Therefore, it was adopted a bibliometric model which is based on the Scopus Elsevier database, of the CAPES journal. The survey was carried out on March 9, 2021. The descriptors used for the search were: “COVID 19” AND “WORKER” AND “HEALTH”. The database returned a total of 3,982 texts. In relation to the country with the highest research index, the United States of America stands out. With regard to the area of concentration, medicine is in first place in the ranking. The article modality, the Harvard Medical School institution; International Journal of Environmental Research and Public Health; the authors Latkin, C. A .; and Tran, B .; and the development agency National Foundation for Natural Science of China (NSFC) stands out within the context.

Keywords: Bibliometric. COVID-19. Occupational Health.

Initial Considerations

On December 2019, in Wuhan, in China, were identified cases of a viral pneumonia caused by a virus named SARS-CoV-2 which is an enveloped RNA virus, that belongs to the Coronaviridae family (HUANG et al., 2020). The SARS-CoV-2 is capable of infecting a wide range of wild and domestic animals, as well as human beings (QUARTO; VEIGA; SOUZA, 2020). The Wuhan territory was favorable to the spread of the virus, as it is one of the largest transportation, trade and industry centers in China; having the largest airport, train station and river port in the center of the country; with a record of around 30,000 passengers circulating daily through different locations (CARDOSO et al., 2020). And because it is a virus with a high capacity for inter-species transmission, on January 30, 2020, the World Health Organization (WHO) determined public health emergency at the international level (ONYEAKA; ZAHID; PATEL, 2020).

The SARS-CoV-2 transmission happens mainly through droplets dispersed by coughing, speaking or sneezing and / or by contact of the hands with contaminated surfaces followed by direct contact with the mucosa of the mouth, eyes or nose (CARDOSO et al., 2020). Also according to the authors, transmissibility among those infected occurs within 7 days after the first symptoms. The SARS-CoV-2 is responsible for the COVID-19 disease. There are no clinical specific manifestation to differentiate COVID-19 from other respiratory infections, with headache, nasal congestion, dry or productive cough, fever, myalgia, distortion or decreased sense of taste and absolute reduction or loss of taste the most common symptoms; while sore throats and gastrointestinal manifestations may happen less frequently (CARDOSO et al., 2020; HUANG et al., 2020). Cardoso et al. (2020) stress that in the most severe manifestation of the disease can be seen: pneumonia, tachypnea and dyspnea. Moreover, according to the authors, during the second week of infection, there is a potential risk of clinical deterioration, especially in patients with comorbidities.

Until March 9, 2021 there were 117.164.167 reported cases of COVID-19 in the world and 2.589.638 deaths. In the same period Brazil accounted 11.051.665 reported cases and 264.325 deaths (CORONAVÍRUS, 2021). Both in Wuhan and in Brazil, the first deaths due to COVID-19 were of contaminated workers in the exercise of their functions (QUARTO; VEIGA; SOUZA, 2020). In Wuhan, the first deaths were from workers in the city's seafood trade; in Brazil the first victim was domestic worker, contaminated after being exposed to the virus by her employers who returned from an international trip (BARROSO et al., 2020). Also according to the authors, the main challenges that are being experienced by professionals from different areas, especially health professionals, during the pandemic, are the lack of Personal Protective Equipment (PPE), the high transmissibility of the virus, the work overload and the pandemic impacts on the integrity of mental health. The COVID-19 pandemic highlighted the fragility of the norms and laws that ensure health and safety at work (BARROSO et al., 2020). The increase in the number of contamination case by the disease, the fact that working conditions and the exercise of work activities are potential sources of exposure to the virus, represent a major challenge for health, therefore, the work process must be considered in the development and implementing pandemic coping strategies. From this perspective, it

is understood that, as the pandemic spreads, it becomes increasingly necessary to discuss the impacts of COVID-19 on workers' health.

Given the importance of the theme, this research seeks to contribute to the theme scope by answering the following question: what are the characteristics of scientific research on COVID-19 and occupational health? This is a bibliometric, exploratory survey that forms a scenario based on the authors with the largest number of publications involving COVID-19 and Worker's health terms, journals with the highest incidence of the term, areas and countries with the highest volume of research, dissemination modality, institutions that most financed studies on the subject and the main funding agencies. The impact of COVID-19 in several areas influences the global scientific collection. Faced with this reality, Costas (2017) says that the characterization of scientific documents generates subsidies for the construction of new knowledge, which justifies the bibliometric contextualization on occupational health and COVID-19.

Methodology

The research consists in an exploratory study carried out through bibliometric, in order to analyze and characterize the scientific production about COVID-19 and Occupational Health. Therefore, it was adopted a bibliometric model which is based on the Scopus Elsevier database, of the CAPES journal. Bibliometric is a study of the quantitative aspects of the production and dissemination of scientific knowledge (RIBEIRO, 2017). The objective of this research is to collaborate with the systematization of studies carried out in a given field of knowledge (CHUEKE; AMATUCCI, 2015).

The search was carried out on February 28, 2021. The search terms used were: “COVID 19” AND “WORKER” AND “HEALTH”, in a simple search mode. The three words correlation seeks to identify texts that address the same subjects in different areas of knowledge (Figure 1).

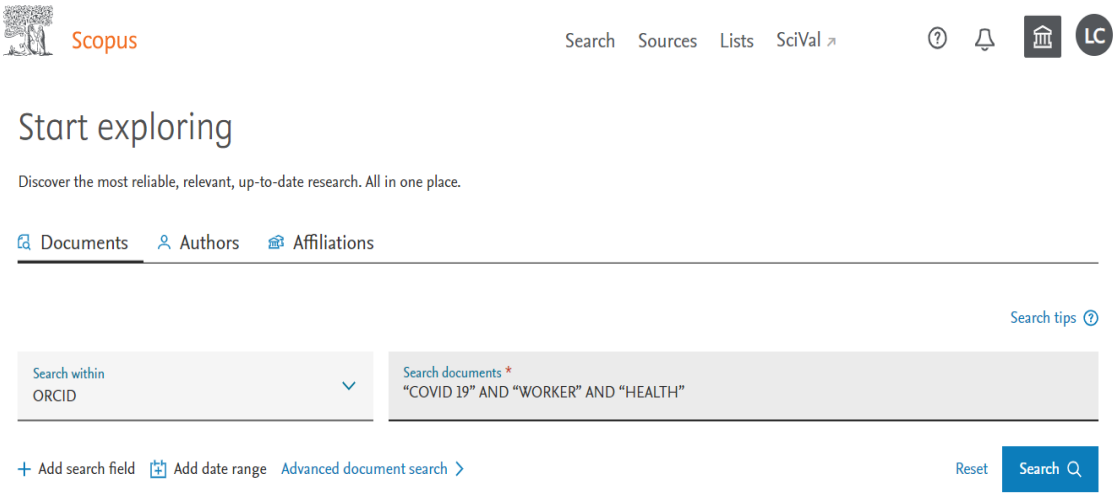

Figure 1 - Search in the Scopus database with the descriptors used in the research Source: Bibliometrics report from the Scopus database (2021)

The research returned a total of 3,982 texts, which is a considerable amount of documents in terms of approaching the theme and due to the filters adopted (titles, keywords and abstracts). Thus the bibliometric analysis addressed the following variables: Source, Author, Affilation, Country / Territory, Document type, Documents by funding sponsor and Subject area. Worth mentioning that the research has as a limitation the use only of the Scopus database.

Results and Discussion

Research characterization regarding the origin country

Globalization experienced by humanity after the Cold War, resulted in an increase and speed in the circulation of people, information and goods between continents (SOLDERA, 2016; CARDOSO et al., 2020). This speed in the propagation of population groups and spices favored COVID-19 transmission worldwide. With regard to scientific research concerning the origin country, on a global scale, the works on the subject matter of study were financed by 155 nations (Figure 2) with emphasis in the United States of America (1,027 documents; 25.7 %), United Kingdom (417; 10.4%), India (409; 10.2%), China (10.1%) and Italy (8.9%). Brazil occupied the 9th position in the ranking with (122; 3%).

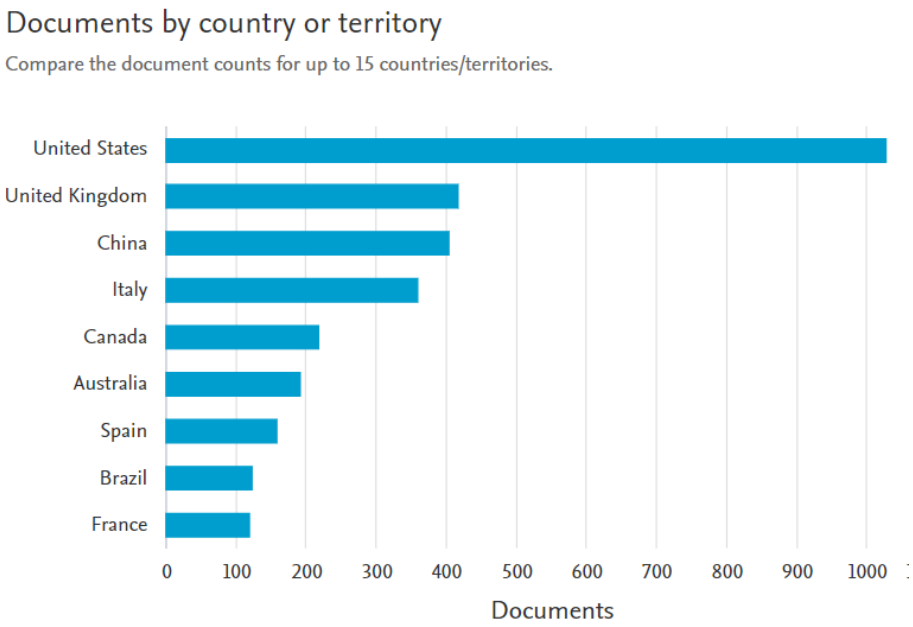

Figure 2 - Documents by country or territory Source: Bibliometric report from the Scopus database (2021)

United States of America (USA), first on Figure 2 ranking, is the nation with the highest number of infected by COVID-19 (CORONAVÍRUS, 2021). A situation that is pointed out by some experts as a result of the country's governmental actions (OFFORD, 2021). The country is one of the biggest world powers, having the largest Gross Domestic Product (GDP) in the world, which attracts large migration networks. According with Arbix (2020), this reality can justify the high level of scientific production on the object, since the search for new resolute methods in the approach to infected patients, as well as the search for protective measures and occupational hygiene practices are fundamental in the reduction of notified cases of contamination and deaths.

In 2020, according to an investigation carried out by Columbia University (2020), the United States allocated about 14% of its GDP to combat COVID-19, part of the investment was allocated to research and intensive care beds. Despite the high volume of studies focused on the relationship between COVID-19 and worker health, the USA is known for its few labor regulations and strong contractual freedom (QUARTO; CARDOSO; MANHÃES, 2020), ranking second in the ranking of nations with the highest rates of occupational accidents (ILO, 2021). The United Kingdom, second in the ranking, surpassed the 4 million notified cases of COVID-19

(CORONAVÍRUS, 2021). China, third in the ranking and the first epicenter of the disease, also ranks as a major producer of scientific studies on the subject. It is believed that the fact that China is the first location to register a case of contamination by SARS-CoV-2 may have boosted scientific production in the territory.

Characterization of publications regarding the area of knowledge

Bibliometric is a tool that helps to identify trends in the progression of knowledge, in relevant or obsolete subjects and dispersions (RIBEIRO, 2017). In this scenario, with regard to the science field, the following stand out: Medicine (3,181; documents; 54.9%), Social Sciences (386; 6.7%) and Environmental Sciences (274; 4.7%) (Figure 3). It should be noted that the same manuscript can present an interdisciplinary, multidisciplinary or pluridisciplinary approach, and can be linked to more than oneknowledge area.

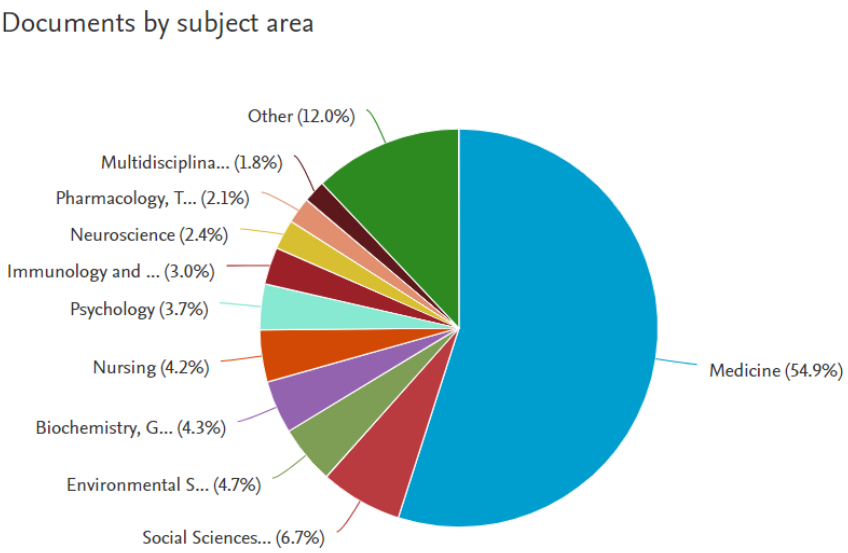

Figure 3 Documents by subject area. Source: Scopus base bibliometric report (2021)

Medicine is a fundamental knowledge field in the fight against COVID-19. As discussed by Grossi, Toniol and Lozano (2020), the pandemic period was concomitant with the cuts in scholarships from the Coordination for the Improvement of Higher Education Personnel (CAPES) and the elimination of social sciences among the priorities of the Ministry of Science, Technology and Innovations (MCTI), as well as the Institutional Scientific Initiation Scholarship Program (PIBIC). However,

within the current pandemic scenario, much is discussed about public policies, teaching and political authoritarianism. In other words, the COVID-19 pandemic resulted in economic, cultural and social changes, which is taken into account, may be related to the prominence of the social sciences in the ranking of documents by areas of knowledge. Within the scope of environmental sciences, the pandemic has raised many debates about the impacts of social isolation on the environment. According to a comparative study carried out by Muhammad, Long and Salman (2020), there was a decrease of approximately 30% in pollution in some of the epicenters of COVID-19. Which shows us that social isolation has impacted the environment in a positive way.

It is worth mentioning the absence of engineering among the science fields with more studies related to the object of study. Occupational safety engineering is a branch of production engineering responsible for drafting, evaluating and analyzing laws and regulations regarding risk prevention within the work environment and its surroundings (QUARTO; CARDOSO; MANHÃES, 2020).The absence of engineering in the ranking is a negative factor for the scientific development of this area of study and for the pandemic confrontation, since hygiene issues and occupational protection are fundamental within this scenario.

Characterization of publications regarding the type of dissemination, responsible institutions and periodical

In addition to identifying countries that invest the most in research and areas of knowledge, bibliometric studies also make it possible to get to know more productive institutions, modes of publication and journals (CARDOSO et al., 2020; QUARTO et al., 2020). Depending on Table 01, they focus on: the type of article dissemination (2,913; 71.9%); the Harvard Medical School (74; 1.8%) and the International Journal of Environmental Research and Public Health (148; 3.7%).

TOTAL PUBLICATIONS: 3.982 DOCUMENTOS		
POSITION	**PUBLICATION MODE**	**N (%)**
1	Article	2.913 (71,9%)
2	Magazines	573 (14,1%)
3	Literatures	251 (6,2%)

POSITION	RESPONSIBLE INSTITUTION	N (%)
1	Harvard Medical School	74 (1,8%)
2	Tongji Medical University	68 (1,7%)
3	HuazHong University of Science and Technology	65 (1,6%)
POSITION	**PERIODIC**	**N (%)**
1	Inter Magazine. Environmental Research and Public Health	148 (3,7%)
2	Plos One	70 (1,7%)
3	Hospital Infection Journal	37 (0,9%)

Table 1 Characterization of publications according to the publication type, institution and journal Source: Adapted bibliometric report from the Scopus database (2021)

Regarding the type of document, Quarto et al. (2020) mention that the scientific article is the most common method of disseminating scientific research today. The universities highlighted in Table 1 are located in the United States of America and China (countries with the largest number of researches on COVID-19 and worker health). The periodical International Journal of Environmental Research and Public Health is dedicated to research on natural resources, health, management of communicable diseases and food hygiene (IJEHR, 2021). Topics that are part of the debate about the pandemic.

More productive authors regarding research on COVID-19 and worker health

One of the bibliometric pillar is the identification and analysis of the most productive authors on a given topic. The author also points out that deepening in their respective approaches can support the understanding of different points of view, as well as in new reality and knowledge. Chart 01 shows that Latkin, C. A .; and Tran, B.

AUTHOR	N	AFFILIATION	TOTAL DOCUMENTS / CITED BY	LATEST MANUSCRIPT
Latkin	9	Johns Hopkins Bloomberg School of Public Health	644/8.873	Characterize the health and economic vulnerabilities of workers to control the emergence of COVID-19 in an industrial zone in Vietnam
Tran	8	Hanoi Medical University	258/20.555	Is returning to work during the COVID-19 pandemic stressful? Study on the

				state of immediate mental health and measures to prevent psychoneuroimmunity in the Chinese workforce

Chart 1 Characterization of the authors plus Source: Adapted bibliometric report from the Scopus database (2021)

Latkin's most recent manuscript (2020), related with this research theme, is a scientific article. The aim of this study is to present a theoretical framework about the notified cases of workers in the industrial zone in Vietnam contaminated by COVID-19. To this end, a bibliometric analysis was carried out in the databases "Web of Science", "PubMed" and "Google Scholar", with the terms and search "Health", "Industrial Worker" and "Vietnam". According to the search, industrial workers in Vietnam were the first individuals to present with the manifestation of COVID-19 disease. The results of the study demonstrate that the most common clinical picture among those infected was the complication of the respiratory system. After discussing and analyzing the results, the author Latkin (2020) concluded that economic vulnerability is the main reason for the high rate of contamination by the disease.

Tran, B.'s manuscript, in turn, is a scientific article that aims to quantify the effects of COVID-19 on the integrity of the mental health of workers who perform their work activities during the pandemic. A sample of 673 respondents participated in the survey. Respondents answered an online questionnaire about their attitudes towards the pandemic and returning to work. Respondents reported a low prevalence of anxiety (3.8%), depression (3.7%), stress (1.5%) and insomnia (2.3%). Contrary to expectations, returning to work did not cause an increase in the level of psychiatric symptoms in the workforce. The low prevalence of psychiatric symptoms may be due to the confidence instilled in preventive measures before resuming work.

Scientific publications, regardless of the database, can be ordered by relevance, based on the number of citations within that index. Based on Oliveira et al. (2019), in order to qualify this research, we sought to expand the results obtained in bibliometric, justifying the results obtained in the Scopus Elsevier database with the data present in Google Scholar. With that, the results found in Scopus were related

to the results of the Google Scholar search, corroborating the convergence of the authors with a greater number of researches about COVID-19 and the Worker's Health and their respective researches.

Regarding the crossing of data obtained between the database mentioned and Google Scholar, Figure 4, points out that it is possible to analyze the return of the search made to the author Latkin, C. A.

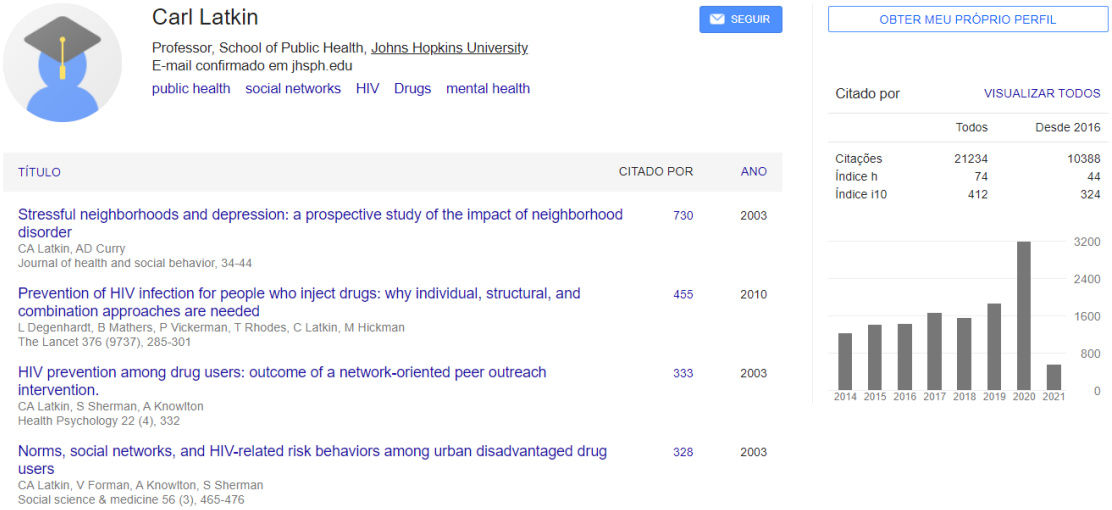

Figure 4 Search return by author Latkin, C. A. Source: Bibliometric report from the Google Scholar database

This author quantitative data show that the first place in the Scopus ranking is the second in the Google Scholar ranking. This divergence is related to the fact that a Scopus Elsevier base is of restricted access to centers and research centers with agreements, while Google Scholar is in the public domain. Therefore, its capillarity and the relevance of its production in an open database are confirmed, confirming the results obtained in the Scopus Elsevier database.

The second author named in the Scopus Elsevier database was, Tran, B., who the return of his search on Google Scholar has presented in (Figure 5), respectively.

Figure 5 Search return from author Tran, B. Source: Bibliometric report from the Google Scholar database

Analyzing the data in Figure 05, it is possible to identify the significant number of times the author was mentioned in academic research and its high number of documents indexed to Google Scholar. This makes the author a reference for current and future researchers interested in studies regarding the theme discussed in this article.

Still according to Oliveira et al. (2019), aiming to enable the description of the results found in a more amplified way, Figure 06 expresses a compilation of the descriptive statistics adopted in this bibliometric study, pointing out the trends of documents and citations over time. These numbers are part of the domain data in the Scopus Elsevier database.

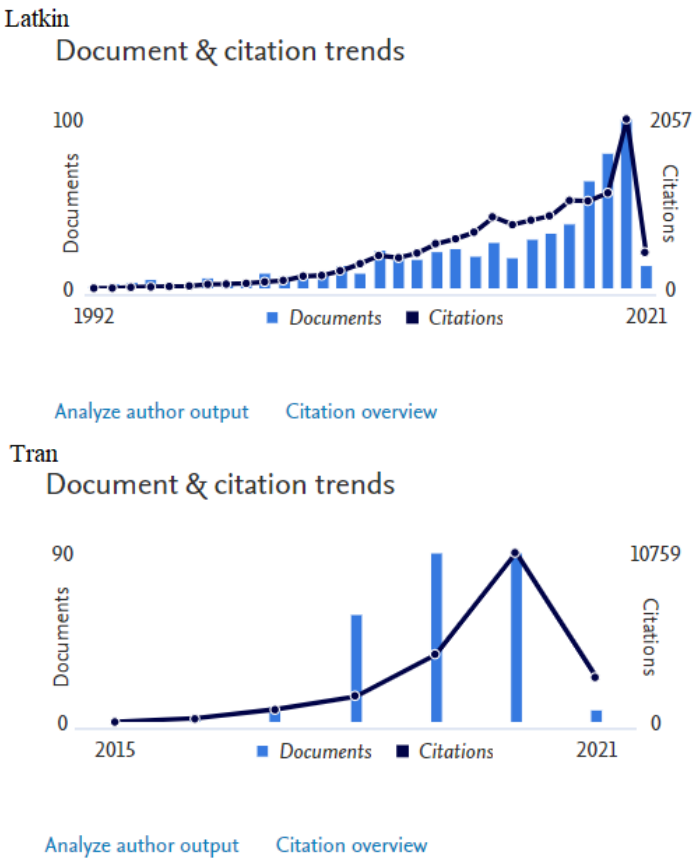

Figure 6 Trends in documents and citations over time Source: Scopus-based bibliometric report (2021)

Figure 6, refers to the results already exposed, reinforcing the characteristics related to the progression of scientific research as to the most productive authors with regard to the theme. The image still highlights 2020 as the year in which the main authors were most cited in scientific works.

Characterization of publications and funding agencies

Regarding the development agencies (Figure 7), the National Foundation for Natural Sciences of China, the National Institutes of Health (USA) and the National Institute of Health Research (Germany) stand out.

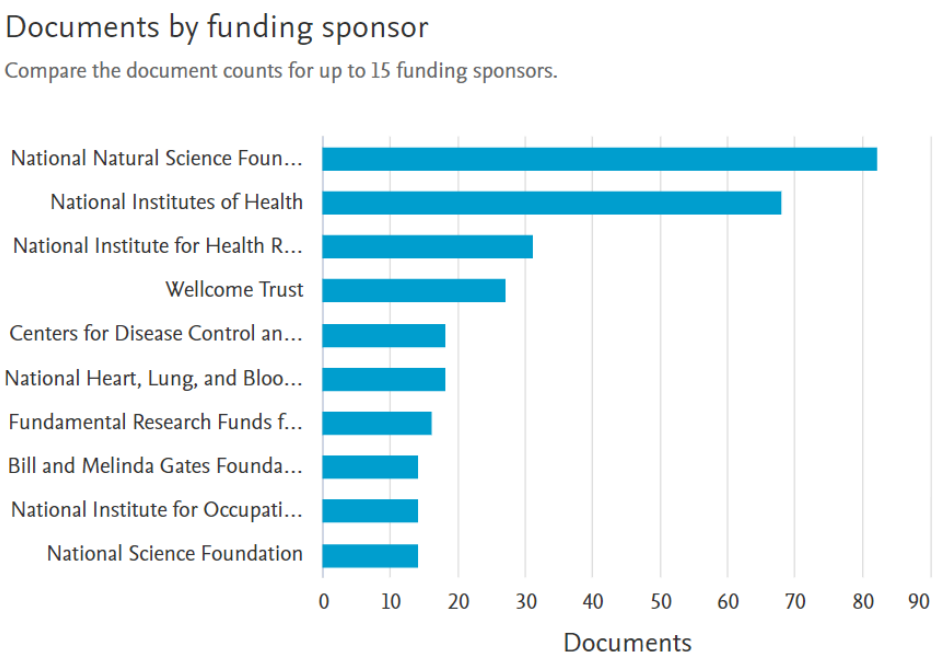

Figure 7 Documents by funding sponsor Source: Scopus base bibliometric report (2021)

Founded on February 14, 1986, the National Foundation for Natural Science of China (NSFC), considered one of the largest development agencies in China, is an institution in charge of administering the National Fund for Natural Sciences of the Central Government, which aims to support basic research, encourage talented researchers, develop international cooperation and promote socioeconomic development (NSFC, 2021).

Characterization of Brazilian scientific production by institution

Brazilian scientific production about COVID-19 and the health of the worker represents 3% of the global scientific production, with Brazil, until the present date, March 9, 2021, the third country with the highest number of infected with the coronavirus (11,051 .665 inhabitants) and the second nation with the highest number of deaths due to COVID-19 disease (266,398 inhabitants) (CORONAVÍRUS, 2021). These surveys are linked to 47 Brazilian institutions, with emphasis on the University of São Paulo (21 documents), the Oswaldo Cruz Foundation (12 documents) and the Federal University of Rio de Janeiro (10 documents) (Figure 8).

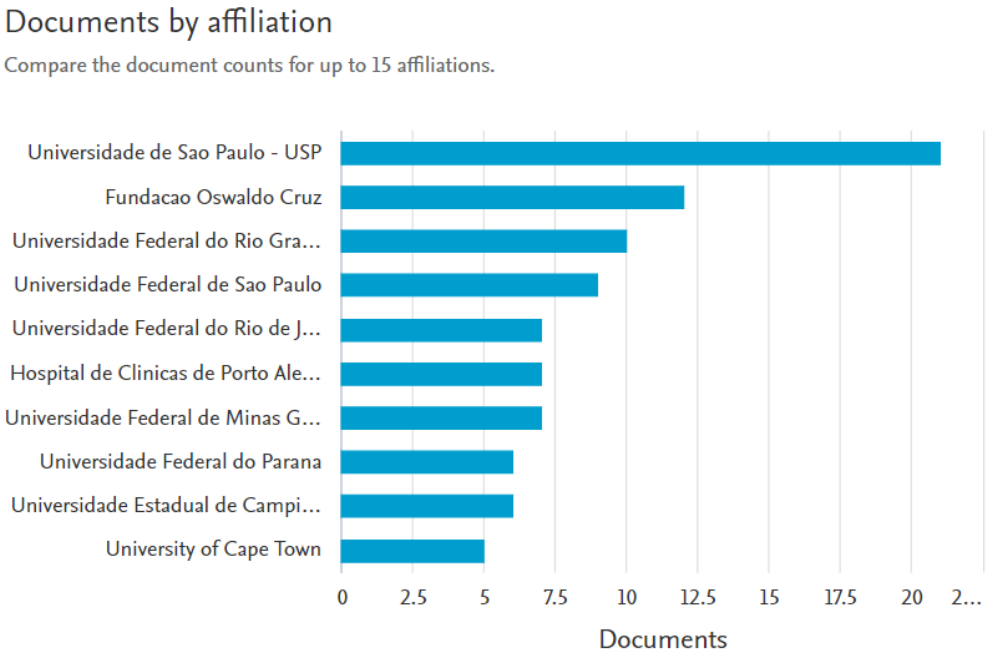

Figure 8 Documents by affiliation Source: Scopus base bibliometric report (2021)

The progression of Brazilian scientific production is in line with the search for knowledge and interpretation of the current health situation to implement interventions that cover the circumstances experienced by the population and establish quality public health (CARDOSO et al., 2020). Pochmann and Silva (2020) say that public institutions are extremely important for national scientific production, contributing directly to improvements in the population's health indicators.

The states with the highest number of publications are those with the highest Gross Domestic Product (GDP) (IBGE, 2017; CARDOSO et al., 2020); income distribution being a possible facilitating factor for research. The result expressed in Figure 08 is concomitant with the statistical graph of notified cases of COVID-19, seen according to the Ministry of Health, the state of São Paulo has the highest rate of cases notified and deaths by COVID-19 in the country. Although Brazil is lagging behind in the fight against COVID-19, compared to other countries in the world, it stands out with regard to occupational health laws and standards. Which is fundamental for the development of occupational health and safety practices in the country.

Conclusion

The global scientific production about COVID-19 and the health of the worker, linked to the Scopus base, points to the nations with the highest rates of contamination and deaths in relation to the spread of the SARS-COV-2 virus, with the majority of the documents being concentrated in the USA. It is known that the disease affects the most diverse areas, such as health, environment, economy, education, society and politics, this science has developed in several fields of knowledge; however, medicine is reinforced as an area of knowledge with the largest number of studies. The article modality, the Harvard Medical School institution; International Journal of Environmental Research and Public Health; the authors Latkin, C. A.; and Tran, B .; and the development agency National Foundation for Natural Science of China (NSFC) featured prominently in relation to publications on the topic.

This study highlights the need for research to stick to interventions that need to be carried out in the sphere of occupational health, during the pandemic period, to contribute to the scientific framework on the subject. The health preservation of essential groups, and of others who keep working due to socioeconomic circumstances, is essential to control the spread of the disease. Every work activity and every worker must be considered, and prepared, not only for their protection, but also to understand that their activity can play an important role in fighting the epidemic.

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