

Open Science, open access: literature review of the scientific communication about Covid-19 on the SciELO platform (2020)

Ciência Aberta, acesso aberto: revisão de literatura da comunicação científica sobre Covid-19 na plataforma SciELO (2020)

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ABSTRACT From the perspective of Open Science by means of open access, the study analyzes the scientific communication about Covid-19, made available by the SciELO platform, until February 19, 2021. With a qualitative approach, content analysis is used for data collection and interpretation. The research is divided into two steps: the first presents the general results on publications, the journals that mostly disseminated the studies, the types of scientific communication used, the citation indexes, and the distribution of articles by thematic areas. The second step shows the aspects listed above and presents a ranking of the 50 most accessed and cited articles. Conclusions show that SciELO made 3,165 publications available, of which 2,042 are scientific articles. The 30 most productive journals are responsible for 43% of the publications. 2,296 documents are from the Health Sciences area and have been identified on 52 different topics related to Covid-19. Among the 42 most accessed and cited studies, three main axes were found: 1) Scientific protagonism: the contribution of science in the fight against Covid-19 – public actions and policies; 2) Protocols and diagnostics for health professionals and spaces; 3) Social, political, and economic issues in the pandemic.

KEYWORDS Covid-19. Information dissemination. Database. Open publications.

RESUMO *A partir da perspectiva da Ciência Aberta por meio do acesso aberto, o estudo analisou a comunicação científica sobre Covid-19, disponibilizada pela plataforma SciELO, até 19 de fevereiro de 2021. De abordagem qualitativa, utilizou para coleta e interpretação de dados a análise de conteúdo. A pesquisa dividiu-se em dois movimentos. O primeiro apresentou os resultados gerais sobre as publicações, os periódicos que mais divulgaram estudos, os tipos de comunicação científica utilizados, os índices de citação, a distribuição dos artigos por áreas temáticas. O segundo movimento apontou aspectos elencados acima e apresentou um ranking dos 50 artigos mais acessados e citados. Concluiu-se que a SciELO disponibilizou 3.165 publicações, das quais 2.042 são artigos científicos. Os 30 periódicos mais produtivos foram responsáveis por 43% das publicações. Ademais, 2.296 documentos são pertencentes às ciências da saúde e foram identificados em 52 temas diferentes relacionados com a Covid-19. Entre os 42 estudos mais acessados e citados, encontraram-se três eixos principais: 1) protagonismo científico: a contribuição da ciência no combate à Covid-19 – ações e políticas públicas; 2) protocolos e diagnósticos para profissionais e espaços de saúde; e 3) questões sociais, políticas e econômicas na pandemia.*

PALAVRAS-CHAVE Covid-19. Disseminação de informação. Base de dados. Publicação de acesso aberto.

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Introduction

Health is democracy! This phrase, evoked in some editorials of the magazine 'Saúde em Debate', is necessary and provocative. Faced with the context of the Covid-19 pandemic that affects the entire planet and that, in Brazil, reverberates in overwhelming and shameful proportions, the portrait of misguided, inefficient public management, which devalues the principles of social well-being, is wide open. The federal government irresponsibly distorts the value of science, public health, the environment, culture and education, becoming harmful to society, health and democracy.

The pandemic has changed the social, cultural and economic context of the population and has left daily marks in the lives of thousands of people who lost the loved ones. On March 30, 2021, Brazil faced a new wave of the disease, and statistics revealed more than 318,000 deaths, 3,780 of which in the previous 24 hours¹. Health and epidemiological safety professionals emphasize that sanitary distancing measures are the most promising ways to combat the virus.

Correa Filho and Segall-Correa² analyze the lockdown as a form of prevention in Western countries that do not prioritize public policies nor invest in their health systems. Generally, these countries use the arguments of austerity measures to dismantle the social welfare apparatus. The authors denounce the Brazilian government's lack of interest in funding projects that help to fight quickly and effectively against the spread of the virus and the exponential increase in the number of deaths. In countries that do not invest in health, adopting lockdown as an isolated strategy is not sufficient to fight the pandemic.

It is necessary to defend the Brazilian Unified Health System (SUS). In this context, Costa, Rizzotto and Lobato³ emphasize that the participation of the federal government lacks public actions and policies, by ignoring the fine line between public health and social and economic issues during the pandemic.

They highlight the role of the SUS in remaining active, given the situation of having more than BRL 20 billion in investments subtracted through the Proposed Amendment to the Constitution N. 95 (the PEC of expenditures). Costa, Rizzotto and Lobato³ reveal the misuse of public resources and the undue actions of embezzlement of public health funds by the current government.

According to Souto and Travassos⁴, the federal government's stance is still aimed at raising the flag of scientific denialism, in addition to creating discord in the midst of the pandemic. Since its inception, the scientific community and health sectors have tried to establish a dialogue and suggest efficient proposals, including the creation of the Brazilian National Plan to Combat the Covid-19 Pandemic. The manifesto is one of the examples cited by the authors, containing 70 recommendations for different sectors of society (citizens, SUS managers, political and health representatives), and seeks to prioritize Primary Health Care networks and strategies.

In the same sense, Giovanella et al.⁵ record the federal government's criminal stance and indifference in denying science, ignoring statistics and belittling the pain and grief of citizens who lost their loved ones to Covid-19. They point out and question the misuse of resources destined to combat the pandemic. Of the BRL 338 billion allocated to fight against Covid-19, only BRL 39 million were distributed, i. e., 11% of the total. In contrast, the authors point to popular initiatives involving community organizations that develop joint actions in low-income communities and the action of groups to combat fake news, aimed at promoting prevention and well-being, with up-to-date, comprehensive and reliable information.

Open Science is democracy. Policy issues must be considered to reflect the parallel between knowledge creation and society. According to Bobbio⁶⁽⁸⁴⁾, in the democratic system, the criteria of visibility and transparency are central: "[...] the government of public power in public". In other words, democracy

depends on the public character of power, and citizens participate through access to information and knowledge, both in the administrative and public spheres. In this sense, investment in public policies is essential to strengthen citizenship.

The concept of Open Science emerges as an alternative to establish dialogue and break hierarchies between the scientific environment and society, as it considers different meanings, practices and initiatives in search of the democratization of knowledge, especially if produced in public institutions. According to Albagli, Clinio and Raychtock⁷⁽⁴³⁶⁾:

The discourse for open science also validates the role of knowledge in defending 'common good', strengthening citizenship and building fairer and more sustainable societies.

Therefore, Open Science is based on different modes of action: open access policies, transparency in data management, promotion of free digital culture in the face of the processes of creation and sharing of scientific and artistic works and the participation of citizens who are non-scientists in the production of knowledge. Among the initiatives there are: opening access to publications (open access); open education and educational resources; citizen science; open data; open scientific tools and materials. The State's promotion of scientific production, as a way of opposing science privatization, also makes up the discussions on Open Science and is called democratic school⁷.

Open Science seeks to interact in a different way, besides the tensions and asymmetries seen in the traditional form of scientific production and the general population, which is not found in academies, universities, and research institutions⁸. Open Science focuses on the production of knowledge, based on principles of equity, in the quest to reconcile all types of knowledge produced, within and outside the scientific community. The Scientific Electronic Library Online (SciELO)

platform is a means of establishing these ties, making data and information openly available, which may help lay citizens, researchers, healthcare providers and scientists.

This study is a literature review, from the perspective of the epistemology of Open Science; in this sense, it describes the phenomenon studied through the following characteristics:

a) object of study: the phenomenon of Covid-19 analyzed through scientific communication, epistemologically based on open science, and its principles of knowledge production;

b) scope/*corpus*: SciELO platform and publications on Covid-19 that were produced until February 19, 2021, the date of data collection for this research;

c) research question: what types of publications on Covid-19 are found on the SciELO platform? What are the characteristics of the most cited and accessed studies from the beginning of the pandemic until February 2021?;

d) purpose: to offer the main characteristics of publications on the SciELO platform to health researchers and from other areas interested in the topic, so that, based on these results, other studies, debates and reflections on Covid-19 can be developed;

e) Justification: The registration of the dynamics of access to Covid-19 on the platform helps researchers in the field to analyze the current nuances and topics and, thus, contribute to studies in more or less explored fields.

The SciELO platform

SciELO is a model of electronic library of scientific articles on the Internet, which includes open access to national publications from all

areas of knowledge. The platform emerged from a cooperation between the São Paulo Research Foundation (Fundação de Amparo à Pesquisa do Estado de São Paulo, Fapesp) and the Latin American and Caribbean Center on Health Sciences Information (Bireme). Guedes⁹ reports that, according to Abel Packer, SciELO has three main objectives:

The first one was to develop a methodology to solve the capacity for online publication because at that time both Brazil and Latin America had few initiatives in this field. The idea was to use the international state of the art to build a solution that would introduce Brazilian journals to the web. The second one, corroborating what Gibbs and Meneghini mentioned above, was to establish a new type of control over the articles, by counting the citations and building an index on the internet complementary to that developed by the Institute for Scientific Information (ISI), thus leading to a more accurate assessment of Brazilian scientific production. The 3rd objective was to evaluate the use, that is, to measure the use of SciELO through the number of downloads. This, according to Packer, was a logical step since the previous objectives were focused on the visibility and accessibility of the project⁹⁽⁵⁸⁻⁵⁹⁾.

In this sense, Packer et al. describe that the methodology of the SciELO project and the steps necessary to create the database are:

[...] a set of norms, guides, manuals, computer programs, and operational procedures aimed at making the texts of scientific journals available in electronic format⁹⁽⁷¹⁾.

SciELO can be fully accessed for free, and its main purpose is to disseminate scientific research and strengthen collaborative ties between Latin American and Caribbean countries. Searches can be performed by year of publication, author, funding agency, journal, abstract and title. The SciELO platform

organizes research results by countries, journals, languages, year of publication and types of scientific literature. The platform has data integration with the Web of Science (WoS), thus it also offers results organized by thematic areas (SciELO and WoS) and citation indexes (cited and non-cited).

In addition to open access and in line with international standards, SciELO has developed priority lines of action formed by principles and objectives for the common development of Brazilian journals and collections¹⁰ based on Open Science initiatives. These lines, arranged in the document in question¹⁰, propose new ways of communicating scientific knowledge. The following can be mentioned: preprints (publications made available before evaluated by reviewers); continuous flow (publishing approved by the editor without the need to wait for every issue to be complete); citation and reference management; data repositories and programming codes; and transparency in peer review (access to editorial processes among the actors involved and identification of reviewers).

Material and methods

The research approach is based on the objectives outlined by the researchers in relation to the results they seek in their study, which may be qualitative, quantitative or both. Qualitative research has as its main objective the description, understanding and interpretation of facts. Data validation occurs through the consistency obtained in the examination of theoretical elements and investigation findings. According to Martins and Theóphilo¹¹, these are qualitative data: descriptions, direct quotes from people, documents, recordings of interviews, interactions between individuals.

In qualitative research, meaning becomes the central concept of investigation¹². Even if a certain study presents numerical data, the qualitative approach can use them to justify

the importance of argumentative content. According to Minayo¹², authors who follow the qualitative trend seek to know and explain social phenomena and dynamics, “the dialectic considers the relationship of quantity as one of the qualities of facts and phenomena”¹²⁽²⁴⁾. Therefore, this study is part of a research with a qualitative approach.

For data capture, collection and analysis, content analysis was applied¹³, which can be divided into three main stages: pre-analysis; material exploration; and treatment of results and interpretations. According to Bardin¹³, during the pre-analysis phase, the aim is to select the object of study and delimit it by means of criteria for data selection. The exploration of the material consists of administering techniques to the *corpus*. Result treatment and interpretations are aimed at presenting statistical operations (frequency of the use of terms), synthesizing the results, displaying inferences and interpretations (with theoretical or pragmatic purposes).

This research is presented in two stages: the first one analyzes the general results of the term ‘covid-19’ found in the SciELO platform; the second specifically analyzes the ranking of the 50 most accessed and cited publications on the platform.

Inserting the term ‘covid-19’ in the simple search field of the SciELO platform was intentional. In addition to the general search, the platform offers advanced search options, provides data on the topic on the SciELO Data, and offers a page where all publications and information about Covid-19 are concentrated. The purpose was to simulate the search behavior of readers, who may not dominate search engines as much as the public of students and researchers who access the content through the advanced search option and/or by applying technical terms and controlled vocabularies. The intention is to simulate the research based on the search needs of the general public.

Data was collected on February 19, 2021, the results were downloaded, and the pages were copied via ‘print screen’, in order to record

the results through images, exactly as they had been shown since the beginning of the search steps. The information collected refers to general statistical data offered by SciELO:

- a) the journals that published articles on the topic;
- b) types of scientific communication sources;
- c) citation indexes;
- d) the distribution of articles on Covid-19 by subject and areas of knowledge;
- e) the language of the publications.

The second stage of the study, between March 9 and 16, 2021, investigates more specific details about the publications of the ‘50 most cited and accessed studies on Covid-19’. The order of the articles (ranking), the date of collection in the database, the authorship, the title, the researchers’ institution of origin, the access link of the publication on the platform, the abstract and keywords (if any) were considered because, in addition to scientific articles, all types of publication that appeared in the results were analyzed. The date of publication on the platform (e-pub) and a field to record relevant observations about the documents were also taken into account.

Results and discussion

First step – general data analysis

The dynamics of the platform means that the results are constantly changing. Therefore, it is important to emphasize the survey and collection dates for the research – which started on February 19, 2021 –, considering that SciELO is one of the main open access databases in Brazil, with daily publications in

various fields of knowledge. The overall search result corresponded to 3,165 publications, of which 2,993 were made available in 2020. By February 2021, 171 more publications had been released, and 1 publication was indexed with a publication date of 2022, but it is certainly from 2021.

SciELO's 'Collections' category sorts the works in the following fields (total publications are in parentheses): Brazil (1,412); pre-prints (450); Public Health (291), South Africa (223), Colombia (183); Chile (132), Peru (111), Spain (109), Portugal (80), Argentina (64), Mexico (37), Uruguay (37), Paraguay (23), Bolivia (11), and Cuba (2). The documents can be accessed in English with 887 publications, in Portuguese with 1,280 and in Spanish with 813 studies. Other languages are present in the publications, with four studies in African (Afrikaans language) and one in German and French, respectively.

The types of scientific communication literature are quite varied when it comes to Covid-19. There are 1,665 articles; 289 review

articles; 88 commentary articles; 363 editorials; 245 letters; 199 short communications; 109 case reports; 24 brief reports; 7 book reviews; 7 corrections; 2 news and 167 publications categorized as 'other' types of literature. On average, 60% of the studies were published through scientific articles, review articles and comments. The other types of literature add up, on average, to 40%, also proving to be relevant to communicate the phenomenon studied.

The WoS citation indexes indicate that 1,574 documents were indexed, with 1,163 in the Science Citation Index Expanded, 368 in the Social Science Citation Index and 43 in the Arts Humanities Citation Index. The index of cited publications, until the collection of the study, was of 1,924 documents, while 791 documents were among the non-cited ones.

The number and variety of journals that have published about Covid-19 in SciELO add up to 326. *Table 1* shows the list of the 30 journals with the highest number of publications.

Table 1. The 30 journals with the highest number of publications on Covid-19 on the SciELO platform until February 2021

Journals and total publications		
1	Cadernos de Saúde Pública	154
2	Ciência e Saúde Coletiva	129
3	SAMJ: South African Medical Journal	109
4	Revista da Associação Médica Brasileira	89
5	Clinics	74
6	Epidemiologia e Serviços de Saúde	66
7	Arquivos Brasileiros de Cardiologia	61
8	Revista da Sociedade Brasileira de Medicina Tropical	56
9	Revista Brasileira de Enfermagem	45
10	Revista de Administração Pública	43
11	International Brazilian Journal of Urology	40
12	Medicina Interna	39
13	Acta Medica Peruana	35
14	Physis: Revista de Saúde Coletiva	34

Table 1. (cont.)

Journals and total publications		
15	Revista Brasileira de Epidemiologia	32
16	International Journal Odontostomatology	31
17	Revista Peruana de Medicina Experimentaly Salud Publica	30
18	Revista de Saúde Pública	30
19	Einstein - SãoPaulo	27
20	Estudos Avançados	27
21	Revista Brasileira de Educação Médica	27
22	Brazilian Journal of Infectiuos Diseases	26
23	São Paulo Medical Journal	26
24	Brazilian Oral Research	23
25	Revista Médica de Chile	23
26	Revista Chilena de Pediatría	22
27	Texto & Contexto Enfermagem	22
28	Medicina - Buenos Aires	21
29	Revista Colombiana de Cirugía	21
30	Revista do Colégio Brasileiro de Cirurgiões	21
Total		1,383

Source: prepared by the authors, 2021.

Among the total number of journals that produced studies on Covid-19 in SciELO, the 30 journals that published the most about it correspond to 9% (on average). At the same time, they are responsible for 43% (on average) of all publications.

The SciELO platform offers categorizations to organize publications in areas of knowledge and other topics specific to WoS. The general categories are based on Capes' areas of knowledge. Studies on Covid-19 are distributed as follows:

- a) 2,296 belong to health sciences;
- b) 251 belong to human sciences;
- c) 222 to biological sciences;
- d) 135 belong to applied social sciences;

- e) 62 belong to the multidisciplinary area;
- f) 12 belong to the agricultural sciences;
- g) 10 studies were published in the area of engineering;
- h) 10 are in the field of exact and earth sciences; and
- i) 1 study belongs to the area of linguistics, letters and arts.

The phenomenon of Covid-19 gives rise to studies in several areas of knowledge, as seen above. In the WoS thematic areas, the fields and subfields of the health area are detailed in *table 2*, with the respective numbers of publications.

Table 2. The health area and studies on Covid-19: WoS fields on the SciELO platform

Fields of knowledge and total publications		Fields of knowledge and total publications	
General and internal medicine	666	Oncology	18
Health policies and services	500	Rehabilitation	17
Health sciences and services	386	Intensive care medicine	16
Public, environmental and occupational health	332	Peripheral vascular disease	16
Medical ethics	205	Demographic	14
Research and experimental medicine	203	Nutrition and diet	12
Forensic medicine	183	Radiology, nuclear medicine and medical imaging	12
Nursing	145	Orthopedics	11
Cardiac and cardiovascular system	110	Parasitology	11
Surgery	109	Audiology and speech therapy	10
Dentistry, oral surgery and medicine	107	Clinical Psychology	09
Contagious diseases	99	Immunology	08
Tropical medicine	96	Reproductive biology	08
Urology and nephrology	69	Physiology	07
Psychiatry	66	Anatomy and morphology	06
Medical laboratory technology	55	Genetics and heredity	06
Pediatrics	55	Geriatrics and Gerontology	06
Obstetrics and gynecology	41	Ophthalmology	06
Psychology	39	Allergy	05
Social sciences, biomedical sciences	34	Endocrinology and metabolism	05
Respiratory System	25	Integrative and complementary medicine	04
Gastroenterology and Hepatology	24	Clinical neurology	02
Pathology	24	Rheumatology	02
Primary health care	20	Dermatology	01
Otorhinolaryngology	19	Applied Psychology	01
Pharmacology and Pharmacy	19	Psychology, psychoanalysis	01
Total: 3,845			

Source: prepared by the authors, 2021.

The 52 themes come along with the number of studies, organized from the largest to the smallest number of publications. The number of records pervades the total number of documents, demonstrating the trans and interdisciplinarity of the publications. The lower the result involving the study topics, the greater the relevance of new publications covering the phenomenon studied, within the specialties in the field of health.

Second step - the 50 most accessed and cited publications about Covid-19 on the Scielo Platform

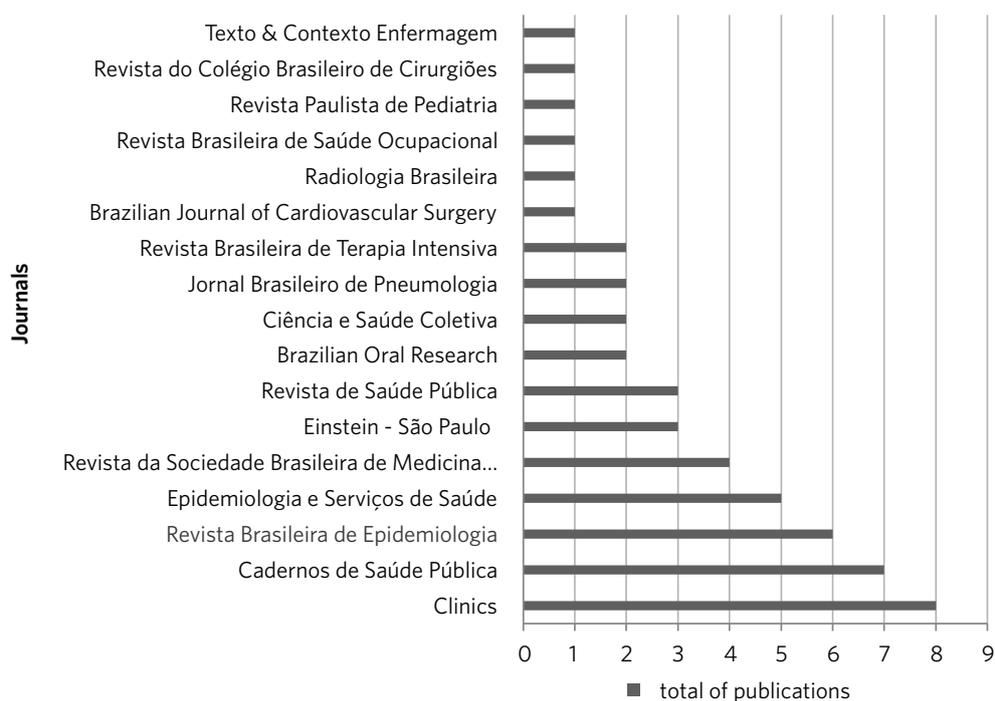
Based on the platform's search filters, the characteristics of the 50 most accessed publications and the 50 most cited ones were analyzed through the creation of a 'ranking', from the 1st to the 50th place. When comparing the results (most accessed and most cited publications),

the references were exactly the same, even the order of the studies was found in the same position. For this reason, the results were combined, uniting the categories into a single one, calling them ‘the 50 most accessed/cited’. Considering the results, based on the SciELO organization forms in the item Collections, 37 publications belong to the category ‘Brazil’

and 13 are from the category ‘Public Health’.

Regarding the language of the publications, 43 studies were in English, 27 were in Portuguese and two were in Spanish. It can be seen that the total exceeds 50, which denotes the presence of bilingual texts. The 17 journals of the ‘50 most accessed/cited’ publications are shown in *graph 1* below:

Graph 1. List of journals and the number of studies published in the ‘50 most accessed/cited’ ranking of the SciELO platform until the end of February 2021



Source: prepared by the authors, 2021.

The journal ‘Clinics’ has the largest number of accessed studies (8), followed by ‘Cadernos de Saúde Pública’ (7) and the ‘Revista Brasileira de Epidemiologia’ (6). Four journals published two papers, and six journals have only one study among the ‘top 50’.

Among the types of ‘scientific communication literature’ of the ‘50 most accessed/cited’ there are 18 editorials; 12 articles; 3 review articles; 3 short communication

articles; 3 commentary articles, 1 letter; a case report and 9 other types of various publications, not specified in the scientific literature typologies of the SciELO database. In the citation indexes, published by the database, among the ‘50 most’ category, 25 publications are cataloged in the Science Citation Index Expanded, and 8 in the Social Science Citation Index; 28 are not cited and 22 are cited.

According to SciELO's knowledge areas, all 50 studies belong to the health sciences. When

identifying the WoS thematic areas, they are distributed as shown in *table 3*:

Table 3. WoS themes of the '50 most accessed/published studies' on Covid-19 on the SciELO platform until February 2021

WoS themes	Number of studies
Health policies and services	13
General and internal medicine	11
Public, environmental and occupational health	11
Health sciences and services	5
Tropical medicine	4
Surgery	2
Dentistry, oral surgery and medicine	2
Respiratory System	2
Intensive care medicine	2
Nursing	1
Cardiac and cardiovascular system	1
Pediatrics	1
Radiology, nuclear medicine and medical imaging	1
Total	56

Source: prepared by the authors, 2021.

As in the study of the general results, the thematic areas are superior to the total number of publications, due to the indexation of the publications in more than one thematic area. It is worth noting the variability of the topics found.

THE SUBTRACTION OF REPEATED REFERENCES

The '50 most cited/accessed' studies ranking is made up of 42 different publications. It was observed that eight publications occupy more than one place in the ranking. So, how do we consider this information? Two solutions were determined, and from the '50 most', we decided to have the '42 most accessed/cited':

Solution 1 – The situation found in the sample of '50' results should also be repeated in the general collection of publications, with a total of 3,165. The most neutral decision is to consider the results given by the database. Some results repeat because some studies may

have been published in different formats and languages simultaneously, generating instantaneous results, automated by the statistical mechanisms of the base. In this sense, the most appropriate decision is to point out the issue and faithfully bring the results given by SciELO.

Solution 2 – to identify each work, maintain the best placement and exclude consecutive positions from repeated studies, since the report shows the ranking by means of the general reference of the study, without specifying the type of literature. Repeated articles:

- a) Silva¹⁴, 1st place kept; 9th place excluded;
- b) Fernandes, Santos and Sato¹⁵, 3rd place kept; 7th place excluded;
- c) Barretto et al.¹⁶, 18th place kept; 4th place excluded;

- d) Ornell et al.¹⁷, 24th place kept; the 49th place excluded;
- e) Marques et al.¹⁸, 25th place kept; 46th place excluded;
- f) Ozamiz-Etxebarria et al.¹⁹, 26th place kept; 47th place excluded;
- g) Lima et al.²⁰, 35th place kept; 50th place excluded and,
- h) Vieira, Garcia and Maciel²¹, 37th kept; 42nd place excluded.

From now on, the reference to the '50 most' will be replaced by the '42 most'. Therefore, the perspective becomes even more qualitative, as the study is carried out having as main criteria the specificities and characteristics of each publication, through content analysis¹² in several fields of the documents.

ANALYSIS OF THE '42 MOST ACCESSED/CITED PUBLICATIONS' ABOUT COVID-19 AT SCIELO UP TO FEBRUARY 2021

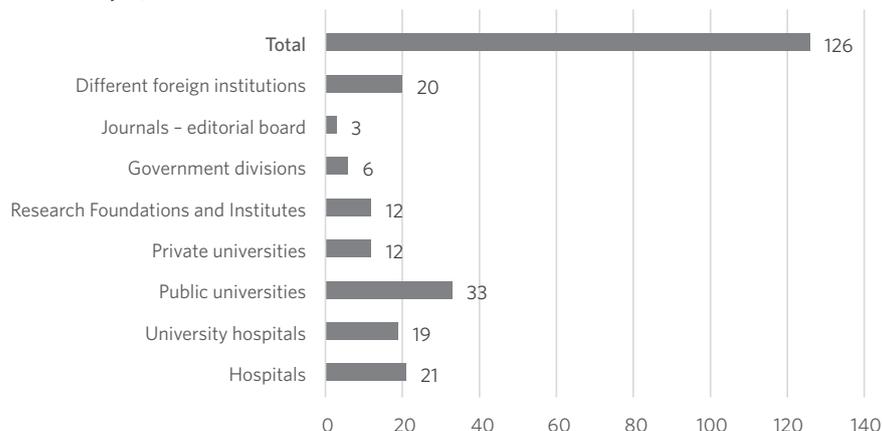
Among the 42 most cited/accessed studies, the publication date back to March 16, 2020 and May 8, 2020. On March 16th and 27th, and

April 3rd, there was a record of one document published per date. On March 23 and 30, and April 6 and 27, two studies were published per day. On April 9, three studies were published, and on April 17, there were four publications. Six publications were released on April 22nd, and six more on the 30th of the same month. May 8 featured 12 published studies. It was the most productive day in the scientific production timeline of the most cited/accessed studies.

The time factor, according to the publication dates, justifies the preference and position of publications in the ranking. The most accessed and cited study is also the first published one (March 16, 2020). The date with the highest number of published studies (May 8) makes it clear that, as time passes, researchers have more data, statistics and information to compose and disseminate increasingly detailed studies.

Where does the science of the 42 most accessed/cited come from? To answer this question, the number of time the researchers' home institutions was mentioned. In this sense, it must be taken into account that there are authors who are related with more than one institution they represent. The researchers' institutions reveal the origin and variety of knowledge production of the most accessed and cited studies (*graph 2*).

Graph 2. References of the home institutions of the authors of the 42 most cited/accessed studies on the SciELO platform on Covid-19 until February 19, 2021



Source: prepared by the authors, 2021.

There were a total of 126 institutions mentioned in the material analyzed and they were of different types, such as: hospitals, university hospitals, public universities; private universities, foundations and research institutes, government divisions, journals (editorial staff members), and foreign institutions (various). It is also worth considering that the number of institutions mentioned varies not only with the number of publications, but with the number of authors and co-authors present in each study, because there are publications with 1 or 2 authors and also those with up to 11 authors.

There were 21 references to 15 different hospitals, with Hospital Israelita Albert Einstein (four references), Hospital Beneficência Portuguesa in São Paulo (two references), and Santa Casa de Misericórdia (two references) being the most cited ones. Among the university hospitals, with 19 references, there were four different institutions: Fundação de Medicina Tropical de Manaus, Hospital das Clínicas de Porto Alegre of the Federal University of Rio Grande do Sul (UFRGS) and Hospital Universitário Cajuru of the Pontifical University Católica do Paraná (PUCPR) received one reference each, while the other 15 references came from researchers belonging to the Hospital das Clínicas of the University of São Paulo (HCMUSP).

Public universities received 33 references, 24 from federal institutions and 9 from state institutions. Among the federal institutions, there were 15 different universities, and the most cited ones were the Federal University of Minas Gerais (UFMG, with five references), the Federal University of the State of Rio de Janeiro (Unirio, with four references), the Federal University of Espírito Santo (Ufes), and the Federal University of Rio de Janeiro (UFRJ), both with three references each. The references of state public universities came from four different institutions: the State University of Rio de Janeiro (Uerj), the

most cited one (four references), followed by the University of São Paulo (USP) and the State University of Campinas (Unicamp), with two references each.

Private universities, with 12 references, refer to nine different institutions, seven of which are mentioned only once (Centro Universitário de Lavras – Unilavras; Universidade Estácio de Sá; Faculdade Ibgem; Fundação Getúlio Vargas; PUCPR; Universidade de Fortaleza; Universidade Vila Velha) and two of them with three and two references, respectively: Colégio Brasileiro de Cirurgiões and Centro Universitário Christus (Unichristus).

Foundations and research institutes (12 references) refer to five different institutions. The most cited are Fundação Oswaldo Cruz (Fiocruz, with six references), followed by the Economic Research Institute (Ipea, with three references) and Fundação Jorge Duprat Figueiredo de Segurança e Medicina do Trabalho (two references). The Instituto Nacional de Infectologia Carlos Chagas and the Instituto de Pesquisa, Inovação Tecnológica e Educação (Ipitec) of Santa Casa de São Paulo received one reference each.

Three distinct government divisions are mentioned six times: the São Paulo State Health Department (three times), the Ministry of Health (two times), followed by the Ministry of Economy (once). Members of the editorial board mention two different journals: 'Revista Brasileira de Cirurgia Cardiovascular' (RBCCV, mentioned twice) and 'Revista do Colégio Brasileiro de Cirurgiões' (mentioned once).

Foreign institutions were also highlighted, with 20 references, comprising universities (mentioned 12), hospitals (mentioned seven times) and research institutions (mentioned twice). Of the universities, four are from Spain, three from Portugal, two from Sweden, two from Colombia and one from the United States. The hospitals are all from Portugal, and the research institutes are from Portugal and the United States. It is worth mentioning that the variety of institutions refers to the extent

of research of the studies analyzed. The following section maps the narrative content of publications.

Analysis of the 42 most accessed/ cited studies

From the data collection, the content of the publications was analyzed, taking into account three aspects: title, abstract and keywords (if any). Based on the material, three main axes of studies were found:

- a) scientific protagonism or how scientific research can contribute to the fight against Covid-19: public actions and policies;
- b) protocols and diagnoses for healthcare providers and health spaces. This material also has studies on imaging tests and diagnostics of patients with Covid-19;
- c) social, political and economic issues evoked by the pandemic, among them, questions about the health and quality of life of healthcare providers.

AXIS 1 - SCIENTIFIC PROTAGONISM: THE CONTRIBUTION OF SCIENCE IN THE FIGHT AGAINST COVID-19: PUBLIC ACTIONS AND POLICIES

This thematic axis, composed of 11 studies, addresses the different ways in which the scientific community can contribute to the fight against the pandemic. Scientific knowledge becomes the protagonist, based on varied contributions arising from scientific evidence¹⁴, health surveillance²², as well as the monitoring and control of epidemic peaks²³. The relevance of researchers in recording and issuing information about the disease is clear²⁴, in order to contribute to decision-making, especially by health professionals.

Prevention and coping actions were pointed out by Moock and Mello²⁵ and Oliveira et al.²⁶

The purpose is to bring reflections and provide subsidies for coping with the pandemic, both at a macro-social level^{16,27} and in specific spaces, especially in health environments. Thus, Medeiros²⁸ approaches the pandemic considering the reality of university hospitals. Since its inception, several controversial issues have been raised, including the use of drugs that have not been scientifically proven due to incomplete studies and their level of efficacy, as is the case with chloroquine^{29,30}.

AXIS 2 - PROTOCOLS AND DIAGNOSES FOR HEALTHCARE PROVIDERS AND HEALTH SPACES

This set of studies contributes to the establishment of guidelines, actions and protocols in the performance of healthcare providers in their workspaces, in the face of the situations imposed by the pandemic. Eighteen publications were found, 12 of which on different topics and 6 on diagnostic imaging.

At the level of macro-political actions, the application of a contingency plan in the face of public health emergencies is carried out by Fernandes, Santos and Sato¹⁵. With the collaboration of several surveillance entities, an international health regulation is drafted. The study was motivated by the arrival of a cargo ship, coming from China to Brazil, in February 2020, with 25 crew members. Diaz-Quijano, Rodriguez-Morales and Waldman³¹ highlight how transmissibility measures can contribute to the formulation of a series of recommendations in the prevention of the new coronavirus. Mendes et al.³² focus on the importance of intensive care and, thus, develop a series of recommendations, mediated by the Portuguese Society of Intensive Care and the Infection and Sepsis Group, while Sarti et al.³³ address reflections on how Primary Health Care can be efficient in combating the pandemic. Satomi et al.³⁴ discuss how to act ethically and equitably in the allocation of resources in the face of possible shortages of materials, beds and ventilators for all individuals through clinical, technical and ethical criteria.

Considering the context of the patients, Chen et al.³⁵ describe ways of coping with the pandemic in tertiary care settings for cancer treatment. Carlotti et al.³⁶ developed care protocols for pediatric patients, while Silva et al.³⁷ point out how Covid-19 manifests itself in children and adolescents. Queiroz et al.³⁸ provide guidance on the management of patients with inflammatory bowel disease. Silva et al.³⁹ discuss medical care for spinal diseases. The context of healthcare providers is brought by Barros et al.⁴⁰, when proposing guidelines for cardiovascular surgeons, considering the possibility of changes if necessary. Due to the potential risks of contagion, oral health is the focus of studies by Pereira et al.⁴¹, who compile evidence on prevention, care, and treatment strategies for dental care professionals. The authors indicate procedures based on international recommendations and documents.

In dialogue with this topic and with the need for description, as a specific category, research on imaging and diagnostic test in patients with Covid-19 present the discussions by Araujo-Filho et al.⁴² on the efficiency of chest X-ray tests for virus screening and identification. The authors point out the debate in medical society about the complexity and uncertainty of results, especially in asymptomatic patients.

Even though it is not recommended for early detection of the disease, Muniz, Milito, and Marchiori⁴³ describe how Computed Tomography (CT) presents valuable results to understand the manifestation of the disease in patients with advanced stages of the disease. The researchers describe the stages of the disease in two patients coming from abroad. The studies conducted by Shoji et al.⁴⁴ mention the benefits found in chest CT, in order to prepare efficient and structured reports on the manifestation of the disease so that specialist physicians from different areas can study. In this sense, the first CT records on the manifestation of the disease have become important documents, as prepared by Moreira, Brotto, and Marchiori⁴⁵. The halo sign contributes

to the diagnoses of Covid-19, according to the studies conducted by Farias et al.⁴⁶ and Farias, Strabelli and Sawamura⁴⁷, despite being a tomographic finding with a wide differential diagnosis.

AXIS 3- SOCIAL, POLITICAL AND ECONOMIC ISSUES EVOKED BY THE PANDEMIC

This axis, composed of 13 studies, shows research of a sociological nature. In this sense, the organization of the studies is divided into subcategories according to the similarities between the discussions: scenarios of the pandemic, social subjects and healthcare providers.

a) Scenarios of the pandemic

It presents three studies on contexts and situations that relate the community in general and the effects of the disease. In the face of a new pandemic, everything is unknown. Among the initial strategies to understand the effects of Covid-19, scientists, doctors and researchers sought to understand the dimension of severity caused by the virus with existing resources and protocols. As Freitas, Napimoga and Donalisio⁴⁸ report, studies on Influenza served as a basis for measuring the severity of the pandemic. The authors analyze the cases using the Pandemic Severity Assessment Framework, a risk assessment tool that measures levels of transmissibility and clinical severity. Thus, the researchers say that the Covid-19 pandemic is one of the most severe in history.

Given the situation predicted since the first studies on the spread of the disease in Brazil, Oliveira, Lucas, and Iquiapaza⁴⁹ indicate the importance of rigorously adopting behavioral and individual and collective hygiene measures and etiquette, constantly cleaning environments and surfaces, and keeping social distancing. These preventive actions, combined with each other and carried out together, are known as Non-Pharmacological Interventions (NPI)⁵⁰. Garcia⁵⁰ discusses the combination of

wearing masks and its effectiveness together with other measures, as it would reduce the chances of infection by asymptomatic people. At the time the study was published (April 2020), wearing masks was neither a widespread habit nor mandatory.

b) Social subjects

It is composed of cultural and behavioral studies. It analyzes health issues in public and private spaces regarding the consequences of the pandemic in social groups, with varied socioeconomic, geographic, historical and professional contexts in a general or specific way.

Three populations are the focus of work by Ozamiz-Etxebarria et al.¹⁹, Lima et al.²⁰ and González-Olmo et al.⁵¹. The Comunidad Autónoma Vasca, located in northern Spain, is the field of study of Ozamiz-Etxebarria et al.¹⁹. The survey was carried out with 976 people to measure levels of anxiety, stress, and depression caused by confinement. In Brazil, the study conducted by Lima et al.²⁰ assesses the behavioral aspects and beliefs of the population from the state of Ceará regarding the pandemic. The survey had the participation of 2,259 people. Oral health is the focus of the survey, carried out with 1,008 people randomly approached in Madrid by González-Olmo et al.⁵¹. The aim of the study was to identify the impact of Covid-19 on the self-perception of vulnerability, infectiousness and aversion to germs in the adult population.

Social isolation and the increase in violence against women are shown by Vieira, Garcia, and Maciel²¹ based on publications and reports from international organizations. Marques et al.¹⁸ bring reflections on violence against women, because the longer they live with the aggressor, the more exposed the victims are. This also happens in relation to violence against children and adolescents.

Distance learning in the pandemic and learning productivity are issues raised by Machado et al.⁵². The authors mention the

challenges of virtual teaching for medical students and professors, in which training requires theoretical, clinical and laboratory knowledge. The health of workers is addressed by Fiho⁵³, to question how activities and working conditions influence the spread of the virus, in order to develop strategies to combat the pandemic. The author raises the issue considering healthcare providers.

c) Healthcare providers: leading role in the fight against the pandemic

Among social subjects, health workers are protagonists in the fight against Covid-19. Some studies under analysis discuss how the pandemic has influenced the work routine and the quality of life of this group of workers. Given the variety and amount of information and studies produced on the pandemic, Correia, Ramos, and Bahten⁵⁴ propose measures to help surgeons, other healthcare providers, and patients in the event of surgery. The document addresses questions about pre, intra and postoperative care, general surgery and the organization of disaster planning and response.

During the pandemic, the mental health of the population has changed. According to Ornell et al.¹⁷, anxiety, stress and depression are among the most common emotional problems. One of the ways to fight the virus is through social distancing, however, healthcare providers are in direct contact with patients and their fluids. The authors emphasize the importance of tracking and monitoring the mental health of healthcare providers regularly for early detection. In this way, they present intervention strategies and models of mental health care and emphasize the responsibility of government and health agencies to protect the psychological well-being of the health community.

The pandemic has strongly impacted companies. According to Andrade⁵⁵, it is up to physicians to protect themselves and the employees, as well as identify and suggest better adaptations through the elaboration of care

protocols and standardized behaviors for the health team. According to the author, company doctors need to exercise their leadership skills and develop strategies to seek better health conditions at work.

Final considerations

Open Science and open access guarantee transparency and ethics in access to information, with the possibility of connecting different levels of knowledge and enhancing knowledge with a social and political emphasis. In addition to fighting the privatization of knowledge, Open Science values the development of public policies, projects and actions of collective interest. SciELO, as a database, guarantees the achievement of the objectives outlined by Open Science. Mapping scientific communication makes it possible to frame the field of knowledge produced on each phenomenon, in this case, Covid-19, from the SciELO platform.

Science is public, and 60% of the institutes cited were federal and state teaching institutions, university hospitals, research foundations and state agencies where the authors of the publications worked. Furthermore, the potential of the production increases as public investments in science, technology, health and education are once again a priority for the federal government.

Considering aspects of scientific communication, 16 journals that have a relevant number of publications are not part of the most accessed/cited studies analyzed in this research: 'Cadernos de Saúde Pública', 'Ciência e Saúde Coletiva', 'SAMJ: South African Medical

Journal', and 'Revista da Associação Médica Brasileira'. Studies on the disease evolve daily, considering the volume of publications on the topic in different databases around the world. The 42 most accessed and cited SciELO articles are precursors and deserve recognition also for having served as an initial basis for the development of other research involving the topics presented.

To say the least, it is unethical for private publishing conglomerates to charge for access to research on Covid-19. This attitude hinders scientific development. Open Science, in the social and political sphere, is against the exploitation of scientific intellectual capital. One way of contributing to the strengthening of this movement is to prioritize open access policies, promoted as a form of resistance to the privatization of scientific knowledge. Issues involving the health and well-being of the world's population need to be made available on an open access basis. Health is democracy, Open Science is democracy!

Collaborators

Stueber K (0000-0002-2171-0365)* contributed to study design and planning; collection, analysis and interpretation of data; drafting and critical review of the content and participated in all versions of the manuscript. Silveira FX (0000-0002-5338-1498)* contributed to the writing of sections, critical review of the content and participation in all versions of the manuscript. Teixeira MRF (0000-0002-9888-7185)* contributed to guidance, critical review of the content and participation in all versions of the manuscript. ■

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