The fast-motion research process about COVID-19 in children: a bibliometric review

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Abstract

Background: From the beginning of the COVID-19 pandemic, a great number of papers have been published in the pediatric field, even if the infection by SARS CoV-2 seems to be milder in children than in the elderly.

Objective: By a bibliometric analysis of all the papers on COVID-19 in the pediatric field published in the first half of 2020, we aimed to assess the worldwide research on this topic, identifying publication trends and topic dissemination and showing the relevance of publishing authors, institutions and countries.

Methods: Scopus database was comprehensively searched for all the indexed documents published between January 1, 2020 and June 11, 2020, dealing with COVID-19 in pediatric age. A machine learning bibliometric methodology was applied to evaluate the total number of papers and citations, journal and publication types, the top-productive institutions and countries and their scientific collaboration, the core keywords.

Results: A total of 2301 papers were retrieved, with an average of 4.8 citations per article. Out of them, 1078 (46.9%) were research articles, 436 (18.9%) reviews, 363 (15.8%) letters, 186 (8.1%) editorials, 7 (0.3%) were conference papers, and 231 (10%) others. The studies were published in 969 different journals, headed by The Lancet. The retrieved papers were published by a total of 12657 authors from 114 countries. The most productive countries were the USA, China, and Italy. The four main clusters of keywords were: pathogenesis and clinical characteristics (keyword occurrences n=2240), public health issues (n=352), mental health (n=82), and therapeutic aspects (n=70).

Conclusions: In the pediatric field, a large number of articles were published in a limited period on COVID-19, testifying the rush to timely spread new findings on the topic. The leading authors, countries, and institutions evidently belong to the most seriously involved geographical areas. A focus on the pediatric population is often included in general articles and the pediatric research about COVID-19 mainly focused on the clinical features, public health issues, and psychological impact of the disease.

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Abstract

Background Since the beginning of the COVID-19 pandemic, a great number of papers have been published in the pediatric field.

Objectives We aimed to assess the worldwide research on COVID-19 in the pediatric field by bibliometric analysis, identifying publication trends and topic dissemination and showing the relevance of publishing authors, institutions and countries.

Methods Scopus database was comprehensively searched for all indexed documents published between January 1, 2020 and June 11, 2020, dealing with COVID-19 in pediatric age (0-18 years). A machine learning bibliometric methodology was applied to evaluate the total number of papers and citations, journal and publication types, the top productive institutions and countries and their scientific collaboration, the core keywords.

Results A total of 2301 papers were retrieved, with an average of 4.8 citations per article. Out of them, 1078 (46.9%) were research articles, 436 (18.9%) reviews, 363 (15.8%) letters, 186 (8.1%) editorials, 7 (0.3%) were conference papers, and 231 (10%) others. The studies were published in 969 different journals, headed by *The Lancet*. The retrieved papers were published by a total of 12657 authors from 114 countries. The most productive countries were the USA, China, and Italy. The four main clusters of keywords were: pathogenesis and clinical characteristics (keyword occurrences n=2240), public health issues (n=352), mental health (n=82), and therapeutic aspects (n=70).

Conclusions In the pediatric field, a large number of articles were published in a limited period on COVID-19, testifying the rush to timely spread new findings on the topic. The leading authors, countries, and institutions evidently belong to the most seriously involved geographical areas. A focus on the pediatric population is often included in general articles, and the pediatric research about COVID-19 mainly focused on the clinical features, public health issues, and psychological impact of the disease.

Introduction

The coronavirus disease (COVID-19) pandemic is representing, with its massive and rapid spreading, an unprecedented challenge for healthcare systems worldwide (WHO Health Emergency Dashboard. Available at: https://extranet.who.int/publicemergency [Last accessed September 15, 2020]). At the same rate, the research community has been extremely prolific, with a considerable amount of scientific papers published in a very short time, in an effort to timely address all aspects of disease management. Many journals have set a fast track publication for COVID-19-related papers. The availability of reviewers for an expedited review process has been called for. In other terms, the editorial process that usually characterizes the research on a disease is sped up and amplified in this exceptional circumstance.

In the pediatric age, the infection by SARS CoV-2 seems to be milder than in the elderly[1], and the relative protection of children against the severe forms of COVID-19 represents itself a major point of intertest in the comprehension of the pathogenetic mechanisms of the disease[2].

Therefore, the research about COVID-19 in the pediatric field has experienced a strong increase. The very high number of continuously published papers and the speed at which research on this topic has been generated makes it extremely difficult to stay updated with such a rapidly evolving knowledge. In this regard, a bibliometric analysis of the current literature on pediatric COVID-19 can help clinicians in keeping updated with emerging and swiftly evolving scientific outcomes. Bibliometric analysis is the attempt to quantitatively assess the current literature on a certain topic, allowing researchers to acquire knowledge about research trends, giving insight into the contribution of a particular country or institution to that topic, and into co-authorship and collaboration[3].

Therefore, we performed a bibliometric analysis of the papers on COVID-19 in the pediatric field published in the first half of 2020, to assess the worldwide research on this topic, identify publication trends, and provide some hints on the gap of knowledge to be filled by future research.

Methods

Scopus database was comprehensively searched for all the indexed documents published between January 1, 2020 and June 11, 2020, dealing with COVID-19 in pediatric age (0-18 years of age). The keywords used were “COVID” or “coronavirus” and “pediatric” or “child” or “children” or “adolescent$” in the title or abstract. We used only these terms to conduct a broad search that would ensure the inclusion of the relevant literature. The inclusion criteria were to be published after the first report of COVID-19 disease from the Wuhan government on 31 December 2019 and to match the search keywords. As COVID-19 was first found in China and a fairly large number of research papers were written in Chinese, language was not limited during the retrieval process.

The literature retrieval group consisted of three trained professionals. We used the export feature of the search engine to retrieve data for further processing. All extracted literature entries were exported into Microsoft Excel (Office 365) for screening and selection. The reviewers (AM, FT, GG, SB) independently screened the titles, abstracts, and, if ambiguous, full texts for the inclusion of articles. Discrepancies were resolved through discussions among them and with a fifth reviewer (IR) in case of difficulties in reaching an agreement.

The reviewers independently conducted information extraction from the included papers. Discrepancies were similarly resolved through discussion among the reviewers.

For studies that fulfilled the inclusion criteria, the following information was extracted: authors, affiliation and country of origin (when there was more than one author, the corresponding author’s information was used), journal, publication date, publication type, citation and abstract. The abstract and title of every record retrieved were screened to determine which studies should be assessed further.

We performed explorative data analysis for:

- total number of papers to measure global productivity
- total citations to assess the relevance of an author, institution or country

- journal and publication types to assess topic dissemination
- scientific collaboration between authors, institutions, and countries to show how they related to others
- core keywords to show clusters of research topics.

The intra-country and inter-country collaboration indices are presented as single-country production (SCP) and multiple-country production (MCP), according to the country of the corresponding author, and the timing of the first COVID-19 case reported for each country was highlighted as well.

A machine learning bibliometric methodology was applied to evaluate the distribution of each factor. The bibliometrix R package with its Biblioshiny web-interface was used[4].

No ethics approvals were considered indicated, as this is a literature study only.

Results

General data

A total of 2301 papers were retrieved. Out of them, 1078 (46.9%) were research articles, 436 (18.9%) were reviews, 363 (15.8%) letters, 186 (8.1%) editorials, 7 (0.3%) were conference papers, and 231 (10%) others.

Citation Analysis

The retrieved articles had 11063 citations with an average of 4.8 citations per article. Of the retrieved papers, 869 (37.8%) were cited at least once. The 10 most frequently cited articles are shown in Table 1. The top-ranking paper (n= 1255 citations) was published in *The New England Journal of Medicine* and was focused on the clinical characteristics of COVID-19 disease in China.

Table 2 shows the distribution of the prevalence of the retrieved articles according to the number of citations.

Table 1. List of the 10 most cited articles about COVID-19 in pediatric age.

First author	Title	Journal	Publication date	Total citations (%)

Guan W	Clinical Characteristics of Coronavirus Disease 2019 in China	The New England Journal of Medicine	April 30, 2020	1255 (11.3)
Chan JFW	A Familial Cluster of Pneumonia Associated with the 2019 Novel Coronavirus Indicating Person-To-Person Transmission: a Study of a Family Cluster	Lancet	February 15, 2020	735 (6.6)
Mehta P	COVID-19: Consider Cytokine Storm Syndromes and Immunosuppression	Lancet	March 13, 2020	324 (2.9)
Wu F	A New Coronavirus Associated with Human Respiratory Disease in China	Nature	February 3, 2020	309 (2.8)
Wu C	Risk Factors Associated with Acute Respiratory Distress Syndrome and Death in Patients with Coronavirus Disease 2019 Pneumonia in Wuhan, China	JAMA Internal Medicine	March 13, 2020	291 (2.6)
Chen H	Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records	Lancet	February 12, 2020	275 (2.5)
Lai CC	Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): The epidemic and the challenges	International Journal of Antimicrobial Agents	February 12, 2020	213 (1.9)
Xu X	Evolution of the Novel Coronavirus from the Ongoing Wuhan Outbreak and Modeling of Its Spike Protein for Risk of Human Transmission	Science China Life Sciences	January 21, 2020	153 (1.4)
Dong Y	Epidemiology of COVID-19 Among Children in China	Pediatrics	June 1, 2020	134 (1.2)

Lu X	SARS-CoV-2 infection in children	The New England Journal of Medicine	April 23, 2020	128 (1.2)

Table 2. Distribution of published papers about COVID-19 in pediatric age according to the number of citations.

N° citations	N° articles (%)
>100	17 (0.74)
50-100	25 (1.09)
20-49	70 (3.04)
5-19	202 (8.78)
<5	1989 (86.44)

Journal analysis

The studies were published in 969 different journals. *The Lancet* headed the list with a total number of 29 publications, followed by *Journal of Medical Virology* (n=26) and *Science of the Total Environment* (n=25). In the analysis of publications' reference lists, the most cited sources were *The Lancet* (n=2336 citations), followed by *The New England Journal of Medicine (n=1835)*, and the *Journal of American Medical Association (n=1017).*

Author analysis

A total of 12657 authors contributed to these papers, with a mean of 5.5 authors per document. Out of the whole authors, 239 were authors of single-authored documents and 12418 were authors of multi-authored documents.

Country analysis

The retrieved papers were published by authors from 114 countries. The most productive country in the COVID-19 research field in pediatrics was the USA, with 178 documents, followed by China, with 138 documents, and Italy, with 87 publications. The top-10 productive countries are shown in

Table 3.

Table 3. List of the top-10 productive countries on the topic of COVID-19 in pediatric age.

Country	Articles	SCP	MCP	First reported case*
USA	178	134	44	January 30, 2020
China	138	119	19	December 31, 2019
Italy	87	70	17	February 20, 2020
India	30	23	7	March 2, 2020
France	26	21	5	February 7, 2020
United Kingdom	23	10	13	January 28, 2020
Canada	22	10	12	January 27, 2020
Iran	19	15	4	February 19, 2020
Korea	18	14	4	January 20th 2020
Australia	17	11	6	January 25th 2020

SCP: single-country publications; MCP: multiple-country publications
* According to https://covid19.who.int/

Institution analysis

The published articles were from 4919 institutions, with the top 10 institutions accounting for 614 papers (26.7%). Huazhong University Of Science And Technology was the most productive institution, with 117 documents, followed by Harvard Medical School (82 publications), and University of Oxford (67 publications). The top-10 productive institutions are shown in Table 4.

Table 4. List of the top-10 productive institutions on the topic of COVID-19 in pediatric age.

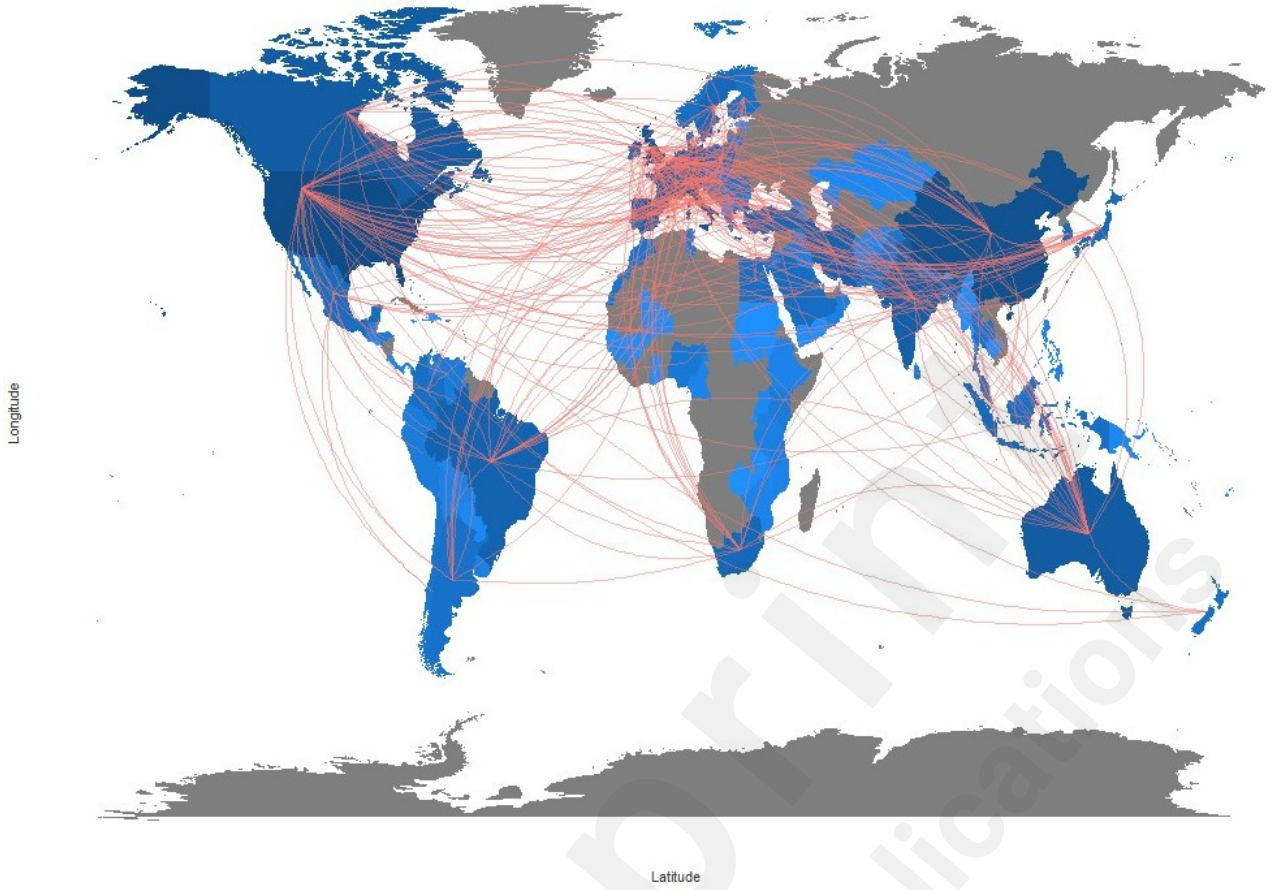
Institution	Country	N° of articles (%)
Huazhong University of Science and Technology	China	117 (5.1)
Harvard Medical School	USA	82 (3.6)
University of Oxford	UK	67 (2.9)
University of Washington	USA	63 (2.7)
University of California	USA	61 (2.6)
University of Toronto	Canada	56 (2.4)

Tehran University of Medical Sciences	Iran	47 (2.0)
University College London	UK	45 (2.0)
Universal Scientific Education and Research Network (USERN)	-	39 (1.7)
University of Melbourne	Australia	37 (1,6)

Collaboration analysis

Figure 1 shows the country collaboration analysis. The network diagram showed that China and the USA were the leaders in COVID-19 research in cooperation with other countries (each node represents a country, node size corresponds to publication number, connecting lines represents country cooperation, and line thickness indicates collaboration frequencies). Overall, developed countries had greater collaboration networks than developing territories.

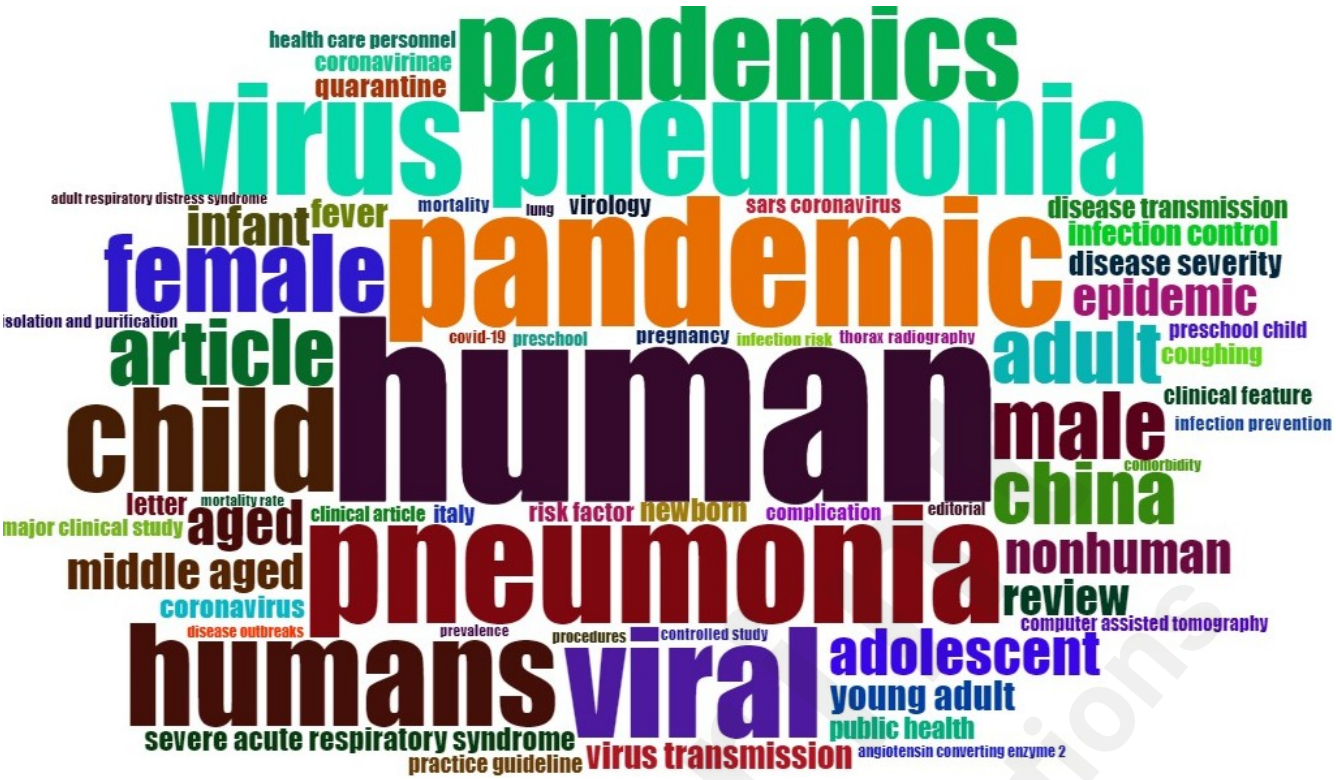
Figure 1. Collaboration map between countries in the publications on the topic of COVID-19 in pediatric age.



Keyword analysis

Overall, the three most common keywords were “COVID-19” with 880 occurrences, “coronavirus” with 368 occurrences and “Sars-Cov2” with 294 occurrences. Figure 2 shows the cloud for the most common keywords of the retrieved papers.

Figure 2. Word cloud of the most frequently used keywords in papers about COVID-19 in pediatric age.



When keywords were clustered into themes, the four main clusters turned out to be pathogenesis and clinical characteristics (keyword occurrence n=2240), public health issues (keyword occurrence n=352), mental health (keyword occurrence n=82), and therapeutic aspects (keyword occurrence n=70).

Discussion

In this bibliometric review, we aimed to provide a comprehensive portrait of the state of the art of published research about COVID-19 in pediatric age. The bibliometric approach properly fits the aim of representing the whole amount of scientific publications on a certain topic in a defined time frame. Therefore, this method has been recently used by many authors to depict the state of the art of the current knowledge about COVID-19 under different perspectives [5-15] and we used it to focus on pediatric age.

The most impressive result is the large number of articles published in a limited period on a single

topic. Most of them were research articles, but, notably, more than 15% of the total published papers were letters, testifying the rush to timely spread even preliminary results and personal perspectives [16]. The low rate of conference papers is probably the result of the fact that most of the national and international conferences scheduled in that period have been cancelled in compliance with social distancing measures.

The citation analysis shows that only about one-third of the published papers were cited at least once, suggesting that the short time frame and the rapidly increasing amount of literature likely lower the possibility for a paper to be cited on this peculiar topic. Furthermore, the top-cited paper reached a high number of citations in a very short time.

The leading authors, countries, and institutions evidently belong to the most seriously involved geographical areas, as already pointed out in previous general bibliometric analyses.

The keyword analysis, as well as the top-cited articles, revealed that a focus on the pediatric population is often included also in general articles about COVID-19. Analyzing the keyword clusters, it could be noticed that pediatric research about COVID-19 mainly focused on the clinical features of the disease and public health issues. Notably, mental health-related topics are of outstanding interest, even overcoming therapeutic aspects. Psychosocial challenges and opportunities for children with chronic health conditions during lockdown, such as digital approaches to remote pediatric health care delivery, represent a mainstream topic in the publication trends during the pandemic[17,18]. This, along with the lack of emergency preparedness-related topics among the most recurrent keywords, could suggest that the research in pediatrics about COVID-19 more frequently addressed the psychological impact of lockdown, according to the milder clinical course of the disease in childhood, and unlike what emerged in a similar bibliometric analysis outside the pediatric area[5].

Taken together, our findings demonstrate that worldwide scientists, facing the unpreceded emergency of COVID-19 pandemic, have felt the urge to publish their findings and opinions aiming to

contribute to the evolving knowledge as soon as new evidence emerged, even in the pediatric field, up to now not so seriously involved in the COVID-19 emergency.

This process has been facilitated by the fact that highly-impacted medical journals have opened special issues or columns for COVID-19[19], some publishers waived publication fees and provided free access to articles' content, and to the effort of many journals to fast track peer review. It would be desirable that some of these positive aspects, implemented in the current difficult times, would be tracked also in the common practice. Nonetheless, in such an accelerated publishing process, it should be of crucial importance to keep high the quality of research papers, being the essential condition to spread valuable information[10,20]. In the future, it would be interesting to compare this first six-month publication rush to the following publication attitude about the COVID-19 topic in the pediatric field.

Our study has some limitations that need to be acknowledged, mainly the intrinsic bias of having considered only studies indexed on Scopus in a limited time frame, knowing that results may differ according to other databases on extending the included period. However, this bibliometric analysis of COVID-19 publications in pediatric field offers a global overview of what has been published on the topic and suggesting possible gaps of knowledge for new lines of research. In particular, Scopus database was chosen for its reliability, wide coverage of scientific production, and daily updates. We decided to search only one database mainly to avoid duplicate results. Moreover, as this bibliometric analysis addressed a very recent and rapidly evolving topic, we preferred to search only one reliable database to overcome gaps in the promptness of updates from different sources. Finally, we preferred Scopus as our main data source since it provides data analysis for publications and citations and allows the results to be sorted according to the number of citations.

Another limitation consists of the limited time frame included in our analysis. Using a different methodological approach, such as a living systematic review, would allow a real-time update about the raising evidence in such a rapidly evolving field. As a result, it would be possible for authors to

constantly monitor the gaps of knowledge they would try to fill with their future research.

In conclusion, also in the pediatric field a huge amount of papers have been published on the topic of COVID-19. It would be advisable that future publication policy would maintain the positive aspects emerged in these hard times, providing solid evidence to inform and support clinical and public health decision making.

Conflicts of Interest: All authors have no conflict of interest to disclose.

References

1. De Luca CD, Esposito E, Cristiani L, Mancino E, Nenna R, Cortis E, Midulla F. Covid-19 in children: A brief overview after three months experience [Internet]. Paediatr Respir Rev. W.B. Saunders Ltd; 2020 [cited 2020 Sep 6]. [doi: 10.1016/j.prrv.2020.05.006]
2. Cristiani L, Mancino E, Matera L, Nenna R, Pierangeli A, Scagnolari C, Midulla F. Will children reveal their secret? The coronavirus dilemma [Internet]. Eur Respir J. NLM (Medline); 2020 [cited 2020 Sep 6]. PMID:32241833
3. Ellegaard O, Wallin JA. The bibliometric analysis of scholarly production: How great is the impact? Scientometrics [Internet] Springer Netherlands; 2015 Dec 1 [cited 2020 Sep 6];105(3):1809–1831. [doi: 10.1007/s11192-015-1645-z]
4. Aria M, Cuccurullo C. bibliometrix: An R-tool for comprehensive science mapping analysis. J Informetr Elsevier Ltd; 2017 Nov 1;11(4):959–975. [doi: 10.1016/j.joi.2017.08.007]
5. Yu Y, Li Y, Zhang Z, Gu Z, Zhong H, Zha Q, Yang L, Zhu C, Chen E. A bibliometric analysis using VOSviewer of publications on COVID-19. Ann Transl Med [Internet] Ann Transl Med; 2020 Jul [cited 2020 Sep 6];8(13):816–816. [doi: 10.21037/atm-20-4235]

6. Şenel E, Topal FE. Holistic Analysis of Coronavirus Literature: A Scientometric Study of the Global Publications Relevant to SARS-CoV-2 (COVID-19), MERS-CoV (MERS) and SARS-CoV (SARS). Disaster Med Public Health Prep [Internet] Cambridge University Press (CUP); 2020 Aug 13 [cited 2020 Sep 6];1–15. [doi: 10.1017/dmp.2020.300]

7. Odone A, Salvati S, Bellini L, Bucci D, Capraro M, Gaetti G, Amerio A, Signorelli C. The runaway science: a bibliometric analysis of the COVID-19 scientific literature. Acta Biomed [Internet] Mattioli 1885; 2020 [cited 2020 Sep 6];91(9-S):34–39. PMID:32701915

8. N VR, Patil SB. Indian Publications on SARS-CoV-2: A bibliometric study of WHO COVID-19 database. Diabetes Metab Syndr Clin Res Rev [Internet] Elsevier Ltd; 2020 Sep 1 [cited 2020 Sep 6];14(5):1171–1178. [doi: 10.1016/j.dsx.2020.07.007]

9. Liu N, Chee ML, Niu C, Pek PP, Siddiqui FJ, Ansah JP, Matchar DB, Lam SSW, Abdullah HR, Chan A, Malhotra R, Graves N, Koh MS, Yoon S, Ho AFW, Ting DSW, Low JGH, Ong MEH. Coronavirus disease 2019 (COVID-19): an evidence map of medical literature. BMC Med Res Methodol [Internet] NLM (Medline); 2020 Jul 2 [cited 2020 Sep 6];20(1):177. PMID:32615936

10. Nowakowska J, Sobocińska J, Lewicki M, Lemańska Ż, Rzymski P. When science goes viral: The research response during three months of the COVID-19 outbreak. Biomed Pharmacother [Internet] Elsevier Masson SAS; 2020 Sep 1 [cited 2020 Sep 6];129. [doi: 10.1016/j.biopha.2020.110451]

11. De Felice F, Polimeni A. Coronavirus disease (COVID-19): A machine learning bibliometric analysis [Internet]. In Vivo (Brooklyn). International Institute of Anticancer Research; 2020 [cited 2020 Sep 6]. p. 1613–1617. PMID:32503819

12. Mao X, Guo L, Fu P, Xiang C. The status and trends of coronavirus research: A global bibliometric and visualized analysis [Internet]. Medicine (Baltimore). NLM (Medline); 2020 [cited 2020 Sep 6]. p. e20137. PMID:32481379

13. Chahrour M, Assi S, Bejjani M, Nasrallah AA, Salhab H, Fares MY, Khachfe HH. A Bibliometric Analysis of COVID-19 Research Activity: A Call for Increased Output. Cureus [Internet] Cureus, Inc.; 2020 Mar 22 [cited 2020 Sep 6];12(3). [doi: 10.7759/cureus.7357]

14. Lou J, Tian SJ, Niu SM, Kang XQ, Lian HX, Zhang LX, Zhang JJ. Coronavirus disease 2019: A bibliometric analysis and review. Eur Rev Med Pharmacol Sci [Internet] Verduci Editore s.r.l; 2020 [cited 2020 Sep 6];24(6):3411–3421. PMID:32271460

15. Warin T. Global Research on Coronaviruses: An R Package. J Med Internet Res [Internet] NLM (Medline); 2020 Aug 11 [cited 2020 Sep 6];22(8):e19615. PMID:32730218

16. Fidahic M, Nujic D, Runjic R, Civljak M, Markotic F, Lovric Makaric Z, Puljak L. Research methodology and characteristics of journal articles with original data, preprint articles and registered clinical trial protocols about COVID-19. BMC Med Res Methodol [Internet] NLM (Medline); 2020 Jun 22 [cited 2020 Sep 6];20(1):161. PMID:32571302

17. Serlachius A, Badawy SM, Thabrew H. Psychosocial Challenges and Opportunities for Youth With Chronic Health Conditions During the COVID-19 Pandemic. JMIR Pediatr Parent. 2020 Oct 12;3(2):e23057. doi: 10.2196/23057. PMID: 33001834.

18. Badawy SM, Radovic A. Digital Approaches to Remote Pediatric Health Care Delivery During the COVID-19 Pandemic: Existing Evidence and a Call for Further Research. JMIR Pediatr Parent. 2020 Jun 25;3(1):e20049. doi: 10.2196/20049. PMID: 32540841.

19. Brown A, Horton R. A planetary health perspective on COVID-19: a call for papers [Internet]. Lancet. Lancet Publishing Group; 2020 [cited 2020 Sep 6]. p. 1099. PMID:32251644

20. Ioannidis JPA. Coronavirus disease 2019: The harms of exaggerated information and non-evidence-based measures [Internet]. Eur J Clin Invest. Blackwell Publishing Ltd; 2020 [cited 2020 Sep 6]. PMID:32191341

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