

Mapping of the Early Trends of 2019 Novel Coronavirus (COVID-19) using PubMed Literature

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ABSTRACT: 2019 novel coronavirus infection (COVID-19) causes severe viral pneumonia in people, known to have a high death rate and a similitude in clinical indications with severe acute respiratory syndrome coronavirus. This investigation intended to study the attributes of distributions in early COVID-19 research through bibliometric analysis. The PubMed database was searched on 07th February 2020 for COVID-19 distributions published from 01st December 2019 to 06th February 2020. Investigation parameters incorporate the year of production, distribution type, examples of universal coordinated effort, and research organizations. An aggregate of 62 COVID-19 research distributions was distributed during the examination time frame. The exploration works were broadcast from 13 nations, demonstrating the global noteworthiness of coronavirus episodes. The USA was the most prominent supporter, with 24 articles distributed over two months and six days, trailed by England (11 articles). Aftereffects of the investigation will bear some significance with understudies, specialists, curators, and data science experts and will fill in as a pattern for resulting examinations.

Keywords: Bibliometric study, PubMed, Coronavirus, COVID-19, Pneumonia, Literature

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1. Introduction

In December 2019, aspiratory contamination related to the novel coronavirus (COVID-19) occurred in Wuhan, China (Lu et al., 2020). Human coronavirus is one of the fundamental pathogens causing respiratory disease. Occasionally, zoonotic viruses can taint humans and afterward spread between individuals, for example, with MERS (Middle East respiratory syndrome coronavirus), SARS (Severe Acute Respiratory Syndrome), and now with COVID-19 (Hu et al., 2017). SARS-CoV and MERS-CoV are often transmitted to humans from civets and dromedary camels, respectively, and both viruses originate in bats (Tao et al., 2017). Still, the origin of COVID-19 needs further investigation. Respiratory droplets produced when an infected person coughs or sneezes transmit the disease. Symptoms including fever, cough, and shortness of breath appear between 2 days and 14 days after exposure to the virus (Wiersinga et al., 2020). Additionally, the potential general wellbeing danger presented by COVID-19 infection is high, both all-inclusive and to the United States Hui et al., (2020). As of now, a vast mass will have an expanded danger

of disease, for instance, human services laborers thinking about contaminated patients and other close contacts of the perished. To assess the momentum effect of COVID-19 logical research-creation, a bibliometric examination was performed utilizing accessible data filed in the PubMed database. Bibliometric investigation analyzes the advancement of any theme and offers an extensive evaluation of logical research patterns. As of late, bibliometric analyses have been widely performed to survey analytical exercises in differing fields, including irresistible sicknesses caused by Nipah infection (Sanni S.A et al., 2013), Zika virus (Delwiche, 2018), SARS CoV (Yang & Yang, 2005), H1N1 influenza (Luchs, 2012), MERS CoV -(Zyoud, 2016b) Swine flu influenza (Baskaran, C. & Sivakami, N., 2014), Ebola virus (Pouris et al., 2016), Dengue (Zyoud, 2016a), Chicken gunya (Bansal et al., 2018). Notwithstanding, inferred from the way that there has been little bibliometric concentrate about COVID-19 research in English writing, the present examination endeavored to evaluate the attributes and nature of early research articles, including COVID-19 analysis.

2. Review of Literature

Lipsitch et al (2020) attempted to identify the full spectrum of disease severity, mode of transmission, range of victims, the role of asymptomatic or presymptomatic individuals in transmission of infection, and risk factors involved in the death of patients. The examination further proposed that family unit studies could be utilized to direct widespread shedding considers, which may help decide when patients were generally irresistible and to what extent they ought to be confined. A vital purpose of the suggestions was that viral testing should not be utilized uniquely for clinical consideration. A period of the testing limit must be held to help general wellbeing endeavors portray the direction and seriousness of the disorder. In this manner, wenzhong & hualan, (2020) conducted a rationed area investigation, homology demonstration and further utilized sub-atomic docking to think about the organic jobs of specific proteins of the novel coronavirus. Furthermore, Zyoud, (2016b) made bibliometric concentrates on Middle East respiratory disorder coronavirus (MERS-CoV) that causes severe viral pneumonia in people, known to have a high death rate and a likeness in clinical indications with SARS coronavirus. An aggregate of 883 MERS-CoV investigates productions distributed throughout the world. The MERS-CoV-related distributions started from 92 nations/ domains, demonstrating the worldwide spread of MERS-CoV inquires. The investigation referenced that the USA was the biggest benefactor, with 319 articles distributed over 4 years, trailed by KSA (113 articles).

Similarly, a bibliometric study conducted by Hossain, (2020) evaluated the contemporary scientific literature to assess the evolution of knowledge on COVID-19 by identifying the leading research stakeholders and analyzing the conceptual areas of knowledge development in this domain. Bibliometric data on COVID-19-related studies published during 2019-20 were retrieved from three significant databases within the Web of Science core collection. A total of 371 records from 13,021 hits were retained in this study.

3. Objectives and Methodology

The supremacy of medical and clinical research on many outbreaks, including the COVID-19 pandemic, is supported by significant literature review publications like the bibliometric analysis. This year, websites and papers were flooded with coronavirus research. According to Gupta et al (2020). It revolutionized the way scientists studied and what they studied. The current study makes a modest attempt to analyze the available literature (in a short span) on COVID-19. Two research questions were sought to meet the objectives:

1. Who are the top researchers examining the COVID 19 outbreak and the top journals, institutions, and countries?
2. What are the most popular keywords and related research hubs?

The bibliometric study analyzed COVID-19 research articles published in December 2019 and January until 07th February 2020. Data were downloaded on 7th February 2020. The search terms included “2019-nCoV”/ “2019 novel coronavirus” / “Wuhan virus”/ “COVID-19”/ “SARS COV-2” in the title/theoretical hunt of the PubMed database and recovered all records that were filed. Considering the pestilence episode that affected worldwide, the investigation tried to perform early research despite articles being restricted to 2 months and seven days. Pieces were incorporated just if their essential center was COVID-19. Copies and news reports were barred. Profile data of each included article were then isolated containing the quantity of the author(s), title, month and year of production, distribution type, and diary title. From the gathered information, the commitments of nations, associations, and the authors towards COVID-19 research, the appropriation of distributed papers in top journals was sought after. The study employed VOSviewer, (Van Eck & Waltman, 2010) to map PubMed COVID-19 articles’ terms. For

segregating title and abstracts, ten items, 45 links, 735 total link strength two clusters, and binary counting methods were used. A base number of events of a term 10 of the 1136 terms, 16 meet the edge. The default decision is to choose the 60% effective terms.

Furthermore, five items, ten connections, 20 all-out connection quality, one bunch, a base number of archives of 2 authors of the 311 authors, and 19 meet the edge. The complete quality of the coauthor joins for 19 authors with different coauthors was determined, and the authors with the best connection quality were taken. Identifying with associations, seven items, 21 connections, 42 all out connection quality, most minor of 2 associations of the 160 associations, 13 meet the limit. For every one of the 13 associations, the total quality of the co-origin connected with different associations was determined. For keywords, five items, seven connections, 24 all-out connection quality, two groups, a base number of events of catchphrases 5 of the 97 keywords, 5 meet the edge. For every one of the five keywords, the complete quality of the co-event connected with different keywords was considered.

4. Results

Science and technology knowledge and resources have never been better, and they've being put to use to perform COVID-19 research at rapid speed all over the world. The number of research projects associated to COVID-19 is increasing on a daily basis, the scope and scale of involvement is astounding, and the level of worldwide collaboration is unparalleled. The genetic sequence of the SARS-CoV-2, was released on January 5, 2020, just weeks after the first cases of sickness were reported, providing critical information for identifying and developing medicines, vaccines, and diagnostics. Despite the fact that the pandemic has increased research challenges and thousands of publications, news articles, and blogs have been published, academically quality data is still lacking.(Weiner et al., 2020).

As expected, most research works (34) on COVID-19 are distributed in the long stretch of January 2020. Approximately 26 articles are distributed in the primary seven-day play of February 2020, while two reports in December explored this subject. Ninety percent of distributions were English (56), and approximately six were Chinese, representing 10% of productions during the examination time frame. Strikingly, 39% of publications were from the United States, while 18% were from the U.K; and Sweden and China represented 10% of the exploration yield.

S.No	Country	Frequency	%
1	United States	24	38.71
2	England	11	17.74
3	Sweden	6	9.68
4	China	6	9.68
5	Netherlands	5	8.06
6	Canada	2	3.23
7	Switzerland	2	3.23
8	Portugal	1	1.61
9	Germany	1	1.61
10	France	1	1.61
11	Iran	1	1.61
12	Korea (South)	1	1.61
13	Japan	1	1.61

Table 1. Most productive countries publishing COVID-19 research

As projected by Teixeira da Silva et al (2021), Between January 1st and June 30th, 2020, a total of 23,634 unique published papers were indexed by Web of Science and Scopus. Research papers accounted for 48% of all COVID-19-related articles on Scopus and 37% of all COVID-19-related articles on Web of Science, according to their findings. The rest of the coronavirus articles on each database were composed of letters, reviews, editorials, and notes. By publication volume in both databases, the United States, China, and Italy were the top three countries. BMJ, Journal of Medical Virology, and The Lancet, on the other hand, published the most coronavirus-related studies. Else (2020) COVID is cited in around 4% of Dimensions articles this year, and around 6% of those indexed in PubMed. Table 1 shows the most fruitful places for COVID-19 research distribution. The United States has the most articles (24), followed by England (11), Sweden, and China (6 papers each).

Table 2 presents the core authors distributing research information on this exceptionally contagious infection. Wang W tops with five contributions, trailed by Lang L and LI X with four publications each, while eight additional writers contributed three articles each. It is intriguing to note that the significant five authors engaged with potential research on this deadly disease in various research labs of Beijing, China.

S.No	Authors	Affiliation	Frequency	%
1	Wang Wenling	NHC Key Laboratory of Biosafety, National Institute for Viral Disease Control and Prevention, Chinese Center for Disease Control and Prevention, Beijing, China.	5	8.06
2	Zhang Leike	State Key Laboratory of Virology, Wuhan Institute of Virology, Center for Biosafety Mega-Science, Chinese Academy of Sciences, 430071, Wuhan, China.	4	6.45
3	Li Xingwang	Clinical and Research Center of Infectious Diseases, Beijing Ditan Hospital, Capital Medical University, Beijing, China	4	6.45
4	Zhao Xiang	NHC Key Laboratory of Biosafety, National Institute for Viral Disease Control and Prevention, Chinese Center for Disease Control and Prevention, Beijing, China	3	4.84
5	Xu Wenjian	Department of Radiology, The Affiliated Hospital of Qingdao University, 16 Jiangsu Road, Qingdao, Shandong, China	3	4.84

Table 2. Core authors contributing COVID-19 research publications

S.No	Journals	Publisher	Impact Factor	Frequency	%
1	Journal of Medical Virology	Wiley-Blackwell, United States	2.049	9	14.52
2	Europe's journal on infectious disease surveillance, epidemiology, prevention and control	European Centre for Disease Prevention and Control, Sweden	7.4	7	11.29
3	The Lancet	Elsevier, Netherlands	59.102	6	9.68
4	The New England Journal of Medicine	Massachusetts Medical Society, United States	70.670	5	8.06
5	Radiology	Radiological Society of North America, United States	7.469	4	6.45

Table 3. Top journals publishing articles on COVID-19

Table 3 shows the results of COVID-19's five most important journal publications. The Journal of Medical Virology contributed the most publications (9) in the restricted ability to focus on the Covid 19 epidemic, followed by Euro Servilely (7), The Lancet (6), and The New England Journal of Medicine with five each.

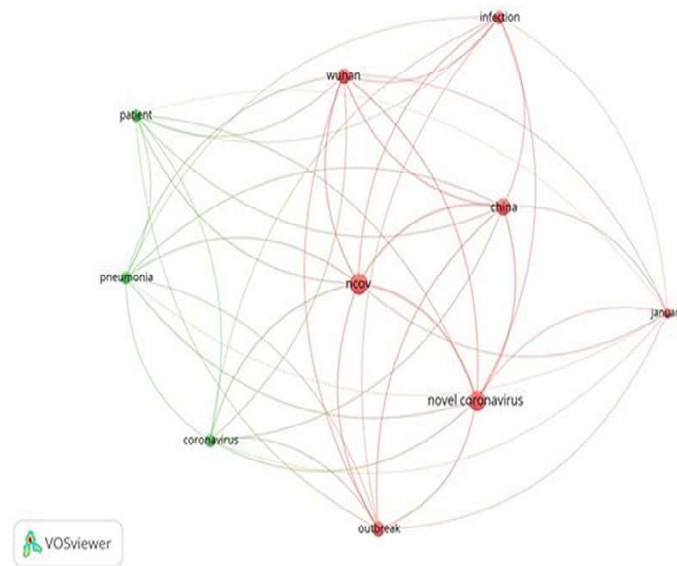


Figure 1. Titles and abstract (Subjects) on COVID-19 research

Title and the abstract are the most important parts of a research paper - for editors (to process the paper further), for reviewers (to have an idea about the paper), and for the readers (only available free parts of a paper and hence, read widely (Cals & Kotz, 2013)). Figure 1 shows the most prominent title and abstracts focused on 2019nCoV. Two clusters were formed: cluster 1 (nCoV) had nine links constituting the following words in title and abstract: outbreak (29 occurrences & 148 total link strength), novel coronavirus (46 occurrences & 207 total link strength), January (12 & 63), China (37 & 197), Wuhan (32 & 173) and infection (21 & 110). Cluster 2 (Coronavirus) had 9 links constituting the following words in title/abstract: patient (18 & 106), pneumonia (20 & 116), and coronavirus (22 & 122). The term nCoV-2019 was found to be most relevant (2.34), followed by a novel coronavirus (1.99) and China (1.37), and the least applicability was observed for the terms January (0.45) and infection (0.48).

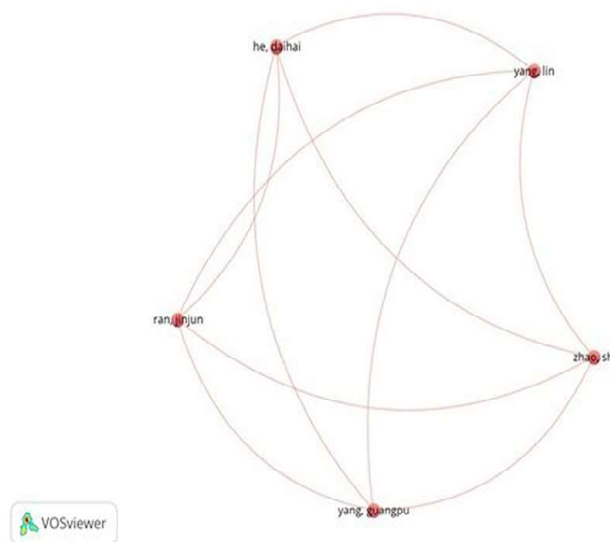


Figure 2. Co-Authors Contributed to COVID19 Research

Figure 2 illustrates the coauthorship pattern observed in the early publication trends of 2019nCoV. It is vivid from the figure that virtually five authors - He Daihai, Ran Jinjun, Yang Guangpu, YangLin, Zhao Shi, who were involved in the 2019nCoV research, received four links, with two documents and a total link strength of 8.

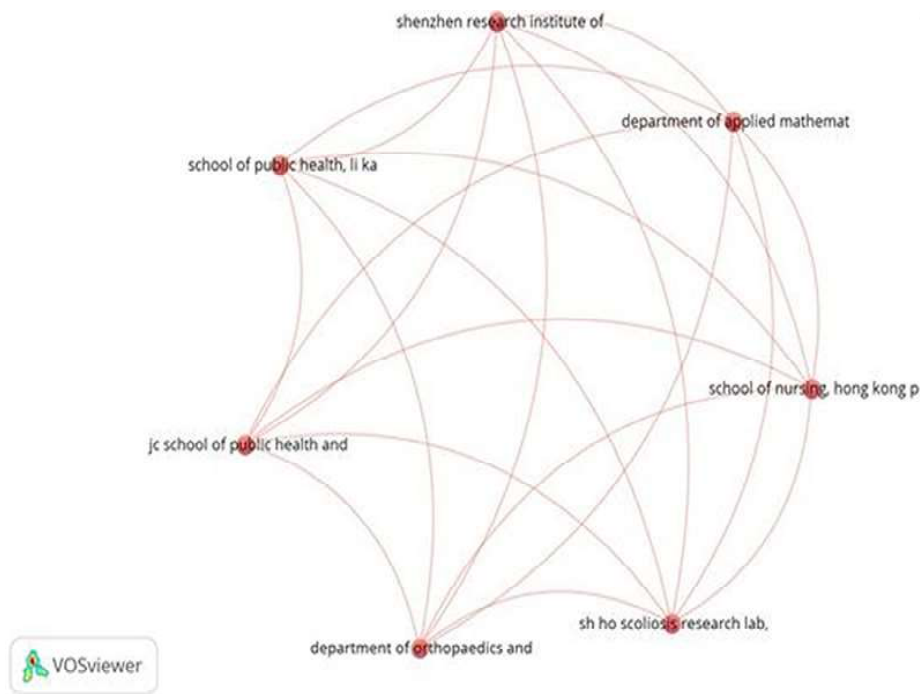


Figure 3. Organizations involved in COVID-19 research work

Out of a sum of 13 organizations, 7 indicated colossal joint effort attributable to their most important connection quality. The association shaped a solitary group and contributed two reports with six connections with a complete connection quality of 12. The worked together establishments are as per the following: Department of Applied Science, Hong Kong Polytechnic College; Department of Orthopedics and Traumatology, Chinese University of Hong Kong; JC School of Public Health and Primary Care, Chinese University of Hong Kong; School of Nursing, Hong Kong Polytechnic University; School of General Wellbeing, Li Ka Shing Faculty of Medicine, University of Hong Kong; Sh ho Scoliosis Exploration Lab; the joint scoliosis investigation focus of the Chinese College of Hong Kong and Nanjing University; and Shenzhen inquire about the organization of the Chinese College of Hong Kong.

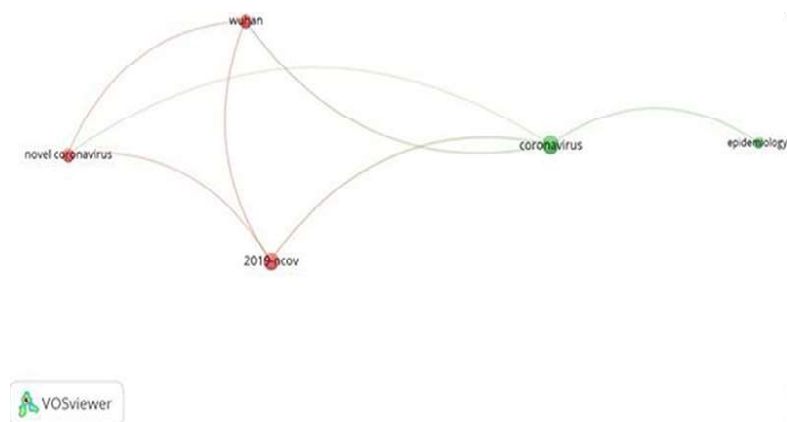


Figure 4. Significant author keywords on COVID -19 research

Keywords empower authors to expand the portrayal of their original copy content past that was introduced in the title and conceptual to incorporate verifiable ideas (Kivunja, 2018). As expressed by Scott, (2001), keywords provided by writers are an essential wellspring of data for both human indexing and programmed ordering frameworks of journal articles. In association with author keywords, 2 clusters were framed, as shown in figure 4. Cluster 1 comprised words such as 2019-NCoV (12 events 3 connections and, total link strength of 13) Wuhan and novel coronavirus with every one of 7 events, 3 links and a total link strength of 12 and 7, respectively. Group 2 comprised 2 keywords viz. coronavirus (14 events, 4 connections with a total link strength of 13), and the study of disease transmission (5 events, 1 connection with a total link strength of 3).

5. Findings

- The COVID-19 pandemic's impact on research and its response to the pandemic emphasizes the importance of research, the obstacles it faces, and the opportunity and resources available to re-make research more efficient and cost-effective. This epidemic, in an ideal world, would result in new research paradigms and strategies. The United States contributed the most to Covid 19 research, followed by China and England, as per findings of the current study. Throughout the COVID-19 period, the United States, China, and the United Kingdom were, and continued to be, at the centre of the global network in coronavirus related research, although poorer countries were largely absent from early research activities, as noted by Fry et al (2020). However, as pointed out by Jaffe et al (2020) nation shares of publications for each study field change significantly, depending not only on the actual volume of research produced by the country, but also on how that research compares to the rest of the world.
- The most productive authors contributing towards Covid 19 research were from China, namely Wang, Zhang, Li, Zhao, and Xu. He Daihai, Ran Jinjun, Yang Guangpu, YangLin, and Zhao Shi were the significant co-authors involved in early covid 19 research.
- According to the statistics obtained in the study period, the "journal of medical virology" has published 15% of articles, followed by "Europe's journal on infectious disease surveillance, epidemiology, prevention and control (11%) and The Lancet (10%)." However, a study made by ElHawary et al (2020) The top 50 cited publications were published in 22 journals, with almost half of them appearing in just three: The Lancet, the New England Journal of Medicine, and the Journal of the American Medical Association (JAMA).
- What are the benefits of bibliometric analysis of article keywords? To begin, keywords are the author's evaluation of the three to five (or so) most important terms in their material. Second, keyword research might reveal current and past research patterns. Finally, bibliometric keyword analysis can provide light on a wide range of intriguing topics. namely most popular/common research subjects in this journal, link between particular keywords and the likelihood of a publication being cited, to identify whether there has been an increase or reduction in the use of specific terms over time? (Pesta et al., 2018). The title/abstract and keywords in this study were mostly focused on the two terms "2019 nCoV and Corona Virus."
- According to Yuen et al (2020), The first definitive proof of SARS-CoV-2 transmission from human to human was revealed by a major study done by a group of doctors and scientists from the University of Hong Kong in Shenzhen, near Hong Kong. This is an excellent illustration of how a high-quality clinical study can significantly influence policy decisions. According to the current study's findings, nearly every institution in Hong Kong participates to early Covid 19 research.

6. Conclusion

The enormous effect on scientific research yield about COVID-19 research replicates its worldwide impact as a conceivably destructive infection. The most significant confinement lies in the way that the PubMed database was utilized to scan for COVID-19. Along these lines, distributions ordered in non-PubMed - databases were not contemplated. Moreover, the quantity of research yield in 2020 will certainly be twofold inferable from the contamination of pandemic flare-up. Using the PubMed database, the qualities of the COVID-19 research yield from December 2019 to 06th February 2020, explored by methods for bibliometric techniques. According to Primer's evaluation of the contents of PubMed-indexed publications, COVID-19 papers (and preprints) initially concentrated on viral transmission, hospital outcomes, and diagnostics and testing. (<https://covid19primer.com>). Subsequently, as mentioned by Harper et al (2020), Since December 2019, almost 20,000 papers have been published, many of them in high-profile publications. Preprint services, such as BioRxiv, are seeing an increase in the amount of

research being uploaded for quick dissemination prior to peer review.

The present study's findings show that COVID-19-related writing has become increasingly broad due to its enormous spread around the world. The central part of productions in COVID - 19 research is distributed by the United States of America (24). The Journal of Medical Virology (9) had allocated the most significant number of articles in a limited ability to focus, and different journals, viz., "Europe's journal on infectious disease surveillance, epidemiology, prevention and control," "Contamination Genetics and Evolution," "The Lancet," and "The New England Journal of Medicine," had additionally essentially contributed. Wan Wenling, Zhang Heike, Lixing Wang, Xu Wenjian, and Zhao Xiang represented their distributions in COVID-19 research, and Yang B, Leung GM, Wang X, Liu Y, and Drosten C contributed altogether. This early research study may provide an accommodating reference to clinical virologists and disease transmission specialists, strategy chiefs, scholastics, and COVID-19 scientists. As COVID-19 could be viewed as an ongoing dangerous illness and another exploration subject, the examination results look at early patterns of research on COVID-19. The COVID pandemic has indeed impacted the globe, not just because of the virus itself but also because of the long-term consequences of the global response to it. While the epidemic may have had some glimmers of hope, present, and future research must be conducted freely and openly, lest future pandemic preparation studies replicate the hard-won experiences of today.

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