# COVID- 19 AND GEOGRAPHY: A BIBLIOMETRIC ANALYSIS (2020-2022*)

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## ABSTRACT

*COVID-19 pandemic produced life altering impact over humanity in more than one way. Observing works on COVID-19 pandemic which have geographical dimensions, outlines the ongoing dialectics in academics alongwith events in the current world. Interface between a bibliometric examination of COVID-19 and Geography provides pertinent information on research in the field. Geography as a discipline has its stronghold in spatial and temporal studies. Contemporary studies such as this prove helpful in outlining the nature as well as geographies of research also. It attempts to bring out the networks and trends, which can be further helpful in avoiding duplication of work and also in determining the future direction of research in the field. With the pandemic creating geographies, such a study at the global level will be insightful. Data generated through the Web of Science and analysed graphically, provides information on languages, countries, authors, affiliations, organisations and linkages between published researches. The quantitative analysis along with linkage analysis generates a descriptive pattern. Results indicate that the share of developed countries is more in contributing to research on the topic, with a handful of developing nations also emerging as major contributors. Besides, scattered groups have been observed in contributing to the topic with works in Public Health dominating the field of research.*

**Keywords:** Bibliometry, COVID-19, Geography, publications, research, WoS.

## INTRODUCTION

COVID-19 pandemic needs no specific introduction as it has become a part of human existence since the year 2019 (WHO, 2022). The infectious disease caused by the recently discovered novel coronavirus (SARS CoV-2 virus) (WHO, 2022) has been responsible for altering human life in an unprecedented manner ever since 2020 (Mehta, *et al.*, 2022). It turned into a global pandemic along with its complexity, a  constantly evolving nature and a set of guidelines to be followed for containing its spread (WHO, 2022). All

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such aspects have diversified its study in ways ranging from economic, political, social, emotional, well- being, health cultural and for many more issues (Andrews, Crooks, Pearce, & Messina, 2021). The event in itself is defined as extensively geographical and also demanding response in that manner whose intellectual examination can lend avenues of unprecedented research in social sciences and sciences (Andrews, Crooks, Pearce, & Messina, 2021).

While this has already taken place in many forms in variety of literature, it becomes pertinent to observe as to how geographical works are being undertaken in studying the disease which has been recorded to produce intense economic, social and political implications with its medical dimensions (Association, 2022). The current paper is an attempt to observe how COVID-19 and Geography, when analyzed together, have been discussed in published literature of recent times. The pandemic is defined to be quick and creating its own geographies (Haas & Arsarjani, 2021). Such aspects make the topic of search relevant. It is in all these regards that an attempt has been made to study the undercurrents in research in the topic since its spread in 2020.  The world- recognized global database of Web of Science has been utilised for this purpose. The aim is to observe broadly and without applying any filters as to how both the topics are recorded in published literature for the relevant time period beginning from 2020 and extending into 2022 (till recent publications as recorded in June, 2022).

Geography as a discipline also provides enhanced understandings of the disease through its strategy of analysis and this can help many disciplines, including the medical field and can help build future together (Bissell, 2021). Besides, the tools of geographic examination ranging from mapping to computer aided techniques, Geographic Information Systems (GIS), provide newer insights into the study of the disease  (Pardo, Napoletano, Verges, & Billa, 2020; Bissell, 2021; ESRI, 2022)  and geography is an aid in fighting it in various forms (Shepherd, 2022).

**MATERIALS AND METHODS**

The current study revolves around publications on COVID-19 pandemic and geography as  broad themes. The data which is gathered from WoS Core Collection database is examined and visualized through the VOS Viewer software 1.6.18 version. The present work is based on this bibliometric data from the Web of Science (WoS) which is provided by Thomson Reuters. It is one of the two largest databases generating many forms of bibliographic information on a variety of disciplines. It was earlier known as the Web of Knowledge, and WoS since 2004. It has records of published literature from 1900 to the present and includes several databases (Annie, Haralstad, & Christophersen, 2015). Diagrammatic output is provided by the database for many bibliometric parameters (Annie, Haralstad, & Christophersen, 2015) such as year of publication, language of publication records, authors, affiliations, institutions, funding, indexing and others (Ramlal, Ahmad, Kumar, Khan, & Chongtham, 2021). This collection is defined as a 'premier' output of WOS, containing more than 21,100 worldwide peer-reviewed journals of high quality. There are more than 250 disciplines related to the sciences, social sciences and arts and humanities in the database. A commercial license is required to conduct analysis from

the database (Ramlal, Ahmad, Kumar, Khan, & Chongtham, 2021). It is also considered as the most trusted citation data provider in the world with 1.9 billion cited works from 171 million records (Clarivate, 2022). The WoS Core Collection provides record of more than 115 years of highest quality research and includes three indices- The Science Citation Index Expanded (SCI-EXPANDED), Social Sciences Citation Index (SSCI) and Arts and Humanities Citation Index (AHCI). These contain databases from 1989 to present (Clarivate, 2022). VOS Viewer is a software which operates as a tool for creating and visualizing bibliometric record and conducting analysis (VOS Viewer, 2022). The software provides help in deriving networks, geographies and mapping of bibliometric information in multiple forms for different themes of the data.

For the chosen topic, the WoS database generated about 612 results published on the topic '*COVID-19 and Geography*' from the time period of 2020-2022 (till the time period of analysis till 25th June.'22). The WoS database also incorporates certain errors (Franceschi, Masiano, & Mastrogiacomo, 2014). In the current examination, some issues were faced in the totals of sub-categories of data; probably due to the nature of pitfalls in the recorded data (Franceschi, Masiano, & Mastrogiacomo, 2014) or due to data reorganisation or others. To keep the analysis error free, attempt has been made to depict the individual results as generated for different categories and data with errors has not been incorporated in the study. From the literature review and data generated, the bibliometric analysis is presented in descriptive, analytical and diagrammatic forms using WoS and VOS Viewer. No filter has been applied to extract data except generating data on the topic 'COVID-19 and Geography' in search.

**RESULTS AND DISCUSSION**

In this category are discussed the bibliometric details on publications on the topic. These can be highlighted in the following categories:

a.  **Citation Report:** For a total of 612 publications, generated by the WoS database from 2020-2022* (till June); 4,895 articles were cited in which 4,768 were without self-citations. The articles were cited 5,494 times with 5,262 without self -citations. This gave an average of 8.93 items on an average. The H-Index was 33. The H-Index is defined as a quantitative measure on publications and citations. It was proposed in 2005 by J.E.Hirsch to provide an estimation of the significance of an author's work along with total research contributions (Library, 2022).

b.  **Other bibliometric analysis:** This includes highlighting the details of published material in its different aspects. The first analysis is of published documents in which the early access articles are not considered. Table 1 shows the result. The examination initiates with document analysis in which the type of documents published in the time period are detailed out.

It was observed that for the time period, articles comprised the major share of publications at about 84% followed by Editorial Materials at 10.1%. Next scrutiny was made for checking the WoS categories in which these publications were made. It generated the results as shown in Table 2.

**Table 1: WoS published data record on 'COVID-19 and Geography'**
**(2020-2022*)**

| Document Types | Record Count | % of 612 |
|---|---|---|
| Articles | 514 | 84.142 |
| Editorial Materials | 63 | 10.194 |
| Review Articles | 26 | 4.207 |
| Letters | 4 | 0.647 |
| Meeting Abstracts | 2 | 0.324 |
| News Items | 2 | 0.324 |
| Corrections | 1 | 0.162 |
| **Total** | 612 | ~ 100% |

**Source:** *Compiled by author, 2022 from WoS (Clarivate, 2022)*

**Table 2: Top 25 Publication Titles on the topic 'COVID-19 and**
**Geography' through WoS Categories (2020-2022*)**

| Publication Titles | Record Count | % of 612 |
|---|---|---|
| *International Journal of Environmental Research and Public Health* | 24 | 3.922 |
| *Dialogues In Human Geography* | 22 | 3.595 |
| *Sustainability* | 20 | 3.268 |
| *Tijdschrift Voor Economische En Sociale Geografie* | 19 | 3.105 |
| *PLOS ONE* | 13 | 2.124 |
| *Geographical Research* | 12 | 1.961 |
| *Geographical Journal* | 9 | 1.471 |
| *Boletin De La Asociacion De Geografos Espanoles* | 7 | 1.144 |
| *Eurasian Geography and Economics* | 7 | 1.144 |
| *Journal of Medical Internet Research* | 7 | 1.144 |
| *Professional Geographer* | 7 | 1.144 |
| *Scientific Reports* | 7 | 1.144 |
| *Tourism Geographies* | 7 | 1.144 |
| *BMJ Open* | 6 | 0.98 |
| *Progress In Human Geography* | 6 | 0.98 |
| *Social Cultural Geography* | 6 | 0.98 |
| *Transactions Of The Institute Of British Geographers* | 6 | 0.98 |
| *Geoforum* | 5 | 0.817 |
| *Journal Of Epidemiology And Community Health* | 5 | 0.817 |
| *Urban Studies* | 5 | 0.817 |

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|---|---|---|
| *Cadernos De Saude Publica* | 4 | 0.654 |
| *Canadian Journal Of Development Studies Revue Canadienne D Etudes DU Developpement* | 4 | 0.654 |
| *Geography Compass* | 4 | 0.654 |
| *Journal Of Public Health* | 4 | 0.654 |

**Source:** *Compiled by author, 2022 from WoS (Clarivate, 2022)*

**Table 3: Top 25 Publishers on the topic 'COVID-19 and Geography' through WoS Categories (2020-2022*)**

| Publishers | Record Count | % of 612 |
|---|---|---|
| *Wiley* | 106 | 17.32 |
| *Elsevier* | 87 | 14.216 |
| *Taylor & Francis* | 86 | 14.052 |
| *Sage* | 78 | 12.745 |
| *MDPI* | 62 | 10.131 |
| *Springer Nature* | 31 | 5.065 |
| *BMI Publishing Group* | 18 | 2.941 |
| *Oxford University Press* | 15 | 2.451 |
| *Public Library Science* | 14 | 2.288 |
| *Frontiers Media Sa* | 12 | 1.961 |
| *Cambridge University Press* | 9 | 1.471 |
| *JMIR Publications, Inc* | 9 | 1.471 |
| *Nature Portfolio* | 9 | 1.471 |
| *Asociacion Espanoles de Geografia* | 7 | 1.144 |
| *Lippincott Williams & Wilkins* | 7 | 1.144 |
| *Cadernos Saude Publica* | 4 | 0.654 |
| *Emerald Group Publishing* | 4 | 0.654 |
| *Mary Ann Liebert, Inc* | 4 | 0.654 |
| *American Medical Association* | 3 | 0.49 |
| *Centers  Disease Control & Prevention* | 3 | 0.49 |
| *Springer Int. Publ. AG* | 3 | 0.49 |
| *American Soc. Microbiology* | 2 | 0.327 |
| *Dove Medical Press Ltd* | 2 | 0.327 |
| *Educational Publishing Foundation-American Psychological Association* | 2 | 0.327 |
| *Ios Press* | 2 | 0.327 |

**Source:** *Compiled by author, 2022 from WoS (Clarivate, 2022)*

**Table 4: Top 10 Countries with Publications on the Topic 'COVID-19 and Geography' (2020-2022\*)**

| Countries/Regions | Record Count | % of Total |
|---|---|---|
| USA | 231 | 37.745 |
| England | 112 | 18.301 |
| Canada | 51 | 8.333 |
| Australia | 49 | 8.007 |
| Peoples Rep. of China | 49 | 8.007 |
| Germany | 38 | 6.209 |
| Spain | 28 | 4.575 |
| Italy | 26 | 4.248 |
| Netherlands | 22 | 3.595 |
| India | 21 | 3.431 |

**Source:** *Compiled by author, 2022 from WoS (Clarivate, 2022)*

The above data is indicative of the fact that journals on health and medicine and in Geography dominate the publication platform. Wiley publishing followed by Elsevier have the maximum share of publications on the topic. USA followed by England (United Kingdom), has the maximum number of publications on the topic for the time period. In terms of language of publications, Table 5 provides details.

**Table 5: Language of Publications on the Topic 'COVID-19 and Geography' (2020-2022\*)**

| Languages | Record Count | % of 612 |
|---|---|---|
| English | 603 | 98.529 |
| Spanish | 5 | 0.817 |
| Portuguese | 2 | 0.327 |
| Afrikaans | 1 | 0.163 |
| French | 1 | 0.163 |

**Source:** *Compiled by author, 2022 from WoS (Clarivate, 2022)*

The share of developing countries like China and India stands amongst the top ten countries with publication on the topic. Otherwise, the trend is dominated by developed countries. This is visible from Tables 3 and 4.

**Observing Linkages:** This was analysed first to check the total link strength along with average publications on the topic for the period. In this category, publications from USA made it to the top most country in the field of record. Also, average publications per year were maximum for USA as can be seen in Fig.1. For documents with average citations examination, Fig. 2. highlights that again USA out numbered other countries. The next analysis conducted in

this category is of examining co- authorship with reference to the organizations of respective authors. The results exhibited a scattered grouping stretched across universities from different geographies. Strong connections were observed with regards to total link strength and average publications in the group associated with the University of Toronto and University of Birmingham.
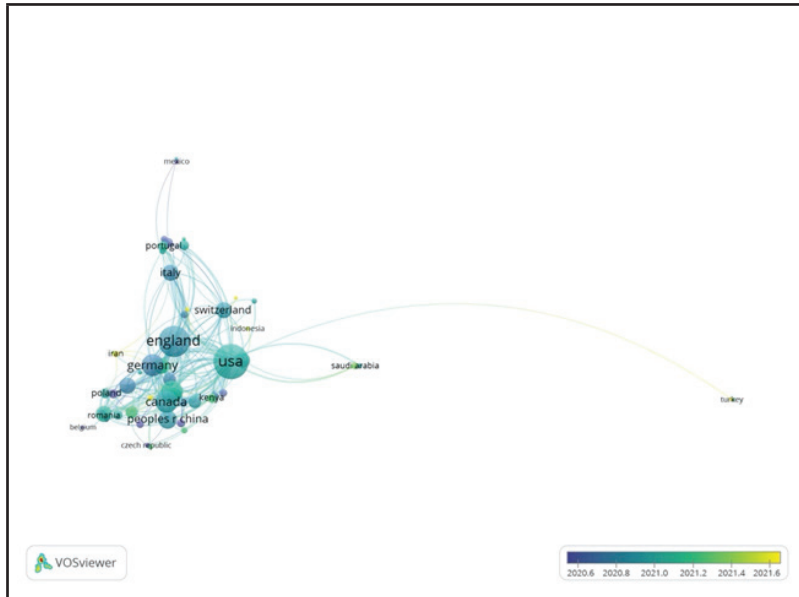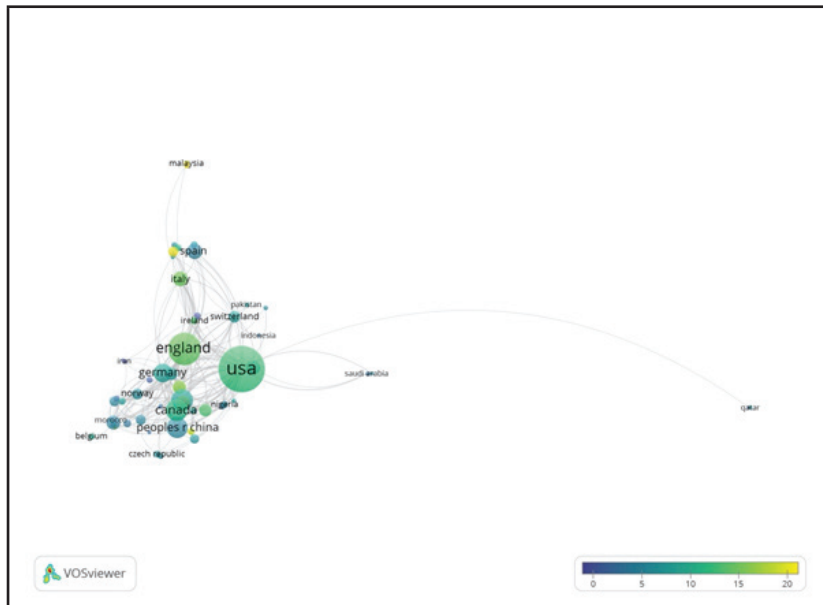


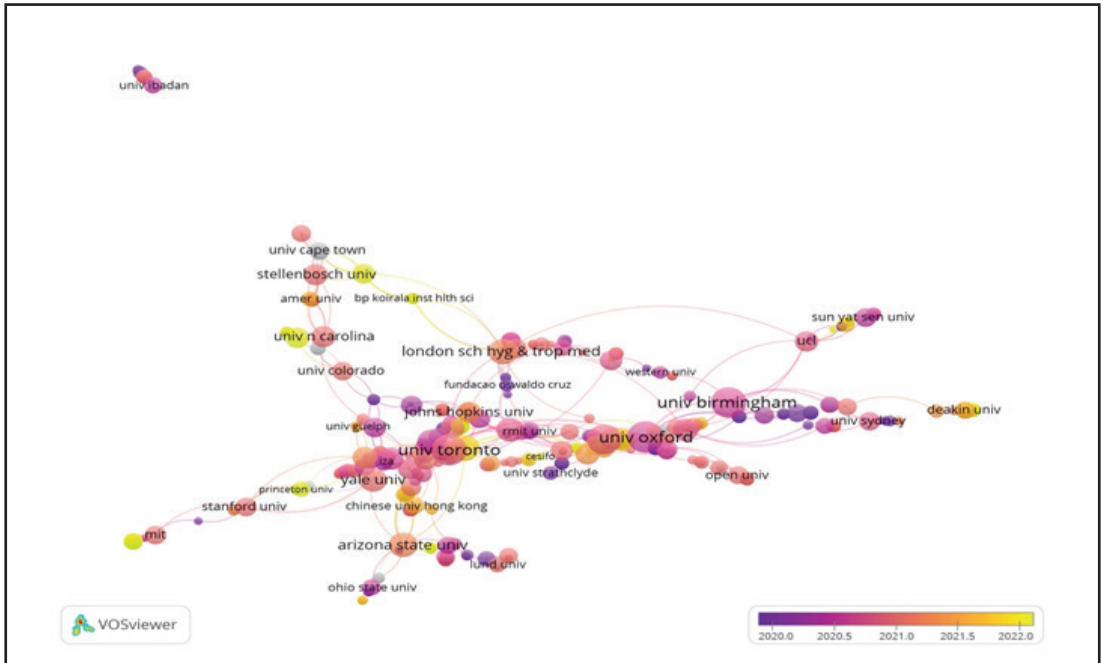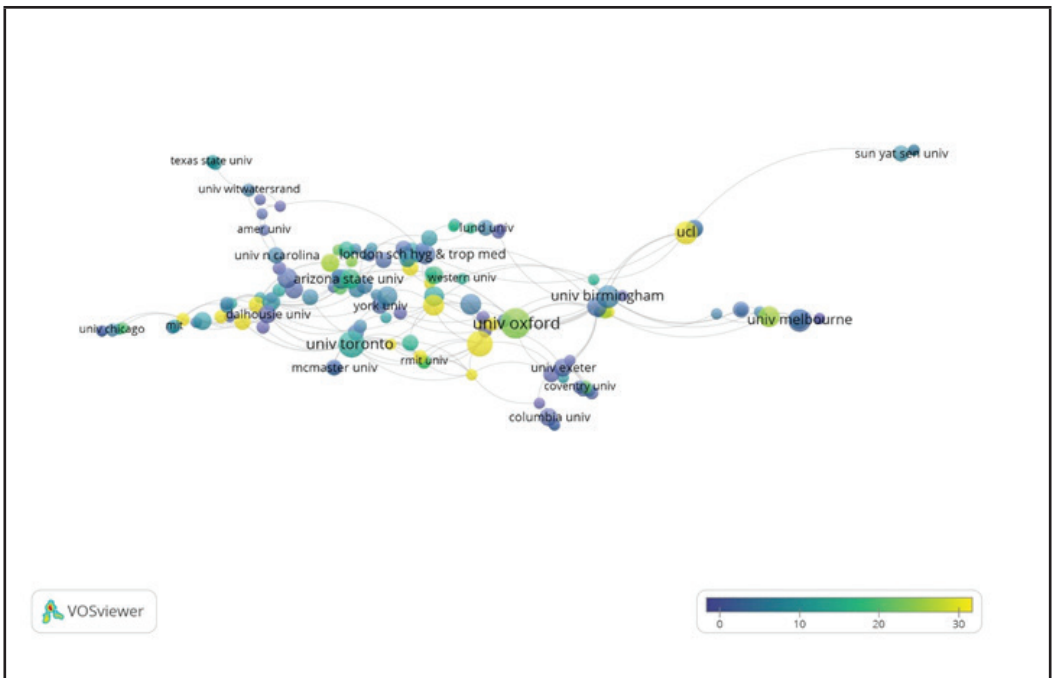**Fig. 1: Linkages Between Average Publications**



**Fig.2: Linkages Between Total Documents and Average Publications**

**Fig. 3: Linkages Between Co-authorship and Organisations**



**Fig. 4: Linkages Between Published Co-Authored Documents and Average Citations**

For total documents and average citations linking co-authorship, scattered grouping is visible with maximum number of works visible in Dalhousie University and University of Oxford.

## CONCLUSIONS

It is insightful to check the research landscape through bibliometric study which is otherwise a huge database to access and interpret. Studies such as the current one show the direction of research and also help in interpreting it. Drawing conclusions on the basis of observations on the topic '*COVID-19 and Geography*', indicates that the developed nations have maximum contribution to the literature and a few developing nations are also major contributors. The contributions of USA and England dominate the numbers. This research has obviously begun after 2020, so the nature of literature is very relevant, concurrent, and dynamic. In terms of number of publications and number of institutions engaged in the field, it can be said that significant work has been carried on the topic in multiple forms across disciplines. For the topic, Public Health and Geography emerged as the maximum contributing disciplines which indicates that the dimensions of the disease have been examined in the medical field along with geographies. The institutes in terms of connections through co-authorship and co-occurrence of works indicate a scattered pattern. There are a number of institutions, however, engaged in the field. A few universities show clustering while many of them are scattered in terms of links, indicating independent works. While the COVID- 19 pandemic has acquired newer dimensions and works are ongoing, it would be further interesting and revealing what geographies of literature are created by research. The current study can help in supplementing these works in later stages as well.

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