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Plotting the Literature on Precautionary Measures of COVID-19: A Scientometric Analysis of Web of Science

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Abstract

This study attempted to evaluate the scholarly publications on COVID-19, social distance, physical distance, social isolation, and self-isolation employing the scientometric analysis technique from 2020 to 2021. The main purpose was to consolidate the published scholarship on the COVID-19 in the Web of Science indexed documents. A total of 635 publications were found. The results indicated that social distance and COVID-19 was the top topic along with the article as a type of document, and the majority were published in the English language in 2021. The name of Gimenez-Llort L was at top of the list of authors, along with Univ. British Columbia, Canada organization, United States top country, COVID-19 as to keyword of the published documents and the main source of publication was PLOS One. Further, we had constructed figures and tables to show the trend of data.

Keywords: COVID-19, Social Distance, Physical Distance, Social Isolation, Self-Isolation, Scientometric Analysis

Introduction

Cases of atypical pneumonia were reported in Hubei, Wuhan, China in late 2019 that caused local and international health authorities to get alarmed (Shoaib & Abdullah, 2020, 2021). The cases were clustered around a single location that raised suspicion for a common source causing these cases (Ranjit, Shin, First, & Houston, 2021; White-Dzuro et al., 2021; Whiteside et al., 2021). Initially, the cause of pneumonia was unknown but after further investigation that cause was determined to be coronavirus that was later named as novel coronavirus 19, and the disease caused by this virus was named COVID-19 by World Health Organization in February 2021 (Shoaib & Abdullah, 2020, 2021; WHO, 2020d). The novel coronavirus is also called SARS-CoV 19 and is transmitted by aerosol droplets and has a person-to-person transmission (WHO, 2020a, 2020b, 2020c). The infective potential of the virus is very high and in a very short period, this virus involved almost all countries of the world and was declared as a pandemic by World Health Organization on 11th March 2020 (WHO, 2020e). Several viruses are included in the category of coronaviruses and every virus has some unique characteristics that differentiate it from other coronaviruses (Alexandrova, Beykov, Vassilev, Jukić, & Podlipnik, 2021; Capasso, Nocentini, & Supuran, 2021). These viruses can cause infection in humans and other animal species. These viruses also have the potential to be transmitted from zoonotic host to humans and such a shift is postulated to be the causes of novel coronavirus introduction in human beings, with bats being postulated as a primary zoonotic host. In addition, these viruses also have the potential to undergo mutations that might lead to change in infectivity, signs and symptoms, treatment options, vaccination (Li & Boix, 2021; Linfield, Raduka, Aghapour, & Rezaee, 2021). Coronaviruses cause a spectrum of diseases that can range from simple flu to life-threatening pneumonia, shock, and death (Ranjit et al., 2021; Shoaib & Abdullah, 2021; Swerdlow, Finelli, & Lipsitch, 2020).

Objectives of the Study

The main aim of the study was to evaluate the scholarly publications on COVID-19, social distance, physical distance, social isolation, and self-isolation employing scientometric analysis techniques. Further, it was divided into the following sub-sections;

- Topic and type of the document from 2020 to 2021
- Language and year of published documents from 2020 to 2021
- Top ten productive authors from 2020 to2021
- Top ten countries from 2020 to 2021

- Top twenty research areas from 2020 to 2021
- Top twenty keywords from 2020 to 2021
- Top ten organizations from 2020 to 2021
- Top ten sources of publications from 2020 to 2021
- Top ten documents by citations from 2020 to 2021

Literature Review

Several studies had been conducted on the COVID-19 by multiple researchers worldwide (Kunutsor & Laukkanen, 2020; Shoaib & Abdullah, 2020, 2021). Researchers tried to evaluate its main causes, signs and symptoms, precautionary measures, risk of infection, and many more aspects (Bai et al., 2020; Bridwell, Long, & Gottlieb, 2020; Davies, 2020; Fang & Meng, 2020; Kunutsor & Laukkanen, 2020; Shakespeare-Finch et al., 2020; Shoaib & Abdullah, 2020, 2021; Siriwardhana, De Alwis, Gür, Ylianttila, & Liyanage, 2020). It is important to mention here that Middle East Respiratory Syndrome (MERS) causing virus was previously known after if caused respiratory symptoms in middle eastern population the current coronavirus was unknown and it was a discovery that this virus causes infection and produces signs and symptoms in human beings, hence the suffix "novel" was used for these coronaviruses (Choe, Wang, & Song, 2020; Hye-Yul, Shin-Jeong, Wayne, & Kyung-Ah, 2018; Lai, Shih, Ko, Tang, & Hsueh, 2020). The mode of transmission of these viruses is proven to be aerosol particles (Stellefson, Paige, Wang, & Chaney, 2021). After being infected, the person is susceptible to produce a range of signs and symptoms whose severity is dependent upon different aspects the most important being the patient's general health status (Bai et al., 2020; Uzunova, Pallanti, & Hollander, 2021; Vorontsova-Wenger, Ghisletta, Ababkov, & Barisnikov, 2020). Hence, the patients who are immunocompromised, old, have chronic medical conditions, are diabetic, suffer from chronic autoimmune conditions, respiratory diseases (Hye-Yul et al., 2018; Lai et al., 2020). It expected to get severe signs and symptoms as compared to healthy and young patients (Choe et al., 2020). The mildest form of the disease does not produce any signs and symptoms in the patients while in its severe form it cause pneumonia, disseminated intravascular coagulation, pulmonary (Ismaila, Bande, Ishaka, Sani, & Georges, 2021; Jianhua, 2020; Kaseda & Levine, 2020; Lipsitch, Swerdlow, & Finelli, 2020).

Since the virus is transmitted from aerosol particles and there is no effective treatment for this condition, health authorities throughout the world have emphasized the use of protective measures to reduce the transmission of this virus (Shoaib & Abdullah, 2020). Using protective measures,

the transmission of the virus is greatly reduced which leads to decreased disease burden and decreased morbidity and mortality even in the vulnerable group (Abdelrahman, 2020; Daigle, Leung, Yin, Kalin-Hajdu, & Nijhawan, 2020; Saran et al., 2020). The advocacy of usage of protective measures, its benefit, the proper method of its usage, and benefit after employing these protective measures are based on extensive research (Addo, Jiaming, Kulbo, & Liangqiang, 2020; Ranjit et al., 2021). The medical community has dedicated a lot of resources and did a lot of research to do primary prevention of this disease (Ahmed, Allaf, & Elghazaly, 2020; Komer, 2020; Rana, Mukhtar, & Mukhtar, 2020). The main preventive measures that are advocated are faced covering with a face mask, social distancing, social and contact isolation, self-isolation in case of any disease symptoms (Daigle et al., 2020; Mehta, 2020; Munko, 2017; Novak, Poling, Muller, & Peyton, 2019; Saran et al., 2020). Since the start of the pandemic, a lot of publications is made on these topics so that the disease may be prevented from spreading from person to person. There is extensive evidence that suggests that by employing these preventive measures spread of novel coronavirus is prevented. It is pertinent here to mention that several studies has been conducted employing scientometric/bibliometric analysis technique to show the trend of data (Ali, Shoaib, & Abdullah, 2021; Aslam, Ali, Naveed, & Mairaj; Naveed, Ali, Aslam, & Siddique, 2021; Shoaib, Abdullah, & Ali, 2021; Ullah & Shoaib, 2021). However, scholars has also used the other qualitative and quantitative methodology to conduct their studies (Ali, Shoaib, & Asad, 2021; Mariam, Anwar, Shoaib, & Rasool, 2021; Shoaib, Abdullah, & Ali, 2020; Shoaib, Rasool, & Anwar, 2021; Shoaib & Ullah, 2019, 2021a, 2021b). Hence, this study attempts to evaluate COVID-19, social distance, physical distance, social isolation, and self-isolation employing the scientometric analysis technique from 2020 to 2021.

The Data and Methods

We extracted data from the Science Citation Index database, Web of Science (Core Collection) employing scientometric analysis on the subject under consideration. The searched query in a web of science was used as: TI=(Social Distance AND COVID 19) OR TI=(Physical Distance AND COVID 19) OR TI=(Social Isolation AND COVID 19) OR TI=(Self Isolation AND COVID 19). The timespan from 2020 to 2021 and data was extracted on March 31, 2021, at 03:14 PM, PST. There were 635 total published documents found. We used Biblioshiny, ScientoPy, VOSviewer, and MS Excel software for the analysis. Further, tables and figures were developed to show the trend of data on COVID-19.

Results and Discussion

This section provided results and discussion on the subject of COVID-19. It is important to mention here that tables and figures were also included to show the trend of data based on the scientometric analysis from 2020 to 2021. Further, it was divided into the following sub-sections;

Topic and Type of the Document from 2020 to 2021

Table 1 indicated that a total of 635 publications were found using the *Searched Query in Web of Science:* TI=(Social Distance AND COVID 19) OR TI=(Physical Distance AND COVID 19) OR TI=(Social Isolation AND COVID 19) OR TI=(Self Isolation AND COVID 19) during the time *of* 2020-20211, *Data Collected Date:* March 31, 2021 *Time*: 03:14 PM, PST. Out of these, the largest number of publications were done with the keywords of Social distance and covid-19 (403, 63.46%), which was followed by social isolation and covid-19 (117, 18.43%). The least number of publications were found for the self-isolation and covid-19 (31, 4.88%).

Table 1
Topic and Type of the Document retrieved from Web of Science Database

a) The topic of the documents	Total Publications	Percentage
Social Distance AND COVID-19	403	63.46
Social Isolation AND COVID-19	117	18.43
Physical Distance AND COVID-19	084	13.23
Self-Isolation AND COVID-19	031	04.88
Total	635	100.00
b) Type of the documents	Total Publications	Percentage
Article	464	73.07
Editorial Material	74	11.65
Letter	50	7.88
Meeting Abstract	16	2.52
Review	16	2.52
News Item	11	1.73
Correction	04	0.63
Total	635	100.00

Further, it is stated that total 635 publications, most of the publications were made in articles form (464, 73.07%). Editorial material had 74 publications amounting to a percentage of 11.65 percent that was closely followed by a letter with a total number of 50 letters and a percentage of 7.88 percent. There were a mere 11 news items published with a percentage of 1.73 percent while 4 corrections were published in the said time on the searched query having a percentage of 0.63 percent. On average 0.817 years elapsed since publications were made. On average 5.441 citations per document were made with 3.029 citations per document per year. There was a total of 15078 references made in the 635 publications. It is important to mention here that there were 635 total

publications, 404 sources (journals, books, etc.), 635 documents, 0817 average years from publication, 5.441 average citations per document, and 3.029 average citations per year per doc 3.029 along with 15078 references.

Language and Year of Published Documents from 2020 to 2021

Table 2 asserted that English was the most frequently used language among a total of 6 languages that were used, with a total of 612 articles published out of 635 articles with a percentage of 96.378 percent. Spanish was the second most frequently used language falling far behind English with 12 (1.8955) articles published in this language. The least number of articles were published in Italian 1 (0.157%). In the year 2020, a total of 519 (81.732%) articles were published. Although 116 (18.268%) articles were published in 2021, the numbers are expected to increase as only three months' data of 2021 was used.

Table 2

Language and Year of Published Documents

a. Language

Languages	Total Publication	Percentage
English	612	96.378
Spanish	12	01.89
Portuguese	06	0.945
German	02	0.315
Russian	02	0.315
Italian	01	0.157
Total	635	100.00

b. Years

Publication Years	Total Publication	Percentage
2020	519	81.732
2021	116	18.268
Total	635	100.00

Top Ten Productive Authors from 2020 to2021

Table 3 revealed that Gimenez-Llort L was the most productive author with a total of 4 publications having 6 citations, his publications started in the year 2020. Galea S had a total of 3 publications but his publications had the largest number of citations (337), his publications also started in the year 2020. There were 3 articles per author and 4 citations per author by Bavinton B, Bourne A, Degenhardt L, Ellard J, and Grulich A starting in the year 2020. In 635 documents that were published in the studied period, a total of 2524 authors made their contributions. There were 2718 author appearances and 85 authors of single-authored documents. Similarly, it reported that 2439

authors contributed to multi-authored documents, 635 documents, 89 documents were authored by a single author, 0.252 documents per author, and 3.97 authors per document. There were 4.28 co-authors per document and the collaboration index amounted to 4.47.

Table 3
Top Ten Productive Authors

Author	TP*	TC*	h_index	g_index	m_index	PY*_start
Gimenez-Llort L	4	6	1	2	0.5	2020
Mahase E	4	11	1	3	0.5	2020
Murphy D	4	4	1	2	0.5	2020
Galea S	3	337	2	3	1	2020
Macintyre CR	3	28	2	3	1	2020
Bavinton B	3	4	1	2	0.5	2020
Bourne A	3	4	1	2	0.5	2020
Degenhardt L	3	4	1	2	0.5	2020
Ellard J	3	4	1	2	0.5	2020
Grulich A	3	4	1	2	0.5	2020

TC* = Total Citations, TP* = Total Publication, PY* = Publication Year

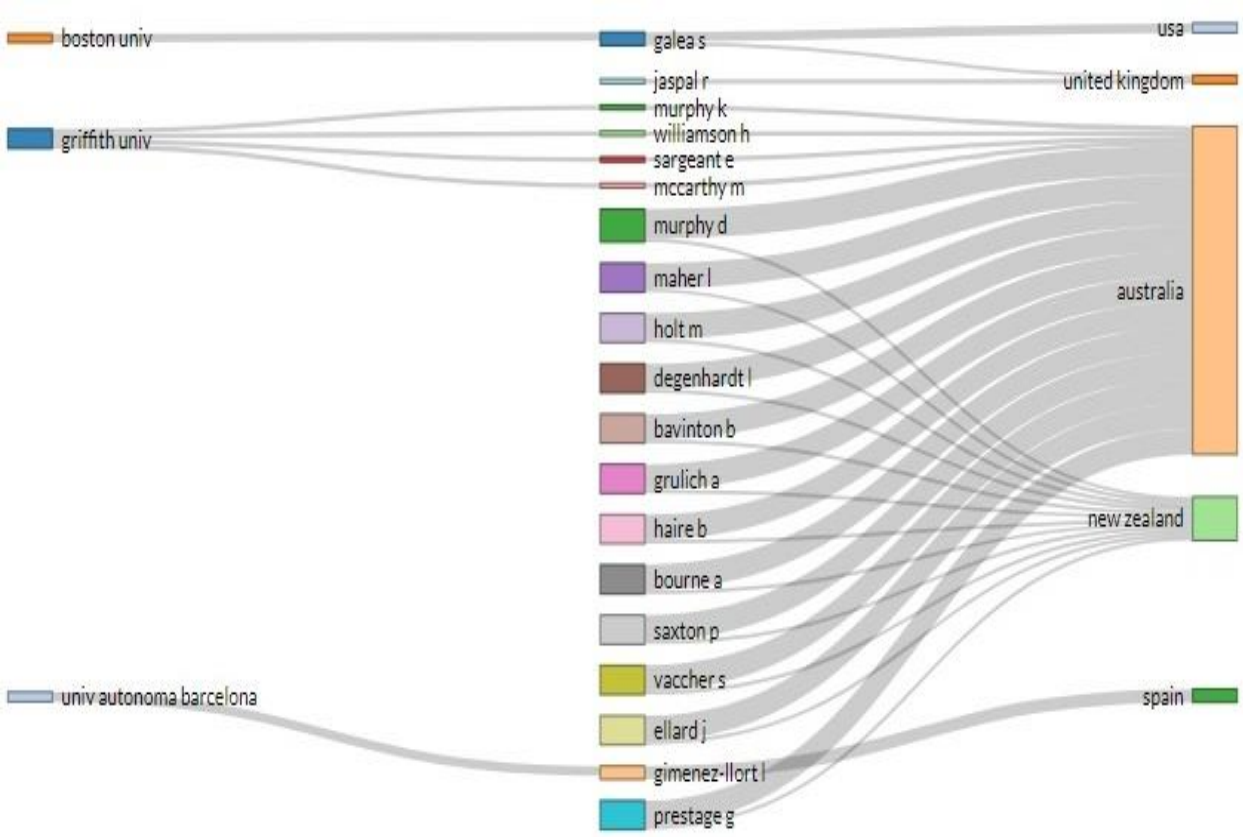

Figure 1. Author affiliation with organizations and countries

Top Ten Countries from 2020 to 2021

Table 4 described that authors from 82 countries contributed to the publication of 635 articles. The above table shows the top 10 countries whose authors contributed to the publications. 117 authors were from the USA that contributed to 141 single country publications and 36 contributed to multiple country publications. This was followed by Brazil who authors contributed to a total of 50 articles, out of which 42 were single country publications and 8 were multiple country publications.

Table 4
Top Ten Countries

Country	TP*	Freq.	SCP*	MCP*	MCP*_Ratio
USA	177	0.29599	141	36	0.2034
Brazil	50	0.08361	42	8	0.16
United Kingdom	43	0.07191	28	15	0.3488
China	31	0.05184	17	14	0.4516
Canada	29	0.04849	19	10	0.3448
Australia	28	0.04682	20	8	0.2857
Italy	23	0.03846	17	6	0.2609
Spain	16	0.02676	10	6	0.375
Germany	15	0.02508	11	4	0.2667
India	13	0.02174	12	1	0.0769

TP* = Total Publication, SCP* = Single Country Publications, MCP* = Multiple Country Publications

The highest multiple country publications ratios were contributed by authors from China with an MCP ratio of 0.4516 having 17 single country publications and 14 multiple country publications giving a total of 31 publications by authors from China. The least number of multiple country publications among the top ten contributing countries was from India having an MCP ratio of 0.0769 with 1 multiple country publication and 12 single country publications giving a total of 13 publications by authors from India.

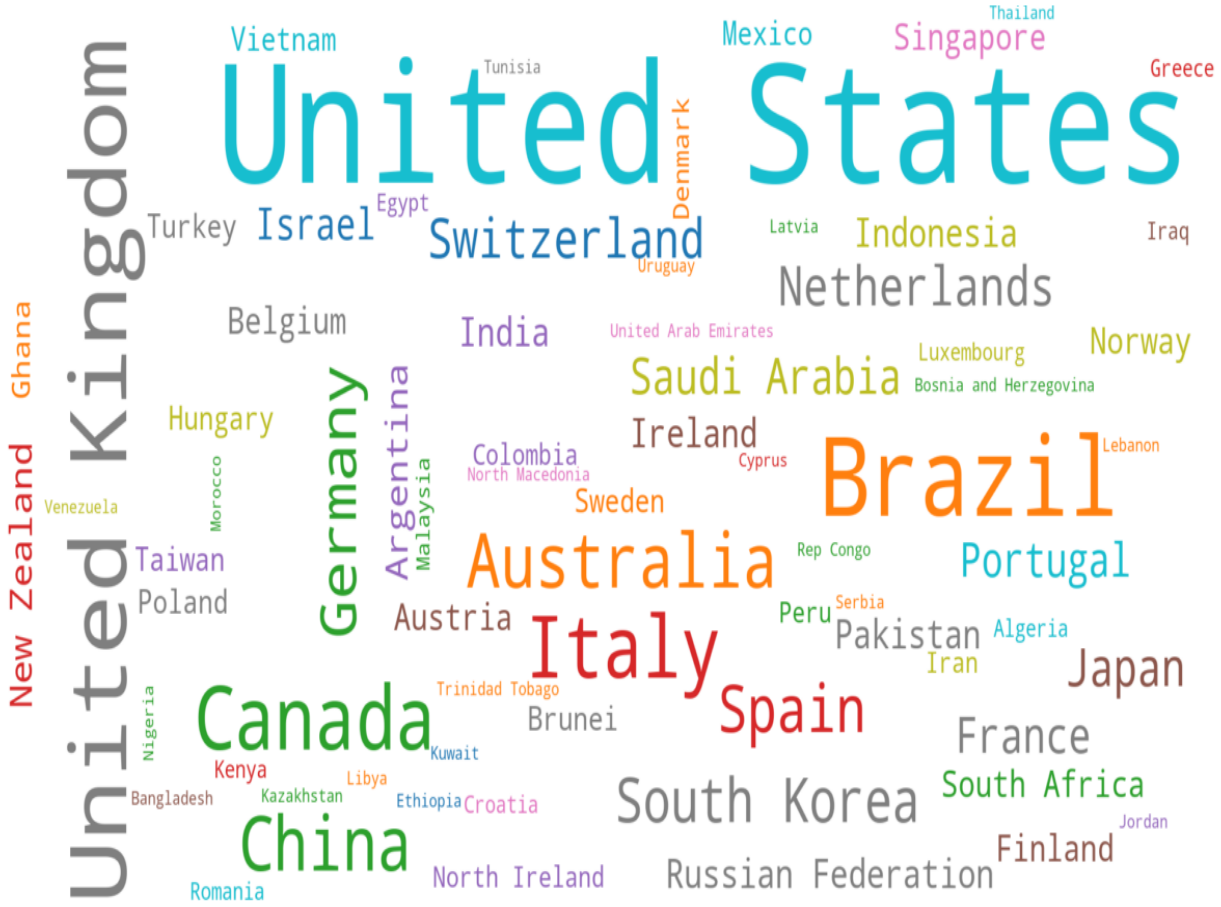

Figure 2. Top Productive Countries (2020-2021)

Top Twenty Research Areas from 2020 to 2021

Table 5 pointed out that the journals that published the 635 documents covered a total of 94 research areas. The above table shows the distribution of published documents by the top twenty research areas. The journals covering Public Environmental Occupational Health published the highest number of documents, with a total number of 104 documents having a percentage of 16.378 percent. Psychology and General Internal Medicine covering journals were very close and occupied second and third place with publishing 74 (11.654%) and 71 (11.181%) articles, respectively. Infectious diseases covering journals published 27 (4.252%) articles. While journals having Computer Science and Engineering as their primary research area were on 19th and 20th position respectively with 10 published articles in each.

Table 5
Top Twenty Research Areas

Research Areas	TP*	% of 635	Research Areas	TP*	% of 635
Public Environmental Occupational Health	104	16.378	Geriatrics Gerontology	21	3.307
Psychology	74	11.654	Education Educational Research	17	2.677
General Internal Medicine	71	11.181	Social Sciences Other Topics	17	2.677
Psychiatry	59	9.291	Social Work	17	2.677
Science Technology Other Topics	55	8.661	Medical Informatics	13	2.047
Environmental Sciences Ecology	33	5.197	Pediatrics	13	2.047
Health Care Sciences Services	32	5.039	Sociology	12	1.89
Infectious Diseases	27	4.252	Pharmacology Pharmacy	11	1.732
Neurosciences Neurology	24	3.78	Computer Science	10	1.575
Business Economics	23	3.622	Engineering	10	1.575

TP* = Total Publication

Top Twenty Keywords from 2020 to 2021

Table 6
Top Twenty Keywords

Keywords	*f*	TLS*	Keyword	*f*	TLS*
Covid-19	306	1252	Mental Health	31	229
Social Distancing	163	592	Physical Distancing	26	109
Social Isolation	58	321	Sars-Cov-2	25	108
Pandemic	50	231	Stress	24	175
Coronavirus	46	208	Impact	22	144
Depression	40	307	Outbreak	20	111
Loneliness	40	256	Public Health	19	71
Quarantine	38	225	Behavior	16	90
Health	36	205	Influenza	16	76
Anxiety	31	230	Risk	14	81

TLS* = Total Link Strength

Table 6 showed the distribution ranking of the top 20 keywords that were used in the 635 published documents. A total of 1637 keywords were used with "Covid-19" being the most frequently used keyword having a total link strength of 1252 and frequency of 306. The second most frequent (163) keyword that was used was "Social Distancing" with a total link strength of 592. "Social Isolation" was used 58 times as a keyword with a total link strength of 321 this was closely followed by "Pandemic" which was used 50 times as a keyword and had a link strength of 231.

"Risk" occupied the 20th spot, being used 14 times and having a total link strength of 81. There were a total of 19 clusters, 352 items having 3751 links with a total link strength of all the keywords equal to 5858. It is important to mention here that there were 1637 keywords, 644 keywords plus (ID), 117 author's keywords (DE), 19 clusters, 352 items, 3751 links, and 5858 total link strength.

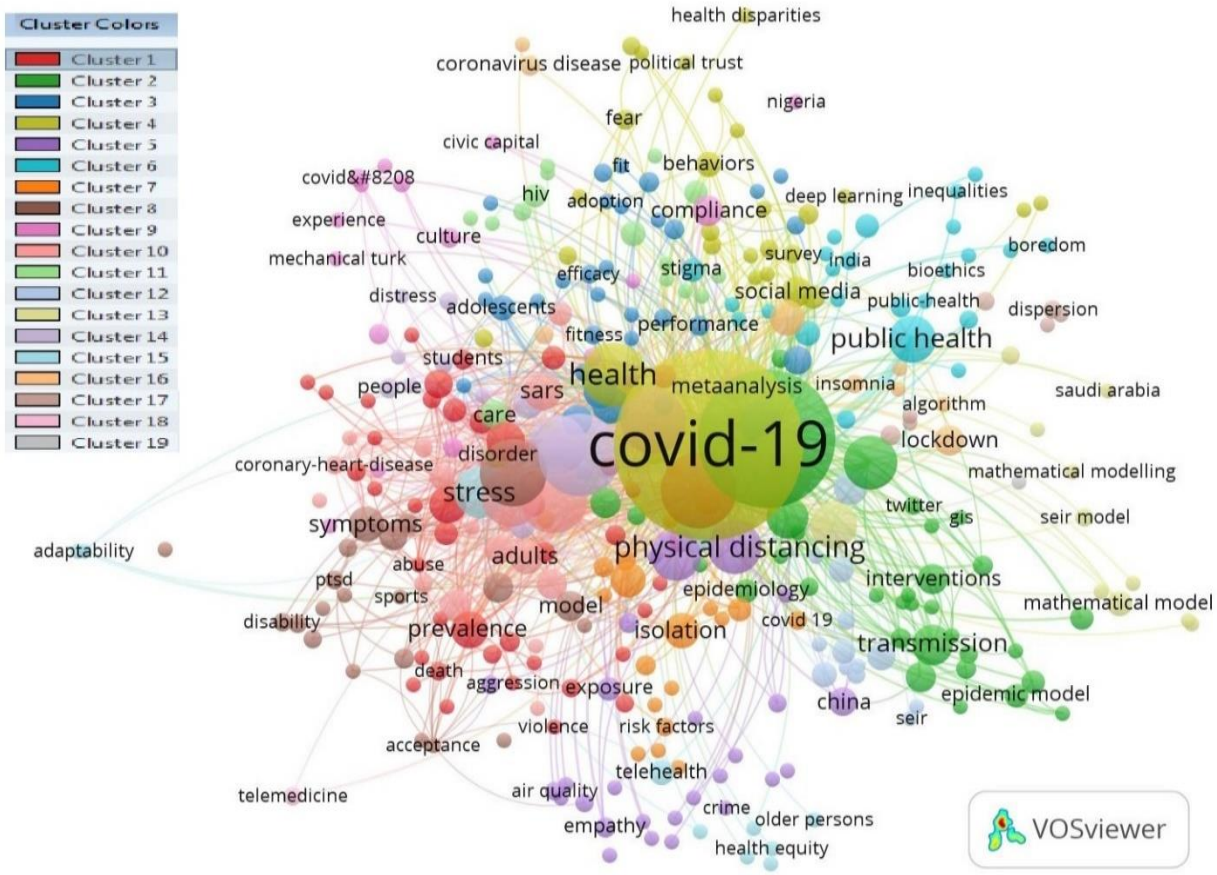

Figure 3. Co-Occurrences of Keywords (2020-2021)

Top Ten Organizations from 2020 to 2021

A total of 1101 organizations contributed to the published documents out of which the top 10 contributors are shown in Table 7 (*See Appendix A*). Univ. of British Columbia, Canada was the most contributing institute with 6 publications with 1.5 as an average growth per year and an average of 3 documents per year. This was closely followed by Univ. Penn. The United States with a total of 6 articles and an average growth per year of 1 and 3 published articles per year. Univ. Brasilia, Brazil, and Univ. Brunei Darussalam, Brunei grabbed 9 and 10th spot respectively with a contribution to 4 articles by each institute, however, the average growth per year was zero and 2 articles were published per year.

Top Ten Sources of Publications from 2020 to 2021

Table 8 showed that the distribution of 635 published documents by the top ten sources of publications in the years 2020 and 2021. A total of 404 sources published these 635 documents, with the sources including Journals, Books, etc. PLOS One had the highest number of total publications (22) that had a total citation of 20. BMJ-British Medical Journal had 15 total publications, but total citations were highest from BMJ with several total citations reaching 100. BMJ also had the highest number of h and g index. International Journal of Environmental Research and Public Health was third in terms of total publications (15) and total citations (35). There were 6 scientific reports with a total citation of 2 (*See Appendix B*).

Top Ten Documents by Citations from 2020 to 2021

Table 9 indicated the distribution of the top ten documents by citations published in the year 2020-2021. A total of 635 documents were published with Chu, Derek K.; et al.'s review with ISSN 0140-6736 being the most cited document with a total of 494 citations. This was followed by Galea, Sandro; et al.'s editorial material having 329 total citations. Lewnard, Joseph A.; Lo, Nathan C.'s editorial material with ISSN 1473-3099 was third in terms of several citations, having a total of 165 citations. Thunstrom, Linda; et al.'s article with ISSN 2194-5888 was cited at 52 locations (*see Appendix C*).

Conclusion

The analysis permits us to claim that scientometric analysis enabled researchers to gain more comprehensions into the COVID-19 and support recognizing variables that were used during research on the subject. The study was mainly based to evaluate COVID-19, social distance, physical distance, social isolation, and self-isolation using the scientometric analysis technique of documents indexed in Web of Science from 2020 to 2021. The results concluded that social distance and COVID-19 was the top topic along with the article as a type of document, and the majority were published in the English language in 2021. The name of Gimenez-Llort L was at top of the list of authors, along with Univ. British Columbia, Canada organization, United States top country, COVID-19 as to keyword of the published documents and the main source of publication was PLOS One. The study recommended that further scientometric techniques may be employed on other databanks and using other COVID-19-related topics.

Limitations of the Study

The present scientometric analysis was based on documents published in the Web of Science only and we did not use other databases. Further, it only focussed to evaluate COVID-19, social distance, physical distance, social isolation, and self-isolation using scientometric analysis from 2001 to 2020. Hence, we did not consider other related topics that are interlinked with the current study on COVID-19.

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Appendix A
Table 7
Top Ten Organizations

Organization	TP*	AGR*	ADY*	PDLY*	h-index
Univ. British Columbia, Canada	6	1.5	3	100	1
Univ. Penn, United States	6	1	3	100	1
Harvard Med Sch., United States	5	0.5	2.5	100	2
Columbia Univ., United States	4	0.5	2	100	1
Griffith Univ., Australia	4	0	2	100	2
Johns Hopkins Univ., United States	4	0.5	2	100	3
London Sch. Hyg. & Trop Med, United Kingdom	4	0	2	100	3
Stanford Univ., United States	4	0.5	2	100	2
Univ. Brasilia, Brazil	4	0	2	100	2
Univ. Brunei Darussalam, Brunei	4	0	2	100	2

TP* = Total Publication, AGR* = Average Growth Rate, ADY* = Average Documents per Year, PDLY* = Percentage of Documents in Last Years

Appendix B
Table 8
Top Ten Sources of Publications

Sources	TP*	TC*	h_index	g_index	m_index	PY*_start
PLOS One	22	20	3	3	1.5	2020
BMJ-British Medical Journal	15	100	4	10	2	2020
International Journal of Environmental Research and Public Health	15	35	5	5	2.5	2020
Frontiers in Psychiatry	11	42	4	6	2	2020
Frontiers in Psychology	11	37	4	6	2	2020
Frontiers in Public Health	7	7	1	2	0.5	2020
Journal of Medical Internet Research	7	45	2	6	1	2020
Ciencia & Saude Coletiva	6	60	3	6	1.5	2020
Scientific Reports	6	2	1	1	0.5	2020
Cadernos De Saude Publica	5	10	2	3	1	2020

TP* = Total Publications, TC* = Total Citations, PY* = Publication Year

Appendix C

Table 9

Top Ten Documents by Citations

DOI	Author	DT*	ISSN	Vol. #	Pages	PY*	TC*
10.1016/S0140-6736(20)31142-9	Chu, Derek K.; et al.	Review	0140-6736	395	15	2020	494
10.1001/jamainternmed.2020.1562	Galea, Sandro; et al.	Editorial Material	2168-6106	180	2	2020	329
10.1016/S1473-3099(20)30190-0	Lewnard, Joseph A.; Lo, Nathan C.	Editorial Material	1473-3099	20	4	2020	165
10.1186/s12916-020-01597-8	Jarvis, Christopher I.; et al.	Article	1741-7015	18	10	2020	82
10.1377/hlthaff.2020.00608	Courtemanche, et al.	Article	0278-2715	39	10	2020	74
10.1016/j.jaac.2020.05.009	Loades, Maria Elizabeth; et al.	Review	0890-8567	59	25	2020	65
10.1007/s12603-020-1366-8	Berg-Weger, Marla; Morley, J. E.	Editorial Material	1279-7707	24	3	2020	56
10.1177/0020764020922269	Banerjee, Debanjan; Rai, Mayank	Editorial Material	0020-7640	66	3	2020	56
10.1038/s41562-020-0898-6	Block, Per; et al.	Article	2397-3374	4	16	2020	55
10.1017/bca.2020.12	Thunstrom, Linda; et al.	Article	2194-5888	11	17	2020	52

DT* =Document Type, PY* = Publication Year, TC* = Total Citations