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Research Visualization of Different Treatment Modalities to Treat COVID-19 Infection: Bibliometric Analysis of PubMed Database

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Abstract

This paper designed to examine research published in PubMed indexed journals of different treatment modalities to treat COVID -19 infection employing bibliometric analysis technique from 2020 to 2021. The purpose was to consolidate the published scholarly work in the PubMed database on different treatment modalities including vaccine, oxygen supplementation, dexamethasone or steroids, aspirin, heparin, remdesivir, zinc, vitamin c or ascorbic acid, oxygen, anti-malarial like chloroquine and hydroxychloroquine, and azithromycin or macrolides. We employed a bibliometric analysis technique and found a total of 3043 published documents. The study findings depicted that vaccine and COVID-19 top was at the top of the list of topics of the published documents along with the United States as a top productive country. The name of Mahase E secured the first position in top authors, Univ. Maryland as a top organization, COVID-19 as a top keyword, COVID as top term analysis by title, and 'BMJ (Clinical Research Ed.)' was the top of the published documents.

Keywords: Vaccine, Anti-Malarial, Remedisivir, Azithromycin, Oxygen Supplementation, Dexamethasone, Heparin, Zinc, Ascorbic Acid, Aspirin, COVID-19, Bibliometric Analysis

Introduction

In this paper, we have evaluated the trend of treatment modalities to treat COVID -19 infection employing bibliometric analysis techniques from 2020 to 2021. This was in late 2019 when a cluster of atypical pneumonia cases was reported in Hubei, Wuhan, China (Shoaib & Abdullah,

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2020, 2021). The presentation was atypical and there was a suspicion of person-to-person transmission of pneumonia. The causative organisms for the pneumonia were unknown. World Health Organization was intimated about these cases in December 2019. In February 2020, the cause of these atypical pneumonia cases was determined, and a novel coronavirus was found to be the cause of these atypical cases of pneumonia. This virus was named COVID-19 alternative name for this virus is SARS CoV 19. Coronaviruses are well known to causes human and animal diseases. These viruses are also known for their infectivity potential. It was due to this infectivity potential that almost all the countries of the world were involved in a matter of months and the outbreak was declared as a pandemic by World Health Organization in March 2020 (Shoaib & Abdullah, 2020, 2021). The viruses can infect animals and can also change their primary host. It is postulated that novel coronavirus was transmitted to human beings from bats. Similar transmission from animals to humans was reported previously as well as the Middle East Respiratory Syndrome. The causative coronavirus for MERS was transmitted to human beings from camels. These viruses can undergo mutations and can cause a wide range of symptoms.

The objective of the study

The main objective of the study was to examine research published in PubMed indexed journals of different treatment modalities to treat COVID -19 infection employing bibliometric analysis techniques from 2020 to 2021. The main treatment options that were used to formulate this study were a vaccine, oxygen supplementation, dexamethasone or steroids, aspirin, heparin, remdesivir, zinc, vitamin c or ascorbic acid, oxygen, anti-malarial like chloroquine and hydroxychloroquine, and azithromycin or macrolides. Further, it was dissected into the following sub-headings;

- Topic in PubMed and top countries
- Documents by top authors, organizations, and keywords
- Term analysis by titles and top productive sources

Review of Literature

Several studies had been conducted to examine the signs and symptoms of COVID-19 in all over the world. Empirical evidences showed that it affected several countries and number of casualties were also reported. As COVID 19 can cause symptoms ranging from mild flu to severe and life-threatening pneumonia. Initially, it was thought that only the respiratory tract is involved by COVID 19, but with rapid spread and increased cases, it was known that its effects are present not only on the respiratory tract but other organ systems that are also involved (White-Dzuro et al.,

2021; Whiteside et al., 2021). Its presentation included fever, headache, shortness of breath, cough, fatigue, anosmia, and decreased appetite (Wagner et al., 2021; Wang et al., 2021). It also had an atypical presentation with the presenting complaint being the formation of intravascular blood clots, stroke, myocardial infarction, sepsis, pneumonia, and DIC (Ranjit et al., 2021; Shchendrygina et al., 2021; Uzunova et al., 2021). The presentation and severity of symptoms depend upon the host characteristics (Bury et al., 2021; Cabañas et al., 2021). Generally, COVID 19 causes severe and life-threatening symptoms in old and immunocompromised hosts and mild to no symptoms in healthy and young hosts (Abdel-Moneim & Hosni, 2021). Since the start of the pandemic nations around the world had focused on preventive measures to stop the spread of this infection (Shoaib & Abdullah, 2020, 2021). As the mode of spread of this virus is through droplets, so the preventive measures included the wearing of facemasks, social distancing, frequent washing of hands, isolation of positive cases, and lockdowns in case of emergence of a cluster of positive cases in any locality (Sharfuddin, 2020; Swerdlow et al., 2020; Van-der Linden et al., 2020). Despite all these efforts the virus was spreading exponentially and caused significant social, psychological, and financial damage (Romano et al., 2020; Sah et al., 2020; Seraphin, 2020; Shakespeare-Finch et al., 2020). Healthcare facilities around the world were overwhelmed due to the increased number of cases (Rismiller et al., 2020). Initially, there was no proven treatment for COVID 19 infection, and a search to find a cure and treat the disease was started (Parnell et al., 2020). Moreover, research to develop a vaccine to prevent the occurrence of this disease was also initiated. A significant drop in oxygen saturation was observed in the patients having moderate to severe COVID 19 pneumonia (Lum et al., 2020). Therefore, oxygen supplementation is part of the treatment protocol from the start of this pandemic. Similarly, it was found that much of the damage due to COVID 19 is due to the inflammatory response of the body, hence anti-inflammatory medications were also added to the regimen. Trails and research around the world showed promising results and benefits if the patients were given vitamin C and zinc and these were also introduced in the treatment protocol, Antimicrobials like azithromycin, chloroquine, and remdesivir also showed to hasten recovery and improve patient's outcome (Bridwell et al., 2020; Freedman, 2020; Hendaus & Jomha, 2020; Hurford, 2020). There was extensive research and publication of these treatment modalities. This bibliometric study is focused to study the PubMed cited publications whose focus was studying different aspects of these treatment modalities. Several studies had been conducted employing bibliometric analysis techniques to evaluate the

scholarly published work in different data bases (Shoaib et al., 2020; Ullah & Shoaib, 2021). However, researcher also opted other different research techniques including qualitative and quantitative to draw results and conclusion on different issues in different field of study (Ali et al., 2021; Shoaib et al., 2020; Shoaib et al., 2021). Hence, the main treatment options that were used to formulate this study were a vaccine, oxygen supplementation, dexamethasone or steroids, aspirin, heparin, remdesivir, zinc, vitamin c or ascorbic acid, oxygen, anti-malarial like chloroquine and hydroxychloroquine, and azithromycin or macrolides. Further, several studies had been conducted to analyze published document in different databases employing bibliometric analysis techniques to show the trend of data (Ali et al., 2021; Shaukat et al., 2021; Shoaib et al., 2021; Ullah & Shoaib, 2021). However, several researchers also used other qualitative and quantitative techniques to conduct their studies including survey, case studies, and field researches (Ali et al., 2021; Mariam et al., 2021; Shoaib & Abdullah, 2021; Shoaib et al., 2020; Shoaib et al., 2021; Shoaib & Ullah, 2021a, 2021b).

The Data and Methods

This study was purely based on the bibliometric analysis and did not outline the methods as we did it for survey research or primary data analysis. For the scientometric analysis, the data was extracted from PubMed database. It was a free search engine accessing primarily the MEDLINE database of references and abstracts on life sciences and biomedical topics. The United States National Library of Medicine at the National Institutes of Health maintain the database as part of the Entrez system of information retrieval. The searched query was used as: ((((((((((Azithromycin[Title]) OR (Macrolide[Title])) AND (COVID[Title])) OR (((Anti-malarial[Title]) OR (Chloroquine[Title])) OR (Hydroxychloroquine[Title])) AND (COVID[Title]))) OR ((COVID[Title]) AND (Oxygen[Title]))) OR (((Vitamin C[Title]) OR (Ascorbic Acid[Title])) AND (COVID[Title]))) OR ((COVID[Title]) AND (Zinc[Title]))) OR ((COVID[Title]) AND (Remdesivir[Title]))) OR ((COVID[Title]) AND (Heparin[Title]))) OR ((COVID[Title]) AND (Aspirin[Title]))) OR ((COVID[Title]) AND (Vaccine[Title]))) OR (((Dexamethasone[Title]) OR (Steroid[Title])) AND (COVID[Title])). It is important here to mention that the data was extracted on May 02, 2021 at 02:13 AM, PST with timespan of 2020 to 2021. The retrieved keywords by topics were reported as COVID and vaccine 1280, COVID and dexamethasone or steroids 128, COVID and aspirin 23, COVID and heparin 99, COVID and remedisivir 247, COVID and zinc 61, COVID and vitamin c or ascorbic acid 44, COVID and

oxygen 160, COVID and anti-malarial OR chloroquine OR hydroxychloroquine 835, COVID and azithromycin OR macrolide 166. Further, Biblioshiny, VOSviewer, and MS Excel software was used to draw results and conclusion.

Results and Discussion

This section provides the results and discussion based on the bibliometric analysis on the subject of the issue of COVID-19. The results are presented in terms of the objective of the study.

Topic in PubMed and Top Countries

Table 1 depicted the distribution of the published documents based on topic and top countries. Data indicated that vaccine and COVID-19 were at the top of the list of topics used in the published documents with a percentage of 42.06 in 2020 to 2021. Similarly, the topic 'Anti-Malarial OR Chloroquine OR Hydroxychloroquine AND COVID-19' secured second position in the list of topics of the published documents with a percentage of 27.44. However, only 0.76 percent of the published documents were published with the topic of 'Aspirin AND COVID-19' from 2020 to 2021. It is pertinent to mention here that there were a very smaller proportion of the published documents with the topic including Remedisivir AND COVID-19, Azithromycin OR Macrolide AND COVID-19, Oxygen AND COVID-19, Dexamethasone OR Steroids AND COVID-19, Heparin AND COVID-19, Zinc AND COVID-19, and Vitamin C OR Ascorbic Acid AND COVID-19. To sum up the debate, the topic 'Vaccine AND COVID-19' secured the top position in the published documents on the subject.

The results in Table 1 also depict the overall top productive countries of the published documents. Data described that the United States was placed at the list of top countries of the published documents with 437 publications, 335 single country publications, and 102 multiple country publications in 2020 to 2021. Similarly, the country India secured the second position in the list of top-name of countries of the published documents with 180 publications, 140 single country publications, and 40 multiple country publications. Contrary to it, the name of Japan was at the bottom of the list of the top countries of the published documents on the subject with 18 publications, 16 single country publications, and 02 multiple country publications. It is worth mentioning to state that the name of France, Italy, China, Canada, Spain, Iran, Germany, Brazil, Turkey, Australia, Netherlands, Egypt, United Kingdom, Israel, Saudi Arabia, Belgium, and Denmark was also in the list of top countries of the published documents.

Table 1
Distribution of Searched Topic in PubMed and Top Countries

Topics	Publications			%	
	2020	2021	Total		
Vaccine AND COVID-19	464	816	1280	42.06	
Anti-Malarial OR Chloroquine OR Hydroxychloroquine AND COVID-19	600	235	835	27.44	
Remedisivir AND COVID-19	159	88	247	8.12	
Azithromycin OR Macrolide AND COVID-19	102	64	166	5.46	
Oxygen AND COVID-19	90	70	160	5.26	
Dexamethasone OR Steroids AND COVID-19	71	57	128	4.20	
Heparin AND COVID-19	64	35	99	3.25	
Zinc AND COVID-19	29	32	61	2.00	
Vitamin C OR Ascorbic Acid AND COVID-19	29	15	44	1.45	
Aspirin AND COVID-19	09	14	23	0.76	
Total	1617	1426	3043	100.00	
<i>Overall Top Productive Countries</i>					
Country	TP*	Freq.	SCP*	MCP*	MCP*_Ratio
USA	437	0.224218	335	102	0.233
India	180	0.092355	140	40	0.222
France	159	0.08158	122	37	0.233
Italy	140	0.071832	118	22	0.157
China	128	0.065675	93	35	0.273
Canada	66	0.033864	40	26	0.394
Spain	57	0.029246	31	26	0.456
Iran	55	0.02822	42	13	0.236
Germany	48	0.024628	30	18	0.375
Brazil	47	0.024115	39	08	0.170
Turkey	43	0.022063	38	05	0.116
Australia	35	0.017958	19	16	0.457
Netherlands	34	0.017445	28	06	0.176
Egypt	33	0.016932	21	12	0.364
United Kingdom	29	0.014879	20	09	0.310
Israel	28	0.014366	21	07	0.250
Saudi Arabia	28	0.014366	14	14	0.500
Belgium	25	0.012827	16	09	0.360
Denmark	20	0.010262	08	12	0.600
Japan	18	0.009236	16	02	0.111
TP* = Total Publication, SCP* = Single Country Publications, MCP* = Multiple Country Publications					

Documents by Top Authors, Organizations, and Keywords

Table 2

Distribution of the Documents by Top Authors, Organizations, and Keywords

<i>Overall Top Productive Authors</i>					
Author	<i>f</i>	%	Author	<i>f</i>	%
Mahase E	56	1.84	Colson P	13	0.43
Raoult D	35	1.15	Dhama K	13	0.43
Gautret P	28	0.92	Li C	13	0.43
Lagier JC	26	0.85	Li H	12	0.39
Honor S	20	0.66	Li Y	12	0.39
Million M	16	0.53	Liu Y	11	0.36
Brouqui P	15	0.49	Wang X	11	0.36
Hoang VT	14	0.46	Dyer O	11	0.36
Rolain JM	14	0.46	Iacobucci G	11	0.36
Wang Y	13	0.43	Ledford H	11	0.36
<i>Top Productive Organizations</i>					
Organizations	<i>f</i>	%	Organizations	<i>f</i>	%
Univ. Maryland	82	1.885	Virginia	54	1.241
			Commonwealth Univ.		
Univ. Toronto	75	1.724	Univ. Denver	49	1.126
Univ. Georgia	67	1.54	Rutgers State Univ.	48	1.103
Univ. N Carolina	63	1.448	Univ. Connecticut	47	1.08
Univ. Michigan	62	1.425	Univ. Washington	46	1.057
Arizona State Univ.	58	1.333	Florida State Univ.	45	1.034
Univ. Illinois	58	1.333	Univ. Texas Austin	45	1.034
NYU	56	1.287	Univ. Calgary	41	0.942
Univ. Tennessee	55	1.264	Univ. Kansas	39	0.896
Univ. Calif Berkeley	54	1.241	Fordham Univ.	38	0.873
<i>Occurrences of Keywords</i>					
Keyword	<i>f</i>	Total Link Strength	Keyword	<i>f</i>	Total Link Strength
COVID-19	1981	18029	Male	387	5795
Humans	1571	17255	Antiviral Agents	322	4180
SAR-CoV-2	1354	13757	Middle Aged	319	4957
Pandemics	873	10759	Adult	278	4119
Coronavirus Infections	747	9491	Aged	275	4259
Pneumonia, Viral	717	9286	Chloroquine	243	2316
Hydroxychloroquine	647	6466	Treatment Outcome	216	3158
Betacoronavirus	605	7943	Azithromycin	192	2309
COVID-19 Vaccines	535	5375	Viral Vaccines	168	2181
Female	398	5950	Vaccination	165	1670

Table 2 described the top author, organizations, and keywords of the published documents on the subject under discussion. Data based on the bibliometric analysis depicted that the name of Mahase E was on the top of the list of overall top productive authors with 56 publications. Similarly, the

name of Raoult D secured a second position with 35 publications. Further, the name Gautret P placed at third position in the list of top productive authors with 28 published documents. Opposite to it, the name of Ledford H was placed at the bottom of the top productive author's list with 11 publications. It is important to mention here that the name of Colson P, Dhama K, Li C, Li H, Li Y, Liu Y, Wang X, Dyer O, Iacobucci G, Honor S, Million M, Brouqui P, Hoang VT, Rolain J M, and Wang Y was also in the list of top productive authors of the published documents in 2020 to 2021.

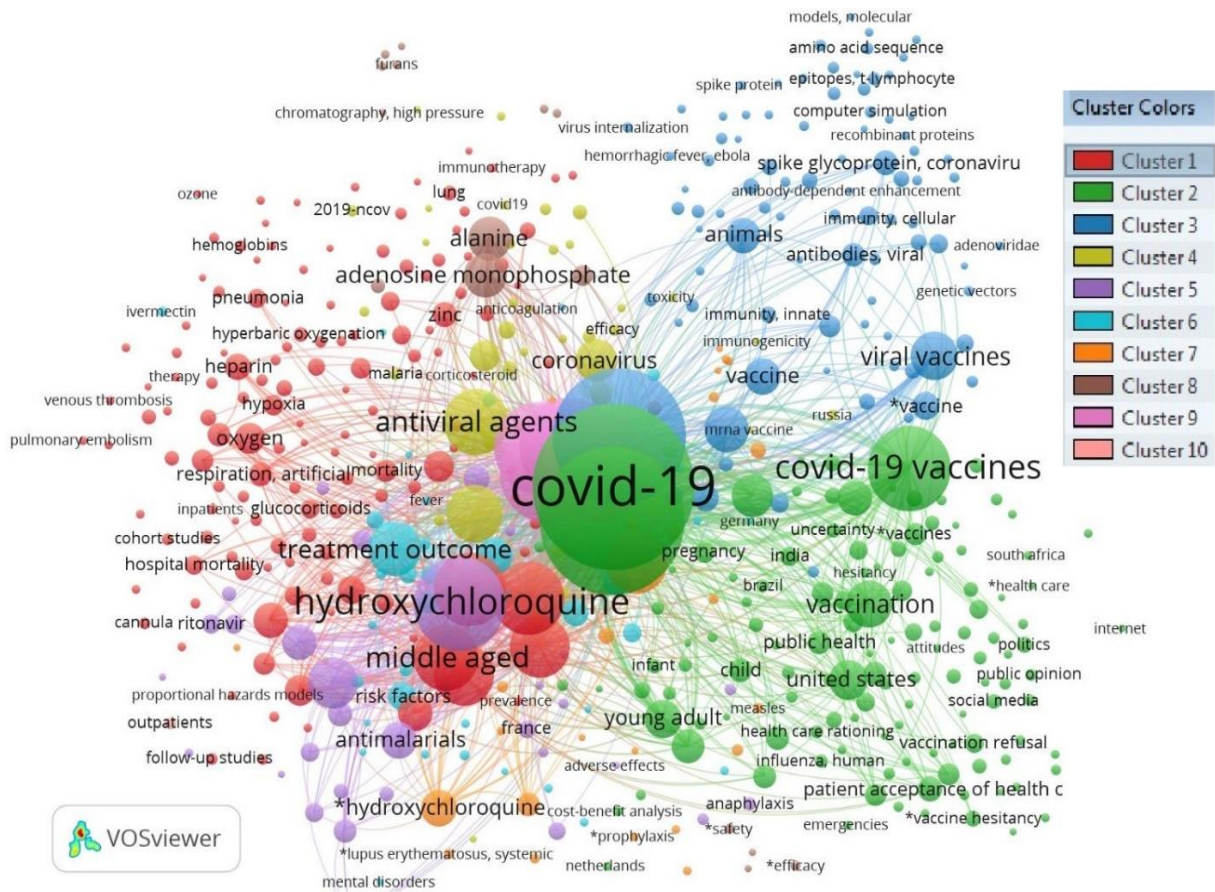


Figure 1. Occurrences of Keywords

Data in the Table 2 described the top productive organizations of the published documents from 2020 to 2021 on the subject under discussion. It showed that the name of Univ. Maryland wat at the top of the list of productive organizations with 82 published documents. Similarly, the name of Univ. Toronto secured the second position in the list of top organizations with 75 publications. However, the name of Fordham Univ. was at the bottom of the list of top productive organizations with 38 publications. It is important to mention here that the name of Florida State Univ. and Univ. Texas Austin organization published an equal number of documents i.e., 45. Similar to it, the name

of Arizona State Univ. and Univ. Illinois was also published similar documents i.e., 58 in numbers. Moreover, the name of Univ. Georgia, Univ. N Carolina, Univ. Michigan, Virginia, Commonwealth Univ., Univ. Denver, Rutgers State Univ., Univ. Connecticut, Univ. Washington, NYU, Univ. Tennessee, Univ. Calif Berkeley, Univ. Calgary, and Univ. Kansas was also on the list of top organizations of the published documents from 2020 to 2021.

Table 2 also presented the top occurrence of keywords in the published documents from 2020 to 2021. Analysis showed that the COVID-19 keyword was placed at the top of the list of top keywords of the published documents with the occurrence of 1981. Similarly, humans keywords secured the second position in the list of top keywords with an occurrence of 1571, and SAR-CoV-2 placed at third position with an occurrence of 1354 keywords. Contrary to it, the vaccination keyword was at the bottom of the list of the top keywords of the published documents with 165 occurrences from 2020 to 2021. It is worth mentioning here that the name of the keyword including male, antiviral agents, middle-aged, adult, aged, chloroquine, treatment outcome, azithromycin, viral vaccines, pandemics

coronavirus infections, pneumonia, viral, hydroxychloroquine, betacoronavirus, COVID-19 vaccines, and female. To conclude the discussion, the keyword vaccination was at the top of the list of top keywords of the published documents.

Term Analysis by Titles and Top Productive Sources

Data in the Table 3 illustrated the term analysis of titles and top productive sources. Bibliometric analysis showed that the term COVID was placed at top of the list of term analysis by title with the frequency of 2632 and vaccine secured the second position as a term analysis by titles of the published documents from 2020 to 2021 on the subject under discussion. However, the term adult was at the bottom of the list of top term analysis by titles with the frequency of 34 in number. It is important to mention here that the terms including vaccine hesitancy, severe COVID, safety, trial, azithromycin, vaccine development, systematic review, clinical trial, dose, meta-analysis, pneumonia, vaccine trial, result, survey, heparin, vaccination, and oxygen were also in the list to term analysis by the title of the published documents.

Table 3 also presented the top productive sources of the published documents from 2020 to 2021. It presented that the name of 'BMJ (Clinical Research Ed.)' was at the top of the list of top productive sources with 158 publications and 'The New England Journal of Medicine' secured

second position in the top productive sources list. However, the name of 'Clinical Infectious Diseases' was placed at the bottom of the list with 21 publications.

Table 3

Published Documents by Term Analysis by Titles and Top Productive Sources

<i>Term Analysis by Titles</i>						
Term	<i>f</i>	Relevance	Term	<i>f</i>	Relevance	
COVID	2632	0.7295	Dose	51	0.2935	
Vaccine	568	0.7857	Meta-Analysis	51	0.9326	
Vaccine Hesitancy	87	0.7495	Pneumonia	49	0.9789	
Severe COVID	84	1.7547	Vaccine Trial	48	0.747	
Safety	80	0.2762	Result	43	0.6585	
Trial	78	0.5625	Survey	43	0.4211	
Azithromycin	75	0.6346	Heparin	42	0.8907	
Vaccine Development	71	1.4092	Vaccination	38	0.4895	
Systematic Review	68	0.9438	Oxygen	37	0.9826	
Clinical Trial	58	0.5889	Adult	34	0.2287	
<i>Top Productive Sources</i>						
Source	TP*	%	Source	TP*	%	
BMJ (Clinical Research Ed.)	158	5.19	Journal of Medical Virology	36	1.18	
The New England Journal of Medicine	69	2.26	JAMA	34	1.11	
Lancet (London, England)	57	1.87	Annals of The Rheumatic Diseases	33	1.08	
International Journal of Antimicrobial Agents	56	1.84	Human Vaccines & Immunotherapeutics	31	1.01	
Annals of Internal Medicine	52	1.71	Travel Medicine and Infectious Disease	30	0.98	
Nature	47	1.54	Medrxiv: The Preprint Server for Health Sciences	28	0.92	
Vaccine	47	1.54	Cureus	26	0.85	
Vaccines	44	1.44	PLOS One	24	0.78	
International Journal of Infectious Diseases	43	1.41	Medical Hypotheses	22	0.72	
Trials	42	1.38	Clinical Infectious Diseases	21	0.69	

TP* = Total Publications

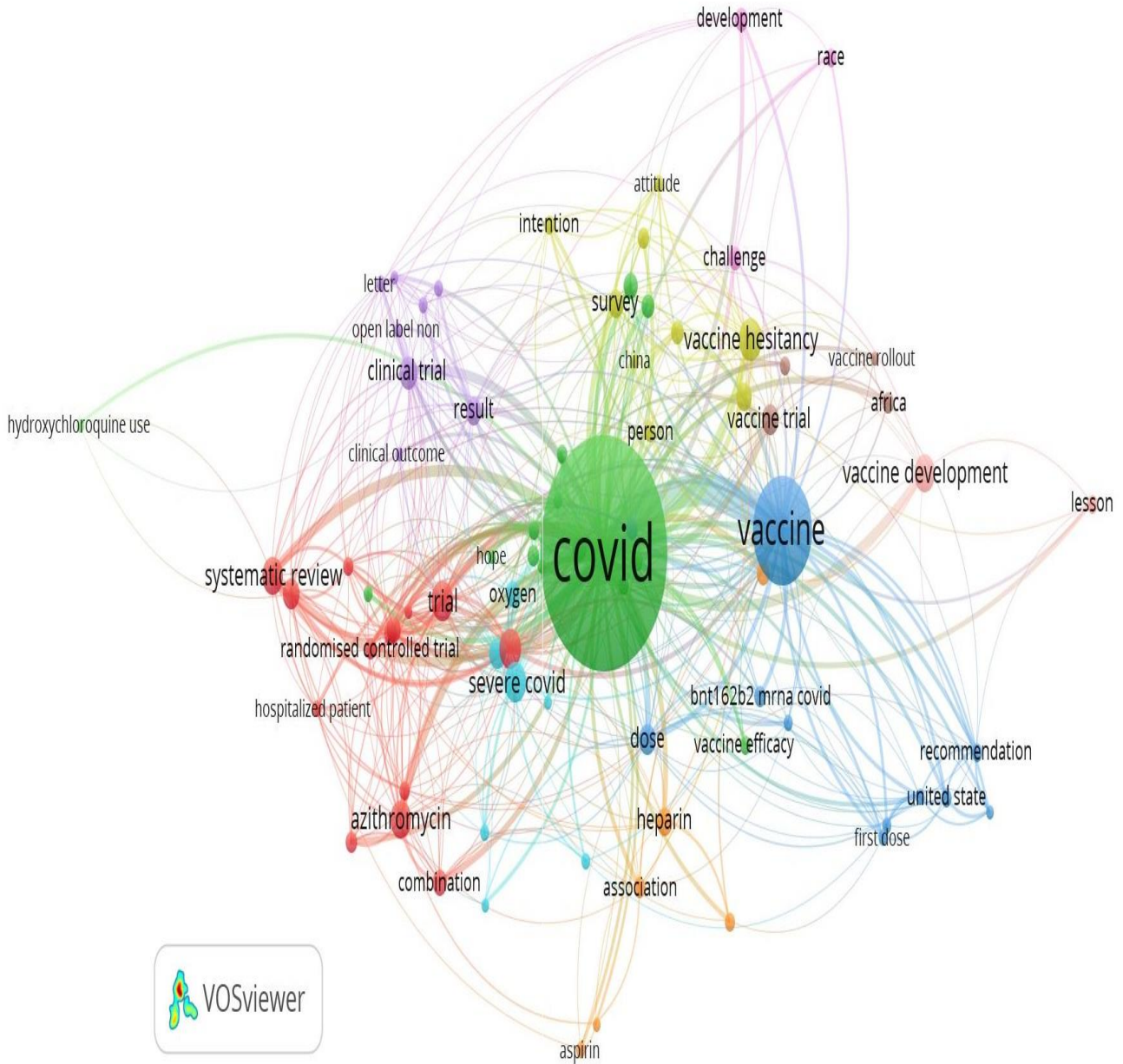


Figure 2. Occurrences of Term Analysis by Titles

Table 4 indicated the searched topic in PubMed by top productive countries and top productive authors from 2020 to 2021. Bibliometric analysis indicated the name of the topic in the Column and the name of the country in the row. Similarly, the name of the authors was also shown in the row in the table.

Table 4

Distribution of Searched Topic in PubMed by Top Productive Countries and Top Productive Authors

Vaccine AND COVID-19	Anti-Malarial OR Chloroquine OR Hydroxychloroquine AND COVID-19	Remedisivir AND COVID-19	Azithromycin OR Macrolide AND COVID-19	Oxygen AND COVID-19	Dexamethasone OR Steroids AND COVID-19	Heparin AND COVID-19	Zinc AND COVID-19	Vitamin C OR Ascorbic Acid AND COVID-19	Aspirin AND COVID-19
<i>Top Productive Countries</i>									
USA	USA	USA	France	USA	India	Italy	USA	USA	USA
India	France	China	USA	China	USA	USA	Australia	Italy	Egypt
China	India	India	Italy	India	Italy	China	Egypt	Finland	China
Italy	China	Italy	Brazil	Italy	Canada	Netherlands	India	China	France
Canada	Italy	Germany	Spain	France	Iran	Brazil	Brazil	India	Germany
Spain	Canada	Iran	Iran	Spain	Brazil	Japan	Germany	Iran	Iran
Israel	Turkey	France	China	Japan	China	Sweden	Italy	Korea	Israel
France	Brazil	Canada	Denmark	UK	Denmark	Turkey	Bangladesh	New Zealand	Italy
Iran	Netherlands	Spain	India	Australia	Egypt	Australia	Japan	Bangladesh	Panama
Germany	Spain	Australia	Japan	Korea	Argentina	France	France	Belgium	Poland
<i>Top Productive Authors</i>									
Mahase E	Raoult D	Brainard DM	Gautret P	Franzini M	Mahase E	Li JP	Sharma P	Li Y	Liu Y
Iacobucci G	Gautret P	Cao H	Raoult D	Valdenassi L	Benfield T	Besser M	Aaseth J	Carr AC	Amin K
Ledford H	Lagier JC	Osinusi AO	Lagier Jc	Arruti E	Bestle MH	Cipollone F	Bellomo R	Hemil H	Bona RD
Dhama K	Honor S	Lundgren J	Honor S	Bertossi D	Cioccari L	D'ardes D	Bolton D	Marik PE	Chang E
Bell BP	Boulware DR	Wang Y	Million M	Chirumbolo S	Cronhjort M	Grandone E	Chinni V	Chalker E	Chun HJ
Dyer O	Lee TC	Beigel JH	Hoang VT	Ferrando C	Gluud C	Macdonald S	Ischia J	Liu F	Defilippo N
Hotez PJ	Liu D	Cao B	Brouqui P	Han Y	Granholm A	Pesavento R	Jones D	Peng Z	Fine R
Lee GM	Mcdonald EG	Chen D	Colson P	Mellado-Artigas R	Hammond N	Thachil J	Patel O	Wright RM	Goshua G
Romero JR	Million M	Chokkalingam AP	Parola P	Ricevuti G	Helleberg M	Thomas W	Perera M	Zhang J	Keating C
Bottazzi ME	Nicol MR	Dezure A	Rolain JM	Villar J	Horby P	Vettor R	Rink L	Zhu Y	Lee Ai

Conclusion

The overall analysis enabled us to claim that the bibliometric analysis technique allowed research scholars to advantage more in-depth understandings into the treatment modalities to treat COVID-19 infection. The study is mainly based on evaluating research published in PubMed indexed journals of different treatment modalities to treat COVID -19 infection employing bibliometric analysis technique from 2020 to 2021. We concluded that a total of 3043 published documents were found on the subject under discussion. Vaccine and COVID-19 top were at the top of the list of topics of the published documents along with the United States as a top productive country. The name of Mahase E secured the first position in top authors, Univ. Maryland as a top organization, COVID-19 as a top keyword, COVID as top term analysis by title, and 'BMJ (Clinical Research Ed.)' was the top of the published documents. The study recommended that other databases should also be used to identify treatment modalities of COVID-19 oriented topics.

Limitations of the Study

The present study was only based on published scholarly work in the PubMed database on different treatment modalities and we did not use other databases. Similarly, it focused only to evaluate vaccine, oxygen supplementation, dexamethasone or steroids, aspirin, heparin, remdesivir, zinc, vitamin c or ascorbic acid, oxygen, anti-malarial like chloroquine and hydroxychloroquine, and azithromycin or macrolides using bibliometric analysis. Hence, we did not use other interlinked variables or treatment modalities of COVID-19.

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