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# Covid-19 and Emergency Medicine: A Scientometric Assessment of Global Publications

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# **Covid-19 and Emergency Medicine: A Scientometric Assessment of Global Publications**

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## **Abstract**

*This study analyses Covid-19 and Emergency Medicine research output during 2020-2021 on different parameters including global publications share, citation impact, contribution of authors and patterns of research communication in most productive and preferred journals. Web of Science Citation Database has been used to retrieve the data for 2 years (2020-2021) with 991 publications using the combined search of Covid-19 with topic field and Emergency Medicine with using Web of Science Subject Categories. The USA tops the list, with a publications share of 38.6%(383) followed far by Italy and UK ranks second with 7.7%(76), Canada with 7.6% and India ranks 14<sup>th</sup> positions with global publications share of 1.7 %(17)). The most productive Institutions are: Harvard Medical University lead with 34 Publications and received 134 Citations followed by University Toronto with 29 (96 Citations), Massachusetts Gen Hospital with 26 (86 Citations), Monash University with 22 (92 Citations), Columbia University and University Ottawa with 18 publications. The top most 5 preferred Journals are: AMERICAN JOURNAL OF EMERGENCY MEDICINE (IF: 1.70 with 141 publication followed far by ANNALS OF EMERGENCY MEDICINE (IF: 5.35) with 97 publications, RESUSCITATION (IF: 4.57) with 77, WESTERN JOURNAL OF EMERGENCY MEDICINE (IF: 1.80) with 71 and EMERGENCY MEDICINE JOURNAL (IF: 2.04) with 64. But its average annual publication growth rate and global publication share is high and Citation quality as reflected in Average Citations Per Paper is less. Concludes that the research needs to increase its output and bring about improvement in the quality of its research efforts. This can be done by investing much more international collaboration and by modernizing and strengthening its research infrastructure in the field of Medicines.*

**Keywords:** Covid-19, Emergency Medicine, Scientometrics, Highly Cited papers

## **INTRODUCTION**

All around the world, acutely ill and injured people seek care every day. Frontline providers manage children and adults with medical, surgical and obstetric emergencies, including injuries and infections, heart attacks and strokes, asthma and acute complications of pregnancy. Prioritizing an integrated approach to early recognition and resuscitation reduces the impact of all of these conditions. WHO's Emergency, Trauma and Acute Care programme is dedicated to strengthening the emergency care systems that serve as the first

point of contact with the health system for so much of the world, and to supporting the development of quality, timely emergency care accessible to all. (WHO: 2019). Scientometric studies are useful in understanding the growth of literature, identifying strengths and weaknesses of a country, organization and an individual in various domains of scientific endeavors. These studies will help the policy makers and science administrators to have better insights in framing science policy and guiding the researchers.

## **OBJECTIVES**

The main objective of this study is to analyze the research performance of Covid-19 and Emergency Medicine research in global context, as reflected in its publications output during 2020-2021. In particular, the study focuses on the following objectives:

- To study the geographical wise distribution of publications;
- To study the most productive Institutions;
- To study the most preferred journals;
- To study the publications productivity and impact of leading authors;
- To study the highly cited papers.

## **DATA SOURCE AND METHODS**

This study is based on the publication data in Covid-19 and Emergency Medicine retrieved from Web of Science Citation database for the study period (2020-2021). The string used to retrieve the data on Covid-19 and Emergency Medicine was as follows: Covid-19 with Topic field and Emergency with Web of Science Subject Categories. A total of 991 publications and 4125 citations received to these publications were transferred to Histcite, VoSviewer, Biblioshiny application and analyzed the data as per objectives of the study. The bibliographic fields were analyzed by normal count procedure for Countries, Institutions, Authorships, Journals and Highly Cited papers.

## **DATA ANALYSIS AND INTERPRETATION**

The present study has covered Covid-19 and Emergency Medicine literature which is indexed by Web of Science online database. A total of 4125 citations were collected from 991 articles from 32 journals for the period of 2 years (2020-2021). The data were analysed and presented in the form of tables and Maps to facilitate the interpretation in the following sections.

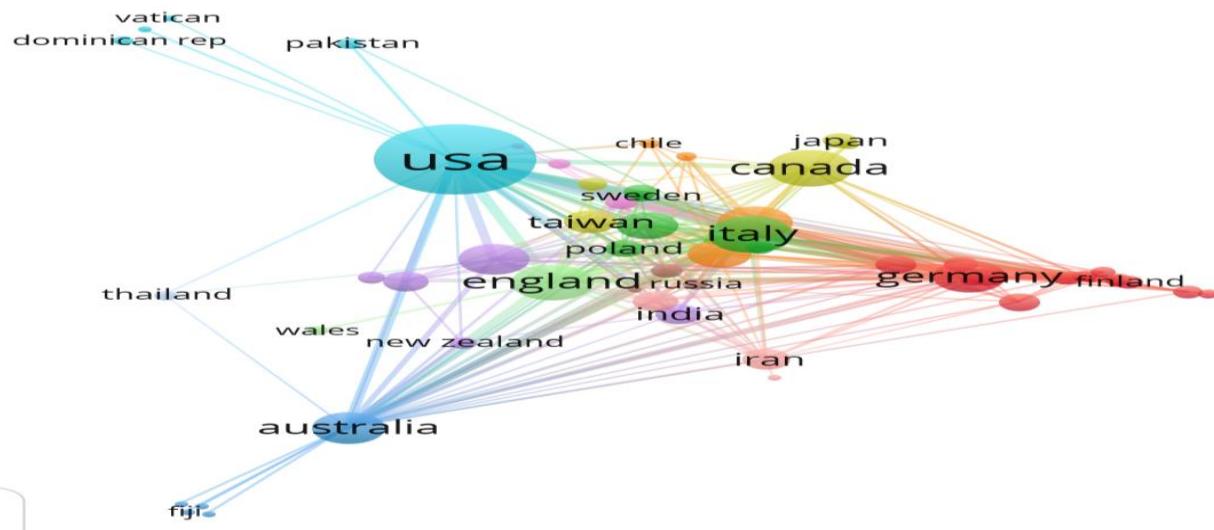
### **Geographical wise distribution of Publications and Citations**

Table 1 shows the geographical wise distribution of Publications and Citations in the field of Covid-19 and Emergency Medicine during the period of 2020-2021. Of these, 20 Countries registered 11-383 publications each, 29 Countries 2-8 publications each, 31 Countries with single publications, 13 Countries received 101-2052 Citations each, 52 countries with 1-95 Citations each and 25 Countries there is no citation. The publications share of the top 10 most productive countries in Covid-19 and Emergency Medicine research ranges from 1.1% to 38.6 % during 2020-2021. The USA tops the list, with a publications share of 38.6%(383). The Italy and UK ranks second with 7.7%(76), Canada with 7.6% followed far by Spain, Australia, Germany, China, France and Turkey (their global publication share ranging from 3.5 % to 5.9%), India ranks 14<sup>th</sup> positions with global publications share of 1.7 %(17)). 60 countries that rank between 21-80 positions are with their global publications share less than 1%.

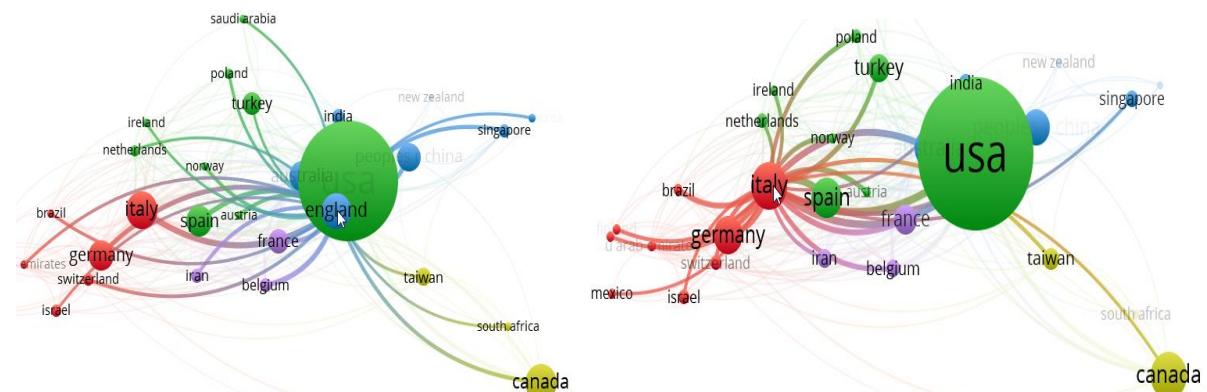
**Table 1: Geographical wise distribution of Publications and Citations**

#	Country	Records	%	Citations	Country	Records	%	Citations
1	USA	383	38.6	2052	Morocco	3	0.3	0
2	Italy	76	7.7	639	Thailand	3	0.3	4
3	UK	76	7.7	321	Argentina	2	0.2	0
4	Canada	75	7.6	299	Chile	2	0.2	13
5	Spain	58	5.9	312	Dominican Rep	2	0.2	4
6	Australia	55	5.5	248	Egypt	2	0.2	14
7	Germany	54	5.4	229	Guatemala	2	0.2	0
8	China	50	5.0	316	Hungary	2	0.2	0
9	France	39	3.9	181	Peru	2	0.2	1
10	Turkey	35	3.5	83	Anguilla	1	0.1	1
11	Unknown	32	3.2	10	Armenia	1	0.1	0
12	Taiwan	24	2.4	42	BELARUS	1	0.1	21
13	Belgium	17	1.7	141	Bulgaria	1	0.1	21
14	India	17	1.7	101	Cameroon	1	0.1	21
15	Iran	16	1.6	103	Cote Ivoire	1	0.1	0
16	Singapore	16	1.6	95	Croatia	1	0.1	0
17	Israel	13	1.3	40	Cuba	1	0.1	0

18	Switzerland	13	1.3	79	Cyprus	1	0.1	2
19	Netherlands	12	1.2	43	Czech Republic	1	0.1	0
20	Poland	11	1.1	50	Ecuador	1	0.1	0
21	Brazil	8	0.8	41	Ethiopia	1	0.1	0
22	Japan	8	0.8	21	Fiji	1	0.1	0
23	Saudi Arabia	8	0.8	30	Honduras	1	0.1	0
24	Austria	7	0.7	64	Kenya	1	0.1	0
25	Norway	7	0.7	168	Lebanon	1	0.1	1
26	Finland	6	0.6	30	Luxembourg	1	0.1	3
27	Greece	6	0.6	31	Malta	1	0.1	24
28	Ireland	6	0.6	52	Mauritius	1	0.1	0
29	South Africa	6	0.6	21	Papua N Guinea	1	0.1	0
30	U Arab Emirates	6	0.6	28	Philippines	1	0.1	0
31	Mexico	5	0.5	42	Portugal	1	0.1	2
32	New Zealand	5	0.5	5	Qatar	1	0.1	5
33	South Korea	5	0.5	26	Romania	1	0.1	0
34	Colombia	4	0.4	21	Serbia	1	0.1	0
35	Denmark	4	0.4	16	Sierra Leone	1	0.1	0
36	Pakistan	4	0.4	19	Slovakia	1	0.1	0
37	Russia	4	0.4	8	Slovenia	1	0.1	0
38	Sweden	4	0.4	2	Solomon Islands	1	0.1	0
39	Indonesia	3	0.3	15	Vanuatu	1	0.1	0
40	Malaysia	3	0.3	3	Vatican	1	0.1	0

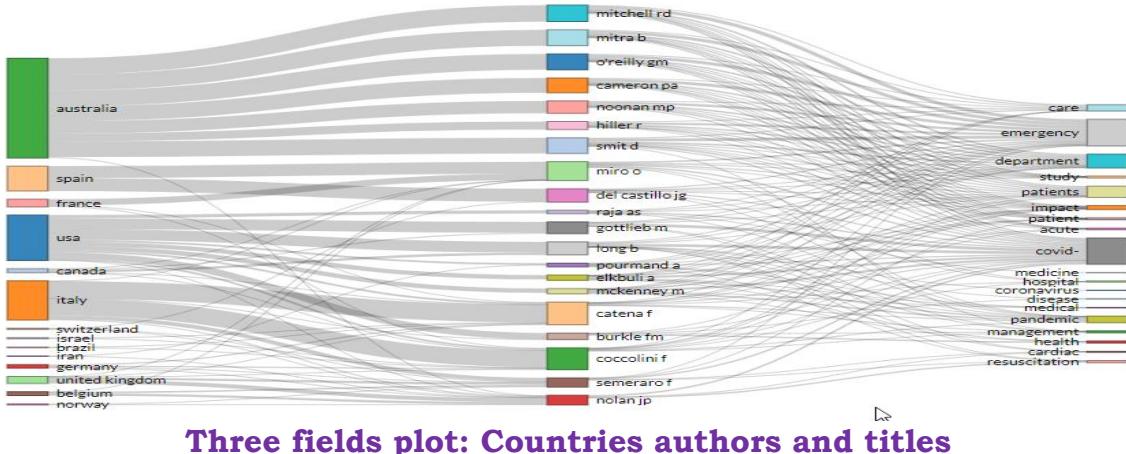


**Citation Network of Countries**



**Citation Network of USA**

**Citation Network of Italy**



**Three fields plot: Countries authors and titles**

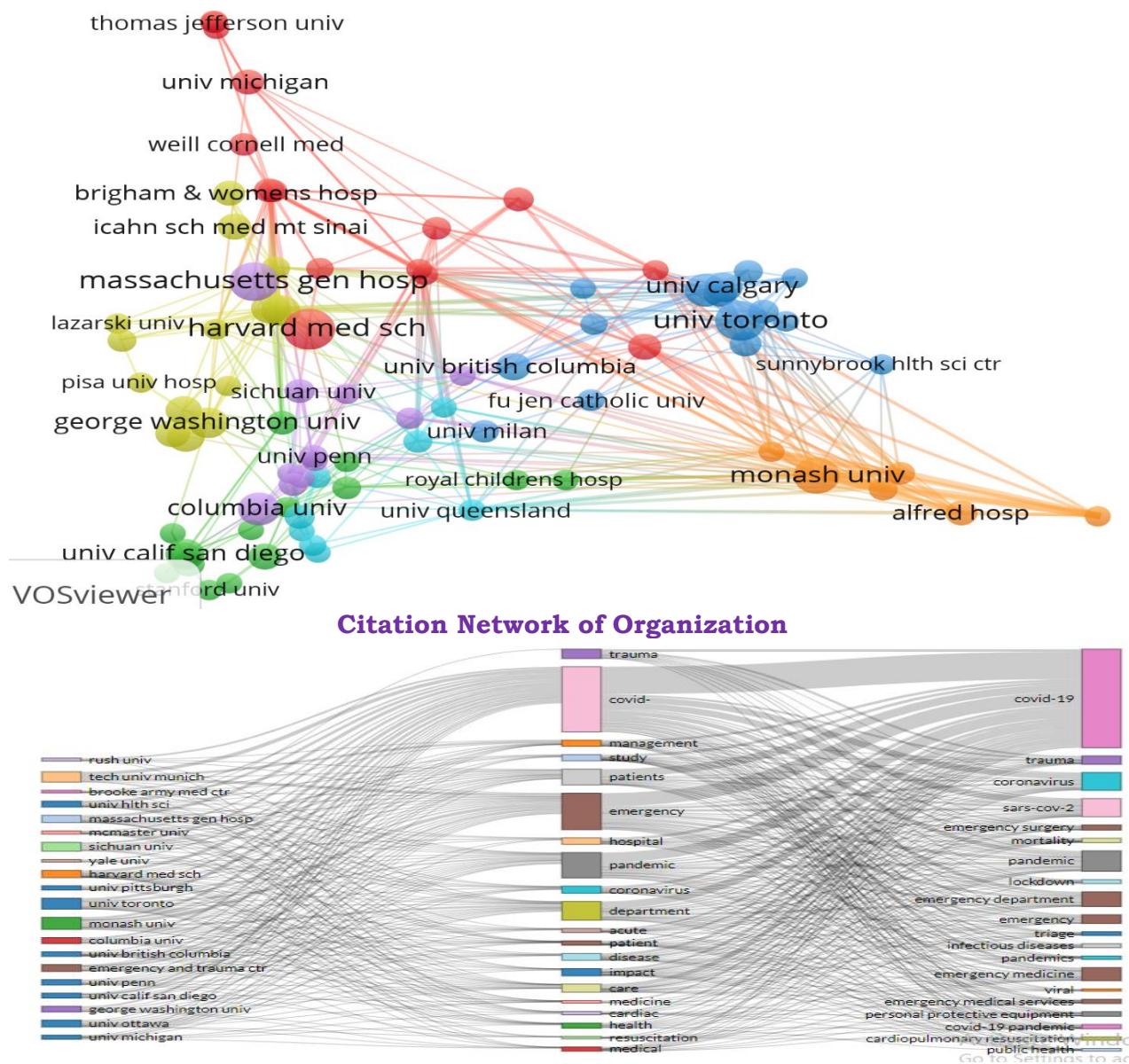
## Most Productive Organization

The top 20 most productive Organizations involved in Covid-19 and Emergency Medicine research have published 9-31 papers each during 2020-2021. The publications profile of these 20 institutions along with their research output and citations received are presented in Table 2. These 20 institutions involved in Covid-19 and Emergency Medicine research together have contributed more than 30 % share (with 311 papers) in the cumulative publications output. The most productive Institutions are: Harvard Medical University lead with 34 Publications and received 134 Citations followed by University Toronto with 29 (96 Citations), Massachusetts Gen Hospital with 26 (86 Citations), Monash University with 22 (92 Citations), Columbia University and University Ottawa with 18 publications. The most cited Organization are: Rush University with 266 Citations for 15 publications followed by Kendall Reg Med Centre with 261 Citations (13 Publications), Brooke Army Med Centre with 247 Citations (14 Publications) and Maggiore Hospital with 237 Citations.

**Table 2: Most Productive Organization (1714)**

#	Institution	Records	Citations
1	Harvard Med School	31	134
2	University Toronto	29	95
3	Massachusetts Gen Hospital	26	86
4	Monash University	22	92
5	Columbia University	18	23
6	University Ottawa	18	84
7	George Washington University	15	44
8	Rush University	15	266

9	University Calif San Diego	15	45
10	Brooke Army Med Centre	14	247
11	Kendall Reg Med Centre	13	261
12	University Calgary	13	31
13	University Hlth Science	12	48
14	University S Florida	11	155
15	Icahn Sch Med Mt Sinai	10	67
16	McMaster University	10	23
17	University British Columbia	10	45
18	University Melbourne	10	75
19	Wayne State University	10	13
20	Alfred Hosp	9	39



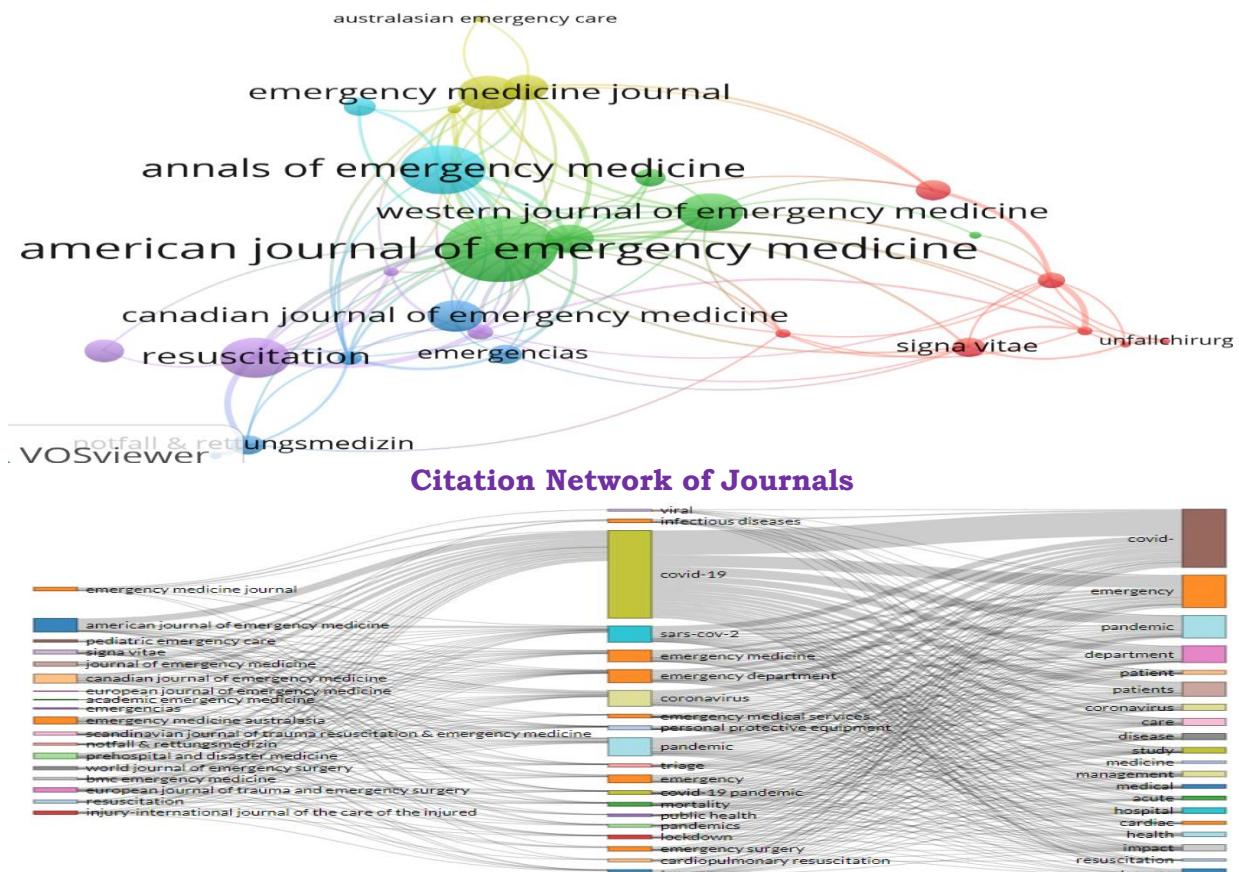
## **Most Preferred Journals**

The pattern of research output in Covid-19 and Emergency as reflected in publications in the most productive national and international journals during 2020-2021 is presented in Table 3. The 32 productive National and International journals publishing the research papers together contributed 991 papers in Covid-19 and Emergency Medicine, which accounts for 100% of the total output of the study period. Of these, 14 Journals registered 30-141 publications each, 18 Journals 1-29 Publications each, 11 Journals registered 129-1178 Citations each, 15 journals 5-89 Citations each and 6 journals there is no Citations. The top most 5 preferred Journals are: AMERICAN JOURNAL OF EMERGENCY MEDICINE (IF: 1.70 with 141 publication followed far by ANNALS OF EMERGENCY MEDICINE (IF: 5.35) with 97 publications, RESUSCITATION (IF: 4.57) with 77, WESTERN JOURNAL OF EMERGENCY MEDICINE (IF: 1.80) with 71 and EMERGENCY MEDICINE JOURNAL (IF: 2.04) with 64. The most 5 Cited journals are: AMERICAN JOURNAL OF EMERGENCY MEDICINE with 1178 Citations for 141 Journals followed far by ACADEMIC EMERGENCY MEDICINE with 524, RESUSCITATION with 411, WESTERN JOURNAL OF EMERGENCY MEDICINE with 319 and WORLD JOURNAL OF EMERGENCY SURGERY with 266 Citations.

**Table 3: Most Preferred Journals**

#	Journal	IF	Records	%	Citations	Citations/PY
1	AMERICAN JOURNAL OF EMERGENCY MEDICINE	1.70	141	14.2	1178	677.50
2	ANNALS OF EMERGENCY MEDICINE	5.35	97	9.8	159	80.50
3	RESUSCITATION	4.57	77	7.8	411	214.00
4	WESTERN JOURNAL OF EMERGENCY MEDICINE	1.80	71	7.2	319	159.50
5	EMERGENCY MEDICINE JOURNAL	2.04	64	6.5	144	85.00
6	CANADIAN JOURNAL OF EMERGENCY MEDICINE	1.58	56	5.7	160	81.00
7	ACADEMIC EMERGENCY MEDICINE	2.5	49	4.9	524	265.50
8	EMERGENCY MEDICINE AUSTRALASIA	1.35	45	4.5	129	71.00
9	PREHOSPITAL AND DISASTER MEDICINE	1.01	39	3.9	81	49.00
10	INJURY-INTERNATIONAL JOURNAL OF THE CARE OF THE INJURED	2.13	33	3.3	149	74.50
11	EMERGENCIAS	2.84	31	3.1	89	44.50
12	SIGNA VITAE	0.38	31	3.1	11	7.00
13	NOTFALL & RETTUNGSMEDIZIN	0.52	30	3.0	54	22.00
14	PEDIATRIC EMERGENCY CARE	0.91	30	3.0	24	12.00
15	JOURNAL OF EMERGENCY MEDICINE	1.17	29	2.9	74	40.50

16	EUROPEAN JOURNAL OF TRAUMA AND EMERGENCY SURGERY	2.21	24	2.4	76	30.51
17	SCANDINAVIAN JOURNAL OF TRAUMA RESUSCITATION & EMERGENCY MEDICINE	2.33	24	2.4	45	23.00
18	EUROPEAN JOURNAL OF EMERGENCY MEDICINE	2.17	22	2.2	133	68.00
19	WORLD JOURNAL OF EMERGENCY SURGERY	4.35	13	1.3	266	133.50
20	BMC EMERGENCY MEDICINE	1.48	12	1.2	6	3.50
21	PREHOSPITAL EMERGENCY CARE	2.43	12	1.2	13	6.00
22	AFRICAN JOURNAL OF EMERGENCY MEDICINE	1.94	10	1.0	20	11.00
23	JOURNAL OF EMERGENCY NURSING	1.48	10	1.0	14	8.50
24	NOTARZT	0.43	10	1.0	5	0.50
25	ULUSAL TRAVMA VE ACİL CERRAHI DERGİSİ-TURKISH JOURNAL OF TRAUMA & EMERGENCY SURGERY	0.60	7	0.7	26	14.00
26	UNFALLCHIRURG	0.62	7	0.7	0	0.00
27	HONG KONG JOURNAL OF EMERGENCY MEDICINE	0.21	5	0.5	0	0.00
28	WORLD JOURNAL OF EMERGENCY MEDICINE	4.1	5	0.5	15	8.50
29	EMERGENCY MEDICINE INTERNATIONAL	1.2	3	0.3	0	0.00
30	BURNS & TRAUMA	3.08	2	0.2	0	0.00
31	AUSTRALASIAN EMERGENCY CARE	0.54	1	0.1	0	0.00
32	EMERGENCY MEDICINE CLINICS OF NORTH AMERICA	4.52	1	0.1	0	0.00



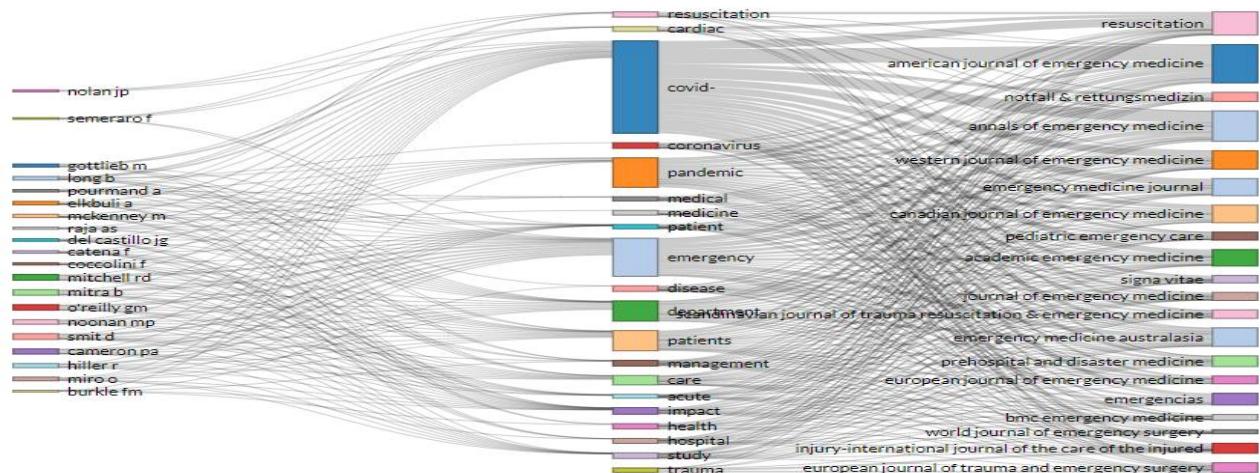
## Most Prolific Authors

Based on the publication data, 30 authors have been identified who have published 5 and above papers in Covid-19 and Emergency Medicine research. Of these 20 authors, 9 authors 10-15 publications each, 615 authors 2-9 publications each, 4172 authors with single publications, 42 authors 103-266 Citations each, 2779 authors 1-98 citations each and 1975 authors there is no citations. The most productive authors are: Gottlieb M Long B with 15 articles respectively followed by Elkbuli A and McKenney M and Mitchell RD with 12 articles respectively, Mitra B, O'Reilly GM and Smit D with 11 respectively and Cameron PA with 10 articles. The most Cited authors are: Gottlieb M with 266 Citations followed by Long B with 249 Citations, Catena F with 225 Citations, Elkbuli A and McKenney M with 210 Citations respectively. Of these, 72 papers with single authors, 919 are multi authored papers and 143 papers with more than 10 authors.

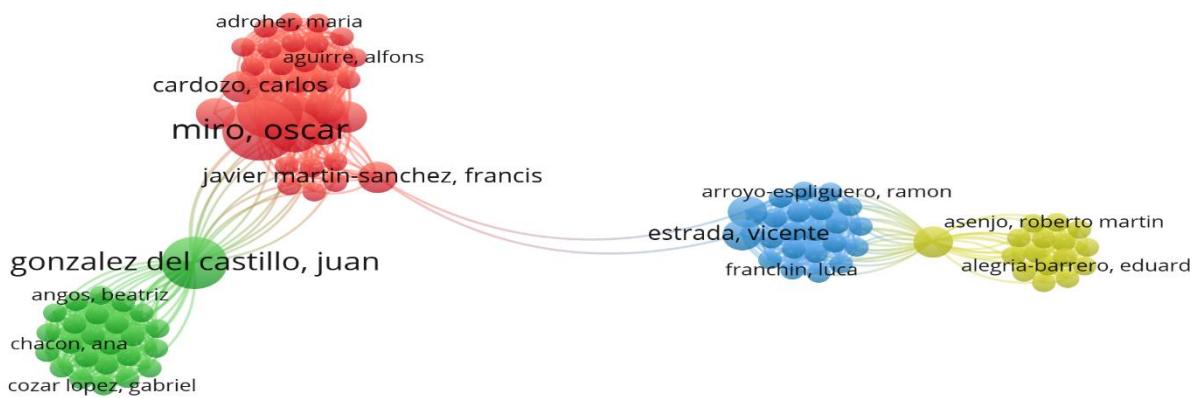
**Table 4: Most prolific Authors**

#	Publication Impact of Authors			Citation Impact of Authors		
	Author	Records	Citations	Author	Records	Citations
1	Gottlieb M	15	266	Gottlieb M	15	266
2	Long B	15	249	Long B	15	249
3	Elkbuli A	12	210	Catena F	9	225
4	McKenney M	12	210	Elkbuli A	12	210
5	Mitchell RD	12	50	McKenney M	12	210
6	Mitra B	11	50	Coccolini F	8	195
7	O'Reilly GM	11	50	Brady WJ	3	185
8	Smit D	11	49	Koyfman A	2	184
9	Cameron PA	10	49	Marini P	2	184
10	Catena F	9	225	Sartelli M	5	179
11	Coccolini F	8	195	Chiarugi M	4	178
12	Miro O	8	63	Ansaloni L	5	177
13	Nolan JP	8	141	Corbella D	2	175
14	Noonan MP	7	32	Agresta F	2	169
15	Pourmand A	7	41	Puzziello A	2	169
16	Raja AS	7	12	Agnoletti V	2	164
17	Semeraro F	7	62	Zago M	4	157
18	Burkle FM	6	32	Bellini V	1	154
19	del Castillo JG	6	59	Bignami E	1	154
20	Hiller R	6	32	Bonati E	1	154
21	Luckhoff C	6	37	Corradi F	1	154
22	Monsieurs KG	6	59	D'Ugo D	1	154
23	Paton A	6	32	De Paolis P	1	154
24	Perkins GD	6	92	Di Marzo F	1	154

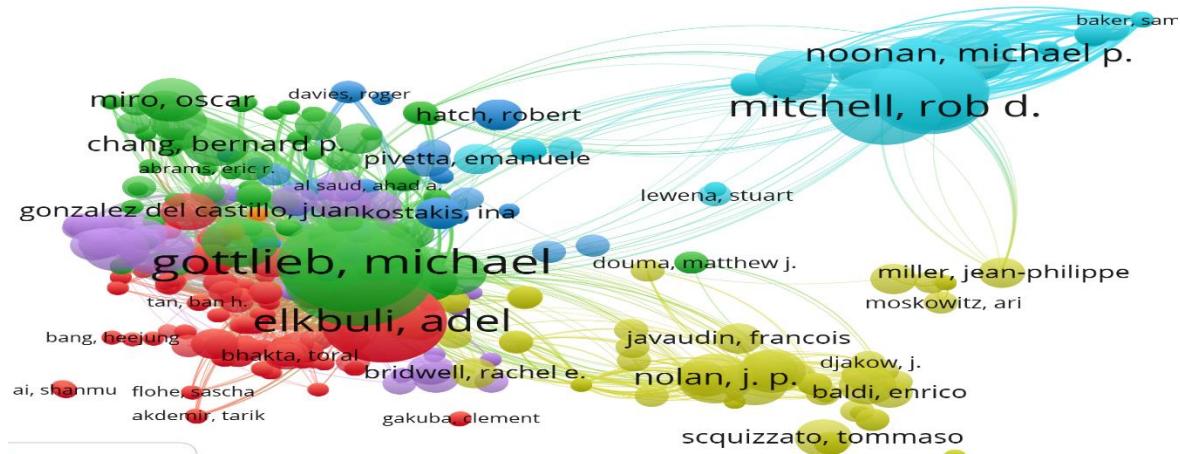
25	Rosenberg H	6	35	Forfori F	1	154
26	Shokoohi H	6	17	Pattonieri V	1	154
27	Smereka J	6	33	Perrone G	1	154
28	Soar J	6	137	Petrini F	1	154
29	Szarpak L	6	26	Pifferi B	1	154
30	Ansaloni L	5	177	Scandroglio I	1	154



Three field plot: Authors, Titles and Journals



Co-Authorship Pattern



Bibliographic Coupling of Authors

## **Highly Cited papers**

The most cited papers in Covid-19 and Emergency Medicine were evaluated in this section. The most top 10 highly-cited papers have received citations from 52 to 182 during 2020-2021. These 10 highly cited papers have received 885 citations, with an average of 88.5 citations per paper. Of these 104 papers citation range is 10-182 and 449 papers there is no Citation. The most cited one was “Cardiovascular complications in COVID-19”, AMERICAN JOURNAL OF EMERGENCY MEDICINE. 2020 JUL; 38 (7): 1504-1507 by Long B, Brady WJ, Koyfman A, Gottlieb M, from Brooke Army Medical Centre, Department Emergency Medicine, 3841 Roger Brooke Dr, Ft Sam Houston, TX 78234 USA with 182 Citations followed by Coccolini F, Perrone G, Chiarugi M, Di Marzo F, Ansaloni L, et al. “Surgery in COVID-19 patients: operational directives”, WORLD JOURNAL OF EMERGENCY SURGERY. 2020 APR 7; 15 (1): Art. No. 25 from Pisa University Hospital, Emergency Surgery Unit, Pisa, Italy with 154 Citations. The most cited one from India is Haleem A, Javaid M, Vaishya R, Deshmukh SG from Jamia Millia Islamia, Department of Mechanical Engineering, New Delhi, India, “Areas of academic research with the impact of COVID-19”, AMERICAN JOURNAL OF EMERGENCY MEDICINE. 2020 JUL; 38 (7): 1524-1526 with 46 Citations.

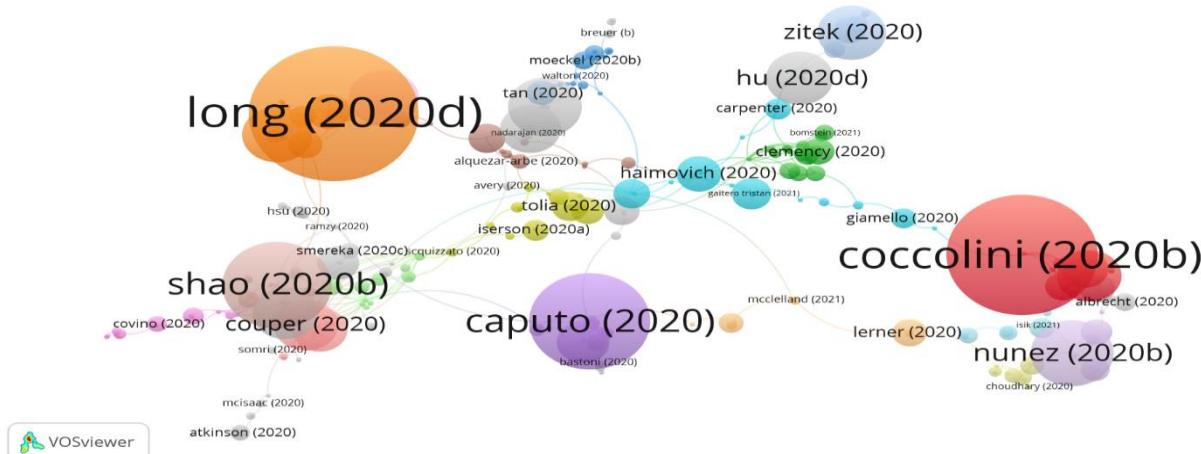
**Table 5: Highly Cited papers from global level**

#	Date / Author / Journal	GCS
1	170 Long B, Brady WJ, Koyfman A, Gottlieb M, Cardiovascular complications in COVID-19, AMERICAN JOURNAL OF EMERGENCY MEDICINE. 2020 JUL; 38 (7): 1504-1507	182
2	46 Coccolini F, Perrone G, Chiarugi M, Di Marzo F, Ansaloni L, et al. Surgery in COVID-19 patients: operational directives, WORLD JOURNAL OF EMERGENCY SURGERY. 2020 APR 7; 15 (1): Art. No. 25	154
3	49 Caputo ND, Strayer RJ, Levitan R Early Self-Proning in Awake, Non-intubated Patients in the Emergency Department: A Single ED's Experience During the COVID-19 Pandemic ACADEMIC EMERGENCY MEDICINE. 2020 MAY; 27 (5): 375-378	114
4	134 Shao F, Xu S, Ma XD, Xu ZM, Lyu JY, et al., In-hospital cardiac arrest outcomes among patients with COVID-19 pneumonia in Wuhan, China, RESUSCITATION. 2020 JUN; 151: 18-23	98
5	210 Nunez JH, Sallent A, Lakhani K, Guerra-Farfan E, Vidal N, et al. Impact of the COVID-19 Pandemic on an Emergency Traumatology Service: Experience at a Tertiary Trauma Centre in Spain	66

	INJURY-INTERNATIONAL JOURNAL OF THE CARE OF THE INJURED. 2020 JUL; 51 (7): 1414-1418	
6	41 Cao YB, Li Q, Chen J, Guo X, Miao C, et al. Hospital Emergency Management Plan During the COVID-19 Epidemic ACADEMIC EMERGENCY MEDICINE. 2020 APR; 27 (4): 309-311	57
7	83 Chowdhury MDS, Rathod J, Gernsheimer J A Rapid Systematic Review of Clinical Trials Utilizing Chloroquine and Hydroxychloroquine as a Treatment for COVID-19 ACADEMIC EMERGENCY MEDICINE. 2020 JUN; 27 (6): 493-504	55
8	627 Boserup B, McKenney M, Elkbuli A , Alarming trends in US domestic violence during the COVID-19 pandemic AMERICAN JOURNAL OF EMERGENCY MEDICINE. 2020 DEC; 38 (12): 2753-2755	55
9	159 Casey K, Iteen A, Nicolini R, Auten J , COVID-19 pneumonia with hemoptysis: Acute segmental pulmonary emboli associated with novel coronavirus infection, AMERICAN JOURNAL OF EMERGENCY MEDICINE. 2020 JUL; 38 (7): Art. No. 1544.e1	52
10	335 Henry BM, Aggarwal G, Wong J, Benoit S, Vikse J, et al. Lactate dehydrogenase levels predict coronavirus disease 2019 (COVID-19) severity and mortality: A pooled analysis, AMERICAN JOURNAL OF EMERGENCY MEDICINE. 2020 SEP; 38 (9): 1722-1726	52

**Table 6: Highly Cited paper from India**

#	Date / Author / Journal	GCS
1	173 Haleem A, Javaid M, Vaishya R, Deshmukh SG Areas of academic research with the impact of COVID-19 AMERICAN JOURNAL OF EMERGENCY MEDICINE. 2020 JUL; 38 (7): 1524-1526	46
2	336 Sahu AK, Amritanand VT, Mathew R, Aggarwal P, Nayer J, et al. COVID-19 in health care workers - A systematic review and meta-analysis AMERICAN JOURNAL OF EMERGENCY MEDICINE. 2020 SEP; 38 (9): 1727-1731	26
3	164 Qureshi AI, Abd-Allah F, Al-Senani F, Aytac E, Borhani-Haghghi A, et al. Management of acute ischemic stroke in patients with COVID-19 infection: Insights from an international panel, AMERICAN JOURNAL OF EMERGENCY MEDICINE. 2020 JUL; 38 (7): Art. No. 1548.e5	13



**Citation Network of Documents**

## **SUMMARY AND CONCLUSION**

All Scientists together have published 991 papers in Covid-19 and Emergency Medicine during 2020-2021. USA lead with share of 38.6% followed far by Italy, UK, Canada Spain, Australia, Germany, China, France and Turkey (their global publication share ranging from 3.5 % to 5.9%), India ranks 14<sup>th</sup> positions with global publications share of 1.7 %. India highly collaborated with USA, Egypt, Saudi Arabia, Turkey, Iran, Italy Turkey, Taiwan, China, Poland, South Korea, Pakistan etc., The top most preferred and Impact Journals are: ANNALS OF EMERGENCY MEDICINE (IF: 5.35) with 97 publications followed by RESUSCITATION (IF: 4.57) with 77. The overall H-Index is 30. India is far behind in terms of publication output, citation quality and share of international collaborative papers in Covid-19 and Emergency Medicine when compared to other countries with an emerging economy. There is an urgent need to substantially increase the research activities in the field of Covid-19 and Emergency Medicine.

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