

Research output on Coronavirus: The Indian Perspective

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Abstract

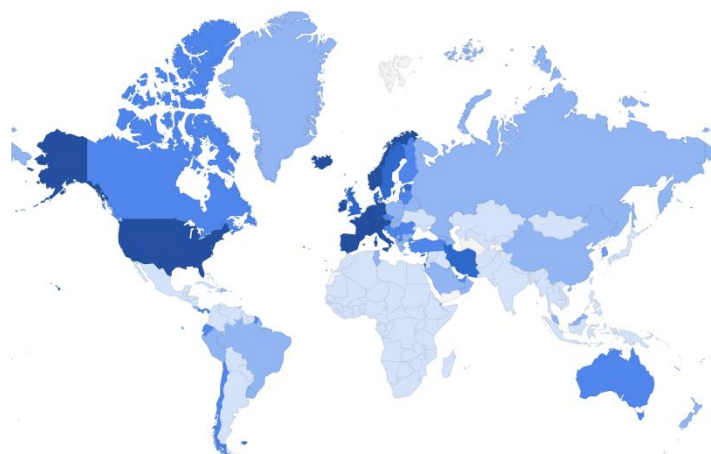
This paper examines the publications on Coronavirus from India indexed in web of science online database. The search term “Coronavirus” or “COVID 19” with topic field has been used as keyword and limited to India. A total of 281 unique records over the year 1975–2020 have been downloaded and analyzed under various categories considered for this study. The highest number of articles are published in the year 2016, 2017, 2018 and 2019. Year 2015 has highest number of Citations with 531 for 17 (6.2 %) Publications. The study found that 1369 authors concentrated the research in this field and 281 papers published in indexed journals. International Centre for Genet Engineering & Biotechnology stood in the first with the highest number of publications with 20 (7.3 %) and received 549 Citations followed by All India Institute of Medical Science with 12 (4.4 %) Publications and received 67 Citations, Guru Ghasidas Vishwavidyalaya with 10 (3.7%) Publications and received 482 Citations, Indian Institute of Technology with 10 (3.7 %) Publications and received 86 Citations, University of Delhi with 8(2.9 %) Publications and received 128 Citations, Indian Institute of Science with 6 (2.2%) and received 61 Citations. India has collaborated with 38 countries. CSIR, DBT India, UGC, USDHHS, DST India and ICMR are most funded agencies in the field of Coronavirus. Furthermore, this study also identified that document wise distribution, Journal wise, institution with subdivision wise, and geographical collaboration of the literature and citation analysis is also distinguished.

Keywords: Scientometrics, Coronavirus, Citations, Bibliometrics

1.0 INTRODUCTION

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered Coronavirus. Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness. The best way to prevent and slow down transmission is be well informed about the COVID-19 virus, the disease it causes and how it spreads. Protect yourself and others from infection by washing your hands or using an alcohol

based rub frequently and not touching your face. The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, so it's important that you also practice respiratory etiquette (for example, by coughing into a flexed elbow). At this time, there are no specific vaccines or treatments for COVID-19. However, there are many ongoing clinical trials evaluating potential treatments. 16,99,019 confirmed by Coronavirus and deaths are 1,02,774 people by globally, India confirmed 7447 and Deaths 239 (WHO 2020).



Scientometric approaches is measuring and mapping research activities and outputs, used to (i) track the temporal and spatial development of research fields and topics, (ii) assess the productivity and impact of researchers and research institutions, as well as (iii) study patterns in gender balance in academia, interdisciplinary, and peer review processes. Methods of research include qualitative, quantitative and computational approaches. *Scientometric* tools could be used to measure and compare the research activities at a range of levels of aggregation including Institutions, scientist work, sectors, countries, highly cited paper and Citations. This could also be used to measure research collaborations, to map scientific networks and to monitor the evolution of scientific fields. Scientometric is a age of research and expedition in every field of knowledge. The consequent increase in the production of information is best reflected in the literature of every discipline.

S. Laksham et al. (2020) presents the global level perspective of Coronavirus research output during the period of 1989 to March 2020 and these analyses included year wise research growth, global publication share and patterns of research communication channels and the most productive journals. Data was extracted from the Web of Science citation database using the

search string of “Coronavirus” OR “Covid 19” and limited to Open Access Publications during 1989 to 2020, a total of 7381 publications were retrieved. The highest numbers of publications (561) were published in 2019, which have received 848 citations. Thus this article can be concluded by collaborative author’s productivity dominates compared to the single author’s contribution. On the basis of literature analysis around the world, it is found that the 7381 publications came from 127 countries. United States (USA) is the most productive country with 2801 publications (37.9% and received 107738 Citations. India (80) has to improve in the field of Coronavirus research in future. The research articles published in peer-reviewed journals of Open Access will create a global impact on the Country, Institutions with subdivision and scientists. These contributions will help the research community to get required information for the research and encourage the researcher in the field of Coronavirus.

Kagan, D. et al. (2020). COVID-19 is the most rapidly expanding coronavirus outbreak in the past two decades. To provide a swift response to a novel outbreak, prior knowledge from similar outbreaks is essential. Here, we study the volume of research conducted on previous coronavirus outbreaks, specifically SARS and MERS, relative to other infectious diseases by analyzing over 45 million papers from the last 20 years. Our results demonstrate that previous coronavirus outbreaks have been understudied compared to other viruses. We also show that the research volume of emerging infectious diseases is very high after an outbreak and drops drastically upon the containment of the disease. This can yield inadequate research and limited investment in gaining a full understanding of novel coronavirus management and prevention. Independent of the outcome of the current COVID-19 outbreak, believe that measures should be taken to encourage sustained research in the field.

2.0 STRUCTURE OF RESEARCH DESIGN

The research design is analytical that adopts detailed analysis of secondary data using a range of bibliometric and scientometric tools, techniques and formula along with standard statistical techniques.

2.1 OBJECTIVES OF THE STUDY

The major objectives are framed with the exclusive notion of the present study as mentioned below:

- To identify the pattern of distribution of Coronavirus research output in India.
- To examine the effectiveness of various sources of research publications.
- To examine the growth of research productivity of Coronavirus during 1975 - 2020.
- To identify the authorship pattern of Coronavirus research output in India.
- To identify the Document type and Journal wise distribution of publications.
- To identify the highly cited papers in the field of Coronavirus.
- To identify the country-wise collaboration of publications.
- To assess the Institution wise research concentration of Coronavirus.
- To identify the subject categories and Funding Agencies.
- To identify the highly cited paper from India.

2.2 Methodology

The present study is carried out about the source documents and research output. The required data was collected from Web of Science online database for the period 1975 - 2020. It can be seen that nearly 281 publications were published. There is increasing regularity in publications in this area and researcher has got the data from the year of 1975 and taken for the analysis. In the present study the research output on Coronavirus publication is taken as a tool to evaluate the performance at various levels.

Description	Results
Documents	281
Sources (Journals, Books, etc.)	179
Period	1975 - 2020
Average citations per documents	13.32
Authors	1062
Author Appearances	1389
Authors of single-authored documents	19
Authors of multi-authored documents	1043
Single-authored documents	21
Documents per Author	0.265
Authors per Document	3.78

3. DATA ANALYSIS AND INTERPRETATIONS

Year wise Publications and Citations

To analyse the year wise publication of research on Coronavirus in India, the data has been presented in below table 1. The table depicts the research output in the comprehensive level. From the below table, we could clearly see that during the period 1975 - 2020 a total of 281 publications were published. After 2003, there is increasing regularity in publications in this area, but the researcher has got the data from the year of 1975 and taken for the analysis. In the present study the research output on Coronovirus publication is taken as a tool to evaluate the performance at various levels. Year 2019 has highest number of publications with 29 (10.6%) and received 70 Citations and Average Citation per Paper (ACPP) value is 2.41 followed by 2017 with 27 (9.9 %) records and received 351 Citations and Average Citation per Paper (ACPP) value is 13.00. Year 2015 has highest number of Citations with 531 for 17 (6.2 %) Publications with followed by 2017 with 351 citations for 27 (9.9 %) publications (ACPP is 13.00), 2008 with 340 Citations and ACPP value is 30.91, 2004 with 303 citations (ACPP is 37.88). After 2004 the highest number of Citations recorded by the researchers and publications start with 1975.

Table 1 shows that Year wise distribution of Publication on Coronavirus

Publications					Citations					
Year	Records	%	TGCS	#	Year	Records	%	TLCS	TGCS	ACPP
2019	29	10.6	70	1	2015	17	6.2	12	531	31.24
2017	27	9.9	351	2	2017	27	9.9	3	351	13.00
2016	23	8.4	295	3	2008	11	4.0	4	340	30.91
2018	23	8.4	96	4	2004	8	2.9	12	303	37.88
2015	17	6.2	531	5	2016	23	8.4	2	295	12.83
2020	16	5.9	5	6	2009	8	2.9	0	250	31.25
2014	15	5.5	176	7	2014	15	5.5	2	176	11.73
2008	11	4.0	340	8	2005	4	1.5	6	174	43.50
2010	11	4.0	132	9	2012	10	3.7	4	172	17.20
2007	10	3.7	144	10	2011	7	2.6	4	156	22.29
2012	10	3.7	172	11	2007	10	3.7	7	144	14.40
2004	8	2.9	303	12	2010	11	4.0	2	132	12.00
2009	8	2.9	250	13	2013	8	2.9	2	120	15.00
2013	8	2.9	120	14	1997	1	0.4	0	103	103.00
2003	7	2.6	42	15	2018	23	8.4	1	96	4.17
2011	7	2.6	156	16	2006	3	1.1	4	77	25.67

2005	4	1.5	174	17	1995	3	1.1	0	71	23.67
1983	3	1.1	10	18	2019	29	10.6	0	70	2.41
1993	3	1.1	14	19	2003	7	2.6	3	42	6.00
1995	3	1.1	71	20	2002	3	1.1	0	37	12.33
1998	3	1.1	10	21	1976	2	0.7	0	29	14.50
2002	3	1.1	37	22	1982	2	0.7	0	14	7.00
2006	3	1.1	77	23	1993	3	1.1	2	14	4.67
1976	2	0.7	29	24	1983	3	1.1	0	10	3.33
1982	2	0.7	14	25	1998	3	1.1	1	10	3.33
1990	2	0.7	6	26	1994	1	0.4	0	8	8.00
1975	1	0.4	0	27	1990	2	0.7	4	6	3.00
1980	1	0.4	0	28	2020	16	5.9	1	5	0.31
1981	1	0.4	2	29	1981	1	0.4	0	2	2.00
1984	1	0.4	1	30	1984	1	0.4	0	1	1.00
1987	1	0.4	0	31	1988	1	0.4	0	1	1.00
1988	1	0.4	1	32	1996	1	0.4	0	1	1.00
1994	1	0.4	8	33	1975	1	0.4	0	0	0.00
1996	1	0.4	1	34	1980	1	0.4	0	0	0.00
1997	1	0.4	103	35	1987	1	0.4	0	0	0.00
2001	1	0.4	0	36	2001	1	0.4	0	0	0.00

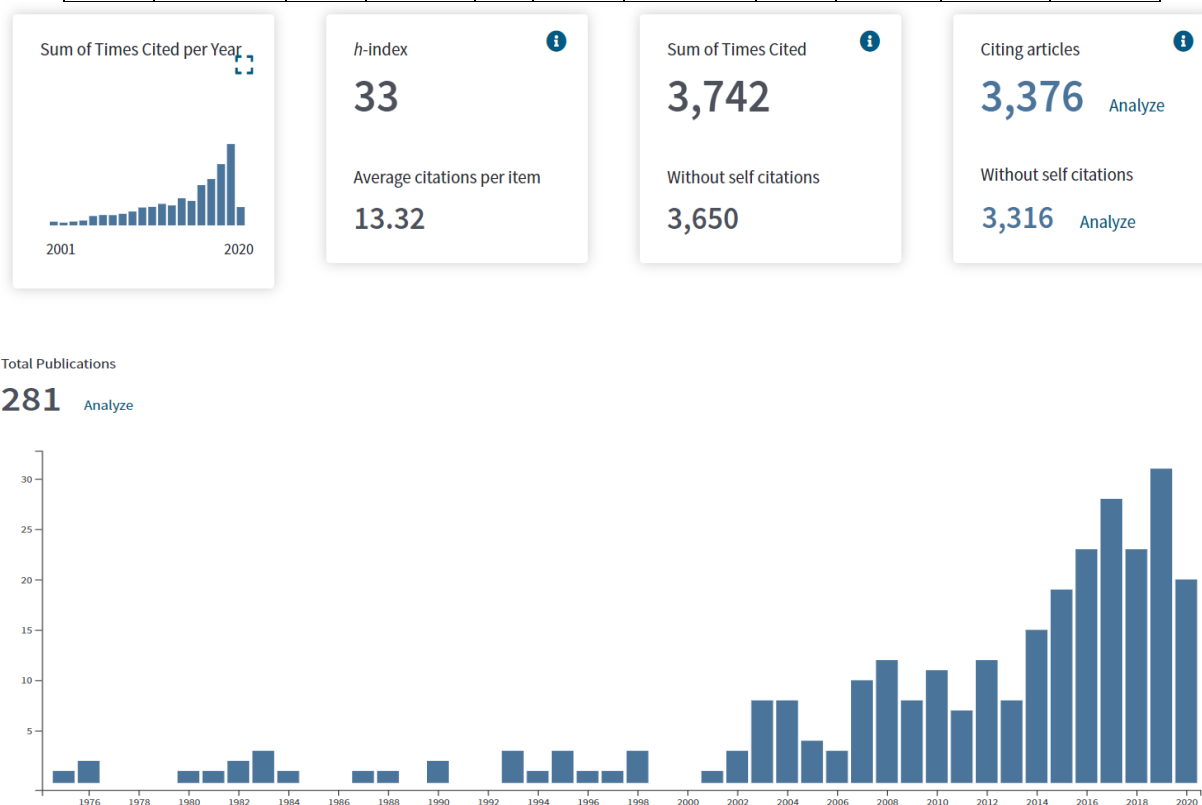


Figure 1 shows year wise distribution of Publications in Coronavirus

Geographical wise research collaboration in Coronavirus

Table 2 shows the list of Countries collaboration with Indian which are involved in producing the research material in the field of Coronavirus during 1975-2020. It is noted that out of the 281 records, it clearly explains that the USA has collaborated the highest records with 38 (Citations 417) and placed in first rank among other top counties. It is followed by Singapore has 16 records with 400 Citations and occupied second rank. China and UK are 14 records respectively (Citations 112 and 401). The result of the study clearly indicates that other countries should also be encouraged and concentrate the research collaboration. 2060 Citations are received through the collaboration of research from 38 Countries.

Table 2 Geographical wise research collaboration on Coronavirus

#	Country	Records	%	TGCS	ACPP		Country	Records	%	TGCS	ACPP
1	USA	38	13.9	417	10.97	21	Russia	2	0.7	2	1.00
2	Singapore	16	5.9	400	25.00	22	St Kitts & Nevi	2	0.7	2	1.00
3	China	14	5.1	112	8.00	23	Sweden	2	0.7	24	12.00
4	UK	14	5.1	401	28.64	24	Switzerland	2	0.7	14	7.00
5	Saudi Arabia	7	2.6	15	2.14	25	Bulgaria	1	0.4	1	1.00
6	Belgium	6	2.2	30	5.00	26	Egypt	1	0.4	4	4.00
7	Thailand	6	2.2	2	0.33	27	Germany	1	0.4	7	7.00
8	Australia	5	1.8	145	29.00	28	Hungary	1	0.4	1	1.00
9	Spain	5	1.8	19	3.80	29	Israel	1	0.4	2	2.00
10	Brazil	4	1.5	51	12.75	30	Latvia	1	0.4	10	10.00
11	Canada	4	1.5	20	5.00	31	Malaysia	1	0.4	3	3.00
12	Japan	4	1.5	27	6.75	32	Namibia	1	0.4	6	6.00
13	South Africa	4	1.5	57	14.25	33	New Zealand	1	0.4	10	10.00
14	France	3	1.1	49	16.33	34	Peru	1	0.4	7	7.00
15	Netherlands	3	1.1	44	14.67	35	Serbia	1	0.4	2	2.00
16	Romania	3	1.1	22	7.33	36	Taiwan	1	0.4	8	8.00
17	South Korea	3	1.1	26	8.67	37	Tanzania	1	0.4	7	7.00
18	Iran	2	0.7	0	0.00	38	Vietnam	1	0.4	4	4.00
19	Italy	2	0.7	106	53.00						
20	Nigeria	2	0.7	3	1.50						

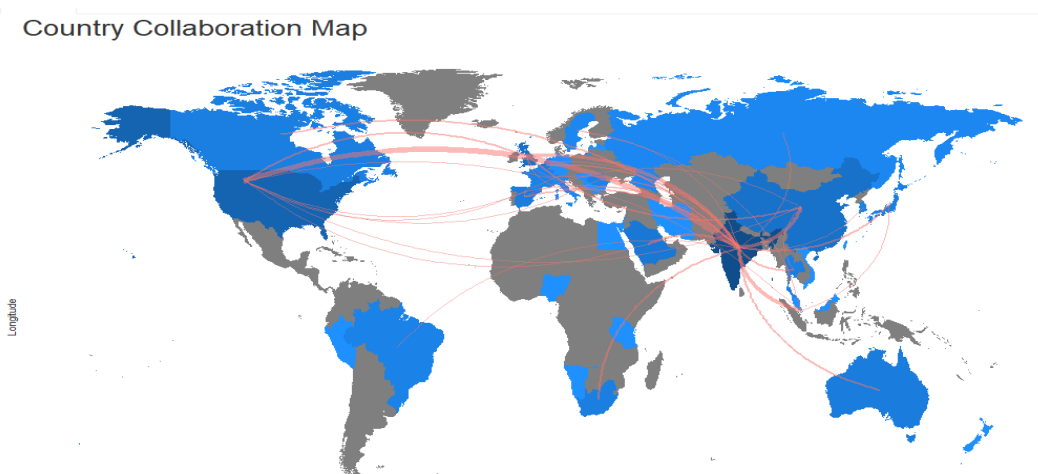


Figure 2 shows that Country wise Collaboration in Coronavirus research

Institution wise distribution of Publications and Citations

Table 3 indicates that the Institution wise distribution of total research output on Coronavirus research literature. International Centre for Genet Engineering & Biotechnology stood in the first with the highest number of publications with 20 (7.3 %) and received 549 Citations followed by All India Institute of Medical Science with 12 (4.4 %) Publications and received 67 Citations, Guru Ghasidas Vishwavidyalaya with 10 (3.7%) Publications and received 482 Citations, Indian Institute of Technology with 10 (3.7 %) Publications and received 86 Citations, University of Delhi with 8(2.9 %) Publications and received 128 Citations, Indian Institute of Science with 6 (2.2%) and received 61Citations. The study found that the highest number of Citations recorded by International Centre for Genet Engineering & Biotechnology with 549 followed by Guru Ghasidas Vishwavidyalaya with 482, National Institute of Virology with 186 and University of Delhi with 128. 15 Institutes are recorded more than 100 Citations and Citation rang is 1-549.

Table 3 shows that Institution wise distribution of Publications and Citations

#	Institution	Records	%	TLCS	TGCS
1	International Centre for Genet Engineering & Biotechnology	20	7.3	24	549
2	All India Institute of Medical Science	12	4.4	2	67
3	National University of Singapore (Collaboration)	12	4.4	19	363
4	Guru Ghasidas Vishwavidyalaya	10	3.7	6	482
5	Indian Institute of Technology	10	3.7	2	86
6	University of Delhi	8	2.9	1	128
7	Indian Institute of Science	6	2.2	3	61
8	CSIR	5	1.8	3	108
9	Dr DY Patil University	5	1.8	1	2

10	Hainan Med University	5	1.8	1	2
11	ICAR Indian Veterinary Research Institute	5	1.8	0	2
12	Indian Inst Science Education & Research Kolkata	5	1.8	1	10
13	Indian Vet Res Inst	5	1.8	0	17
14	University Penn	5	1.8	4	50
15	Nagarjuna University	4	1.5	1	34
16	National Institute of Virology	4	1.5	2	186
17	Thomas Jefferson University	4	1.5	0	41
18	Bose Inst	3	1.1	1	71
19	Chulalongkorn University	3	1.1	1	2
20	Grigore Antipa Natl Museum Nat Hist	3	1.1	3	22
21	Indian Inst Chemical Technology	3	1.1	1	45
22	Jamia Millia Islamia	3	1.1	0	69
23	Jawaharlal Nehru Univ	3	1.1	0	11
24	KMT Primary Care Ctr	3	1.1	1	1
25	Mangalayatan University	3	1.1	0	12
26	NIAID	3	1.1	0	12
27	Savitribai Phule Pune Univ	3	1.1	0	2
28	State University Ghent	3	1.1	1	13
29	University Hong Kong	3	1.1	3	16
30	University Mysore	3	1.1	0	63

Bibliographical Form wise distribution of Publications

The literature on the Topic “Coronavirus” has been published in different forms such as articles, Review, Letter, Editorial Materials, Notes, Correction, Meeting abstracts, Book Chapter etc. The main objective of this analysis is to know the forms in which the literature is being published. The study helps the information scientists or librarians in knowing the most productive form of literature on the topic “Coronavirus”. A total 281 publications 181 (66.6%) are Journal articles followed by Review 58 (21.2) and remaining Publications are published different forms. The study found that coronavirus publications are shared in 11 forms.

Table 4 shows that Bibliographical form wise distribution

#	Document Type	Records	%	TLCS	TGCS
1	Article	181	66.3	57	2182
2	Review	58	21.2	13	1463
3	Letter	8	2.9	5	21
4	Editorial Material	7	2.6	0	12
5	Article; Proceedings Paper	4	1.5	1	50
6	Note	3	1.1	0	4
7	Article; Early Access	2	0.7	0	1
8	Correction	2	0.7	0	1
9	Letter; Early Access	2	0.7	0	0
10	Meeting Abstract	2	0.7	0	0

11	Article; Book Chapter	1	0.4	0	3
12	Discussion	1	0.4	0	0
13	Review; Book Chapter	1	0.4	0	5
14	Review; Early Access	1	0.4	0	0

Source Title wise distribution of Publications

Below the table indicates that the Journal wise distribution of total research output on Coronavirus research literature. EUROPEAN JOURNAL OF MEDICINAL CHEMISTRY in the first journal with the highest number of publication with 19(7.0 %) and received 882 Citations and Impact Factor value is 4.81 with H-index value is 14 (G-Index 19) followed by INDIAN JOURNAL OF ANIMAL SCIENCES with 7 (2.6%) Publications and received 5 Citations, PLOS ONE with 6 (2.2) and recorded 142 Citations (H-index: 5 and G-index: 6). It is found that LANCET has the highest impact factor (59.10) followed by, Nature (43.07), BMJ-BRITISH MEDICAL JOURNAL (27.60), NUCLEIC ACIDS RESEARCH (11.15). The remaining less than 10 Impact factor journals are listed in the below table. 8 Journals recorded more than 100 Citations. Bradford postulated the division into three equal zones of one third article is each zone. Based on the Bradford law, each zone should follow a linear geometric expression in the form of $1: n : n^2$. On analysis of the data, it is found that the literature on neural network does not follow this rule and each zone represents the Bradford expression as 18: 66:90 which does not fit into the expression.

Table 5 shows that source wise publications, Citations and Indexes

#	Journal	Records	TGCS	GCS/t	h_index	g_index	m_index	PY_start
1	EUROPEAN JOURNAL OF MEDICINAL CHEMISTRY – (IF: 4.81)	19	882	183.12	14	19	1.27	2010
2	INDIAN JOURNAL OF ANIMAL SCIENCES	7	5	0.80	1	1	0.03	1988
3	PLOS ONE –(IF: 2.77)	6	142	15.42	5	6	0.42	2009
4	HYDROBIOLOGIA (IF:2.05)	5	35	1.19	4	5	0.09	1976
5	INDIAN JOURNAL OF MEDICAL RESEARCH (IF:2.06)	5	9	2.11	2	2	0.05	1982
6	JOURNAL OF MEDICAL VIROLOGY (IF: 2.37)	5	48	3.90	2	4	0.15	2008
7	INDIAN JOURNAL OF MEDICAL MICROBIOLOGY (0.98)	4	85	6.67	1	4	0.08	2008
8	INDIAN JOURNAL OF PEDIATRICS (1.13)	4	8	1.44	2	2	0.11	2003
9	JOURNAL OF VIROLOGY (4.32)	4	148	11.43	4	4	0.25	2005
10	LANCET (59.10)	4	132	10.82	3	4	0.17	2003
11	VIROLOGY – 2.65	4	57	3.56	4	4	0.22	2003
12	BIOCHEMISTRY – 2.95	3	26	2.75	3	3	0.21	2007
13	CAHIERS DE BIOLOGIE MARINE – 0.35	3	20	2.59	2	3	0.25	2013
14	CURRENT SCIENCE – 0.75	3	4	0.17	2	2	0.04	1975
15	INDIAN VETERINARY JOURNAL	3	6	0.19	1	2	0.03	1990

16	INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH	3	3	0.83	1	1	0.25	2017
17	JOURNAL OF BIOSCIENCES – 1.41	3	50	3.80	2	5	0.11	2003
18	JOURNAL OF GENERAL VIROLOGY – 2.80	3	81	7.22	3	3	0.21	2007
19	MEDICINAL CHEMISTRY RESEARCH – 1.72	3	20	3.26	2	3	0.29	2014
20	NUCLEIC ACIDS RESEARCH – 11.14	3	144	17.37	3	3	0.33	2012

Single Vs Multiple Authors

The table shows the details about the single and multi-authored papers. Out of total of 281, the maximum number of contributions i.e. 262 (93.24%) have been contributed by multiple authors and followed by the minimum number of contributions i.e. 19 (6.76%) by single author.

Table 6 shows that single Vs Multiple Authors Contribution of Publications

Authorship Pattern	Publications	%
Single Author	19	6.76
Multiple Authors	262	93.24
Total	281	100.00

The table shows the details about the degree of collaboration. Degree of collaboration is a prominent area of research in bibliometric or Scientometric studies which indicate trends in single and joint authorship during 1975 to March 2020, as shown in above Table. The average degree of collaboration is 0.93. The degree of collaboration is calculated by using the following formula (K. Subramanyam, 1982):

The formula is Where

C = Degree of Collaboration
 Nm = Number of multiple authors
 Ns = Number of single authors

$$C = \frac{N_m}{N_m + N_s}$$

$$C = \frac{262}{262+19} = 0.93$$

In the present study the value of C is C= 0.93

As a result, it was found that the degree of collaboration in the subject of Coronavirus is 0.93, which openly indicates its dominance upon multiple contributions.

Ranking of Authors based on Publications and Indexes

Table 7 presents the publications, Citation, h-index, g-index and m-index values and average CPP for first/top 30 authors. In the table indicates that the Author wise distribution of total research output on Coronavirus research literature. The author of “LAL SK” has produced 16 articles with 497 Citations (h –index value is 11 and g-index value is 16 followed by “BHARTI SK” has produced 10 articles with 573 Citations (h –index: 8 and g-index:10). Only 3 authors are produced more than 10 publications and 43 authors are recorded more than 100 Citations. The highest number citation recorded by Bharti SK with 573 followed by Asati V with 545, Lal SK with 497, Mahapatra DK with 386, Surjit M with 371 and Chow VTK with 340 Citations.

Table 7 shows that ranking of authors based on Publications and Indexes

Author	h_index	g_index	m_index	TC	NP	PY_start
LAL SK	11	16	0.65	497	16	2004
BHARTI SK	8	10	1.33	573	10	2015
DAS SARMA J	4	8	0.33	77	10	2009
ASATI V	7	9	1.17	545	9	2015
CHOW VTK	8	9	0.47	340	9	2004
MAHAPATRA DK	7	9	1.17	386	9	2015
SURJIT M	7	8	0.41	371	8	2004
JAMEEL S	5	6	0.29	219	6	2004
KUMAR P	4	6	0.24	97	6	2004
KUMAR S	1	1	0.25	5	6	2017
DHAMA K	1	4	0.11	22	5	2012
KUMAR R	4	5	0.14	95	5	1993
LIU BP	4	5	0.24	231	5	2004
MALIK YS	1	4	0.17	22	5	2015
PADHAN K	4	5	0.29	85	5	2007
SHINDLER KS	3	5	0.25	50	5	2009

Highly Cited papers

In the below table shows top 20 highly cited papers along with their Global Citations Scores, The highest number of Global Citations Scores 187 entitled on “Anti-cancer chalcones: Structural and molecular target perspectives EUROPEAN JOURNAL OF MEDICINAL

CHEMISTRY. 2015 JUN 15; 98: 69-114 by Mahapatra DK et al. and CR value is 261 followed by 143 Global Citations Scores entitled on PI3K/Akt/mTOR and Ras/Raf/MEK/ERK signaling pathways inhibitors as anticancer agents: Structural and pharmacological perspectives, EUROPEAN JOURNAL OF MEDICINAL CHEMISTRY. 2016 FEB 15; 109: 314-341 by Asati V., Mahapatra DK and Bharati SK. and CR value is 150, Paper 3 with 116 Global Citations Scores entitle on Plants as bioreactors for the production of vaccine antigens, BIOTECHNOLOGY ADVANCES. 2009 JUL-AUG; 27 (4): 449-467 and CR value is 232 and fourth with 115 entitled on A large outbreak of acute encephalitis with high fatality rate in children in Andhra Pradesh, India, in 2003, associated with Chandipura virus, LANCET. 2004 SEP 4; 364 (9437): 869-874 by Rao BL, Basu A, Wairagkar NS, Gore MM, Arankalle VA, et al.

Table 8 shows that highly Cited papers in Coronavirus from India

Paper	Total Citations	TC per Year
MAHAPATRA DM, 2015, EUR J MED CHEM	187	31.1667
ASATI V, 2016, EUR J MED CHEM	143	28.6
TIWARI S, 2009, BIOTECHNOL ADV	116	9.6667
RAO BL, 2004, LANCET	115	6.7647
JEFFERSON T, 2008, BMJ-BRIT MED J	104	8
RAJ GD, 1997, AVIAN PATHOL	103	4.2917
AKHTAR J, 2017, EUR J MED CHEM	101	25.25
MAHAPATRA DK, 2015, EUR J MED CHEM	95	15.8333
SURJIT M, 2004, BIOCHEM J	84	4.9412
SRIKANTH P, 2008, INDIAN J MED MICROBI	83	6.3846
SACHDEVA G, 2005, BIOINFORMATICS	76	4.75
THAKUR N, 2012, NUCLEIC ACIDS RES	73	8.1111
SURJIT M, 2006, J BIOL CHEM	72	4.8
MAHAPATRA DK, 2015, EUR J MED CHEM-a	69	11.5
SHI T, 2015, J GLOB HEALTH	67	11.1667
SURJIT M, 2005, J VIROL	65	4.0625
JOSHI P, 2011, J COLLOID INTERF SCI	64	6.4
SURJIT M, 2004, BIOCHEM BIOPH RES CO	64	3.7647
SURJIT M, 2007, J VIROL	54	3.8571
RAJ H, 1995, J PHYSIOL-LONDON	53	2.0385

Subject wise distribution of Publications

The Indian research output on Coronavirus during 1975–2020 has been published in context of 81 subjects according to Web of Science Subject categories. The highest number of publications output coming from Chemistry Medicinal 35 (12.46%) followed by Virology with 26 publications (9.25%), Biochemistry Molecular Biology with 22 (7.8%), Immunology with 21 (7.47%). The study found that 16 subject categories recorded more than 10 publications.

Table 9 shows that Subject wise distribution of Publications

Subject Categories	records	% of 281
CHEMISTRY MEDICINAL	35	12.456
VIROLOGY	26	9.253
BIOCHEMISTRY MOLECULAR BIOLOGY	22	7.829
IMMUNOLOGY	21	7.473
PHARMACOLOGY PHARMACY	16	5.694
INFECTIOUS DISEASES	15	5.338
MARINE FRESHWATER BIOLOGY	15	5.338
MULTIDISCIPLINARY SCIENCES	14	4.982
MEDICINE GENERAL INTERNAL	13	4.626
MICROBIOLOGY	13	4.626
VETERINARY SCIENCES	13	4.626
BIOLOGY	12	4.270
MEDICINE RESEARCH EXPERIMENTAL	12	4.270
BIOTECHNOLOGY APPLIED MICROBIOLOGY	11	3.915
PUBLIC ENVIRONMENTAL OCCUPATIONAL HEALTH	11	3.915
CHEMISTRY MULTIDISCIPLINARY	10	3.559

Funding wise distribution of Publications

Table 10 shows that the COUNCIL OF SCIENTIFIC INDUSTRIAL RESEARCH CSIR INDIA leads the table with (19) 6.76% of publications being featured in the funding agency followed by the DEPARTMENT OF BIOTECHNOLOGY DBT INDIA with (18) 6.40% publications, UNIVERSITY GRANTS COMMISSION INDIA with (18) 6.40% of publications, UNITED STATES DEPARTMENT OF HEALTH HUMAN SERVICES with (13) 4.62 % of Publications, DEPARTMENT OF SCIENCE TECHNOLOGY INDIA and INDIAN COUNCIL OF MEDICAL RESEARCH with (11) 3.91

% of publications. The study found that 137 funding agencies are supported for Coronavirus Research.

Table 10 shows that funding agencies wise distribution of Publications

Funding Agencies	records	% of 281
COUNCIL OF SCIENTIFIC INDUSTRIAL RESEARCH CSIR INDIA	19	6.762
DEPARTMENT OF BIOTECHNOLOGY DBT INDIA	18	6.406
UNIVERSITY GRANTS COMMISSION INDIA	18	6.406
UNITED STATES DEPARTMENT OF HEALTH HUMAN SERVICES	13	4.626
DEPARTMENT OF SCIENCE TECHNOLOGY INDIA	11	3.915
INDIAN COUNCIL OF MEDICAL RESEARCH	11	3.915
NATIONAL INSTITUTES OF HEALTH NIH USA	9	3.203
CENTERS FOR DISEASE CONTROL PREVENTION USA	4	1.423
DEPARTMENT OF BIOTECHNOLOGY	4	1.423
NATIONAL MULTIPLE SCLEROSIS SOCIETY	4	1.423
DOP MINISTRY OF CHEMICALS FERTILIZERS GOVT OF INDIA	3	1.068
DST GRANT FROM DEPARTMENT OF SCIENCE AND TECHNOLOGY GOVT OF INDIA	3	1.068
ASM IUSSTF INDO US RESEARCH PROFESSORSHIP AWARD	2	0.712
DUPRE FELLOWSHIP MULTIPLE SCLEROSIS SOCIETY INTERNATIONAL FEDERATION MSIF UK	2	0.712
EUROPEAN COMMISSION JOINT RESEARCH CENTRE	2	0.712
IISER KOLKATA	2	0.712
IMI	2	0.712
MINISTRY OF SCIENCE AND TECHNOLOGY GOVERNMENT OF INDIA	2	0.712
NATIONAL NATURAL SCIENCE FOUNDATION OF CHINA	2	0.712
NATIONAL OCEANIC ATMOSPHERIC ADMIN NOAA USA	2	0.712
NOAA S CENTER	2	0.712
RESEARCH TO PREVENT BLINDNESS RPB	2	0.712
SPANISH GOVERNMENT	2	0.712
UNIVERSITY OF DELHI	2	0.712

FINDINGS AND CONCLUSION

Based on the analysis undertaken the present study reveals the following findings:

- The study found that 281 publications are published on Coronavirus from India.
- It found that 1369 authors are contributed in the field of Coronavirus and they referred 14894 publications as reference.
- It found that 76 citations are cited within the collection.
- It found that and 7 papers are received 100 above citations and 21 papers are recorded more than 50.

- The study found that the COUNCIL OF SCIENTIFIC INDUSTRIAL RESEARCH CSIR INDIA leads with (19) 6.76% of publications being featured in the funding agency followed by the DEPARTMENT OF BIOTECHNOLOGY DBT INDIA with (18) 6.40% publications, UNIVERSITY GRANTS COMMISSION INDIA with (18) 6.40% of publications.
- The study found that the highest number of publications output coming from Medical Chemistry 35 (12.46%). The study found that 16 subject categories recorded more than 10 publications.
- It found that Total number of publications is 281 and 3742 times cited by others scientist, its average citation value is 13.32. The overall years h – index value is 33.
- The study found that International Centre for Genet Engineering & Biotechnology stood in the first with the highest number of publications with 20 (7.3 %) and received 549 Citations The study found that the highest number of Citations recorded by International Centre for Genet Engineering & Biotechnology with 549 followed by Guru Ghasidas Vishwavidyalaya with 482. 15 Institutes are recorded more than 100 Citations and Citation rang is 1-549.
- It found that funding agencies such CSIR, DBT India, UGC, USDHHS, DST India and ICMR are most funded agencies in the field of Coronavirus.
- It found that the highest number citation recorded by Bharti SK with 573 followed by Asati V with 545, Lal SK with 497, Mahapatra DK with 386, Surjit M with 371 and Chow VTK with 340 Citations.

The research articles published in peer-reviewed journals will create a global impact on the Country, Institutions with subdivision and scientists. These contributions will help the research community to get required information for the research. Perhaps, the institutions as well as authors will get an opportunity to collaborate with regional, national and international research institutions and scientists. This is very much useful not only for the information manager in finalizing the subscription list of periodicals but also for the research scholars as they tend to know the countries that are leaders in their respective field of research.

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