Bibliometric Analysis of Contribution of South Asian Countries in Research Conducted on COVID-19

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Abstract: Researchers worldwide are striving hard to find a solution for the corona viruspandemic and reduce the fatalities from this severe outbreak. The purpose of thisresearch paper is to evaluate and visualize the published documents about coronavirus research, based on extracted data from SCOPUS database. The study was conducted by using bibliometric method. Data was collected using SCOPUS database from December, 2019 to January, 2022. The main objectives of the study were to know the status of Bibliometric Analysis of Contribution of South Asian Countries in Research on COVID-19. The main method to obtain the result of the present investigations were using SCOPUS database from December, 2019 to January, 2022. A systematic review of literature was performed using the Scopus database. The search terms (covid OR "COVID 19" OR covid-19 OR covid19 OR "2019 nCoV" OR 2019-ncov OR "SARS Coronavirus 2" OR sars-cov-2 OR 2019 novel AND coronavirus) were used and searched for in the title field.The main findings of the study were the number of publications on covid 19 rapidly increases from 2018 to 2021. In 2018 the number was only 1 whereas in in 2021 it increases up to 15185. India topped the list among south asian countries in bibliometric research on covid-19. The most number of articles/research papers were published in English language 22897 followed by Spanish only 27 research papers. As far as top co authorship of authors is concerned Wiwanitkit, V. topped the list among all authors with 6610 citations.

Keywords: COVID-19, South Asian Countries, Pandemic, Bibliometric, SCOPUS database;

1. Introduction

After an article is published, how much influence does it have? How can you measure the article's impact? *Bibliometrics* is the answer. Bibliometrics can be used for books, websites, monographs, conference proceedings, policy statements, even patents. In the health field, bibliometrics are mostly used to measure the influence or impact of research articles. Bibliometric methods estimate how much influence or impact a selected research article has on future research. It usually does this by counting the number of times the article is cited after it is published.

The concept is that if a research article, called the source item, is cited in a future article, then it must have influenced the researchers who produced the future (downstream) article. Being cited by another researcher indicates that the source researcher is having an impact on the science: The research product is being used by others to create even more information. If a source item is cited many times, it must mean that its publication was useful to many people and has high impact. High impact is felt to reflect high value.

Human coronaviruses (HCoVs) were first observed in the 1960s among patients with thecommon cold (Su & et al., 2016). There are different kinds of HCoVs, out of which Van der Hoekand, et al. (2004) reported three types of human coronaviruses: coronavirus 229E (HCoV-229E), HCoV-OC43, and Severe Acute Respiratory Syndrome (SARS)-associated coronavirus (SARS-CoV). Also, Su & et al. (2016) reported two kinds of HCoVs, namely "Severe AcuteRespiratory Syndrome (SARS) " and "Middle East Respiratory Syndrome (MERS) ".The recent outbreak of human coronavirus disease (COVID-19) was first reported from Wuhan, in China, on December 31, 2019 (World health organization (WHO, 2020a). The outbreak was declared a public health emergency of international concern on January 30 2020(WHO, 2020 b). Based on the latest data up to December 12 2020, there were 71,612,109 reported cases of COVID-19 globally and 1,604,565 deaths (Worldometers, 2020). As the statistics indicate, the coronavirus disease has severely affected the lives of human beings in this decade, especially towards the end of 2019 and the start of 2020. The disease has started an outbreak in almost all countries around the world, and therefore massive global, national, institutional and individual efforts are required to control and conquer this pandemic. One of the important works to find solutions to this problem is to do research. Isaac Newton in 1676 had famously said, "If I have seen further, it is by standing on the shoulders of Giants" (Pu& et al., 2015). This metaphor is used for discovering the truth by building on prior discoveries, which has become a guiding principle for scientific progress and investigation. It also implies that researchers conduct their research projects based on previously published works. Moreover, the number of research publications produced worldwide are so enormous and ever increasing. This scenario demands the need to filter and distinguish the core actors of scientific society, to choose the best ones for their future research. Bibliometrics, the study of measuring and analyzing scientific literature, enables us to identify the essential works, researchers, institutions, countries, and concepts. Using this method, it is possible to systematically analyze the published documents on coronavirus and identify the leading authors, institutions, and countries in this area and throw light on what the authors had focused on what topics and which topics need attention.

The South Asian Association for Regional Cooperation (SAARC) is an economic and political organization of eight countries in South Asia. It was established in 1985 when the Heads of State of Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka formally adopted the charter. Afghanistan joined as the 8th member of SAARC in 2007. To date, 18th Summits have been held and Nepal’s former Foreign Secretary is the current Secretary General of SAARC.

Cooperation in SAARC is based on respect for the five principles of sovereign equality, territorial integrity, political independence, non-interference in internal affairs of the Member States and mutual benefit. Regional cooperation is seen as a complement to the bilateral and multilateral relations of SAARC Member States. SAARC Summits are held annually and the country hosting the Summit holds the Chair of the Association. Decisions are made on an unanimity basis while bilateral and contentious issues are excluded from the deliberations of SAARC. In addition to the eight Member States, nine Observer States join SAARC Summits:

China, the US, Myanmar, Iran, Japan, South Korea, Australia, Mauritius and the European Union.

2. Objectives of the Study

The main objectives of the study were as follows

1. To know the status of Bibliometric Analysis of Contribution of South Asian Countries in Research on COVID-19.
2. To know the year wise number of publications and subject areas explored by previous investigators.
3. To find out the country wise number of publications and find out the difference among them.
4. To explore the languages in which number of publications were carried out and top co-authorship analysis, Citation Analysis of Source Journals and Network view of Journals.

3. Scope of the Study

The study was conducted by using bibliometric method. Data was collected using SCOPUS database from December, 2019 to January, 2022.

4. Review of Related Literature

Academic publications have become the trademark of Science and Technology (S&T) information at the advanced level of national development. Till date, various studies have been undertaken which use scholarly publications to measure the technical and scientific output ofSAARC countries. **Gupta B M and Bala A (2013)** studied the outputs of S&T collaborationsamong South Asian countries by analysing authored research papers published during theperiod 1992–1999 in the journals covered by Science Citation Index. They found that India hadstronger collaborative linkage with all the other SAARC nations, but the collaborations wererestricted to a few subject areas. **Mahbuba and Rousseau (2010)** presented a comparative analysisbetween Bangladesh, Pakistan and Sri Lanka with India, by analysing the Web of Science(WoS) and Scopus data. They observed that India has got the maximum number of WoSpublications followed by Pakistan, Bangladesh and Sri Lanka. But based on the comparativeanalysis of the relative quality indicator, they found that Sri Lanka is the best performer amongthe four countries. Many recent articles have also used patent as an indicator to measure theS&T output, but most of those studies compared India with China or other developing Asiancountries. (Tarakanta, Siddhartha, Wadia, Bindal, &Tripathi, 2014) **Grisel Zacca-Gonzalez,Zaida Chinchilla-Rodriguez, Benjamin Vargas-Quesada and Felix de Moya-Anegon(2014)** Article is aimed to describe the regional distribution of output in Public Health, and thelevel of visibility and specialization, for Latin America. Data was obtained through the portal of SCImago Journal and Country Rank, using the category “Public Health, Environmental and Occupational Health”, in the period 1996-2011. Found that, the contribution

of Latin Americato the arsenal of world science lies more or less midway on the international scale in terms ofits output and visibility. Revealed as its greatest strengths is the high level of specialization inPublic Health and the sustained growth of output. The main limitations identified were arelative decrease in collaboration and low visibility. Collaboration is a key factor in thedevelopment of scientific activity in Latin America. **Dilruba Mahbuba and Ronald Rousseau (2010)** made a comparative study on three countries, they are India, Bangladesh and Pakistan.In this investigation, they make use of Web of Science (WoS) data as well as Scopus data(using the SCImago website). Special attention is given to collaboration data and the evolutionof country h-indices. Lists of most cited (in the WoS) articles are provided. These lists clearlyshow that India often is a partner in large multinational research groups (receiving aconsiderable amount of citations in this way), while this is not the case for Pakistan andBangladesh. According to SCImago (based on Scopus), India published most in the fields ofMedicine, Chemistry, Physics and Astronomy and Agricultural and Biological Sciences.Pakistan and Bangladesh publish most in the fields of Medicine and Agricultural and Biologicalsciences. **Gupta, BM, Dhawan SM and Ugrasen Singh (2009)** compared the status of socialscience research in India, China and Brazil using various indicators. It particularly focuses onthe analyses of annual average publication rate vis-à-vis global publication share; similarity inthe research profile of different countries; research priorities of countries as measured in termsof national publications output by sub-fields; relative share of international collaborative papersin the national output; distribution of research output by geographical regions within eachcountry; and characteristics of high productivity institutions and highly cited papers computedon select measures. Only 7 Indian institutions have shown publication growth rate higher thanthe average growth rate of the 19 institutions, 18 institutions were found as high productivity institutions in China in social science, each published 50 or more publications during 1996-2007 and Seventeen institutions in Brazil have been termed as high productivity institutions insocial sciences.

Literature review revealed that different authors have completed their bibliometric studywith only two or three countries in some cases region-wise, whereas none of the articles isconcerned to SAARC countries, so the author decided to select this topic for the study purpose.

5. Methodology

The study was conducted by using bibliometric method. Data was collected using SCOPUS database from December, 2019 to January, 2022. A systematic review of literature was performed using the Scopus database. The search terms (covid OR "COVID 19" OR covid-19 OR covid19 OR "2019 nCoV" OR 2019-ncov OR "SARS Coronavirus 2" OR sars-cov-2 OR 2019 novel AND coronavirus) were used and searched for in the title field. The search was limited to articles from South Asian countries published from January 1, 2020 to January 1, 2022. All electronic searches were performed on January 27, 2022.

6. Analysis and Interpretation of Data

Table 1: Showing Year wise number of publications

Year	Number of Publications
2021	15185
2020	7718
2019	4
2018	1

From the table 1 it has been shown the number of publications in the year 2018 was only one and gradually it increases to 15185 in the year 2021. This data indicates that the investigators have shown their interest in the field of bibliometric research on covid-19 in each proceeding year.

Table 2: Shows the subject area and number of Publications

Subject area	Number of publications
Medicine	12268
Biochemistry, Genetics and Molecular Biology	2930
Computer Science	2627
Social Sciences	2325
Engineering	1996
Pharmacology, Toxicology and Pharmaceutics	1727
Immunology and Microbiology	1461
Environmental Science	1314
Mathematics	1106
Business, Management and Accounting	853
Agricultural and Biological Sciences	800
Physics and Astronomy	775
Economics, Econometrics and Finance	759
Decision Sciences	646
Psychology	602
Chemistry	600
Multidisciplinary	555
Energy	553
Neuroscience	499
Materials Science	480
Nursing	474
Chemical Engineering	417
Health Professions	381
Dentistry	318
Arts and Humanities	317
Earth and Planetary Sciences	298
Veterinary	132

The table 2 is showing that bibliometric studies in the field of medicine tops the list and veterinary science was at the bottom. Biochemistry, Genetics and Molecular Biology was on the second number and computer science, Social Sciences, EngineeringPharmacology, Toxicology and Pharmaceutics,Immunology and Microbiology, Environmental Science, Mathematics, Business, Management and Accounting, Agricultural and Biological Sciences, Physics and Astronomy, Economics, Econometrics and Finance, Decision Sciences, Psychology, Chemistry, Multidisciplinary, Energy, Neuroscience, Materials Science, Nursing, Chemical Engineering, Health Professions, Dentistry, Arts & Humanities, Earth and Planetary Sciences and at the bottom was Veterinary Science.

Table 3 shows the document type and number of publications

Document type	Number of publications
Article	13588
Review	3472
Letter	2713
Conference Paper	1470
Note	668
Editorial	479
Book Chapter	348
Short Survey	83
Erratum	43
Data Paper	25
Book	10
Retracted	9

As far as the table3 is concerned it has been shown that the number of articles published were 13588, review articles were 3472 letter were 2713, conference paper 1470 followed by note, editorial, book chapter, short survey, erratum, data paper, book and retracted were at the bottom end.

Table 4 Shows the Source Type

Journal	21096
Conference Proceeding	1159
Book Series	555
Book	88
Trade Journal	10

From the table 4, it has been shown that Journals were on the top whereas trade journals were on the bottom with merely 10 publications during these years.

Table 5 Countries and Number of Publications

COUNTRIES	Number of	Top Co-authored	Number of

	publications	**countries**	**publications**
India	17795	United States	2453
Pakistan	3118	United Kingdom	1640
Bangladesh	1796	Saudi Arabia	1165
Malaysia	574	China	1040
Thailand	421	Australia	925
Sri Lanka	284	Canada	599
Nepal	624	Italy	526
Bhutan	32	Germany	425
		Brazil	396
		South Korea	392
		Japan	384
		Spain	352
		Turkey	330
		Egypt	329
		France	325
		Switzerland	317

From the table 5 it may be noted that India was among the topmost countries where 17795 publications were published on COVID 19 among South Asian Countries followed by Pakistan, Bangladesh, Malaysia, Thailand, Sri Lanka, Nepal &Bhutan have least contribution of 32 publications. Whereas the top co-authored countries list was topped by United States followed by United Kingdom, Saudi Arabia, China, Australia, Canada, Italy, Germany, Brazil, South Korea, Japan, Spain, Turkey, Egypt, France, Switzerland.

Table 6 Language and Number of Publications

LANGUAGE	**Number of publications**
English	22897
Spanish	27
French	18
Portuguese	7
German	1
Persian	1
Russian	1
Turkish	1
Undefined	1

From the table 6 it can be inferred that the most number of publications were in English followed by Spanish, French, Portuguese, German, Persian, Russian, Turkish & Undefined were the least contributing language in Bibliometric Research.

Table 7 Top Co-Authorship Analysis

Rank	Authors with the highest publication outputs				
	Authors	Country	Count	affiliations	Citation
1.	Wiwanitkit, V.	India	173	Dr. D. Y. Patil Medical College, Hospital & Research Centre, Dr. D. Y. PatilVidyapeeth, Pune, Pune, India	6610
2.	Dhama, K.	India	145	Indian Veterinary Research Institute, Bareilly, India	11457
3.	Wiwanitkit, V.	India	89	Dr. D. Y. Patil Medical College, Hospital & Research Centre, Dr. D. Y. PatilVidyapeeth, Pune, Pune, India	87
4.	Mungmunpuntipantip, R.		75	Private Academic Consultant, Bangkok, Thailand	46
5.	Tiwari, R.	India	72	College of Veterinary Science India, Department of Microbiology and Immunology, Tirupati, India	6596
6.	Vaishya, R.	India	65	Indraprastha Apollo Hospitals, New Delhi, India	2988
7.	Essar, M.Y.	Afghanistan	59	Kabul University, Kabul, Afghanistan	280
8.	Ullah, I.	Pakistan	58	Gandhara University, Peshawar, Pakistan	440
9.	Joob, B.	Thailand	57	Medical Academic Center, Bangkok, Thailand	1069
10.	Misra, S.	India	53	All India Institute of Medical Sciences, Jodhpur, Department of Surgical Oncology, Jodhpur, India	2441
11.	Rodriguez-Morales, A.J.	Colombia	53	FundaciónUniversitariaAutónoma de lasAméricas, Medellin, Colombia	9847
12.	Rabaan, A.A.	Pakistan	51	University of Haripur, Department of Public Health and Nutrition, Haripur, Pakistan College of Medicine	2944
13.	Sah, R.	Nepal	51	Tribhuvan University, Kathmandu, Nepal	2894
14.	Grover, S.	India	50	Indian Veterinary Research Institute, Bareilly, India	5684
15.	Ish, P.	India	51	College of Veterinary Science India, Department of	

				Microbiology and Immunology, Tirupati, India	

Table 7 shows the Co authorship of authors country wise and number of citations. Indian authors namelyWiwanitkit, Vwas at top followed by five more investigators from India and their citations were at the top. Top six authors were from India and seventh author country affiliation was from Afghanistan than Pakistan, Thailand Colombia and Nepal.

Table 8 Citation Analysis of Source Journals

Journals with the highest publication output						
Rank	Journal	Publisher/ Country	Impact factor	Count	Rank	Citations (2017-2020)
1.	Indian Journal Of Ophthalmology	India		334	61	3110
2.	International Journal Of Research In Pharmaceutical Sciences			256		6552
3.	Journal Of Biomolecular Structure And Dynamics			252	197	6552
4.	Diabetes And Metabolic Syndrome Clinical Research And Reviews	India		231	33	6074
5.	Indian Journal Of Critical Care Medicine	India		198	44	916
6.	Plos One	US		184	9	372024
7.	Asian Journal Of Psychiatry		3.54	170	37	3464
8.	Journal Of Medical Virology	Wiley Periodicals, LLC.	2.327	152	20	14948
9.	Economic And Political Weekly	India		151		1381
10.	International Journal Of Current Research And Review			143		
11.	Frontiers In Public Health			130		
12.	Indian Journal Of			129		

	Medical Research					
13.	Indian Journal Of Otolaryngology And Head And Neck Surgery			119		
14.	Library Philosophy And Practice			117		
15.	Journal Of The Association Of Physicians Of India			115		
16.	Journal Of Physics Conference Series			104		
17.	Indian Pediatrics			103		
18.	International Journal Of Environmental Research And Public Health			101		
19.	Heliyon			100		
20.	Scientific Reports			97		

From Table 8 it can be inferred that Indian Journal of Ophthalmology was among the top journals which publishes the bibliometric research on covid-19 with 334 count and citations were 3110 followed by International Journal Of Research in Pharmaceutical Sciences with 256 count and 6552 citations.Economic And Political Weekly from India was at ninth number with 151 count and 1381 citations whereas Scientific Reports were at the bottom with 97 counts and no citation.

Table: 9 Network view of Journals

	Top 20 cited titles			
	Title	Authors	Source title	Citations
1.	COVID-19 and mental health: A review of the existing literature	Rajkumar R.P.	Asian Journal of Psychiatry	1268
2.	A Review of Coronavirus Disease-2019 (COVID-19)	Singhal T.	Indian Journal of Paediatrics	1254
3.	Clinical, laboratory and imaging features of COVID-19: A systematic review and meta-analysis	Rodriguez-Morales A.J., Cardona-Ospina J.A., Gutiérrez-Ocampo E., Villamizar-Peña R., Holguin-Rivera Y., Escalera-Antezana J.P., Alvarado-Arnez L.E., Bonilla-Aldana D.K., Franco-Paredes C., Henao-Martinez A.F., Paniz-et.al.	Travel Medicine and Infectious Disease	1117

		American Network of Coronavirus Disease 2019-COVID-19 Research (LANCOVID-19)		
4.	Evidence of the COVID-19 Virus Targeting the CNS: Tissue Distribution, Host-Virus Interaction, and Proposed Neurotropic Mechanisms	Baig A.M., Khaleeq A., Ali U., Syeda H.	ACS Chemical Neuroscience	1000
5.	Autoantibodies against type I IFNs in patients with life-threatening COVID-19	748 authors Bastard P., Rosen L.B., Zhang Q., Michailidis E., Hoffmann H.-H., Zhang Y., Dorgham K., Philippot Q., Rosain J., Béziat V., Y., Abelc L., Alcover A., Aschard H., Astrom K., Bousso P., Bruhns P., Cumano A., Demangel C	Science	766
6.	Neurological associations of COVID-19	Ellul M.A., Benjamin L., Singh B., Lant S., Michael B.D., Easton A., Kneen R., Defres S., Sejvar J., Solomon T.	The Lancet Neurology	724
7.	Repurposed antiviral drugs for COVID-19 — InteriM WHO solidarity trial results	76 authors Pan H., Peto R., Henao-Restrepo A.-M., Preziosi M.-P., Sathiyamoorthy V., Karim Q.A., Alejandria M.M., García C.H., Kieny M.-P., Malekzadeh R., Murthy S., Srinath Reddy K., Periago M.R., Hanna P.A., Ader F., Al-Bader A.M., Alhasawi A.,	New England Journal of Medicine	700
8.	Inborn errors of type I IFN immunity in patients with life-threatening COVID-19	814 authors Zhang Q. , Liu Z. , Moncada-Velez M. ,Chen J. ,Ogishi M. , Bigio B. , Yang R. , Arias A.A. ,Zhou Q. ,Han J.E.	Science	692
9.	Intensive care management of coronavirus disease 2019 (COVID-19): challenges and recommendations	Phua J., Weng L., Ling L., Egi M., Lim C.-M., Divatia J.V., Shrestha B.R., Arabi Y.M., Ng J., Gomersall C.D., Nishimura M., Koh Y., Du B., Asian Critical Care Clinical Trials Group	The Lancet Respiratory Medicine	686

10.	The SARS, MERS and novel coronavirus (COVID-19) epidemics, the newest and biggest global health threats: what lessons have we learned?	Peeri N.C., Shrestha N., SiddikurRahman M., ZakiR., Tan Z., Bibi S., Baghbanzadeh M., Aghamohammadi N., Zhang W., Haque U.	International Journal of Epidemiology	656
11.	Study of knowledge, attitude, anxiety & perceived mental healthcare need in Indian population during COVID-19 pandemic	Roy D., Tripathy S., Kar S.K., Sharma N., Verma S.K., Kaushal V.	Asian Journal of Psychiatry	639
12.	Transplantation of ACE2-Mesenchymal stem cells improves the outcome of patients with covid-19 pneumonia	Leng Z., Zhu R., Hou W., Feng Y., Yang Y., Han Q., Shan G., Meng F., Du D., Wang S et.al.	Aging and Disease	591
13.	A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak	Chew N.W.S., Lee G.K.H., Tan B.Y.Q., Jing M., Goh Y., Ngiam N.J.H., Yeo L.L.L., Ahmad A., Ahmed Khan F., NapoleanShanmugam G., Sharma A.K. et.al.	Brain, Behavior, and Immunity	584
14.	Effect of restricted emissions during COVID-19 on air quality in India	Sharma S., Zhang M., Anshika, Gao J., Zhang H., Kota S.H.	Science of the Total Environment	511
15.	Suicide risk and prevention during the COVID-19 pandemic	Gunnell D., Appleby L., Arensman E., Hawton K., John A., Kapur N., Khan M., O'Connor R.C., Pirkis J., Caine E.D., Chan L.F., et.al.	The Lancet Psychiatry	504
16.	Psychosocial impact of COVID-19	Dubey S., Biswas P., Ghosh R., Chatterjee S., Dubey M.J., Chatterjee S., Lahiri D., Lavie C.J.	Diabetes and Metabolic Syndrome: Clinical Research and Reviews	482
17.	COVID-19 outbreak: Migration, effects on society, global environment and prevention	Chakraborty, I., Maity, P.	Science of the Total Environment	481
18.	Effect of lockdown amid COVID-19 pandemic on air quality of the megacity Delhi, India	Mahato, S., Pal, S., Ghosh, K.G	Science of the Total Environment	466
19.	Epidemic of COVID-19 in China and associated	Ahmed M.Z., Ahmed O., Aibao Z., Hanbin S., Siyu L., Ahmad	Asian Journal of Psychiatry	409

	Psychological Problems	A.		
20.	Mental health problems faced by healthcare workers due to the COVID-19 pandemic–A review	Spoorthy, M.S.	Asian Journal of Psychiatry 51,102119	378

Table 9 shows theNetwork view of Journals where Asian Journal of Psychiatry was among top journals with 1268 citations whereas Indian Journal of Paediatrics1254 citations, Travel Medicine and Infectious Disease 1117 citations ACS Chemical Neuroscience 1000 citations followed by other journal where the number of citations were below 1000.

7. Conclusion

To conclude the answer, we can say that the number of publications on covid 19 rapidly increases from 2018 to 2021. In 2018 the number was only 1 whereas in in 2021 it increases up to 15185. India topped the list among south asian countries in bibliometric research on covid-19. The most number of articles/research papers were published in English language 22897 followed by Spanish only 27 research papers. As far as top co authorship of authors is concerned Wiwanitkit, V. topped the list among all authors with 6610 citations.

References

[1] Gupta, B. M., & Kumbar, B. D. (2013). Social Science Research: A Comparative Studyof Publications Output of India, China and Brazil during 1996 - 2010. *InformationStudies, 1*(1).

[2] Gupta, B. M., Dhawan, S. M., & Singh, U. (2009). Social Science Research in India,China and Brazil - A Comparative Study. *DESIDOC Journal of Library andInformation Technology, 29*(2), 15-23.

[3] Grisel, Z. G., Zaida, C. R., Benjamin, V. Q., & Felix de, M. A. (2014). *BibliometricAnalysis of Regional Latin America's Scientific Output in Public Health throughSCImago Journals and Country Rank.* Retrieved from Biomed Central: www.biomedcentral.com/1471-2458/14/632

[4] Khalili, L. &Sreekumar, M.G., (2021) Bibliometric Analysis of Worldwide Coronavirus Research based on Web of Science between 1970 and February 2020. *International Journal of Information Science and Management Vol. 19, No. 1, 2021, 27-43*

[5] Mehbuba, D., & Rousseau, R. (2010). Scientific research in the Indian sub-continent:Selected trends and indicators 1973-1007 comparing Bangladesh, Pakistan and Sri Lanka with India, the local giant. *Scientometrics, 84*(2), 403-420.South Asian Association for Regional Cooperation (SAARC) Retrieved On 28/01/2022 from https://mfasia.org/mfa_programs/advocacy/south-asian-association-for-regional-coopera/tion/

[6] Su, S., Wong, G., Shi, W., Liu, J., Lai, A. C., Zhou, J., Liu, W., Bi, Y. &Gao, G. F. (2016).Epidemiology, genetic recombination, and pathogenesis of coronaviruses.*Trends inmicrobiology*, 24(6), 490-502.

[7] Van der Hoek, L., Pyrc, K., Jebbink, M. F., Vermeulen-Oost, W., Berkhout, R. J., Wolthers, K.C., Wertheim-van Dillen, P. M., Kaandorp, J., Spaargaren, J. &Berkhout, B. (2004). Identification of a new human coronavirus. *Nature medicine*, *10*(4), 368-373.

[8] World Health Organization (2020,a).*Coronavirus disease (COVID-19) outbreak*. Retrievedfrom https://www.who.int/emergencies/diseases/novel-coronavirus-2019

[9] World Health Organization (2020b).Coronavirus Disease (COVID-19) – events as theyhappen. *who.int*. Retrieved from https://www.who.int/emergencies/diseases/novelcoronavirus-2019/events-as-they-happen

[10] Worldometers (2020). COVID-19 Coronavirus Pandemic. Retrieved fromhttps://www.worldometers.info/coronavirus/

[11] Pu, L. L. Q., Chen, Y. R., Li, Q. F., Wu, W., Park, D. H., Takayanagi, S., & Wei, F. C.(2015). *Aesthetic Plastic Surgery in Asians: Principles and Techniques*, Two-Volume Set.Florida: CRC Press, Taylor & Francis Group.

[12] Tarakanta, J., Siddhartha, D., Wadia, N., Bindal, D., & Tripathi, A. (2014). PatentingTrends among the SAARC nations: comparing the local and international patenting intensity. *Current Science*, *106*(9), 1190-1195.