ScientificScholar®
Knowledge is power
Publisher of Scientific Journals

https://sajhealthsci.com

South Asian Journal of Health Sciences

Article in Press

Original Article

Mapping the landscape of COVID-19 research from Bangladesh: A bibliometric analysis of highly cited papers

Raju Vaishya[1], Brij Mohan Gupta[2], Ghouse Modin Nabeesab Mamdapur[3], Mallikarjun Kappi[4], K. S. Ali[3]

[1]Departmnet of Senior Consultant Orthopaedic & Joint Replacement Surgeon, Indraprastha Apollo Hospitals, Sarita Vihar, New Delhi, [2]Departmnet of Library and Information Science, Formerly with CSIR-NISTADS, New Delhi, [3]Department of Library and Information Science, Yenepoya (Deemed to be University), Deralakatte, Mangalore, [4]Department of Library and Information Science, Government First Grade College, Hosapete, India.

***Corresponding author:**
Mallikarjun Kappi,
Department of Library and Information Science, Government First Grade College, Hosapete, India.

mkmallikarjun@gmail.com

Received: 22 May 2024

Accepted: 28 June 2024

EPub Ahead of Print: 10 August 2024

Published: ****

DOI 10.25259/SAJHS_7_2024

Quick Response Code

ABSTRACT

Objectives: We aimed to analyse the highly-cited papers on COVID-19 research from Bangladesh. This study used bibliometric methods to examine the characteristics and trends of COVID-19 research in the country.

Material and Methods: To source publication data for the study, the Scopus database was used, until 26th July 2023, employing a specific search strategy. The search yielded 4124 papers, which were then rearranged based on the frequency of citations to obtain the highly cited papers (HCPs), which received 100 or more citations.

Results: The 110 (2.67%) HCPs registered citations ranging from 100 to 1502, with an average of 236.21 Citations per Paper (CPP). Only 30.9% of the publications received external funding and and received an average CPP of 332.0. Similarly, 80% of the HCPs were involved in international collaboration, and and received an average of 249.89 CPP. The major international contributors were the USA, Australia, U.K., and China. The most productive organisations were Jahangirnagar University, International Centre for Diarrhoeal Disease Research, and University Of Dhaka. The most impactful organisations were Neurogen Children's Healthcare, Bangabandhu Sheikh Mujib Medical University, and Begum Rokeya University. Three most productive authors were Mamun, M.A. (n=8), Saiful Islam, M. (n=6), Tajuddin Sikder, Md. and Bodrud-Doza, Md. (n=4 each).

Conclusion: This study provides the current status of research on COVID-19, including its trends and the most significant contributions from Bangladesh. It has highlighted the top authors, organisations, journals, and research hotspots in the field of COVID-19 research. This information can also help researchers identify potential collaborators, relevant papers, and important research questions in their areas of expertise.

Keywords: COVID-19; Research; Collaboration; Bangladesh; Asia

INTRODUCTION

Despite significant efforts to manage and control the COVID-19 pandemic, morbidity, mortality and its variants have caused major disruptions to daily life. Continuous viral evolution, limited vaccine availability and recurring waves of outbreaks have posed significant challenges for countries like Bangladesh in responding to the pandemic. Bangladesh reported its first confirmed coronavirus case on 8 March 2020 and recorded the first death from COVID-19 on 20 March 2020.[1]

Since the origin of the virus, there has been a high influx of publications on COVID-19 globally, including from Bangladesh.[2,3] To track the most relevant and impactful publications in the scientific community, a bibliometric analysis was conducted, focusing on highly cited papers (HCPs). These papers provide valuable insights into influential contributors, articles and topics,

attracting greater attention among researchers.[4] Although many bibliometric studies exist on the assessment of global COVID-19 research literature in South Asia countries,[5–12] only one study exists on the assessment of COVID-19 publications from Bangladesh.

This study makes a bibliometric assessment of HCPs from Bangladesh, which highlights the core contribution of COVID-19 research in Bangladesh. Therefore, this study attempts to identify the major trends, including major organisations and authors, and the most important themes being pursued using significant keywords and channels of communications.

MATERIAL & METHODS

Using a comprehensive search strategy, studies on COVID-19 research from Bangladesh published between 2020 and 2023 were identified. The data was retrieved on 26 July 2023, resulting in the retrieval of 4124 records. These records were then rearranged to identify 110 HCPs that received 100 or more citations. Data analysis and visualisation were conducted using Microsoft Excel and VOSviewer. Our search strategy was as follows:

TITLE-ABS-KEY ('COVID 19' OR '2019 NOVEL CORONAVIRUS' OR 'CORONAVIRUS 2019' OR 'SARS-COV-2' OR 'SARS-COV 2' OR 'CORONAVIRUS DISEASE 2019' OR '2019-NOVEL COV' OR '2019 NCOV' OR 'COVID 2019' OR 'CORONA VIRUS 2019' OR 'NCOV-2019' OR 'NCOV2019' OR 'NCOV 2019' OR '2019-NCOV' OR 'COVID-19' OR 'SEVERE ACUTE RESPIRATORY SYNDROME CORONAVIRUS 2' OR 'NOVEL CORONAVIRUS') AND LIMIT-TO (PUBYEAR, 2023) OR LIMIT-TO (PUBYEAR, 2022) OR LIMIT-TO (PUBYEAR, 2021) OR LIMIT-TO (PUBYEAR, 2020) AND LIMIT-TO (AFFILCOUNTRY, 'BANGLADESH').

The HCPs were considered as those that received 100 or more citations. The most productive authors and institutions were those that contributed a maximum – more than the average number of publications – and the most impactful authors and institutions were those that had registered citations per paper (CPP) and relative citation index (RCI) more than their average.

RESULTS

Overall picture

Of the 541,400 global papers indexed in the Scopus database on COVID-19 till 26 July 2023, only 4124 (0.7%) records originated from Bangladesh. Among these, 110 were HCPs (2.6%) received between 100 and 1502 citations, and collectively received 26,027 citations with an average of 236.6 CPP. The citation range of these HCPs is as follows: 67 papers in the 100–193 citation range, 38 papers in the 209–485 citation range, three papers in the 738–890 citation range and two papers in the 1293–1502 citation range. The composition of the HCPs includes 75 (68.1%) articles, 27 (24.5%) reviews and one (0.9%) conference paper.

Of the top 110 HCPs, 68 were published in 2020, 32 in 2021, and ten in 2022. A total of 88 HCPs (80%) were involved in the International Collaboration Papers (ICPs), which received a total of 21,990 citations, with an average CPP of 249.8. The USA had the highest participation in ICPs of Bangladesh (n = 37, 42%), followed by Australia and the UK (n = 29, 32.9% each), China (n = 19, 21.5%), Canada (n = 18, 20.4%), India (n = 17, 13.2%), Pakistan (n = 16, 18.1%), Sweden (n = 14, 15.9%), Egypt (n = 13, 14.7%), Malaysia and Japan (n = 12, 13.6% each) and Brazil (n = 11, 12.5%), among others.

Only 23 (23.6%) out of the 110 HCPs received extramural funding support from foreign agencies, accumulating 8632 citations, with an average of 332 CPP. The major external funding agencies supporting HCPs from Bangladesh, along with their productivity, include the *National Institute of Health* (n = 6), *National Institute of Allergy & Infectious Diseases*, *National Center for Advancing Translational Sciences* and the *European Commission* (n = 4 each), *UK Research & Innovation, World Health Organisation* and the *National Institute of Health & Care Research* (n = 2 each), among others.

Among the types of research, epidemiology contributed the largest share (20%, 22 papers) in the top 110 HCPs, followed by clinical studies (19%, 21 papers), risk factors (13.1%, 15 papers), complications (5%), genetics (5.4%, six papers), diagnosis (3.6%, four papers), pathophysiology (2.7%, three papers) and complications and prognosis (1.8%, two papers each). Regarding the population age groups, adults reported the largest share (27.2%, 30 papers) in the top 110 HCPs, followed by middle-aged individuals (17.2%, 19 papers), aged individuals and adolescents (11.8%, 13 papers) and children (7.2%, nine papers).

Analysis by broad and narrow subjects

Broad subjects

Classifying the 110 HCPs by Scopus subject categories revealed that Medicine contributed the majority share (51.8%), followed by Environmental Science (14.5%) and Immunology and Microbiology (13.6%). Additionally, Biochemistry, Genetics and Molecular Biology, Social Sciences and Psychology accounted for 9%, 8.1% and 7.2%, respectively, while Computer Science, Business, Management and accounting Neuroscience and Pharmacology, Toxicology and Pharmaceuticals ranged from 3.6% to 6.3%. In terms of citation impact, Computer Science had the highest average CPP with 987.5, whereas Environmental Science had the lowest with 161.6, as shown in Figure 1.

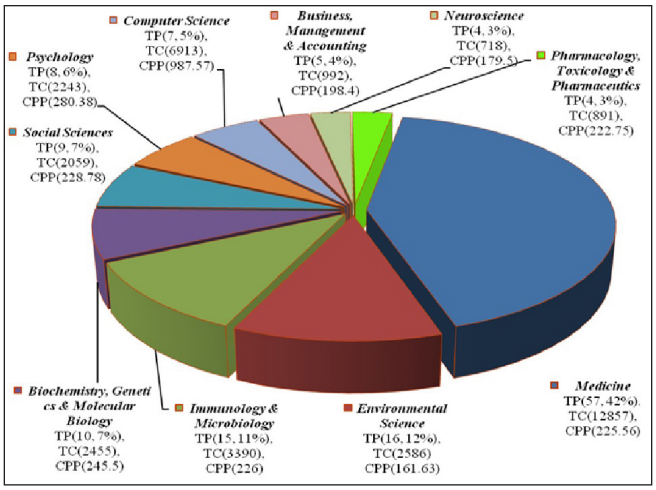

Figure 1: Distribution of papers by broad subjects. TP: Total papers, TC: Total citations, CPP: Citation per paper.

Significant keywords

The 1666 author keywords appearing in 110 HCPs from Bangladesh was identified. Among them, the most important keywords were notified based on their occurrence as: 'COVID-19' (n = 75), 'Psychology' (n = 19), 'Virology' (n = 16), 'Virus Transmission' (n = 14), 'Disease Severity' (n = 13), 'Mental Health' (n = 11), 'Anxiety' (n = 250) and more. These keywords highlight the critical subfields of research being pursued in HCPs. A co-occurrence network of top 50 selected keywords was visualised to explore the thematic clusters further presented in Table 1. The network consisted of 240 nodes connected by 523 links, with a total of 1117 total link strengths. This visualisation provides valuable insights into the main topics within the research field. These keywords across different clusters, namely *Red* (Cluster 1 with 14 keywords), *Green* (Cluster 2 with 13 keywords), *Blue* (Cluster 3 with 12 keywords), Yellow (Cluster 4 with six keywords) and *Lavender* (Cluster 5 with five keywords), respectively, as shown in Figure 2.

Most productive journals

The 110 Bangladesh HCPs in COVID-19 were published in 71 journals, with 62 journals publishing one paper each, seven journals publishing two papers each, eight journals publishing three papers each and one journal publishing four and six papers, respectively. The top ten journals listed in Table 2, which individually published three to six papers and together published 34 papers and received 8795 citations, accounted

Table 1: List of Top 50 Selected Keywords, Ranked by the Frequency of Occurrence.

Keyword	Occ.	TLS	CC	Keyword	Occ.	TLS	CC
Disease Severity	13	78	Red	Virology	16	88	Blue
Immunology	8	50		Comorbidity	9	58	
Pneumonia	8	52		Infection Prevention	8	54	
Genetics	6	32		Prevention and Control	8	43	
Neutralising Antibody	6	44		Infection Risk	7	55	
Antivirus Agent	5	25		Sars-Cov-2 Vaccine	7	52	
Immune Response	5	31		Diabetes Mellitus	6	51	
Virus Neutralisation	5	37		Vaccination	6	44	
Virus Replication	5	24		Hypertension	5	42	
Angiotensin Converting Enzyme 2	4	27		COVID-19 Vaccines	4	29	
Immunoglobulin G	4	33		Sustainable Development	4	5	
Interferon Type 1	4	26		Vaccine Hesitancy	4	28	
Oseltamivir	4	38		Virus Transmission	14	80	Yellow
Remdesivir	4	41		Social Media	10	50	
Psychology	19	102	Green	Disease Transmission	7	23	
Mental Health	11	65		Internet	7	35	
Anxiety	10	46		Infection Control	6	33	
Depression	9	63		Misinformation	6	22	
Fear	9	37		COVID-19	75	240	Lavender
Quarantine	9	45		Deep Learning	7	13	
Disease Association	7	47		Convolutional Neural Network	6	12	
Mental Disease	6	43		Machine Learning	5	8	
Mental Stress	5	36		Disease Surveillance	4	25	
Anxiety Disorder	4	35		Occ. = Number of Occurrences of keywords			
Mental Disorders	4	32		TLS = Total Link Strength			
Social Stigma	4	32		CC = Cluster Colour			
Stress	4	23					

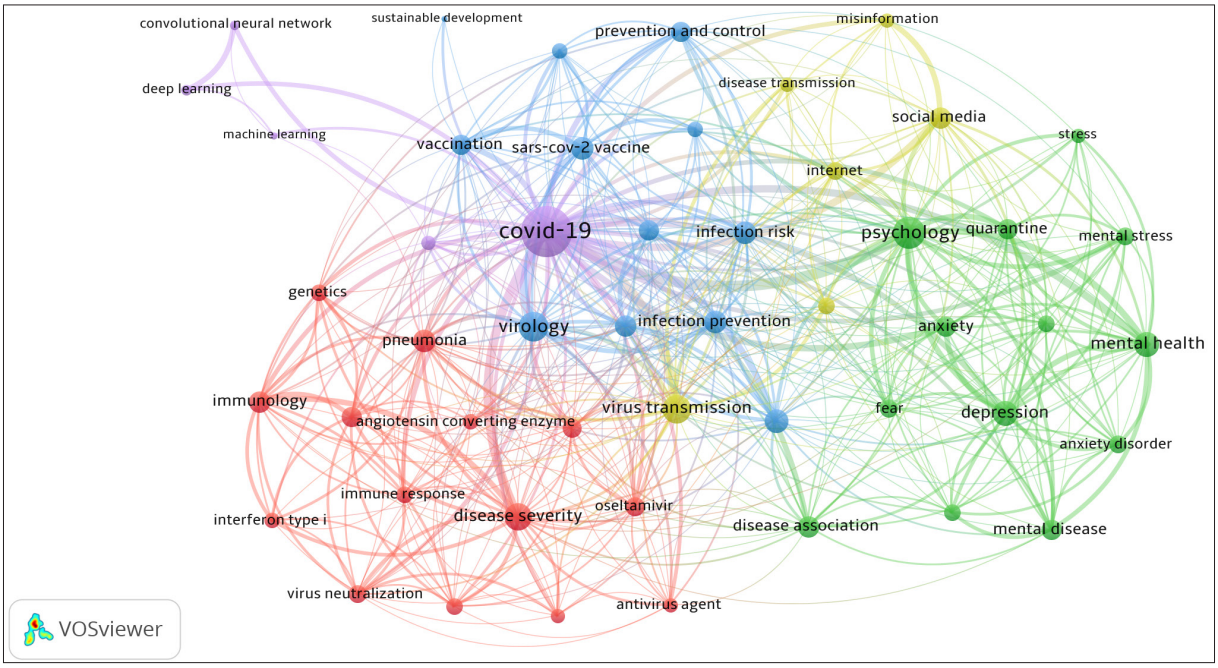

Figure 2: Top 50 selected keywords network analysis.

Table 2: Profile of the Most Productive Journals.

Source	Publisher	TP	TC	CPP
PLoS ONE	PLS	6	1213	202.1
Heliyon	Elsevier Ltd	4	695	173.7
Science	AAAS	3	2906	968.6
Informatics in Medicine Unlocked	Elsevier Ltd	3	646	215.3
Journal of Medical Virology	John Wiley & Sons	3	632	210.6
Sustainable Production and Consumption	Elsevier B.V.	3	610	203.3
Science of the Total Environment	Elsevier B.V.	3	543	181
International Journal of Mental Health and Addiction	Springer	3	528	176
Journal of Affective Disorders	Elsevier B.V.	3	525	175.0
Psychiatry Research	Elsevier Ireland Ltd	3	497	165.6
Seven journals contributing two papers each (14.4%) Share		14	3748	267.7
Sixty-two journals contributing one paper each (51.8%) Share		62	13,484	217.4
Total		**110**	**26,027**	**236.6**

TP: Total publication, TC: Total citation, CPP: Citation per paper, Bold values: indicate statistically significant differences between TP, TC, and CPP.

for 33.7% and 48.2% share of the total Bangladesh HCPs and their citations. Among the top ten most productive journals, the six most productive journals were (i) *PLoS One* (n = 6), *Heliyon* (n = 4), *Science, Informatics in Medicine Unlocked, Journal of Medical Virology* and *Sustainable Production and Consumption* and *Science of the Total Environment* (n = 3 each) and (ii) *Science* registered the highest (968.6) CPP, followed by the *Asian Journal of Psychiatry* (567 CPP), *Journal of Infection and Public Health* (257 CPP), *BMJ Global Health* (250 CPP), *The Lancet Global Health* (247.5 CPP) and *Informatics in Medicine Unlocked* (215.3 CPP). Among the 17 journals, two met the threshold. These 17 journals are scattered in 11 different coloured clusters with eight links and 12 total link strengths, as shown in Figure 3.

Most productive and impactful authors

A total of 281 authors from Bangladesh participated in 110 HCPs in the COVID-19 research, out of 3,085 authors. Of these, 241 contributed one paper each, 25 authors two papers each, nine authors three papers each, four authors four papers each and one author six and eight papers. The top 21 authors individually contributed two to eight papers, accounting for a total of 69 papers and 15,038 citations, or 62.7% and 57.8%

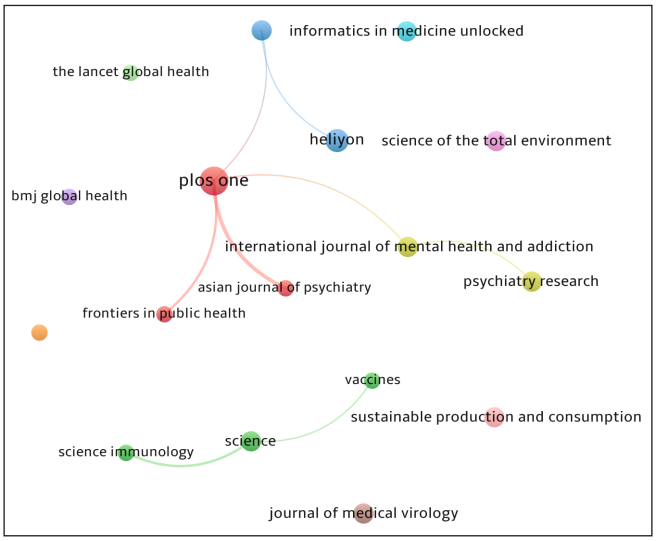

Figure 3: Top 17 sources network analysis.

of the total Bangladesh HCPs publications and citations, respectively.

Further analysis revealed that six authors, listed in Table 3 contributed more than the average group productivity (0.7) of all six authors: Mohammed A. Mamun (eight papers), Md. Saiful Islam (six papers) and K.M. Furkan Uddin, Md. Tajuddin Sikder, Md. Milon Islam and Md. Bodrud-Doza (four papers each). Two authors, K.M. Furkan Uddin (777 and 3.2) and Md. Saiful Islam (221.8 and 0.9), had CPP and RCI values above the group average (293.6 and 1.2) of all six authors. Figure 4 presents a co-authorship map of the top 40 highly productive Bangladesh authors. These authors are divided into 14 groups with 106 links and a total link strength of 169. The lines connecting the nodes indicate their collaborations and the width of the links represents the strength of the collaboration network analysis

Role of foreign authors

Out of the total 110 HCPs papers, 23 (20.9%) were collaborations among Bangladeshi researchers while the remaining 87 (79.1%) involved collaborations with international authors. Therefore, it was beneficial to identify the top ten foreign authors who engaged extensively in collaborations with researchers from Bangladesh. These ten foreign authors are listed in Table 4. By publication productivity, the largest contributions (n = 6) were made by Zhang Yu, followed by Qian Zhang, Paul Bastard, Abel Laurent, Alessandro Aiuti, Gulsum Alkan, Luis M. Allende, Mark S. Anderson, Andrés Augusto Arias and Melike Keser Emiroğlu, (n = 5 each). Melike Keser Emiroğlu registered the highest CPP (672.6) among the top foreign authors who registered CPP of 670.4 each.

Most productive and impactful organisations

In all, 96 Bangladesh organisations contributed to the COVID-19 research, of which 61 organisations participated with one paper each, 17 organisations with two papers each, four organisations with three papers each, four organisations with four papers each, four Organisations with five papers each and six organisations with 7–17 papers each. The top 18 organisations contributed 3–176 papers each, and together they contributed 110 papers and 25,983 citations, accounting for 100% and more than 100% share each in the total Bangladesh HCP publications and citations, respectively. Table 5 presents the Bibliometric Profile of top ten productive organisations of Bangladesh, contributing five or more papers. Further analysis revealed that five organisations contributed more than the average group productivity (6.11) of all 30 organisations. Jahangirnagar University, Dhaka (n = 17), International Centre for Diarrhoeal Disease Research-Bangladesh and University of Dhaka, Dhaka (n = 11 each), Undergraduate Research Organisation, Dhaka, and BRAC

Table 3: Bibliometric Profile of Top Six Authors (Four or More Papers).

Author	Affiliation	TP	FA	TC	CPP	ICP	RCI
Mamun, Mohammed A.	Jahangirnagar University, Dhaka	8	3	1697	212.1	6	0.9
Islam, Md. Saiful	International Centre for Diarrhoeal Disease Research, Bangladesh	6	3	1331	221.8	5	0.9
Uddin K.M. Furkan	NeuroGen Children's Healthcare, Dhaka	4	0	3108	777	4	3.2
Sikder, Md. Tajuddin	Jahangirnagar University, Dhaka	4	0	856	214	4	0.9
Islam, Md. Milon	Khulna University of Engineering & Technology, Khulna	4	0	743	185.7	4	0.7
Bodrud-Doza, Md.	BRAC University, Dhaka	4	1	604	151	1	0.6
Nine authors contributing three papers each		27	7	4566	169.1	22	0.7
Twenty-five authors contributing two papers each		50	8	2133	42.6	44	0.1
A total of 241 authors contributing one paper each		241	88	47,012	195	24	0.8

TP: Total publications, FA: First author, TC: Total citations, CPP: Citations per paper, ICP: International collaborative papers, RCI: Relative citation index.

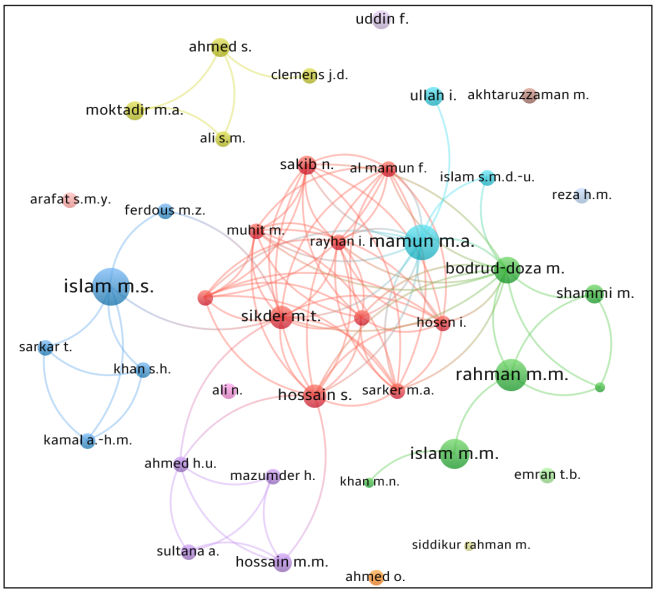

Figure 4: Co-authorship map of the top 40 highly productive authors.

University, Dhaka (n = 8 each), and Jashore University of Science and Technology, Jashore (n = 7). Five organisations registered CPP and RCI above the group average (233.6 and 0.9) of all 18 organisations: Neurogen Children's Healthcare, Holy Family Red Crescent Medical College, Dhaka (670.4 and 2.8), Bangabandhu Sheikh Mujib Medical University, Dhaka (340 and 1.4), Begum Rokeya University, Rangpur (322.5 and1.3), Khulna University of Engineering and Technology, Khulna (262.2 and 1.1), and North South University, Dhaka (239.2 and 1). The bibliometric profiles of the top ten most productive organisations have published three or more papers. Figure 5 shows a citation-based network map of the top 35 most productive organisations of Bangladesh.

Role of foreign organisations

Since 80% of the Bangladesh 110 HCPs in COVID-19 involve international collaboration, it will be useful to identify the top ten foreign organisations collaborating most with

Table 4: List of Foreign Authors Most Actively Collaborating with Bangladesh Authors.

Authors	Affiliations	TP	FA	TC	CPP	RCI
Zhang Yu	National Institutes of Health, USA	6	0	3515	585.8	2.4
Qian Zhang,	The Rockefeller University, USA	5	2	3350	670	2.8
Paul Bastard	INSERM, USA	5	2	3352	670.4	2.8
Abel Laurent	Université Paris Cité, Paris, France	5	0	3352	670.4	2.8
Alessandro Aiuti	San Raffaele Telethon Institute for Gene Therapy, Italy	5	0	3352	670.4	2.8
Gulsum Alkan	Selçuk Tip Fakültesi, Department of Pediatrics, Turkey	5	0	3352	670.4	2.8
Luis M. Allende	Hospital Universitario, Spain	5	0	3352	670.4	2.8
Mark S. Anderson	UCSF School of Medicine, USA	5	0	3352	670.4	2.8
Andrés Augusto Arias	Colombia Universidad Pontificia Bolivariana, Colombia	5	0	3352	670.4	2.8
Melike Keser Emiroğlu,	Selçuk Tip Fakültesi, Turkey	5	0	3363	672.6	2.8

TP: Total publications, FA: First author, TC: Total citations, CPP: Citations per paper, RCI: Relative citation index.

Table 5: Bibliometric Profile of Top Ten Organisations (Five or More Papers).

Affiliation	TP	TC	CPP	RCI
Jahangirnagar University, Dhaka	17	3398	199.8	0.8
International Centre for Diarrhoeal Disease Research, Bangladesh	11	2362	214.7	0.9
University Of Dhaka, Dhaka	11	2512	228.3	0.9
Undergraduate Research Organisation, Dhaka	8	1674	209.2	0.8
BRAC University, Dhaka	8	1619	202.3	0.8
Jashore University of Science and Technology, Jashore	7	1165	166.4	0.7
Neurogen Children's Healthcare, College, Dhaka	5	3352	670.4	2.8
North South University, Dhaka	5	1196	239.2	1
Shahjalal University of Science and Technology, Sylhet	5	1158	231.6	0.9
Bangladesh University of Engineering & Technology, Dhaka	5	883	176.6	0.7
Four organisations contributing four papers each	16	3825	239.0	1.0
Four organisations contributing three papers each	12	2553	212.7	0.9
Seventeen organisations contributing two papers each	34	6814	200.4	0.8
Sixty-one organisations contributing one paper each	61	13,400	219.6	0.9

TP: Total publications, TC: Total citations, CPP: Citations per paper, RCI: Relative Citation Index.

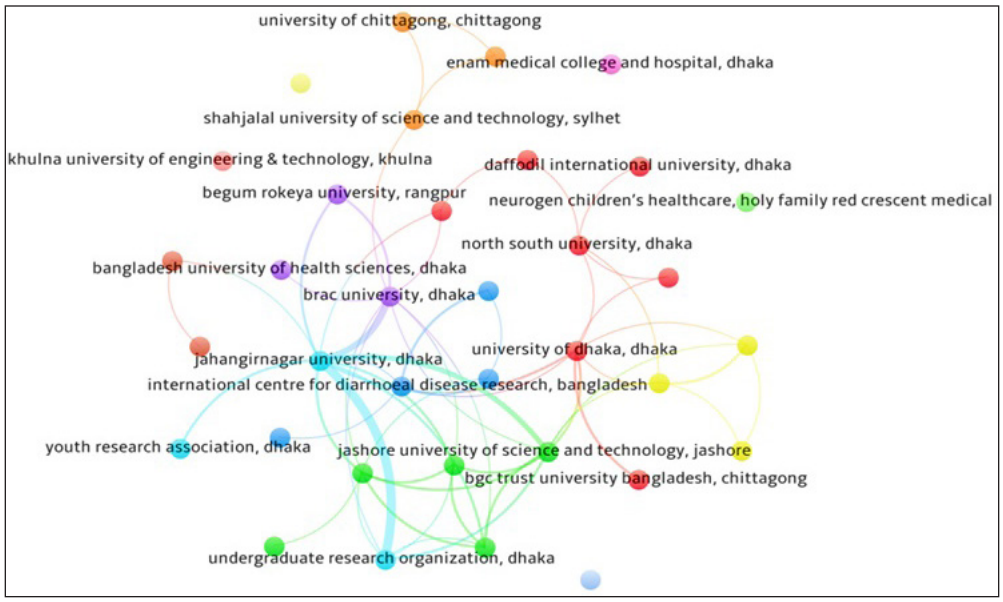

Figure 5: Top 35 organisations network analysis of two or more papers.

Table 6: Foreign Organisations Most Actively Collaborating with Bangladesh Organisations.

Organisation	TP	TC	CPP
UNSW Sydney, Australia	13	4792	368.6
University of British Columbia, Canada	9	3864	429.3
Aarhus Universitet, Denmark	9	3942	438
Bilkent Üniversitesi, Turkey	7	3985	569.2
Karolinska Institutet, Sweden	7	3650	521.3
University of Sharjah, UAE	7	3642	520.2
Stanford University, USA	7	3623	517.5
Imperial College London, UK	7	3603	514.7
Ciber De Enfermedades Respiratorias, Spain	7	3603	514.7
King Saud University, Saudi Arabia	6	3498	583

TP: Total papers, TC: Total citations, CPP: Citations per paper.

Bangladesh organisations. These ten foreign organisations are listed in Table 6. By publication productivity, the largest contribution (n = 13) was made by the University of New South Wales (UNSW), Sydney, Australia, followed by the University of British Columbia, Canada, and Aarhus Universitet, Denmark (n = 9 each), Karolinska Institutet, Sweden, Bilkent Üniversitesi, Turkey, University of Sharjah, UAE, Stanford University, USA, Imperial College London, UK, Ciber De Enfermedades Respiratorias, Spain (n = 7), and King Saud University, Saudi Arabia (n = 6). King Saud University, Saudi Arabia, registered the highest CPP (of 583) among the top ten foreign organisations, followed by Bilkent Üniversitesi, Turkey (569.2), Karolinska Institutet, Sweden (521.4), University of Sharjah, UAE (520.2), and UNSW Sydney, Australia (368.6).

Top ten highly cited papers

The 110 HCPs in COVID-19 research from Bangladesh were distributed across different citation ranges the top five HCPs are listed in Table 7. Specifically, there were 67 papers with citations ranging from 100 to 194, 19 papers with citations between 209 and 288, 14 papers with citations ranging from 304 to 399, eight papers with citations between 413 and 891 and two papers with citations ranging from 1,295 to 1,503. Notable HCPs include works such as 'Autoantibodies against type I IFNs in patients with life-threatening COVID-19' by Bastard *et al.* with 1,502 citations and 'Inborn errors of type I IFN immunity in patients with life-threatening COVID-19' by Zhang *et al.* with 1,293 citations, both published in Science.

DISCUSSION

The examination of COVID-19-related scholarly publications stemming from Bangladesh provides an insightful overview of research dynamics, collaboration patterns and significant contributors in this domain. Despite comprising a relatively small percentage (0.7%) of the total COVID-19 papers indexed in Scopus, Bangladesh's scholarly output of 4124 papers, including 110 HCPs, amassing 26,027 citations, demonstrates the nation's impactful contribution to the global discourse on COVID-19. These HCPs, characterised by an average citation count of 236.6 per paper, encompass a wide array of research areas, reflecting the diverse interests and expertise of Bangladeshi researchers across epidemiology, clinical studies and risk assessment.

A notable revelation from this analysis is the extensive international collaboration involved in generating impactful COVID-19 research from Bangladesh. Approximately 80% of

Table 7: List of Top Five Highly Cited Papers.

Authors (Year)	Title	Source	Total Citations
Bastard *et al*., 2020	Autoantibodies against type I IFNs in patients with life-threatening COVID-19	Science, 370 (6515), eabd4585	1502
Zhang *et al*., 2020	Inborn errors of type I IFN immunity in patients with life-threatening COVID-19	Science, 370 (6515), eabd4570	1293
Peeri *et al*., 2020	The SARS, MERS and novel coronavirus (COVID-19) epidemics, the newest and biggest global health threats: What lessons have we learned?	International Journal of Epidemiology, 49(3), 717–726	890
Chowdhury *et al*., 2020	Can AI Help in Screening Viral and COVID-19 Pneumonia?	IEEE Access, 8, 132665–132676	749
Ahmed *et al*., 2020	Epidemic of COVID-19 in China and associated Psychological Problems	Asian Journal of Psychiatry, 51, 102092	739

the HCPs engaged in partnerships with researchers from other countries, highlighting the global nature of scientific inquiry into the pandemic. However, it is intriguing to note that only a fraction of these papers (23.6%) received extramural funding from foreign agencies, underscoring the need for enhanced international research support and collaborations to fortify Bangladesh's contributions to COVID-19 research.

A bibliometric analysis of the top 100 HCPs on COVID-19 research from India was recently carried out by few scholars. Vaishya *et al*. reported an average CPP of 566.6 of these articles, which is much higher than those from Bangladesh (236.6).[13] Interestingly, Indian papers were involved with international collaboration in 59% publications vis-à-vis 80% in Bangladesh papers, but had slightly higher external funding support of 29% compared to 23.6% in Bangladesh HCPs. Naseer *et al*. analysed COVID-19 research from South Asia and reported that the majority of the top 100 articles were from India (n = 68), followed by Bangladesh (n = 18) and Pakistan (n = 12).[14]

This investigation also sheds light on specific thematic concentrations within the scholarly works. The dominant subject focus on Medicine, Environmental Science and Immunology and Microbiology suggests the multidisciplinary nature of COVID-19 research in Bangladesh. Moreover, the analysis of author keywords and co-occurrence networks revealed critical themes and delineated research clusters, offering insights into the nuanced subfields within the COVID-19 landscape.

Notably, a handful of Bangladeshi authors and organisations emerged as prolific contributors, surpassing their average productivity and citation impact metrics. Recognising these individuals and institutions, such as Mohammed A. Mamun and Md. Saiful Islam, underscores the potential for continued impactful contributions from within Bangladesh's research community.

We believe that the HCPs may be helpful to the global fund of knowledge in various ways, viz. they are often novel and describe the new research, provide useful clinical practice guidelines and guide the future researchers in their field of speciality by laying down the groundwork for a new or emerging theory.[15–17] The HCPs may also direct the readers and researchers towards them and could influence the researchers to cite these articles more than the lower citation count papers.[18]

This bibliometric analysis helps clinicians identify potential collaborators, important studies and relevant research topics in the field of COVID-19 research in Bangladesh. With over 80% of the literature involving international collaboration, this study also highlights leading international organisations and authors participating in COVID-19 research from Bangladesh. Overall, the study sheds light on the leading organisations, authors and journals contributing to the advancement of COVID-19 research in Bangladesh.

Future directions should prioritise fostering robust national and international collaborations, leveraging diverse expertise to address emerging challenges in COVID-19 and other research. Strengthening funding avenues and promoting interdisciplinary approaches could enhance Bangladesh's scientific contributions to combating the pandemic. This analysis emphasises Bangladesh's significant role in COVID-19 research and underscores the potential for growth through increased collaboration, diversified funding sources and continued support for researchers and institutions. Embracing these strategies will augment Bangladesh's impact in COVID-19 research and contribute meaningfully to the global scientific response to pandemics.

CONCLUSION

This bibliometric study examined 110 HCPs (with 100 or more citations) on COVID-19 from Bangladesh. The average CPP of these was 236.6: 80% of them were international collaborative papers and 23.6% received research funding. The

top publishing authors were Md. A. Mamum and Md. Saiful Islam and top organisations were Jahangirnagar University, International Centre for Diarrhoeal Disease Research and University of Dhaka.

Author contribution

All authors contributed significantly to the conception, design, analysis and interpretation of data in this study.

Data availability

The datasets generated and/or analysed during this study are available from the corresponding author on reasonable request.

Ethical approval

Ethical approval is not required as it is a retrospective study.

Declaration of patient consent

Patient's consent not required as there are no patients in this study.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of AI-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

REFERENCES

1. Bangladesh University of Health Sciences, BRAC Advocacy for Social Change. Impact of COVID-19 on Essential Health Services in Bangladesh: A Rapid Assessment. Bangladesh University of Health Sciences; 2020:1-47. [accessed 2023 December 5]. https://www.brac.net/program/wp-content/uploads/2021/08/Rapid-Assessment-on-Impact-of-COVID-19-on-Essential-Health-Services-in-Bangladesh-Report.pdf.
2. WHO. Coronavirus disease (COVID-2019) Bangladesh situation reports. Published 2021. [accessed 2023 December 5]. https://www.who.int/bangladesh/emergencies/coronavirus-disease-(COVID-19)-update/coronavirus-disease-(covid-2019)-bangladesh-situation-reports.
3. WHO. WHO Coronavirus (COVID-19) Dashboard. Published 2023. [accessed 2023 December 5]. https://covid19.who.int.
4. Fardi A, Kodonas K, Gogos C, Economides N. Top-Cited Articles in Endodontic Journals. J Endod 2011;37:1183–90.
5. Shah SAH, Shaikh MA. COVID-19 (SARS-CoV-2) and Bibliometrics of Pakistani Research: COVID-19 and Pakistan. LAP LAMBERT Academic Publishing; 2020. p. 52. ISBN-13: 978-6202563475.
6. Gupta BM, Dhawan SM, Mueen Ahmed KK, Mamdapur GMN. Global research on COVID-19 disease: A scientific assessment of publications during 2020–21. Int J Med Sci Public Health 2021;11:76–84.
7. Gupta BM, Dhawan SM, Surulinathi M. Select South Asian Countries in Covid-19 Research: A Bibliometric Assessment of their Publications during 2019–21. JYP 2021;13:s19–29.
8. Raut R, Sah R, Dixit K, Rodriguez-Morales AJ, Marco Z, Dhama K, *et al*. A review of the scientific contributions of Nepal on COVID-19. Curr Trop Med Rep 2021;8:257–64.
9. Koser N. Bibliometric analysis of contribution of South Asian countries in research conducted on COVID-19. IJMRE 2022;2:25–38.
10. Gupta BM, Kappi M, Walke R, Bansal M. Covid-19 research in Bangladesh: A scientometric analysis during 2020–23. IJSMC. 2023;3.
11. Gupta BM, Mamdapur GMN, Vaish A, Vaishya R. COVID-19 research output from South Asia: A scientometric analysis of highly cited papers. Apollo Medicine 2024:09760016241245854. doi:10.1177/09760016241245854
12. Gupta BM, Kappi MM, Bansal J, Walke R, Mamdapur GM. Scientometric analysis of top 100 high cited papers on COVID-19 research in Nepal: A study. Indian Journal of Information Library & Society 2023;36:43–56.
13. Vaishya R, Gupta BM, Misra A, Mamdapur GMN, Walke R, Vaish A. Top 100 highly cited papers from India on COVID-19 research: A bibliometric analysis of the core literature. Diabetes Metab Syndr 2023;17:102898.
14. Naseer B, Ali M, Azhar N. COVID-19 research in South Asia: A bibliometric analysis of the 100 most-cited articles. GMS Hyg Infect Control 2023.
15. Vaishya R, Gupta BM, Kappi M, Vaish A. A scientometric analysis of the most highly cited publications on fracture research from India: 1989–2022. Ann Natl Acad Med Sci 2023:s-0043-1775600.
16. Vaishya R, Gupta BM, Misra A, Mamdapurj GMN, Vaish A. Global research in sarcopenia: High-cited papers, research institutions, funding agencies and collaborations, 1993–2022. Diabetes Metab Syndr 2022;16:102654.
17. Vaishya R, Patralekh MK, Bijukchhe AR, Vaish A, Vijay V, Agarwal AK. The top 10 arthroplasty articles published in last 10 years by Indian authors. J Clin Orthop Trauma 2018;9:94–100.
18. Teplitskiy M, Duede E, Menietti M, Lakhani KR. How status of research papers affects the way they are read and cited. RP 2022;51:104484.

How to cite this article: Vaishya R, Gupta BM, Mamdapur GMN, Kappi M, Ali KS. Mapping the landscape of COVID-19 research from Bangladesh: A bibliometric analysis of highly cited papers. South Asian J Health Sci. doi: 10.25259/SAJHS_7_2024