



A Review of the Scientific Contributions of Nepal on COVID-19

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Abstract

Purpose of Review There has been a high influx of publications on the SARS-CoV-2 and COVID-19 worldwide in the recent few months as very little was known about them. Nepal too had a substantial number of publications on the same, and there was a need to track the most relevant and impactful to the scientific community through bibliometric analysis.

Recent Findings A total of 72 publications were analyzed. Bagmati Pradesh (88%) and its district, Kathmandu (77%), was with the most publications. There were no publications from Gandaki and Karnali Province. Most of the publications were in the international medical journals (82%), 53% chose European journals to publish, and 15.27% were related to and published in psychology journals. The majority were original articles (39%) and mostly related to public health (20.83%). 59.7% of the papers had Nepalese as the first author. Most of them were affiliated with Tribhuvan University Teaching Hospital and Patan Academy of Health Sciences.

Summary Our analysis suggests a need to shift the type of studies from observational studies to studies oriented more towards the therapeutic and clinical trials of available medicines and patient care management. Similarly, the bibliometric analysis gives an overall picture of Nepali medical research's publication status around the globe.

Keywords COVID-19 · SARS-CoV-2 · Coronavirus · Pandemic · Bibliometrics

Rupesh Raut and Ranjit Sah contributed equally.

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Introduction

Coronavirus disease 2019 (COVID-19) has changed almost every aspect of life. The coronavirus is a zoonotic disease that is believed to have emerged from the Wuhan City of Hubei Province in China in late December of 2019 and has later taken a form of a worldwide pandemic. By April 6, 2021, the total confirmed cases worldwide are 132.28 million cases and 2.87 million deaths with more than 200 countries affected, and in Nepal alone, there are 278,470 cases confirmed and 3,036 deaths. [1] Nepal had its first COVID-19 case on January 13, 2020. The index case was a student studying in Wuhan and had returned to Nepal for his winter vacation. [2]

Initially, little was known about this SARS-CoV-2; several research articles were written around the world to learn and share any new information with the rest of the world. The number of research articles published on COVID-19 within the past few months is as many as the ones on Dengue since the last century. With such a high influx of papers from all over the world, there is a need to track the most relevant and impactful ones. Globally, as the submission of research papers on COVID-19 increased exponentially, multiple scholarly journals too accelerated time to publication. [3] Several other journals issued special COVID-19 themed issues. [4] COVID-19 preprints were often shorter and were reviewed faster. [5]

Compared to the rest of the world, we have a limited number of publications on COVID-19. However, there is a need for a bibliometric analysis to qualitatively and quantitatively analyze these publications. The bibliometric study provides a cross-sectional view at a given time and also the current state of the research in the same field. It accentuates the impact of the articles they can have on the universe of COVID-19 knowledge. Several literature databases are used to do bibliometric analysis, among which, the most commonly used are the Web of Science and Scopus currently [6]; the latter has been used in this study.

We analyzed the 72 publications on COVID-19 from Nepalese researchers which have been categorized according to the districts and provinces of research done, the journal they have been published in, the impact factors, and number of citations, and help answer the evolution of research on this field within the nation.

Articles were retrieved from PubMed using these search terms: Covid-19, COVID-19 virus, coronavirus 2019, and SARS-CoV-2. Their citations in Scopus were recorded on July 17, 2020. Duplicate papers and the ones containing no information about COVID-19 were eliminated. The analysis of only those citations was made, which were found in Scopus.

We recorded the following: article title, journal, journal impact factor [IF, Journal Citation Reports], journal country,

type of article, article category, language, and affiliation center (of Nepali and other authors). VOSviewer software was used for visualization mapping.

We classified the articles into the following ten categories: original article, review, commentary, editorial, letter, news, report, viewpoint, guidelines & consensus, and others.

Publications were also categorized into the following ten types according to the investigation they had mainly shown in their articles: diagnosis, epidemiology, pathophysiology, prevention, prognosis, public health, social issues, special populations, treatment, and others.

Findings Related to COVID-19 Research in Nepal

Publications

While searching for the publications, the number increased as each month passed by. By July 17, we had a total of 75 papers. The publisher withdrew one of the documents upon the author's request, and two had no information about COVID-19 or Nepal. Researchers were also not from Nepal, and their affiliated institution was also not from Nepal. Thus, we were left with a total of 72 articles for analysis. Out of these, 69% were open access and 31% were paid.

Authors

Out of the available 72 publications, 43 (59.7%) had Nepalese researchers working in an institution in Nepal as the first author and 29 publications had the first author as a foreigner followed by one or more Nepalese co-authors. Among Nepalese as the first author, the maximum number of articles in COVID-19 by Nepalese as the first author was from Tribhuvan University Teaching Hospital (TUTH) and Patan Academy of Health Sciences (PAHS), five each. Universidad Tecnológica de Pereira from Colombia and ICAR-Indian Veterinary Research Institute from India also had published five each. When all the Nepali authors were considered (first and co-author), TUTH had the most significant number of contributions (21), followed by PAHS (14). A total of 26 (36%) publications were single-center studies, and 46 (64%) were multi-center studies.

States

Authors from 5 different states were present, out of seven. Previously, states were only numbered from 1 to 7. At the time of writing, only 4 out of 7 provincial governments gave official names to their respective states, and Province No. 1, 2, and 5 are still numbered as such. While scrutinizing the first and co-authors from these 72 articles, 96 were from

different Nepali institutes, including two who did not disclose their affiliated institute and only mentioned that they were private practitioners. The majority of studies (88%) were from Bagmati Pradesh (Province No. 3), followed by Province No. 2 and Province No. 5 (4% each) and by Province No. 1 and Sudurpaschim Pradesh (Province No. 7) (2% each). There were no publications from Gandaki Pradesh and Karnali Pradesh (Fig. 1).

Districts

Out of 77 districts, researchers were affiliated to the institutions from 11 districts only, most of which came from the Kathmandu District (77%), followed by Lalitpur (6%). The third highest number of research was from the institutions in Morang and Rupandehi (3% each). Bhaktapur, Kavrepalanchok, Parsa, and Kailali comprised 2%; Chitwan, Palpa, and Jhapa comprised only 1% of the total contributions in COVID-19 research (Fig. 2).

Journals

We found 39 journals in which these articles were published. The median impact factor (IF) of the journals was 2.093. The highest impact factor was the *British Medical Journal* (30.223), and the lowest was that of the journal

Pathophysiology (0.073). Most of the authors chose international journals to publish their work (~82%). Among them, 53% were published in European journals, followed by 22% in South Asia, 18% in North American, 4% in South-East Asia, and the remaining 3% in Latin American Journals. All of the articles (100%) were in the English language, and so were the publishing journals (Fig. 3).

Of the total of papers, 18 (25%) of these were published in journals from the UK, 13 (18%) each in journals from the USA and Nepal, 12 (16.6%) in journals from the Netherlands, 4 (5.5%) in journals from Italy, 3 (4.16%) in journals from Malaysia, 2 (2.78%) in the journal from Pakistan and Mexico, and 1 (1.38%) each in journals from Switzerland, Scotland, Poland, India, and Germany (Fig. 4).

The journal with most Nepalese publications, the *Journal of Nepal Health Research Council*, had seven papers (9.72%), followed by 6 (8.33%) each in the *Journal of the Nepal Medical Association* and the *Asian Journal of Psychiatry*. A total of 11 (15.27%) articles were published in several International Psychology Journals. Five (6.94%) were published in *Travel Medicine and Infectious Disease*.

Citations

Out of 72 articles, 41 were not cited yet. Thirty-one articles were cited 324 times to date. The paper with the most

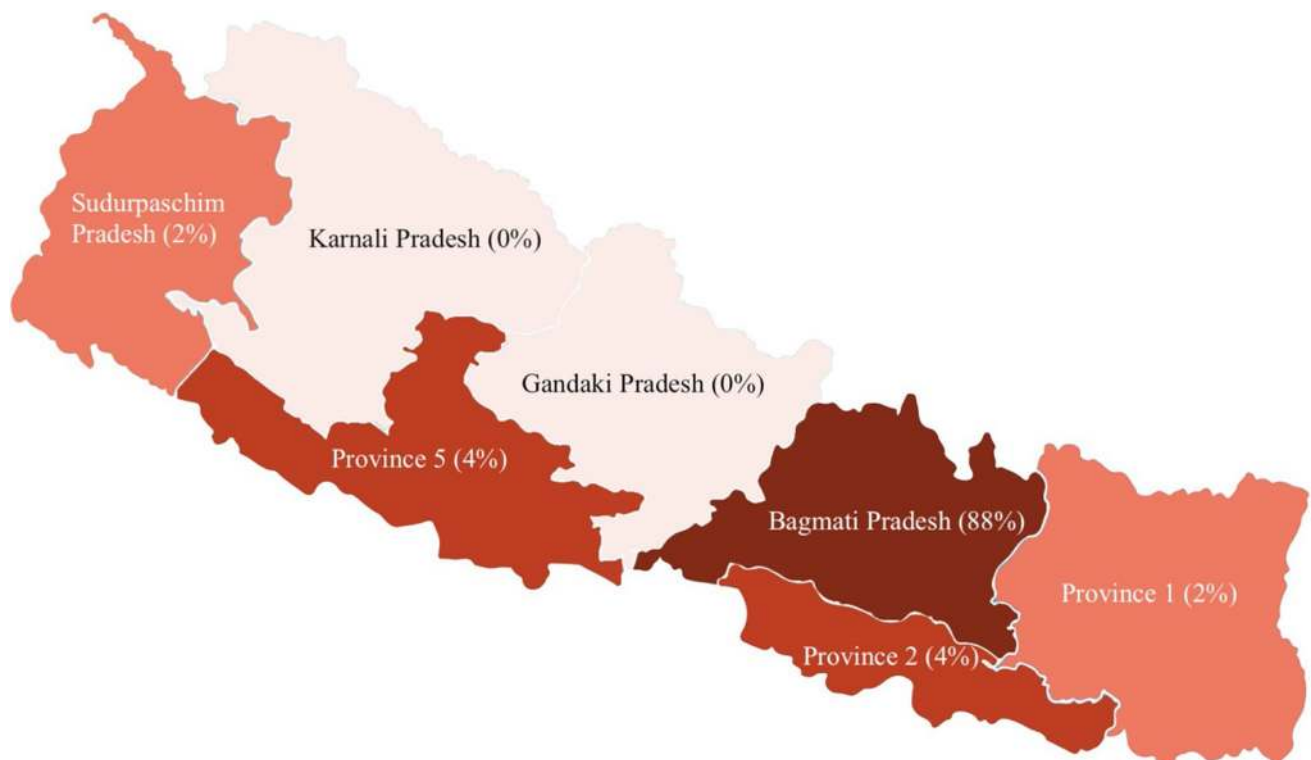


Fig. 1 Affiliation of Nepali authors to institutions in different states of Nepal

Fig. 2 Number of *publications* according to *districts*

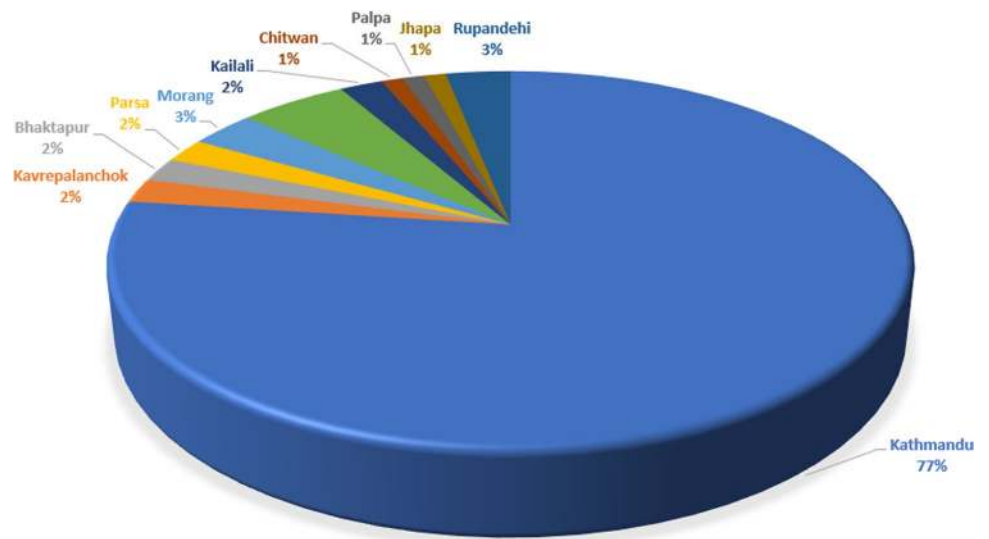


Fig. 3 Number of publications according to different regions

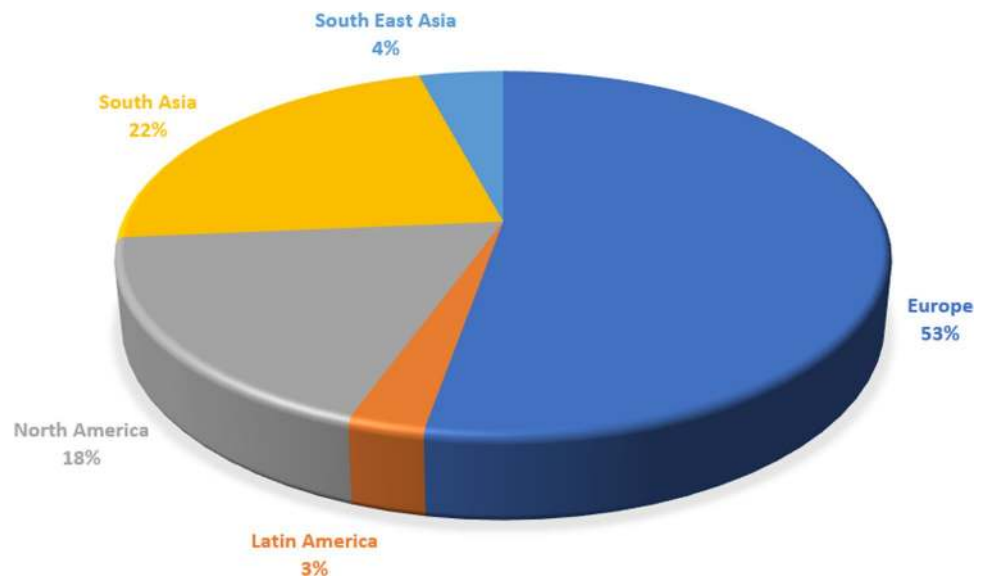
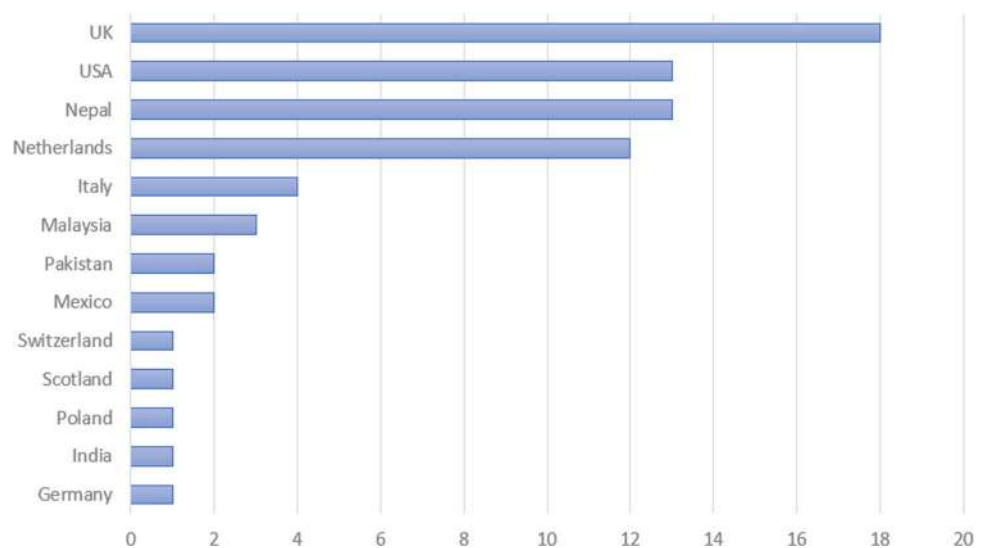


Fig. 4 Number of publications categorized according to country of publication, collaboration



number of citations was 140 times by Rodriguez-Morales et al. and was published in *Travel Medicine and Infectious Disease* (IF 4.589). This was followed by the article by Phua et al., in the journal *The Lancet Respiratory Medicine* (IF 25.09). This article was cited 64 times to date.

Article Category

In decreasing order, the categories were as follows: public health: 15 (20.8%), treatment: 12 (16.67%), special populations: 8 (11.11%) and pathophysiology 8 (11.11%), prevention 6 (8.33%), diagnosis 6 (8.33%), social issues: 6 (8.33%) and other topics (clinical investigation, ethics, rehabilitation) 6 (8.33%) and finally, epidemiology 5 (6.94%) (Fig. 5).

Article Type

The majority of papers, 28 (39%), were original articles, 28 (31%) were letters to the editor, 13 (18%) were review articles, 5 (7%) were editorials, and 4 (5%) were notes (Fig. 6).

The national collaborations between Nepal authors seem to be limited based on network visualization maps at Scopus and PubMed databases (Figs. 7 and 8).

Discussion

COVID-19 has been the main focus of scientific researchers around the globe this year. Since very little was known about this SARS-CoV-2 initially, there was indeed a boom in the number of observational studies initially and recently in experimental trials. [7] Our search was done on July 17, 2020, using the Scopus database with relevant search equations. Compared to neighboring countries like India and Pakistan, we have a limited number of publications on this

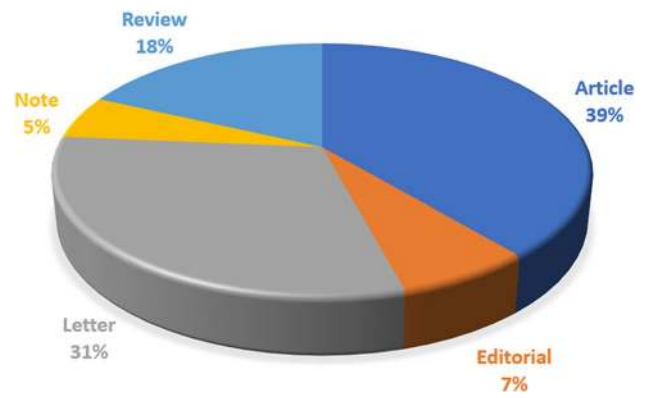
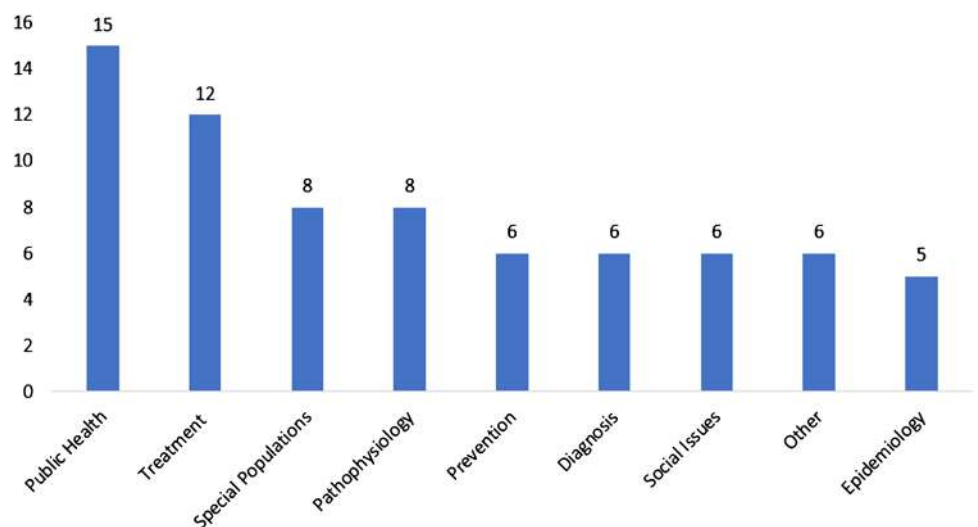


Fig. 6 Types of publications on COVID-19 from Nepal

topic. Moreover, we did not come across any journal with the bibliometric analysis of the publication on COVID-19 in Nepal.

The number of COVID-19-related publications was highest during the first 10 days of February, and majority of them were from China [8, 9], a quarter of which was published in Chinese language. [10] Second most publications was from the USA during the initial days. [11, 12] The idea of bibliometric analysis of publications in Nepal has not been explored to its full potential yet. We can only find a handful of journals with such an analysis. [13, 14] Our analysis represents the overall estimates of health research being carried out in Nepal and published in national and international PubMed indexed journals. As with any developing country, there is an underrepresentation of health research studies in Nepal and its publication in international literature. [14] A majority of the publications belong to the descriptive type of studies as there is a paucity in the clinical trials being conducted in

Fig. 5 Focus of the COVID-19 articles (number of articles)



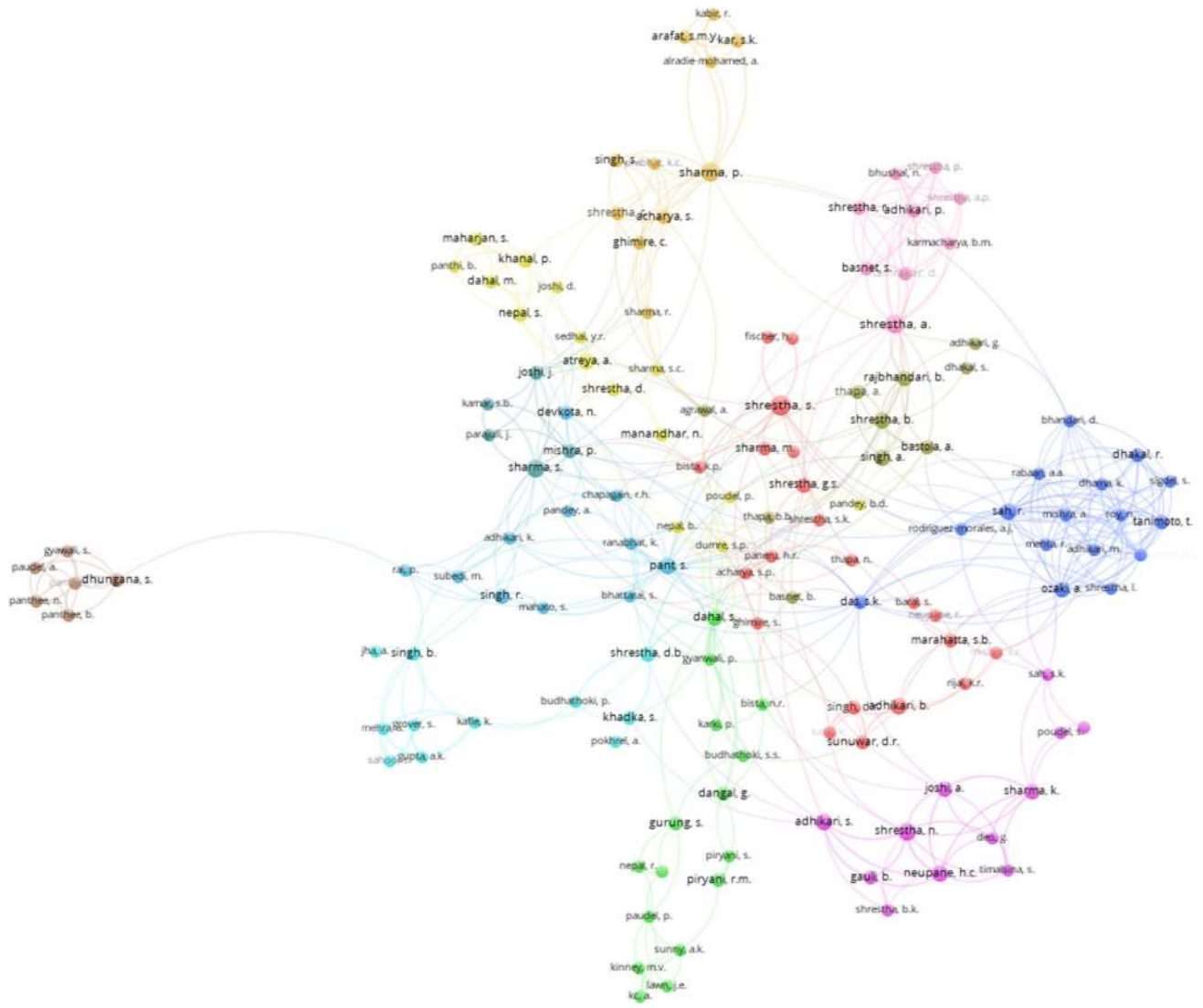


Fig. 7 Network analysis for authors of Nepal on COVID-19 at Scopus. Analyzed with VOSviewer

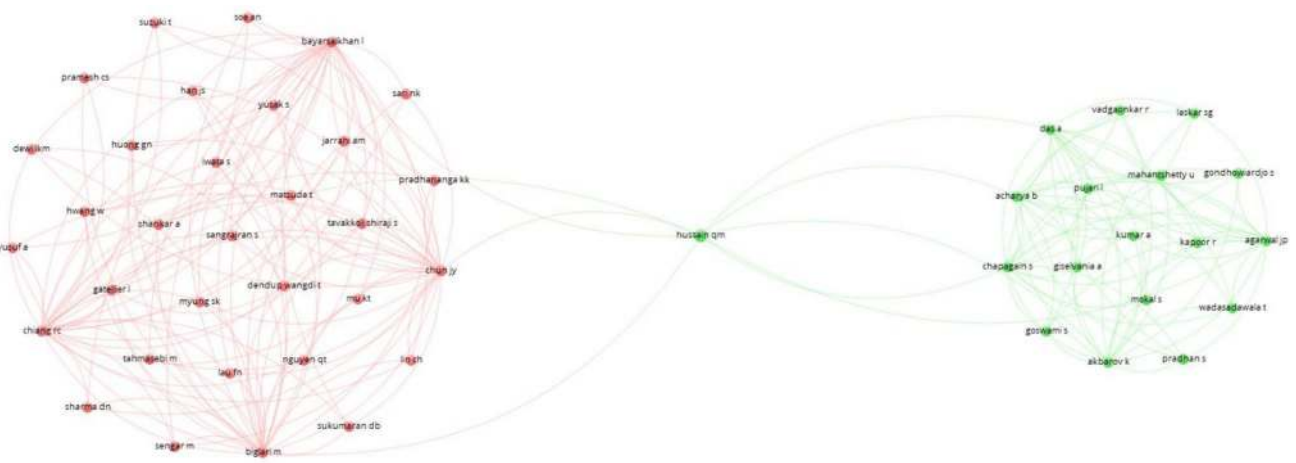


Fig. 8 Network analysis for authors of Nepal on COVID-19 at PubMed. Analyzed with VOSviewer

developing countries like Nepal. Common reasons being limited human and other resource capacities, lack of funding, ethical and regulatory issues, poor data collection, and administrative matters. [15] The inclination of Nepali researchers to focus on descriptive and qualitative studies is similar. Our research saw more than 60% of the publications consisted of letters, review articles, editorials, and notes combined. Only 39% were original articles. Gianola et al. in their bibliometric analysis also reported that letters and case reports had a greater share of publications. [16].

Major popular international journals tend to reject the studies right away if it is coming from developing countries. [17] In contrast to this, we saw publications in both low- and high-impact-factor journals worldwide. Nepal got its first medical journal, the *Journal of Nepal Medical Association*, in 1963. Over 100 journals are being published from Nepal, out of which 25 are medical journals. [18] To date, there are 10 PubMed indexed medical journals in Nepal. Our analysis shows that COVID-19-related information is published in only two of these, the *Journal of Nepal Health Research Council* and *Journal of Nepal Medical Association*. Our study shows that only 18% of articles were published in Nepali Journals, a vast majority prioritizing international journal. Globally, the *Journal of Medical Virology* had the most publications on COVID-19, closely followed by CUREUS. [19] None of the research papers included on our review was published in any of these journals. Research on COVID-19 is not equally spread across the nation. Most of the research was being done in the Kathmandu district (77%) and ten other districts. Sixty-six districts had no participation at all. Our finding was similar to Simkhada's (2010) conclusion that most health research was being carried out in the capital and a few other urban cities with teaching hospitals and universities. [14].

The worldwide bibliometric analysis of COVID-19 publications showed that English was the major language of the articles. The second common was in Chinese, followed by French, Spanish, and others. [20, 21] All the medical journals of Nepal are in the English language, and Nepali researchers prefer to write in English. Our study shows that 100% of the articles are written and published in English. In another worldwide bibliometric analysis of the COVID-19 publication, the majority were articles (48.0%), followed by letters (22.0%), reviews (9.4%), editorials (9.2%), and notes (9.1%). [22] Our analysis also showed the majority of original articles followed by other categories in the same sequence.

Aristovnik et al., in their study, mentioned that the typical research topics on COVID-19 roamed around virology, epidemiology, clinical presentations, investigations, diagnosis, and treatment. [23] We found in our research that the issues of interest in the articles published revolved

around these parameters, too, the majority of which fall under the public health category, followed by treatment. According to the bibliometric analysis of publications from the Arab countries, majority of the publications were related to public health and epidemiology too. [24] While 16.6% of the publications were regarding the treatment protocol, none had discussed about the vaccine. Similar was the finding in another study where only 14% of the publications were related to the treatment. [25] One article by Ahmad et al. was among the first ones to have bibliometric analysis of publications on COVID-19 vaccine. [26] Numerous clinical trials have been registered across the globe since the onset of the pandemic. [27] COVID-19 has become the research hotspot of coronavirus research, and the key to defeating this pandemic is also the clinical research on the same. [28] There is an urgent need for cooperation between governments and scientific researchers globally to combat this pandemic. [29, 30].

Limitations

Our review has several limitations. We used only PubMed indexed journals to search for the articles on COVID-19 by Nepali authors. Other publications in other databases were not included. We were dependent on the indexing of the databases used. That might have potentially avoided any articles yet to be published (those accepted but not published previously).

Conclusion

As the COVID-19 outbreak quickly infected several countries and took the form of a pandemic, many research publications also escalated in Nepal and abroad. We believe that our results guide the research centers that most of Nepal's publications are qualitative type and there is a need to shift our study towards the therapeutic and clinical trials of available antivirals and other medications and find a new solution to this rapidly spreading pandemic. We want to invite the country's scientific community to contribute by publishing their findings with maximal transparency.

Author Contribution RR, RS, KD, AJRM, JM, and AL processed data, implemented techniques, analyzed results, and drafted the initial version of the manuscript. YSM, RT, DKBA, and KD joined the discussions and provided constructive suggestions on editing the manuscript.

Declarations

Conflict of Interest The authors declare no competing interests.

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