A bibliometric analysis of COVID -19 research papers indexed in SCOPUS: Comparison of Sri Lankan context with Global context

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Abstract

Health burdens and the socio-economic crisis are the unprecedented global effect of the pandemic caused by novel Coronavirus. As numerous research papers have been published on COVID-19, bibliometric evaluation for valuable information is crucial as it helps to identify suitable researchers and institutions for appropriate consultancy and suitable journals for publication. This study aims to bibliometrically analyse the medical science-related COVID-19 research papers indexed in SCOPUS, and compare the Global and Sri Lankan context. Therefore, highly cited articles, most impactful authors and journals, most prolific and productive country, and co-authorship by country were analysed. The data were mined from the SCOPUS database. SCOPUS analytic was used to analyse initial results and VOSviwer software was used to analyse citation and co-authorship. "Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China" was the most cited article in the global context, and "Enhancing immunity in viral infections with special emphasis on COVID-19: A review" was obtained the highest citation in the Sri Lankan context. Y. Liu, was the most impactful author internationally, whereas Priyanka Ranasinghe was the most impactful author in Sri Lanka. The Lancet and the New England Journal of Medicine were the most impactful journals globally and locally, respectively. China was the leading country, whereas the United States was the country that had the largest co-authorships link strength and produced the highest number of publications. The Sri Lankan authors highly collaborated with the USA, UK and Australia. Hence China is in the leading position in the case of the researches on COVID-19. In Sri Lanka, review articles with meta-analyses are mainly produced and this type of article receive the highest citations.

Keywords: *Bibliometric analysis, COVID-19, highly cited articles, most impactful journals, co- authorship by country*

Introduction

The spread of the COVID -19 virus impels an unprecedented global human social and economic crisis and is considered a threat to the core of human existence. Since the first COVID-19 case was identified in Wuhan, China, in December 2019, 221 countries and territories around the world have reported a total of 218,946,857 confirmed cases of COVID -19, including 4,579 518 deaths as of 3rd of September 2021 worldwide (WHO, 2020).

Due to the exponential growth of these coronavirus cases, it was declared as an international public health emergency by the World Health Organization (WHO) on 30th January 2020 and as a pandemic on 11th March 2020 (Mahase, 2020). In many countries, lockdowns, which severely damaged several businesses across industries was implemented due to the pandemic outbreak (Donthu & Gustafsson, 2020; Leite, Hodgkinson, & Gruber, 2020 as cited by Verma & Gustafsson, 2020). Hence, the impact tends to extend towards economically too.

In order to provide recommendations and suggestions as to the remedies for this crisis, the academia also joined with the health sector to fight against the pandemic. As the publication of research papers increases exponentially along the pandemic in shorter period of time, evaluating the quality of those papers and obtain

valuable information is crucial. Among the research papers, scientific and medical research plays a vital role in tackling COVID-19, and controlling its transmission. Awareness of the research trend on COVID-19 is also believed to fill the knowledge gaps by inducing the researchers to conduct in the areas that are necessary.

Scientometrics helps to identify suitable researchers and institutions on a specified topic for appropriate consultancy. In addition, the policymakers could also identify the researchers as well as institutions for providing funding support to undertake researches (Yu et al., 2020). SCOPUS is one of the databases used in bibliometric analyses for its transparency and coverage.

Objectives

This study aims to analyse the medical science related COVID 19 research papers indexed in SCOPUS and compare between the global context and the Sri Lankan context. In this regard, the study analysed highly cited articles, most impactful authors and journals, most prolific and productive country, and co-authorship by country.

Methods

The data was mined from the SCOPUS database on 04th September, 2021. Initially, the search was performed by using the keyword of "COVID 19". Then results were filtered for publication year for 2019 to 2021, language for English, publication type for the research article, and the subject areas were limited to 'medicine', 'Biochemistry, Genetics, and Molecular Biology', 'Immunology and Microbiology', 'Pharmacology, Toxicology, and Pharmaceutics' 'Neuroscience' and 'Psychology' and other subject area were excluded. This search yielded 60150 research papers. Since it is not possible to download all the records from the SCOPUS, the results were arranged in an order citation count per article from highest citation to smallest citation. After that, the first two thousand records were downloaded as .CSV file for bibliometric analysis. The same search quarry was then specified only to Sri Lanka and the search yielded 73 records. It was download as .CSV file for bibliometric analysis.

SCOPUS analytics was used to analyse initial results (60150) to get an idea of the overall picture of data, and VOSviwer software was used to analyse the bibliometric analysis of the first two thousand articles. Citation, bibliographic coupling and co-authorship were analysed.

Results and discussion

Highly cited articles

When considering the citation count per article, 60 articles had citations of more than a thousand per article, 49 articles received citations within the range between 500 and 1000, and 1135 articles were with citations, within the range from 100 to 499.

The research paper "Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China" written by Huang et al. and published in the journal "The Lancet" was the most cited article that obtained

17,807 citations, and the research paper “Clinical characteristics of coronavirus disease 2019 in China, written by Guan et al., and published in the journal "New England Journal of Medicine" which received 11643 citations was received the next place in the list of highly cited articles in COVID-19 researches.

According to (Yu et al., 2020), more research papers are produced on clinical features and transmission of disease and viral genomes and disease transmission with the highest usage of keywords as “COVID-19”, “novel coronavirus”, “clinical features” and “epidemiology”. Further, as the COVID-19 pandemic originated from Wuhan, China, findings published by the Chinese experts might have been considered as most important and helpful.

There are 73 research papers that have authors with Sri Lankan affiliations. Among them, 43 papers are with the first author with Sri Lankan affiliation. Among the papers which have first Sri Lankan first author, the highest citation (166) was obtained to the review paper “Enhancing immunity in viral infections, with special emphasis on COVID-19: A review” authored by Jayawardena et al. (2020), published in Diabetes and Metabolic Syndrome: Clinical Research and Reviews. The highly cited articles are mainly review articles with meta-analysis.

Most Impactful Authors

Even though the highest number of publications was reported by E.Mahase of UK (197) and G. Lacobucci of USA (147), the most impactful authors in terms of citations were mainly from China. There are nine authors with more than fifteen thousand citations. Among them Y. Liu, Y. Wang and H. Chen were the topmost impactful authors based on the citation per article (1673, 1071, 949 citations per article, respectively). H. Chen, Y. Liu, and Y. Wang were the author or co-authors for the topmost cited articles. Further, they received top places in having co-authorship too. In the Sri Lankan context, the most impactful authors in terms of citation were those who contributed to the highly cited article mentioned in the previous section. Among them, the highly cited author is Priyanka Ranasinghe (190 citations for four articles) from the University of Colombo.

Most Impactful Journals

In terms of the number of publications, the New England Journal of Medicine (42), Cell (39), and the Lancet (34) were the leading. However, in terms of average citation per article, the Lancet (1723) and New England Journal of Medicine (1243) were the top impactful journals. In this line, the journal Cell takes 14th rank. Among the Sri Lankan authors publication, Asia-Pacific Journal of Public Health has five publications but only two citations. Diabetes and metabolic syndrome: clinical research and reviews has four articles with 171 citations. The New England Journal of Medicine has only three articles with 178 citations. The New England Journal of Medicine is the most impactful journal among Sri Lankan authors in terms of average citations per article.

Most prolific and productive countries

According to the search results, the highest number of research articles had been published by the United States

of America, followed by China and United Kingdom. However, according to the average citation per document, China was the leading country (with the 516 average citations per document), and it was followed by Germany, Canada, and so on, whereas the United States was eighth on the list.

Co-authorship pattern by country

The country-to-country link strength shows the number of publications co-authored for co-authorship study by two linked countries, whereas the cumulative strength of the connection indicates the total strength of a country's co-authorship connections with other countries. The analysis reveals that the United States was the country that had the largest association with 469 co-authorships link strength connected to 21 countries. The United Kingdom and Italy were next to the US with the total co-authorships link strength of 408 and 306, respectively.

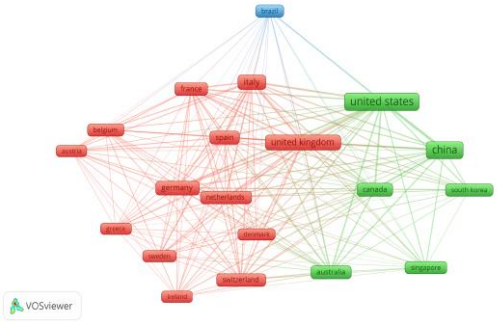

Figure 1. Co-authorship pattern by Countries

Among the publication contributed by Sri Lankan authors, they have collaborated with nineteen countries but no collaboration was observed with China. The Sri Lankan authors have highly collaborated with USA, UK and Australia.

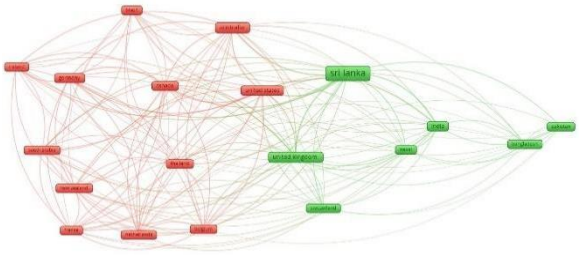

Figure 2. Co-authorship pattern of Sri Lanka

Conclusion and recommendation

Bibliometric evaluation of the research papers is essential to fill the knowledge gaps by conducting the research. In the global context, among the 60150 articles "Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China" written by the Chinese authors was the most cited article in COVID-19 research. Further, the Chinese authors were the topmost impactful authors based on the citation per article, and they have the highest co-authorship too. According to the average citation per document China was identified as the leading country. In the case of the number of publications produced,it retained second place. Hence the most outstanding contribution provided by China is visible. Further, United States was the country that had

the most considerable co-authorships link strength and produced high number of publications. The Lancet and New England Journal of Medicine were the most impactful journals,In terms of average citation per article.

In the Sri Lankan context, “Enhancing immunity in viral infections with special emphasis on COVID-19: A review” was obtained the highest citation, and Priyanka Ranasinghe was the most impactful author. The Sri Lankan authors highly collaborated with the USA, UK and Australia. In Sri Lanka, review articles with meta-analysis were mainly produced, while globally, the researches were mainly produced on clinical features and transmission of disease and viral genomes and disease transmission.

As this bibliometric study utilised only SCOPUS databases to collect data, future studies are recommended to carry out with other databases such as Web of science, Google Scholar, EBSCO, and PubMed to collect more comprehensive data for bibliometric analysis to avoid bias.

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