Original Article

Publications on Post-Covid Mucormycosis: A Bibliometric Study of WHO Database.

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Abstract

***Background**: The COVID-19 pandemic has triggered a large number of publications to inform, understand, conduct more research and control the situation. Although the researchers are analyzing the bibliometrics on this condition, no bibliometric studies are available on the publications related to post-covid mucormycosis. This study is aimed at bibliometric assessment of the publications related to post-covid mucormycosis.*

***Methods**: In the presented study, authors have performed the bibliometric analysis of the World health organization (WHO) database named 'Global literature on coronavirus disease.' WHO is maintaining this database since the pandemic, and it contains thousands of reports. Two simple search terms, 'Covid' and 'mucormycosis' used to search the entire database in 'title, abstract, subject' mode with the search string was tw:(mucormycosis covid). The search was not restricted to any date range.*

***Results**: Only 51 reports (40 articles and 01 clinical trials) were obtained with the above search terms. The study found that there is considerable growth in such publication in the last 6 months. Interestingly only three such reports were published in the year 2020. Database wise 38 of these 51 reports were available in Medline. Most of such reports were published by Indian authors. Indian Journal of Ophthalmology emerged as the most productive journal contributing the highest number (10) of these reports.*

***Conclusions**: The highly acclaimed publications were the reviews. This study suggests that India is the most productive country for publications related to post-covid mucormycosis. This resembles the fact that the country, faced the excessive emergence of post-covid-19 mucormycosis cases reported the second-highest number of Covid 19 cases in the substantial worldwide outbreak in the second wave, which is followed by post covid mucormycosis.*

Keywords: Bibliometrics; COVID-19; Post-Covid; Mucormycosis; WHO COVID-19 Database.

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Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), popularly known as Covid-19, is associated with an array of opportunistic bacterial and fungal infections[1]. The use of immunosuppressants, including steroidal therapy, is widespread in the early stage of infection, and it is used to prevent and treat the period of high inflammation of COVID-19. This also diminishes the host immune response to the microorganisms and provides an excellent opportunity for the other bacterial and fungal infections[2]. Recently, there is a severe emergence of mucormycosis in patients with COVID-19 has been reported more and more all over the world, especially in India (majority rhino-orbital-cerebral mucormycosis (ROCM))[3]. Mucormycosis is an invasive vascular fungus, usually found in the environment, growing on moist surfaces and dead and decaying plant matter. The primary reasons for the emergence of mucormycosis infection include immunocompromised host, diabetes mellitus associated hyperglycemia, etc.

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There are many studies published recently that report the emergence of post-covid 19 mucormycosis infection. However, the characteristics and impact of these studies are still lacking. In this sense, bibliometric analysis is a systematic tool for monitoring research in this field, providing veterans and new scientists with an overview of the scientific landscape in this field.

Methods

Database Selection

World health organization (WHO) database named as 'Global literature on coronavirus disease'[4] which is a comprehensive collection on Covid 19 related research including clinical trials. It included the citations form of all the other relevant databases such as Medline and Scopus. Two simple search terms, 'Covid' and 'mucormycosis' used to search the entire database in 'title, abstract, subject' mode with the search string was tw:(mucormycosis covid). The search was not restricted to any date range. Data collection was acquired from July 30 to August 5, 2021

Data Export and Analysis

The information retrieved from the Global literature on coronavirus disease database was exported to Microsoft Excel®. Later, software VOSviewer 1.6.13 was used for visualization and data analysis.

Bibliometric Indicators

The following bibliometric indicators were evaluated:

- Volume and growth of publications related to covid 19 related mucormycosis.
- Co-occurrence keywords network visualization.
- Co-occurrence keywords overlay visualization.
- Co-occurrence keywords overlay visualization.
- Most active countries.

Results and Discussion

A total of 51 documents dedicated to covid 19 related mucormycosis were retrieved from the WHO database. Most of these articles (38 out of 51) are available in the Medline. A large number of these reports (50 out of 51) were published in the year 2021. The emergence of post-covid-19 mucormycosis-related publications is depicted in Figure1. The initial publication related to post covid-19 mucormycosis emerged as early as in the mid of 2020. The report suggested the possibilities for fungal infections covid-19 affected patients, including aspergillosis, candidiasis, mucormycosis, or cryptococcosis as co-morbidities in COVID-19 patients. The report suggests the higher rates of infections, especially in severely ill or immunocompromised patients.[5] However, this was the only such report in 2020, and most of the other reports were published in 2021. The first substantial rise in similar publications occurred in April, and the majority of publications reported between May to July in the year 2021, and most of these reports were from India. Furthermore, most of these reports (78%) originated from the Indian institutes (Figure 2), which agrees with previous claims of the rapid emergence of post-covid-19 mucormycosis in India during second wave[7-10].

The spread of invasive mucormycosis infection during the second wave of the COVID-19 pandemic in India is mainly associated with severe complications such as vision loss, brain abscesses, and sudden strokes suddenly increased[6], which is also reflected in the published reports.

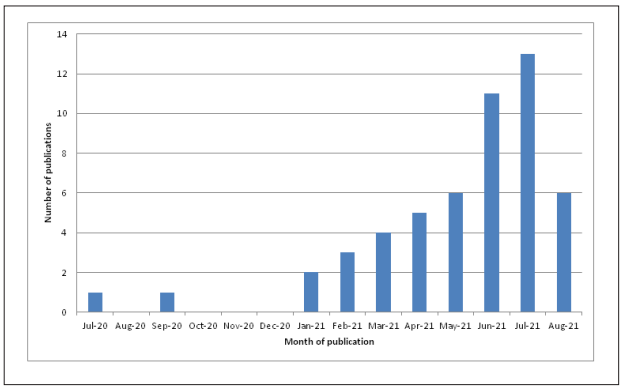

Figure 1: Emergence of post-covid-19 mucormycosis-related publications. Note: The date of entry into the WHO database is considered for preparing this graph.

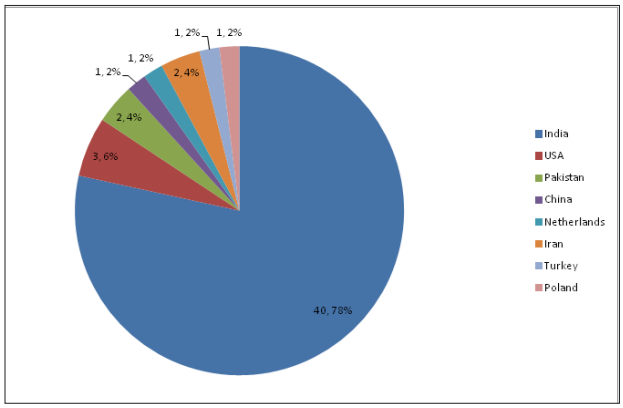

Figure 2: Geographical representation in post-covid-19 mucormycosis-related publications.

Figure 3: Figure 3 shows the research topic map in network visualization, overlay visualization mode, and density visualization, which displays the five clusters of relevant research topics concerning the post covid 19 mucormycosis. The most significant nods in the network are Covid 19, SARS-Cov-2, mucormycosis diagnosis, humans followed by drug therapy, antifungal agents. Furthermore, a significant number of studies were focused on orbital disease diagnosis and therapy. The WHO database reflects the maximum number of reports related to Rhino-ocular-cerebral infections.[11-20]

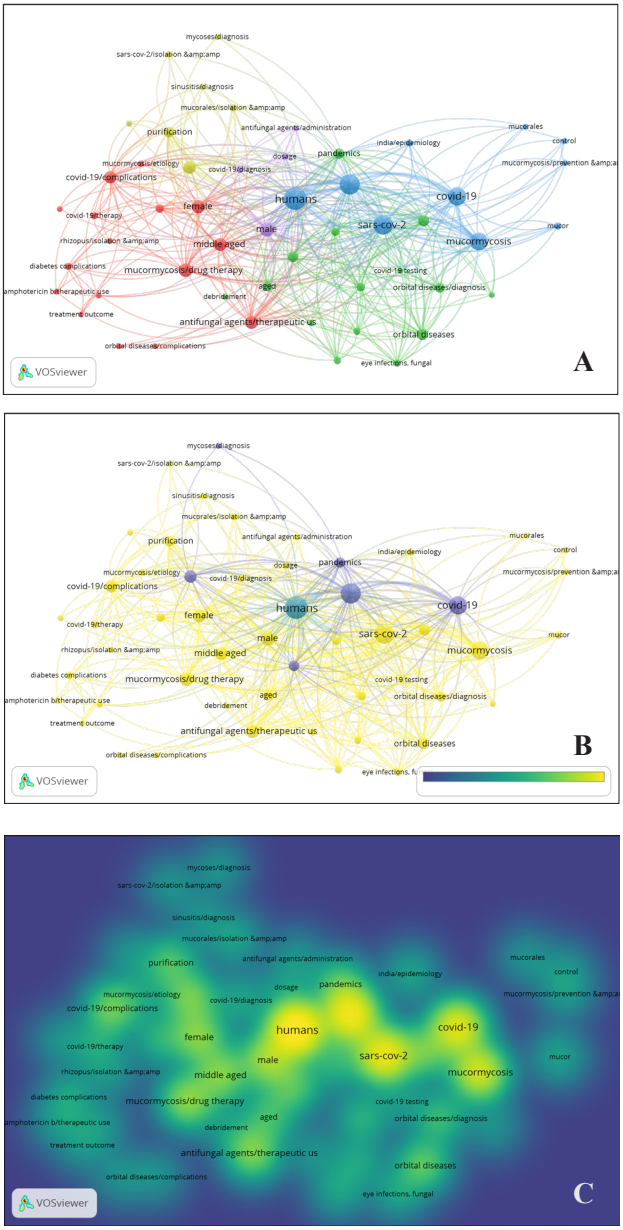

Figure 3: Research-topic network visualization of publications related to post covid 19 mucormycosis a) network visualization b) overlay visualization mode, and c) density visualization mode.

Conclusion

Studies related to covid-19 associate invasive mucormycosis have been continuously rising from mid-2020 to the present time. Most of these studies were focused mainly on orbital diseases, eye infections, diabetes-related complications, paranasal Sinuses. The other studies reported complications are endophthalmitis, ophthalmoplegia, and post-operative complications. India, followed by China, and the USA, were the more productive country on studies related to post covid-19 mucormycosis, and they also had the most substantial collaboration network.

Limitations and Future Recommendation

There is currently minimal data available regarding post-Covid mucormycosis, and most of the studies are published as case reports due to the concise history of the disease. Although these reports are continuously growing, the collaboration network is somewhat weak. There is a great need to strengthen scientific cooperation to solve this global health problem and ensure successful treatment strategies.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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CONSENT FOR PUBLICATION

Every author had reviewed and approved the final copy of the manuscript and has agreed to be responsible for all aspects of the work, including any issues related to accuracy or integrity.

AUTHOR CONTRIBUTIONS

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis, and interpretation, or in all these areas; took part in drafting, revising, or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agreed to be accountable for all aspects of the work.

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