Mapping the Nexus: A Bibliometric Analysis of Pandemics and Slum Dwellers' Health

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Abstract

INTRODUCTION: Pandemics have historically posed significant threats to public health, with their impact often disproportionately affecting vulnerable populations, including slum dwellers. The convergence of densely populated under-resourced urban areas and the rapid spread of infectious diseases presents unique challenges and heightened risks to the health and well-being of individuals residing in these marginalized communities.
OBJECTIVES: The study aims to examine how the epidemic has affected slum residents. Additionally, the study intends to measure the stress and resiliency of such residents. For this reason, bibliometric analysis has been used.
METHODS: Such analysis has been carried out through the use of procedures like keyword selection, database selection, and research paper collection, search result refinement with selection and rejection criteria, and data collection and analysis. The databases Scopus and Dimension have been chosen to compile papers from 2020 to 2022. When searching for publications, terms like "slum dwellers," "coping strategy," "pandemic stress," and "slum resilience" are often used. Data analysis is done using the R software package Biblioshiny.
RESULTS: China, Spain, and Switzerland lead in average article citations and overall citations. Dominant themes are Covid, slum, health, and pandemic, with a focus on pandemic effects, health issues, and infection spread. The thematic map highlights "Covid and Slum Dwellers" as a central research theme, with thematic evolution from Covid and Population to themes like Slum, Surveys, and Participants, indicating a focus on data collection via interviews on the Covid impact on slum residents.
CONCLUSION: Several research papers were published to study the COVID-19 impact on slum dwellers from different dimensions. But their resilience strategy was less emphasised which can be a platform for emerging researchers. More studies are expected in this area. This study will assist policymakers in revising their approach to development and slump transformation.

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1. Introduction

The World Health Organization (WHO) has identified the 2019 coronavirus disease (COVID-19), caused by the SARS-CoV-2 coronavirus, to be a global pandemic. Due to the disease's high infectiousness, dense urban population, and dearth of water, sanitation, and hygiene (WASH) facilities, the Global South countries are especially at risk. Eastern and central India's slums, particularly those in Uttar Pradesh, Jharkhand, Bihar, West Bengal, and Odisha, were more prone to COVID-19 transmission since these areas lacked access to basic services and infrastructure for slum dwellers [1]. Due to their congested housing conditions and lack of basic resources, the slums which represent the highest level of urban poverty constitute a case of particular vulnerability

and make it challenging to adhere to social distancing policies[2]. Therefore, the slum areas of cities are probably more vulnerable to COVID-19 due to poor infrastructure, a lack of medical resources, and high human density. It might be difficult for those who live in slums to get healthcare. Public health facilities are scarce and frequently of poor quality in these communities. The slums in developing nations have revealed high costs and prevalence of catastrophic health expenditure (CHE), and those with chronic illnesses and the poorest households appear to be more susceptible to financial hardship.

The current coronavirus disease (COVID-19) pandemic that started at the end of 2019 has put the entire planet in danger. The virus seriously harmed the economy. Globally, nations are now more concerned about the economic costs and financial effects of the epidemic on nations and their citizens rather than the issue of the disease's spread. All socioeconomic strata were severely impacted by COVID-19 in different ways, with women, slum dwellers, and people without social protections being the most vulnerable.[3]. Among the most popular anti-virus measures are curfews, lockdowns, and working from home, but they have neglected the plight of slum dwellers who must choose between life and a living. [4]. Lockdown prevents slum residents from leaving to work in unofficial jobs. Real hunger for their family results from their lack of finances (McFarlane 2020; Patel et al. 2020). Additionally, residents of slums are required to wear masks and even face shields to avoid being imprisoned (Mehta 2020). Slum residents have already been exposed to a number of social, economic, and environmental issues due to the pandemic stress, and these exposures may help them become more resilient to COVID-19. As the fate of the current pandemic is still unknown, the pandemic resilience strategy of slum dwellers or policymakers' timely intervention in it has immense importance. As a result, the country needed to arm itself with sufficient safety precautions to successfully address these issues.

In the first quarter of 2021, COVID-19 killed 2.9 million individuals and infected more than 138.09 million (World Meter, 2021). COVID-19 has increased the threat of calamity and precipitated unprecedented circumstances when compared to the bubonic plague of 1347, the Spanish Flu of 1918, SARS, MERS, and Ebola in recent years[5]. Dwellers in slums in developing nations that make up 33.33 percent of the world's urban density have been ranked as most at risk of COVID-19 contagion[6] Middle 2020, COVID-19 started spreading infection in large slums in the world in Dharavi [7] in Mumbai, Orangi[8] in Karachi. In slums, it is nearly impossible to follow WHO PCI recommendations for segregation, handwashing, or self-quarantine/isolation. (Social Science in Human Action. 2020).

The pre-existing vulnerabilities of urban slum people were made worse by COVID-19. Planning in slums becomes more difficult by maintaining the WHO-recommended level of physical isolation and distance. The scenarios make it seem vital to find out if these resource-scarce communities, which are already prone to poverty, a lack of access to healthcare, infrastructure issues, and space limitations, could become resilient against these dangers [9].[10] Examines the lack of sanitary services in urban slums, which has become a significant barrier to dealing with the pandemic. In this sense, the project aims to investigate the following research questions:

1. What is the study's inferential finding in terms of document type, content, authors, and author collaboration?
2. Which are the most occurred keywords related to the study area (word cloud and word tree map)?
3. Which are the most relevant affiliations in terms of countries and sources?
4. Who are the major contributors (authors and countries) to the study field?
5. What are the clusters and their contents in terms of authors and keywords?

2. Methodology

The Dimension database was used to gather research data because it broadcasts peer-reviewed conferences and papers as well as original citation sources. There are a total of 72 published research publications that have been chosen for bibliometric analysis. The term "bibliometric methodology" refers to the application of quantitative techniques (such as units of production and citation analysis) to bibliometric data. (Broadus, 1987; Pritchard, 1969).

The workflow of the study started with selecting the keywords and database followed by an analysis of the data and interpretation of the results.
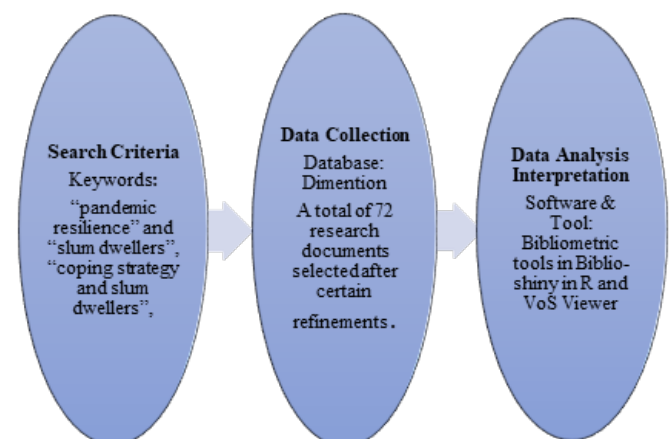

Fig. 1: Workflow of study

3. Discussion

The discussion has been made based on data analysis results obtained from the Biblioshiny platform.
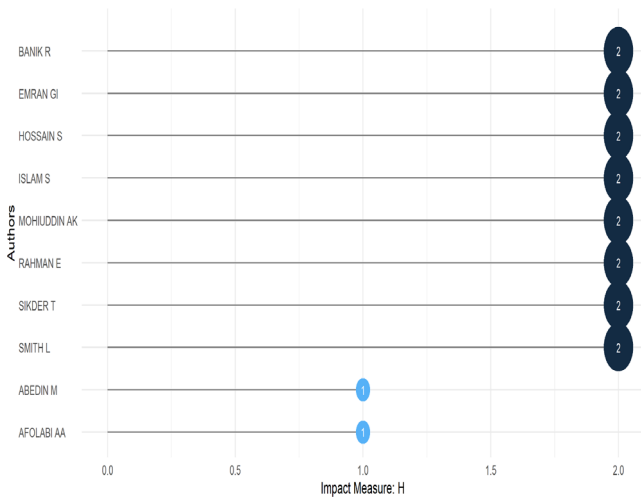
3.1 H-index analysis of authors' local impact

Fig. 2: H-index analysis of authors' local impact
Source: Author's Compilation

The ensuing influence as determined by the h-index can also be used to sort authors whose papers were published. The h-index in the current study spans from 0 to 2. The size of this influence is depicted in dark blue on the bar graph above. The authors with the greatest h-indexes are shown in the figure above. They are Banik R, Emran GI, Hossain S, Islam S, Mohiuddin AK, Rahman E, Sikder T, and Smith L, who each have an h-index of 2.

3.2 Word Cloud

The magnitude of the terms in the word cloud here reflects how frequently they appear. Although the order of the phrases is somewhat random, the most important ones are given large size and placed in the centre to make them more noticeable.
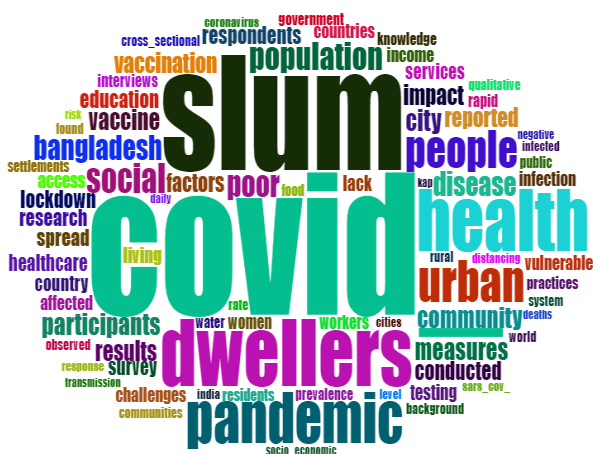

Fig. 3: Visualization of the words that have been used the most frequently in articles on the resilience of slum inhabitants and pandemic stress.
Source: Author's Compilation

The word cloud in Fig. 3 indicates the words that were most frequently used in the paper's discussion of pandemic stress and slum dwellers' resilience. The most frequent words are "COVID," "slum," and "dwellers," with "health" and "pandemic" coming in second and third, respectively. This suggests that researchers have examined the effects of the Covid pandemic on slum dwellers' health and occupation.

3.3 Top Authors' Production over Time

The top 20 writers in the area of study from 2020 to 2022 are shown in the graph below, along with their total number of publications and citations. The author who has the most publications and citations is Islam S. "Knowledge, attitudes, and practises associated with the COVID-19 among slum dwellers resided in Dhaka City: a Bangladeshi interview-based survey," an article by the authors that was published in the "Journal of Public Health" and had 53 citations. Large contributions to the field have also been made by Alam W. and Farnaz N.
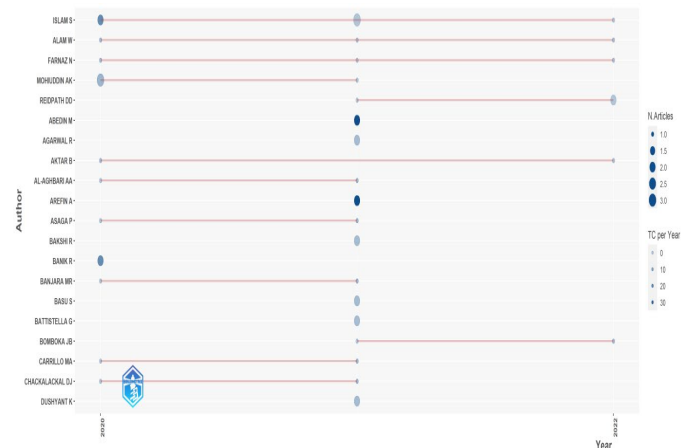

Fig. 4: The output of a top author over time
Source: Author's Own Compilation
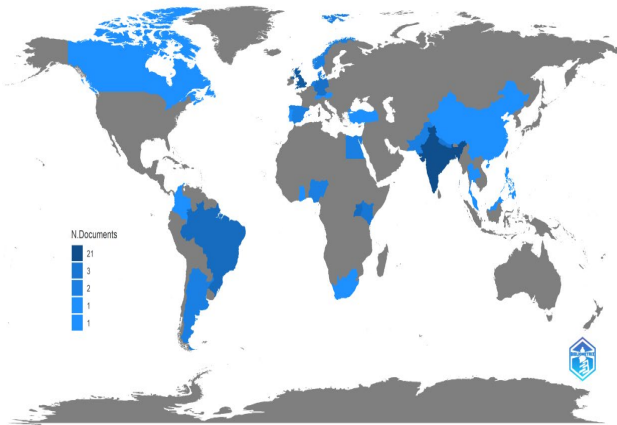
3.4 Country Scientific Production

Fig. 5: Country Scientific Production
Source: Author's Own Compilation

The scientific output of the nations is depicted in the above graph. Indigo-colored markers on the map indicate the nations with the greatest publication rates for papers. It was discovered that Bangladesh and countries like India published the most documents, 21 in the present case.

3.5 Top Ten Countries Scientific Production (2020-2022)

The table below shows the top ten countries' scientific production between the years 2020-2022.

Table 1: Total Citations and Average Citations by Country
Source: Author's Compilation

Country	Total Citations	Average Article Citations
Bangladesh	143	11.00
India	27	3.00
Netherland	25	1.32
Switzerland	15	15.00
Spain	14	14.00
China	12	12.00
Denmark	12	12.00
Ghana	10	10.00
Brazil	9	3.00
Germany	9	4.50

It reveals that among the listed top ten countries, Bangladesh has the most total citations (143), while Brazil and Germany have the fewest total citations. India has 27 total citations, the Netherlands has 25, Switzerland has 15, Spain has 14, Ghana has 10, while China and Denmark both have 12 total citations. The Netherlands has the fewest average article citations (1.32), while Switzerland has the highest average of 15, totalling 15. Following Switzerland, Spain, with an average article citation of 14, is followed by China and Denmark, both of which have an average article citation total of 12.

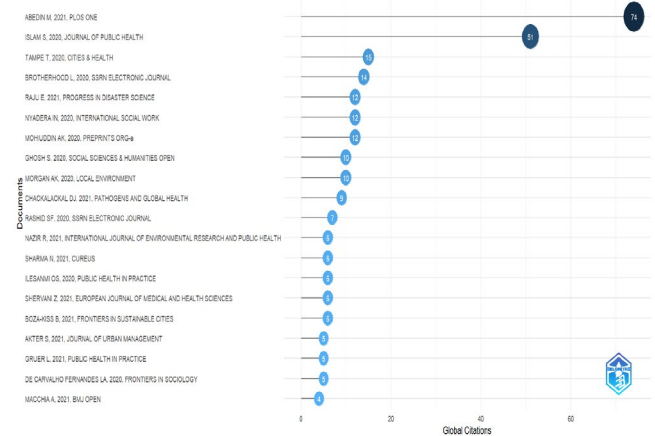## 3.6 Most Cited Documents In the world

Fig. 6: Most Cited Documents In the world
Source: Author's Compilation

The above figure shows the most globally cited documents between 0 to 80. It was found that in the journal PLOS ONE the article written by the author Abedin M, in the year 2021 has got 74 global citations shown in the black bar chart which is the highest number among the given articles. In the journal of Public Health, the author ISLAM S, 2020 has achieved 51 citations for its documents globally which are shown in the indigo bar chart. In between 10-15 citations there are 5 documents and all the rest documents have received citations between 4 to 10 globally.
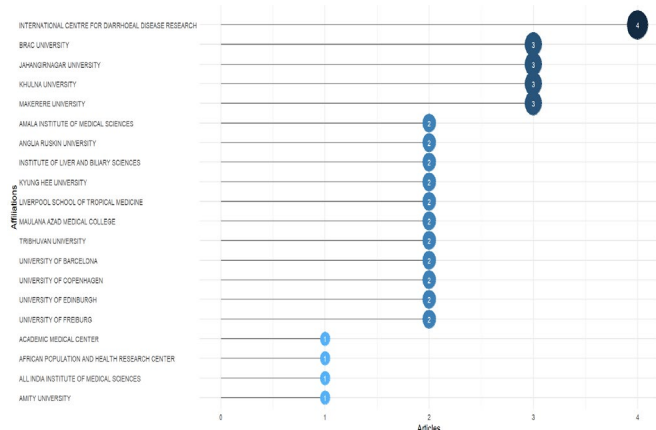
3.7 Most Relevant Affiliations

Fig. 7: Most Relevant Affiliation
Source: Author's Compilation

The top relevant affiliate articles are shown in Fig.6. The affiliation that received the most citations is 4 and is reflected in the black bar chart which is claimed by the International Centre for Diarrhoeal Disease Research. The second largest affiliations are claimed by Barc University, Jahangirnagar University, Khulna University, and Makerere University which is shown on the blue bar chart the remaining fifteen articles have different numbers of affiliates at levels two and one, indicated by deep blue and light blue colours.

3.8 Most Relevant Sources

The study also examined the influence of each journal that published articles on the subject of pandemic stress and the resilience of slum dwellers by computing the journal h-index, which is represented in the bar chart as seen in the above image. This graph displays each paper's h-index value numerically as well as its influence through a blue shadow, with darker colours denoting journals with greater impact.
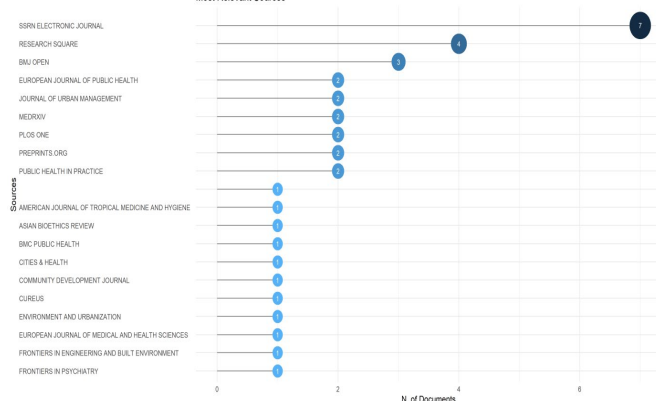

Fig. 8: H-index score for every journal
Source: Author's Compilation

With an h-index of 7, SSRN Electronic Journal held the top spot in terms of influence, which is represented on the

chart by a black bar. The second-ranked journal in terms of impact is Research Square, which is indicated by the point in the blue chart and has an h-index of 4, followed by BMJ Open, which has an h-index of 3, and the other seventeen journals, which have h-indexes of 2 and 1, which suggest relatively low influence.

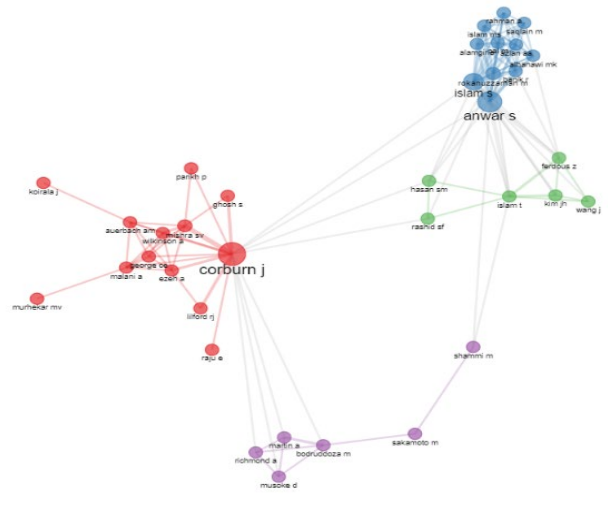## 3.9 Cluster Chain Network by Authors

Fig. 9: Cluster chain network Visualization of Authors as per Cited Documents
Source: Author's Compilation

The above figure shows the cluster chain network visualization of authors as per cited documents. The network above is formed by the composition of four clusters. The first cluster depicts the work citation of authors like Corburn J, Malani A, Mishra SV, Auerbach A M & Ezeh which is represented in a red colour network. The second cluster is formed by interlinking of citation works of authors like Anwar S, Islam S, & Rokanuzzaman M represented in blue colour. In the third cluster, the authors whose works are cited include Ferdous Z, Bodruddoza M, Hasans M & Rashid S together form a cluster depicted in green colour. In the four clusters, the authors whose work cited are Bobruddoza M & Shammi M together form a cluster network in purple colour.
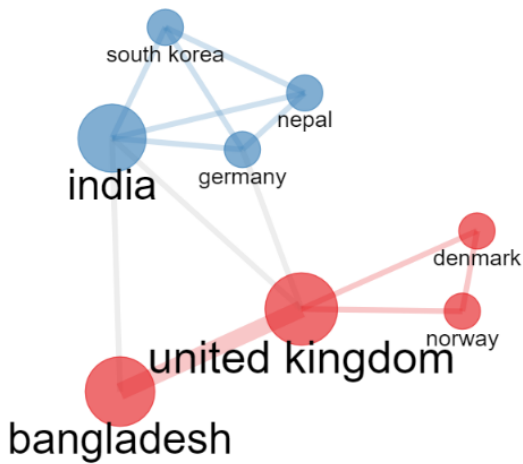
3.10 Cluster Chain Network by Countries

Fig. 10: Cluster chain network visualization of countries as per cited documents
Ten regions having the most cited documents.
Source: Author's Compilation

The above figure reveals the countries having the most cited documents in the chain cluster network. There are two cluster networks interlinked with each other. In the first cluster, countries that are linked are Bangladesh, the United Kingdom, Norway, and Denmark which are marked in the pink colour network. The second cluster is formed by the interlinking of countries like India, Germany, Nepal, and South Korea. This cluster is represented in a blue colour network. Bangladesh has 21 citations which is the highest frequency of cited documents whereas Argentina and Denmark have 2 which is the lowest frequency of citation. After Bangladesh, India had the highest citation of 20 then the United Kingdom had 12 citations. Brazil and Uganda have citation of 5, Germany has 4, and Kenya and Nepal have 3 equal citations.

3.11 Word Growth

A development curve with an annual occurrence value is created for the words that are often used in this study. According to these findings, "Population," "Covid," "Slums," "Pandemic," and "Health" are the research area-related words that are most frequently used. The use of all such words will reach its peak in 2021. In the same year, the terms "Population" and "Covid" experienced the most growth. The same trend was also seen in the categories of "Health" and "Urban" from 2020 to 2021, but it changed to a fall from 2021 to 2022.
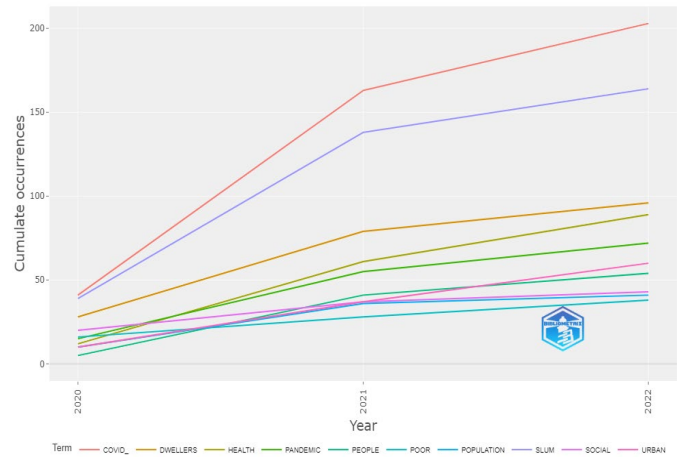

Fig. 11: Word Growth
Source: Author's Compilation

Region	Frequency	Region	Frequency
Bangladesh	21	Germany	4
India	20	Kenya	3
Uk	12	Nepal	3
Brazil	5	Argentina	2
Uganda	5	Denmark	2

3.12 Thematic Map

Four topological zones that differ in density and centrality are formed on a theme map. This result was attained using a semi-automatic evaluation of the titles of all references looked at in this study, together with other appropriate keywords (other than the author's keywords) to catch deeper variations.

Fig. 12: Four topological zones are identified on a thematic map based on density and centrality.
Source: Author's Compilation

The high density and centrality of the "motor" or "driving" themes in the upper right quadrant imply that

these topics are unimportant for upcoming research. Specific and underrepresented themes can be found at the top left quadrant, which is also where there is a lot of "Urban Population" and where there is rapid development. Low centrality and density in the lower quadrant indicate that these themes have been used but have not lost favour; "Emerging Theme" methods are absent from this region. Finally, fundamental subjects are found in the lower right quadrant, as shown by their great centrality. There is a part on "Covid and Slum Dwellers" in this topic that is significant for general research.

3.13: Thematic Evolution

From 2020 to 2022, the themes' development is depicted in the image below. The data reveals a number of frequently utilised themes. Some of the themes that will be popular from 2020 to 2021 are displayed on the left. Three themes are presented, each with a varying size based on how frequently it is used. The most current themes in use between 2021 and 2022 are displayed in the right section. Four themes are presented, each with a varied size based on how it would be used.
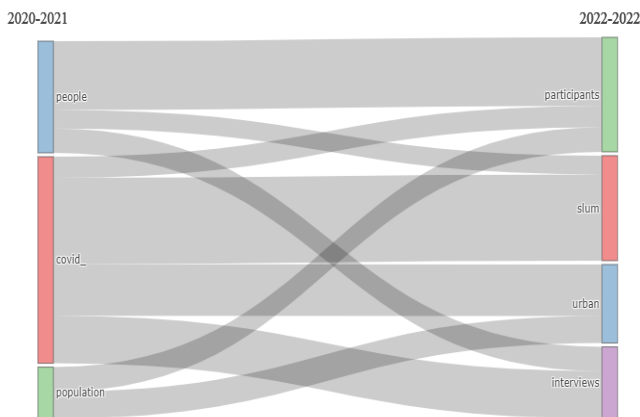

Fig. 13: Thematic Evolution
Source: Author's Compilation

The left section shows that from 2020 to 2021 the word "people" has first been added to "Participants" then added to "slum", and then to "interviews". The second word "Covid" was first added to "slum" then added with "urban" and "interviews" then coming to the "population" it was first added to "participants" and then to "urban". In the right section, the first word "participants" is added with "people" and marginally added with "Covid" and "population". The word "slum" was added with "people" and "Covid", the word "urban" was half added with "Covid" and "population", and the word "interviews" was added with "people" and "Covid". The thematic evolution infers that slum people were interviewed for Covid related issues.

3.14 Tree Map

A list of terms that appear in various forms in a number of the current study's publications are described in the word tree map below.
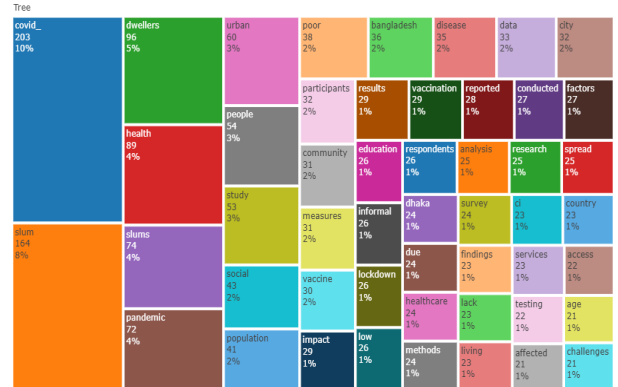

Fig. 14: Word Tree Map
Source: Author's Compilation

First, the term "Covid" is widely used 203 times which is 10% of total usage. The word "Slum" is the second most used word used for 96 times which is 8%. And in third place, there is the word "Dwellers". Similarly, the words "Health", "Slums" "Pandemic" and "Urban" ranges from 89 to 60 times.

3.15 Co-occurrence of Keywords Network
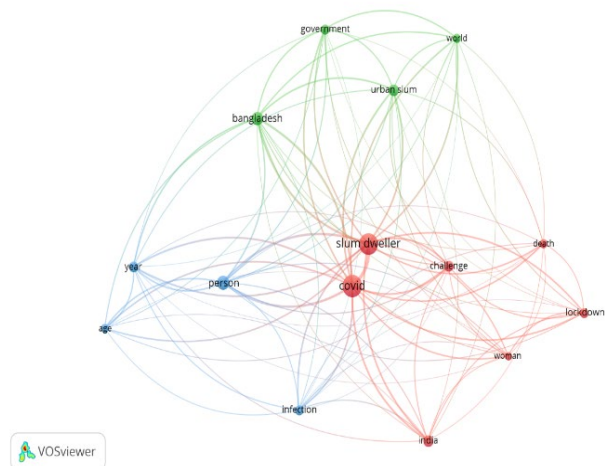
Fig. 15: Co-occurrence of Keywords Network
Source: Author's Compilation

The keyword co-occurrence analysis has been done with words having a minimum of 10 occurrences in both title and abstract. Slum dweller and Covid are found to be the most occurred words. 3 clusters have been found. The biggest cluster is in red and it focuses on the different challenges of slum dwellers during Covid and lockdown. The second cluster is in blue and mainly deals with the

demographic factor with effect on infection. The third cluster which is in green focuses on the role of government in developing urban slums and the slum dwellers in different countries across the world.

4. Future Research Direction

Most of the research works have focused on the impact of pandemics on slum dwellers but a little attention was diverted to assess the resilience and coping strategy towards the pandemic of the said dwellers. Researchers like Word cloud, word tree map, and keyword co-occurrence analysis did not produce a word like 'resilience' or 'preparedness' against the pandemic.

Several studies dissected slums of major cities like Khulna and Dhaka of Bangladesh(Khan, 2022; Shermin & Rahaman, 2021; Islam, 2021;), and Nashik of India(Palwe & Bajaj, 2021)so there is a geographical gap in analysing Covid impact on slums dwellers of small cities.

Further, researchers tried to dig out the Covid impact on health and its infection rate on slum dwellers. However, Covid effect on aspects like education, livelihood, and employment may also be explored.

The authors have mainly identified the health and economic issues of slum dwellers, but the COVID pandemic has fuelled a major issue which is very unbearable for the society is the rise of child labour. It has been found that the children of the slum dwellers have left their school and started working to earn a livelihood. It means the rate of child labour again started increasing which needs to be addressed (Morgan, 2020). A major study has been conducted on the already residing slum dwellers but very little emphasis has been given to the migrated slum dwellers(Raqib et al., 2022)because of the pandemic. The behavioural aspect of dwellers like wearing a mask, social distancing, sanitization, and vaccination during COVID 19 was not up to the mark due to which many slum dwellers has lost their life (Mohindra et al., 2021).

Ensuing research has not emphasised the above consequential effects of the pandemic. Even if the pandemic is over, its effect will be in long run.

5. Conclusion

The paper tried to break down the pandemic stress and its impact on slum dwellers across the world through a bibliometric analysis. Many research works have been conducted in India and Bangladesh. Although China, Spain, and Switzerland have the most average article citations, these countries have also claimed a higher number of overall citations. Authors like Bankir R, Emran GI, and Hossain, S have earned the highest H index.

Words like Covid, slum, health, pandemic, etc are appeared most often followed by impact, survey, health care, spread, etc. Researchers focused on pandemic effects, health issues, the spread of infection, etc. Authors like Islam S, Alam W, and Farnaz N contributed a lot to the research field. Journals like Plos One, Journal of Public Health, and Cities & health produced a greater number of papers and claimed as most global cited documents.

The most relevant affiliated institutions are International Canter for Diarrhoeal Disease Research, BRAC University, Jahangirnagar University, and Khulna University. SSRN Electronic Journal, Research Square, and BMJ Open are the most relevant sources.

The bibliometric analysis infers four cluster networks of authors and three cluster networks of countries.

In the thematic map, the basic theme with high centrality contains the word "Covid and Slum Dwellers" deducing the general research interest in the topic. Similarly, thematic evolution starts with Covid and Population in 2020-21 and joins with themes like Slum, Surveys, and Participants. It can be deduced that researchers collected data through interviews about the Covid effect on the slum people.

Several research papers were published to study the covid impact on slum dwellers from different dimensions. But their resilience strategy was less emphasised which can be a platform for emerging researchers.

Acknowledgement:

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