Reshaping Healthcare: A Bibliometric Analysis of Lessons Learned in Post-COVID-19 Health Policy

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Abstract

The COVID-19 pandemic has profoundly impacted health policy globally, leading to heightened concern and urgency. However, previous studies have been hampered by limited resources and insufficient discussions on the long-term implications for health policies following multiple COVID-19 waves. Thus, this study examined the evolution of international studies on post-COVID-19 health policy. A comprehensive analysis used well-known literature databases Scopus and Web of Science to explore parameters including publication growth, participating countries, areas of interest, and keyword analysis of topics such as "COVID-19" and "Health Policy." The United States emerged as an active participant, focusing on "Computer science." Key themes included "COVID-19 Pandemic," "Public health policy," and "Epidemiology," highlighting current trends. It emphasized the significance of global cooperation and knowledge exchange in addressing the complex challenges posed by the pandemic and shaping resilient health policies for the future. The contribution of this study lies in providing a comprehensive overview of post-COVID-19 health policy study and its implications for the health field.

Keywords: bibliometric analysis, health policy, post-COVID-19

Introduction

The coronavirus disease 2019 (COVID-19) pandemic has had profound global impacts, unprecedentedly affecting health systems, economies, and societies. Originating in late 2019 in Wuhan, China, it quickly spread across continents, necessitating rapid and comprehensive responses from governments and organizations worldwide.[1] This crisis has highlighted the crucial role of effective health policy in managing and minimizing the consequences of such outbreaks. Governments and healthcare authorities have faced complex challenges, including devising containment strategies, ensuring equitable vaccine distribution, optimizing resource allocation, and balancing public health priorities with socioeconomic considerations.[2,3] A systematic review of the pandemic's lessons and its implications for health policy is vital. Such an assessment can provide valuable insights to enhance preparedness, response strategies, and the overall resilience of health systems in anticipation of future health crises.[4] By critically evaluating the successes, failures, and innovative approaches observed during the pandemic, policymakers can navigate future challenges more effectively and safeguard public health and well-being.[5]

Health policy is crucial in post-pandemic preparedness and response efforts. It guides governments and healthcare systems to establish robust strategies and frameworks to effectively prevent, detect, and respond to future health crises.[6,7] Lessons from the COVID-19 pandemic can inform the development of health policies that prioritize early detection systems and facilitate monitoring of the disease's geographical spread and the effectiveness of control measures.[8] Also, this pandemic provides valuable early warnings with lessons for building public health resilience.[9]

The COVID-19 pandemic has impacted health systems and policy frameworks, shaping the post-pandemic landscape. Governments and healthcare systems have witnessed the strain on healthcare infrastructure, resource limitations, and the need for increased flexibility and resilience.[10] Post-pandemic health policies should address these challenges by strengthening healthcare systems, enhancing capacity, and prioritizing investments in areas such as healthcare workforce development, infrastructure, and technology. Furthermore, the pandemic has highlighted the importance of integrating public health considerations into broader policy frameworks,

including social determinants of health, health equity, and preparedness for future infectious diseases. As further support, social and health policies are necessary to ensure that the pandemic does not exacerbate health inequalities in the future.[11]

Evidence-based decision-making remains crucial in post-pandemic health policy development. As countries recover, policymakers must rely on robust scientific evidence, data-driven analysis, and evaluation of interventions to inform their policy choices.[12] It is essential to draw insights from the successes and failures of pandemic response strategies to design evidence-based policies that address emerging challenges. Additionally, fostering study collaborations, strengthening health information systems, and investing in health data collection and analysis is critical for evidence-based decision-making.[13] By adopting this approach, post-pandemic health policies can effectively address evolving health needs, support healthcare systems, and enhance the overall resilience of societies in future global crises.[14]

To address the aforementioned gaps in previous studies related to post-pandemic health policies, this study utilizes bibliometric analysis as a valuable tool. Bibliometric analysis facilitates a comprehensive assessment of scholarly literature, enabling the identification of trends, gaps, and emerging themes in the field. By systematically analyzing citations, publication outputs, and collaboration networks, bibliometric analysis provides insights into the research landscape and dissemination of knowledge. Furthermore, this study aimed to identify research gaps in the literature on post-pandemic health policies. The analysis will help pinpoint areas that have received less attention or require further investigation, ensuring a more focused and targeted approach to future study endeavors. By understanding these gaps, the study can contribute to filling the knowledge voids and generating new insights in the field.

Method

Bibliometric analysis is crucial in software and database research, providing authors with valuable insights, important applications, and significant contributions.[15] Authors utilize it to gain a comprehensive understanding of the existing body of knowledge in their respective domains. By analyzing citation patterns, publication trends, and co-authorship networks, key authors, influential papers and emerging study directions could be identified.[16] This analysis enables them to identify gaps in the literature, help easily detect areas requiring further development, and identify potential collaborators that contribute to the advancement of software and database fields.[17]

Furthermore, bibliometric analysis allows to assess the impact and visibility of their work and others by examining citation counts and publication metrics.[18] It pro-

vides a quantitative measure of scholarly impact, aiding in evaluating authors, institutions, and funding agencies. Overall, bibliometric analysis is a powerful tool in software and database domains, facilitating knowledge discovery, fostering collaborations, and contributing to the growth and progress of the field.[19]

The search query utilized various terms, including: "covid-19" OR "sars-cov-2" AND "health policy." The present inquiry was executed on the title, abstract, and keyword sections of Scopus, and the topic field of Web of Science (WoS), encompassing the title, abstract, author keywords, and keywords plus R. The dataset was obtained on 24 June 2023 using the specified search criteria. Pre-processing of the dataset involved loading 335 papers, of which 99 (29.60%) were omitted based on their document type, resulting in 236 papers remaining. Of these, 75 were sourced from WoS, and 161 came from Scopus. A total of 69 duplicated papers were found, all removed from the Scopus dataset. However, 43 papers were identified as duplicates with different citation numbers. After handling duplicates, the dataset contained 167 unique papers, 75 from WoS and 92 from Scopus. This comprehensive pre-processing aimed to ensure data quality and resulted in a refined dataset ready for further analysis and examination. This investigation focused on addressing the following research questions to highlight key aspects related to post-COVID-19 and health policy:

1. How many publications have been published on post-COVID-19 and health policy, and how has the study evolved?
2. Which countries have made significant advancements in investigating post-COVID-19 and health policy?
3. What are the main areas of research and recurring themes found in the literature exploring post-COVID-19 and health policy?
4. Which papers have the highest citation count and are considered primary and influential post-COVID-19 and health policy?

Results

The bibliometric analysis presented two sections with descriptive information on publication growth, countries involved, study areas, and highly cited papers. Additional foci were the evolving keywords used, inspiring future studies and lessons in post-COVID-19 and health policy.

Publication Growth and Pattern-Related Studies on Post-COVID-19 and Health Policy

Figure 1 depicts the analysis of publication growth and patterns in post-COVID-19 and health policy. The figure illustrates the trends observed in publications from 2019 to 2025 using Scopus and WoS databases. It shows each database's total number of publications, the annual growth rate (AGR), and the average daily yield (ADY).

The negative AGR (-4 for Scopus and -2.5 for WoS) indicated decreased publications over time. The ADY remained constant at 0, suggesting a consistent publication rate. The h-index, a measure of productivity and impact, was 13 for Scopus and 14 for WoS, indicating the presence of highly cited publications. The figure also provides year-wise publication counts, revealing variations in output. These findings highlighted the dynamic nature of post-COVID-19 and health policy literature and emphasized further investigating the factors influencing these trends.

Top Countries in Post-COVID-19 and Health Policy-Related Papers

Figure 2 showcases the leading countries in post-COVID-19 and health policy studies. The United States has the highest contribution with 62 publications, followed by the United Kingdom with 25, Canada with 19, Australia and Italy with 13 each. These countries have consistently published papers, maintaining a stable publication rate over the years (AGR, ADY, and percentage of documents in last years (PDLY) of 0). The United States holds an h-index of 14, with highly cited publications indicating significant influence. The United Kingdom also has notable contributions, with an h-index of 11. Canada, Australia, and Italy have h-indices of seven, demonstrating their presence in research. Examining publication counts by year, the United States experienced an increase from 14 publications in 2019 to a peak of 23 in 2022, followed by a slight decline in 2023. The United Kingdom decreased from nine publications in 2020 to five in 2021, maintaining consistency thereafter. Canada witnessed a remarkable rise from one publication in 2020 to 10 in 2021, followed by a decline in 2022. Australia

peaked with eight publications in 2022 and none subsequently. Italy displayed a steady output, ranging from three publications in 2020 and 2021 to five in 2022.

Key Areas of Literature Exploring Post-COVID-19 and Health Policy

Figure 3 presents key areas of literature on post-COVID-19 and health policy. In Health Care Sciences & Services, the highest number of publications (10) showed a slight decline in output (-0.5 AGR), consistent rate (2.5 ADY), and significant presence (h-index 6). In Public Administration, five publications had similar trends.
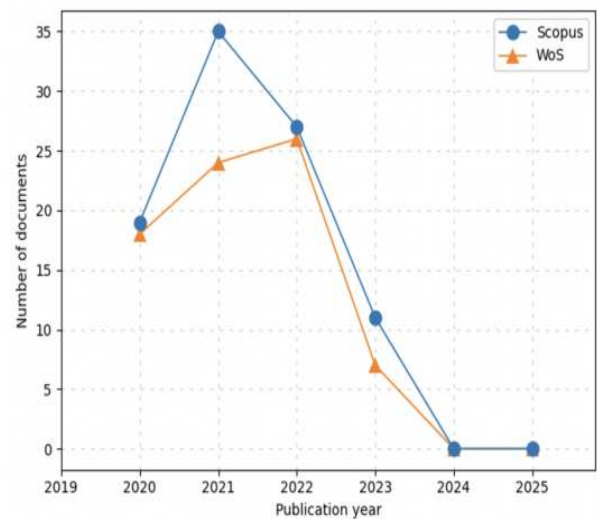

Figure 1. Publication Growth and Pattern-Related Studies on Post-COVID-19 and Health Policy
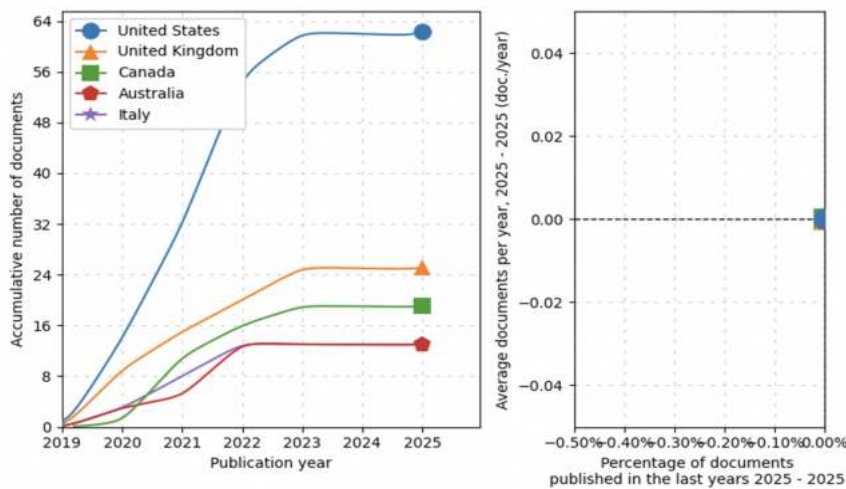

Figure 2. Top Countries in Post-COVID-19 and Health Policy-Related Papers

Other subject areas like Social Work, Computer Science, Education & Educational Research, Geology, and Geriatrics & Gerontology had varying publication counts and statistics.

Top Author Keywords with Recurring Themes Associated Literature on Post-COVID-19 and Health Policy

Figure 4 represents the top author keywords, showing the most recurring themes associated with literature on post-COVID-19 and health policy. The keyword "COVID-19 Pandemic" is most prominent with nine publications. Additionally, the positive AGR of 2 indicated an increasing trend in research output over time, reflecting the urgency and significance of studying the pandemic and its impact on health policy. The ADY of 3 suggested a consistent publication rate in this area. Furthermore,

Figure 3. Key Areas of Literature Exploring Post-COVID-19 and Health Policy

the high h-index of 2 indicated the presence of influential publications in this field. Finally, the increasing number of publications from 2020 to 2023 underscored the ongoing attention and study dedicated to understanding and addressing the pandemic's challenges and implications for health policies.

"Public health policy" was another significant keyword associated with five publications. Although the negative AGR of -0.5 indicated a slight decline in study output, the subject remains a critical study area. The consistent ADY of 1.5 reflected a steady publication rate, and the h-index of 2 suggested a moderate impact. Conversely, while the number of publications increased from one in 2020 to three in 2022, the decline to zero in 2023 might indicate a shift in research focus or the need for further investigation in this area.

"Epidemiology" and "Pandemics" each have three publications. "Epidemiology" demonstrates a positive AGR of 1, reflecting increased research interest. The ADY of 1 suggested a consistent publication rate, and the moderate h-index of 1 impacted the field. However, "Pandemics" showed a stable AGR of 0 and a lower ADY of 0.5. While the number of publications was lower, an h-index of 2 suggested some influential contributions in this area. These keywords highlighted the importance of studying disease transmission patterns, risk factors, and outbreak management strategies, particularly in the context of the ongoing COVID-19 pandemic.

"Surveillance," "coronavirus," "health disparities," "Data envelopment analysis," "Ecological study," and "Europe" each had two associated publications. "Surveillance" had an ADY of 0, indicating a lower publication rate, but the higher h-index of 3 suggested a notable impact within this field. In contrast, "coronavirus" and "Ecological study" both demonstrated an ADY of
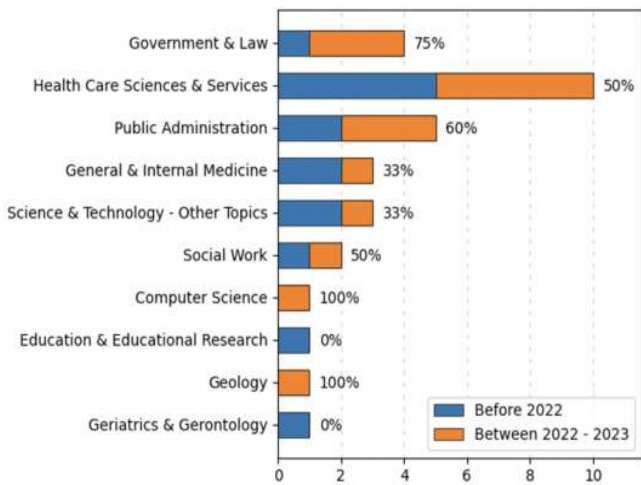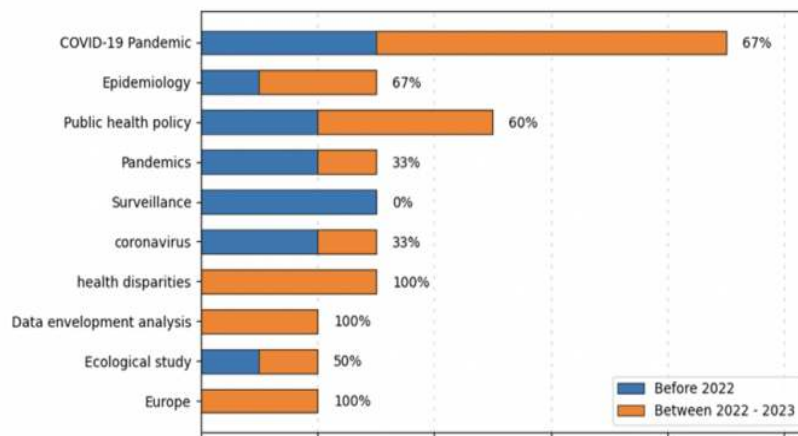

Figure 4. Top Author Keywords with Recurring Themes Associated Literature on Post-COVID-19 and Health Policy

0.5, indicating a relatively steady publication rate. While "coronavirus" had a higher h-index of 3, "Ecological study" had an h-index of 1. "Health disparities" reflected a specific focus on understanding and addressing inequities in health outcomes, and its higher PDLY of 100 might indicate challenges in publishing studies in this area. "Data envelopment analysis" and "Europe" exhibited similar PDLY values of 100 but had different h-indices of 2 and 1, respectively, suggesting varying levels of impact in their respective fields.

Highest Citation Count in the Field of Post-COVID-19 and Health Policy Minimal 50 Citations

The publication "Trust and Compliance to Public Health Policies in Times of COVID-19" by Bargain and Aminjonov received the most citations (306) among studies related to COVID-19 and health policy.[20] This indicated the significant impact of their work in understanding the role of trust and compliance in public health policies during the pandemic. In comparison, the publication "COVID-19 Pandemic and Comparative Health Policy Learning in Iran" by Raoofi, *et al.*, received 122 citations, illuminating lessons learned from comparative health policy in Iran during the pandemic.[21]

Also notable is a review by Prado, *et al.*, with 103 citations.[22] They explore wastewater-based epidemiology as a tool for tracking SARS-CoV-2 and supporting public health policies at Brazil's municipal level, highlighting its potential in monitoring the virus's spread.[22] Additionally, the publication "COVID-19 Evolution During the Pandemic – Implications of New SARS-CoV-2 Variants on Disease Control and Public Health Policies" by van Oosterhout, *et al.*, received 102 citations.[23] Their review addresses the implications of emerging SARS-CoV-2 variants in disease control and public health policies, emphasizing the need for adaptive measures.[23]

The publication "Health Policy and Leadership Models During the COVID-19 Pandemic: A Review" by Nicola, *et al.*, garnered 76 citations.[24] Their review examines various health policy and leadership models implemented during the pandemic, contributing to a better understanding of effective strategies for managing public health crises. Lastly, the review "Smoking, SARS-CoV-2 and COVID-19: A Review of Reviews Considering Implications for Public Health Policy and Practice" by Grundy, *et al.*, received 70 citations.[25] Their work critically assesses the implications of smoking in the context of SARS-CoV-2 and COVID-19, providing insights into its impact on public health policies and practices.[25]

Discussion

Data analysis from Scopus and WoS databases shows decreased publications over time, with negative AGR but constant ADY. Despite the observed decline in publica-

tion growth for studies on post-COVID-19 and health policy, there is still consistent output of publications with highly cited works that stress the significance of study in this area. Further examination is necessary to comprehend the factors impacting publication trends.

For several reasons, the United States has emerged as a leading contributor to post-COVID-19 and health policy literature. The country boasts a robust research infrastructure with numerous universities, research institutions, and funding opportunities, enabling extensive studies and a larger number of published papers. Additionally, the United States possesses numerous experts and resources dedicated to this field, facilitating high-quality publications and significant contributions to the literature. Adequate funding is crucial in supporting study in this area, allowing authors to undertake comprehensive studies and disseminate their findings. Furthermore, the United States actively engages in international collaborations, leading to increased joint publications and further strengthening its position in the field. The country's research culture places great importance on post-COVID-19 and health policy study, fostering an environment encouraging authors to publish their findings.

Two prominent areas that have received significant attention in the literature are Government & Law and Health Care Sciences & Services. The focus on Government & Law highlights the critical role of government actions and legal frameworks in addressing public health crises like the COVID-19 pandemic. This area examines the implications of government policies, regulations, and legal frameworks in managing the pandemic and its impact on public health. It provides valuable insights into the effectiveness and impact of governmental responses, aiming to inform future policymaking and crisis management strategies.

Key themes in post-COVID-19 and health policy study included "COVID-19 Pandemic," "Public health policy," and "Epidemiology." The authors were delving deeper into understanding the pandemic's long-term effects on healthcare systems, including the resilience of health infrastructure, healthcare delivery models, and capacity to respond to future public health crises. As the pandemic evolves and health policies continue to be implemented, there is an opportunity to explore the effectiveness of different policy approaches, analyze their outcomes, and identify best practices for managing similar health emergencies in the future.

Epidemiology is a growing study interest focusing on refining disease transmission models, identifying risk factors, and developing effective outbreak management strategies. This involves studying the impact of various public health interventions, testing strategies, contact tracing methodologies, and vaccination campaigns. Furthermore, study in the field emphasizes "Public health

policy." It recognizes "health disparities" as an important keyword, indicating a need to address the unequal impact of the pandemic on different population groups. This could involve examining social determinants of health, assessing intervention effectiveness in reducing disparities, and proposing policies that promote health equity.

Notable works have focused on the crucial aspects of the pandemic, including the role of trust in shaping effective policy responses and valuable lessons learned from comparative health policy experiences in different contexts. These contributions highlight the significance of comprehending trust, compliance, and cross-country knowledge exchange in developing effective health policies in the post-COVID-19 era.

Conclusion

This study uses bibliometric analysis to examine post-pandemic health policy study. It identifies publication trends, countries involved, study areas, and highly cited papers. Publications in this field showed a declining growth rate, necessitating further investigation into the factors behind this trend. The United States contributes most to post-pandemic health policy literature, followed by the United Kingdom, Canada, Australia, and Italy. Key study areas included healthcare services, public administration, and interdisciplinary subjects, reflecting the field's dynamic nature. Important themes like the COVID-19 pandemic, public health policy, epidemiology, and health disparities emerged consistently. This study provides valuable insights for future study and informs evidence-based post-pandemic health policies by analyzing the study landscape and identifying gaps.

Abbreviations

COVID-19: coronavirus disease 2019; WoS: Web of Science; AGR: Annual Growth Rate; ADY: Average Daily Yield; PDLY: Percentage of Documents in Last Years.

Ethics Approval and Consent to Participate

Not applicable.

Competing Interest

The authors declare that there are no significant competing financial, professional, or personal interests that might have affected the performance or presentation of the work described in this manuscript.

Availability of Data and Materials

Scopus and Web of Science (CSV files), and ScientoPy were used as study materials.

Authors' Contribution

AA and KHA conceptualized the study design, contributed to data analysis, interpreted the results, drafted the manuscript, and approved the final copy. SRR, NSR, and NT helped prepare the manuscript. All authors read and approved the final version of the manuscript.

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