





A systematic review of public policy implementation during the Covid-19 pandemic: Current topics and future directions

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Abstract

The Covid-19 pandemic greatly impacted global public policy implementation. There is a lack of research synthesizing the lessons learned during Covid-19 from a policy perspective. A systematic review was conducted following PRISMA guidelines to examine the literature on public policy implementation during the Covid-19 pandemic in order to gain comprehensive insights into current topics and future directions. Five clusters of topics were identified: lessons from science, crisis governance, behavior and mental health, beyond the crisis, and frontlines and trust. Extensive collaboration among public health departments emerged as a significant research theme. Thirty recommendations for future research were identified, including the examination of frontline worker behavior, the use of just tech in policy implementation, and the investigation of policies driving improvements in global public health. The findings indicate that current research on public policy implementation during the Covid-19 pandemic extends beyond health and economic crisis-related policies. However, further studies in a post-pandemic context are needed to validate the identified topics and future directions.

KEYWORDS

public policy implementation, Covid-19, systematic review, PRISMA, qualitative evidence

BACKGROUND

The pandemic has significantly altered the course of public policy implementation worldwide. The Covid-19 crisis has highlighted major governmental issues, resulting in two major waves of crises—the health crisis (Poppe, 2020) and the economic crisis (Coulibaly, 2021). As a response, governments worldwide have implemented new or reinforced existing emergency public policies to contain the spread of Covid-19 and mitigate its impact.

Science has been actively contributing to evidence-based decision-making since the beginning of the pandemic, particularly through systematic reviews that provide in-depth knowledge on specific topics. In public policy, systematic reviews have addressed issues such as public health policies (Baral, 2021), welfare policies (Moledina et al., 2021), social distance policies (Ayuningtyas et al., 2020), technologies (El-Taliawi et al., 2021; Shirazi et al., 2023), as well as economic aspects (Bitanihirwe & Ssewanyana, 2021). However, there is a lack of reviews identifying the most frequently reported topics on the implementation of public policies in the pandemic period; such reviews can assist with building and prioritizing a future agenda.

Public policy implementation refers to the process by which formulated policies are converted into governmental actions to achieve intended goals (Hill & Hupe, 2022; Pressman & Wildavsky, 1973). It is a critical phase that determines policy success or failure. Implementation involves a complex web of actors, rules, and resources that shape how policies are put into practice (Barrett, 2004; Hill & Hupe, 2022). This is the definition we considered in this review.

Compared to research on the formulation and evaluation phases of policy development, there is still a relatively limited amount of literature on the process of public policy implementation, although this is continuously expanding (Hill & Hupe, 2022; Howlett, 2018; Pressman & Wildavsky, 1973). Studies on the topic are starting to take a more holistic approach to analyzing policies, shifting the focus to not only examine policy outcomes but also to question why policies fail in the implementation process (Barrett, 2004). Recent trends suggest a need for practical research that increasingly emphasizes the problems that arise during implementation (Cairney, 2020; Heinrich, 2016; Howlett, 2020).

Greer et al. (2020) argue that crises like the Covid-19 pandemic represent an unprecedented stress test for policy implementation, revealing system fragilities and requiring adaptations. However, despite its importance, this phase remains underexplored in the literature compared to policy formulation and evaluation (Howlett, 2018; O'Toole, 2000). There is a need for practical, holistic research on implementation challenges and strategies (Gofen et al., 2024; Hill & Hupe, 2022; Sheikh et al., 2021).

A systematic review focusing specifically on policy implementation is critical at this juncture for several reasons. First, it synthesizes knowledge of how governments worldwide adapted and operationalized policies under immense pressure during an unprecedented crisis (Greer et al., 2020; Sheikh et al., 2021). Second, it reveals persisting challenges as well as innovative strategies in policy implementation that can inform preparedness for future public health emergencies (Aminullah & Erman, 2021; Greer et al., 2020; Li et al., 2020).

The pandemic has increased the demands on public management, and it is crucial to understand how governments around the world are responding to this crisis. As we navigate this new post-pandemic phase, it is necessary to identify lessons learned to assist policy makers as well as improve existing processes. Therefore, the purpose of this study was to conduct a systematic review of the literature on public policy implementation during the Covid-19 pandemic period in order to gain comprehensive insights into current topics and future directions in the field.

Finally, much existing literature concentrates on policy design and outcomes but does not provide sufficient insights into on-the-ground implementation issues (Howlett, 2018; O'Toole, 2000).

Examining the black box of implementation during Covid-19 is vital to truly understand why policies succeed or fail and how they can be strengthened (Barrett, 2004; Sausman et al., 2016). This review anchors the analysis firmly within the extensive scholarship on policy implementation in normal times as well as crisis conditions.

METHOD

A systematic literature review was conducted following the PRISMA guidelines (Page et al., 2021).

Inclusion criteria and study selection

We conducted systematic searches in Scopus and Web of Science databases without restricting by specific subject categories. Due to the unprecedented and urgent nature of the Covid-19 pandemic, many journals across disciplines opened calls for papers about the crisis. Limiting by category could exclude valuable insights from fields like public administration, social sciences, health, and others that opened submissions on the pandemic. As implementation encompasses multiple dimensions (Hill, 2002), we opted for a broad, multidisciplinary search to obtain a comprehensive view of the literature. Rigorous inclusion criteria were then applied to ensure relevance.

Searches were conducted in Scopus and Web of Science across all categories for English papers published in 2020–2021 using the keywords “Public Policy Implementation” AND “Covid-19”. After removing duplicate articles, we selected the remaining ones based on the inclusion criteria, as listed cumulatively in Table 1.

Screened articles were then read in full, and data were extracted. Extracted data included authors, publication dates, journals, funding institutions, titles, abstracts, keywords, and reference lists. These were analyzed using the RStudio Bibliometrix package. Bibliometrix provides tools for statistical analysis of research trends including textual mapping, collaboration network visualization, and matrix creation. The analysis involved identifying evaluated topics, challenges, institutional collaboration, recommendations for future research, and key findings from each study. Two authors independently analyzed to ensure the accuracy and consistency of the results.

The extracted literature data were first analyzed in RStudio using the Bibliometrix package to identify and remove duplicate articles through fuzzy text matching of titles, authors, years, and abstracts. After duplicate removal, co-occurrence analysis of keywords and bibliographic coupling of shared references were performed to map relationships between non-duplicate publications. Interactive visualizations were then generated with VOSViewer to create a network graph for clustering articles into topics based on content similarities using Bibliometrix's mapping algorithms.

Quality assessment

To systematically assess the qualitative evidence in the included studies, we utilized the Confidence in the Evidence from Reviews of Qualitative Research (CERQual) approach (Lewin et al., 2018; Wainwright et al., 2023). CERQual provides a transparent framework for evaluating confidence in findings from qualitative evidence syntheses. It involves assessing four components

TABLE 1 Inclusion criteria of the systematic review.

No.	Criteria
1	Studies focusing on public policy implementation
2	Studies that had the Covid-19 pandemic as the context
3	Full-text available studies
4	Studies evaluating public policies implemented by national or subnational governments (not private organization policies)

TABLE 2 Components of GRADE-CERQual^a approach.

1. Methodological limitations	‘The extent to which there are concerns about the design or conduct of the primary studies that contributed evidence to an individual review finding’
2. Coherence	‘An assessment of how clear and cogent the fit is between the data from the primary studies and a review finding that synthesizes that data’
3. Adequacy	‘An overall determination of the degree of richness and quantity of data supporting a review finding’
4. Relevance	‘The extent to which the body of data from the primary studies supporting a review finding is applicable to the context specified in the review question’

^aLewin et al. (2018, p. 1).

for each review finding: (1) Methodological limitations, (2) Coherence, (3) Adequacy, and (4) Relevance (see [Table 2](#)).

Two reviewers independently evaluated each finding using the CERQual criteria. Based on the assessments, each component received a score of high ($x > 0.75$), moderate ($0.50 < x < 0.75$), low ($0.25 < x < 0.50$), or very low (< 0.25). The final CERQual assessment for each finding was determined by the lowest score received for any component. As an overall benchmark, findings receiving a final score of 0.70 or higher were determined to have adequately high confidence.

After applying the inclusion criteria ([Table 1](#)), 512 articles remained. Of those, 116 articles received a final CERQual score below 0.70 and were excluded, leaving 396 articles that were qualitatively reviewed and tested using the CERQual method. The use of this systematic process enhanced the credibility and minimized bias in the included evidence by accounting for qualitative indicators not captured by quantitative metrics alone.

The CERQual component scores for each of the five study clusters are presented in [Table 3](#). This transparent reporting of the quality assessment allows readers to evaluate the level of confidence in the evidence supporting the review findings (see [Table 3](#)).

Clustering of topics reported by studies

We then utilized the VOSViewer software to perform data mapping and clustering analysis on the text of the included articles. VOSViewer is a bibliometric tool that combines descriptive research data with multivariate statistical data to generate visual representations of research clusters (van Eck & Waltman, 2014).

To identify the clusters in the dataset, VOSViewer employs a technique called bibliographic coupling, which measures the strength of relationships between publications based on shared

TABLE 3 CERQual component scores by study cluster, $n = 396$ ($\alpha > 0.70$).

Cluster	Methodological limitations	Coherence	Adequacy	Relevance
1	High	Moderate	High	High
2	Moderate	Moderate	High	High
3	Moderate	High	Moderate	High
4	High	High	Moderate	High
5	Moderate	High	High	Moderate

references. In other words, if two articles share a significant number of references, they are considered to be related and form a cluster.

VOSViewer calculated the frequency of shared keywords within each article. The size of each publication on the bibliometric map reflects the number of times it used the same keywords. Articles that have a higher number of shared keywords are more likely to be grouped in a cluster. Finally, the nature and conceptual differentiators of the clusters were reviewed by the authors, and a theme was identified for each cluster representing their specific research areas. This approach allows for the systematic exploration of the literature and provides insights into the current topics and future directions in public policy implementation during the Covid-19 pandemic.

To delineate the topics of the clusters, we reviewed the content of the publications within each group along with their keywords. We identified the core theme and key concepts examined by the articles in each cluster. This allowed us to assign an appropriate label and definition to each of the five clusters based on the nature of the publications grouped by the bibliographic coupling analysis.

This process provided a robust, data-driven approach to systematically categorize the topics discussed based on their relationships rather than relying solely on subjective groupings. It enabled the exploration of connections in the literature and identification of current research focus on public policy implementation during the pandemic.

Considering the analysis, we discuss the collaboration network between universities and funding institutions, and report on the main journals in which the studies included in our review were published. Also, the distinct research clusters identified, and their current topics related to public policy implementation in the pandemic context are presented and discussed. Finally, we analyze future directions for studies and highlight research priorities based on potential areas that require further exploration.

PRISMA diagram

Out of 1076 articles, 318 records were considered duplicates and excluded with the help of R Studio Software. The authors read the abstract, methodology, and main results of the remaining 758 articles. After applying inclusion criteria and GRADE-CERQual criteria, 396 articles were included in this study. The PRISMA diagram is summarized in [Figure 1](#).

RESULTS

In [Table 6](#) we present the cluster analysis of topics addressed in the studies included in this review. The number of articles in each cluster (n value) represents the total count of articles that were

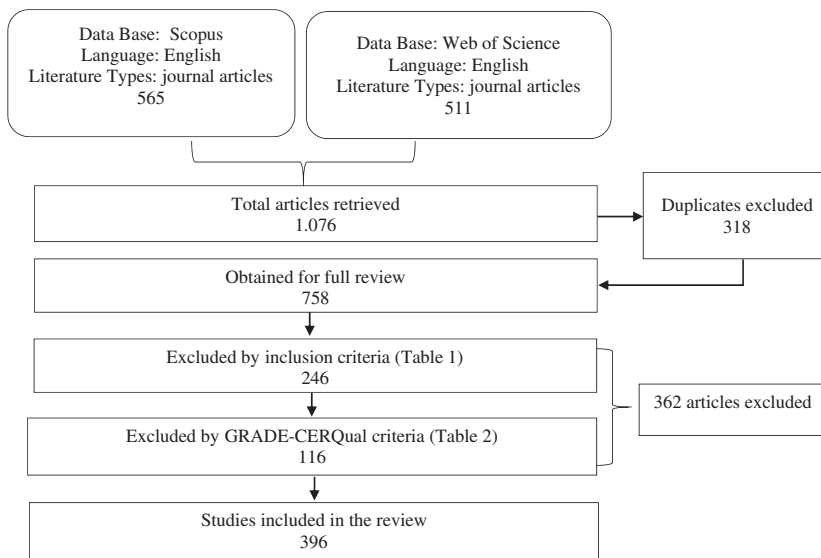
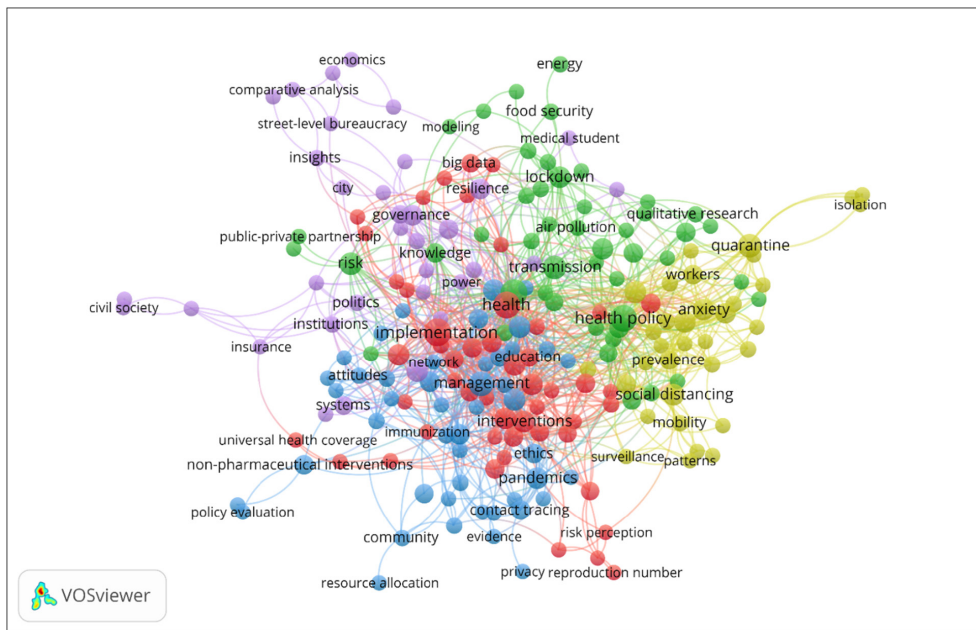


FIGURE 1 PRISMA diagram.



Cluster	Theme	Color	n value	%
1	Lessons learned and cooperation from science	Red	n = 102	26
2	Governance in times of crisis	Blue	n = 76	19
3	Behavior, Mental Health, and Vulnerability	Yellow	n = 57	14
4	Beyond the sanitary and economic crisis	Green	n = 72	18
5	Frontlines and institutional trust	Purple	n = 89	23

FIGURE 2 Synthesis of the themes formed by the clusters, $n = 396$.

grouped within that specific cluster. These numbers indicate the size or volume of research within each cluster. Five distinct research clusters emerged focusing on keywords related to public policy implementation and Covid-19. These clusters are displayed in different colors in [Figure 2](#).

[Figure 3](#) below presents the most frequent journals in which the studies were published. The interdisciplinary nature of the research published is noteworthy. This could be attributed to the variety of fields contributing to the topic. We observed a substantial effort by journals to publish articles related to Covid-19, with a particular interest in manuscripts focusing on public policy implementation. It is also worth mentioning that most journals make their data available openly, contributing to the strengthening of open science during this global crisis.

[Table 4](#) presents the major institutions and funders of the studies. The University of Toronto, Johns Hopkins University, and the University of California, for instance, could be sought as

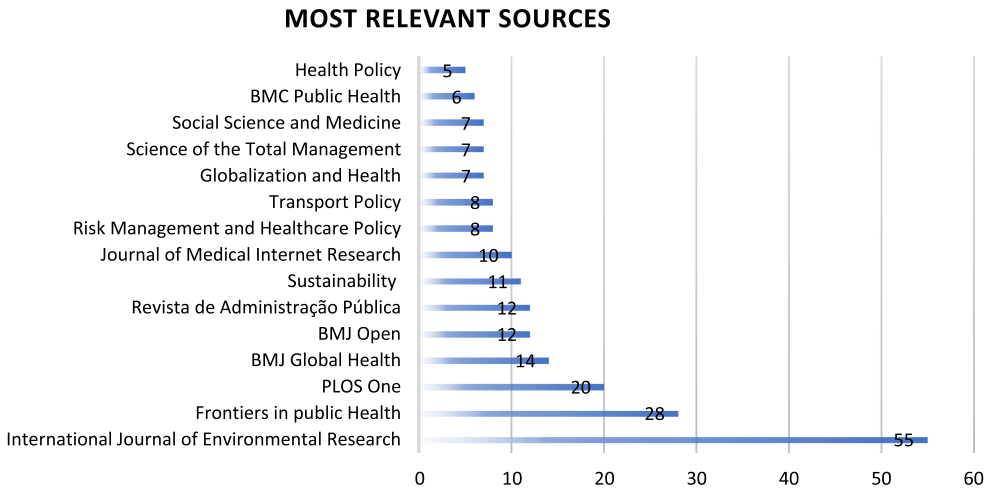


FIGURE 3 Most relevant journals, $n = 396$.

TABLE 4 Top 10 institutions and funders contributing to research on public policy implementation during the pandemic ($n = 396$).

Institutions	Articles	Financiers	Articles
University of Toronto	53 (13%)	United States Department of Health and Human Services	24 (6%)
Johns Hopkins University	36 (9%)	National Institutes of Health NH USA	19 (4%)
University of California	31 (7%)	European Commission	16 (4%)
London School of Hygiene and Tropical Medicine	25 (6%)	National Natural Science Foundation of China NSFC	9 (2%)
University of Oxford	24 (6%)	UK Research Innovation	8 (2%)
University of Washington	22 (5%)	Medical Research Council UK MRC	6 (1%)
Harvard Medical School	15 (3%)	Centers for Disease Control Prevention USA	5 (1%)
Univ Penn	13 (3%)	National Science Foundation NSF	5 (1%)
Seoul National University	12 (3%)	Fundamental Research Funds for the Central Universities	5 (1%)
National University of Singapore	11 (2%)	NIH Nacional Institute on Drug Abuse Nida	5 (1%)

potential research partners due to their significant presence in the literature. Similarly, institutions such as the United States Department of Health and Human Services, the National Institutes of Health NH USA, and the European Commission could be potential funding sources for researchers studying public policy implementation in the context of the pandemic.

The diversity of institutions and funders represented in the literature highlights the extensive global collaboration taking place to research public policy implementation during the Covid-19 pandemic. The prominence of public health and policy research centers indicates the importance of this topic and its contributions to informing government decision-making and response efforts worldwide during this crisis. Examining the publishing and funding landscape provides context on the multidisciplinary nature of implementation research and the significance of global partnerships in strengthening evidence-based policy and practice.

When examining the profile of publications on public policy implementation in the context of Covid-19 from 2020 and 2021, it is important to note the significance of some studies published in the first half of 2020, which have stimulated further research. The descriptive mapping shows that there are multidisciplinary publications, indicating an evolutionary step from previous studies that highlighted the need for interdisciplinary implementation research (Ollaik & Medeiros, 2011).

Moreover, the description also revealed the importance of journals publishing studies from a wide range of areas in open access, allowing the scientific community to contribute to decision-making during the pandemic, as recommended in recent systematic reviews (Lieneck et al., 2021; Moledina et al., 2021). Universities and research centers of Global Public Health and Public Policy Departments around the world played a significant role in making these studies possible. Collaboration between countries was also an important factor in the publication of these papers.

What are current topics in public policy implementation in the context of the Covid-19 pandemic?

Cluster analysis is a powerful tool that can be used to group similar data that exhibit significant differences between groups. In the context of our study, we used cluster analysis to identify five distinct research clusters that represent the current trends in public policy implementation research related to the Covid-19 pandemic. Figure 2 shows the clustering of these five groups, which provides insights into how the field of public policy implementation has approached the Covid-19 pandemic.

Cluster 1: Lessons learned and cooperation from science. Red, $n = 102$

The first cluster has the most articles and connections among the five identified clusters. Its main keywords include implementation, interventions, misinformation, social distancing policy, bureaucracy, risk perception, policy analysis, global health, universal health coverage, and big data.

- a. Barriers in the process of public policy implementation. The pandemic intensified known barriers on implementing public policies. Lack of structure, resources, and equipment led to failures in policy implementation, particularly affecting frontline workers (Means et al., 2020). Developed health systems also faced infrastructure barriers, with hospitals lacking resources and trained professionals (An & Tang, 2020; Schneider, 2020). Other significant barriers

identified include information overload, uncertainty, and misinformation, which are particularly challenging for frontline workers. Governments need to combat damaging myths and conspiracy theories circulated on social media (Vraga & Jacobsen, 2020).

- b. Local experiences as replication lessons. Local pandemic experiences can be shared for collective learning. Governments engaging with the population to implement restrictive measures have reduced virus spread and gained popular support (Lyu & Wehby, 2020). Quick-acting cities during the initial response should use their learnings to create permanent solutions for safe and equitable mobility (Fischer & Winters, 2021). Analyzing successful local public policies strengthens collective efforts (Rossitti et al., 2021). Evidence-based models are recommended for comprehensive decision-making processes (Ferrinho et al., 2020; Stratil et al., 2020). Coalitions of support can cross boundaries and create alliances to achieve shared goals (Mintrom & O'Connor, 2020).
- c. Multidisciplinarity in public policy making. The pandemic has fostered change in public policy formulation as governments seek to balance individual and collective interests in implementing preventive measures for epidemic diseases. Multidisciplinary expertise is necessary to ensure policies consider legal, social, ethical, and scientific factors. Zhang and Tang (2021) quantify the potential benefits of public acceptance of these measures. Transparency from policy makers is vital so that no abuses of power occur. Experts from diverse backgrounds should advise governments to find an equilibrium between public health interests and the maintenance of civil liberties (Obasa et al., 2020).
- d. Strengthening Global Public Health. Universal Health Coverage (UHC) is a popular concept in health system reform discussions, and Covid-19 has highlighted the need for it. However, blindly adopting technocratic health solutions can lead to further financialization and health injustice (Lopez Cabello, 2021). Guidelines are necessary to consider contextual factors for global implementation, and studies show that pandemic preparedness was lacking before Covid-19. Examining the relationship between global public health spending and pandemic preparedness can analyze countries' variations in crisis containment (Eissa, 2020). Collaboration between developing and developed countries can facilitate sharing of Covid-19 responsibilities in research and policy implementation (Zyoud, 2021). The pandemic provides an opportunity to build more egalitarian health systems, but careful consideration must be given to policy and solution implementation. Strengthening global public health policy and improving health service structures are crucial for future crisis preparedness (Slonim et al., 2020).

Cluster 2: Governance in times of crisis. Blue, $n = 76$

This cluster highlights governance strategies and engagement approaches relevant to policy implementation during crises. Key themes that emerge from the articles include engagement, technology, workers, accountability, communication, control strategies, management, contact tracing, and policy evaluation.

- a. Political engagement as a strategy. Political engagement is crucial for the successful implementation of social distancing and immunization policies. Studies highlight the importance of the target audience feeling safe and confident with the official information provided (Wellenius et al., 2021). Policy responses and solidarity from social organizations can minimize socioeconomic crises, but implementation platforms are lacking (Angaw, 2021). Leaders' engagement in transmitting confidence to the population is relevant for high

adherence to immunization (Piraveenan et al., 2021). Non-pharmaceutical interventions require engagement for policy adherence (Restrepo, 2021).

- b. Technology as an ally in the implementation. Attention is drawn to how technology has been presented as an ally in implementing policies across different areas. Studies show that measures such as intelligent transportation can help reduce crowding and contain the virus with the aid of technology (Pamucar et al., 2021). Another study highlights the use of innovation and technology to combat economic crises, using a data mapping approach to analyze the contributions of the sharing economy (Belezas & Daniel, 2021). AI and Big Data play a vital role in public policy implementation. AI can simulate restrictive policies and improve outcomes (Liu & Huang, 2020). However, the implementation of health information technology also poses many ethical challenges and unintended consequences. Regulatory frameworks need to be developed for the development and management of electronic health records, health data research, artificial intelligence, robotics, and public-private partnerships (Sheikh et al., 2021).
- c. Strengthening policy health education. Studies are analyzing public policies that can contribute to strengthening global public health. Health education is a potential area for future research (Sofonea et al., 2021). Some studies have focused on the increased level of anxiety among healthcare workers (AL-Shammary et al., 2021). There is an urgent need for research on health training policies, particularly on the quality of health workforce education and practice, and strengthening regulatory and accreditation systems (Burdick & Dhillon, 2020). More research is needed to understand the implementation, management, and impact of health worker education regulation, including the intersection of educational accreditation with workforce regulation policy.

Cluster 3: Behavior, mental health, and vulnerability. Yellow, $n = 57$

The third cluster presents 57 articles and shows an important delivery of this article. The situation of vulnerability exacerbated by the global crisis is a point highlighted in the literature with indications of future studies. The main keywords of the group are workers, anxiety, isolation, mobility, patterns, depression, quarantine, equity, mental health, public trust, burnout, stress, and social support.

- a. Mental health and behavior. The pandemic revealed the importance of effective leadership during a crisis. A study on the response to Covid-19 in various countries shows that successful crisis management requires transparency, accountability, and communication. Leaders must prioritize citizen well-being and coordinate action at all levels of government (Goggolidou et al., 2021). The pandemic brought significant changes to the workplace, with remote work becoming the norm. While new technologies and practices have supported employees, concerns about work-life balance, well-being, and productivity have emerged (Cascini et al., 2020).

Covid-19 highlighted the need for greater investment in healthcare infrastructure and better preparedness for future health crises, including the development of effective vaccines and treatments. The pandemic exposed weaknesses in healthcare systems globally (Saleh & Shayor, 2020). Education was also significantly impacted by the pandemic, with schools and universities transitioning to remote learning. Educators had to develop new teaching methods and strategies, but concerns over access to education, the digital divide, and the quality of education provided also arose (Goggolidou et al., 2021).

- b. Policies for the most vulnerable. The pandemic exposed social and economic vulnerability globally. Poorly designed policies could lead to unintended harm and greater inequality, according to the literature. Studies suggest policies to encourage small farmers and support basic income programs as ways to mitigate the crisis. However, there are warnings about the coverage of immunization policies and eligibility criteria for citizens. Empirical studies and sectoral policies prioritizing society's needs are necessary for decision-making by leaders (Carvalho et al., 2020; Voo et al., 2020). The impact of Australia's history of inequality on Covid-19 budget measures is also explored (Andrew et al., 2021).

Cluster 4: Beyond the sanitary and economic crisis. Green, $n = 72$

While much pandemic research has concentrated on health and economic crisis policies (Coulibaly, 2021; Poppe, 2020), this cluster explores public policies in other spheres indirectly impacted by Covid-19. This cluster covers overlooked areas like environmental policies, transportation, education, and food security that still require attention during the crisis. Further analysis of these policies can reveal important lessons for decision-makers.

- a. Environmental, transport, and sustainability policies. While much research has focused on the health and economic crises brought about by the pandemic (Coulibaly, 2021; Poppe, 2020), there is growing interest in policies indirectly affected by the pandemic. For example, there is concern in the literature regarding energy and waste management policies, sustainable wastewater surveillance, and the importance of green spaces in urban areas. These policies, often neglected by public management, require attention to prevent new crises. Potential studies in the cluster dataset suggest that future research should go beyond health and economic policies (Islam & Chowdhury, 2021; Keshaviah et al., 2021; Itiki & Chowdhury, 2020). The transportation policy sector is also a topic of interest for future research, especially as it has been heavily impacted by the pandemic (Zhang et al., 2021). Additionally, there is a small but noteworthy portion of articles that explore the potential for sustainable economies and circular economy strategies (Chen et al., 2021).
- b. Social welfare and food security policies. The Covid-19 pandemic has highlighted the interconnections between human health, biodiversity, ecosystem services, and agriculture. While most studies focus on health and economic crises, there is a need for research on social welfare and food security. Such studies can guide policy makers in taking assertive governmental and community actions to meet the basic needs of vulnerable populations affected by the pandemic. Strengthening Sustainable Development Goals (SDGs) can help advance the subject and contribute to climate and environmental frameworks, as well as boosting food security (De Garine-Wichatitsky et al., 2021; Onah et al., 2021). Hossain (2020) and Payne et al. (2020) emphasize the importance of studying policies that impact food security, such as agriculture, sports, physical activity, and leisure, for their effects on social development.
- c. Educational policies in times of crisis. The pandemic has brought about a significant change in the way education policies are implemented worldwide. The sudden shift from face-to-face to remote education has posed a great challenge for educators, parents, students, and governments to ensure the quality of education is not compromised. The approach of raising awareness, providing direct services, educating future professionals, and supporting the development of sound policies has a far-reaching impact (Osborne et al., 2020). Engaging students as agents of change and enhancing bottom-up institutional innovation are also important

strands of educational policy implementation studies. However, macro-level policy changes are necessary for broader transformative potential and to integrate these efforts into future pandemic preparedness strategies (Kreitlow et al., 2021). Studies have also highlighted the challenges for universities in maintaining budgets, the exhaustion of professors, and the need for science to contribute to containing the pandemic through multidisciplinary collaboration and technology (Panizzon et al., 2020).

Cluster 5: Frontlines and institutional trust. Purple, $n = 89$

The fifth and last cluster composed of 89 articles deals with a theme still incipient in the literature but with potential studies for future indications. Called by the literature the great protagonists of the pandemic, the frontliners served the world population represented as health professionals, educators, public safety professionals, etc. The most relevant keywords of the group are economics, resilience, street-level bureaucracy, insights, governance, politics, institutions, civil society, and trust.

- a. The frontliners of the pandemic. Frontliners, also known as street-level bureaucrats are facing the hard work of the pandemic by delivering public service to the user in extreme situations. Negative emotions (fear, anger, and sadness) prevailed on physician rating sites during the study of Shah et al., (2021). Other factors are raised in the literature for the difficult work of the frontliners like lack of secure communication from the central government, delay in decision-making, lack of preparation of the government to face the pandemic delayed treatment of thousands of people (Aminullah & Erman, 2021). Education professionals are also facing similar challenges, with factors such as the psychological safety of public school principals being a problem generated by the pandemic in the delivery of services to citizens (Means et al., 2020).

Despite these challenges, studies have identified some feelings that may motivate frontline professionals. Healthcare professionals, for example, report a sense of purpose in helping others, being an inspiration to others, and a sense of belonging (Pauly et al., 2021). Additionally, frontline workers express a sense of gratitude for being on the front lines of the largest pandemic in recent history, even in a context where they must exercise discretion in highly unpredictable situations with greater demands and fewer resources (Gofen & Lotta, 2021).

- b. The level of institutional trust and its impact on public service delivery. The media are a key ally for pandemic institutional communication. Studies have explored how public voice behavior in the media influences policy developments and identified models that explain the influence of cognitive processes and emotions under political tone (Yang & Su, 2020). Clear and objective communication from public leaders is crucial for institutional confidence, as misinformation can impact health worker engagement (Lunsky et al., 2021).

Using social media for public policy engagement can be advantageous for the government if done responsibly (Jung et al., 2020). The lack of coordination in responses to Covid-19 and the varying rigor of state responses may worsen the crisis, highlighting the importance of considering trust and public opinion (Knaul et al., 2021). Government communication with service users is crucial, and listening to frontline workers is key to understanding public anxieties. A

systematic review highlights the association of trust with government measures, compliance, mortality rates, and the impact of government action on trust levels (Devine et al., 2021).

- c. Technology as an ally of health workers. Reliable global public health data sources are crucial for optimizing public, private, and academic partnerships related to vaccine development and implementation, as highlighted at the meeting for health systems strengthening (Weitzman et al., 2021). To track public health interventions for Covid-19, a proposed global health database, HIT-COVID has been suggested by studies (Zheng et al., 2020).

The literature highlights the importance of technology for implementing economic and social welfare policies. The term “Just Tech” refers to the ethical use of technology to address societal needs and inequalities, especially for vulnerable groups (Mercier et al., 2015; Vahdat, 2021). In this review’s context, we examine how technologies could be implemented equitably to strengthen public health policies and services during the pandemic, improving outcomes for underserved populations. Further research on Just Tech solutions to avoid exacerbating digital divides and accessibility issues is recommended (Hoffman et al., 2020).

In healthcare, telemedicine provides opportunities to connect patients and providers. Health policies have adapted to facilitate access to virtual healthcare, demonstrating the field’s dynamic ability to respond to public crises (Hoffman et al., 2020). This highlights how technology implementation enabled continued health service delivery during the pandemic.

These five potential clusters presented contribute to overcoming gaps presented in previous studies that show the lack of studies that guide directions of the field of public policy implementation studies (Brancalion et al., 2020; El-Taliawi et al., 2021; Howlett, 2020; Thomann et al., 2018). This type of summary is important to the literature because it forms the most relevant keywords from the five clusters in the database. Relevant keywords from the five potential clusters in the database are presented in Table 5, along with a summary of current topics and potential studies for each group.

What are the future directions for studies of public policy implementation in the context of Covid-19 pandemic?

The implementation of public policies has always been a complex challenge due to its unique structure, context, and actors involved (Ferreira & Medeiros, 2016; Novato et al., 2020; Ollaik & Medeiros, 2011). The Covid-19 pandemic, declared by the World Health Organization in March 2020, has presented new challenges to policy makers and opened up an important research agenda to analyze policies that contribute to the containment and mitigation pandemic’s effects (Niquini et al., 2020).

The reviewed studies focused on exploring various themes and potential directions for future research. We highlight the growing trend of behavioral studies of frontliners in times of crisis (Brodkin, 2012; Hill, 2003; Lipsky, 1980), the technological tools as allies for solutions in the implementation of public policies for the most vulnerable people evidenced by the pandemic, previously called by the literature as “Just Tech” (Hood, 1986; Mercier et al., 2015) and the need for future studies that analyze public policies that are “drivers” for strengthening Global Public Health (Lopez Cabello, 2021; Slonim et al., 2020). Based on these themes, the authors suggest 30 research questions for future studies. These are presented in Table 6.

TABLE 5 Overview of current keywords and topics by cluster.

Clusters	Keywords	Current topics	Representative articles
Cluster 1 = Red <i>n</i> = 102	Implementation, intervention, misinformation, social distancing policy, bureaucracy, risk perception, network, policy analysis, global health, universal health coverage, big data	Structural problems of the policy, lack of training of health professionals, and misinformation as a barrier to the implementation of public policies Empirical reports of local experiences can serve as collective learning as a “coalition of support”. Relevant policy debates to strengthen global public health	An and Tang (2020) Means et al. (2020) Lyu and Webby (2020) Fischer and Winters (2021) Zhang and Tang (2021) Ştefan and Grama (2020) Lopez Cabello (2021)
Cluster 2 = Blue <i>n</i> = 76	Engagement, technology, workers, accountability, communication, control strategies, management, contact tracing, and policy evaluation	Increased community engagement for the implementation of restriction policies. The identification of technological innovations that contribute to better public health service delivery. The need for training of health professionals as the front line in times of epidemic crises	Liu and Huang (2020) Sofonea et al. (2021) AL-Shammery et al. (2021) Burdick and Dhillon (2020)
Cluster 3 = Yellow <i>n</i> = 57	Workers, anxiety, isolation, mobility, patterns, depression, quarantine, equity, mental health, burnout, stress, social support	Psychological impact on people's lives during the pandemic. Change in behavior of frontline bureaucrats. Evident vulnerability and economic crisis affect social disparity	Hoagwood et al. (2021) Holthe et al. (2020) Marquez-Barrenechea et al. (2020) Voo et al. (2020) Cardoso (2020)
Cluster 4 = Purple <i>n</i> = 72	Environment, globalization, education, change climate, transports, sustainable development, air pollution, energy, and food security	Besides the prism of the health and economic crisis, such as environment, food security, transportation, and climate change. Social welfare and education policies with complex implementation in a pandemic moment	Itiki and Chowdhury (2020) Keshaviah et al. (2021) Onah et al. (2021) Hossain (2020) Payne et al. (2020) Osborne et al. (2020)
Cluster 5 = Green <i>n</i> = 89	Economics, street-level bureaucracy, power, civil society, insurance, systems, institutions, public trust, technology, telemedicine	Behavior and influencing factors of frontliners on the front lines of the pandemic. The level of government trust and institutional support as influencers of public service delivery. And papers reporting on science and technology as major allies in the battle against covid-19	Aminullah and Erman (2021) Pauly et al. (2021) Gofen and Lotta (2021) Hoffman et al. (2020)

TABLE 6 Summary of future directions with research questions.

Thematic area	Research questions
Lessons learned and cooperation from science a. Barriers in the process of public policy implementation b. Local experiences as replication experiences c. Multidisciplinarity in the formulation of public policies d. Strengthening of Global Public Health	<ul style="list-style-type: none"> • What barriers to the implementation of public policies innovate in the literature of the field from the bottom-up perspective? • What measures can be taken by the government to avoid the new barriers in the process of public policy implementation? • How can local studies contribute to collective learning in the implementation of socially insulated policies? • How can evidence-based models contribute to the implementation literature in the pandemic context? • How can multidisciplinary policy making contribute to social equity? • How can technology serve as a driver in strengthening global public health? • What government instruments can contribute to the sustainable health stipulated by the SDGs for care by 2030?
Governance in times of crisis a. Political engagement as a strategy b. Technology as an ally in the implementation c. Strengthening of training policies for health professionals	<ul style="list-style-type: none"> • How can the coalition of support contribute to greater public policy engagement? • How does the choice of government instruments impact the trust of the information passed on to the policy target audience? • How do fake news and information overload affect street-level bureaucrats in delivering public service? • How can technology contribute to policy implementation in a pandemic context? • In what ways can strengthening health training policies contribute in a health crisis situation like Covid-19?
Behavior, mental health, and vulnerability a. Mental health and behavior b. Policies for the most vulnerable	<ul style="list-style-type: none"> • In what proportions can the government act to minimize the impact of the pandemic on people's lives? • How does psychological burden undermine the implementation of public policies? • What relational factors between fake news and the denial of adherence of the target audience of immunization policies during the pandemic of Covid-19? • What actions has the government taken to remedy the social inequality exacerbated by the pandemic? • What actions of eligibility of welfare policy implementation to identify the 'invisible' citizens, those who were identified only because of the severity of the pandemic?
Beyond the health and economic crisis a. Environment, transportation, and sustainability policies b. Social welfare and food security policies c. Public-private partnerships as drivers for strengthening global public health d. Educational policies in times of crisis	<ul style="list-style-type: none"> • What lessons have been learned from the emergency policies implemented during the pandemic to contain the economic and health crisis? • What evidence is there in the process of implementing sustainable economic policies in developed countries? • How are the implementation of "non-priority" public policies during the pandemic being handled by governments? • What lessons have been learned from remote education as a catalyst for change in times of crisis?

(Continues)

TABLE 6 (Continued)

Thematic area	Research questions
Frontlines and institutional trust	<ul style="list-style-type: none"> • What behavioral factors of street bureaucrats influence the implementation of public policies in times of crisis?
a. The frontlines of the pandemic	<ul style="list-style-type: none"> • What is the learning process like for frontline professionals acting in the containment of Covid-19?
b. The level of institutional trust and its impact on public service delivery	<ul style="list-style-type: none"> • What is the perception of street bureaucrats in acting as public health policy implementers in the biggest health crisis in existence?
c. Technology as an ally of health workers	<ul style="list-style-type: none"> • How does the profile of public entrepreneurs emerge in the role of public policy implementers? • What is the relationship between the choice of government instruments and the level of institutional trust? • How does the level of institutional trust impact public service delivery? • What is the relationship of technology to the continuity of public services? • What is the perception of the actors involved in the implementation of telemedicine as a global public health driver? • What lessons were learned from the use of technology in the process of implementing non-pharmaceutical public policies to contain Covid-19?

DISCUSSION

The results of this systematic review have significant implications that extend beyond just the pandemic context. While the review offers timely insights into policy implementation issues during the Covid-19 crisis, the findings highlight difficulties as well as innovative strategies that can inform preparedness and response efforts for future public health emergencies more broadly as highlighted by Islam and Chowdhury (2021).

Among the main themes identified, structural barriers in health systems, even in developed countries, were extensively documented (An & Tang, 2020; Schneider, 2020). Information overload and misinformation also emerged as a relevant obstacle, particularly affecting frontline implementers (Vraga & Jacobsen, 2020).

Political and community engagement was emphasized in several studies as fundamental for successful adherence of the population to social distancing and immunization policies (Piraveenan et al., 2021; Wellenius et al., 2021). Similarly, the incorporation of multiple disciplines and expertise in the formulation of public policies could lead to more equitable and balanced policies (Obasa et al., 2020).

Digital technologies played a vital role as allies in combating the pandemic and ensuring the continuity of essential public services, such as telemedicine (Jung et al., 2020; Sheikh et al., 2021). However, research also highlighted the need for ethical and regulatory safeguards in this process (Hoffman et al., 2020).

The review revealed an increasing emphasis on behavioral studies of frontline implementers, or street-level bureaucrats (Brodkin, 2012; Hupe et al., 2015; Lipsky, 1980). Further research is needed on how behavioral factors influence their work in crisis contexts (Gofen & Lotta, 2021; Pauly et al., 2021).

While this review offers timely insights into policy implementation during Covid-19, its solitary pandemic focus provides a restricted perspective. Incorporating other crises could enrich understanding by revealing commonalities and differences across events. Similarly, the preponderance of qualitative methods indicates an area for methodological diversification. Enhanced reporting of geographical contexts is also needed to support appropriate assessments of representation and transferability. These limitations provide opportunities to extend the knowledge foundation built here.

Additional areas for continued strengthening include systematically examining addressed research gaps to further validate priorities and incorporating interdisciplinary perspectives to provide a multidimensional view. This focused analysis makes notable contributions by revealing how an unprecedented crisis challenged and shaped implementation worldwide. It also uncovers persisting difficulties and emergent innovations that can inform preparedness. By anchoring within seminal literature while integrating multidisciplinary insights, this review uniquely responds to calls for practical implementation research.

The identified gaps and future directions, such as research on the use of technology for vulnerable populations and analyses of policies to strengthen global public health, can guide researchers and public managers in improving policy implementation in the context of health crises.

This systematic review makes several notable contributions to the literature on policy implementation. First, it provides a timely synthesis of knowledge on implementation issues and strategies specifically in the context of the Covid-19 pandemic, an unprecedented global crisis that posed major challenges for governments worldwide (Hill & Hupe, 2022; Park & Chung, 2021).

Second, it highlights persistent difficulties like lack of resources and coordination even in developed country contexts, underscoring the need for greater preparedness. At the same time, it reveals innovative approaches leveraging technology and community engagement that could inform future crisis response (Greer et al., 2020).

Third, this review anchors the analysis firmly within seminal policy implementation literature, while expanding its scope by including insights from diverse disciplines beyond public administration. This interdisciplinary perspective enriches understanding of the multidimensional nature of policy implementation (Hill & Hupe, 2022; Mazmanian & Sabatier, 1983; Pressman & Wildavsky, 1973).

In essence, governments frequently need to respond urgently during societal disruptions ranging from economic instability to environmental disasters. By revealing persisting difficulties like resource constraints as well as adaptive innovations leveraging technology and communication, this review's synthesis of public policy implementation strategies and experiences during an extraordinary global crisis offers insights that policy makers can apply to enhance preparedness and execution when managing any turbulent event.

Finally, by systematically analyzing implementation during an extraordinary crisis, this systematic review addresses a clear gap in the literature by concentrating specifically on the implementation phase of public policy during the pandemic. It reveals current topics and recommends future directions to advance knowledge and practice in the field. The results demonstrate the evolution of policy implementation research toward interdisciplinary perspectives.

FINAL CONSIDERATIONS

This study successfully achieved its goal of systematically reviewing research on public policy implementation during the Covid-19 pandemic. The findings provide valuable insights into current

issues and future directions in this field. The review highlights the multidisciplinary nature of the literature on public policy implementation during the pandemic, with studies contributing evidence-based research. The crisis caused by the pandemic extends beyond the realms of health and economics.

The persisting difficulties and innovative strategies revealed here can inform preparedness and response efforts for future public health emergencies more broadly. For example, the resource and coordination challenges faced by health systems worldwide underscore the need for greater infrastructure investment and enhanced governance to strengthen crisis preparedness regardless of context.

One notable future research direction is the exploration of the relationship between technology and public policy care, often referred to as Just Tech in the literature. This area holds promise for improving policy implementation and addressing the needs of vulnerable populations. Additionally, there is a need for further studies that analyze public policies driving the strengthening of Global Public Health. Understanding the impact of these policies and identifying effective strategies are crucial for mitigating future global health crises.

It is important to recognize a limitation of this paper, which is its exclusive focus on the Covid-19 crisis. A comprehensive understanding of public policy implementation in global crises can be gained by analyzing the literature on other challenging contexts with complex interactions between different levels of government.

In conclusion, this systematic review demonstrates the extensive collaboration and multidisciplinary research taking place among public health departments in addressing public policy implementation during the Covid-19 pandemic. The literature goes beyond traditional health and economic crises, offering valuable recommendations for future research.

These recommendations include studying the behavioral factors influencing frontline workers, leveraging technology in policy implementation, and investigating policies that contribute to the improvement of global public health. Replicating this study in a post-pandemic context would further validate the identified research topics and future directions.

CONFLICT OF INTEREST STATEMENT

The authors declare none.

DATA AVAILABILITY STATEMENT

The data of this study are available from the Web of Science and Scopus Database. Restrictions apply to the availability of these data, which were used under license for this study. The codes that support the findings of this study are openly available in GitHub at <https://github.com/valerianovato/bibliometrix-01>, reference number branch main.

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