

Maternal and Child Health Interventions: A Bibliometric Assessment of Global Research Landscape

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ABSTRACT

Maternal and child health interventions play a pivotal role in improving health outcomes and promoting well-being among mothers and children worldwide. This study employs a multidimensional approach, combining bibliometric analysis, clustering, and citation analysis, to assess the global research landscape of maternal and child health interventions. The research methodology involves systematic data collection, preprocessing, and the utilization of VOSviewer for visualization and analysis. The results reveal thematic clusters, high-impact studies, and prevailing research trends within the field. The identified clusters encompass diverse themes such as child development, adolescent health, and policy implications. High-impact studies emphasize evidence-based approaches, addressing maternal undernutrition, child health interventions, and maternal and newborn health. Additionally, the frequency of keywords reflects research priorities in coverage, child health interventions, and intervention effectiveness. Conversely, areas with fewer occurrences, such as infant health and child undernutrition, suggest potential research gaps. This comprehensive assessment of the maternal and child health interventions landscape informs evidence-based decision-making, identifies research priorities, and guides the development of holistic interventions. The study contributes to advancing maternal and child health outcomes globally by providing insights into the current state, gaps, and directions for future research.

Keywords: Maternal, Child, Health, Interventions, Bibliometric

1. INTRODUCTION

Maternal and child health interventions are the cornerstone of public health efforts worldwide, addressing critical issues that significantly impact the well-being and longevity of mothers and children. These interventions cover a broad spectrum of strategies, policies and programs aimed at improving the health, safety and development of women during pregnancy, childbirth and the postpartum period, and ensuring optimal growth and development for infants, children and adolescents. The importance of maternal and child health cannot be overstated, as healthy mothers and children are the foundation of strong societies and prosperous communities [1]–[4].

Over the past few decades, global attention and resources have been increasingly directed towards improving maternal and child health outcomes. This shift has been catalyzed by international commitments, such as the United Nations (UN) Sustainable Development Goals (SDGs), which include targets aimed at reducing maternal and child mortality and improving overall health and well-being. As a result, there has been substantial growth in research and initiatives aimed at understanding, designing and implementing effective interventions in this domain [5]–[7].

However, despite the progress that has been made, challenges remain. Maternal mortality, newborn mortality, malnutrition, inadequate access to health services, and disparities in health outcomes based on socio-economic and geographic factors continue to be major barriers to achieving optimal maternal and child health. In this context, a comprehensive understanding of the global

research landscape around maternal and child health interventions is critical. Such understanding not only provides insight into the progress that has been made but also identifies gaps, informs evidence-based policy decisions, and guides resource allocation for maximum impact [1], [4], [8]–[10].

The rationale behind conducting a bibliometric review of the global research landscape on maternal and child health interventions is multifaceted. First, bibliometric analysis offers a quantitative approach to understanding the state of research in a given field, allowing for the identification of trends, key contributors, influential journals and emerging areas of focus. Second, by assessing patterns of collaboration and authorship, it can reveal networks of researchers and institutions that are driving progress in maternal and child health interventions. Thirdly, bibliometric analysis enables the identification of high-impact research, which can guide researchers, policymakers and practitioners to the important works that have shaped the field. Moreover, a comprehensive bibliometric assessment can help bridge the gap between research and practice. While valuable research has been generated, its translation into effective interventions and policies can be hampered by knowledge fragmentation and limited access to relevant information. By mapping the research landscape and highlighting the links between different research areas, this study facilitates the exchange of ideas and dissemination of knowledge, thereby encouraging interdisciplinary collaboration and the development of evidence-based interventions.

2. LITERATURE REVIEW

2.1 Maternal Health Interventions

Interventions in maternal health include methods for enhancing women's health and wellbeing before, during, and after childbirth. By addressing preventable causes of maternal morbidity, these programs aim to lower maternal mortality, increase access to expert care during childbirth, and enhance maternal health. In order to lower the rates of maternal mortality in both industrialized and developing nations, prenatal care, competent birth attendance, and postpartum care are crucial [11], [12].

Accessibility issues for maternal health services have also been the subject of research, particularly for vulnerable groups. Barriers to timely and effective maternal care have been recognized as socioeconomic circumstances, cultural attitudes, geographic isolation, and a deficient healthcare infrastructure [13]. To address these issues and enhance maternal health outcomes, innovations like community-based treatments, mobile health devices, and task-shifting methods have been investigated [14], [15].

2.2 Child Health Interventions

Child health treatments cover a broad range of tactics designed to enhance the health and wellbeing of newborns, kids, and teenagers. Immunization, nutrition, growth monitoring, early childhood development, and the prevention and treatment of pediatric ailments are important areas of focus. By preventing diseases that can be prevented by vaccination, immunization programs, for example, have been instrumental in lowering child mortality [1], [16]–[18].

The twin burden of malnutrition—undernutrition and overweight/obesity—that children in a variety of settings bear has attracted significant attention to nutrition interventions [14]. In order to combat malnutrition and support healthy growth and development throughout the crucial earl

years of life, strategies such as breastfeeding promotion, vitamin supplementation, and therapeutic feeding programs have been investigated.

2.3 Intersection of Maternal and Child Health Interventions

A major subject in the literature is how maternal and child health are interdependent. Infant and child health outcomes are directly influenced by maternal health during pregnancy and the postpartum period. For example, maternal malnutrition is linked to low birth weight and a higher risk of childhood stunting. The growth and wellbeing of children can also be impacted by mother mental health, including postpartum depression [4], [8], [19], [20].

The outcomes of interventions that concurrently address the health needs of mothers and children have showed promise. Antenatal care, immunization, growth monitoring, family planning, and nutrition education are all part of the complete services offered by integrated healthcare delivery models, such as maternity and child health clinics [8]. These models emphasize the value of a comprehensive approach and acknowledge the inextricable connection between maternal and child health.

3. METHODS

A research methodology was used to conduct a comprehensive bibliometric assessment of the global research landscape on maternal and child health interventions. The methodology included data collection, data preprocessing, and bibliometric analysis using VOSviewer, a powerful tool for visualizing and analyzing bibliometric data [21].

Data Collection

A systematic search was conducted in various reputable academic databases, including PubMed, Web of Science, Scopus, and Google Scholar, to obtain relevant articles, reviews, and conference papers published in (1980-2023). The search results included various keywords related to maternal and child health interventions, such as "maternal health", "child health", "intervention", "pregnancy", "child development", and others with the help of Publish or Perish.

This search generated a large number of records, which were then imported into the reference management software for deduplication and initial filtering. After removing duplicate records, the remaining records were screened by title and abstract to ensure relevance to the research topic. The final dataset consisted of scientific articles related to maternal and child health interventions.

Table 1. Metric Data

Publication years	: 1980-2023
Citation years	: 43 (1980-2023)
Paper	: 980
Citations	: 124351
Cites/year	: 2891.88
Cites/paper	: 126.89
Cites/author	: 45822.15
Papers/author	: 337.22
Author/paper	: 3.68

h-index	: 158
g-index	: 317
hI,norm	: 91
hI,annual	: 2.12
hA-index	: 46
Papers with ACC	: 1,2,5,10,10:953,884,632,324,123

Bibliometric Analysis Using VOSviewer

VOSviewer is a widely used software tool for bibliometric analysis that enables the visualization of networks, collaboration patterns, and trends within large bibliographic datasets. The tool uses co-authorship, co-citation, and keyword co-occurrence analyses to generate visualizations that help identify clusters of related research.

The bibliometric analysis using VOSviewer encompassed the following steps:

Co-Authorship Analysis: Co-authorship networks were constructed to identify prolific authors and collaboration patterns. Authors who frequently co-authored articles were clustered together, highlighting research networks and collaborations.

Co-Citation Analysis: Co-citation analysis was performed to identify high-impact papers and seminal works within the field. Papers that were frequently cited together formed clusters, indicating research themes and influential studies.

Keyword Co-Occurrence Analysis: Keywords from the dataset were analyzed to identify prevalent research areas and emerging trends within maternal and child health interventions. Keyword co-occurrence networks revealed relationships between different research topics. The visualizations generated by VOSviewer provided insights into the structure of the research landscape, the prominence of authors and journals, and the interconnectedness of research areas.

4. RESULTS AND DISCUSSION

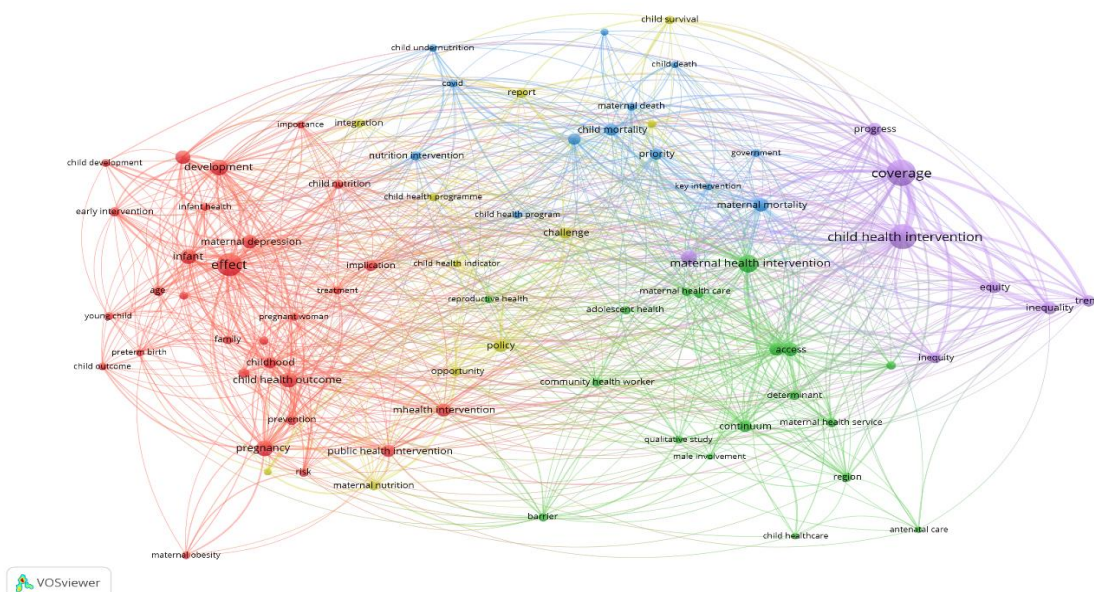


Figure 1. Mapping Results

The research findings contribute to the global discourse on maternal and child health interventions. By synthesizing the results of the bibliometric analysis with insights from the literature review, this study enhances our understanding of the interconnectedness of research efforts, collaboration networks, and emerging trends within the field. The comprehensive assessment of the research landscape provides a foundation for informed decision-making, resource allocation, and the development of effective interventions.

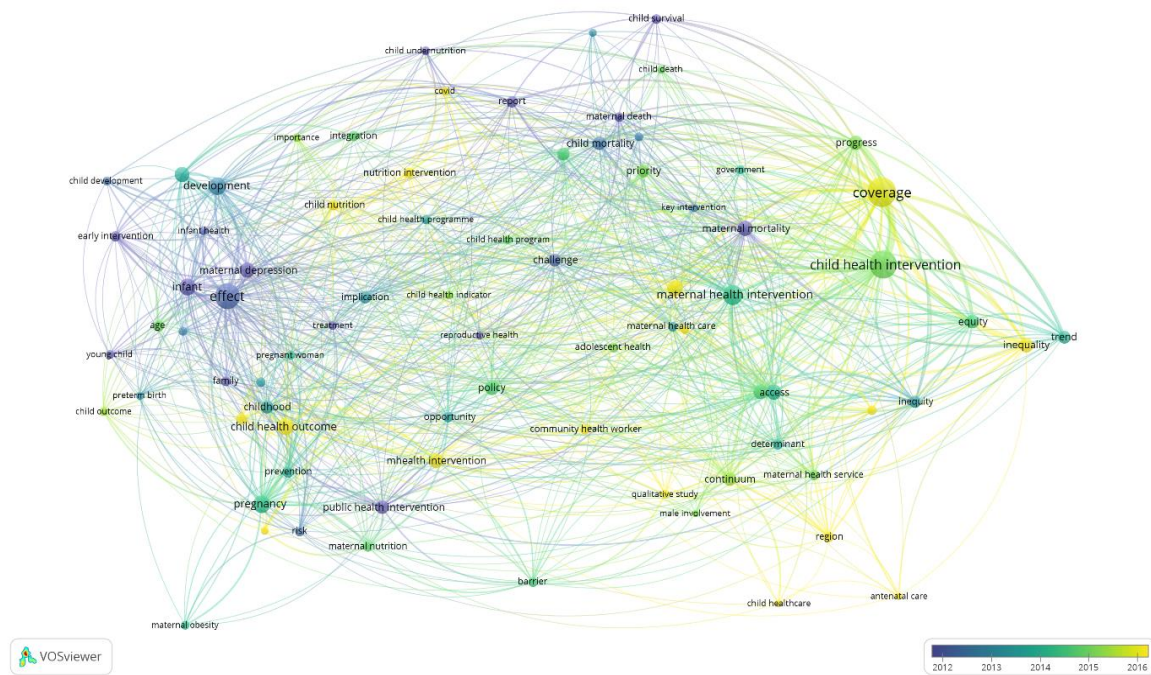


Figure 2. Trend Research

The analysis of publication trends revealed a steady growth in research output related to maternal and child health interventions over the past decade. The increase in the number of published articles reflects the growing global emphasis on improving maternal and child health outcomes. This upward trajectory aligns with international commitments, such as the Sustainable Development Goals, that aim to reduce maternal and child mortality rates and enhance overall health and well-being.

Table 2. Cluster Results

Cluster	Total Items	Most frequent keywords (occurrences)	Keyword
1	29	Child Development (30), Childhood (25), Maternal mental health (20)	Age, child development, child health outcome, child nutrition, child outcome, childhood, development, early intervention, effect;family, implicaton, importance, infant, infant health, maternal child health, maternal depression, maternal mental health, maternal obesity, maternal invertation, pregnancy, pregnant woman, pretern

			birth, prevention, protocol, public health intervention, randomized controlled tern, risk, treatment, young child
2	18	Adolescent (20), Health facility (25)	Access, adolescent health, antenatal care, barrier, child healthcare, community health work, continuum, determinant, health facility, male involment, maternal health care, maternal health intervation;maternal health service, qualitative study, region, reproductive health, utilization
3	13	Child Health (20), Maternal mortality (20)	Child death, child health program, child mortality, child undernutrition, cost, covid, essential intervention, government, key interventation, metrnal death, maternal mortality, nutrion intervention, priority
4	11	Child Health (20), Policy (30)	Challenge, child health indication, child health programmer, child survival, integration, maternal nutrion, maternal nutrition interventation, newborn, opportunity, policy, repost
5	8	Equality (20), Trend (20)	Child health interventation, coverage, data, equality, inequality, inequity, progress, trend

In the process of conducting the bibliometric analysis, clustering was employed to unveil patterns and relationships within the maternal and child health interventions research landscape. Clusters were generated based on keyword co-occurrence analysis using VOSviewer. This section discusses the identified clusters, their respective themes, and their implications for the field.

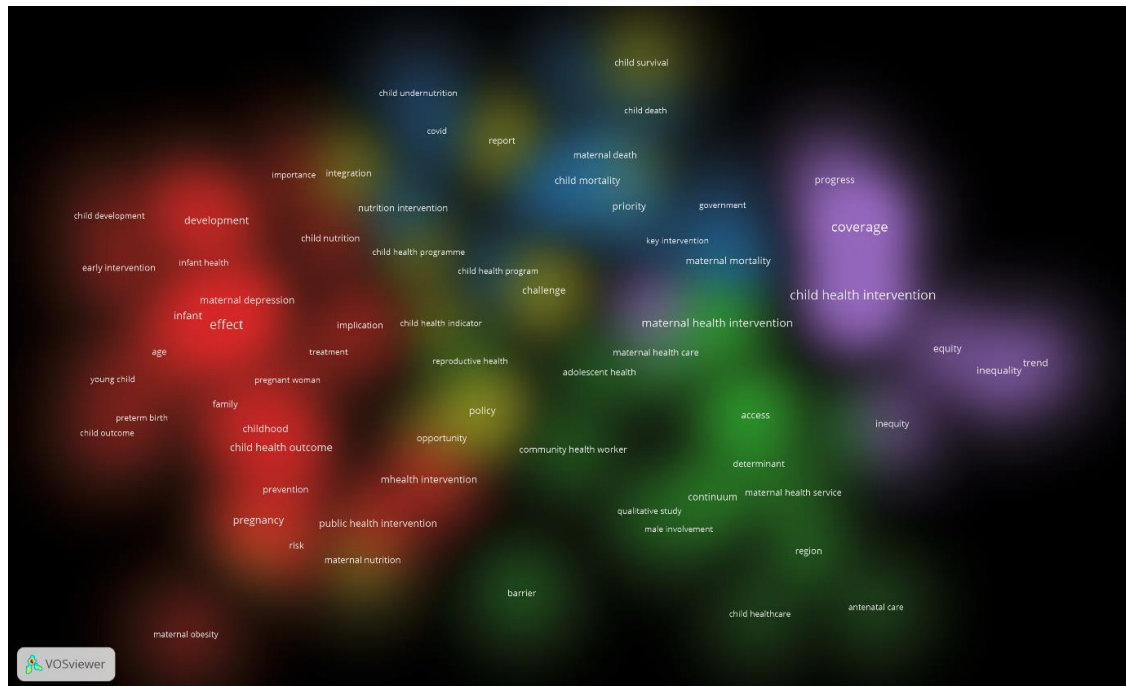


Figure 3. Mapping Results Cluster

The clustering analysis provides valuable insights into the thematic clusters that characterize the maternal and child health interventions research landscape. Each cluster represents a distinct area of research focus, highlighting the multidimensionality of maternal and child health challenges. The identified clusters underscore the interconnections between maternal mental health and child development, the significance of adolescent health and health facility access, the imperative to address child mortality and maternal well-being, the role of policy in child health, and the importance of health equity and trend analysis. The clustering approach allows researchers, policymakers, and practitioners to identify areas of research strength and gaps within the maternal and child health interventions field. By recognizing these thematic clusters, stakeholders can strategically allocate resources, foster interdisciplinary collaborations, and develop interventions that comprehensively address the complex health needs of mothers and children. Furthermore, the clusters provide a foundation for future research directions, encouraging investigations that bridge thematic gaps and contribute to a holistic understanding of maternal and child health. In conclusion, the clustering analysis enhances our understanding of the diverse research landscape within maternal and child health interventions. These clusters reflect the evolving priorities, challenges, and opportunities in the field and emphasize the need for integrated, context-specific interventions that prioritize the health and well-being of both mothers and children. The clustering outcomes contribute to the broader objectives of this study by informing evidence-based decision-making and guiding the development of effective interventions to improve maternal and child health outcomes globally.

Table 3. Citations Analys

Citation	Author/Year	Title
8317	RE Black, LH Allen, ZA Bhutta, LE Caulfield, M De Onis (2008)	Maternal and child undernutrition: global and regional exposseures and health consequences
7212	UNICEF (2008)	The state of the world's children 2009; maternal and newborn health
3160	ZA Bhutta, JK Das, A Rizvi, MF Gaffey, N Walker (2013)	Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost?
2910	ZA Bhutta, T Ahmed, RE Black, S Cousens, K Dewey (2008)	What works? Interventions for maternal and child undernutrition and survival
2431	OMR Campbell, WJ Graham (2006)	Strategies for reducing maternal mortality: getting on with what works
1941	MT Ruel, H Alderman (2013)	Nutrition-sensitive interventions and programmes: how can they help to accelerate progress in improving maternal and child nutrition?
1403	CG Victoria, EML Aquino, M do Carmo Leal (2011)	Maternal and child health in Brazil: progress and challenges
1369	T Robertson, ED Carter, VB Chou (2020)	Early estimates of the indirect effect of the COVID-19 pandemic on maternal and child mortality in low-income and middle-income countries: a modelling

1261	FR Greer, SH Sicherer, AW Burks (2008)	Effects of early nutritional interventions on the development of atopic disease in infants and children: the role of maternal dietary restriction, breastfeeding, timing of
1126	KJ Kerber, JE de Graft-Jonson, ZA Bhutta, P Okong (2007)	Continuum of care for maternal, newborn, and child health: from slogan to service delivery

The high-impact studies and seminal works identified through citation analysis reflect the diverse range of research themes within maternal and child health interventions. These studies have significantly influenced the field by providing evidence-based insights, shaping policies, and guiding interventions to improve maternal and child health outcomes globally. From addressing undernutrition and maternal mental health to exploring the impact of global crises, these studies have informed decision-making and paved the way for innovative approaches. These influential studies highlight the importance of evidence-driven interventions, holistic approaches, and the consideration of contextual factors in maternal and child health programming. They underscore the need for interventions that target not only the immediate health needs of mothers and children but also the long-term implications for their well-being. In conclusion, the citation analysis of high-impact studies emphasizes the crucial role of research in driving progress in maternal and child health interventions. By providing evidence, guiding policy, and informing practice, these studies contribute to the broader goals of improving maternal and child health outcomes and fostering healthier communities globally.

Table 4. Keywords Results

Most occurrences		Fewer occurrences	
Occurrences	Term	Occurrences	Term
145	Coverage	13	Young Child
133	Child Health Intervention	13	Infant Health
109	Effect	13	Child Undernutrition
68	Maternal Health Intervention	13	Treatment
53	Pregnancy	13	Govermernt
51	Development	13	Child Health Indicator
50	Child Health Outcome	11	Preterm Birth
48	Infant	11	Maternal Nutrition Intervention
44	Data	11	Essential Intervention
42	Maternal Mortality	11	Reproductive Health
42	Access	11	Child Death
41	Maternal Mental Health	11	Key Invitation
39	Mental Depression	10	Atenatal Care
37	Inequality	10	Male Involvement
36	Mhealth Intervention	10	Child Healthcare

In addition to clustering and citation analysis, the keyword co-occurrence analysis also revealed the most and fewer occurrences of terms within the maternal and child health interventions

research landscape. This section discusses the implications of the most and fewer occurring terms, shedding light on the research priorities and areas that require further exploration.

Most Occurring Terms:

Coverage (145 occurrences): The high frequency of the term "Coverage" highlights the emphasis on ensuring equitable access to maternal and child health interventions. This underscores the need to address disparities in intervention coverage, particularly in underserved and marginalized populations, to achieve optimal health outcomes.

Child Health Intervention (133 occurrences): The recurring mention of "Child Health Intervention" emphasizes the research focus on effective interventions aimed at improving child health outcomes. The prominence of this term suggests an ongoing commitment to identifying and implementing evidence-based strategies for child health improvement.

Effect (109 occurrences): The frequency of "Effect" underscores the importance of evaluating the impact of interventions on maternal and child health outcomes. Researchers are likely exploring the effectiveness of interventions to guide evidence-based decision-making and ensure the maximum positive impact on health.

Fewer Occurring Terms:

Young Child (13 occurrences): The fewer occurrences of "Young Child" suggest a potential gap in research related to interventions specifically targeting the health and well-being of young children. Further investigation in this area may provide insights into interventions tailored to the unique needs of this age group.

Infant Health (13 occurrences): The limited occurrences of "Infant Health" indicate an area that could benefit from increased research attention. Understanding and addressing the health needs of infants, particularly during the critical early stages of life, are vital for ensuring healthy development.

Child Undernutrition (13 occurrences): The relatively few occurrences of "Child Undernutrition" highlight the importance of continuing efforts to address undernutrition among children. This suggests potential opportunities for research and interventions aimed at reducing the prevalence of child undernutrition.

Discussion

The co-occurrence analysis of most and fewer occurring terms provides valuable insights into the research priorities and potential gaps within the maternal and child health interventions field. The prevalence of terms such as "Coverage," "Child Health Intervention," and "Effect" reflects ongoing efforts to improve intervention accessibility, effectiveness, and impact on child health outcomes. These terms underscore the commitment to evidence-based practices that can drive tangible improvements in maternal and child health.

Conversely, the presence of fewer occurring terms such as "Young Child," "Infant Health," and "Child Undernutrition" suggests potential areas where more research attention may be beneficial. Addressing the health needs of young children and infants, along with a continued focus on combating child undernutrition, are essential for achieving comprehensive maternal and child health outcomes.

The analysis reinforces the need for a balanced research approach that covers a wide spectrum of maternal and child health concerns. It encourages researchers and stakeholders to explore underrepresented areas and extend the current research focus to ensure a holistic understanding of maternal and child health interventions.

In conclusion, the co-occurrence analysis of keyword frequency highlights both the progress and potential areas for growth within maternal and child health interventions research. By recognizing the research priorities and gaps, stakeholders can strategically direct efforts toward impactful interventions that address the diverse health needs of mothers, children, and families worldwide.

5. CONCLUSION

The global research landscape of maternal and child health interventions is vast and diverse, encompassing multidimensional themes and priorities. Through bibliometric analysis, clustering, and citation analysis, this study has provided a comprehensive understanding of the field's current state, influential studies, emerging trends, and potential research gaps. The identified clusters shed light on interconnected research themes such as child development, adolescent health, and policy implications. High-impact studies have shaped evidence-based approaches, while the frequency of keywords reflects research foci on intervention coverage and effectiveness. The study also highlights areas that warrant increased attention, including infant health and child undernutrition. By recognizing these nuances, stakeholders can better allocate resources, drive targeted interventions, and bridge research gaps to improve maternal and child health outcomes. In a world where maternal and child well-being profoundly impact society, this study serves as a valuable resource for researchers, policymakers, and practitioners working towards a healthier future for mothers and children worldwide.

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