

Innovations and Barriers in Telehealth for Maternal and Child Health: A Global Analysis

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ABSTRACT: Telehealth has emerged as a transformative solution in maternal and child health (MCH), particularly in the wake of the COVID-19 pandemic. This narrative review aims to synthesize recent innovations and identify systemic barriers that influence telehealth adoption in MCH contexts globally. Literature was sourced from PubMed, Scopus, CINAHL, and Google Scholar, focusing on studies published in the past decade involving telehealth interventions targeting pregnant women, postpartum mothers, and children under five. Findings highlight that digital innovations such as mobile health applications, SMS reminders, and teleconsultations enhance antenatal care attendance, reduce perinatal mortality, and improve postpartum mental health and breastfeeding outcomes. However, significant challenges persist, including limited infrastructure, digital illiteracy, and socio-cultural resistance—especially in low- and middle-income countries. The review underscores the importance of inclusive policy frameworks, adequate funding, and healthcare workforce readiness in supporting equitable telehealth implementation. Future research should prioritize long-term impact evaluation and culturally tailored strategies to promote sustainable adoption.

Keywords: Telehealth, Maternal Health, Child Health, Digital Health, Mobile Health, Global Health Equity.



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INTRODUCTION

In recent years, telehealth has emerged as a pivotal innovation in the field of maternal and child health (MCH), reshaping the way healthcare is delivered to vulnerable populations across both developed and developing countries. Telehealth, broadly encompassing digital health platforms, telemedicine consultations, and mobile health (mHealth) applications, has been increasingly adopted as a response to challenges in healthcare accessibility. The global health crisis caused by the COVID-19 pandemic further amplified the urgency of integrating telehealth into mainstream maternal and neonatal care, as lockdowns, travel restrictions, and healthcare system strain threatened access to essential services (Benny et al., 2021). This digital transformation not only served as an emergency response but also positioned telehealth as a long-term strategy for addressing persistent inequities in healthcare delivery.

One of the most notable advancements in this context is the use of mobile applications tailored to maternal and child health. Evidence shows that mHealth interventions can improve engagement with healthcare services by delivering timely education, reminders for antenatal visits, and postpartum care guidance. For instance, Madubuonwu and Mehta (2021) demonstrated that mobile-based interventions contribute to enhanced maternal and neonatal outcomes by increasing patient adherence to recommended health practices. Similarly, De and Pradhan (2023) highlighted the role of mobile technologies in reducing perinatal mortality, while Kanté and Målqvist (2025) provided further evidence of their effectiveness across diverse healthcare settings. Gilano et al. (2024) emphasized the capacity of digital platforms to bridge geographical divides, connecting patients in rural areas with trained providers. Likewise, Alam et al. (2019) found that mobile technology initiatives improve referral systems and health service utilization among pregnant women in low-resource settings.

Epidemiological data underscores the relevance and urgency of advancing telehealth in maternal and child health. According to the World Health Organization, maternal mortality remains unacceptably high, particularly in low- and middle-income countries where barriers such as geography, socioeconomic inequality, and inadequate infrastructure persist (Sagastume et al., 2024). Telehealth offers an opportunity to mitigate these barriers by facilitating antenatal and postnatal follow-ups through digital tools (De & Pradhan, 2023; Islam et al., 2022). The pandemic further demonstrated how telehealth can sustain continuity of care while aligning with public health measures (Benny et al., 2021). Beyond physical health, telehealth has shown promise in addressing postpartum mental health, where Walsh et al. (2022) and Paul et al. (2021) documented improved well-being among mothers who engaged in virtual counseling and peer-support interventions during periods of isolation.

While these innovations offer transformative potential, they are accompanied by critical challenges that limit scalability and sustainability. A fundamental obstacle lies in the inadequacy of infrastructure, particularly in LMICs. De and Pradhan (2023) note that poor connectivity and technological shortages hinder effective utilization of maternal and neonatal health services. Turkmani et al. (2023) reported that inconsistent electricity supply and unreliable internet services remain major barriers in regions such as Bangladesh and Lao PDR. Moreover, digital literacy disparities exacerbate these infrastructural constraints. Ishaque et al. (2025) observed that users with limited technical competence are less likely to benefit fully from mHealth interventions, while Hanach et al. (2024) emphasized the need for training programs that equip both healthcare providers and patients with the necessary digital skills.

Socio-cultural dynamics further complicate the adoption of telehealth. In many communities, maternal care is deeply rooted in traditions that value face-to-face interactions, creating resistance toward digital alternatives. Walsh et al. (2022) highlighted cultural barriers that emerged when postpartum women were abruptly transitioned to telehealth services during the pandemic, with many expressing discomfort and distrust in digital consultations. Such findings underscore the risk that telehealth, if not adapted sensitively, could inadvertently reinforce health inequities rather than reduce them.

Another pressing challenge is the fragmented body of evidence on the long-term effectiveness of telehealth interventions in maternal and child health. While numerous studies have examined outcomes during the pandemic, relatively few have systematically assessed sustainability in post-pandemic contexts (Moise et al., 2023). Moreover, the qualitative experiences of women using telehealth remain underexplored, leaving gaps in understanding how socio-cultural and economic factors influence their engagement (Bock et al., 2021). Wu et al. (2024) also stress that socio-economic disparities continue to determine access, with vulnerable populations often facing the greatest barriers to telehealth adoption.

This gap in the literature justifies the need for a comprehensive review that consolidates evidence on both the innovations and barriers of telehealth in maternal and child health. Despite the growing number of studies, the absence of synthesized findings across diverse contexts limits the ability of policymakers and practitioners to design effective and equitable interventions. Therefore, there is a strong rationale for a narrative review that not only maps current knowledge but also identifies areas where further research is urgently required.

The primary aim of this review is to critically examine the dual aspects of telehealth for maternal and child health: the innovations that have shown potential to improve outcomes and the barriers that continue to constrain their effectiveness. Specifically, the review will analyze infrastructural, educational, socio-cultural, and policy-related factors that shape the adoption of telehealth interventions. In doing so, it seeks to provide a balanced perspective that acknowledges both the opportunities and challenges inherent in digital health for MCH.

The scope of this review is broad yet targeted. It considers evidence from both developed and developing countries, recognizing that while innovations may emerge globally, their implementation and outcomes are context-specific. Special attention is given to vulnerable populations, including ethnic minorities, rural communities, and immigrant groups, who often face compounded barriers in accessing maternal healthcare. By focusing on these groups, the review aims to highlight strategies that can ensure equitable adoption of telehealth, thereby contributing to the global goal of reducing maternal and child mortality.

METHOD

The methodological approach adopted for this narrative review was designed to ensure the rigorous identification, evaluation, and synthesis of literature pertaining to telehealth interventions in maternal and child health (MCH). Given the broad scope of digital health applications and the interdisciplinary nature of MCH research, the methodology combined systematic search strategies with explicit criteria for inclusion and exclusion, thereby enhancing the validity and reliability of the review findings.

The first step involved identifying relevant scientific databases known for their comprehensive coverage and credibility in health-related research. PubMed was prioritized as it is one of the most authoritative biomedical databases, extensively indexing peer-reviewed literature in maternal

health, child health, and telehealth applications (Bulcha et al., 2024; Duodu et al., 2022). Scopus was also used to capture studies across a wider disciplinary range, including those at the intersection of telecommunications, healthcare delivery, and public health policy (Ishaque et al., 2025). Given the breadth of research and the potential inclusion of diverse types of sources, Google Scholar was incorporated to identify dissertations, reports, and other academic contributions not always indexed in traditional medical databases. While this broadened the scope of captured literature, careful evaluation was required to account for variable quality (Alam et al., 2019). Additionally, the Cumulative Index to Nursing and Allied Health Literature (CINAHL) was included because of its emphasis on nursing and allied health studies, which are critical for understanding maternal and neonatal care practices (Walsh et al., 2022). By triangulating these databases, the search process ensured a comprehensive and interdisciplinary perspective on telehealth applications in MCH.

The second stage of the methodology was the development of an effective search strategy based on carefully selected keywords and Boolean operators. The chosen primary keywords included “telehealth,” “maternal health,” “child health,” “telemedicine,” “m-health,” “digital health,” “pregnancy,” and “postpartum.” These terms were selected to reflect the multiple dimensions of telehealth interventions, from digital platforms and mobile health technologies to their specific applications across the maternal and neonatal care continuum. Boolean operators were strategically applied to refine searches and maximize precision. For instance, the combined search string (“telehealth” OR “telemedicine” OR “m-health”) AND (“maternal health” OR “child health” OR “newborn care”) AND (“digital intervention” OR “health outcomes”) allowed for the simultaneous capture of studies that integrated digital health tools with specific maternal and neonatal health outcomes. This structured approach minimized the risk of excluding relevant studies while avoiding the retrieval of an unmanageable number of irrelevant results.

Following the initial identification of records, clear inclusion and exclusion criteria were established to ensure the relevance and quality of the literature. The inclusion criteria were designed to target research that directly addresses the intersection of telehealth and MCH. Eligible study designs encompassed randomized controlled trials (RCTs), cohort studies, systematic reviews, and qualitative research, as these designs collectively provide a comprehensive understanding of both the effectiveness and lived experiences of telehealth interventions. In terms of population, the review focused on studies involving pregnant women, postpartum mothers, infants, and children under the age of five, recognizing these groups as the most vulnerable in the maternal and child health continuum. With respect to publication type, only peer-reviewed journal articles, conference papers, and systematic reviews published within the last ten years were considered. This temporal restriction was implemented to ensure that the review reflects contemporary practices and technologies, as telehealth has rapidly evolved in the past decade (Baggett et al., 2023; Brugnaro et al., 2022).

In contrast, exclusion criteria were equally critical for refining the selection. Studies focusing primarily on chronic diseases unrelated to maternal or child health, such as diabetes or cardiovascular disease in non-pregnant adults, were excluded. This was to ensure that the scope remained tightly aligned with maternal and child health outcomes. Similarly, studies involving adult populations outside the scope of pregnancy, postpartum conditions, or child development were

not included. Finally, only studies published in English were reviewed, a decision made to maintain consistency in analysis and avoid potential misinterpretation arising from language translation.

The process of literature selection unfolded in multiple stages. Initially, all identified records from the databases were imported into a reference management system, where duplicates were systematically removed. Titles and abstracts were then screened independently to determine preliminary eligibility based on the defined inclusion and exclusion criteria. During this stage, particular attention was given to whether studies explicitly addressed telehealth or digital health interventions in maternal or child health contexts. Full-text articles of potentially relevant studies were subsequently retrieved and examined in detail. The evaluation focused on methodological rigor, relevance to the research questions, and clarity in reporting outcomes. To ensure robustness, each study was assessed not only for its immediate findings but also for the extent to which it contributed to understanding the broader landscape of telehealth interventions.

The final selection of studies was subjected to a qualitative synthesis process. Here, thematic analysis was employed to identify recurring patterns and categories across the literature. This involved coding the studies according to their main findings, such as improvements in antenatal care attendance, reduction in perinatal mortality, barriers related to infrastructure, or cultural resistance to telehealth adoption. Thematic coding facilitated the organization of results into coherent themes that informed subsequent sections of this review. By adopting this structured synthesis process, the methodology ensured that the evidence presented is both comprehensive and analytically rigorous.

In summary, the methodology employed in this review combined the systematic identification of literature from reputable databases, the careful application of keyword search strategies, and stringent inclusion and exclusion criteria to maintain relevance and quality. Through a stepwise screening and synthesis process, the selected studies provide a robust foundation for analyzing innovations and barriers in telehealth applications for maternal and child health. The methodological choices made, from database selection to thematic coding, were guided by the overarching aim of ensuring transparency, reproducibility, and depth in capturing the complexities of this rapidly evolving field. This approach not only reinforces the credibility of the findings but also provides a framework for future research endeavors seeking to examine the role of telehealth in improving maternal and child health outcomes.

RESULT AND DISCUSSION

The synthesis of literature on telehealth interventions in maternal and child health (MCH) revealed three dominant themes: innovations in telehealth, barriers to implementation, and global perspectives highlighting differences between developed and developing countries. Within these thematic areas, empirical findings, case studies, and systematic reviews provide a detailed picture of how digital health tools are shaping MCH outcomes globally.

The first significant theme emerging from the literature concerns innovations in telehealth and their role in increasing access to maternal and child health services. Digital innovations such as

mHealth platforms, mobile applications, and teleconsultation services have proven particularly effective in extending care to populations historically marginalized due to geographic, economic, or infrastructural barriers. Alam et al. (2019) reported that mobile phone-based consultation services in Bangladesh significantly improved communication between doctors and patients while simultaneously expanding the coverage of maternal and child healthcare services to remote areas. This demonstrates how telehealth has enabled healthcare providers to overcome distance-related challenges, ensuring women in underserved communities receive vital antenatal and postnatal care.

In addition, interventions utilizing short message service (SMS) reminders have shown measurable impacts on maternal health outcomes. Kanté and Målqvist (2025) found that SMS-based interventions increased antenatal care (ANC) attendance and reduced perinatal mortality with an odds ratio of 0.50, highlighting the capacity of relatively simple technologies to produce substantial improvements in maternal and neonatal health. Similarly, mobile applications designed to deliver educational content and reminders to pregnant women have enhanced adherence to medical appointments and improved maternal knowledge of pregnancy health practices. Madubonwu and Mehta (2021) documented how digital reminders supported behavioral changes, thereby improving maternal engagement in health services.

Beyond antenatal care, telehealth innovations have also improved postpartum outcomes. Studies indicate that mobile and web-based platforms enable postpartum mothers to access counseling and educational resources, improving outcomes related to breastfeeding and mental health (Walsh et al., 2022; Paul et al., 2021). Ishaque et al. (2025) demonstrated that mHealth interventions were associated with higher initiation rates of breastfeeding and greater participation in prenatal programs, thereby reinforcing the significance of digital solutions in promoting healthier practices across the maternal-child health continuum.

Khaksar et al. (2022) further provided evidence that remote monitoring systems targeting hypertensive disorders in pregnancy were effective in reducing complications through early detection and timely intervention. Duodu et al. (2022) also observed positive correlations between digital health tools and improved neonatal outcomes, underscoring the role of telehealth in preventing pregnancy-related complications and enhancing infant survival. Collectively, these findings establish strong empirical evidence that telehealth innovations have a transformative impact on maternal and child health indicators.

Despite the promising contributions of telehealth, several barriers hinder its effective and equitable implementation. Among these, infrastructural deficiencies remain the most significant challenge. Research by Turkmani et al. (2023) highlighted that many low- and middle-income countries (LMICs) lack basic technological infrastructure, including reliable internet connectivity and stable electricity supplies. This severely limits the ability of healthcare providers to deliver services through digital platforms and constrains patients' ability to access them. Without adequate infrastructure investment, the potential of telehealth to reach marginalized populations remains limited, particularly in remote or rural settings where health disparities are often most pronounced.

In addition to infrastructure, socio-cultural factors and digital literacy levels significantly influence the acceptance and effectiveness of telehealth interventions. Morony et al. (2018) argued that limited digital literacy among both patients and healthcare workers undermines the usability of telehealth systems. Many potential users feel unprepared or lack the confidence to engage with

digital platforms, thereby reducing program effectiveness. Complementing this, Walsh et al. (2022) reported that cultural norms favoring face-to-face interactions for maternal care created resistance toward telehealth during the COVID-19 pandemic, when digital services were introduced rapidly. These findings suggest that while technology can theoretically overcome physical access barriers, social resistance and inadequate digital competencies remain key obstacles.

Addressing these issues requires focused efforts in community education, awareness campaigns, and training initiatives. Wu et al. (2024) and Helle et al. (2019) emphasized the importance of promoting digital literacy and culturally sensitive outreach to foster broader acceptance. Without such measures, telehealth risks exacerbating inequalities by excluding populations less comfortable with technology. The literature thus illustrates a paradox: while telehealth has the capacity to democratize healthcare, it can also entrench disparities if sociocultural and educational barriers are not systematically addressed.

A global comparison of telehealth implementation reveals substantial disparities between developed and developing countries. In high-income nations, telehealth systems benefit from advanced healthcare infrastructure, integrated regulatory frameworks, and greater digital readiness. Stanley and Wallace (2022) noted that in Australia and Canada, telehealth was effectively used as an alternative to in-person prenatal and postpartum care, reducing complications and expanding access to maternal services. Similarly, Madubonwu and Mehta (2021) documented how robust policy support in developed countries facilitated widespread adoption and successful integration of telehealth within healthcare systems.

In contrast, telehealth adoption in developing countries is often constrained by technological and infrastructural limitations. De and Pradhan (2023) observed that in many African and Asian contexts, inadequate internet penetration and uneven distribution of digital devices hindered widespread access to telehealth services. Turkmani et al. (2023) corroborated these findings, noting persistent structural deficiencies in regions such as Bangladesh and Laos. Duodu et al. (2022) found that in Ghana, the success of mHealth programs in improving antenatal attendance depended heavily on community-level engagement and motivation, demonstrating that technological solutions alone are insufficient without parallel social and community-based strategies.

Policy factors emerge as another critical determinant of telehealth success. In developed countries, governments have often incentivized healthcare providers to adopt telehealth, streamlining integration into national healthcare systems (Madubonwu & Mehta, 2021). By contrast, in many LMICs, lack of sustained investment in health technologies and insufficient policy support remain significant obstacles. Turkmani et al. (2023) argued that the absence of consistent government backing often leaves telehealth initiatives fragmented and unsustainable. Conversely, studies such as Nugraheni et al. (2024) emphasized the potential of inclusive and locally adaptive policies to transform telehealth delivery in developing countries by aligning interventions with community needs.

Taken together, the literature indicates that the global implementation of telehealth in maternal and child health is uneven, with success dependent on infrastructural readiness, socio-cultural acceptance, and supportive policy environments. Developed countries demonstrate how integration of telehealth can significantly improve outcomes, while developing regions highlight the importance of contextual adaptation and targeted investments. This comparative perspective

underscores the necessity for international collaboration, knowledge-sharing, and policy innovation to bridge the divide and ensure that telehealth fulfills its promise as an equitable healthcare solution for mothers and children worldwide.

The findings of this review highlight the significant impact of telehealth interventions on maternal and child health, corroborating much of the existing literature while providing further insights into contextual factors that shape adoption and effectiveness. Studies such as those by Baggett et al. (2023) have shown that telehealth interventions extend beyond clinical outcomes to influence family well-being, including reducing risks of child maltreatment and fostering positive mother–child interactions. This aligns with a growing body of literature demonstrating that digital health solutions can address not only physical health indicators but also psychosocial dimensions of maternal and child health. Similarly, Ishaque et al. (2025) confirmed that participation in mHealth programs significantly improved neonatal health outcomes, including increased initiation of breastfeeding. These findings affirm prior evidence of the effectiveness of telehealth, while emphasizing its multidimensional benefits across maternal and infant well-being.

At the same time, newer research introduces greater nuance by emphasizing the importance of local context and community engagement in the success of telehealth. Duodu et al. (2022) highlighted that the effectiveness of mHealth programs in Ghana relied heavily on community-level motivation and social trust, an element often overlooked in earlier studies that tended to focus on technology itself rather than its sociocultural embedding. Walsh et al. (2022) similarly noted that during the COVID-19 pandemic, rigid public health measures inadvertently limited access to essential maternal services, underscoring the importance of responsive communication strategies and flexible telehealth systems. Such observations suggest that the adoption of telehealth is not solely dependent on technological readiness but also shaped by broader systemic and cultural contexts.

Systemic factors play a decisive role in shaping the outcomes of telehealth interventions. Health policies that actively support the integration of telehealth into maternal and child health services have proven essential, particularly in low- and middle-income countries. Turkmani et al. (2023) observed that where policies explicitly facilitated telehealth adoption, access and utilization increased significantly. Conversely, in contexts where health governance remained fragmented, telehealth initiatives often lacked sustainability. Financial investment is another critical systemic factor. Alam et al. (2019) emphasized that without adequate funding for telecommunications infrastructure and training programs, the benefits of telehealth remain largely inaccessible to disadvantaged populations. These findings reflect a systemic challenge whereby inequitable resource allocation undermines the promise of telehealth.

The preparedness and adaptability of the healthcare workforce is equally pivotal. Morrison et al. (2022) demonstrated that targeted training programs for healthcare providers not only improved competence in digital technologies but also led to better maternal health outcomes. Without adequate training, providers risk becoming barriers rather than facilitators of telehealth. This is particularly salient in resource-limited settings, where health workers may already be overburdened, and additional technological responsibilities can exacerbate inefficiencies. Addressing workforce readiness is therefore indispensable in ensuring that telehealth interventions translate into meaningful health improvements.

The literature also highlights a range of proposed solutions aimed at overcoming the barriers to telehealth adoption. Helle et al. (2019) advocate for the development of inclusive policies that prioritize equity and accessibility, ensuring that telehealth does not inadvertently exacerbate existing health disparities. Training programs tailored for both healthcare providers and patients are critical for improving digital literacy and confidence, thereby broadening telehealth's reach. Duodu et al. (2022) suggested community-based strategies that empower local actors, such as community health workers, to serve as intermediaries who bridge the gap between formal health systems and patients. Such models are particularly effective in contexts where trust in institutional healthcare is limited or where cultural norms favor personalized interactions.

Design considerations also play a fundamental role in shaping the success of telehealth platforms. Paul et al. (2021) emphasized that user-friendly interfaces are crucial in reducing anxiety among new users and fostering greater engagement among mothers. Applications that are intuitive, multilingual, and culturally tailored increase adoption rates and facilitate continuity of care. These findings indicate that technological sophistication alone does not guarantee success; rather, usability and cultural alignment are central to ensuring that telehealth platforms effectively meet the needs of target populations.

Despite the breadth of evidence supporting telehealth, notable limitations persist in the current research landscape. Much of the literature focuses on short-term outcomes, particularly during the COVID-19 pandemic, leaving questions about the long-term sustainability and scalability of telehealth interventions largely unanswered (Moise et al., 2023). Furthermore, qualitative insights into user experiences remain underrepresented, despite their importance in shaping interventions that are sensitive to local needs and barriers (Bock et al., 2021). Socioeconomic factors, such as poverty and inequality, continue to limit access to telehealth, yet few studies provide comprehensive strategies for addressing these structural determinants (Wu et al., 2024). There is also a lack of comparative studies that systematically evaluate differences in telehealth adoption across diverse sociopolitical and cultural contexts, limiting the transferability of findings.

These gaps underscore the necessity for further research. Longitudinal studies are needed to evaluate the sustained effectiveness of telehealth on maternal and child health outcomes beyond crisis contexts. Investigations into the socio-economic determinants of telehealth access could inform strategies to reduce disparities, while participatory research approaches that integrate user perspectives may guide the design of more equitable and culturally appropriate digital health tools. Expanding the evidence base to include comparative, cross-country analyses could further illuminate best practices and policy models for telehealth implementation. By addressing these gaps, future research can contribute to refining telehealth interventions and ensuring their effectiveness across varied global contexts.

CONCLUSION

This review highlights the transformative potential of telehealth in advancing maternal and child health across diverse global contexts. The findings demonstrate that digital innovations such as mHealth platforms, mobile applications, and teleconsultations significantly improve access to care, increase antenatal attendance, reduce perinatal mortality, and enhance postpartum support,

including mental health and breastfeeding outcomes. Evidence further reveals that telehealth is effective in both preventive and therapeutic dimensions, offering scalable solutions for improving maternal and neonatal outcomes. At the same time, major barriers persist, particularly in low- and middle-income countries where infrastructural deficiencies, limited digital literacy, and socio-cultural resistance impede effective implementation. Systemic factors such as policy support, financial investment, and workforce readiness emerge as decisive in determining the success or failure of telehealth interventions. Addressing these barriers requires sustained policy innovation, inclusive health financing strategies, and training initiatives that strengthen both provider and patient engagement with digital tools. The urgency of these issues underscores the need for governments, healthcare organizations, and communities to work collaboratively in ensuring equitable access to telehealth. Future research should prioritize longitudinal studies to evaluate the long-term sustainability of telehealth interventions, alongside qualitative investigations into user experiences that account for cultural and socioeconomic determinants of health. By bridging infrastructural gaps, investing in digital literacy, and promoting culturally sensitive designs, telehealth can be fully realized as a cornerstone of equitable healthcare delivery for mothers and children worldwide.

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