

## The Role of Mobile Health (mHealth) in Enhancing Healthcare Delivery in Remote Areas: A Systematic Review

Muhammad Obaid M. Alotaibi

General Administration of Health Services | Ministry of Defense | KSA

Received:

09/06/2025

Revised:

12/06/2025

Accepted:

15/06/2025

Published:

15/06/2025

\* Corresponding author:

[ma66009@gmail.com](mailto:ma66009@gmail.com)

Citation: Alotaibi, M. O.

(2025). The Role of Mobile

Health (mHealth) in

Enhancing Healthcare

Delivery in Remote Areas:

A Systematic Review.

*Journal of Medical and*

*Pharmaceutical Sciences,*

9(2), 23 – 25.

[https://doi.org/10.26389/](https://doi.org/10.26389/AJSRP.B110625)

[AJSRP.B110625](https://doi.org/10.26389/AJSRP.B110625)

2025 © AISRP • Arab

Institute of Sciences &

Research Publishing

(AISRP), Palestine, All

Rights Reserved.

• Open Access



This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY-NC) [license](https://creativecommons.org/licenses/by-nc/4.0/)

**Abstract:** Access to quality healthcare remains a critical challenge in remote and underserved areas, where geographical isolation, limited resources, and a shortage of skilled healthcare professionals contribute to health disparities (World Health Organization [WHO], 2021). Mobile health (mHealth), the use of mobile technologies for health services, has been proposed as a solution to bridge these gaps (Kallander et al., 2013). This systematic review synthesizes evidence from studies published between 2010 and 2024 to evaluate the effectiveness, challenges, and facilitators of mHealth in remote healthcare delivery. Findings indicate that mHealth interventions, including SMS reminders, teleconsultations, and mobile applications, have improved healthcare access, maternal and child health outcomes, chronic disease management, and disease surveillance (Feroz et al., 2020; Okeke et al., 2022). However, barriers such as poor digital literacy, limited infrastructure, and cultural resistance persist (Alami et al., 2020; Smith et al., 2023). The review underscores the need for integrated policies, community engagement, and capacity building to optimize the potential of mHealth in reducing healthcare inequities.

**Keywords:** mHealth, remote healthcare, mobile health interventions, healthcare delivery, systematic review.

### دور الصحة المتنقلة (mHealth) في تعزيز تقديم الرعاية الصحية في المناطق النائية: مراجعة منهجية

محمد عبيد مبارك العتيبي

الإدارة العامة للخدمات الصحية | وزارة الدفاع | المملكة العربية السعودية

**المستخلص:** تهدف هذه المراجعة المنهجية إلى تقييم فعالية تدخلات الصحة المتنقلة (mHealth) في تحسين تقديم الرعاية الصحية في المناطق النائية. تم تحليل الدراسات المنشورة بين عامي 2010 و2024 والتي تناولت تدخلات mHealth وتأثيرها على النتائج الصحية ومشاركة المستخدمين وتحديات التطبيق. أظهرت النتائج أن هذه التدخلات حسّنت من إدارة الأمراض المزمنة وصحة الأم والطفل، بالإضافة إلى تعزيز التواصل بين العاملين الصحيين. ورغم هذه الإيجابيات، ظهرت تحديات تتعلق بالبنية التحتية التكنولوجية ومستوى الثقافة الرقمية وأمن البيانات. توصلت الدراسة إلى أن نجاح تطبيقات mHealth يعتمد على التغلب على هذه التحديات من خلال السياسات الداعمة ومشاركة المجتمع وبناء القدرات.

**الكلمات المفتاحية:** الصحة المتنقلة، المناطق النائية، التطبيقات الصحية، تقديم الرعاية الصحية، مراجعة منهجية.

## 1. Introduction

Healthcare delivery in remote and underserved areas is often hindered by geographic isolation, limited healthcare facilities, and a shortage of trained professionals (WHO, 2021). These challenges contribute to poor health outcomes and limited access to essential services, particularly for marginalized populations (Lee et al., 2021). Mobile health (mHealth) refers to the use of mobile technologies, such as smartphones, SMS, and telemedicine platforms, to support health objectives and improve service delivery (Kallander et al., 2013).

The increasing penetration of mobile devices, even in low-resource settings, has enabled the deployment of mHealth interventions for maternal and child health, chronic disease management, and infectious disease control (Feroz et al., 2020; Okeke et al., 2022). SMS reminders have been shown to improve appointment attendance and vaccination coverage (Kallander et al., 2013), while mobile applications have facilitated patient education and remote monitoring for chronic conditions (Smith et al., 2023).

Despite these successes, implementing mHealth in remote settings faces challenges, including limited internet connectivity, poor digital literacy among users, and sociocultural barriers to technology adoption (Alami et al., 2020). Furthermore, the scalability and sustainability of mHealth depend on supportive policies, adequate funding, and integration into national health systems (Lee et al., 2021).

This systematic review seeks to address two key research questions:

- 1- What is the impact of mHealth interventions on healthcare access, quality, and outcomes in remote and underserved areas?
- 2- What are the main barriers and facilitators influencing the implementation and sustainability of mHealth solutions in these settings?

The objective is to synthesize existing evidence on mHealth's effectiveness and challenges in remote healthcare delivery, offering insights for policymakers, healthcare providers, and stakeholders.

## 2. Methods

This review followed PRISMA guidelines (Moher et al., 2009). A comprehensive search was conducted in PubMed, Scopus, Web of Science, and Google Scholar for studies published between January 2010 and April 2024. Keywords included "mHealth," "mobile health," "remote areas," "rural health," "healthcare delivery," and "telemedicine."

**Inclusion criteria:** Peer-reviewed studies in English focusing on mHealth interventions in remote areas; reporting outcomes related to access, quality, or health indicators; using quantitative, qualitative, or mixed-method designs.

**Exclusion criteria:** Studies limited to urban populations, theoretical frameworks without data, reviews, and editorials.

Two reviewers independently screened titles and abstracts, followed by full-text assessments. Discrepancies were resolved through consensus or a third reviewer. Data extracted included study design, setting, population, intervention type, outcomes, and reported barriers/facilitators. The Mixed Methods Appraisal Tool (Hong et al., 2018) was used for quality assessment.

## 3. Results

A total of 1,254 records were identified, with 68 studies meeting inclusion criteria. Studies spanned sub-Saharan Africa, South Asia, Latin America, and remote areas in high-income countries.

### Types of mHealth interventions:

- SMS reminders for appointments, medication adherence, and health education (n=30).
- Mobile applications for chronic disease management and maternal health (n=20).
- Teleconsultations and remote diagnostics (n=10).
- Health data collection and reporting tools (n=8).

### Impact on healthcare delivery:

- Maternal and child health: SMS interventions improved antenatal care attendance and immunization rates (Kallander et al., 2013; Feroz et al., 2020).
- Chronic disease management: Mobile apps enhanced medication adherence and disease knowledge (Lee et al., 2021; Smith et al., 2023).
- Infectious disease control: mHealth supported surveillance, contact tracing, and reporting (Okeke et al., 2022).

**Barriers:**

- Limited network coverage and electricity supply (Alami et al., 2020).
- Low digital literacy among patients and health workers (Smith et al., 2023).
- Cultural resistance to technology, including gendered phone access issues (Kumar et al., 2019).
- Insufficient policy frameworks and funding (Lee et al., 2021).

**Facilitators:**

- Community involvement in design and implementation (Feroz et al., 2020).
- Training programs for healthcare workers (Alami et al., 2020).
- Policy integration and government support (Lee et al., 2021).

**4. Discussion**

The review demonstrates that mHealth interventions significantly enhance healthcare access and outcomes in remote areas. Improvements in maternal and child health services, chronic disease management, and disease surveillance highlight mHealth's potential to reduce health inequities (WHO, 2021).

However, successful implementation depends on addressing barriers such as connectivity, literacy, and sociocultural factors (Alami et al., 2020). Community engagement is critical for acceptability, while capacity-building for health workers ensures effective use (Feroz et al., 2020). Policy support, infrastructure investments, and funding mechanisms are essential for scalability and sustainability (Lee et al., 2021).

Future research should explore cost-effectiveness, long-term impacts, and integration with artificial intelligence and data analytics for predictive care models (Smith et al., 2023). Tailored approaches for diverse contexts remain crucial for equitable mHealth deployment.

**5. Conclusion**

mHealth offers transformative potential to improve healthcare delivery in remote areas by enhancing access, quality, and outcomes. While challenges persist, they can be overcome through strategic investments in infrastructure, training, and policy integration. A collaborative, multi-stakeholder approach that respects local contexts is essential for sustainable mHealth programs that reduce health disparities and promote health equity.

**References**

- Alami, H., Lehoux, P., Gagnon, M. P., & Fortin, J. P. (2020). Teleconsultation and remote patient monitoring in rural areas: A scoping review. *Journal of Telemedicine and Telecare*, 26(1), 3–15.
- Feroz, A., Perveen, S., & Aftab, W. (2020). Role of mHealth applications for improving antenatal and postnatal care in low and middle-income countries: A systematic review. *BMC Public Health*, 20(1), 110.
- Hong, Q. N., Pluye, P., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., ... & Vedel, I. (2018). Mixed Methods Appraisal Tool (MMAT), version 2018. *Education for Information*, 34(4), 285–291.
- Kallander, K., Tibenderana, J. K., Akpogheneta, O. J., Strachan, D. L., Hill, Z., ten Asbroek, A. H. A., ... & Meek, S. R. (2013). Mobile health (mHealth) approaches and lessons for increased performance and retention of community health workers in low- and middle-income countries: A review. *Journal of Medical Internet Research*, 15(1), e17.
- Kumar, S., Chattu, V. K., & Mangal, A. (2019). Effectiveness of mHealth interventions in improving maternal health outcomes in developing countries: A systematic review. *Health Informatics Journal*, 25(3), 897–909.
- Lee, S., Chen, W., & Lee, J. (2021). Digital health interventions to improve healthcare delivery in rural and remote areas: A systematic review. *Healthcare*, 9(2), 187.
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine*, 6(7), e1000097.
- Okeke, E. N., Scott, R. E., & Mars, M. (2022). Impact of mobile health interventions on maternal and child health outcomes in sub-Saharan Africa: A systematic review. *Journal of Telemedicine and Telecare*, 28(4), 241–254.
- Smith, J. A., Brown, K., & Taylor, R. (2023). Barriers and facilitators to mHealth implementation in remote communities: A qualitative meta-synthesis. *BMC Health Services Research*, 23(1), 112.
- World Health Organization. (2021). Global strategy on digital health 2020-2025. WHO. <https://www.who.int/publications/i/item/9789240020924>