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# Effectiveness Of mHealth Intervention In Improving Antenatal And Postnatal Care Outcomes: A Systematic Review And Meta-Analysis Of Recent Evidence

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## Abstract

Maternal health outcomes is a global midwifery concern. This systematic review and meta-analysis evaluated the effectiveness of mobile health (mHealth) interventions on four key maternal and child health outcomes: antenatal care (ANC) attendance, facility delivery, exclusive breastfeeding at 5–6 months, and completion of childhood immunisation at 9 months. A literature search of electronic databases identified eligible randomised controlled trials published between 2020 and 2025. Data were synthesised using a random-effects model, with effect sizes reported as pooled relative risks and statistical significance assessed at $p < 0.05$. The review found that mHealth interventions significantly improved ANC attendance 50% (RR: 1.5 (95%CI: 1.02-2.18)). In contrast, mHealth did not significantly influence facility delivery, exclusive breastfeeding practices, or childhood vaccination completion at 9 months. The results underscore the differential impact of mHealth across the maternal care continuum. This review provides evidence that mHealth has substantial potential to improve ANC uptake but requires strategic adaptation to meaningfully influence other maternal and child health outcomes.

**Keywords:** Antenatal, Breastfeeding, Delivery, Immunization, mHealth, Postnatal

## INTRODUCTION

Maternal health outcomes is a global midwifery concern. Many low- and middle-income countries report high maternal morbidity and mortality rates (Knop et al., 2024). The high rates may be driven by gaps in access to quality antenatal and postnatal care. The gaps may involve late antenatal booking and inadequate follow-up attendance (Gilano et al., 2024). Effective strategies are therefore needed to enhance timely

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engagement with routine maternal health services. Ameyaw et al. (2025) highlighted that one promising approach involves the use of mobile health (mHealth) technology to support mothers during pregnancy and the postpartum period.

mHealth technologies have expanded rapidly in the past decade. Rising mobile phone ownership has created new opportunities to deliver targeted and scalable health information (Zolfaqari et al., 2024). Many countries now deploy mhealth tools to strengthen communication between pregnant women and health providers (Mbunge & Sibiya, 2024). These tools often include either SMS reminders or voice messages. Ameyaw et al. (2025) noted that mHealth interventions aim to improve knowledge, promote healthy behaviours, support appointment attendance, and enhance continuity of care. The accessibility and relative affordability of mobile technologies make them particularly valuable in settings with limited resources.

Antenatal care (ANC) offers opportunities for identifying risk factors, delivering preventive interventions, and guiding health decisions. Previous research like Gilano et al. (2024) has hinted that regular ANC visits are associated with improved pregnancy outcomes and safer deliveries. However, attendance rates remain suboptimal in many developing regions of the world (Sunday & Etuk, 2024; Singh & Walters, 2024). Barriers such as limited awareness due to cultural misconceptions and financial challenges may frequently hinder women from completing recommended visits. Kachimanga et al. (2024) mentioned that mHealth interventions may help overcome these barriers by providing convenient information delivery with regular prompts and personalised support such as digital credit token transfers.

Antenatal attendance is a pivotal determinant of maternal and newborn health outcomes. Yet some women still initiate care late or attend ANC irregularly (Olomi et al., 2025). This informed Sunday and & Neji (2025) to say that missed or delayed visits would limit opportunities for early risk detection (Esuabana et al, 2023) and essential health education or intervention. Therefore, strengthening timely antenatal engagement is central to improving pregnancy outcomes. According to Alemneh et al (2024), mHealth interventions have emerged as a promising strategy for addressing late and irregular ANC visits.

Facility delivery is essential for reducing maternal and neonatal morbidity. This is because skilled birth attendance ensures timely management of complications (Shartyanie et al., 2025). Nonetheless, some women still deliver outside the facility due to financial challenges, limited autonomy, and cultural preferences for traditional birth attendance (Dai et al., 2024). The gaps sustain preventable deaths in many low-resource settings. Consequently, interventions that promote facility delivery are needed. Phillips et al. (2024) acknowledged that mHealth strategies show potential in increasing facility-based births by addressing misinformation and prompting women to plan ahead for delivery.

Postnatal care (PNC) is equally critical for safeguarding maternal and newborn health. The immediate postpartum period carries heightened risks, yet many women do not return for scheduled PNC visits (Chilunjika & Chilunjika, 2024). Poor awareness of danger signs and low autonomy in decision making may contribute to the low PNC uptake (Olomi et al., 2025). mHealth tools can help address the gaps by extending communication beyond facility walls. They can provide guidance on breastfeeding, newborn care, family planning, and early recognition of complications. They also allow health workers to follow up with mothers who miss appointments, reducing the likelihood of adverse outcomes (Knop et al., 2024).

Exclusive breastfeeding for the first six months is globally recommended (Ogaji et al., 2021). The literature demonstrates that it has substantial benefits for infant immunity, nutrition, and development (Doan, et al., 2023). However, adherence to this recommendation remains inconsistent as it is influenced by cultural norms (Verma et al., 2025). Many mothers discontinue exclusive breastfeeding prematurely, often due to misinformation or perceived insufficient milk supply (Doan, et al., 2023). Strengthening postnatal guidance is vital for improving breastfeeding outcomes. mHealth interventions may enhance

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exclusive breastfeeding duration by delivering timely and targeted messages that reinforce best practices and provide reassurance.

Vaccination compliance during infancy is critical for preventing vaccine-preventable diseases and reducing child mortality. Yet completion of immunisation schedules remains suboptimal in many developing countries due to forgetfulness and low awareness (Chen et al., 2024). The gaps undermine population immunity and increase vulnerability to outbreaks. Improving parental knowledge and timely attendance to vaccination appointments is a key public health priority (Ogaji et al., 2021). Consequently, mHealth interventions may have potentials towards enhancing vaccination compliance. By prompting caregivers, clarifying schedules, and countering misinformation, digital tools can strengthen routine immunisation uptake and improve child health outcomes (Gayesa et al., 2023).

Despite growing interest in mHealth, evidence regarding its effectiveness remains inconclusive. Some studies like Coleman et al. (2020) and Sabin et al. (2020) report significant improvements in ANC and PNC indicators like ANC attendance, skilled birth utilisation (facility delivery), exclusive breastfeeding duration and childhood vaccination, while others like Adams et al. (2020) and Vanhuyse et al. (2022) report inconsistent effects. The rapid evolution of digital platforms necessitated a review of the current evidence. Previous reviews like that of Sunday and Orokpo (2023) have examined mHealth applications in maternal health, but focused on limited geographical areas. Additionally, earlier reviews often included studies published more than a decade ago, before the current wave of smartphone-based platforms. As digital technologies have advanced, newer interventions may offer enhanced functionality, greater usability, and stronger behavioural impact. A systematic review and meta-analysis that examines the most recent evidence is therefore necessary to provide timely insights.

Using the Population, Intervention, Control, and Outcome (PICO; Hamilton, 2025) framework, the present review tested whether mHealth interventions improves ANC and PNC outcomes compared with standard routine care without digital support. The Population (P) comprises pregnant and postpartum women receiving antenatal or postnatal services. The Intervention (I) includes any structured mHealth strategy involving SMS reminders. The Comparison (C) was usual care without mHealth enhancement. The Outcomes (O) are antenatal attendance, facility delivery, exclusive breastfeeding duration, and vaccination compliance. The Research Question was articulated as thus: Among mothers, how effective are mobile health interventions, compared with standard care, in improving antenatal attendance, facility delivery, exclusive breastfeeding duration, and vaccination compliance?

## METHODS

This systematic review and meta-analysis adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Veroniki et al., 2025) guidelines. The review protocol was developed a priori and registered on PROSPERO (an international prospective register of systematic reviews; ID number: CRD420251131235).

- ***Search Strategy***: A literature search of the electronic databases of PubMed, Scopus, Web of Science, CINAHL, and Embase was conducted to identify relevant peer reviewed studies. The string combined free-text keywords and synonyms: (mHealth OR mobile phone OR SMS OR mobile app) AND (antenatal OR prenatal OR postnatal OR breastfeeding OR immunization) AND (trial OR randomized). Boolean operators were used but no truncations were applied to increase wider database support (Vieira et al., 2021). Hand searching of the reference list of identified studies was done to identify additional studies. The search was limited to English language articles published between 2020 and 2025. Studies were eligible if they examined the effect of mobile health (mHealth) interventions on antenatal attendance, facility delivery, exclusive breastfeeding

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duration, or vaccination compliance. Cluster randomised controlled trials and randomised controlled trials involving pregnant or postpartum women were included. Studies that lacked an mHealth component, did not report relevant outcomes, or were not primary research were excluded. The search was independently done by two reviewers (FAB and DSO), then discrepancies were discussed with the other members of the review team.

- ***Screening Protocol***: Screening was conducted in four stages. At the first stage, all retrieved records were checked for duplicates. After removing duplicates, the remaining records underwent title screening for relevance in the second stage. Studies with relevant titles entered the abstract screening in the third stage. Records that met the inclusion criteria were moved to full-text review in the fourth stage. The screening was performed independently by two reviewers (FAB and DSO), with disagreements resolved through discussion with other members of the review team. A structured data extraction form was used to collect information on study characteristics. Data extraction was performed independently by two reviewers (FAB and DSO) to minimise bias.
- ***Quality Assessment***: The methodological quality of included studies was assessed independently by two reviewers (FAB and DSO) using the JBI Critical Appraisal tool, which considers randomisation processes, blinding, and outcome measurement analyses. Each domain was rated as Yes (score 1 if criteria was met) and No, Unclear, or Not available (Score 0 if criteria was not met). Disagreements between reviewers were resolved through discussion with the other members of the review team.

**Data Analysis and Meta-Analysis**: When at least two comparable studies reported the same outcome with sufficient statistical detail, a meta-analysis was conducted using a random-effects model to account for heterogeneity between the studies. Effect sizes were calculated as risk ratios (RRs). Heterogeneity was assessed using the $I^2$ statistic. All analyses were conducted using the online meta-analytic software.

## RESULTS

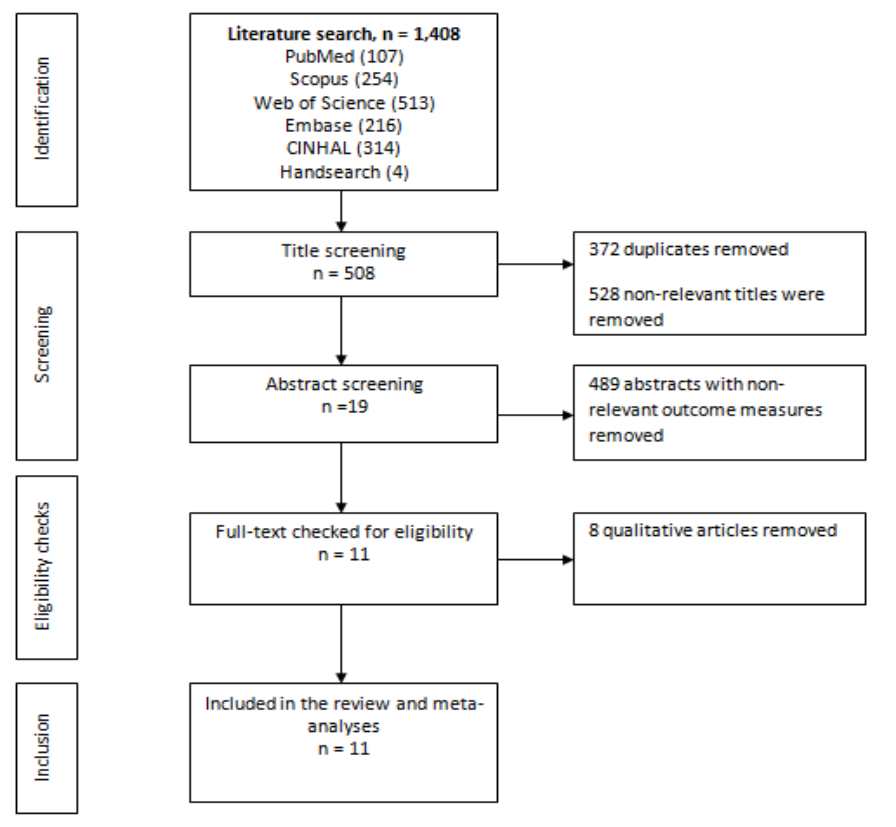



**Figure 1: The study selection process (PRISMA flow diagram)**

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Figure 1 showed that a total of 1,408 records were identified through database searching and hand-searching. The records were screened; 372 duplicates and 528 non-relevant titles were removed. Then 489 abstracts were excluded for lacking relevant outcome measures. Finally, 8 qualitative studies were excluded because they did not meet the inclusion criteria. Ultimately, 11 studies met all eligibility requirements and were included in the review and meta-analysis.

**Table 1: Characteristics of the included studies, n = 11**

| Author (Year) | Aim | Country | Design | Type of intervention | Type of control | Primary Outcome parameter |
|---|---|---|---|---|---|---|
| Adam et al. (2021) | Measured the effects of an animated, mobile video series on Exclusive breastfeeding duration | South Africa | Cluster RCT | mobile video | usual care | EBF duration 5-6 months |
| Billah et al. (2022) | Assessed the effect of electronic job aid-supported nutrition counselling on EBF. | Bangladesh | Cluster RCT | electronic job aid-supported nutrition counselling | usual care | EBF duration 5-6 months |
| Coleman et al. (2020) | evaluated effects of an mHealth intervention on uptake of maternal health services. | South Africa | Cluster RCT | SMS-based mHealth | usual care | 4 focused Antenatal visits |
| Oladepo et al. (2021) | investigated the effect of reminder SMS sent to mothers in rural communities on full and timely completion of routine childhood immunization. | Nigeria | Cluster RCT | SMS-based Mhealth | usual care | Full child vaccination at 9 months |

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| | | | | | | |
|---|---|---|---|---|---|---|
| Qureshi et al. (2020) | Examined outcomes with community-level interventions targeting pregnant women in Pakistan. | Pakistan | Cluster RCT | SMS-based Mhealth | usual care | Delivery in the health facility |
| Sabin et al. (2020) | tested an intervention that aimed to increase retention in antiretroviral therapy (ART) among HIV-positive pregnant women | Uganda | RCT | SMS-based Mhealth | usual care | Delivery in the health facility |
| Short et al. (2022) | Evaluate the feasibility of an mHealth‐supported breastfeeding peer counselor intervention implemented in rural India | India | RCT | mHealth‐supported breastfeeding peer counselor | usual care | EBF duration 5-6 months |
| Souza et al. (2021) | Evaluated the effectiveness of a mobile application for cell phones in the adherence of pregnant women to prenatal consultations. | Brazil | RCT | mobile application-based ANC consultations | usual care | 4 focused Antenatal visits |
| Vanhuyse et al. (2022) | Assessed the impact of conditional cash transfers (CCTs) to retain women in the | Kenya | Cluster RCT | An electronic system recorded attendance and triggered payments to | usual care | 4 focused Antenatal visits |

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| | | | | | | |
|---|---|---|---|---|---|---|
| | continuum of care (antenatal care (ANC), delivery at facility, postnatal care (PNC) and child immunisation) | | | the participant's mobile for the intervention arm (US$4.5) | | |
| Von-Dadelszen et al. (2020) | Examined outcomes with community-level interventions targeting pregnant women in three low-income countries. | Mozambique, Pakistan, and India | Cluster RCT | SMS-based Mhealth | usual care | Delivery in the health facility |
| Wu et al. (2020) | Assessed the effectiveness of using WeChat to improve breastfeeding practices | China | RCT | online messaging-based Mhealth | usual care | EBF duration 5-6 months |

*RCT = Randomised controlled trial*

Table 1 revealed that characteristics of the included studies. The review included 11 studies, conducted across nine countries: South Africa (2), Bangladesh (1), Nigeria (1), Pakistan (1), Uganda (1), India (2), Brazil (1), Kenya (1), and a multi-country study in Mozambique, Pakistan, and India (1). Most of the studies employed a cluster randomised controlled trial (cluster RCT) design (7 studies), while the remaining used individual RCTs (4 studies). The interventions were predominantly SMS-based messaging, and all the studies compared the intervention with usual routine care. The primary outcome measures varied across studies but aligned with the review objectives. Four studies focused on exclusive breastfeeding (EBF) duration, three assessed antenatal care attendance, three evaluated facility delivery, and one measured full childhood vaccination completion at 9 months.

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**Table 2: Methodological quality of included studies, n = 1**

| Author (Year) | Was true randomization used for assignment of participants to treatment groups? | Was allocation to treatment groups concealed? | Were treatment groups similar at the baseline? | Were participants blind to treatment assignment? | Were those delivering treatment blind to treatment assignment? | Were outcomes assessors blind to treatment assignment? | Were treatment groups treated identically other than the intervention of interest? | Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed? | Were participants analyzed in the groups to which they were randomized? | Were outcomes measured in the same way for treatment groups? | Were outcomes measured in a reliable way? | Was appropriate statistical analysis used? | Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of the trial? | Quality score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Adam et al. (2021) | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 10 |
| Billah et al. (2022) | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 11 |
| Coleman et al. (2020) | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 11 |

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| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Oladepo et al. (2021) | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 10 |
| Qureshi et al. (2020) | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 11 |
| Sabin et al. (2020) | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 10 |
| Short et al. (2022) | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 11 |
| Souza et al. (2021) | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 11 |
| Vanhuyse et al. (2022) | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 10 |
| Von-Dadelszen et al. (2020) | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 11 |
| Wu et al. (2020) | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 12 |

*Quality assessment score > 9/13 is acceptable*

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Table 2 demonstrated that all 11 included studies had acceptable methodological. All the included studies score above 9 on the JBI critical appraisal tool (69%).

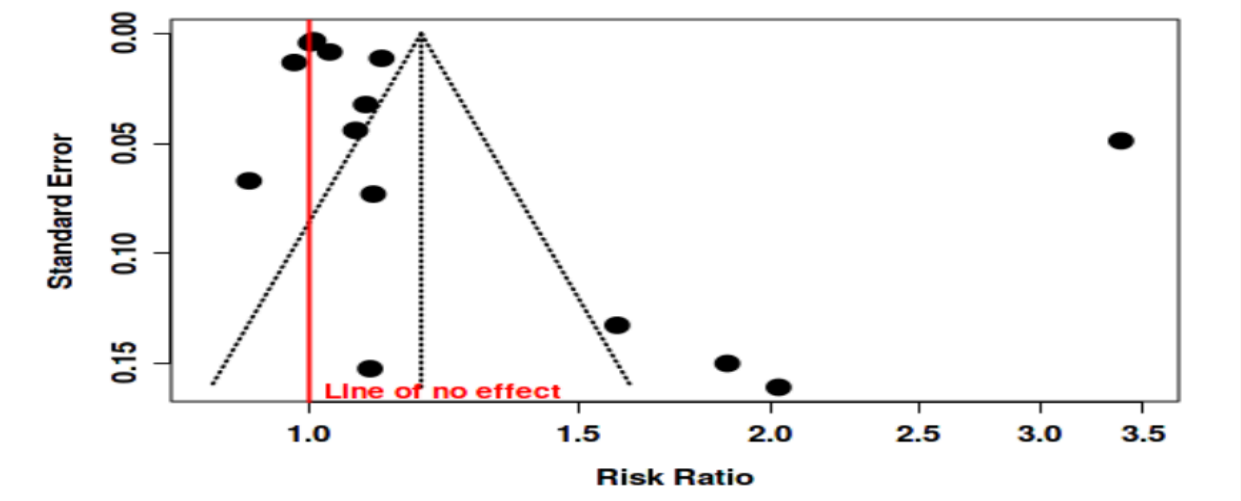



**Figure 2: Funnel plot showing test of publication bias**

Figure 2 indicated no potential publication bias. The Egger's test did not support the presence of funnel plot asymmetry (intercept: 4.71, 95% CI: 0.22-9.2, t: 2.057, p-value: 0.062).

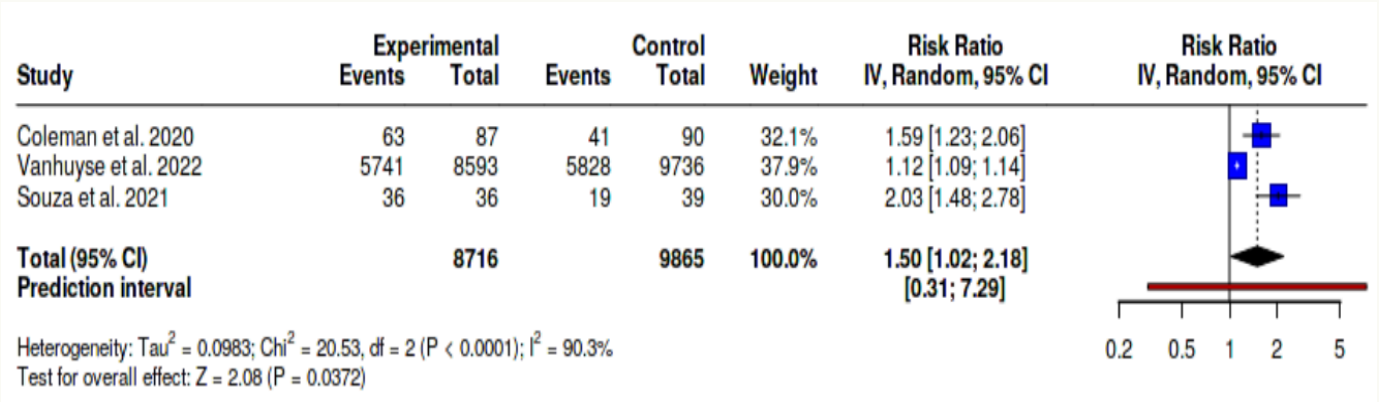



**Figure 3: Effect of mHealth on antenatal care attendance**

Figure 3 demonstrated that mHealth significantly (*p = 0.037*) increased ANC attendance by 50%.

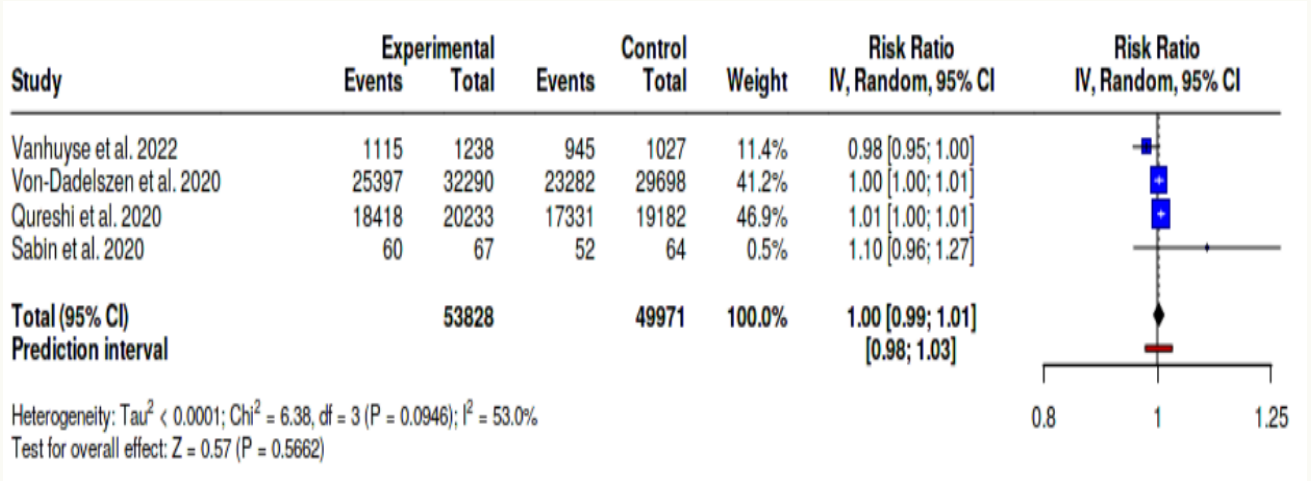



**Figure 4: Effect of mHealth on facility delivery**

Figure 4 revealed that mHealth had no significant impact on the frequency of facility delivery (*p = 0.566*).

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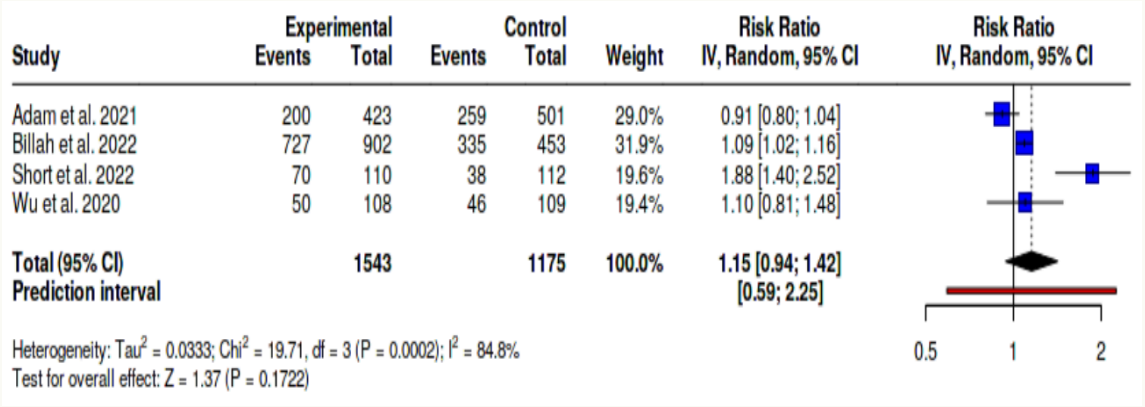



**Figure 5: Effect of mHealth on exclusive breastfeeding (5-6 months)**

Figure 5 demonstrated that mHealth did not have a significant ($p = 0.172$) effect on exclusive breastfeeding (5-6 months).

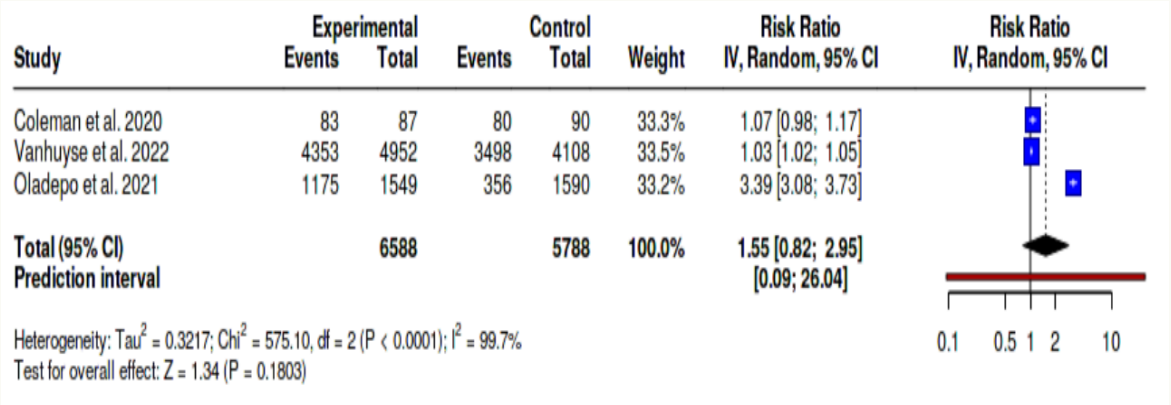



**Figure 6: Effect of mHealth on childhood vaccine compliance at 9 months**

Figure 6 showed that mHealth did not significantly improve the completion of childhood vaccination at 9 months ($p = 0.180$).

## DISCUSSION

The review found that mHealth interventions significantly increased antenatal care (ANC) attendance by almost 50%. This indicates a strong positive influence of mobile-based communication. This effect may be attributed to the ability of mHealth tools to provide timely reminders and reinforce health messages. SMS reminders may have strengthened perceived support by offering continuous contact with the health system. These mechanisms align with behavioural theory, which emphasises the role of cueing, reinforcement, and accessible information in promoting health-seeking behaviour. This finding is consistent with earlier reviews that also reported improved ANC uptake following digital reminder systems in low- and middle-income countries. Reviews by Rahman et al. (2022) and Yadav et al. (2022) similarly demonstrated significant gains in ANC attendance with mobile messaging interventions. The magnitude of improvement observed in this meta-analysis suggests that mHealth remains an effective and scalable strategy for increasing ANC attendance.

The review found that mHealth interventions did not significantly increase facility delivery rates. This finding indicates that digital reminders and messages alone may be insufficient to influence women's delivery choices. Facility delivery is shaped by a complex interplay of factors, including transportation challenges, financial constraints, sociocultural norms, perceptions of provider attitudes, and broader structural barriers. While mHealth may enhance knowledge and birth preparedness, it may not directly

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eliminate physical and economic obstacles that deter many women from choosing health facilities for childbirth. The limited effect observed, therefore, reflects deeper systemic and contextual barriers that require interventions beyond digital messaging alone. Bossman et al. (2022) and Gayesa et al. (2023) reported a contrasting finding in a previous review and noted a significant impact of mHealth interventions on facility birth. This finding suggests that mHealth may be more effective when integrated within wider maternal health programmes rather than delivered as a stand-alone strategy.

The review found that mHealth interventions did not significantly increase the duration of exclusive breastfeeding (EBF) to 5–6 months. This suggests that while digital platforms may support maternal knowledge, they may not adequately address the complex psychosocial, cultural, and environmental factors that influence breastfeeding continuation. Breastfeeding is a behaviour that depends heavily on social support, maternal confidence, and family influence. Mobile messages or digital counselling alone may thus be insufficient to sustain breastfeeding through the recommended six months, especially where mothers face significant contextual barriers. The non-significant finding contrasts findings in a review by Gayesa et al. (2023) that highlighted that mHealth improved breastfeeding duration. The present result suggests that digital interventions alone may not adequately substitute for interpersonal breastfeeding support.

The review found that mHealth interventions did not significantly improve completion of childhood vaccination by 9 months. This finding indicates that digital reminders may have a limited influence on full immunization adherence. Although reminders can improve awareness of upcoming doses, vaccination schedules involve multiple visits across the first year of life, and caregivers may face recurring barriers such as transportation costs, competing household responsibilities, and health system inefficiencies. These obstacles may prevent timely attendance even when mothers receive reminders. Additionally, some reminder systems may lack specificity, tailoring, or sufficient frequency to sustain adherence across multiple immunization appointments. The non-significant finding corresponds with evidence from prior reviews like Knop et al. (2024) who reported no improvements in long-term compliance. The observed pattern suggests that improving full completion of the vaccination schedule likely requires broader system-level support, such as caregiver engagement strategies.

## CONCLUSION

This systematic review and meta-analysis demonstrated that mHealth interventions significantly improved antenatal care attendance but did not yield meaningful effects on facility delivery, exclusive breastfeeding duration, or completion of childhood vaccination. In general, mHealth remains a valuable, scalable approach for strengthening antenatal behaviours.

### Implications for Practice

The findings of this review underscore the relevance of mHealth interventions as a practical tool for strengthening antenatal care utilisation. Health systems in low-resource settings can incorporate mobile reminders and digital counselling to support timely ANC attendance and enhance continuity of care. However, the limited impact of mHealth on facility delivery, exclusive breastfeeding duration, and vaccination completion suggests that digital tools should not be implemented as isolated solutions. Instead, practitioners should integrate mHealth within broader maternal and child health programmes that address transportation difficulties, financial constraints, health worker availability, and family or community influences.

### Recommendations

Future research should prioritise multi-component mHealth interventions that address both behavioural

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and structural determinants of maternal and child health outcomes. Policymakers should invest in digital health strategies only alongside efforts to strengthen health system readiness, workforce capacity, and community support, ensuring that mHealth is embedded within comprehensive maternal and child health programmes.

**References**

Adam, M., Johnston, J., Job, N., Dronavalli, M., Le Roux, I., Mbewu, N., ... & Bärnighausen, T. (2021). Evaluation of a community-based mobile video breastfeeding intervention in Khayelitsha, South Africa: The Philani MOVIE cluster-randomized controlled trial. *PLoS Medicine, 18*(9), e1003744. https://doi.org/10.1371/journal.pmed.1003744

Alemneh, E., Kebebaw, T., Nigatu, D., Azage, M., Misgan, E., & Abate, E. (2024). Electronic maternal and child health application usability, feasibility and acceptability among healthcare providers in Amhara region, Ethiopia. *PLOS Digital Health*, *3*(5), e0000494.

Ameyaw, E. K., Amoah, P. A., Asiama, A. A., & Agbadi, P. (2025). mHealth knowledge and usage in maternal healthcare delivery: perspectives and experiences of healthcare practitioners in Ghana. *BMJ Open*, *15*(1), e092746.

Billah, S. M., Ferdous, T. E., Siddique, A. B., Raynes‐Greenow, C., Kelly, P., Choudhury, N., ... & Dibley, M. J. (2022). The effect of electronic job aid assisted one‐to‐one counselling to support exclusive breastfeeding among 0–5‐month‐old infants in rural Bangladesh. *Maternal & Child Nutrition, 18*(3), e13377. https://doi.org/10.1111/mcn.13377

Bossman, E., Johansen, M. A., & Zanaboni, P. (2022). mHealth interventions to reduce maternal and child mortality in Sub-Saharan Africa and Southern Asia: a systematic literature review. *Frontiers in Global Women's Health*, *3*, 942146.

Chen, H. H., Hsiung, Y., Lee, C. F., Huang, J. P., Chi, L. K., & Weng, S. S. (2024). Effects of an mHealth intervention on maternal and infant outcomes from pregnancy to early postpartum for women with overweight or obesity: A randomized controlled trial. *Midwifery*, *138*, 104143.

Chilunjika, S. R., & Chilunjika, A. (2024). Using Mobile-Health Technologies to Promote Maternal Health Care in Developing Countries: A Case of Zimbabwe. *African Journal of Gender, Society & Development*, *13*(4), 359.

Coleman, J., Black, V., Thorson, A. E., & Eriksen, J. (2020). Evaluating the effect of maternal mHealth text messages on uptake of maternal and child health care services in South Africa: a multicentre cohort intervention study. *Reproductive Health, 17*(1), 160. https://doi.org/10.1186/s12978-020-01017-3

Dai, Y., Min, H., Sun, L., Wang, X., Zhu, C., & Gu, C. (2024). Assessing women's and health professionals' views on developing a midwifery‐led mobile health app intervention in pregnancy: A descriptive qualitative study. *Journal of Advanced Nursing*, *80*(10), 4259-4271.

Doan, T. T. D., Tran, T. C., Pham, N. M., Zhao, Y., Dinh, T. P. H., Hoai, N. X., ... & Bui, T. T. H. (2023). Designing and developing a mobile app (BeBo) in a randomized controlled trial study to promote breastfeeding among Vietnamese mothers. *International Breastfeeding Journal*, *18*(1), 7.

Esuabana, S. B. & Sunday, U. B. & Neji, G. N. (2023). Family related variables and undergraduate students' tendencies to social behaviour in university environment in Cross River State, Nigeria.

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*AFRIBVAM Journal, 4*(5), 54-60.

Gayesa, R. T., Ngai, F. W., & Xie, Y. J. (2023). The effects of mHealth interventions on improving institutional delivery and uptake of postnatal care services in low-and lower-middle-income countries: a systematic review and meta-analysis. *BMC Health Services Research*, *23*(1), 611.

Gilano, G., Dekker, A., & Fijten, R. (2024). The role of mHealth intervention to improve maternal and child health: A provider-based qualitative study in Southern Ethiopia. *PloS One*, *19*(2), e0295539.

Hamilton, D. K. (2025). Design and the PICO Question. *HERD: Health Environments Research & Design Journal*, *18*(2), 5-7.

Kachimanga, C., Zaniku, H. R., Divala, T. H., Ket, J. C., Mukherjee, J. S., Palazuelos, D., ... & Akker, T. V. D. (2024). Evaluating the adoption of mHealth technologies by community health workers to improve the use of maternal health services in Sub-Saharan Africa: systematic review. *JMIR mHealth and uHealth*, *12*, e55819.

Knop, M. R., Nagashima-Hayashi, M., Lin, R., Saing, C. H., Ung, M., Oy, S., ... & Yi, S. (2024). Impact of mHealth interventions on maternal, newborn, and child health from conception to 24 months postpartum in low-and middle-income countries: a systematic review. *BMC Medicine*, *22*(1), 196.

Maghalian, M., Veisi, S., Mirghafourvand, M., Rezaei, M., Samad-Soltani, T., Naghizadeh, A., & Ghanbari-Homaie, S. (2025). Developing and testing a mobile application for imparting knowledge: the positive birth experience guideline to midwifery students. *BMC Medical Education*, *25*(1), 577.

Mbunge, E., & Sibiya, M. N. (2024). Mobile health interventions for improving maternal and child health outcomes in South Africa: a systematic review. *Global Health Journal*, *8*(3), 103-112.

Ogaji, D. S., Arthur, A. O., & George, I. (2021). Effectiveness of mobile phone-based support on exclusive breastfeeding and infant growth in Nigeria: a randomized controlled trial. *Journal of Tropical Pediatrics*, *67*(1), fmaa076.

Oladepo, O., Dipeolu, I. O., & Oladunni, O. (2021). Outcome of reminder text messages intervention on completion of routine immunization in rural areas, Nigeria. *Health Promotion International, 36*(3), 765-773. https://doi.org/10.1093/heapro/daaa092

Olomi, G. A., Manongi, R., Makasi, C. E., Woodworth, S., Mlay, P., Yeates, K., ... & Khashan, A. S. (2025). The mHealth clinical decision-making tools for maternal and perinatal health care in Sub-Saharan Africa: A systematic review. *PLoS One*, *20*(4), e0319510.

Orokpo, M. O., & Sunday, U. B. (2023). Prevalence of Health Challenges among the Aged in Southern Cross River State, Nigeria: Implications for Educational Research in Counselling services. *Prestige Journal of Education*, *6*(2), 198-209.

Phillips, J. C., Alfano, A. R., Barfield, L. C., Cain, L., Sadjadi, M., Morales, E., ... & Hannan, J. (2024). Exploring maternal and infant health app development and effectiveness research: scoping review. *JMIR Pediatrics and Parenting*, *7*(1), e46973.

Qureshi, R. N., Sheikh, S., Hoodbhoy, Z., Sharma, S., Vidler, M., Payne, B. A., ... & Bhutta, Z. A. (2020). Community-level interventions for pre-eclampsia (CLIP) in Pakistan: a cluster randomised controlled trial. *Pregnancy Hypertension, 22*(1), 109-118. https://doi.org/10.1016/j.preghy.2020.07.011

Rahman, M. O., Yamaji, N., Nagamatsu, Y., & Ota, E. (2022). Effects of mHealth interventions on

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improving antenatal care visits and skilled delivery care in low-and middle-income countries: systematic review and meta-analysis. *Journal of Medical Internet Research*, *24*(4), e34061.

Sabin, L. L., Halim, N., Hamer, D. H., Simmons, E. M., Jonnalagadda, S., Larson Williams, A., ... & Messersmith, L. J. (2020). Retention in HIV care among HIV-seropositive pregnant and postpartum women in Uganda: results of a randomized controlled trial. *AIDS and Behavior, 24*(11), 3164-3175.

Shartyanie, N. P., Hanifa, I. N., & Khan, N. (2025). Digital Health Interventions in Emergency Obstetric and Newborn Care Services in Low-and Middle-Income Countries: Scoping Review. *Journal of Medical Internet Research*, *27*, e75738.

Short, V. L., Bellad, R. M., Kelly, P. J., Washio, Y., Ma, T., Chang, K., ... & Derman, R. (2022). Feasibility, acceptability, and preliminary impact of an mHealth supported breastfeeding peer counselor intervention in rural India. International *Journal of Gynecology & Obstetrics, 156*(1), 48-54.

Singh, K., & Walters, M. R. (2024). Use of mHealth in promoting maternal and child health in "BIMARU" states of India "A health system strengthening strategy": Systematic literature review. *PLOS Digital Health*, *3*(2), e0000403.

Small, Z., Thompson, S. E., Sharma, A., Majumdar, S., Thout, S. R., Praveen, D., & Hirst, J. E. (2024). Mobile health (mHealth) interventions for health promotion during the perinatal period in India: a scoping review. *Frontiers in Global Women's Health*, *5*, 1427285.

Souza, F. M. D. L. C., Santos, W. N. D., Santos, R. S. D. C., Silva, V. L. M. D., Abrantes, R. M. D., Soares, V. F. R., & Silva, R. A. R. D. (2021). Effectiveness of mobile applications in pregnant women's adherence to prenatal consultations: randomized clinical trial. *Revista Brasileira De Enfermagem, 74*(Suppl 5), e20190599. https://doi.org/10.1590/0034-7167-2019-0599.

Sunday, U. B. & Etuk, I. S. (2024). Statistical Analysis of Marital Adjustment: An Evaluation of Sustainable Peace among Upper Basic Education (UBE) Teachers in Akwa Ibom State, Nigeria. *Journal of Qualitative Education, 16*(1), 175-196.

Sunday, U. B. &. Neji, G. N. (2025). Dichotomization of family structure and prenatal preference in Phi-coefficient Analysis: Implication for Educational Review. *British American University Journal of Social and Contemporary Issues (BAUJSOCI), 1*(1), 288-306.

Vanhuyse, F., Stirrup, O., Odhiambo, A., Palmer, T., Dickin, S., Skordis, J., ... & Copas, A. (2022). Effectiveness of conditional cash transfers (Afya credits incentive) to retain women in the continuum of care during pregnancy, birth and the postnatal period in Kenya: a cluster-randomised trial. *BMJ open, 12*(1), e055921. https://doi.org/10.1136/bmjopen-2021-055921

Verma, G. S., Gopalakrishnan, L., Ayadi, A. E., Diamond-Smith, N., Bagga, R., Dhir, S. K., ... & Duggal, M. (2025). Preliminary Effectiveness of a Postnatal mHealth and Virtual Social Support Intervention on Newborn and Infant Health and Feeding Practices in Punjab, India: Quasi-Experimental Pre-Post Pilot Study. *JMIR Pediatrics and Parenting*, *8*, e65581.

Veroniki, A. A., Hutton, B., Stevens, A., McKenzie, J. E., Page, M. J., Moher, D., ... & Tricco, A. C. (2025). Update to the PRISMA guidelines for network meta-analyses and scoping reviews and development of guidelines for rapid reviews: a scoping review protocol. *JBI evidence synthesis*, *23*(3), 517-526.

Vieira, R., Sousa-Pinto, B., & Figueira, L. (2021). Beware of word truncation in PubMed: unexpected problems and potential solutions. *BMJ Evidence-Based Medicine*, *26*(1), 34-36.

© 2026 The Authors. Published by Bexford Publishing Ltd 

Von-Dadelszen, P., Bhutta, Z. A., Sharma, S., Bone, J., Singer, J., Wong, H., ... & Sotunsa, J. O. (2020). The Community-Level Interventions for Pre-eclampsia (CLIP) cluster randomised trials in Mozambique, Pakistan, and India: an individual participant-level meta-analysis. *The Lancet, 396*(10250), 553-563.

Wu, Q., Huang, Y., Liao, Z., van Velthoven, M. H., Wang, W., & Zhang, Y. (2020). Effectiveness of WeChat for improving exclusive breastfeeding in Huzhu County China: randomized controlled trial. *Journal of Medical Internet Research, 22*(12), e23273. http://doi.org/10.2196/23273

Yadav P, Kant R, Kishore S, et al. (January 14, 2022) The Impact of Mobile Health Interventions on Antenatal and Postnatal Care Utilization in Low- and Middle-Income Countries: A Meta-Analysis. Cureus 14(1): e21256. http://doi.org/10.7759/cureus.21256

Zolfaqari, Z., Ayatollahi, H., Ranjbar, F., & Abasi, A. (2024). Motivating and inhibiting factors influencing the application of mhealth technology in post-abortion care: a review study. *BMC Pregnancy and Childbirth*, *24*(1), 73.

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