Impact of Mobile Health (mHealth) on Antenatal Care Compliance: A Narrative Review

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***Abstract*—Background: Antenatal care (ANC) is vital for maternal and neonatal health, yet adherence to recommended visits remains suboptimal. Mobile health (mHealth) interventions, such as SMS reminders, mobile applications, and teleconsultations, have emerged as strategies to improve ANC compliance.**
Objective: To review recent evidence on the effectiveness of mHealth interventions in enhancing ANC compliance and discuss behavioral, contextual, and nursing implications.
Methods: A narrative review was conducted focusing on high-quality studies published between 2020 and 2025. Seven key studies were selected, including meta-analyses, systematic reviews, and original trials evaluating mHealth interventions for improving ANC attendance and maternal outcomes.
Results: Meta-analyses and systematic reviews demonstrate that mHealth interventions significantly improve ANC compliance (OR/RR = 1.66–2.94). Real-world trials confirm efficacy of SMS reminders, mobile apps, and combined interventions in increasing ANC attendance and early booking. Behavioral studies indicate high acceptability among pregnant women, with barriers including digital literacy, device access, and socio-cultural factors.
Conclusion: mHealth interventions are effective and feasible tools to enhance ANC compliance. Successful implementation requires addressing barriers and tailoring interventions to local context. Nursing professionals play a critical role in delivering, monitoring, and supporting these interventions.

***Index Terms*—mHealth, mobile health, antenatal care, compliance, nursing interventions, maternal health**

I. INTRODUCTION

- Importance of ANC: Early and regular ANC visits reduce maternal and neonatal morbidity and mortality. WHO recommends at least eight ANC contacts.
- Current challenges: Low adherence due to geographic, financial, educational, and cultural barriers.
- mHealth emergence: Mobile-based interventions (SMS, apps, voice calls) provide scalable, cost-effective solutions.
- Aim: Summarize recent evidence on mHealth interventions for ANC compliance and discuss behavioral and nursing implications.

II. METHODS

- Approach: Narrative review of high-quality studies published 2020–2025.
- Data sources: Google Scholar, PubMed, Scopus.
- Inclusion criteria: Meta-analyses, systematic reviews, RCTs, quasi-experimental studies, behavioral studies on mHealth and ANC compliance.
- Exclusion criteria: Studies not reporting ANC outcomes or outside maternal health context.
- Synthesis: Studies grouped into three categories:
  1. Systematic evidence (meta-analyses/reviews)
  2. Real-world evidence (original trials)
  3. Behavioral insights (acceptability, barriers, facilitators)

Table 1: Systematic Evidence on the Effectiveness of mHealth Interventions for Antenatal Care Compliance

Study	Type	Intervention	Outcome	Key Finding
Singh et al., 2023	Meta-analysis	SMS, mobile apps, voice messages	ANC attendance	RR = 1.66; significant improvement
Nuryuliana et al., 2024	Meta-analysis	mHealth (SMS, apps)	ANC adherence	OR = 2.94; strong evidence for LMICs
Rahman et al., 2022	Systematic review	One-way & two-way SMS	≥4 ANC visits	RR one-way = 2.14; two-way = 1.17

Table 2: Real-World Trials Evaluating mHealth Interventions to Improve ANC Attendance and Maternal Outcomes

Study	Location	Intervention	Outcome	Key Result
Jeddy, 2025	Underserved regions	Mobile app	≥4 ANC visits	78% intervention vs 52% control
Wagnew et al., 2025	Ethiopia	SMS + phone calls	ANC visits, low birth weight	Increased visits; reduced low birth weight
Mohamed et al., 2025	Multi-country	Mobile health adoption trends	ANC attendance	Usage rebounded post-COVID-19; shows sustainability

Table 3: Behavioral Insights on User Acceptability, Intention to Use, and Barriers of mHealth Interventions

Study	Location	Focus	Findings
Atinafu et al., 2023	Ethiopia	Intention to use mobile-based support	77.3% intended use; predictors: usefulness, trust, ease of use

III. DISCUSSION

i)Summary of Findings

This narrative review highlights that mHealth interventions ranging from SMS reminders and mobile apps to voice-based communication, significantly improve antenatal care (ANC) compliance. Meta-analyses and systematic reviews (Singh et al., 2023; Nuryuliana et al., 2024; Rahman et al., 2022) consistently report increased odds of attending the recommended number of ANC visits (OR/RR = 1.66–2.94). Original trials demonstrate real-world feasibility, showing higher ANC attendance, earlier booking, and improved maternal outcomes, such as reduced low birth weight (Jeddy, 2025; Wagnew et al., 2025). Behavioral studies indicate high acceptability among pregnant women, with perceived usefulness, trust, and ease of use being strong predictors of adoption (Atinafu et al., 2023).

ii)Comparison Across Studies

- Effectiveness: Systematic evidence demonstrates that interactive interventions (two-way SMS, app notifications) are generally more effective than one-way messaging in improving ANC attendance.
- Context-Specific Adaptations: Trials from Ethiopia, India, and underserved regions show that tailoring content to local language, literacy level, and cultural context increases compliance and engagement.
- Comprehensive Interventions: Interventions combining reminders, health education, and personalized follow-ups outperform single-component strategies.

iii)Behavioral and Sociocultural Considerations

- High acceptability of mHealth is noted, but barriers remain: digital literacy, smartphone access, internet connectivity, and socio-cultural constraints can limit effectiveness.
- Pregnant women often prefer interactive, user-friendly interfaces and culturally appropriate content.
- Family support and involvement of health workers enhance adherence and trust in the intervention.

IV. IMPLICATIONS FOR NURSING PRACTICE

- Nurses are central in implementing mHealth interventions by:
  - Educating pregnant women on using apps or SMS services
  - Providing follow-ups and monitoring engagement
  - Addressing technical or cultural barriers to use
- mHealth complements conventional ANC, enabling efficient monitoring, early detection of risk, and improved maternal education.

V. STRENGTHS AND LIMITATIONS

Strengths:

- Combines systematic evidence, real-world trials, and behavioral insights for a holistic perspective.
- Focus on recent studies (2020–2025) ensures relevance to current digital health trends.

Limitations:

- Heterogeneity of interventions and study settings may limit generalizability.
- Long-term maternal and neonatal outcomes are less frequently reported.
- Limited data from high-income countries; most evidence is from LMICs (Low Middle-Income Countries).

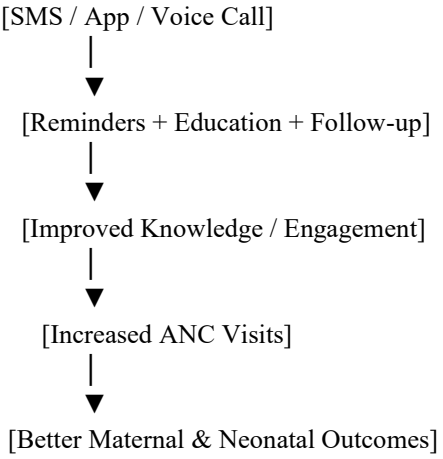
VI. RECOMMENDATIONS

- Future mHealth programs should be culturally sensitive, user-friendly, and accessible, including offline options where connectivity is limited.
- Integration into national maternal health policies and routine ANC workflows is essential for sustainability.
- Further large-scale, longitudinal studies are needed to assess long-term maternal and neonatal outcomes and cost-effectiveness.

VII. CONCLUSION

mHealth interventions are effective in improving ANC compliance. Evidence demonstrates increased attendance, earlier booking, and high acceptability. Nursing professionals are central to successful implementation. Addressing digital literacy, access, and socio-cultural barriers ensures sustainable impact.

Figure 1: Pathway of mHealth Interventions to ANC Compliance.



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