

# Enhancing Maternal and Neonatal Outcomes in Gestational Diabetes: A Literature Review of mHealth Interventions

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## ABSTRACT

This literature review evaluates the effectiveness of mobile health (mHealth) interventions in managing gestational diabetes mellitus (GDM), focusing on their potential to improve glycemic control, patient engagement, and postpartum type 2 diabetes (T2D). Findings indicate that mHealth apps like Habits-GDM and GDM-health enhance glycemic management and reduce neonatal complications but have limited success in managing gestational weight. While the Pregnant+ app increases health engagement, its effects on delivery outcomes and postpartum T2D are mixed. The research underscores the importance of integrated, continuous management to leverage mHealth in GDM care and highlights the Clinical Nurse Leaders' key role in integrating these technologies with traditional care to optimize GDM management. This literature review contributes to the dialogue on mHealth interventions' role in GDM care, advocating for a holistic approach that merges mHealth with standard practices to enhance health outcomes.

## BACKGROUND AND SIGNIFICANCE

GDM is a significant public health concern, affecting approximately 10% of pregnancies in the U.S. and 14% globally. With a 30% increase in prevalence from 2016 to 2021, particularly among women aged 40 and older, the urgency for effective management strategies cannot be overstated. Untreated GDM poses serious risks, leading to outcomes such as cesarean sections, miscarriage, and pre-eclampsia. Additionally, women with GDM are at a tenfold increased risk of developing T2D. These complications and the link between T2D and GDM highlight the urgency for effective management strategies with standard practice including lifestyle changes, glucose monitoring, and insulin, but challenges in engagement and follow-up care persist. mHealth interventions offer potential solutions by enhancing patient engagement and improving self-care and disease management.

## METHODS AND PICO

The evidence search was guided by the PICO statement: In pregnant women with gestational diabetes mellitus (GDM), how does the use of mobile health (mHealth) interventions (I) compared to traditional in-person care alone (C) affect self-care behaviors to improve maternal and neonatal outcomes (O)? The literature search was conducted using the PubMed database, employing "randomized control trial" and "gestational diabetes" as keywords, initially yielding 1,415 articles. Filtering for 'free full text', 'clinical', and from the last five years, narrowed results to 149. Incorporating 'mobile phone' refined the search to eight articles, of which five were excluded due to lack of relevance and quality. Expanding the search to include 'pregnancy', 'gestational diabetes', and 'mHealth' identified 13 articles, reduced to 11 after exclusions criteria. Ultimately, five high-quality articles were selected for review focusing on mHealth's role in enhancing self-care and outcomes in GDM management.

## EVIDENCE SUMMARY TABLE

Authors	Level of Evidence	Study Type	Sample Size	Methods	Results
Borgen et al. 2019	I/B	RCT	238	Pregnant+ app for managing GDM, offering dietary and exercise guidance.	No significant difference in 2-hour postpartum oral glucose tolerance test (OGTT) levels; increased health engagement.
Huang et al. 2021	I/B	RCT	309	Mobile health services during the peripartum period for GDM management.	Increased incidence of postpartum T2D in the intervention group; similar glycemic control postpartum.
Mackillop et al. 2018	I/B	RCT	206	GDM-health app for real-time blood glucose level (BGL) management.	Increased patient satisfaction, fewer preterm births and cesarean deliveries; no significant change in average BGL.
Slagle et al. 2022	II/B	Prospective	446	Mobile app for postpartum T2DM screening using fasting blood glucose (FBG).	High sensitivity and specificity for T2D screening; viable alternative to traditional methods.
Wei Yew et al. 2021	I/B	RCT	340	"Habits-GDM" app for tracking and managing dietary, activity, weight, and blood glucose levels.	Improved maternal glycemic management and reduced neonatal complications but did not significantly reduce excessive gestational weight gain (EGWG).

## SUMMARY AND CONCLUSIONS

- **mHealth Impact on GDM Management:**
  - Habits-GDM App and GDM-health System studies demonstrated improved glycemic management and reduced neonatal complications, emphasizing mHealth's role in enhancing care.
  - Pregnant+ App showed increased health engagement, underscoring the potential of mHealth to elevate patient involvement.
- **Challenges and Opportunities:**
  - Variability in addressing excessive gestational weight gain and postpartum T2D prevention points to the complexity of GDM management and the need for comprehensive approaches.
  - Increased postpartum T2D in some interventions highlights the necessity for sustained management strategies.
- **Integrated Care Approach:**
  - Effective GDM management requires blending mHealth solutions with traditional care, offering a holistic model that optimizes both glycemic control and maternal-neonatal health.

## IMPLICATIONS FOR PRACTICE

- **Enhanced Patient Engagement:** mHealth interventions enhance patient engagement in GDM management through active participation, education, and streamlined communication with healthcare providers, bolstering compliance, health literacy, and satisfaction while offering vital psychosocial support for improved well-being and adherence.
- **Improved Monitoring and Data Feedback:** mHealth facilitates real-time glycemic monitoring and feedback, significantly improving self-management and treatment adherence while generating data that informs evidence-based care improvements for a comprehensive, advanced, and patient-centered GDM care approach.
- **Continuous Care:** The need for ongoing management strategies, especially postpartum, highlights mHealth's potential to provide extended care beyond traditional care and clinical settings.
- **Clinical Nurse Leaders' Role:** CNLs are essential in integrating mHealth into GDM care, ensuring that digital health interventions complement traditional approaches, assessing outcomes for quality improvement, and promoting interdisciplinary collaboration for a holistic care model.

## ACKNOWLEDGEMENT

I would like to extend my sincere gratitude to Dr. Cory Stephens, DNP, MSN, RN, NI-BC, CPHIMS, FHIMSS, Assistant Professor in Informatics Nursing at the Department of Organizational Systems & Adult Health, for his invaluable guidance and feedback throughout the research and literature review process, and his support in my academic growth.

## REFERENCES

