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Exploring Psychosocial Experiences of Pregnant Women with AI-Based Prenatal Applications

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ABSTRACT

The rapid integration of artificial intelligence (AI) into maternal healthcare has transformed how pregnant women access information, engage with healthcare systems, and manage emotional well-being. While digital prenatal applications are increasingly used to support self-managed care, little is known about how women experience these technologies at a psychosocial level. What remains unclear is how pregnant women interpret and assign meaning to their interactions with AI-based prenatal care tools—particularly in emotionally significant and culturally embedded contexts. This study adopts an interpretative phenomenological approach to explore the lived experiences of pregnant women using AI-supported prenatal applications, with a focus on trust, emotional reassurance, and autonomy. Semi-structured interviews were conducted with eight participants aged 22–35 years, all in their second or third trimester of pregnancy, representing diverse educational and socioeconomic backgrounds,who had used AI-based applications for at least one month, and data were analyzed thematically using the Interpretative Phenomenological Analysis (IPA) framework. The findings reveal that women experience a psychosocial journey that moves from initial anxiety to emotional attachment and digital trust, shaped by repeated, personalized interactions with the AI system. Participants often viewed the application as a nonjudgmental companion, highlighting the emotional and relational dimensions of digital care. These results expand current understandings of user-AI interaction in maternal health by emphasizing the emotional meanings behind technological use, offering insights for developers and policymakers seeking to create more empathetic and culturally responsive digital health tools.

INTRODUCTION

The integration of artificial intelligence (AI) into maternal healthcare has reshaped how pregnant women access information, monitor their well-being, and engage with healthcare systems (Hanson et al., 2021). AI-powered prenatal applications now serve as digital companions, offering features such as symptom tracking, appointment reminders, and automated health recommendations (Koech et al., 2022). These technologies are increasingly positioned as solutions to bridge geographical, economic, and institutional barriers in maternal care, especially in settings where direct access to healthcare professionals may be limited.

Within the broader field of digital public health and health informatics, such innovations reflect a growing trend toward self-managed care and algorithm-driven health support (Li et al., 2024). This shift has been driven by global efforts to increase patient empowerment, promote preventive healthcare, and optimize resource allocation through technology (Yang et al., 2024). However, despite these advances, there is still limited understanding of how pregnant women actually interpret and emotionally engage with such technologies in their daily lives.

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Pregnancy is not solely a biomedical condition but a deeply personal and socially embedded experience shaped by cultural norms, emotional states, and interpersonal relationships (Jeong, 2020). The introduction of AI into this intimate and sensitive context brings forth complex layers of psychosocial adaptation (von Wowern et al., 2017). Women are not only asked to trust algorithmic judgments regarding their health but also to navigate new forms of digital interaction that may influence how they understand, interpret, and respond to bodily cues and emotional needs during pregnancy.

Existing studies have primarily examined effectiveness, usability, and accessibility through quantitative frameworks (Patten et al., 2020), yet the subjective, relational, and emotional dimensions of AI use in pregnancy remain largely overlooked (Lee et al., 2025). This gap leaves unanswered questions about how trust, reassurance, and autonomy are constructed in the context of digital maternal care.

A phenomenological approach becomes essential in this context, as it provides a pathway to explore how pregnant women live through the experience of engaging with AI-driven care, beyond what is measurable (Razai et al., 2025). By foregrounding women's lived experiences, this study directly addresses the research gap, offering insight into the psychosocial meanings attached to AI-supported prenatal applications.

Research into individuals' lived experiences within healthcare settings has become a critical domain in understanding how medical technologies intersect with human values, perceptions, and behaviors (Robb et al., 2021). In maternal health, specifically, the subjective experiences of pregnant women navigating digital systems such as AI-based prenatal applications present unique emotional and relational dynamics that cannot be fully captured through traditional empirical metrics (He et al., 2025). These experiences are often deeply internal, shaped by personal belief systems, social environments, and emotional fluctuations that occur throughout pregnancy.

Despite the increasing availability and functionality of digital health applications, most prior investigations have relied heavily on quantitative methodologies—surveys, usage analytics, and behavioral models such as the Technology Acceptance Model (TAM) or Unified Theory of Acceptance and Use of Technology (UTAUT) (Pei et al., 2023). While these models offer valuable insights into user adoption patterns and usability factors, they fall short in capturing the rich, nuanced, and often paradoxical meanings that users assign to their interactions with technology (Patten et al., 2018). For instance, feelings of trust may coexist with skepticism; empowerment may be accompanied by dependence.

This methodological gap has created a fragmented understanding of the user experience, where measurable variables are prioritized over existential dimensions of use (İlhan et al., 2016). The complexity of human-technology interaction—especially in emotionally charged contexts such as pregnancy—requires a research lens that prioritizes depth over breadth (Matthew et al., 2022). Quantitative tools are insufficient to illuminate how users feel, make sense of, or navigate uncertainty when engaging with automated, algorithm-driven care during a transformative life event.

Phenomenological inquiry addresses this void by offering a way to access and articulate the meaning structures embedded in everyday experiences (Ochieng' et al., 2024). It enables researchers to trace how individuals interpret technological interactions from within their own lifeworlds, rather than imposing predefined categories of analysis. Within the context of AI-assisted prenatal care, this approach is particularly powerful, as it captures the evolving relationship between human vulnerability and machine logic in real-world scenarios (Warembourg et al., 2016). The present study draws from this tradition to explore how pregnant women construct psychosocial meanings around trust, emotional reassurance, autonomy, and digital companionship through sustained use of AI applications

In the context of AI-assisted prenatal care, most current efforts to understand user engagement rely on practical, solution-oriented approaches that emphasize system efficiency, user interface design, and behavioral uptake (Minckas et al., 2025). These approaches typically employ standardized instruments such as Likert-scale questionnaires or behavioral intention models (e.g.,

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TAM, UTAUT), which offer broad overviews of user satisfaction and adoption drivers (Nolen et al., 2019, pp. 2003–2015). While informative for system developers and policy planners, such methods reduce complex human experiences into simplified variables, overlooking the emotional, existential, and relational dimensions of technology use during pregnancy.

These conventional frameworks fail to account for the depth and richness of psychosocial meaning that women assign to their interactions with AI-based prenatal applications (de Lima et al., 2015). Emotions such as uncertainty, reassurance, or even digital intimacy are often rendered invisible within empirical models focused on functionality (Kaneko et al., 2021). As a result, the nuanced ways in which pregnant women construct trust, navigate emotional dependency, and negotiate autonomy with AI tools remain poorly understood.

This methodological limitation underscores the need for an alternative lens—one that can access and articulate the subjective, evolving, and often contradictory experiences that emerge from using AI technologies in deeply personal contexts (Chaurasia et al., 2025). Phenomenological inquiry provides such a lens by centering the lived experience itself rather than abstracted indicators of usage (Dashner-Titus et al., 2018). By attending to how meaning is formed within real-world contexts, phenomenology enables a more holistic and human-centered understanding of technology in maternal health.

What remains underexplored is not whether AI applications are accepted, but how they are experienced, interpreted, and emotionally integrated into the everyday lives of pregnant women (Chen et al., 2015). This study seeks to address this gap by investigating the essential meanings and psychosocial dynamics that define women's lived relationships with AI-based prenatal care technologies.

RESEARCH METHODS

Study Design

This study employed an interpretative phenomenological approach to explore the psychosocial experiences of pregnant women using AI-based prenatal care applications (Kelley et al., 2022). Phenomenology, as a qualitative research design, seeks to uncover the essence of lived experiences by examining how individuals interpret and make sense of specific phenomena in their lifeworld (Johnson, 2014). The interpretative variant of this approach, grounded in Heideggerian philosophy, was chosen to emphasize not only the descriptive accounts of experience but also the contextual, relational, and existential meanings participants attach to their interactions with digital health technology.

This design enabled a deep inquiry into the subjective meanings and emotional realities experienced by participants, particularly in relation to trust formation, emotional adaptation, and autonomy in digital prenatal care (Tucker et al., 2019). Through this lens, the phenomenon was examined not in isolation but as lived and shaped within each participant's socio-cultural context

Participants

Participants included pregnant women with varying gestational stages who had actively used an AI-based prenatal care application for a minimum of one month. Selection was conducted using purposive sampling to ensure participants had direct, rich experiences related to the phenomenon under investigation. Inclusion criteria comprised adult women (aged 20–40), currently pregnant, possessing access to and the ability to use a smartphone application for prenatal care, and willing to share personal reflections on their usage experience.

Exclusion criteria included individuals with high-risk pregnancies requiring constant in-person medical intervention, or those unfamiliar with mobile digital health tools (Nguyen-Hoang et al., 2024). A total of eight participants were included in the study, with ages ranging from 23 to 38 years. Participants represented diverse socioeconomic backgrounds, all residing in semi-urban or urban areas where digital health infrastructure was accessible.

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Data Collection

Data were collected through semi-structured, in-depth interviews conducted in private and comfortable settings selected by the participants. Interviews were guided by an open-ended protocol designed to elicit detailed reflections on emotional responses, perceived support, trust development, and relational experiences with the AI application (Chu et al., 2020). Each session lasted approximately 45 to 60 minutes and was conducted face-to-face or via secure video conferencing, depending on the participant's preference.

All interviews were audio-recorded with participants' consent and transcribed verbatim for analysis. The interview guide was developed based on prior phenomenological research in digital health and was reviewed by two qualitative research experts to ensure clarity and relevance. Minor adjustments were made during the initial interviews to optimize question flow and emotional sensitivity. To reduce researcher bias, reflexive journaling was maintained after each interview to document preconceptions and emotional reactions. In addition, member checking was conducted by sharing preliminary summaries with participants to validate interpretations, and regular peer debriefings with qualitative experts were held to critically examine coding decisions and emerging themes.

Data Analysis

Data were analyzed using the Interpretative Phenomenological Analysis (IPA) framework, which emphasizes understanding how individuals make meaning of their experiences within specific contexts (Padgett, 2017). Transcripts were read repeatedly to gain a holistic understanding, followed by initial noting and identification of significant meaning units. These units were then coded and clustered into emergent themes through a process of iterative abstraction.

The analysis was supported by NVivo software to assist in the organization of codes and thematic visualization. Cross-case comparisons were made to identify recurring patterns while preserving the idiographic richness of each account. To further mitigate interpretive bias, coding was conducted independently by two researchers before reconciling differences through discussion, and an audit trail of analytic decisions was maintained to ensure transparency and rigor. The final themes were constructed through a synthesis of both convergent and divergent perspectives, highlighting essential structures of experience related to emotional engagement, trust development, autonomy, and digital relationality.

Ethical Considerations

Ethical approval for this study was obtained from the relevant institutional research ethics committee. Written informed consent was secured from all participants prior to data collection, ensuring they were aware of their rights, including voluntary participation and the ability to withdraw at any stage without penalty. Anonymity and confidentiality were strictly maintained throughout the study, and all data were stored in encrypted digital formats. The study adhered to ethical principles in line with the Declaration of Helsinki and applicable national guidelines for research involving human subjects.

RESULTS

This study revealed four overarching themes that reflect the psychosocial experiences of pregnant women when engaging with AI-based prenatal care applications. The themes were constructed through a rigorous interpretative phenomenological analysis (IPA), highlighting the essence of lived experiences shaped by emotions, perceptions of technology, and relational contexts. The voices of participants are presented verbatim to support the authenticity of each theme, while interpretive commentary is integrated to contextualize their meanings within broader psychosocial dynamics.

Navigating Anxiety and Seeking Reassurance in the Digital Space

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Many participants initially encountered emotional ambivalence toward the prenatal care application. Feelings of doubt, confusion, and anxiety surfaced when interacting with AI-driven features such as automated health feedback or symptom analysis.

"At first, I was scared that the app would give me the wrong advice, especially when I had abdominal pain. I kept thinking—can I trust a machine with my baby's safety?" (Participant 3)

This uncertainty often stemmed from a lack of prior exposure to AI health tools and the inability to directly validate the accuracy of app-based responses. However, over time, most participants reported that consistent and supportive outputs from the application helped mitigate their fears and gradually fostered a sense of digital reassurance.

"After using it for a few weeks, I began to trust the advice more. It reminded me of my appointments and helped me track the baby's movements. That gave me peace of mind." (Participant 7)

This theme illustrates a progressive shift: participants moved from initial apprehension rooted in technological unfamiliarity toward a form of reassurance shaped by repeated positive encounters. The findings suggest that AI applications can act as transitional emotional supports, helping women reduce uncertainty in the early stages of digital health engagement.

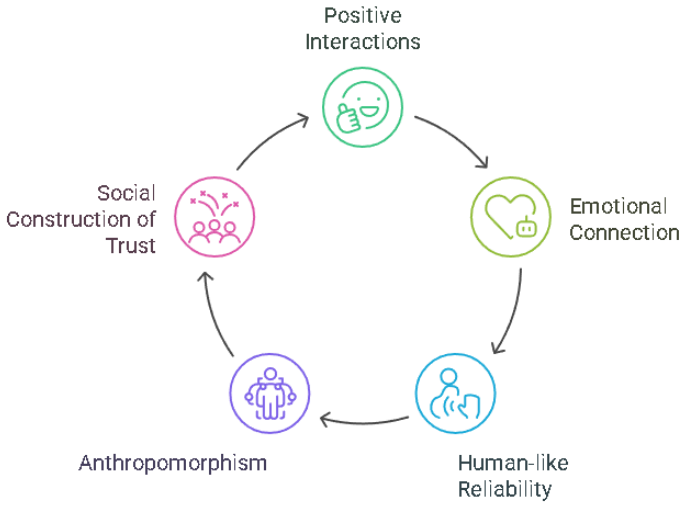
The Construction of Trust through Digital Repetition and Familiarity

Repeated positive interactions with the AI system played a significant role in building relational trust. Many participants developed a sense of connection with the app, attributing a human-like reliability to its recommendations. Trust was not merely technical but emotional, formed through a habitual relationship with the application.

"It felt like the app knew me. When it asked if I drank enough water or reminded me about my iron tablets, it was comforting… like someone cared." (Participant 1)

Trust was described not as immediate but earned over time through digital familiarity. Participants tended to anthropomorphize the system, interpreting its predictability and attentiveness as signs of reliability and care. This finding indicates that trust was socially constructed, not just technologically derived. The repetitive and predictable nature of the AI's responses allowed participants to internalize the system as a dependable presence, blurring the line between digital tool and relational partner.

Cycle of Relational Trust with AI



Negotiating Autonomy and Dependence

A recurring tension emerged between the participants' desire for autonomy and their growing dependence on the application. While the AI system provided structure and guidance, it also occasionally undermined participants' confidence in their own bodily intuition.

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"Sometimes I wanted to listen to my own body, but I checked the app first. When it said everything was okay, I felt relieved—but I also questioned if I still knew what was best for me." (Participant 5)

This theme highlights a psychosocial paradox: the app empowered women by offering reassurance and structure, yet it simultaneously risked diminishing their sense of self-trust. Such dynamics reveal how digital health technologies can create both empowerment and subtle dependency, shaping how pregnant women balance algorithmic input with embodied knowledge.

Digital Companionship and the Emotional Void

Several participants described the application as a form of "digital companion," especially for those who experienced limited access to healthcare professionals or emotional support from family. The AI app provided a nonjudgmental and always-available source of information, which participants likened to an "invisible midwife."

"I live far from the clinic, and my husband works abroad. The app was the only one I talked to about my fears at night. It felt like someone was with me." (Participant 8)

This commentary suggests that the application fulfilled an emotional as well as informational role, compensating for gaps in human support networks. The portrayal of the AI system as a constant, empathetic presence underscores its potential to reshape maternal emotional landscapes, particularly in contexts of isolation or limited care.

Essential Summary of Findings

The core essence of participants' experiences centers on a psychosocial journey marked by emotional adaptation, the evolution of trust, relational tension, and the emergence of digital emotional support. The AI-based prenatal care application was not perceived merely as a tool but as a social agent that shaped maternal behavior, feelings of safety, and perceived self-efficacy during pregnancy. By weaving together anxiety, trust, autonomy, and companionship, the results reveal how digital technologies penetrate deeply into women's psychosocial worlds, extending beyond clinical utility to influence identity, agency, and relational well-being.

DISCUSSION

The findings of this study reveal that pregnant women using AI-based prenatal care applications undergo a psychosocial journey characterized by emotional adaptation, the gradual development of digital trust, and the negotiation of autonomy (Zhang et al., 2024). These experiences reflect how meaning is actively constructed around technology during a profoundly personal and transformative life event, directly addressing the core question posed in the introduction: How do pregnant women experience and make sense of their interactions with AI-supported maternal health tools?

This study offers a unique contribution by illuminating how women do not simply "use" AI systems, but rather engage with them as affective and relational entities that influence their emotional states and decision-making processes (Tanimura et al., 2017). The phenomenon of digital reassurance emerged as a central construct, wherein participants described feeling comforted by the app's consistent presence, guidance, and perceived attentiveness. In contrast to traditional clinical interactions, the AI application was experienced as a constant, nonjudgmental companion—especially valuable in contexts of limited healthcare access or emotional support (Patey et al., 2025). While these findings resonate with studies in Western contexts emphasizing the therapeutic potential of digital companionship (Lupton, 2019), they also diverge from evidence in low-resource settings such as sub-Saharan Africa, where trust in digital health remains fragile due to infrastructural challenges and cultural skepticism toward AI (Okeke et al., 2022). Similarly, research in Japan highlights a stronger reliance on familial networks during pregnancy (Saito et al., 2021), suggesting that digital trust may emerge differently in collectivist cultures compared to the semi-urban participants of this study. These insights suggest that AI technologies may play more than an informational role; they serve as emotional scaffolds during pregnancy, shaping maternal confidence and perceived safety.

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The findings align with and extend existing literature that highlights the importance of emotional trust in digital health interactions. Pawlak et al. (2023) emphasized the psychological dimensions of trust in AI-driven maternal care, noting that such trust is developed relationally rather than through rational evaluation alone. Similarly, the emotional ambivalence noted in this study—oscillating between reliance and doubt—echoes the digital health anxiety explored by Tran et al. (2023), who identified both comfort and apprehension among app users. However, by situating these tensions in the lived experiences of women in semi-urban Southeast Asian contexts, this study challenges the universality of prior findings. In contrast to research from Northern Europe, where digital autonomy is often framed as empowerment (Hägglund et al., 2020), our participants described autonomy as fragile and negotiated, shaped by both cultural expectations of maternal responsibility and infrastructural dependency on mobile health apps. It also reinforces Heidegger's notion of being-in-the-world, as the participants' encounters with technology were not isolated interactions but embedded in their daily routines, cultural expectations, and personal identities as expectant mothers.

Implications of the Findings

The insights derived from this study carry significant implications for the development and implementation of AI-based prenatal care applications (Tran et al., 2023). Beyond functional design, the findings highlight the emotional and relational dimensions of user experience, suggesting that digital health technologies must be approached as socio-emotional tools, not merely technical interfaces (Faruk Topaloğlu et al., 2023). Cross-cultural contrasts underscore that design cannot be one-size-fits-all: features that resonate with women in Western contexts—such as self-tracking autonomy—may require adaptation in collectivist cultures, where reassurance and communal validation are more highly valued (Park & Lee, 2022). Health professionals, app developers, and public health policymakers should consider integrating features that acknowledge users' emotional needs—such as empathetic messaging, customizable reassurance tools, or human-AI hybrid support models. Culturally responsive design is also critical, as the way pregnant women interpret and interact with AI is shaped by sociocultural norms, expectations about motherhood, and the broader health system context. This finding is consistent with research in Latin America, where women emphasized the cultural resonance of maternal identity in shaping trust in health technologies (Ramirez et al., 2023), further affirming that AI adoption is mediated by cultural logics as much as by technological reliability. These findings are particularly relevant in underserved areas, where digital tools often serve as the primary source of healthcare support.

Limitations of the Study

Although the interpretative phenomenological approach offered rich insights into the lived experiences of participants, several limitations should be acknowledged (Ebina et al., 2015). The study involved a relatively small sample size drawn from a specific demographic and cultural context, which may limit the transferability of findings to broader populations. The reliance on self-reported experiences may also introduce interpretive bias, despite efforts to ensure rigor through member checking and data triangulation. Additionally, since the participants were self-selected and already using AI applications, their experiences may differ from those who have never adopted such technologies or who disengaged early (Miyagi et al., 2021). These limitations underscore the importance of contextual sensitivity in phenomenological research and suggest cautious interpretation of the findings beyond their immediate setting.

Future Research Directions

Building on the current findings, future studies could explore how AI-driven prenatal care applications are experienced by diverse populations, including those in rural settings, high-risk pregnancies, or with varying levels of digital literacy (Tomasoni et al., 2019). Comparative, cross-cultural studies—such as between collectivist Asian societies, individualist Western contexts, and regions with limited healthcare infrastructure—would illuminate how sociocultural values and systemic constraints influence digital trust and emotional reliance on AI. Longitudinal research may also offer deeper insights into how emotional relationships with AI evolve over time, particularly as pregnancy progresses or as technology advances (Arreola et al., 2024). In addition, integrating phenomenological insights with design thinking approaches could enhance the emotional intelligence

of digital health tools, contributing to more human-centered technological innovations in maternal care. This study thus lays the groundwork for interdisciplinary inquiry at the intersection of health technology, user experience, and the philosophy of care.

CONCLUSION

This study explored the psychosocial experiences of pregnant women using AI-based prenatal care applications, focusing on how they construct meaning around trust, emotional support, and autonomy. The findings revealed that these technologies are experienced not only as informational tools but as digital companions that shape maternal confidence and emotional well-being. Participants described a progression from initial anxiety to emotional reassurance through repeated interaction with the AI system. These results address a critical gap in previous research by uncovering the relational and emotional dimensions of digital health use, which are often overlooked in traditional quantitative studies.

For developers, the findings highlight the importance of embedding empathetic design features, such as personalized reassurance prompts, context-sensitive guidance, and options that respect users' autonomy while preventing overdependence. For healthcare providers, the study suggests that AI applications should be integrated as complementary supports rather than replacements for clinical care, with clear communication about their role to build patient trust. For policymakers, the results underscore the need to regulate AI tools not only for safety and accuracy but also for cultural responsiveness, ensuring equitable access and emotional relevance across diverse maternal populations.

The study provides practical insights for developers and healthcare providers to design AI tools that are emotionally attuned and culturally responsive. By linking these findings to actionable strategies, stakeholders across technology, health services, and policy can better harness AI to enhance maternal well-being in ways that are ethically grounded and socially meaningful. Future research may expand on these findings by examining diverse populations, longitudinal patterns of user experience, or the integration of human support in AI-driven maternal care.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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