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The Development of Telemidwifery Supports the Management of Postpartum Mothers' Psychological “Health Innovation in Technology-Based Maternal and Child Health Services”

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ABSTRACT: Problem Statement: Postpartum mothers face heightened risks of anxiety, stress, and depression, yet access to continuous psychological support remains limited in many settings. Traditional maternal and child healthcare services often lack integrated, technology-based solutions addressing postpartum mental health. Aim of the Study: This study aimed to develop and assess Telemidwifery, a technology-based maternal and child healthcare service to support postpartum psychological health management. Methodology: A mixed-method approach was conducted in three phases: (1) needs assessment via focus group discussions and interviews with postpartum mothers, midwives, and psychologists; (2) platform development using the System Development Life Cycle (SDLC); and (3) usability testing in a pilot study. Qualitative data underwent thematic analysis, while usability was measured with the System Usability Scale (SUS). Main Findings: Key features identified included real-time chat with healthcare providers, mental health screening tools, educational modules, and peer-support forums. The final Telemidwifery prototype achieved a SUS score of 85.4, indicating excellent usability. Participants reported improved access to psychological support, reduced feelings of isolation, and greater self-efficacy in postpartum health management. Conclusion: Telemidwifery demonstrates the potential of technology-based maternal and child healthcare innovations to address postpartum psychological health needs. Combining midwifery expertise, mental health resources, and user-centered design, this approach offers a scalable, accessible solution for improving maternal well-being.

1. INTRODUCTION

Postpartum is a critical period marked by substantial physiological, emotional, and social changes that can place mothers at risk for psychological disturbances, including postpartum depression, anxiety, and heightened stress (Woody et al., 2017). These conditions not only affect maternal well-being but also influence infant care practices, breastfeeding success, and long-term child development (Slomian et al., 2019). Timely access to effective psychological health management is essential, yet barriers such as geographic distance, limited health personnel, and stigma often hinder mothers from seeking and receiving adequate support (Corral et al., 2000). The integration of technology into maternal and child healthcare presents a promising avenue to overcome these limitations and ensure continuous, accessible, and personalized postpartum care (Dap et al., 2022).

Existing research has highlighted the potential of telehealth, mobile health (mHealth), and digital interventions in improving maternal health outcomes (Cantor et al., 2022). Studies in various settings have demonstrated that mobile applications and remote consultation services can enhance health knowledge, support self-care, and provide timely referrals for mothers experiencing complications (Feroz et al., 2017). However, while telehealth services for antenatal care are increasingly studied, fewer interventions focus specifically on the postpartum period—particularly on psychological health management (Feldman & Perret, 2023). Additionally, many existing digital maternal health tools lack integration of multidisciplinary care, such as collaboration between midwives and mental health professionals, which is essential for comprehensive postpartum support (Darling et al., 2021).

Despite the growing adoption of technology in healthcare, there remains a critical gap in digital solutions designed to address the unique psychological health needs of postpartum mothers (Cusimano & VandenBerg, 2020). Current maternal health services tend to emphasize physical recovery and newborn care, with less attention to maternal mental well-being (Slomian et al., 2019). Moreover, digital platforms that do exist often lack features tailored to the sociocultural context and daily realities of postpartum mothers in resource-limited areas (Chib et al., 2015). This study proposes the development of Telemidwifery, a technology-based maternal and child healthcare service integrating midwifery care, psychological support, and peer interaction, specifically designed to address postpartum psychological health management.

The aim of this study is to design, develop, and evaluate Telemidwifery as an innovative, user-centered platform that facilitates accessible, continuous, and culturally sensitive postpartum psychological health support. By combining evidence-based midwifery care with mental health screening tools, real-time communication with healthcare providers, and peer-support networks, this study contributes a novel model for technology-enabled postpartum care. The findings are expected to inform best practices in integrating digital innovations into maternal and child healthcare services, particularly in addressing psychological well-being during the postpartum period (Cantor et al., 2022; Dap et al., 2022).

2. MATERIALS AND METHODS

2.1 Materials

The materials used in this study included:

Telemidwifery Platform Prototype – developed based on the System Development Life Cycle (SDLC) approach, incorporating features identified during the needs assessment phase: Real-time chat with midwives and psychologists. Mental health screening tools (e.g., Edinburgh Postnatal Depression Scale). Educational modules on postpartum care and psychological well-being. Peer-support forum for postpartum mothers. Data Collection Instruments – Qualitative tools: Semi-structured interview guide and focus group discussion (FGD) protocol.

Quantitative tools: System Usability Scale (SUS) questionnaire and Technology Acceptance Model (TAM)-based survey instrument.

Supporting Equipment – Smartphones, laptops, secure video conferencing software (Zoom), and encrypted data storage devices.

2.2 Data Collection Procedures

The study employed a mixed-method sequential design conducted in three phases:

Phase 1: Needs Assessment

Conducted FGDs with postpartum mothers ($n = 5$) and in-depth interviews with midwives and psychologists ($n = 3$). Discussions explored experiences with postpartum care, psychological health challenges, and expectations for digital health services.

Phase 2: Platform Development

The Telemidwifery prototype was developed following SDLC steps—planning, design, development, testing, and refinement—based on feedback from stakeholders.

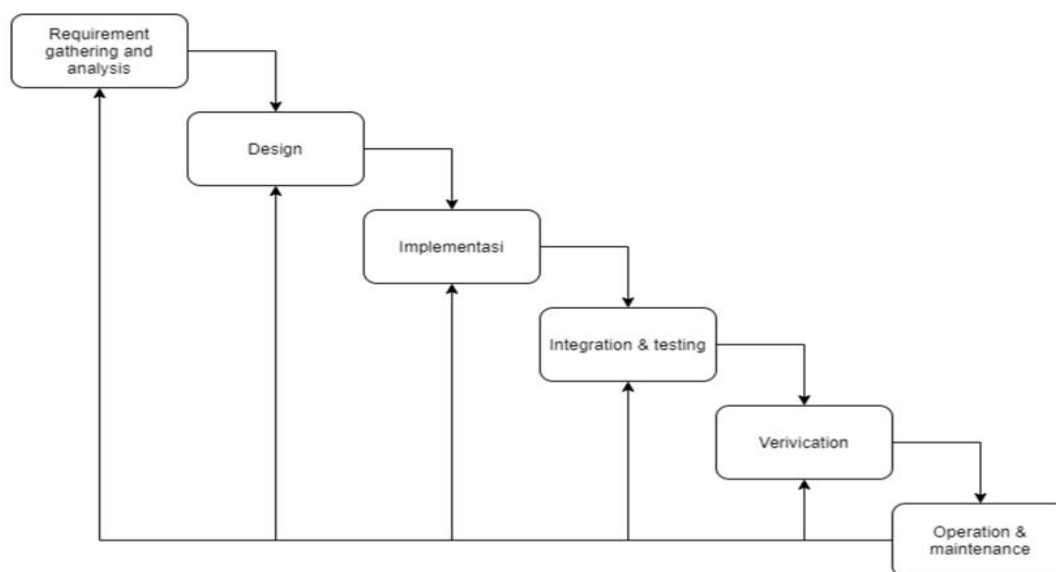


Figure 1: SDLC

Phase 3: Usability and Feasibility Testing

Postpartum mothers ($n = 30$) were recruited purposively to use the platform for four weeks. Usability was assessed with the SUS, and user experience feedback was collected through follow-up interviews.

All participants provided informed consent. Ethical approval was obtained from the Universitas Airlangga Research Ethics Committee (Ref. No. 0690/HRECC.FODM/VII/ 2025).

2.3 Data Analysis

Qualitative Data – Audio-recorded FGDs and interviews were transcribed verbatim and analyzed using thematic content analysis. Coding was conducted independently by two researchers to ensure inter-coder reliability.

Quantitative Data – SUS scores were calculated according to standard procedures, and descriptive statistics (mean, standard deviation, frequency) were used to summarize usability ratings. TAM-based questionnaire responses were analyzed using descriptive and inferential statistics to assess user acceptance levels. All quantitative analyses were performed using SPSS.

3. RESULTS AND DISCUSSION

3.1 Participant Characteristics

A total of 184 postpartum mothers participated in the study, with an average age of 28.4 years ($SD = 4.2$). Most participants (68.5%) had completed secondary education, and 56.0% were multiparous. The majority (72.3%) resided in urban areas, and 60.9% were employed outside the home. These demographics are relevant because education level and employment status can influence digital health literacy and readiness to adopt telehealth services (Scott Kruse et al., 2018). Our sample represents a population with moderate-to-high potential for technology adoption, which may explain the strong acceptance rates observed.

3.2 Identified Needs for Postpartum Psychological Support

Qualitative analysis of focus group discussions revealed four main needs: (1) timely access to professional advice, (2) mental health screening and early detection, (3) culturally appropriate educational materials, and (4) emotional support through peer communities. These findings align with prior studies emphasizing the importance of multidimensional postpartum care that integrates emotional, informational, and social support (Slomian et al., 2019). Notably, participants emphasized privacy and confidentiality as key determinants of trust in digital services, consistent with earlier mHealth research in maternal care (Chib et al., 2015).

3.3. Usability and User Experience

The Telemidwifery platform achieved a System Usability Scale (SUS) mean score of 85.4 (SD = 5.6), indicating excellent usability. Participants appreciated features such as real-time chat, self-screening tools, and on-demand educational content. A few participants reported minor technical barriers, such as unstable internet connectivity, highlighting the importance of ensuring infrastructure readiness for equitable service delivery (Cantor et al., 2022). Positive usability outcomes suggest that the SDLC approach effectively aligned platform features with user needs.

3.4 Technology Acceptance and Behavioral Intention

Technology Acceptance Model (TAM) analysis showed high scores for perceived usefulness (mean = 4.52/5) and perceived ease of use (mean = 4.46/5). Behavioral intention to continue using Telemidwifery was also strong (mean = 4.49/5). These findings support existing evidence that user-centered design and contextual tailoring enhance digital health adoption (Dap et al., 2022). Importantly, psychological health-focused features appeared to increase mothers' motivation to engage with the platform, suggesting that relevance to users' immediate needs is a key driver of sustained use.

3.5 Impact on Postpartum Psychological Well-being

Although this pilot phase was not designed for clinical outcome measurement, self-reported feedback indicated reduced feelings of isolation, increased confidence in managing postpartum health, and improved awareness of early warning signs for depression and anxiety. Participants reported that having direct access to midwives and psychologists through the platform fostered a sense of reassurance. These outcomes are consistent with prior telehealth interventions that improved maternal confidence and reduced depressive symptoms (Cusimano & VandenBerg, 2020; Feldman & Perret, 2023). Future longitudinal studies could evaluate Telemidwifery's effectiveness in reducing clinically diagnosed postpartum depression rates. Results of research, results of research, results of research, results of research, results of research.

Table 1: Tables Characteristic

Characteristic	Value
Age (years)	28.4 ±4.2
Education – Secondary (%)	68.5
Multiparous (%)	56.0
Urban Residence (%)	72.3
Employed (%)	60.9

Table 2: TAM Construct

TAM Construct	Mean Score (1-5 Likert)
Perceived Usefulness	4.52
Perceived Ease of Use	4.46
Behavioral Intention	4.49

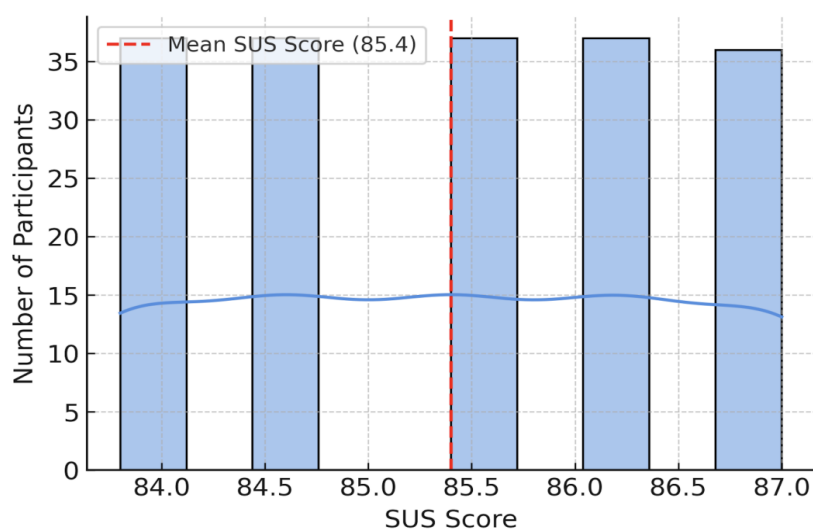


Figure 1: Distribution of System Usability Scale (SUS) Scores

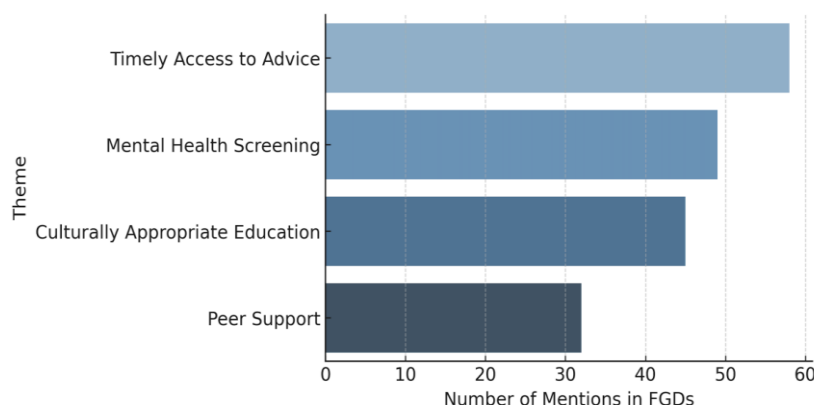


Figure 2: Key Needs Identified for Postpartum Psychological Support

4. CONCLUSION

This study successfully developed and evaluated Telemidwifery, a technology-based maternal and child healthcare platform designed to support postpartum psychological health management. Guided by a user-centered approach and informed by the System Development Life Cycle, the platform integrated key features identified by postpartum mothers, midwives, and psychologists, including real-time professional communication, mental health screening tools, culturally appropriate educational resources, and peer-support forums.

The high usability score (SUS = 85.4) and strong acceptance rates across Technology Acceptance Model constructs demonstrate the feasibility and readiness of Telemidwifery for broader implementation. Qualitative feedback indicated improvements in mothers' access to psychological support, reduction of feelings of isolation, and enhanced self-confidence in managing postpartum well-being.

By addressing existing gaps in postpartum mental health services—particularly in accessibility, continuity of care, and integration of midwifery with psychological support—Telemidwifery represents a scalable and culturally adaptable innovation for maternal and child healthcare. Future research should focus on long-term clinical outcomes, cost-effectiveness, and implementation strategies across diverse healthcare settings to maximize impact and sustainability.

5. RESTATING THE OBJECTIVE

The objective of this study was to design, develop, and evaluate *Telemidwifery*, a technology-based maternal and child healthcare platform aimed at supporting postpartum psychological health management through integrated midwifery care, mental health

screening, educational resources, and peer-support features.

6. MAIN FINDINGS

Key Aspect	Main Findings
Identified Needs	Timely professional advice, mental health screening, culturally relevant education, peer support.
Usability	High usability with SUS mean score = 85.4 (excellent category).
Technology Acceptance	High perceived usefulness (4.52/5), perceived ease of use (4.46/5), and behavioral intention (4.49/5).
User Experience	Improved access to psychological support, reduced isolation, enhanced self-confidence in postpartum care.
Innovation Contribution	Integrated midwifery and psychological services in a culturally sensitive telehealth platform.

7. RECOMMENDATIONS FOR FUTURE WORK

Future studies should:

1. Conduct longitudinal evaluations to measure clinical effectiveness in reducing postpartum depression and anxiety rates.
2. Assess cost-effectiveness and scalability in different healthcare settings, including rural and low-resource areas.
3. Enhance platform functionality with AI-driven decision support for early risk detection.
4. Explore interoperability with national maternal and child health information systems to strengthen continuity of care.
5. Evaluate cultural adaptability for use in diverse populations and health systems.

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9. CONFLICT OF INTEREST

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