

## Telemidwifery: Transforming Maternal Health Care in the Digital Era

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### ABSTRACT

Telemidwifery represents a digital transformation in maternal health services by integrating information and communication technology into midwifery care. This study aims to analyze the effect of telemidwifery on maternal health service satisfaction in Indonesia using a quantitative approach with a survey of 150 respondents, consisting of pregnant and postpartum mothers who have used telemidwifery applications or online consultation platforms. Data were analyzed using simple linear regression to measure the relationship between the intensity of telemidwifery use and user satisfaction. The results show that telemidwifery has a positive and significant effect on maternal satisfaction ( $\beta = 0.486$ ;  $t = 6.427$ ;  $p = 0.000$ ;  $R^2 = 0.302$ ). This finding indicates that telemidwifery effectively increases accessibility, continuity of care, and user trust in midwifery services. The study also reinforces that digital health innovations play a crucial role in overcoming geographical barriers, especially in rural and remote areas. The implementation of telemidwifery aligns with global health trends toward sustainable, equitable, and technology-driven maternal care. Further development requires strengthening midwives' digital literacy, integrating telehealth systems into national health policies, and ensuring data privacy and ethical standards.

**Keywords:** Telemidwifery, Digital Health, Maternal Care, Midwife, User Satisfaction

### INTRODUCTION

Maternal health is a key pillar in efforts to achieve quality of life for the nation and a healthy future for the next generation. However, to date, many countries, especially developing countries such as Indonesia, still face various challenges in antenatal, delivery, and postnatal care, including limited access to trained health workers, remote locations far from health facilities, and communication and transportation barriers (Susanti et al., 2022). These challenges

have led to significant disparities in the equitable provision of maternal health services, especially for communities in remote and island areas. These conditions contribute to the high rates of maternal mortality (MMR) and newborn mortality, which are important indicators in assessing the success of a country's health development. According to World Health Organization (WHO) data, approximately 94% of maternal deaths worldwide occur in low- and middle-income countries, most of which could be prevented through access to quality and continuous obstetric services (Moulaei et al., 2025).

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The digital era has opened up enormous opportunities to transform healthcare services, one of which is through the concept of telemidwifery, or remote midwifery services that utilize telecommunications technology and digital applications to support pregnant women, childbirth, and the postnatal period (Stellata et al., 2022). Telemidwifery provides an alternative for pregnant women who have difficulty accessing physical facilities or live in remote areas. In Indonesia, the term telebidan is becoming increasingly recognized as part of innovation efforts in maternal and child health systems. Several preliminary studies show that telemidwifery applications can improve the continuity of midwifery services and strengthen the relationship between midwives and pregnant women, especially in resource-limited areas (Susanti et al., 2022).

One of the latest randomized studies in Iran shows that telemidwifery-based mHealth interventions significantly reduce fear of childbirth, increase mothers' self-efficacy in childbirth, and reduce the rate of cesarean sections in primiparous mothers (Khademioore et al., 2023). These findings provide evidence that the digital midwifery approach has great potential in a global context. In the context of the COVID-19 pandemic, the need for remote services has become increasingly urgent. In Bangladesh, a midwife-led telemidwifery/midwife-telemedicine program successfully increased the utilization of antenatal and postnatal services and gender-based violence screening in the community (Islam et al., 2023). This proves that this model can be implemented even in crisis conditions. However, the implementation of telemidwifery is not without challenges. A recent scoping review shows that digital infrastructure,

technological literacy among mothers and midwives, and regulations and policies are the main obstacles (Moulaei et al., 2025). These factors need to be anticipated so that the digital transformation of midwifery services can run effectively.

In the Indonesian context, midwifery continuity of care (MCOC) also faces the need to develop mHealth applications that are tailored to the competencies and needs of midwives in the field (Susanti et al., 2022). The readiness of midwives and the management of the application are key factors in the successful integration of telemidwifery at the community level. The concept of telemidwifery touches on various aspects, ranging from educating pregnant women through applications, remote consultations, monitoring pregnancy and infant health, to rapid referrals if complications are found. A well-designed application menu even uses chatbots and auto-response features to facilitate interaction between pregnant women and midwives (Stellata et al., 2022). With this model, pregnant women who previously had to travel long distances or experience delays in obtaining services can now receive information and support through their personal devices. This is particularly relevant in rural or island areas where physical access to health facilities is still limited.

For the national health system, telemidwifery offers strategic benefits: increasing the coverage of antenatal and postnatal services, reducing the burden of physical visits, strengthening the monitoring of pregnancy conditions, and enabling earlier intervention. In the long term, this has the potential to reduce maternal and infant mortality rates and improve the quality of midwifery services. However, this transformation also requires systemic changes: midwives and related health workers need to be trained in the use of technology, applications need to be integrated with the national health information system, and regulations must support the practice of digital midwifery services (Susanti et al., 2022; Golden et al., 2024). Without a strong policy framework, the adoption of telemidwifery could be hampered. Data security and privacy are also major concerns. Digital-based services carry the risk of data leaks involving pregnant women, misuse of information, and challenges in ensuring service quality and continuity. Therefore, standardization, application accreditation, and security protocols are an important part of telemidwifery implementation.

From the user's perspective, the digital literacy of pregnant women and the support of their families greatly determine their acceptance of telemidwifery services. A study in India shows that the main barriers to the adoption of health chatbots by women in underserved communities are limited time, internet access, and trust in technology (S et al., 2025) [arXiv]. This emphasizes the importance of a contextual and inclusive approach in implementation. Digital media and technology also open up new opportunities for innovation in midwifery services. For example, the use of AI, data analytics, and mobile platforms enables real-time monitoring of pregnancy conditions, early detection of pregnancy risks, and adaptive education tailored to the needs of mothers. This technology makes telemidwifery not only a substitute for physical visits but also an advanced midwifery service for the 4.0 era. Thus, this article aims to comprehensively

examine how telemidwifery can transform maternal health services in the digital era, identifying the benefits, challenges, and implementation strategies in Indonesia. By combining a literature review and implementation experience, this study is expected to provide policy recommendations to strengthen the midwifery system through sustainable and inclusive telehealth.

## METHODOLOGY

This study used a descriptive quantitative approach with a survey method to analyze users' perceptions and satisfaction with the implementation of telemidwifery services in the maternal health system. This approach was chosen because it can provide an objective picture of the influence of telemidwifery on access to and effectiveness of midwifery services (Sugiyono, 2022). The research population included midwives and pregnant and breastfeeding mothers who had used telemidwifery services, with purposive sampling and a total of 120 respondents (Kurniawan, 2023).

The research instrument was a closed questionnaire with a five-point Likert scale covering the variables of accessibility, communication effectiveness, and user satisfaction. This questionnaire was compiled based on the Technology Acceptance Model (TAM) and Service Quality (SERVQUAL) theory (Davis, 1989; Parasuraman et al., 1991). Validity was tested using Corrected Item-Total Correlation and reliability using Cronbach's Alpha, which produced a value of 0.87, indicating a valid and reliable instrument (Ghozali, 2021; Nunnally & Bernstein, 1994).

Data were collected online using Google Forms and analyzed using descriptive statistics and simple linear regression using SPSS 26.0 and SmartPLS 4.0 (Hair et al., 2021). This study has been approved by the Health Research Ethics Committee of the University of Indonesia (No. 077/EC/2025) and was conducted in accordance with the WHO research ethics principles (2024), which include the principles of beneficence, respect for persons, and justice.

## RESULTS AND DISCUSSION

### 1. Descriptive Statistics

The following table shows the results of descriptive analysis of the three main variables of the study, namely service accessibility, digital communication effectiveness, and telemidwifery user satisfaction.

**Table 1. Descriptive Statistics of Research Variables**

| Variable                            | Indicators                                                               | Mean | Interpretation |
|-------------------------------------|--------------------------------------------------------------------------|------|----------------|
| Service Accessibility               | Ease of access, response speed, service coverage                         | 4.12 | High           |
| Digital Communication Effectiveness | Clarity of information, midwife-mother interaction, consultation comfort | 3.95 | Moderate-High  |

| Variable          | Indicators                                                         | Mean | Interpretation |
|-------------------|--------------------------------------------------------------------|------|----------------|
| User Satisfaction | Overall satisfaction, perceived benefits, recommendation to others | 4.05 | High           |

*Source: Processed primary data (2025)*

The descriptive results show that respondents have a positive perception of the implementation of telemidwifery. The highest average score was found in the service accessibility variable (mean = 4.12), indicating that the use of digital applications expands the reach and makes it easier for pregnant women to consult with midwives. The user satisfaction variable (mean = 4.05) also shows a high level of satisfaction, indicating that this digital service provides significant benefits in terms of time efficiency, convenience, and communication quality. These results support the findings of a study by Stellata et al. (2022), which states that the telemidwifery service model improves the accessibility of maternal services in areas with limited midwifery personnel.

## 2. Simple Linear Regression Test Results

To test the effect of telemidwifery on user satisfaction, a simple linear regression analysis was conducted with the following results:

**Table 2. Simple Linear Regression Analysis Result**

| Variable      | Coefficient ( $\beta$ ) | t-value | Sig. (p) | R <sup>2</sup> | Interpretation                                       |
|---------------|-------------------------|---------|----------|----------------|------------------------------------------------------|
| Telemidwifery | 0.486                   | 6.427   | 0.000    | 0.302          | Positive and significant effect on user satisfaction |

The regression results show that the telemidwifery variable has a positive and significant effect on user satisfaction, with a regression coefficient value of  $\beta = 0.486$  and a significance value of  $p = 0.000 < 0.05$ . The  $R^2$  value of 0.302 indicates that telemidwifery explains 30.2% of the variation in user satisfaction, while the remaining 69.8% is influenced by other factors outside the model, such as internet network quality, digital literacy, and socio-cultural factors. This means that the higher the quality of telemidwifery services, the higher the level of user satisfaction.

This finding is consistent with the Technology Acceptance Model (TAM) theory (Davis, 1989), which asserts that perceived ease of use and perceived usefulness influence the level of user acceptance and satisfaction with technology. Similar results were also found by Moulaei et al. (2025), who explained that telemidwifery plays an important role in improving the quality of maternal services through the integration of digital communication between health workers and patients.

The results of this study show that telemidwifery is an effective innovation in expanding access to midwifery services and increasing user satisfaction in the digital age. Telemidwifery services not only accelerate access to consultation and monitoring of pregnant women's health, but also improve continuity of care and referral coordination through more responsive online communication. Empirical evidence from various studies shows that the telemidwifery/mHealth model can reduce childbirth anxiety, increase antenatal visit compliance, and maintain service quality by reducing unnecessary physical visits (Khademioore et al., 2023; Knop et al., 2024). Furthermore, midwives' experiences with telehealth services confirm that successful implementation is highly dependent on the readiness of human resources, digital infrastructure, and policy support; without these aspects, the benefits of telemidwifery will not be optimal even if the technology is available (Golden et al., 2024; Moulaei et al., 2025). Therefore, to make telemidwifery a sustainable solution, there needs to be a concerted effort to provide digital literacy training for midwives, integrate the application with the national referral system, and ensure data privacy in line with WHO recommendations on the ethics and governance of digital health services (WHO, 2024; Stellata et al., 2022).

In addition, the regression test results show that user satisfaction is greatly influenced by perceptions of the benefits and ease of use of the telemidwifery application. This reinforces the concept of user-centered service, where the success of digital innovation depends on the system's ability to meet the emotional and functional needs of users. However, this study also found several obstacles, such as the digital literacy gap among older users, limited internet access in certain areas, and the need for stronger digital midwifery regulations to ensure data security and service professionalism (WHO, 2024). Overall, the results of this study confirm that telemidwifery has great potential to become a main pillar in the maternal health care system in the digital era. Sustainable implementation requires policy support, digital competency training for midwives, and cross-sectoral synergy between the government, healthcare providers, and the community. Thus, telemidwifery not only serves as a means of online consultation but also as a strategic instrument in achieving equitable and sustainable quality maternal healthcare services in Indonesia.

## CONCLUSION

This study concludes that telemidwifery has a significant positive impact on improving maternal health service satisfaction in the digital era. By enabling midwives to provide remote consultations, education, and monitoring, telemidwifery bridges the gap in healthcare access caused by geographic and resource disparities. The findings affirm that telemidwifery enhances continuity of care and supports maternal well-being through flexible, efficient, and responsive service delivery. These results are consistent with previous research indicating that telehealth and mHealth innovations effectively reduce maternal anxiety, improve compliance with antenatal visits, and ensure service quality despite distance barriers (Khademioore et al., 2023;

Knop et al., 2024; Moulaei et al., 2025). To ensure its sustainability, telemidwifery implementation must be accompanied by policies that strengthen digital infrastructure, provide training for midwives, and uphold ethical standards in data management (WHO, 2024). In conclusion, telemidwifery is not merely a technological innovation but a strategic approach to achieving equitable and high-quality maternal health services in Indonesia's digital transformation era.

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