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Effectiveness of Digital-Based Continuity of Midwifery Care on Client Satisfaction in West Java, Indonesia

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ABSTRACT

Background: Continuity of midwifery care ensures consistent, personalised support across the maternity cycle and is linked to better maternal and neonatal outcomes. In low-resource areas like West Java, implementation is challenged by geographic and workforce limitations. Digital-based continuity of care has emerged as a promising approach to overcome geographical and logistical barriers, particularly in low-resource settings such as West Java, Indonesia. **Objective:** This study evaluated the impact of a digital-based continuity of midwifery care program on postpartum client satisfaction zin West Java, Indonesia. **Methods:** A quasi-experimental design was employed, involving 300 postpartum women divided equally into intervention (digital-based care) and control (standard care) groups for six weeks. The intervention utilised a digital platform that offered features such as appointment scheduling, health education materials, and real-time communication with midwives. Client satisfaction was measured using the Indonesian version of the Patient Satisfaction Questionnaire Short Form (PSQ-18). Data were analysed using paired t-tests and ANCOVA to adjust for potential confounding variables such as age, education, and parity when comparing satisfaction scores between groups. **Results:** The intervention group showed significant improvements in satisfaction scores across all PSQ-18 subscales compared to the control group. Adjusted mean differences were statistically significant, with moderate to large effect sizes (Cohen's d: 0.52–0.70). The digital platform significantly enhanced accessibility, communication, and interpersonal engagement, contributing to higher satisfaction levels among participants. **Conclusion:** Digital-based continuity of midwifery care effectively improves client satisfaction by improving accessibility, facilitating effective communication, and providing personalised support. Future research should investigate the long-term effectiveness and scalability of digital-based continuity of care interventions.

Keywords: Client Satisfaction; Continuity of Care; Digital Health; Midwifery; Mobile Health

INTRODUCTION

Indonesia continues to face significant maternal health challenges, as evidenced by its maternal mortality ratio (MMR) and disparities in antenatal care (ANC) coverage. Despite a decline in maternal deaths over recent decades, Indonesia's Maternal Mortality Ratio (MMR) remains one of the highest in Southeast Asia., with substantial regional disparities (WHO, 2025). Between 1990 and 2020, the national MMR decreased from 450 to 305 per 100,000 live births, representing a 32% reduction (UNFPA, 2025). Although maternal mortality rates have declined, inconsistencies in care quality and availability remain prominent, especially in underserved regions like West Java. Geographic barriers, unequal distribution of healthcare providers, and limited health literacy among pregnant women are key contributors to these challenges (Susanti *et al*., 2022).

Continuity of midwifery care is increasingly recognised as a vital component in improving maternal and

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neonatal health outcomes. The WHO emphasises the importance of integrated, continuous maternity care to reduce maternal and neonatal morbidity and mortality (WHO, 2025). Advances in digital health technologies, such as mobile health (mHealth) applications, teleconsultation platforms, and electronic health records, have transformed maternal healthcare delivery. These innovations demonstrate great potential in enhancing access, improving care coordination, and elevating healthcare quality (Knop *et al*., 2024; Ameyaw, Amoah & Ezezika, 2024). For example, mHealth solutions facilitate timely interventions and improve communication between healthcare providers and patients, reducing complications during pregnancy and childbirth (Knop *et al*., 2024).

Indonesia's maternal and neonatal challenges are exacerbated by regional disparities in healthcare access and quality. Digital-based continuity of care offers a promising solution to bridge these gaps. Mobile applications and teleconsultation platforms mitigate geographic limitations by providing remote, real-time support, enabling continuous monitoring and timely intervention (Susanti et al., 2022). These technologies also enhance client satisfaction through improved communication and personalised health education. A systematic review highlighted the effectiveness of digital continuity of care in improving maternal health outcomes, particularly in low-resource settings (Ameyaw, Amoah & Ezezika, 2024). Likewise, mHealth interventions have contributed to reductions in preterm births and increased antenatal care attendance, demonstrating their potential to address healthcare disparities (Knop et al., 2024).

Digital technologies have transformed maternal health services by integrating and streamlining care delivery. Research indicates that digital tools empower women by providing accessible health information and encouraging active participation in healthcare decisions (Ngo, Truong & Nordeng, 2020). Teleconsultation platforms facilitate timely guidance in remote areas where access to traditional care is limited. Moreover, mobile applications offering tailored health education enhance health literacy, enabling expectant mothers to make informed decisions about their care. These tools are crucial in reducing regional disparities in maternal outcomes across Indonesia (Pierce, Whitten & Hillman, 2023).

Numerous studies support the benefits of digital interventions in maternal care. mHealth applications deliver education, track pregnancy milestones, and strengthen midwife-client communication (Ameyaw, Amoah & Ezezika, 2024). They improve ANC adherence, reduce delays in care-seeking, and enhance client satisfaction (Knop *et al*., 2024). For instance, a randomised trial in Yogyakarta showed mHealth tools improved maternal satisfaction and adherence to ANC schedules (Siswati *et al*., 2024).

Despite global support for digital tools in maternity care, research specific to Indonesia is limited. A study by Susanti *et al*. (2022) on teleconsultation in rural West Java found improved satisfaction and health literacy but did not fully assess the impact of digital services on continuity of care. Moreover, few digital platforms focus on midwifery care and its unique role in maintaining client-provider relationships, especially in culturally and geographically diverse settings.

Although digital health solutions show promise, further research is needed on their impact on midwifery-specific care and client satisfaction in Indonesia. Most studies examine general mHealth tools without addressing midwifery-specific needs. Research on how digital platforms can overcome socio-cultural and logistical challenges in West Java is also limited. This study addresses these gaps by evaluating the effect of a digital-based continuity of midwifery care program on postpartum client satisfaction in West Java, Indonesia.

METHODOLOGY

Study Design

This study utilised a quasi-experimental design to assess the impact of a digital-based continuity of midwifery care program on client satisfaction in West Java, Indonesia. The intervention group engaged with a digital platform designed to improve the consistency and accessibility of midwifery services for six weeks. This platform offered features such as appointment scheduling, health education resources, and direct communication with midwives. In contrast, the control group received in-person consultations during scheduled visits, with no options for remote follow-ups or digital communication between clients and midwives outside these appointments (Table 1).

Table 1: Digital-based Continuity of Midwifery Care

Category	Intervention Group	Control Group
Type of Care	Digital-based continuity of midwifery care	Standard midwifery care
Care Delivery Method	Through a digital platform	In-person or phone-based care without digital tools
Features of Intervention		
- Appointment Scheduling	Clients could schedule and manage appointments with midwives via the platform	Appointment scheduling was done manually or in person.
- Health Education Materials	Access to digital health education resources, including videos, articles, and infographics tailored to maternal health and pregnancy care	Provided verbally during in-person visits or through printed materials.
- Direct Communication	Real-time communication with midwives through chat or video consultation for queries, guidance, and follow-up	Queries were addressed during scheduled visits or through phone calls.
Continuity of Care	Ensured seamless monitoring and interaction through the platform, enabling consistent follow-ups and personalised care planning	Continuity relied on in-person follow-ups and traditional communication methods.
Geographical Accessibility	Digital platform facilitated care access regardless of client location	Care accessibility depended on physical visits to healthcare facilities.

Sample

The study focused on postpartum women who had previously accessed antenatal care services in West Java. Eligible participants included women aged 18 to 45 years who had attended a minimum of four antenatal visits and were proficient in using a smartphone (assessed through a brief demonstration). Exclusion criteria encompassed women with high-risk pregnancies necessitating specialised medical care and those unwilling to participate.

The sample size was determined using G*Power software (version 3.1.9.7) for a two-tailed t-test, aiming to detect a medium effect size (d = 0.5) as described by Faul et al. (2009). The significance level was set at 0.05, and statistical power at 0.80. The calculation indicated a requirement of 128 participants per group, total sample size was 300. To account for potential attrition, the sample size was increased by 15%, resulting in an adjusted target of approximately 150 participants per group. Recruitment was conducted through convenience sampling at healthcare facilities in West Java that provided midwifery services. Eligible women were approached during their postpartum visits and invited to join the study. Allocation to the intervention or control groups was determined based on a predetermined schedule, with participants assigned according to the day of their visit. This method ensured a systematic distribution of participants while maintaining feasibility within the healthcare setting.

Instrument

Client satisfaction was measured using the Indonesian version of the Patient Satisfaction Questionnaire Short Form (PSQ-18), originally developed by Ware and Gandek (1998). The PSQ-18 comprises 18 items distributed across seven subscales: general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with the doctor, and accessibility/convenience. Responses were recorded on a 5-point Likert scale, with higher scores indicating greater satisfaction. The original PSQ-18 demonstrated strong reliability, with Cronbach's alpha values ranging from 0.70 to 0.90. Similarly, the Indonesian adaptation showed acceptable reliability, with Cronbach's alpha exceeding 0.70 across all subscales.

Procedure

After obtaining ethical approval, healthcare providers introduced the study to eligible postpartum women during their clinical appointments. Women who consented to participate were assigned to either the intervention or control group, based on the allocation system of their respective healthcare facilities. Midwives in the intervention group underwent training on effectively using the digital platform and

integrating it into standard care practices for one session with 30 to 45 minutes. Participants in this group received an introduction to the platform and detailed usage instructions during their initial visit. Technical support was provided throughout the study to resolve any operational issues by researchers.

The intervention group received midwifery care through the digital platform, which included features such as appointment scheduling, health education materials, and direct communication with midwives. The control group continued receiving conventional care (in-person consultations). Platform usage, including interaction frequency and types of activities, was tracked to assess adherence and engagement. At six weeks postpartum, all participants completed the PSQ-18 questionnaire, either electronically or in paper format, to evaluate their satisfaction with the provided care.

Data Analysis

Statistical analyses were conducted using SPSS (Statistical Package for the Social Sciences) software (version 25). Assumptions of normality and homogeneity of variance were tested using the Shapiro-Wilk and Levene's tests, respectively. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were used to summarise participant demographics and satisfaction scores. Paired t-tests evaluated within-group changes in satisfaction scores before and after the intervention. Analysis of covariance (ANCOVA) was performed to adjust for potential confounding variables such as age, education, and parity when comparing satisfaction scores between groups. Effect sizes were calculated to quantify the magnitude of differences between groups. Statistical significance was defined as $p < 0.05$, and 95% confidence intervals were reported where applicable.

Ethical Considerations

The research obtained ethical clearance from the Institutional Review Board of Universitas Padjadjaran, Indonesia with reference number 1107/UN6.KEP/EC/2023 on 15th January 2023.

RESULTS

The study included 300 postpartum women, divided equally into intervention (n = 150) and control (n = 150) groups. The age distribution shows the majority of participants are aged 26–35 years, with no significant differences between groups ($p > 0.05$). Education levels are comparable across groups, with most participants having secondary education (62%). The demographic characteristics indicate no significant differences between the groups in terms of age, education, employment status, or parity (p-value > 0.05) (Table 2).

Table 2: Demographic Characteristics of Participants

Characteristic	Intervention Group (n = 150)	Control Group (n = 150)	Total (N = 300)	*p*-value
Age (years)				
18–25	42 (28%)	33 (22%)	75 (25%)	0.232
26–35	83 (55.3%)	91 (60.7%)	174 (58%)	0.487
36–45	25 (16.7%)	26 (17.3%)	51 (17%)	0.892
Education Level				
Primary	10 (6.7%)	14 (9.3%)	24 (8%)	0.423
Secondary	94 (62.7%)	92 (61.3%)	186 (62%)	0.816
Tertiary	46 (30.7%)	44 (29.3%)	90 (30%)	0.784
Employment Status				
Household	77 (51.3%)	85 (56.7%)	162 (54%)	0.352
Employed	73 (48.7%)	65 (43.3%)	138 (46%)	0.352
Parity				
Primiparous	47 (31.3%)	53 (35.3%)	100 (33%)	0.524
Multiparous	103 (68.7%)	97 (64.7%)	200 (67%)	0.524

The results indicated statistically significant improvements in satisfaction scores in the intervention group across all subscales of the PSQ-18. Conversely, the control group showed minimal changes, with no statistically significant differences in most subscales. Detailed results are presented in Table 3.

Table 3: Paired t-test Results for Satisfaction Scores (PSQ-18)

Subscale	Group	Pre-Intervention Mean (SD)	Post-Intervention Mean (SD)	Mean Difference (95% CI)	*t*-value	*p*-value
General Satisfaction	Intervention	3.1 (0.8)	4.2 (0.7)	1.1 (0.9, 1.3)	12.45	<0.001
	Control	3.2 (0.8)	3.3 (0.8)	0.1 (-0.1, 0.3)	1.25	0.212
Technical Quality	Intervention	3.2 (0.9)	4.1 (0.6)	0.9 (0.7, 1.1)	10.78	<0.001
	Control	3.3 (0.8)	3.4 (0.9)	0.1 (-0.2, 0.4)	0.92	0.362
Interpersonal Manner	Intervention	3.4 (0.7)	4.3 (0.6)	0.9 (0.7, 1.1)	11.62	<0.001
	Control	3.3 (0.8)	3.4 (0.7)	0.1 (-0.1, 0.3)	1.03	0.304
Communication	Intervention	3.3 (0.8)	4.2 (0.7)	0.9 (0.7, 1.1)	11.03	<0.001
	Control	3.3 (0.9)	3.4 (0.8)	0.1 (-0.2, 0.4)	1.12	0.265
Financial Aspects	Intervention	3.5 (0.6)	4.2 (0.5)	0.7 (0.5, 0.9)	9.28	<0.001
	Control	3.5 (0.6)	3.6 (0.7)	0.1 (-0.1, 0.3)	1.05	0.295
Time Spent with Doctor	Intervention	3.2 (0.8)	4.1 (0.7)	0.9 (0.7, 1.1)	10.89	<0.001
	Control	3.2 (0.8)	3.3 (0.8)	0.1 (-0.2, 0.4)	1.14	0.257
Accessibility/Convenience	Intervention	3.3 (0.9)	4.2 (0.8)	0.9 (0.7, 1.1)	11.15	<0.001
	Control	3.3 (0.9)	3.4 (0.9)	0.1 (-0.2, 0.4)	1.06	0.289

Participants in the intervention group reported significantly higher satisfaction scores across all subscales compared to those in the control group. The differences remained statistically significant after adjusting for confounding variables (p-value < 0.05). Effect sizes ranged from moderate (0.52) to large (0.70), indicating a substantial impact of the intervention on patient satisfaction (Table 4).

Table 4: ANCOVA Test Results for Satisfaction Scores (PSQ-18)

Subscale	Adjusted Mean Difference	*p*-value	Effect Size (Cohen's *d*)
General Satisfaction	0.30 (95% CI: 0.15, 0.45)	<0.001	0.60
Technical Quality	0.28 (95% CI: 0.12, 0.44)	0.002	0.57
Interpersonal Manner	0.31 (95% CI: 0.16, 0.46)	<0.001	0.65
Communication	0.29 (95% CI: 0.14, 0.44)	<0.001	0.58
Financial Aspects	0.26 (95% CI: 0.10, 0.42)	0.003	0.52
Time Spent with the Doctor	0.27 (95% CI: 0.12, 0.42)	<0.001	0.56
Accessibility/Convenience	0.34 (95% CI: 0.19, 0.49)	<0.001	0.70

DISCUSSION

The findings of this study reveal that implementing a digital platform for continuity of midwifery care significantly enhances postpartum women's satisfaction in West Java, Indonesia. The intervention effectively improved accessibility, communication, and interpersonal engagement. These results align with previous research, which underscores the benefits of digital health tools in improving patient experiences in maternal care. For example, Wang *et al*. (2021) found that digital platforms enhance patient engagement and satisfaction by streamlining communication and offering timely access to information. Similarly, O'Shea *et al.* (2023) noted that maternal health-focused digital interventions improved care quality by strengthening relationships between clients and providers.

Digital platforms tailored for midwifery care have demonstrated efficacy in addressing logistical challenges, such as geographical barriers and limited access to healthcare professionals, thereby optimising care delivery. Studies highlight the role of digital health solutions in promoting maternal and child health by fostering consistent communication and building trust between clients and providers (Marston *et al*., 2021; Russell, 2022). Digital health interventions have demonstrated cost-effectiveness in resource-limited settings, enhancing healthcare delivery by improving safety, efficacy, and quality of care. (Gentili *et al.*, 2022; Jiang, Ming & You, 2019). Additionally, these interventions can be culturally adapted to align with specific norms, beliefs, and values, which is essential in diverse societies like Indonesia (Nittas *et al*., 2024). By incorporating culturally appropriate messaging and support mechanisms, digital platforms not only enhance user engagement but also improve satisfaction with care delivery.

This study also emphasises the unique ability of digital tools to foster interpersonal connections, an often overlooked aspect of digital health research. Features such as real-time communication and personalised care plans promote continuity and support, crucial for enhancing client satisfaction (Jayousi *et al*., 2024). These

findings are consistent with earlier studies indicating that interpersonal elements of care, even when facilitated digitally, contribute significantly to positive healthcare experiences (Ramachandran *et al*., 2023; Lindberg, Bhatt & Ferm, 2021). Furthermore, digital continuity of midwifery care provides a practical solution for overcoming barriers to care access, particularly in regions where geographical and logistical challenges limit traditional service delivery. As demonstrated by Golden *et al*. (2024), integrating digital tools in midwifery care can mitigate structural obstacles, enabling clients to access postpartum support despite issues like distance or transportation challenges. These improvements highlight the transformative role of technology in advancing equity and quality in maternal healthcare.

The findings suggest that addressing accessibility and communication challenges is crucial for enhancing client satisfaction in postpartum care. This conclusion supports Ridgway *et al*. (2021), who demonstrated that digital health tools reduce perceived barriers by streamlining communication and ensuring timely care delivery. Enhanced interaction between midwives and clients through digital continuity of care fosters a more supportive and responsive healthcare experience, leading to higher satisfaction rates (Royal College of Midwives, 2024). Beyond improving accessibility, digital platforms empower clients by providing real-time information and ongoing support during the postpartum period.

Despite these promising outcomes, challenges remain in optimising the implementation of digital continuity of care. Barriers such as limited technological literacy and inadequate internet infrastructure in some regions may hinder the effectiveness of these tools. In Indonesia, disparities in technological literacy and internet infrastructure between urban and rural areas significantly impact the effectiveness of digital tools. Urban regions, particularly major cities like Jakarta and Surabaya, generally benefit from robust internet connectivity and higher levels of digital proficiency among residents. Conversely, rural areas often face challenges such as limited access to high-speed internet and lower levels of technological literacy. A study by Hadi (2018) highlights that only 36% of rural households in Indonesia had internet access in 2019, compared to 62% in urban areas, underscoring a significant digital divide. This disparity hampers the adoption of online services and e-governance initiatives in rural communities. Furthermore, research by Akbar and Wijaya (2024) indicates that digital literacy programs are predominantly concentrated in urban centers, leaving rural populations with fewer opportunities to develop essential technological skills. Addressing these challenges requires targeted initiatives, such as digital literacy training for clients and midwives, as well as efforts to expand internet access in underserved areas (Knop *et al*., 2024). Additionally, further research is needed to assess the long-term impact of digital continuity of care on maternal and child health outcomes. While this study demonstrates significant improvements in client satisfaction, future studies should explore clinical outcomes, cost-effectiveness, and scalability to fully realise the potential of digital midwifery care interventions.

Limitation

This study has several limitations. First, the findings are context-specific, focusing solely on postpartum women in West Java, Indonesia, which may limit their applicability to other populations or regions. Second, the study relied on self-reported measures of satisfaction, which are subject to recall and response biases. Third, the absence of long-term follow-up restricts insights into the sustainability of the observed improvements. Lastly, potential confounding factors, such as participants' prior familiarity with digital tools, were not explicitly controlled. Despite these limitations, the study lays a valuable foundation for future research and technological innovation aimed at enhancing postpartum care on a broader scale.

CONCLUSION

This study demonstrates the effectiveness of a digital platform in improving postpartum women's satisfaction with midwifery care in West Java, Indonesia. Significant advancements in accessibility, communication, and interpersonal engagement highlight the transformative potential of digital health tools in maternal healthcare. Future research should explore the applicability of these findings in diverse geographical and cultural contexts, assess the sustainability and long-term impacts of digital health interventions on maternal and child health outcomes, and investigate strategies for integrating digital continuity of care into existing healthcare systems to enhance scalability and optimise maternal healthcare services.

Recommendation

Based on these findings, it is recommended that healthcare providers and policymakers consider integrating

digital platforms into routine postpartum care services to enhance the quality and accessibility of midwifery care. Further efforts should focus on scaling up this intervention to other regions while ensuring cultural and contextual adaptation to meet the needs of diverse populations. Additionally, continuous training and support for midwives in using digital platforms can optimise their effectiveness and user satisfaction. Future research should explore long-term outcomes and cost-effectiveness to provide a comprehensive understanding of the broader impact of digital platforms on maternal healthcare.

Conflict of Interest

The authors have no conflicts of interest to declare.

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