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RESEARCH ARTICLES

Pelatihan *Continuity of Care* Berbasis Aplikasi Mobile terhadap Pengetahuan Mahasiswa Kebidanan

Mobile Application-based Continuity of Care Training on Improving Midwifery Students' Knowledge

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Abstract

The quality of midwifery education is a key factor influencing maternal and newborn health outcomes and the achievement of global development goals. To address 21st-century challenges, midwives must be equipped with the skills provided by a competency-based Continuity of Care (CoC) curriculum aligned with educational standards. However, implementing CoC within learning methodologies and clinical guidance remains challenging. Technology-based training has emerged as an effective strategy to address these issues. This study aimed to analyze the effect of mobile CoC training on students' knowledge. A pre-experimental one-group pretest-posttest design was conducted with 50 students selected through purposive sampling. Knowledge was measured using a validated structured questionnaire. Data analysis using the Wilcoxon test showed a significant increase in knowledge after the intervention (p-value <0.001). An effect size of 0,661 indicates that mobile application-based training has a strong influence (moderate-to-large category) on increasing students' knowledge. The use of this application facilitated flexible, interactive access to materials, thereby enhancing students' cognitive competence in providing continuous midwifery care.

Keywords: *continuity of care, digital health, midwifery education*

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Abstrak

Kualitas pendidikan kebidanan merupakan faktor kunci yang mempengaruhi derajat kesehatan ibu dan bayi baru lahir serta pencapaian tujuan pembangunan global. Untuk menghadapi tantangan abad ke-21, bidan harus dibekali keterampilan melalui kurikulum *Continuity of Care* (CoC) berbasis kompetensi yang selaras dengan standar pendidikan. Namun, penerapan CoC dalam metodologi pembelajaran dan bimbingan klinis masih menghadapi kendala. Pelatihan berbasis teknologi muncul sebagai strategi efektif untuk mengatasi masalah ini. Penelitian ini bertujuan untuk menganalisis pengaruh pelatihan CoC berbasis aplikasi mobile terhadap pengetahuan mahasiswa kebidanan. Desain penelitian menggunakan pre-experimental dengan pendekatan *one-group pretest-posttest* terhadap 50 mahasiswa yang dipilih menggunakan teknik purposive sampling. Pengetahuan diukur menggunakan kuesioner terstruktur yang telah divalidasi. Analisis data dengan uji wilcoxon menunjukkan adanya peningkatan pengetahuan yang signifikan setelah intervensi (*p-value* <0,001). Nilai *effect size* sebesar 0,661 menunjukkan bahwa pelatihan berbasis aplikasi mobile memiliki pengaruh yang kuat (kategori sedang menuju besar) terhadap peningkatan pengetahuan mahasiswa. Penggunaan aplikasi ini memfasilitasi akses materi yang lebih fleksibel dan interaktif, sehingga efektif dalam meningkatkan kompetensi kognitif mahasiswa dalam asuhan kebidanan berkelanjutan.

Kata kunci: *continuity of care*, pendidikan kebidanan, teknologi kesehatan digital

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Highlight:

- The implementation of mobile-based *Continuity of Care* (CoC) training has proven to be an effective strategy to overcome conventional learning and clinical guidance barriers in midwifery education.
- There was a highly significant increase in the knowledge of midwifery students after the mobile application intervention, with statistical analysis showing a *p-value* < 0.001.
- Strengthening CoC curricula through technology-based training is essential to equip midwives with global competency standards, ultimately improving

INTRODUCTION

High-quality midwifery education is not merely an academic requirement but a fundamental determinant for improving maternal and newborn health outcomes and achieving global development goals (Smith et al., 2023; Ige and Ngcobo, 2024). Midwives are pivotal in providing Continuity of Care (CoC), a philosophy that fosters women's trust and empowerment from preconception through the postnatal period (Hunter et al., 2022; Baghini et al., 2023). Consequently, equipping midwives with 21st-century skills through competency-based CoC curricula is imperative. To meet these demands, educational strategies are shifting towards digital integration, specifically Mobile Learning (mLearning), which utilizes portable devices to enhance student engagement and educational outcomes (Johnston et al., 2022).

Despite the established benefits of CoC, its implementation in midwifery education faces significant structural and pedagogical barriers. Students frequently struggle with the

complexities of manual documentation, which creates a substantial administrative burden leading to clinical inefficiencies (Cooper et al., 2021). Crucially, this heavy reliance on manual processes often distracts students from the core clinical reasoning required for CoC, resulting in a significant deficit in their fundamental knowledge and theoretical understanding of holistic care. In Indonesia, the need for digitalization in midwifery education is pressing to align with national health modernization goals. However, many educational institutions still face challenges regarding institutional readiness and the slow transition from conventional to digital pedagogical methods. This gap creates a barrier, leaving students unprepared to use modern health information systems effectively (Dustar et al., 2023). Preliminary observations at the study site confirm that these factors contribute to students' lack of confidence and readiness for professional practice (Carter et al., 2020).

To bridge this competency gap, this study implements a specific mLearning intervention using a dedicated mobile application designed to simulate CoC management. Training is central to this process as it systematically constructs competence. Drawing on the epistemological framework of Zagzebski (2017), knowledge is defined as a state of 'cognitive contact with reality', distinguished into 'knowledge by acquaintance' (direct experience) and 'propositional knowledge' (knowing facts). This study posits that mobile application-based training enhances students' cognitive contact with CoC concepts by providing an interactive platform that simplifies documentation and reinforces theoretical concepts. This digital approach is designed to strengthen students' propositional knowledge and facilitate a deeper, more practical understanding of clinical continuity (Mao et al., 2024).

METHODS

This study employed a quantitative pre-experimental design, using a one-group pretest-posttest approach to analyze the impact of the intervention (Lim, 2025). The research was conducted at the Diploma III Midwifery Study Program, Cirebon Campus, Ministry of Health Polytechnic of Tasikmalaya, from April to August 2025. A sample of 50 subjects was selected using purposive sampling, focusing on final-year midwifery students who had received prior orientation/training on the CoC application and met the inclusion criteria. Data were collected using two validated instruments: a structured questionnaire focused on labor pain management using hypnopressure techniques and a usability survey assessing student satisfaction and the technical ease of the mobile application (Kotronoulas et al., 2023).

The intervention consisted of mobile application-based Continuity of Care (CoC) training administered between the pretest and posttest measurements. Data processing and analysis were performed using STATA software version 15.0. Univariate analysis was used to describe subject characteristics, while bivariate analysis used both the Paired-Samples *t-test* and the *Wilcoxon Signed-Rank Test*. The *Wilcoxon* test was specifically utilized as a reinforcement because the post-test data did not meet the normality assumptions (*Shapiro-Wilk*; *p-value* <0,001). Additionally, Cohen's d was calculated to determine the effect size of the training on student knowledge. Ethical clearance for this study was granted by the Health Research Ethics Committee of the Faculty of Public Health, Hasanuddin University (No: 929/UN4.14.1/TP.01.02/2025).

RESULTS AND DISCUSSIONS

The results of this study are presented with an overview of the subjects' demographic characteristics, as detailed in Table 1.

Table 1. Characteristics of midwifery students of the ministry of health of Tasikmalaya Campus

Characteristics	n	%
Age		
17 Years	1	2
18 Years	14	28
19 Years	28	56
20 Years	7	14
Job		
Work	3	6
Unemployed	47	94
Total	50	100

Source: Primary data, 2025

Based on Table 1, it can be seen that the age range of midwifery students of the Tasikmalaya Ministry of Health Polytechnic of the Cirebon campus is between the ages of 17–20 years, most subjects were 19 years old (28 participants; 56%). Subjects in this study were mostly unemployed, 47 (94%) and 3 subjects were employed (6%)

Table 2. Analysis of CoC application usability results

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
I want to use this system more often	0 (0%)	2 (4,1%)	3 (6,1%)	20 (40,8%)	25 (50%)	50
I found the system too complicated	11 (22,4%)	21 (40,8%)	12 (24,5%)	3 (6,1%)	3 (6,1%)	50
I think the system is easy to use	1 (2%)	2 (4,1%)	5 (10,2%)	15 (30,6%)	27 (53,1%)	50
I think I need the support of a technician to be able to use this system	8 (16,3%)	7 (14,3%)	16 (30,6%)	10 (20,4%)	9 (18,4%)	50
I found the various functions in this system to be well integrated	0 (0%)	1 (2%)	7 (14,3%)	17 (34,7%)	25 (50%)	50
I think there are too many	9 (18,4%)	18 (34,7%)	16 (32,7%)	2 (4,1%)	5 (10,2%)	50

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
inconsistencies in this system						
I imagine that most people will learn to use this system very quickly	1 (2%)	1 (2%)	7 (14,3%)	14 (28,6%)	27 (53,1%)	50
I find this system very complicated to use	25 (50%)	11 (22,4%)	8 (16,3%)	2 (4,1%)	4 (8,2%)	50
I feel very confident using this system	0 (0%)	1 (2%)	6 (12,2%)	19 (38,8%)	24 (46,9%)	50
I need to learn a lot before I can run this system	0 (0%)	7 (14,3%)	13 (26,5%)	10 (20,4%)	20 (38,8%)	50

Source: Primary data, 2025

Based on the results of the usability survey analysis, most subjects stated that they wanted to use this system more often (50% strongly agreed and 40,8% agreed). Most subjects did not feel the system was too complicated, and there were 22,4% who strongly disagreed, even 20,4% approved, but this indicates that some subjects still found it easy to use. More than half of subjects (53,1%) strongly agree that the system is easy to use. However, 20,4% agreed and 18,4% strongly agreed that they needed technical assistance to use the system, indicating the need for initial assistance.

Table 3. Descriptive statistics of pre-test and post-test scores

Variable	N	Mean	Std. Deviation	Minimum	Maximum	Median
Pre-test	50	7,04	3,820	6	10	6,50
Post-test	50	9,12	2,246	7	10	9,50

Source: Primary data, 2025

In addition, the features in the system are considered quite useful, with 50% of subjects strongly agreeing. Some subjects also considered that there were inconsistencies in the system (18,4% strongly disagreed), and 53,1% stated that the system could be mastered quickly. However, there are still 50% of subjects who strongly disagree that the system is complicated to use for the first time, and 38,8% say they need to learn more first.

Based on Table 3, it can be seen that descriptive statistical analysis for pre-test and post-test scores shows significant results. The average pre-test score was 7,04 with a standard deviation of 3,820, while the average post-test score increased to 9,12 with a standard deviation of 2,246. This average increase showed a positive change in the subjects' learning outcomes after following the given intervention.

Based on Table 4, Normality tests using Kolmogorov-Smirnov and Shapiro-Wilk showed different results for both measurement conditions. The pre-test data showed a

normal distribution (KS: p = 0,109, SW: p = 0,423), while the post-test data did not meet the normality assumption (KS: p-value <0,001, SW: p-value <0,001)

Table 4. Data normality test results

Variable	Kolmogorov-Smirnov		Shapiro-Wilk	
	Statistic	Sig.	Statistic	Sig.
Pre-test	0,115	0,109	0,976	0,423
Post-test	0,187	<0,001	0,893	<0,001

Source: Primary data, 2025

Based on Table 5, the results of the research conducted on midwifery students of the Tasikmalaya Ministry of Health Polytechnic, Cirebon campus, the results were obtained, the age characteristics of the subjects had an age range of 17–20 years. The level of knowledge of subjects before the continuity of care training 42 subjects had good knowledge (84%) and less knowledge by 8 people (16%), then after the continuity of care training was carried out, 49 subjects had good knowledge (98%), and 1 subject had poor knowledge (2%). Based on the results of the analysis using Wilcoxon test, the p-value was <0,001 (< 0,05) so it can be concluded that there is a significant influence before and after the continuity of care training.

Table 5. Knowledge of midwifery students of Tasikmalaya Ministry of Health Polytechnic, Cirebon Campus before and after application-based continuity of care training

Knowledge	Training		p-value	Effect size
	Pre	Post		
Good	42 (84%)	49 (98%)	<0,001*	0,661
Poor	8 (16%)	1 (2%)		

Note: *Uji Wilcoxon, significant if p-value < 0,05

Training is a systematic process that aims to improve the knowledge, skills, attitudes, and behaviors of a person or group so that they have competencies that are in accordance with the needs of a job or a certain goal. These activities can be teaching, self-development, or practices designed to improve the abilities, capabilities, productivity, and performance of individuals or teams in specific contexts, such as in the world of work (Stavropoulou et al., 2025). Continuous care training is training to improve the knowledge and skills of health workers (especially midwives) in providing comprehensive health services, ranging from pregnancy, childbirth, postpartum and newborns, to family planning, in a coordinated and sustainable manner. The goal is to prevent fragmented services, ensure continuity of care, and improve the quality of services so as to reduce maternal and infant mortality rates (Boli et al., 2020; Stavropoulou et al., 2025).

Training is one of the strategic efforts to increase knowledge through a systematic, planned, and directed learning process. According to Zagzebski (2017), knowledge is a state of cognitive contact with reality, distinguished into knowledge by acquaintance (direct experiential contact) and propositional knowledge (knowing facts about the world). Thus, through training, individuals can enhance this cognitive contact, gaining new propositional knowledge and strengthening the knowledge they already have. The training process provides opportunities for participants to receive information, discuss material, and conduct practices or simulations so that understanding becomes more in-depth and applicative. This is in line with the opinion of WHO (2018) which states that

the training of health workers plays an important role in increasing the capacity of knowledge and skills so that it can support the improvement of service quality. The interaction that occurs between facilitators and participants, as well as between participants, allows for the exchange of experiences that also enrich insights. In addition, the evaluation and feedback provided during the training process are a means to measure the extent of the knowledge improvement obtained. Thus, it can be concluded that training has proven to be effective in improving knowledge because it provides an active, participatory, and application-oriented learning process in real practice (Qodir, 2020).

Continuity of care is an important concept in health services that emphasizes the continuity of care provided to patients in an integrated and sustainable manner, both in the short and long term. WHO (2018) defines continuity of care as service that is consistent, coordinated, and focuses on patient needs through continuity of information, continuity of relationships between patients and health workers, and continuity of care management (Amelia and marcel, 2024). This concept not only ensures that patients receive services that are in accordance with their health conditions, but also improves the quality, efficiency, and satisfaction of patients with the services received. In line with research conducted by Haggerty et al. (2013), continuity of care has been shown to contribute to increased patient confidence, lower the risk of unnecessary hospitalization, and improve long-term health outcomes. In midwifery practice, continuity of care is very relevant to support the health of mothers and children, because continuous services from pregnancy, childbirth, postpartum to baby care can reduce the risk of complications and improve family welfare (Agustina et al., 2022).

The application of continuity of care in midwifery can be seen in the continuity of services provided by midwives to mothers starting from pregnancy, childbirth, postpartum to newborn. For example, during pregnancy, midwives provide regular antenatal care by monitoring maternal and fetal health, providing nutritional counseling, and early detection of complications. During childbirth, the midwife continues to accompany the mother so that she creates a sense of security and comfort, and can immediately take action in the event of an emergency. After childbirth, the continuity of care continues through postpartum monitoring, breastfeeding counseling, and early detection of complications in mothers and babies. Furthermore, midwives also provide newborn health services, immunizations, and counseling about baby care. Research by Sandall et al. (2016) shows that continuity of care in midwifery practice is associated with increased maternal satisfaction, lowering the number of unnecessary medical interventions, and providing positive experiences during pregnancy and childbirth. This proves that continuity of care plays an important role in improving the quality of obstetric services and supporting the achievement of maternal and child health targets (Barokah et al., 2023).

CONCLUSIONS

Mobile application-based Continuity of Care (CoC) training demonstrates a statistically significant effect on the knowledge of midwifery students. The integration of digital technology into the learning process has proven effective in enhancing students' understanding and application of clinical knowledge, significantly encouraging professional competence. The use of a mobile platform provides accessibility and flexibility that supports deeper cognitive engagement, resulting in proficiency in best practices and the achievement of higher competency standards. Therefore, implementing technology-based training strategies is highly recommended to strengthen the midwifery

education curriculum and support the continuous improvement of maternal health service quality in Indonesia.

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