



Effect of a Blended Clinical Learning Model on Delivery Care Competency Among Professional Midwifery Students

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Track Record Article	Abstract
Revised: 18 July 2026 Accepted: 24 September 2026 Published: 30 September 2026 How to cite : Nugraeny, L., Hajar, S., & Wardayani, E. (2026). Effect of a Blended Clinical Learning Model on Delivery Care Competency Among Professional Midwifery Students. <i>Contagion: Scientific Periodical Journal of Public Health and Coastal Health</i>, 8(3), 696–705.	<i>Delivery care competency is a fundamental ability that midwifery professional students must master to provide safe, effective, and high-quality maternal health services. Conventional clinical education alone does not consistently build this competency, creating a need for learning models that combine structured self-paced preparation with supervised hands-on practice. This study aimed to analyze the effectiveness of a blended clinical learning model, compared with conventional clinical learning, in improving delivery care competency scores among professional midwifery students. Novelty: Unlike previous studies that examined blended learning in general nursing or midwifery theory courses, this study evaluates a structured seven-stage blended clinical learning model specifically designed for intrapartum (delivery) care practicum, integrating a Learning Management System (LMS), video demonstration, laboratory simulation with formative OSCE, bedside teaching, and structured clinical reflection. A quasi-experimental design with a pretest-posttest control group approach was used. Sixty midwifery professional students undergoing clinical practice in maternity care were allocated by purposive sampling into an intervention group (n = 30) and a control group (n = 30). The intervention group received a four-week blended clinical learning program; the control group received conventional clinical learning. Delivery care competency was measured with an Objective Structured Clinical Examination (OSCE) checklist and a clinical competency observation sheet (content validity by three experts). Data were analyzed with paired t-tests and independent t-tests after Shapiro-Wilk normality tests and Levene's tests for homogeneity of variance confirmed the assumptions for parametric testing. Delivery care competency scores in the intervention group increased significantly from 68.45 ± 5.21 to 87.32 ± 4.11, compared with an increase from 69.11 ± 5.10 to 75.24 ± 5.42 in the control group. The between-group difference in post-intervention scores was statistically significant (p < 0.001; mean difference = 12.08, 95% CI 9.59–14.57; Cohen's d = 2.51). Blended clinical learning produced a significantly greater improvement in delivery care competency—including labor assessment, clinical decision-making, delivery skills, therapeutic communication, documentation, and clinical reasoning—than conventional learning. These findings support blended clinical learning as a practical strategy for strengthening intrapartum clinical education in midwifery professional programs, provided it is implemented with adequately trained preceptors and structured reflection sessions.</i> Keywords: <i>Blended Clinical Learning, Delivery Care Competency, Midwifery Students, Clinical Reasoning, Maternity Care.</i>

INTRODUCTION

Delivery (intrapartum) care competency is one of the core abilities that midwifery professional students must master before independent practice. It encompasses maternal assessment, clinical diagnosis, evidence-based decision-making, hands-on delivery skills, therapeutic communication, documentation, and clinical reasoning throughout the course of labor (World Health Organization, 2023). Because complications during labor can escalate

within minutes, competency gaps at the point of graduation translate directly into risk for mothers and newborns; global efforts to reduce preventable maternal and neonatal mortality therefore depend heavily on the clinical readiness of newly graduated midwives (Estiningtyas et al., 2022; Sukontrakoon et al., 2026).

Despite its importance, midwifery professional education continues to face persistent obstacles in building this competency. Students frequently report low self-confidence, limited direct exposure to labor cases, variable quality of clinical supervision, and underdeveloped clinical reasoning when managing intrapartum cases (Benner, 2017; Estiningtyas et al., 2022; Jokiniemi, 2026). In many training sites, students share a single patient case to fulfil logbook requirements, which further narrows the range of clinical experience available before graduation (Estiningtyas et al., 2022; Wati et al., 2025). Preceptor availability and pedagogical capacity for simulation-based teaching are also uneven across institutions (Bogren et al., 2021; Wati et al., 2025). These conditions can directly affect the quality and safety of the delivery care that students later provide.

Advances in educational technology have opened opportunities to redesign clinical learning to address these gaps. Blended learning — the deliberate integration of online and face-to-face instruction — has been shown across health professions education to be at least as effective as, and often superior to, non-blended instruction for building knowledge and skill (Garrison & Vaughan, 2018; Lockey et al., 2022; Toghyani et al., 2025). When applied to clinical (as opposed to purely theoretical) learning, blended approaches typically combine a Learning Management System (LMS) for self-paced study, video demonstration of procedures, online case discussion, laboratory simulation, bedside teaching, structured clinical reflection, and direct supervised practice with patients.

Evidence from adjacent fields of nursing and midwifery education supports the potential of this approach for delivery care specifically. Simulation-based and blended interventions have improved communication-skill competence and self-efficacy in clinical handover training (Chung et al., 2022), clinical competency examination performance (Mojtahedzadeh et al., 2024), and simulation-based clinical readiness among midwifery and nursing-midwifery students preparing for childbirth care (Gebrekidan et al., 2024; Sukontrakoon et al., 2026). A low-cost, high-fidelity simulation approach to intrapartum skills has likewise been shown to strengthen student confidence and competence before real clinical exposure (Ferrari et al., 2024; Womack & Stec, 2025). A scoping review of blended teaching in nursing and midwifery education, however, found that most available evidence still concerns general nursing curricula or theoretical courses, with comparatively few studies examining

structured, multi-stage blended models built specifically around a single, high-stakes clinical skill such as assisting normal delivery (Ndayisenga et al., 2021).

This gap defines the novelty and rationale of the present study. Unlike prior blended-learning research in midwifery education, which has largely evaluated single components (e.g., an online module, a virtual round, or a stand-alone simulation session) (Naysanian et al., 2024; Toghyani et al., 2022), this study evaluates a fully sequenced, seven-stage blended clinical learning model purpose-built for intrapartum care practicum — moving students from orientation and self-directed LMS learning, through video- and case-based preparation, formative OSCE-supported laboratory simulation, bedside teaching and hands-on practice, to structured clinical reflection with preceptor feedback and final competency evaluation. Delivery care specifically requires this level of structure, rather than a generic blended approach, because it combines time-critical psychomotor skill, rapid clinical decision-making, and therapeutic communication under conditions that cannot be fully replicated through passive online content alone; students need repeated, low-stakes rehearsal (via video and simulation) before being exposed to the variability of real intrapartum cases (Mulyadi et al., 2021; Pérez-Perdomo & Zabalegui, 2024).

The blended clinical learning model is grounded in two complementary theoretical frameworks. Kolb's (2015) Experiential Learning Theory — whose relevance to clinical education continues to be reaffirmed in recent nursing curricula (Cheng et al., 2025) — holds that durable learning occurs through a cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation — a cycle that maps directly onto the sequence of simulation, reflection, and repeated clinical practice used in this study's model. Benner's (2017) "From Novice to Expert" theory, recently reaffirmed as a guiding framework for expertise development in clinical practice (Jokiniemi, 2026), further explains that clinical competence develops through structured, repeated exposure to real and simulated cases with expert feedback, which is the mechanism this study's bedside teaching and preceptor-feedback stages are designed to operationalize.

Based on this background, this study aimed to analyze the effectiveness of a structured blended clinical learning model, compared with conventional clinical learning, in improving delivery care competency—including labor assessment, clinical decision-making, delivery skills, therapeutic communication, documentation, and clinical reasoning — among professional midwifery students.

METHODS

This study used a quasi-experimental design with a pretest-posttest control group approach to evaluate the effect of a blended clinical learning model on delivery care competency among midwifery professional students. Random allocation to groups was not performed; group assignment followed pre-existing classes or clinical practice groups (intact groups), meaning individual randomization was not possible. To minimize selection bias in the absence of individual randomization, baseline equivalence between groups was verified statistically prior to the intervention (see Table 1), and both groups were drawn from students within the same cohort, semester, and clinical rotation schedule to reduce systematic differences in prior exposure.

The study was conducted at the Midwifery Professional Study Program and an affiliated maternity clinic in Medan over a three-month period, from January to March 2026. The population comprised all midwifery professional students undergoing clinical practice in maternity care during that period. A sample of 60 students was selected using purposive sampling and allocated into an intervention group ($n = 30$) and a control group ($n = 30$).

Determination of adequate sample size using a formula to test the difference between two means (Lemeshow/Cohen formula) based on parameters such as effect size, statistical power ($1-\beta$), and the confidence level employed; or, where relevant, an explanation that the 60 respondents represent the entire population available during the study period (total sampling).

Inclusion criteria: midwifery professional students who were (a) actively enrolled in the delivery/intrapartum care clinical practicum during the study period, (b) willing to participate as respondents and provide informed consent, and (c) willing to complete the entire blended clinical learning program (for the intervention group) or the conventional learning program (for the control group), and (d) had not previously participated in a similar structured blended clinical learning program.

Exclusion criteria: students who (a) did not complete the intervention or control program, (b) did not complete the pretest or posttest, or (c) were absent from more than 20% of the scheduled main learning sessions. The independent variable was blended clinical learning; the dependent variable was midwifery students' delivery care competency, encompassing assessment, diagnosis, clinical decision-making, delivery skills, therapeutic communication, documentation, and clinical reasoning.

Throughout the program, lecturers were responsible for LMS content delivery, online facilitation, and formative feedback, while clinical preceptors were responsible for bedside supervision, real-time correction of technique, and structured reflection sessions. The control

group received conventional clinical learning consisting of lectures, live (non-recorded) demonstrations, and routine, unstructured clinical practice, following the standard approach used at the institution prior to this study.

The study proceeded through a preparation phase (securing research permits, developing the blended clinical learning modules, developing and validating instruments, and finalizing group allocation), followed by a pretest for both groups, a four-week intervention period, and a posttest using the same instruments as the pretest.

Data were processed through editing, coding, entry, cleaning, and tabulation, and analyzed using univariate and bivariate methods. Before applying parametric tests, the normality of score distributions was assessed using the Shapiro-Wilk test and the homogeneity of variances using Levene's test. A paired t-test was used to compare pretest and posttest scores within each group, and an independent t-test was used to compare the magnitude of improvement between groups. Mean differences are reported with 95% confidence intervals, and effect size was calculated using Cohen's d. The significance level was set at $\alpha = 0.05$.

This study obtained ethical approval from the Health Research Ethics Committee (approval number: 11205/UN5.2.9.D2/PT/2025). All respondents provided informed consent prior to participation. Respondent confidentiality was maintained throughout, and data were used solely for scientific purposes.

RESULTS

Table 1. Characteristics of Research Respondents

Characteristic	Intervention Group (n = 30)	Control Group (n = 30)	p-value
Age (Mean $\pm$ SD)	22.4 $\pm$ 1.2	22.1 $\pm$ 1.1	0.421
Gender (Female)	30 (100%)	30 (100%)	—
GPA $\geq$ 3.00	24 (80%)	23 (76.7%)	0.761

Table 1 shows no significant difference in respondent characteristics between groups ($p > 0.05$), supporting baseline equivalence despite the absence of individual randomization.

Table 2. Differences in Childbirth Care Competency Values Before and After Intervention

Group	Pretest Mean $\pm$ SD	Posttest Mean $\pm$ SD	deviation	p-value
Intervention	68.45 $\pm$ 5.21	87.32 $\pm$ 4.11	18.87	<0.001
Control	69.11 $\pm$ 5.10	75.24 $\pm$ 5.42	6.13	0.032

Table 2 shows an increase in delivery care competency scores in both groups. However, the increase in the intervention group was higher than in the control group. Paired t-test results showed a significant increase in student competency after blended clinical learning ($p < 0.001$).

Table 3. Comparison of Childbirth Care Competencies Between Groups After Intervention

Group	Mean $\pm$ SD	Mean Difference	p-value
Intervention	87.32 $\pm$ 4.11	12.08	<0.001
Control	75.24 $\pm$ 5.42	-	-

Independent t-test results showed a significant difference in delivery care competency between the intervention and control groups after the intervention ($p < 0.001$). Students who received blended clinical learning demonstrated better competency than those who received conventional learning.

Competency assessments demonstrated that blended clinical learning improved students' abilities in assessing labor, establishing diagnoses, assisting normal deliveries, therapeutic communication, and documenting midwifery care. Students in the intervention group also demonstrated improved clinical reasoning and decision-making skills during delivery practice.

The results of this study demonstrate that the integration of online learning, laboratory simulations, case discussions, and direct clinical practice provides a more comprehensive learning experience than conventional learning. The blended clinical learning approach allows students to review material and reflect on practice, thus optimally enhancing conceptual understanding and clinical skills.

DISCUSSION

This study found that the blended clinical learning model produced a significantly greater improvement in delivery care competency than conventional clinical learning, with gains evident across labor assessment, clinical decision-making, delivery skills, therapeutic communication, documentation, and clinical reasoning.

These findings are consistent with Kolb's, (2015) Experiential Learning Theory, whose four-stage cycle has recently been shown to strengthen case-based clinical reasoning when built into nursing curricula (Cheng et al., 2025): the model's sequence of simulation, hands-on practice, and structured reflection gave students repeated opportunities to move through the full experiential cycle — concrete experience, reflective observation, conceptualization, and active experimentation — rather than encountering delivery care only once during a single supervised shift. The results also support Benner's, (2017) "From Novice to Expert" framework, which a recent systematic review confirms still underpins understanding of how clinical expertise develops through experience and structured support (Jokiniemi, 2026); in this framework, repeated, feedback-rich exposure to clinical cases is the mechanism by which competence develops, and the bedside-teaching and preceptor-feedback stages of the model

appear to have provided this mechanism more consistently than conventional, unstructured practice.

Beyond theory, these results align with recent empirical evidence from blended and simulation-based clinical education. Chung et al., (2022) found that a blended learning programme significantly improved nursing students' communication-skill competence and self-efficacy for a different high-stakes clinical task (clinical handover), through a similar combination of face-to-face training and structured online modules. Mojtahedzadeh et al., (2024) likewise found that a blended (in-person and virtual) clinical competency examination format was feasible and acceptable for assessing final-year nursing students, reinforcing the value of combining virtual and in-person elements in clinical assessment. In midwifery education specifically, Gebrekidan et al., (2024) reported that simulation-based education was associated with higher student satisfaction across governmental midwifery programs in Ethiopia, and Sukontrakoon et al., (2026) found that high-fidelity simulation improved knowledge, self-confidence, and clinical readiness among nursing-midwifery students preparing for childbirth care — outcomes consistent with the confidence- and competence-related gains observed in the present study's intervention group. A meta-analysis of systematic reviews across health professions education similarly found blended learning to be superior to non-blended instruction for knowledge acquisition (standardized mean difference = 0.77, 95% CI [0.59, 0.94]) (Lockey et al., 2022), suggesting the effect observed here is broadly consistent with the wider literature rather than an isolated finding.

At the same time, these results should be interpreted with appropriate caution regarding alternative explanations. First, students in the intervention group received more contact time, more individualized feedback, and more novel learning materials than the control group; part of the observed improvement may reflect a Hawthorne-type effect (increased effort or engagement associated with receiving special attention) rather than the specific content of the blended model itself. Second, because both groups were drawn from the same institution and clinical site, some contamination between groups cannot be fully excluded — for example, informal sharing of video materials or case discussions between intervention and control students. Third, variation in clinical preceptor quality and in students' pre-existing clinical exposure was not formally measured or statistically controlled in this study, and either factor could account for part of the between-group difference. Fourth, motivation and prior academic performance, while balanced at baseline on GPA (Table 1), were not assessed as continuous covariates and may still have contributed unevenly to outcomes. Finally, the four-week intervention period is too short to determine whether the observed competency gains are

retained into subsequent clinical rotations or into early professional practice; retention over time was not assessed.

These limitations do not negate the study's findings, but they do mean the effect size reported here should be interpreted as an estimate of effectiveness under close pedagogical attention, rather than a guaranteed outcome of the blended materials alone. Future studies with randomized allocation, blinded OSCE assessment, active-control designs (e.g., comparing blended learning against an equally time-intensive conventional alternative), and longer follow-up would help isolate the specific contribution of the blended model from these confounding factors.

Overall, taken together with theory and the wider empirical literature, the results support blended clinical learning as a promising, though not yet definitively isolated, strategy for strengthening delivery care competency in midwifery professional education — one that merits further confirmatory research using stronger causal designs.

CONCLUSION

This study provides evidence that a structured, seven-stage blended clinical learning model produces a significantly greater improvement in delivery care competency than conventional clinical learning among professional midwifery students, with consistent gains across labor assessment, clinical decision-making, delivery skills, therapeutic communication, documentation, and clinical reasoning. The main scientific contribution of this study is demonstrating that blended learning benefits are not limited to theoretical or communication-skill courses previously studied in nursing and midwifery education, but can also be realized in a structured, sequenced form for a single, high-stakes intrapartum clinical skill — provided the model is implemented with defined stages, clear preceptor roles, and structured reflection, rather than as a loose combination of online and offline activities. Practically, these findings suggest that midwifery education programs facing limited clinical placement capacity or variable preceptor quality may be able to use a similarly structured blended design to standardize and strengthen delivery care training, while continuing to monitor for the confounding factors discussed above.

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