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Brief Report

Evaluating the Effectiveness of a Three-phase Clinical Education Model for Midwifery Students: A Quasi-Experimental Study

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Abstract

Background: Clinical education represents the cornerstone of midwifery training. Professional competency acquisition underpins effective practice, with adequate learning opportunities fundamental to the clinical education process.

Objectives: This study aimed to examine the effectiveness of clinical education using a three-phase clinical education model among midwifery students.

Methods: This quasi-experimental study employed a pre-test-post-test design with a control group, comprising 26 students and 3 clinical instructors selected through census sampling. The study was conducted in the labor ward of Ali ibn Abi Talib Hospital (Zahedan University) from September to December 2023. Students were randomly assigned into two groups (n=13 each). The control group received traditional education, while the intervention group followed a three-phase clinical education model. Training effectiveness was evaluated using pre/post-intervention questionnaires. Data were analyzed using paired t-tests for within-group comparisons and independent t-tests for between-group analyses. Open-ended responses underwent summative content analysis.

Results: The intervention group showed a significant improvement in perception scores from 50.30±8.58 at pre-test to 64.40±9.06 at post-test (P<0.001), whereas the control group showed no significant change (P=0.900). Between-group comparisons confirmed a significant post-test difference, and the mean score change was significantly greater in the intervention group (14.07±11.78 vs. −0.33±10.04, P=0.001). Qualitative findings identified three subcategories of advantages and three subcategories of disadvantages regarding the educational method.

Conclusion: The new educational method improved learning, structure, and clinical competency acquisition among midwifery students, directly impacting patient care delivery.

Keywords: Educational Model; Clinical Education; Midwifery; Quasi-Experimental Study

Background

Clinical education forms the core of midwifery training, translating theoretical knowledge into practical competencies and serving as the crucial link between classroom instruction and clinical environments (1, 2). By developing essential cognitive, emotional, and psychomotor skills for client care, midwifery students- who spend over 50% of their training in direct patient care settings- build the clinical proficiency fundamental to their professional practice (3, 4). This is particularly critical in midwifery, as evidence shows that effective midwifery significantly reduces maternal and neonatal mortality, with trained midwives capable of delivering essential maternal and newborn care services (5). Globally, such evidence underscores the transformative potential of skilled midwifery; in the Iranian context, this is exemplified by the substantial decline in the maternal mortality ratio from 48 per 100,000 live births in 2000 to 16 in 2017, largely due to enhanced midwifery services under multidisciplinary supervision (6).

Despite the central role of clinical education's importance in midwifery, studies reveal a significant gap between theoretical instruction and students' clinical performance (7). Research shows that current clinical

training programs inadequately develop required competencies, with most midwifery students focusing on lower cognitive domain levels (e.g., knowledge recall and basic comprehension) rather than higher-order skills- such as analysis, evaluation, and clinical decision-making- contrary to curriculum objectives (8, 9).

Midwifery education in Iran primarily follows a traditional instructor-led approach where instructors explain patient conditions before joint examinations and diagnostic decisions (10). This method may limit students' clinical competency development. In spite of exploring various educational frameworks, midwifery training lacks a comprehensive model addressing all clinical skill dimensions, particularly the integrated development of higher cognitive skills (e.g., critical thinking), affective domains (e.g., emotional resilience), and advanced psychomotor abilities through structured, progressive training (11). Implementing more effective teaching approaches could enhance midwifery care quality and potentially further reduce maternal and infant mortality rates.

Objectives

This study was conducted to evaluate the effectiveness of the clinical education model (a three-phase model of clinical skills training) at Zahedan University of Medical Sciences.

Methods

Study design: This study employed a quasi-experimental design with a pre-test–post-test structure and a control group.

Study setting and participants: The research was conducted over a 120-day period, from September 1 to December 30, 2023, in the maternity ward of Ali ibn Abi Talib Teaching Hospital, affiliated with Zahedan University of Medical Sciences. The study included all 26 fifth-semester undergraduate midwifery students and their instructors, using census sampling due to the small and accessible population.

Sample size calculation: According to the study conducted by Mohammadi Rizi et al. (2015) and considering students' perceptions of clinical education quality as the main outcome, the sample size was calculated (95% confidence interval and 80% power) according to the relevant formula for comparing means between two independent groups:

Where:

n: the required sample size per group,

$Z_{1-\alpha/2}$: The Z-value corresponding to the two-tailed confidence level (1.96 for $\alpha = 0.05$, or 95% confidence),

$$(n = \frac{\left(z_1 - \frac{\alpha}{2} + z_1 - \beta\right)^2 (\delta_1^2 + \delta_2^2)}{(\mu_1 - \mu_2)^2})$$

$Z_{1-\beta}$: The Z-value corresponding to the desired power (0.84 for $\beta = 0.20$, or 80% power),

σ_1 and σ_2: The standard deviations of the outcome variable in the control and intervention groups, respectively,

$\mu_1 - \mu_2$: The anticipated difference in means between the two groups**.**

A sample size of 13 individuals was obtained for each group (12). Thus, regarding normality assumptions with our small sample size (n=13 per group), we conducted the Shapiro-Wilk test to formally assess whether our data met the assumptions for parametric testing. Results of the Shapiro-Wilk test indicated that all variables (pre-test and post-test scores in both control and intervention groups) demonstrated normal distribution (all P>0.05, ranging from 0.933 to 0.970).

Inclusion and exclusion criteria: Eligible participants included fifth-semester midwifery students at Zahedan University enrolled in childbirth internship who attended regularly and completed all assessments. These 26 students were included via census and then randomly assigned into intervention/control groups. Students missing multiple sessions or unavailable were excluded.

Inclusion criteria for clinical instructors required: 1) at least 3 years of responsibility for teaching midwifery students; 2) possession of a master's or doctoral degree in midwifery or a related field; and 3) willingness to participate in the study and implement the clinical education model, assessed via formal consent and a pre-study orientation workshop. Three such willing clinical instructors who applied the clinical education model were selected and included via census among eligible candidates.

Research approach: This study evaluated a three-phase clinical education model in midwifery training. After explaining objectives and obtaining informed consent, 26 fifth-semester midwifery students enrolled in 'Normal and Abnormal Delivery Internship' were included via census and then randomly divided into control and experimental groups (13 each). The control group received conventional training (a teacher-centered approach standard in Iranian midwifery programs, involving instructor explanation after student history-taking, joint examination, and diagnostic decision-making (10), while the experimental group followed a novel model developed by the research team through a literature review and expert consultations. This three-phase clinical education model was implemented across ten sessions (each

lasting approximately 6-8 hours), aligned with typical clinical shift durations in Iranian midwifery internships to balance practical training and student well-being (13). This model focused on preparation, interpersonal interaction, active learning, critical thinking, and clinical reasoning, supported by proactive instructor guidance and constructive feedback. Two weeks post-intervention, identical post-test questionnaires were administered to both groups to evaluate short-term retention and skill consolidation, minimizing immediate recall bias and longer-term confounding. Additionally, the experimental group provided qualitative feedback on their learning experience.

Pre-implementation measures for the educational intervention: Prior to implementation, a clinical education model was developed based on comprehensive literature review, research team expertise, and input from medical education experts, and documented in a training booklet. Various clinical education models (14, 15) and their applications were examined, leading to finalization of the model through expert feedback. The booklet outlined the model's features, content, and procedures, and included a schematic framework (Figure 1). Midwifery instructors participated in a six-hour workshop on effective implementation, including questions and challenges addressed through interactive discussions, as well as intervention planning, duration, and assessment timeline.

Educational intervention: The newly implemented clinical education model was structured in three distinct phases, as summarized in Table 1.

Data Collection Instrument: Students' perspectives on the quality of midwifery education were evaluated using a validated questionnaire designed by researchers. This questionnaire was administered before the intervention and two weeks after. It included demographic data, 16 items rated on a five-point Likert scale (1=strongly disagree to 5=strongly agree), and open-ended questions regarding the new educational approach. Questionnaire items, developed from literature review (16, 17) and research team insights, covered four domains: motivation for clinical education (2 items: 1 and 2), participation in learning (4 items: 3, 4, 5, 6), educational structure (4 items: 7, 10, 12, 15), and clinical readiness (6 items: 8, 9, 11, 13, 14, 16). For clarity and fidelity to the actual instrument, one authentic item from each domain is provided in Table 2. Content validity was evaluated using the Content Validity Index (CVI) and Content Validity Ratio (CVR) by ten experts. CVI was calculated as the proportion of experts rating items 3 or 4 (relevance, clarity, simplicity); scores>0.79 were acceptable, 0.70–0.79 required revision, and <0.70 led to elimination. CVR was computed using Lawshe's formula.

Results confirmed adequate content validity. Cronbach's alpha was 0.921, indicating high reliability (>0.70). Content validity was established through review by four medical education experts with suggested revisions incorporated. Reliability was confirmed using test-retest method with Cronbach's alpha coefficient of α=0.92.

Data Analysis: Data analysis employed descriptive statistics, paired t-tests for within-group comparisons, and independent t-tests for between-group comparisons using SPSS v26 (significance level 0.05, 80% power). Open-ended responses underwent summative content analysis with independent coding by two authors, involving keyword extraction, code organization into categories, and credibility review. Discrepancies in coding were resolved through discussion and consensus between the two coders, with a third author consulted if agreement could not be reached. This method was chosen due to response brevity, allowing systematic pattern identification and comprehensive understanding of participants' experiences (18).

In this study, 26 undergraduate midwifery students and 3 clinical instructors participated. The mean age ± standard deviation of students in the control group was 21.30±1.31 years, while in the intervention group, it was 21.84±2.08 years. The mean age of the clinical instructors was 43.60±2.08 years. Additional demographic information of the study participants is presented in Table 3. Independent t-tests and chi-square tests were performed to compare demographic characteristics between the intervention and control student groups. No significant differences were found (p>0.05 for gender, age and marital status).

Comparison of clinical education evaluation scores between traditional and new method: To assess intervention effectiveness, total questionnaire scores were analyzed using paired t-tests for within-group comparisons. In the control group, mean perception scores of clinical education quality showed a slight decrease from 48.90±8.77 at baseline to 48.60±4.94 post-intervention (P=0.900). In contrast, the intervention group demonstrated a substantial improvement, with mean scores rising from 50.30±8.58 to 64.40±9.06 (P<0.001) (Table 4).

Due to the constraints of the paper's word limit, supplementary results from this study are included in the Appendices 1-3.

Discussion

This study assessed the effectiveness of a three-phase clinical education model on instruction quality for midwifery students at Zahedan University of Medical Sciences, finding that the intervention enhanced students' perceived quality of instruction.

Clinical Education Model: This study's educational model provided structured clinical instruction through a systematic approach. It aligns with established frameworks like SNAPPS (formerly SNNAP) (19) and the four-step method (12), but uniquely integrates a three-stage structure—preparation cycle (pre-round), clinical encounter cycle (round), and conclusion cycle (post-round)—tailored to midwifery contexts in resource-limited settings. Research confirms that such structured approaches standardize instruction, enable objective evaluation, and bridge the theory-practice gap (20). While similar to models by Mohammadi Neyrizi et al. (12, 21), and Cohen et al. (22)—as well as Cox (23), Meeting-to-Meeting (15), and Engage (24)—our model advances these by emphasizing patient involvement as educational partners. This fosters ethical balance between student learning and patient dignity, an aspect underexplored in prior midwifery-focused studies (25). By starting with preparation and clear objectives, progressing through other steps to develop diverse competencies, and ending with feedback for deep learning, our approach addresses gaps in traditional models, such as inconsistent patient-centered integration.

Quantitative findings indicate the intervention's effectiveness, with students' perceptions of clinical education quality significantly improving (intervention group scores increased from 50.33 to 64.40). This enhancement is likely due to the incorporation of active, participatory learning methods that foster direct engagement and hands-on experience, promoting deeper understanding and improved competencies (26). Our results align with but extend previous research. For instance, Mohammadi Neyrizi et al. (12) reported 77% improvement in delivery management skills, while Parchebafieh et al. (27) noted enhancements in clinical skills and satisfaction. However, unlike these smaller or qualitative studies, our quasi-experimental design provides robust evidence of perceptual improvements in instruction quality, complementing skill-focused outcomes in competency-based models (28). Additional studies confirm that innovative methods during clinical rounds enhance learning (29), but our work contributes novel insights into midwifery-specific applications in Iran, where structured models are less evaluated (25).

Advantages of the New Educational Approach: Clinical education is vital for developing midwifery students' professional competencies.

Student perspectives indicate that effective teaching methods enhance learning and qualification acquisition through two key dimensions: enhanced learning and targeted instruction (14), aspects our model uniquely operationalizes via its phased structure. Students reported appropriate strategies led to deeper understanding and better theoretical knowledge consolidation. They also noted improved ability in physiological childbirth (30). Targeted instruction with clear objectives (31), continuous supervision, and in-depth content (32) increased student confidence with patients and enhanced clinical skills. Literature supports the value of targeted education and effective knowledge transfer (33).

Our study adds to this by demonstrating how integrating these elements in a midwifery-tailored model yields measurable perceptual gains, beyond the self-efficacy and skill development reported in placement-focused research (34).

Disadvantages of the New Educational Approach: Despite its advantages, our model faces challenges common to clinical education in midwifery. These include time constraints due to high student numbers (35, 36) and inadequate infrastructure, such as insufficient spaces and equipment (37). Such factors can lead to incomplete content coverage, hindered skill acquisition, and diminished student confidence (25, 38). While our intervention mitigated some issues through standardized protocols, broader environmental limitations persist, as highlighted in recent surveys of nursing and midwifery education (25).

Study limitations included a small sample size, single-center implementation, varying clinical case complexity, and differences in instructor implementation. While these were partially addressed through uniform case selection and standardized protocols, they still pose potential impacts on validity and generalizability. The small sample may introduce selection bias and reduce statistical power, limiting the detection of subtle effects beyond Zahedan University. The single-center design restricts external validity, potentially overestimating effectiveness in better-resourced environments. Varying case complexity could confound results, while instructor differences may threaten internal validity through inconsistent model delivery. Future research should utilize semi-structured interviews for deeper insights, adopt multi-center designs for broader applicability, and

employ larger samples to enhance power and reduce bias.

Conclusion

The findings of this quasi-experimental study indicate that innovative, active teaching methods in midwifery education enhance student learning, build professional competencies, and improve patient care quality. Successful implementation necessitates faculty mentorship, sufficient clinical instruction time, appropriate infrastructure, and adequate equipment. Additionally, developing flexible programs that can adapt to emergencies further strengthens educational outcomes.

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Conflict of interests: There is no conflict of interest.

Ethical approval: This study is part of a Master's thesis in Medical Education, approved under project code 99000819 and approved by the Ethics Committee of Kerman University of Medical Sciences (Ethics Code: IR.KMU.REC.1399.668).

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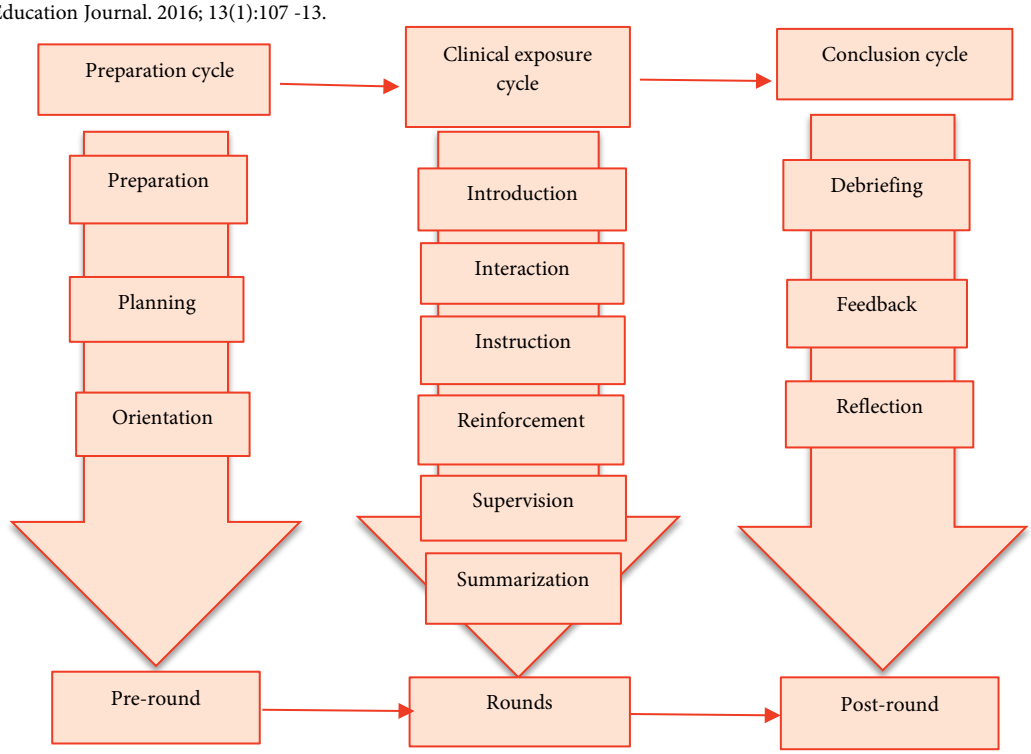

Figure 1. Schematic framework of the Clinical Education Model

Table 1. Structure of the Clinical Education Model for Midwifery students

Cycle	Step	Description
Preparation Cycle	Preparation	Instructors demonstrate full mastery of educational content and clinical skills.
	Planning	Determining student numbers, clinical round objectives, patient selection, student role allocation, and scheduling.
	Orientation	Assessing students' baseline knowledge through question and answer to tailor instruction and communicate educational objectives and policies.
Clinical Encounter Cycle	Introduction	Students meet patients and obtain informed consent in accordance with hospital procedures and ethical guidelines, ensuring patient privacy and confidentiality.
	Interaction	Patient engagement in the educational process with student questioning encouraged.
	Instruction	Structured teaching focused on critical thinking and clinical reasoning skills.
	Reinforcement	Enhancing clinical skills through feedback and error correction.
	Supervision	Close monitoring of student activities.
	Summarization	Reviewing and consolidating session content.
Conclusion Cycle	Debriefing	Comprehensive explanation of discussed subject matter.
	Feedback	Examining student strengths and weaknesses.
	Reflection	Planning targeted strategies to address weaknesses and enhance future performance.

Table 2. Authentic questionnaire items by domain (one example per domain)

Domain	Item No.	Description
Motivation for clinical education	Item 2	"I have motivation, enthusiasm, and interest in attending the clinical training sessions."
Participation in learning	Item 3	"I play an active role in my own learning process."
Educational structure	Item 12	"The objectives and teaching plan are clearly defined."
Clinical readiness	Item 13	"The clinical training sessions increase my readiness and mastery in performing clinical skills."

Table 3. Demographic characteristics of the study participants

Variable	Clinical Instructors	Control Group	Intervention Group
Gender (n) (%)			
Female	3 (100.0)	13 (50.0)	13 (50.0)
Male	0 (0)	0 (0)	0 (0)
Age (year)	43.60 ± 2.08	21.30 ± 1.31	21.84 ± 2.08
Marital Status (n) (%)			
Single	1 (33.3)	12 (92.3)	10 (76.9)
Married	2 (66.7)	1 (7.7)	3 (23.1)
Field of Study (n) (%)			
Reproductive Health	2 (66.7)	0 (0)	0 (0)
Midwifery	1 (33.3)	13 (50.0)	13 (50.0)
Educational Level (n) (%)			
PhD	2 (66.7)	0 (0)	0 (0)
Master's Degree	1 (33.3)	0 (0)	0 (0)
Bachelor's Degree	0 (0)	13 (50.0)	13 (50.0)
Teaching Experience (n) (%)			
1–5	0 (0)	0 (0)	0 (0)
6–10	2 (66.7)	0 (0)	0 (0)
11–15	1 (33.3)	0 (0)	0 (0)

Table 4. Comparison of students' perceptions between traditional and new clinical Teaching Method

Group	Before (Mean(SD))	After (Mean(SD))	t-statistic*	P-value
Control	48.90(8.77)	48.60(4.94)	0.129	0.900
Intervention	50.30(8.58)	64.40(9.06)	-4.62	<0.001

SD: Standard Deviation

*Paired t-test

Appendix 1. Between-group comparison of students' perception scores before and after the intervention

Group		t-statistic*	P-value
Pre-test	Control	-0.442	0.642
	Intervention		
Post-test	Control	-5.929	<0.001
	Intervention		

*Independent t-test

Appendix 2. Comparison of mean score differences between groups pre- and post-intervention

Group	Mean	SD	Difference in mean change	Test Statistic	P-value	Effect Size	95% CI
Control	-0.33	10.04	14.4	-3.60	0.001	1.28	0.50-2.04
Intervention	14.07	11.78					

SD: Standard Deviation

Appendix 3. Students' perspectives of the new teaching method

Main Category	Subcategory	Codes	Example quotes
Strengths	Enhanced Learning	Deepened understanding Improved retention of theoretical concepts Adequate preparation and practical experience for future work Enhanced performance in physiological childbirth Effective integration of theory and practice	"This method helped me understand the material much deeper than before." "Theoretical lessons are more firmly fixed in mind. We gain readiness and experience for future work."
	Goal-oriented teaching	Clear learning objectives at session start Defined tasks reducing confusion Continuous instructor supervision Detailed coverage of educational topics	"The clear objectives and feedback made me more confident in handling patients."
	Development of Professional Competencies	Improved history-taking skills More effective physical examinations Instructor modeling of professional patient interaction Increased confidence in patient care	"I felt more prepared for real clinical decisions after the structured phases."
Weaknesses	Time Constraints	Limited time per student due to high volume and emergencies Prolonged sessions without sufficient breaks Scheduling conflicts with residents	"With so many students, we sometimes ran out of time to cover everything." "Prolonged sessions with no sufficient downtime made it hard to retain information or stay engaged with patients."
	Inadequate Educational Infrastructure	Lack of dedicated space for educational rounds Insufficient facilities in physical environment Shortage of equipment for clinical skill practice	"Lack of equipment in the ward made some practices difficult."
	Communication and Support	Poor coordination among staff, instructors, and students Insufficient instructor support and excessive criticism Disrespect from personnel reducing student confidence	"There was no clear communication about who was responsible for what during rounds, leading to confusion and missed learning opportunities for us." "The disrespect from personnel, like ignoring our input or belittling our efforts, made me doubt my abilities and hesitate in clinical situations."