

The Use of Bedside Case-Based Learning in the Clinical Practice of Midwifery Education in China

Yao Zhang

Zhejiang Chinese Medical University

Xinfen Xu

Women's Hospital, School of Medicine, Zhejiang University

Fang Wang

Women's Hospital, School of Medicine, Zhejiang University

Lewei Tu

Zhejiang Chinese Medical University

Qinqi Deng

Zhejiang Chinese Medical University

Mengyan Xu

Hangzhou Women's Hospital

Guijuan He

Zhejiang Chinese Medical University

Linda Johnston

linda.johnston@utoronto.ca

Lawrence S. Bloomberg Faculty of Nursing, University of Toronto

Research Article

Keywords: Bedside Case-Based Learning (BCBL), Bedside Teaching, Case-Based Learning (CBL), Self-Rating Scale of Self-Directedness Learning (SRSSDL), Critical Thinking Disposition Inventory-Chinese Version (CTDI-CV), Bachelor's Degree Midwifery Education

Posted Date: March 5th, 2024

DOI: <https://doi.org/10.21203/rs.3.rs-3984740/v1>

License:  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Additional Declarations: No competing interests reported.

Abstract

Aim

This study aimed to investigate the impact of bedside case-based learning on critical thinking and capacity for self-directed learning in a group of midwifery students in China

Background

Bedside teaching is a well-established educational tool to improve the clinical practice of medical, nursing, and midwifery students. A new pedagogical approach; bedside case-based learning (BCBL) is an interactive teaching approach involving small-group, student-educator discussion to describe the etiology and management of a patient case. This new approach has been gradually integrated into Chinese midwifery education programs to promote clinical problem-solving skills, knowledge application, teamwork, and collaboration.

Design:

A quasi-experimental pre-test-post-test group design

Methods

This study used a quasi-experimental pre-test-post-test group design. A convenience sample of 67 third-year students majoring in midwifery at the university were prospectively enrolled in this study. Pre- and post-BCBL class surveys were conducted using the Self-Rating Scale of Self-Directed Learning (SRSSDL) and the Critical Thinking Disposition Inventory-Chinese Version (CTDI-CV) to assess changes in self-learning and critical thinking abilities before and after the intervention.

Results

Following bedside case-based learning, the total scores for self-directed learning capacity and critical thinking increased, although there were no statistically significant differences ($P > 0.05$).

Conclusions

Although there were no statistically significant differences between pre- and post-test results, students' self-assessed scores in self-directed learning and critical thinking improved between pre- and post-test.

Background

As a result of the 2016 'Two-Child Policy' and the subsequent 2021 'Three-Child Policy', China has increasingly faced the challenges of a midwifery workforce shortage. [1]. The International Confederation of Midwives (ICM) has indicated that education is one of the three critical foundations for midwifery workforce development[2]. A 4-year direct-entry midwifery education for bachelor's degrees was established in four universities in China in 2016[3]. Teaching content in this program in the first two years is focused on fundamental theories. In the third year of the program, students complete courses relating to clinical practice in simulation lab. Students must complete at least ten months of continuous integrative clinical practicum in the fourth year of the program.

Bedside teaching is a vital component of midwifery education. Bedside Case-Based Learning (BCBL) combines interactive bedside teaching and case-based learning using instructor-led small group discussion to identify a presenting patient's etiology and management. BCBL is a novel active learning approach that has been promoted as piquing student attention, motivating them to prepare ahead of time and work in groups, and enhancing their critical thinking skills, all of which are linked to their problem-solving abilities[4]. Although there are numerous studies on active learning strategies[5–7], the impact of a bedside, case-based learning approach to improve midwifery students' self-directed learning and critical thinking skills has not been studied to date.

Methods

Study design

This study was a quasi-experimental design using one group pre-test-post-test design.

Sample Selection and Setting

This study was conducted in an undergraduate direct-entry midwifery program at the Zhejiang Chinese Medical University nursing school in Zhejiang Province, China. A convenience sample of all midwifery students, having successfully completed foundational courses in Years 1 and 2; were provided with information about the study, a consent form, and invited to participate in the study. The study enrolled sixty-seven third-year students majoring in midwifery, which was the first-generation midwifery student at the Zhejiang Chinese Medical University nursing school.

Application of Bedside Case-Based Learning Model

At the beginning of the semester, students completed the pre-class surveys; the Self-Rating Scale of Self-Directed Learning (SRSSDL), and the Critical Thinking Disposition Inventory (CTDI)-Chinese version to provide baseline data. At the end of the semester, all students were required to complete the post-class surveys with the same scales to evaluate the effect of BCBL in improving students' learning abilities. The BCBL process lasted for the whole semester with a class held each week.

The BCBL approach was as follows:

Before class, clinical instructors prepared the teaching materials and required readings for the course, identified the learning objectives and the typical clinical scenario case one day in advance of class, collaborated with the identified patient on the process, and obtained consent from the patient. Before each class, students engage with the provided content and complete the required readings. There are a total of 14 themes over the semester (Table 1).

Table 1
Teaching themes in the BCBL approach to midwifery education

Teaching themes
Gestational hypertension, Intrahepatic cholestasis of pregnancy
Preterm birth & Post-term birth
Peripartum cardiomyopathy
Gestational diabetes mellitus
Liver disease during pregnancy
Anemia in pregnancy
High-risk pregnancy
Cesarean section
Abnormal labor and delivery
Shoulder dystocia
Postpartum Hemorrhage
Uterine rupture
Amniotic fluid embolism
Postpartum disorder

Before beginning classroom activities, students are assigned to one of four parallel groups of seven to eight individuals. All clinical instructors receive the same training on teaching content and how to deliver BCBL effectively in advance. The clinical instructors are practicing midwives at Hangzhou Women's Hospital. Each class session begins with a brief overview of the topic and the class schedule.

Each clinical instructor presents a typical patient case with the same disorder using a slide deck. The clinical instructors then lead students to the bedside to directly acquire the patient's medical history.

Students then engage in small-group discussions under the supervision of the clinical instructor where they are encouraged to pose relevant clinical questions to patients and seek information using the Internet or the databases held by the hospital library.

A student representative from each group presents a summary of the key findings to the class, the group's responses to the questions raised, and clarification on any unanswered questions.

Subsequently, the clinical instructors review the essential theoretical information and summarize it for the class

Students are required to complete and submit an assessment report at the end of each class.

Instruments

Self-assessments completed by students included the Self-Rating Scale of Self-Directed Learning (SRSSDL) and the Critical Thinking Disposition Inventory-Chinese Version (CTDI-CV) to measure midwifery students' self-directed learning ability, and critical thinking, at the beginning and end of the semester.

Williamson developed the self-rating scale of self-directed learning (SRSSDL) in 2007[8]. The author authorized Shen Wangqin and Hu Yan[9] from Fudan University to translate it to Chinese in 2012. The SRSSDL consists of 60 categories across five dimensions: awareness (12 items), learning activities (12 items), learning strategies (12 items), evaluation (12 items), and interpersonal skills (12 items). The responses for each item are rated using a five-point Likert type scale (5 = Always, 1 = Never). The score ranges from 60 to 300 points, with a higher score indicating a higher ability for self-directed learning. The Chinese version of the SRSSDL has demonstrated good reliability and internal consistency (Cronbach's α coefficient is 0.97).

Based on the California Critical Thinking Dispositions Inventory, Pang[10] adapted and updated the Chinese Critical Thinking Disposition Inventory (CCTDI). The scale is a standardized 70-item, multiple-choice survey with seven dimensions: truth-seeking (10 items), open-mindedness (10 items), analyticity (10 items), systematicity (10 items), self-confidence (10 items), inquisitiveness (10 items), and cognitive maturity (10 items). The responses for each item are rated using a six-point Likert type scale (6 = Strongly Agree, 1 = Strongly Disagree). The total score ranges between 70 and 420 points with a higher score indicating higher critical thinking skills. The Chinese version of the CCTDI has demonstrated good reliability and internal consistency (Cronbach's α coefficient is 0.90).

Data analysis

The data were processed and analyzed using SPSS version 20.0 (Chicago, USA). Continuous variables, such as demographic characteristics, are presented as mean \pm standard deviation. Categorical variables are shown as the number of participants (percentage). A paired sample t-test was used to analyze the mean difference between pre- and post-test for the same students. P values < 0.05 were considered statistically significant.

Results

Participants

A total of sixty-seven third-year undergraduate students majoring in midwifery were enrolled in our study, representing a response rate of 100%. All participants were female, with an average age of 20.21 ± 0.729 years. They all completed the midwifery bedside teaching course with no study withdrawals. Most students (55/67) had indicated an interest in midwifery before admission, and 64/67 students wanted to work at the hospital after graduation (Table 2).

Table 2
Demographic information of the participants

Variable	n(%)
Age Group	
18 ~ 20 years	48(72)
21 ~ 25 years	19(28)
Majors of interest before admission	
Midwifery	55(82)
Other majors	12(18)
Work intention after graduation	
Midwifery and related work	64(96)
Other	3(4)

Pre–and post-class self-directed learning

We compared the pre- and post-class survey scores of SRSSDL (Table 3). We found that the post-class scores for learning awareness, learning behavior, learning strategies, learning evaluation, and interpersonal skills of self-directed learning ability were no different when compared to the pre-class survey scores ($P > 0.05$).

Table 3
Pre-and post-class SRSSDL scores

Dimensions	Before BCBL	After BCBL	T value	P value
	Mean ± SD	Mean ± SD		
Awareness	27.36 ± 5.353	28.12 ± 4.819	0.835	0.405
Learning strategies	27.04 ± 5.221	27.12 ± 5.077	0.868	0.387
Learning Activities	27.72 ± 5.564	28.17 ± 4.373	0.503	0.616
Evaluation	28.31 ± 5.980	28.67 ± 4.417	0.375	0.708
Interpersonal skills	26.99 ± 5.701	26.99 ± 5.820	0.279	0.781

Pre- and post-class CTDI-CV scores

We compared the pre- and post-class survey scores of CCTDI-CV and found no statistically significant difference between the two groups ($P > 0.05$). (Table 4)

Table 4
Pre-and post-class CTDI-CV scores

Dimensions	Before BCBL	After BCBL	F value	Pvalue
	Mean ± SD	Mean ± SD		
Truth-seeking	35.612 ± 6.543	36.817 ± 6.833	0.178	0.673
Open-mindedness	37.940 ± 6.483	37.400 ± 6.173	0.000	0.995
Analyticity	32.731 ± 7.959	34.017 ± 5.299	3.468	0.065
Systematicity	34.268 ± 6.195	35.467 ± 5.350	1.036	0.311
Self-confidence	32.328 ± 7.042	33.817 ± 5.537	2.365	0.127
Inquisitiveness	33.328 ± 6.702	35.800 ± 5.068	3.552	0.062
Cognitive Maturity	41.075 ± 8.459	41.567 ± 6.956	2.169	0.143

Discussion

Midwifery is a practice-based specialty; with education programs aimed at cultivating skilled midwives with solid theoretical knowledge, proficient clinical practice skills, and the interpersonal skills required for caring for pregnant women and infants [11]. The four-year or five-year bachelor's degrees; direct entry midwifery programs were re-established in four university nursing schools in 2016 after several years in abeyance[3]. Baccalaureate midwifery education is still developing in China in the face of a growing urgency to graduate increased numbers of midwives to meet demands under the recently implemented "Three-Child Policy".

Historically, the midwifery education model was theory-based and taught in a traditional lecture-based format. However, such traditional models of midwifery education may no longer meet the needs of students. Students are reported to have often challenges in relation to participation and engagement in their own learning, difficulty integrating theory and practice, and a lack of ability to problem-solve in the clinical environment. [12]. As a consequence, new graduates become comfortable with clinical work only when working at a hospital, with the development of critical thinking skills requiring immersion in authentic and/or simulated clinical settings and interaction with patients. Compared to the traditional training model, some studies have demonstrated the advantages of either CBL or bedside teaching[13–16]. Bedside case-based learning(BCBL) is a specialized form of interactive small-group teaching in the patient's presence in the hospital and is reported to be a better way to integrate theoretical learning with clinical practice for midwifery students[4]. Previous studies have generally focused on either CBL *or* Bedside teaching as separate approaches. Furthermore, several studies have shown that the practice of bedside teaching has been declining in recent years for a variety of reasons, including an increased patient turnover secondary to reduced lengths of stay, concerns regarding patient privacy, and the higher costs associated with this intensive approach to teaching[13]. With the outbreak of COVID-19, simulation-based education replaced bedside teaching in health professions education[17]. Some studies have shown that the difference in knowledge and skills between non-bedside simulation teaching and bedside teaching is not significant[18–20]. The difference may lie in communication skills and abilities.

In this study, we combined bedside teaching and case-based learning in order to provide more interactive sessions. Our pre-post test design found that the scores for SRSSDL were not significantly different. One reason may be the small sample size with only sixty-seven participants. Although the scores did not show any significant difference in self-directed learning abilities pre- and post-class, students self-reported making progress in three dimensions: awareness, learning activities, and evaluation. The results also showed that students were acquiring new knowledge beyond the prescribed course objectives and raising questions independently.

Several studies are consistent with the results of our study. A study by Kulkarni et al. in 2019 reported highly positive results in the integration of case-based learning strategies in bedside clinics[21]. Their study reported a high level of motivation among the students using this approach (88%). Dubey et al. and Nair et al. also reported similar results; showing 74–98% motivation among the students to learn using additional resources [22, 23]. Moreover, bedside teaching may be more engaging for students by presenting case scenarios and allowing the students to solve problems the way they would as midwives working in wards. This BCBL approach is similar to the approach used by the United States Medical Licensing Exam (USMLE) in their final step 3 (Clinical Case Simulators).

Previous reviews have demonstrated that bedside teaching can improve the communication abilities of medical students and residents[14]. However, our study did not identify any significant improvement in students' interpersonal skills. One possible reason may be that the number of people in each bedside teaching group is limited to ten. In addition, when taking a patient's medical history, not every member of the group can engage in effective nurse-patient conversation. Students self-reported the lowest score in

the domains of "share information with others" and "easy to work with others." Clinical instructors may lack relevant teaching skills to encourage students to participate in teamwork.

Previous studies have shown that CBL is effective in teaching specialized nursing courses and increases students' satisfaction and critical thinking skills[24]. Our study compared the pre-and post-class scores of each item in the Chinese version of the Critical Thinking Disposition Inventory (CTDI-CV) and found no statistical differences between pre-and post-class scores in each dimension. One possible reason may be that the clinical instructors themselves lack training in developing critical thinking skills in students. According to Glen[25], critical thinking is considered as an indispensable element of education and a trait of an educated person. The disadvantage is that one is unable to teach critical thinking if one is not a critical thinker oneself. Educators may not have their own critical and reflective thinking developed when they were learners, which makes it difficult for them to facilitate critical thinking as instructors. Approaches to developing those skills in educators may be an area that needs further exploration.

Limitations

The outbreak of COVID-19, which resulted in visiting restrictions at hospitals, presented a serious limitation to further study. In addition, we did not include a control group with a standard teaching model for the analysis. Case-control studies with a larger sample size should be considered in future research to lessen the risk of confounding factors.

Conclusion

In summary, a bedside case-based learning strategy for midwifery students did not lead to improvements in independent learning and critical thinking abilities in this study. This teaching method is also a challenge for clinical instructors; requiring excellent foundational knowledge, extensive clinical experience, and highly developed critical thinking skills. The new BCLC model may need more observations and further research to continually optimize and summarize past experiences and deficiencies for future improvement.

Abbreviations

Bedside Case-Based Learning (BCBL)

Self-Directed Learning (SRSSDL)

Critical Thinking Disposition Inventory-Chinese Version (CTDI-CV)

Case-Based Learning (CBL)

International Confederation of Midwives (ICM)

United States Medical Licensing Exam (USMLE)

Declarations

Ethical approval and consent to participate

This study was approved by the Research Ethics Committee at the Nursing School of Zhejiang Chinese Medical University and conducted according to the Helsinki Declaration. Informed consent was obtained from all the participants.

Consent for publication

Not applicable

Availability of data and materials

The authors confirm that the data supporting the findings of this study are available within the article

Competing interests

The authors declare that they have No competing financial interests exist.

Funding sources

This study was supported by Zhejiang Medicine and Health Technology Plan Project (Innovative Talent Support Plan Project [grant number 2020RC024];

Zhejiang Province Higher Education Teaching Reform Project [grant number jg20190220]; and Zhejiang Chinese Medical University Talent Support Project [grant number 2020SR02].

Authors' contributions

All authors contributed to conception, design and data analysis of this study.

Yao Zhang contributed to the acquisition and interpretation of data and drafted the manuscript.

Xinfen Xu contributed to the conceptualization of the manuscript.

Fang Wang critically revised the manuscript.

Lewei Tu provided critical feedback on the manuscript.

Qinqi Deng contributed to the design of the study and performed statistical analyses.

Mengyan Xu contributed to the data collection and interpretation

Guijuan He (Corresponding Author 2) contributed to the study design and revised the manuscript.

Linda Johnston (Corresponding Author¹) contributed to the interpretation of data and provided significant revisions to the manuscript.

Acknowledgements

All the participants in this study

References

1. Li Y, Lu H, Zhao Y, Ren L, Cao L, Pang D, et al. Core competencies of the midwifery workforce in China: A scoping review. *J Nurs Manag.* 2022;30:535–58.
2. Li Y, Lu H, Zhao Y, Ren L, Cao L, Pang D, et al. Core competencies of the midwifery workforce in China: A scoping review. *J Nurs Manag.* 2022;30:535–58.
3. Gao Lling, Lu H, Leap N, Homer C. A review of midwifery in mainland China: Contemporary developments within historical, economic and sociopolitical contexts. *Women Birth.* 2019;32:e279–83.
4. Kulkarni SP, Kurane AB. Integration of case based learning and bedside teaching in undergraduate students in pediatrics. *Int J Contemp Pediatr.* 2019;6:2112.
- 5.
6. Capone R. Blended Learning and Student-centered Active Learning Environment: a Case Study with STEM Undergraduate Students. *Can J Sci Math Technol Educ.* 2022;22:210–36.
7. Oliván-Blázquez B, Aguilar-Latorre A, Gascón-Santos S, Gómez-Poyato MJ, Valero-Errazu D, Magallón-Botaya R et al. Comparing the use of flipped classroom in combination with problem-based learning or with case-based learning for improving academic performance and satisfaction. 2022;:14697874221081550.
8. Williamson SN. Development of a self-rating scale of self-directed learning. *Nurse Res.* 2007;14:66–83.
9. Shen W, Hu Y. Reliability and validity of the Chinese self-directed learning scale. *Chin J Nurs.* 2011;46:1211–3.
10. Pang M, Wong K, Chan K, Chan M, Bai H, Li S. Validity and reliability of the Chinese critical thinking disposition inventory. *Chin J Nurs.* 2004;39:644–7.
11. Bergstrom L. Midwifery as a discipline. *J Nurse Midwifery.* 1997;42:417–20.
12. Behmanesh F, Bakouei F, Nikpour M, Parvaneh M. Comparing the Effects of Traditional Teaching and Flipped Classroom Methods on Midwifery Students' Practical Learning: The Embedded Mixed Method. *Technology, Knowledge and Learning* 2020 27:2. 2020;27:599–608.
13. Peters M, ten Cate O. Bedside teaching in medical education: a literature review. *Perspect Med Educ.* 2014;3:76.
14. Ratelle JT, Gallagher CN, Sawatsky AP, Kashiwagi DT, Schouten WM, Gonzalo JD, et al. The Effect of Bedside Rounds on Learning Outcomes in Medical Education: A Systematic Review. *Acad Med.*

2022;97:923–30.

15. Kaur G, Rehncy J, Kahal KS, Singh J, Sharma V, Matreja PS, et al. Case-Based Learning as an Effective Tool in Teaching Pharmacology to Undergraduate Medical Students in a Large Group Setting. *J Med Educ Curric Dev.* 2020;7:238212052092064.
16. McLean SF. Case-Based Learning and its Application in Medical and Health-Care Fields: A Review of Worldwide Literature. *J Med Educ Curric Dev.* 2016;3:JMECD.S20377.
17. Lukanović D, Allied AL-MIT. &, 2021 undefined. The impact of Covid-19 on simulation-based learning of gynecology and obstetrics skills. Taylor Francis. 2022;31:684–9.
18. Anggraini S, Chrisnawati C, Warjiman W. The Effectiveness of the Implementation of the Hospital Clinical Practice Based Simulation Model on the Practice Learning Outcomes of Nurse Profession Students During the Covid-19. *INDONESIAN NURSING JOURNAL OF EDUCATION AND CLINIC (INJEC).* 2022;6:185–91.
19. Heitmann H, Wagner P, Fischer E, Gartmeier M, Schmidt-Graf F. Effectiveness of non-bedside teaching during the COVID-19 pandemic: a quasi-experimental study. *BMC Med Educ.* 2022;22:1–7.
20. Ajab S, Pearson E, Dumont S, Mitchell A, Kastelik J, Balaji P et al. An Alternative to Traditional Bedside Teaching During COVID-19: High-Fidelity Simulation-Based Study. *JMIR Med Educ.* 2022;8(2):e33565 <https://mededu.jmir.org/2022/2/e33565>. 2022;8:e33565.
21. Kulkarni SP, Kurane AB. Integration of case based learning and bedside teaching in undergraduate students in pediatrics. *Int J Contemp Pediatr.* 2019;6:2112–5.
22. Dubey S, Dubey AK. Promotion of higher order of cognition in undergraduate medical students using case-based approach. *J Educ Health Promot.* 2017;6:75.
23. Pillai Nair S, Shah T, Seth S, Pandit N, Shah GV. Case Based Learning: A Method for Better Understanding of Biochemistry in Medical Students. *J Clin Diagn Res.* 2013;7:1576.
24. Shohani M, Bastami M, Leili I, Gheshlaghi A, Nasrollahi A. The effectiveness of CBL in teaching specialized courses to undergraduate nursing students. 2022. <https://doi.org/10.21203/rs.3.rs-1870481/v1>.
25. Glen S. Developing critical thinking in higher education. *Nurse Educ Today.* 1995;15:170–6.