



The impact of competency-based education on cognitive improvement and clinical skills in midwifery students

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ABSTRACT

Midwifery education is increasingly shifting toward the implementation of Competency-Based Education (CBE), a transformative approach aimed at producing graduates with robust clinical and cognitive competencies by emphasizing measurable outcomes across cognitive, psychomotor, and affective domains. Understanding how the CBE model is implemented and the outcomes it yields is crucial for informing curriculum design, faculty development, and institutional readiness. This article aims to evaluate the impact of CBE on enhancing the clinical skills and cognitive development of midwifery students. A literature search was conducted across PubMed, Google Scholar, Scopus, and ScienceDirect databases using Boolean operators for keywords related to CBE and midwifery education. Studies were selected using the PRISMA method based on specific inclusion criteria, resulting in the identification of 13 relevant studies published between 2021 and 2026. The analysis indicates that CBE significantly improves students' clinical procedural skills, critical thinking abilities, and decision-making capabilities. Simulation-based approaches, problem-based learning, and structured assessments proved effective in supporting competency attainment. However, implementation barriers such as resource limitations, a lack of faculty training, and institutional resistance remain prevalent, particularly in resource-limited settings. CBE contributes positively to the development of clinical and cognitive competencies among midwifery students.

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ABSTRAK

Pendidikan kebidanan semakin mengarah pada penerapan Competency-Based Education (CBE), sebuah pendekatan transformatif yang bertujuan menghasilkan lulusan dengan kompetensi klinis dan kognitif yang kuat melalui penekanan pada capaian terukur dalam domain kognitif, psikomotorik, dan afektif. Pemahaman tentang bagaimana model CBE diimplementasikan dan luaran apa yang dihasilkannya menjadi penting untuk menginformasikan desain kurikulum, pengembangan tenaga pengajar, serta kesiapan institusi. Artikel ini bertujuan untuk mengevaluasi dampak CBE terhadap peningkatan keterampilan klinis dan pengembangan kognitif mahasiswa kebidanan. Pencarian literatur dilakukan melalui database PubMed, Google Scholar, Scopus, dan ScienceDirect dengan menggunakan teknik Boolean operators untuk kata kunci terkait CBE dan pendidikan kebidanan. Studi diseleksi menggunakan metode PRISMA berdasarkan kriteria inklusi tertentu dan diperoleh 13 studi relevan yang terbit antara tahun 2021 hingga 2026. Hasil analisis menunjukkan bahwa CBE secara signifikan meningkatkan keterampilan prosedur klinis, kemampuan berpikir kritis, dan kemampuan pengambilan keputusan mahasiswa. Pendekatan berbasis simulasi, pembelajaran berbasis masalah, serta asesmen terstruktur terbukti efektif dalam mendukung pencapaian kompetensi. Namun, hambatan implementasi seperti keterbatasan sumber daya, kurangnya pelatihan dosen, dan resistensi institusional masih banyak ditemukan, terutama di wilayah dengan sumber daya yang terbatas. CBE memberikan kontribusi positif terhadap pengembangan kompetensi klinis dan kognitif mahasiswa kebidanan.

Kata Kunci: competency-based education; keterampilan klinis; mahasiswa kebidanan; pengembangan kognitif

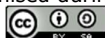
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INTRODUCTION

The competence of professional midwives is a key factor in improving maternal and newborn health on a global scale. High-quality midwifery education, aligned with international standards, is essential to prepare midwives capable of delivering safe and effective reproductive healthcare services (Ruwayda & Hastono, 2024). The demand for competent midwives with robust clinical judgment and cognitive abilities is rising globally, particularly in response to efforts aimed at reducing maternal and neonatal morbidity and mortality (Nove et al., 2021). Traditional educational methods, often relying on teacher-centered lectures and theoretical assessments, are increasingly inadequate in equipping midwifery students with the essential skills required to operate effectively within complex and dynamic clinical settings (Ulfa et al., 2021).

In response to these challenges, a transformative approach to health professional training, including midwifery education, has emerged in the form of CBE. This approach emphasizes measurable learning outcomes, whereby students are expected to achieve specific competencies through a combination of knowledge, skills, and attitudes assessed against predetermined standards (Ige et al., 2023). Recent years have seen increased implementation of various CBE models in midwifery education across different countries. These include simulation-based training, structured clinical assessments, and integrated problem-based learning strategies. While these models show promising outcomes in enhancing clinical performance and cognitive development, their implementation also presents several challenges, ranging from inadequate assessment tools and insufficient faculty training to systemic resistance within traditional academic structures (Ramanathan et al., 2022).

The implementation of CBE in midwifery education has attracted growing scholarly attention over the past decade, examined through various review approaches. Qualitative inquiry into curricula requires substantial structural and institutional adjustment, including faculty readiness and assessment redesign (Muraraneza & Mtshali, 2021). While numerous primary studies have evaluated individual CBE interventions in midwifery education, there remains a lack of integrative literature synthesis that simultaneously examines the impact of diverse CBE models on both cognitive and clinical competence domains within a single review framework.

Most prior reviews have addressed either clinical skill outcomes or cognitive outcomes separately, without capturing the interrelationship disparities. Given the growing emphasis on competency as a benchmark for quality education and practice, it is essential to critically examine how these models are implemented and what outcomes they yield across both domains. The review also seeks to identify key trends, challenges, and enablers affecting the effective integration of CBE into midwifery curricula. Building on this, this literature review aims to explore the current models of Competency-Based Education implemented in midwifery education and to analyze their impact on students' clinical and cognitive competence.

LITERATURE REVIEW

Competency-Based Education

CBE focuses on clearly defined learning outcomes, particularly the achievement of observable and measurable competencies across the cognitive, psychomotor, and affective domains. In this model, a student's progress is determined by their ability to demonstrate mastery of a particular skill rather than time spent in class. In recent years, there has been an increase in the application of various CBE models in midwifery education in various countries. This includes simulation-based training, structured clinical examinations, and integrated problem-based learning strategies. While these models show promising results in improving clinical performance and cognitive development, their implementation also presents challenges.

These range from inadequate assessment tools and faculty training to systemic resistance in traditional academic structures (Ramanathan et al., 2022). The basic principles of CBE include several key aspects. First, learning is oriented towards clear and measurable results, where competencies are determined from the beginning. Second, students' progress is based on evidence of competency mastery, not on learning time. Third, learning is *student-centered* by providing opportunities for students to play an active role in the learning process and determine learning strategies that suit their needs (Açıkgöz & Babadoğan, 2021). Student-centered learning has been proven to have a significant impact on increasing student involvement, material development, and the quality of learning outcomes (Wisesa et al., 2025).

Competence in Midwifery

Competence in midwifery, according to the International Confederation of Midwives (ICM), is a set of abilities that includes knowledge, skills, and professional behavior. ICM emphasizes the importance of clinical competence, decision-making capacity, and professional behavior in midwifery practice. ICM stipulates that midwifery competence is a global standard that serves as a reference in midwifery education, regulation, and practice. This standard is categorized into five domains: cross-functional, sexual and reproductive health and rights, antenatal care, care during labor and birth, and *ongoing care of women and newborns*. These competencies are designed to ensure that midwives can provide services throughout the female reproductive life cycle comprehensively.

A multinational validation study reported that although the scope and implementation of midwifery competencies vary across countries, national competency standards are generally aligned with the ICM Essential Competencies, highlighting their global relevance in guiding midwifery education, regulation, and professional practice (Chakraborty et al., 2023). The development competence is influenced by multiple interacting factors, including competency-based education, quality of clinical learning environments, effective mentorship and supervision, experiential learning, reflective practice, and opportunities for continuous professional development, all of which contribute to strengthening both clinical capability and professional confidence (Arundell et al., 2024). In addition, midwives' competence is closely related to the ability to work independently, take responsibility for clinical decisions, and collaborate with other health workers. Midwives are expected to analyze the situation,

identify risks, and make the right decisions according to *evidence-based* and applicable scientific practice standards.

Cognitive and Clinical Skills in Midwifery Students

According to Dhakal & Bobrin in their book named "*Cognitive Deficits*", cognition is the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses. It encompasses various aspects of high-level intellectual functions and processes such as attention, memory, knowledge, decision-making, planning, reasoning, judgment, perception, comprehension, language, and visuospatial function, among others. Clinical skills are essential for bridging the gap between theoretical knowledge and real-world practice.

Midwifery education requires students to translate classroom learning into clinical actions, which can only be achieved through hands-on practice and experiential learning (Sirisomboon et al., 2024). The development of cognitive abilities and clinical skills is a fundamental objective in midwifery education, as these competencies are essential for ensuring safe and effective maternal and neonatal care. Cognitive improvement in this context includes knowledge acquisition, critical thinking, and clinical reasoning, while clinical skills refer to the practical abilities required to perform procedures and manage patient care.

METHODS

This study employs a literature review approach, synthesizing theories, findings, and other research materials from reference sources to serve as the foundation for research activities. The review summarizes and reflects on various sources, including scientific articles and research reports. Article searches were conducted using national and international publications retrieved from three databases: Google Scholar, PubMed, and ScienceDirect. The keywords used in this research were combined using Boolean operators: ("*Competency-Based Education*" OR "*Competency-Based Learning*" AND ("*Midwifery*") AND ("*Clinical skill*") AND ("*Cognitive Skills*" OR "*Cognitive Improvement*").

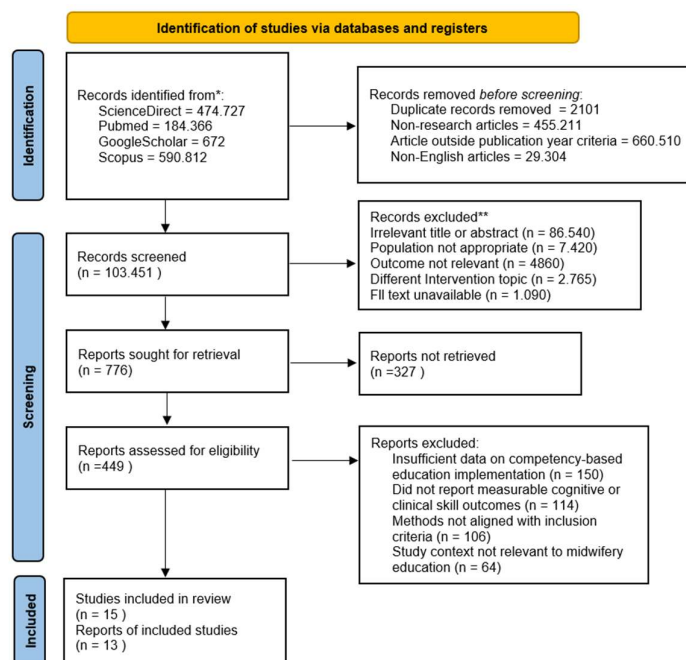


Figure 1. PRISMA Flow Diagram of the Present Study
Source: Research 2026

The literature search followed the PRISMA guidelines (see: **Figure 1**). The number of articles obtained from each database was screened for relevance based on titles, followed by abstract screening. Article eligibility was assessed based on inclusion and exclusion criteria. The inclusion criteria were: research articles published in English, publications from the last five years, and full-text or open-access availability. Articles that did not meet these criteria were excluded from further stages.

RESULTS AND DISCUSSION

This literature review evaluates the impact of CBE on the enhancement of cognitive abilities and clinical skills among midwifery students.

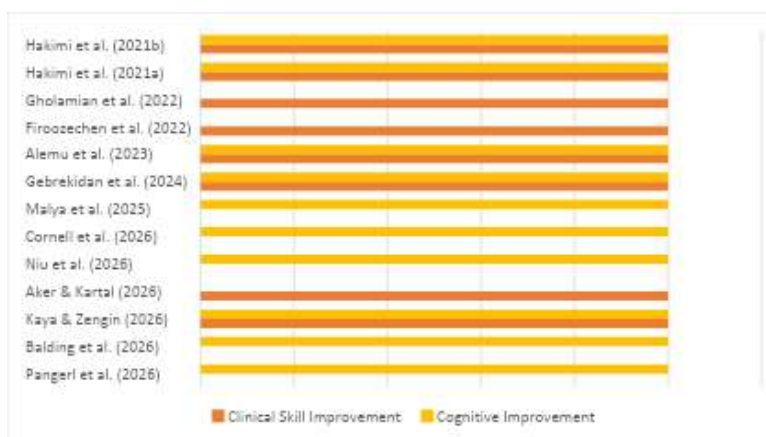


Figure 2. Distribution of Cognitive and Clinical Skill Improvements Across Included Studies
Source: Research 2026

Based on an analysis of 13 articles published between 2021 and 2026 (see **Figure 2**), the findings indicate that the implementation of CBE consistently leads to significant improvements in various aspects of learning, including theoretical mastery, practical skills, clinical decision-making, and student confidence in clinical settings.

Table 1. Summary of Included Studies in the Literature Review

No	Author (Year)	Study Design	Intervention Focus	Sample	Key Finding
1	Pangerl et al., 2026	Quantitative descriptive	Breastfeeding education content mapping in Australian midwifery curricula	14 Australian universities	Significant variations and implementation gaps exist in curricula; evidence-based standardization is needed to ensure consistent cognitive knowledge acquisition
2	Balding et al., 2026	Qualitative (phenomenography)	Midwifery students' perceptions of emotional intelligence and its role in practice	16 Australian midwifery students	Emotional intelligence is an essential competency beyond cognitive ability in midwifery practice
3	Kaya & Zengin, 2026	Randomized controlled trial (RCT)	Scenario-based high-fidelity simulation for electronic fetal monitoring	71 second-year midwifery students in Turkey	High-fidelity simulation significantly improved cognitive knowledge, self-efficacy, and technical performance
4	Aker & Kartal, 2026	Randomized controlled trial (RCT)	Simulation-based training for postpartum hemorrhage management	78 third-year midwifery students in Turkey	Simulation training improved psychomotor skills and self-efficacy in obstetric emergency management
5	Niu et al., 2026	Latent profile analysis	Resilience profiles and disaster preparedness	681 nursing and midwifery students in China	High-resilience students demonstrated stronger coping mechanisms and better emergency preparedness competence
6	Cornell et al., 2026	Qualitative descriptive	Video-recorded self-assessment for clinical skills	12 Australian midwifery students	Video-based assessment improved self-reflection, reduced anxiety, and supported authentic skill development
7	Malya et al., 2025	Quasi-experimental	Simulation-Based Education (SBE) on early neonatal care knowledge	204 nursing and midwifery students	Increased neonatal knowledge, especially in Apgar scoring, ventilation, and skin-to-skin care

No	Author (Year)	Study Design	Intervention Focus	Sample	Key Finding
8	Gebrekidan et al., 2024	Descriptive survey	Satisfaction with clinical simulation	413 midwifery students	84.7% reported satisfaction with CBE-based simulation learning
9	Alemu et al., 2023	Quasi-experimental + qualitative	Cesarean section procedure simulation	60 midwifery students	Increased knowledge, skills, and self-confidence in surgical procedures
10	Firoozechen et al., 2022	Qualitative	Clinical competency framework	24 participants (experts and students)	Identified four domains of midwifery competence supporting the CBE approach
11	Gholamian et al., 2022	Quasi-experimental	Clinical skills training (pelvic, suturing)	34 midwifery students	Significant improvement in clinical skills after CBE training
12	Hakimi et al., 2021	Experimental	Postpartum hemorrhage management	86 midwifery students	Sustained improvement in knowledge, skills, and confidence
13	Hakimi et al., 2021	Quasi-experimental	Neonatal resuscitation simulation	80 midwifery students	Improved ability to recognize and manage neonatal emergencies with confidence

Source: Research, 2026

Collectively, these studies demonstrate that the adoption of CBE frameworks leads to improved skill acquisition and cognitive outcomes across varying learning environments and geographic contexts (see: **Table 1**).

Discussion

Improvement Of Clinical Skills Through Competency-Based Learning.

One of the most prominent findings across the reviewed studies is the significant improvement in students' clinical skills following CBE training. A quasi-experimental study demonstrates that midwifery students who underwent CBE training achieved higher practical scores in pelvic examinations, Leopold maneuvers, and suturing skills ([Gholamian et al., 2022](#)). These findings can be scientifically explained through Kolb's Experiential Learning Theory, where students develop understanding and skills through direct experience and active reflection ([Davitadze et al., 2022](#)).

Postpartum hemorrhage management training using emergency scenarios and Objective Structured Clinical Examinations (OSCEs) significantly improved students' ability to recognize danger signs and perform timely interventions ([Hakimi et al., 2021b](#)). The effectiveness of simulation-based training for cesarean procedures has been confirmed to result in marked improvements in technical skills and confidence ([Alemu et al., 2023](#)). Additionally, a competency-based approach is recognized as an effective strategy for enhancing the knowledge, skill, and self-confidence of midwifery students in managing neonatal resuscitation ([Hakimi et al., 2021a](#)).

Recent advancements in High-Fidelity Simulation (HFS) also demonstrate substantial enhancements in postpartum hemorrhage (PPH) management skills and self-efficacy compared to traditional models (Aker & Kartal, 2026). The implementation of video-recorded clinical skills assessments serves as a powerful mechanism for fostering metacognition and reflection, enabling students to bridge the gap between theoretical knowledge and clinical competence (Cornell et al., 2026). Qualitative research examining the components of clinical competence among Iranian undergraduate midwifery students indicates that clinical skills, alongside ethical conduct, holistic care, and effective communication, are crucial elements of competence. Although the study did not quantify skill improvements, it highlighted that practical abilities, particularly psychomotor skills, are considered essential in midwifery education.

The researchers also stressed the need for developing valid assessment tools to evaluate these skills in real clinical environments (Firoozehchian et al., 2022). These outcomes are theoretically underpinned by the concept of *Deliberate Practice*, which posits that mastery of complex procedures requires repeated, structured training in a controlled environment, supported by systematic feedback. CBE accommodates this through progressive learning, repetition, and formative assessments (Higgins et al., 2021). Evidence from multiple studies consistently demonstrates that CBE significantly enhances students' clinical performance by integrating theoretical knowledge with practical application in real or simulated clinical settings (Imanipour et al., 2021).

Strengthening of Cognitive Improvement and Clinical Decision-Making

Beyond technical proficiency, CBE was found to enhance cognitive functions such as conceptual understanding, critical thinking, and clinical decision-making. In studies focusing on neonatal resuscitation, students exhibited significant improvements in knowledge scores and their capacity to identify critical steps in emergencies (Hakimi et al., 2021a). These findings reinforce the premise that active learning, a core principle of CBE, fosters metacognition and evidence-based decision-making. Similar findings conclude that scenario-based Problem-Based Learning (S-PBL) programs are effective strategies for strengthening the clinical reasoning abilities of nursing students (Son, 2023).

CBE is increasingly recognized as an effective approach for strengthening both clinical skills and cognitive abilities among healthcare students, emphasizing outcome-based learning and the application of knowledge in real clinical contexts (Ghods Astan et al., 2022). Furthermore, integrated teaching-learning approaches within competence-based models have demonstrated significant improvements in students' ability to make accurate clinical decisions, particularly in specialized areas such as oncology nursing (Davoodi et al., 2022). Clinical competence is also deeply intertwined with emotional intelligence, which is a vital cognitive-affective attribute for practitioners to manage their own emotions and those of their patients in challenging clinical environments (Balding et al., 2026).

The structured design of CBE, which incorporates continuous assessment, feedback, and mastery learning, contributes to better professional outcomes, critical thinking, and clinical readiness (Jiang & Hou, 2026). Individual resilience also serves as a critical factor in clinical decision-making capacity, suggesting that CBE frameworks should incorporate psychological

support to bolster students' cognitive readiness (Niu et al., 2026). The CBE plays a crucial role in strengthening cognitive development and clinical decision-making through an emphasis on active learning and reasoning skills (Ghodsi Astan et al., 2022).

The Role of Simulation and Learning Environments in CBE Success

One of the key conclusions regarding successful implementation is the role of simulation and the learning environment. The SBE significantly increases knowledge scores in elements such as Apgar assessments, ventilation in the "golden minute," and skin-to-skin contact practices (Malya et al., 2025). Scientifically, this reflects the effectiveness of simulation in creating authentic contexts that encourage knowledge activation and transfer to real practice (Alharbi et al., 2024). Students report higher satisfaction with simulation-based learning when supported by active faculty involvement, structured checklists, and repeated practice in a supportive laboratory setting (Gebrekidan et al., 2024). Simulation-based learning is identified as a principal enhancement strategy alongside mentorship, multidisciplinary collaboration, and mobile learning tools (Podder et al., 2025). Meaningful social learning experiences, such as team-based simulations and collective reflection, provide a risk-free environment where students can make mistakes, reflect on their actions, and build both clinical competence and self-confidence (Tu et al., 2026).

CBE Implementation Challenges and Gaps Between Regions

Although the benefits of CBE are well-documented, implementation challenges remain, particularly in low- and middle-income countries. Considerable disparities in educational outcomes have been observed between institutions due to limited access to physical simulation facilities and shortages of qualified faculty (Malya et al., 2025). Successful implementation depends not only on curriculum design but also on sufficient infrastructure and an institutional culture that embraces innovation (Firoozehchian et al., 2022).

Transitioning to CBE demands a cultural shift toward supporting adaptive learners, establishing strong mentorship, and enabling continuous tracking of learner progress through robust information systems (Lomis et al., 2021). Variations in the application of professional competencies across different work settings may lead to "deskilling" if practitioners lack the autonomy to practice their full scope (Pfund et al., 2026). Targeted interventions, such as investment in faculty training, development of low-cost simulation models, and adaptation of competency frameworks to local contexts, are essential to bridging regional inequalities and ensuring equitable healthcare education worldwide (Nagai et al., 2024; Ramanathan et al., 2022).

CONCLUSION

Based on the findings of this review, it can be concluded that CBE significantly enhances both the cognitive abilities and clinical competencies of midwifery students. CBE has proven effective in improving theoretical knowledge, hands-on practical skills, clinical decision-making abilities, and student confidence, particularly in handling critical clinical scenarios such as neonatal resuscitation, postpartum hemorrhage, and cesarean section procedures.

This educational approach aligns well with the current demands of midwifery training, which require graduates to be work-ready and capable of delivering safe and competent maternal and neonatal care. Therefore, integrating CBE into midwifery curricula is highly relevant to international standards and the evolving expectations of modern healthcare systems.

AUTHOR'S NOTE

All sources of information, ideas, and data derived from other works have been properly cited and referenced in accordance with academic and ethical standards. Any similarity with existing works is unintentional and has been addressed through appropriate citation. The authors would like to express their gratitude to all parties who contributed to this study. No conflict of interest is declared by the authors. This research received no specific grant from any funding agency.

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