Short Communication

The Impact of a Blended Learning Approach Incorporating Microlearning and Spaced Learning on Clinical Competence in Nursing Students

Abstract

Background: Nursing education focuses on clinical skill development. This study evaluated the effectiveness of combined microlearning and spaced learning to improve final-semester nursing students' clinical competence. **Materials and Methods:** A quasi-experimental study (2022–2023) at Lorestan University of Medical Sciences involved 48 final-semester nursing students (27 control, 21 intervention). The intervention group received a 3-month structured microlearning and spaced learning program using videos, workshops, texts, and podcasts. Clinical competence was assessed via Ministry of Health standardized forms, and data were analyzed using SPSS software. **Results:** Demographic characteristics in the two study groups were similar ($P > 0.05$). The posttest mean (SD) clinical competence score in the intervention group was 18.34 (0.96), while in the control group, it was 16.64 (0.89). The difference was statistically significant ($t_{46} = 6.34$, $P < 0.001$). **Conclusions:** Microlearning and spaced learning significantly improved clinical competence, suggesting their effectiveness as innovative nursing education strategies.

Keywords: *Clinical competence, learning, nursing, students*

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Introduction

To become a competent nurse in a clinical setting, students must acquire essential skills during their studies and obtain the necessary qualifications.[1] Clinical competence is the bedrock of nursing practice.[2] Increasing professional competence in nurses leads to improved quality and safety of patient care,[3] whereas a lack of competence can result in job dissatisfaction, increased turnover, and a decline in care quality.[4] Despite extensive training, many nursing students and graduates struggle to acquire the clinical skills necessary for success in complex healthcare settings.[5,6]

To guarantee the delivery of high-quality care, Objective Structured Clinical Examinations (OSCEs) are essential for evaluating practical skills and promoting professional development.[7] Traditional educational methods are often restrictive and fail to foster innovation, highlighting the urgent need to revise current teaching strategies.[8,9] Emerging educational models, such as microlearning and spaced learning, have proven effective in improving learning outcomes. Microlearning simplifies content into smaller, manageable units, facilitating quicker comprehension,[10] while spaced learning enhances long-term retention through periodic reviews of material.[11]

Despite the growing adoption of microlearning in healthcare education, robust evidence supporting its effectiveness in enhancing advanced clinical skills and learning outcomes, particularly, among nursing students, remains scarce.[12] Further research is essential to fully understand its impact on clinical competence in nursing.[13]

Given the extensive curriculum for final-year nursing students and the complexity of clinical skills they require, along with frequent reports of learning challenges and skill deficiencies, adopting innovative educational strategies is essential. The aim of this study is to examine the impact of blended learning, incorporating microlearning and spaced learning, on enhancing clinical competence in nursing students.

Material and Methods

This quasi-experimental study was conducted with a total of 48 eighth-semester nursing

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students of the School of Nursing of Lorestan University of Medical Sciences, Iran. The participants were allocated into an intervention group (21 students, first semester of 2023) and a control group (27 students, second semester of 2022). The sampling method was census sampling (complete enumeration). Participants were included based on the inclusion criteria (eighth-semester nursing students, physical and mental health, willingness to cooperate, and active participation) and exclusion criteria (unwillingness to cooperate and absence from more than two educational sessions).

The research instruments included a demographic questionnaire and the Meretoja scale for assessing clinical competence. This tool evaluates 73 nursing skills across seven domains based on the novice-to-expert framework, using a scoring range of 0 to 100.[14] Additionally, a standardized four-point Likert scale was employed to assess clinical skills in the domains of knowledge and proficiency, with a scoring range of 0 to 20. A student survey form was also utilized to evaluate students' experiences with the applied educational strategy.

The Meretoja scale was initially completed by the students. Subsequently, educational content, including 7-min video clips, checklists, infographics, podcasts, and occasionally hands-on practice in the clinical skills center, was developed according to the predetermined schedule. After undergoing psychometric evaluation by five experts, the content was gradually delivered as short modular sessions over a 3-month internship period. These modules were shared virtually in four stages: on the first day, 2 days later, 1 week later, 1 month later, and, in some cases, 3 months later. To ensure student engagement, feedback was collected through assessments at each stage. Upon completion of the training, a clinical competency exam was conducted at the faculty by trained specialists using standardized checklists to assess students' knowledge and skills. At the end of the examination session, the Meretoja scale and a feedback form were distributed among the students once again. Data were analyzed using SPSS software (version 16; SPSS Inc., Chicago, IL, USA).

Ethical considerations

After obtaining approval for the research proposal and receiving the ethical code (IR.MUI.RESEARCH.REC.1402.233) from the Ethics Committee of Lorestan University of Medical Sciences, students and the research team were enrolled in a virtual group to define tasks and regulations, and written informed consent was obtained.

Results

All students participated until the end of the study. Demographic characteristics did not differ significantly between the two groups ($P > 0.05$). The results indicated that gender was the only demographic variable significantly associated with clinical competence scores ($P < 0.05$).

The results of the independent *t*-test indicate a significant difference between the clinical competence scores of the two groups after training ($p = 0.007$). The mean (SD) clinical competence score in the intervention and control groups was 18.34 (0.96) and 16.64 (0.89), respectively (*t*-test = 6.30; df = 47; $p = 0.007$). Student survey results regarding educational strategies revealed that these methods contribute to emphasizing key points, deepening learning, better retention of information, boosting self-confidence, and reducing exam anxiety. Additionally, these approaches facilitate group discussions, identification of strengths and weaknesses, and the combined use of various methods, while eliminating time and place constraints.

Discussion

The present research showed that the use of the combination of microlearning and spaced learning as a novel educational approach significantly improved students' clinical competence. Some studies in the field of microlearning[10,15] and spaced learning[11,16] support this finding.

This finding can be explained by the fact that the integration of these two innovative teaching methods has provided a rich and dynamic learning experience for students, enabling them to master the educational content more effectively and deeply.

This combination, by providing short, engaging learning content and regular review, has significantly improved students' understanding of concepts, memory retention, and problem-solving abilities. Through this approach, students not only acquire theoretical knowledge, but also gain ample practical opportunities to apply their knowledge in clinical settings. This can directly lead to an improvement in their clinical skills. Rich clinical experiences, coupled with innovative teaching methods, enable nursing students to acquire the necessary skills and knowledge to perform nursing duties.

The results showed a significant difference in clinical competency scores based on the gender. Some studies were in line with the aforementioned results,[17] while others contradicted them.[18] Findings suggest that individual factors, such as gender, can influence clinical competence by affecting cognitive abilities, life experiences, and personal commitments. This study had some limitations, including a small sample size, which may affect statistical power and generalizability. The findings are limited to final-year nursing students and may not apply to students in earlier semesters or other disciplines. Preventing the transfer of content between groups was a strength that minimized contamination bias. Due to the similar conditions in the study groups, the obtained results can be attributed to the educational intervention.

Conclusions

This study demonstrated that the combined use of innovative teaching methods, such as microlearning and spaced repetition, significantly enhanced students' clinical competence.

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Conflicts of interest

Nothing to declare.

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