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The effect of case-based learning using artificial intelligence on critical thinking, clinical decision-making, and achievement motivation in nursing students

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Abstract:

Background: In today's clinical environments, nurses must be able to think critically, make quick, evidence-based decisions, and be motivated for academic and professional advancement. One of the effective strategies for improving these issues is case-based learning, which can become an effective method in education by integrating new technologies, including artificial intelligence. The present study aimed to determine the effect of case-based learning using artificial intelligence on critical thinking, clinical decision-making, and achievement motivation of nursing students.

Method: This study was a single-group quasi-experimental study with a pre-test and post-test design that was conducted from January 1403 to June 1404 on 36 undergraduate nursing students at Lorestan University of Medical Sciences. Sampling was done using the whole-count method. Data collection tools included Ricketts' Critical Thinking Questionnaire, Lowry's Clinical Decision-Making, and Hermans Achievement Motivation. The educational intervention was conducted in two six-week phases; In each phase, students were exposed to 12 clinical scenarios and used a ChatGPT-based chatbot to analyze cases, receive feedback, and practice decision-making. Data analysis was performed using SPSS version 25 and paired t-tests for pre-test-post-test comparisons, and repeated-measures analysis of variance was performed to examine step-wise changes.

Findings: The mean score of students' achievement motivation increased from 83.83 at the pre-test to 81.88 after six weeks and 50.91 at the end of twelve weeks ($p<0.001$). The mean score of critical thinking increased from 121.25 to 125.72 and then to 129.94, with only the difference between the pre-test and the second phase being statistically significant ($p=0.005$). In contrast, the mean score of clinical decision-making decreased from 31.99 to 42.92 and then 86.91. The mean difference between the pre-test and both subsequent stages was statistically significant ($p<0.05$), but the difference between the two stages after the intervention was not significant ($p=1.00$).

Conclusion: This educational method provides an interactive environment, safe clinical simulation, and intelligent feedback, allowing for deep and sustainable learning. It is suggested that this approach be used as part of the curriculum in nursing education to reduce the gap between theoretical education and clinical practice and to prepare the ground for training more capable nurses.

Keywords: Case-Based Learning; Artificial Intelligence; Critical Thinking; Clinical Decision-Making; Achievement Motivation