



The relationship between Blended Learning in Clinical Nursing Process and Critical Thinking Skills in Nursing Students; A Quasi-Experimental Study



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ABSTRACT

Aims Nurses need to think critically to provide effective care. They use critical thinking skills (CTS) every day to care based on the nursing process (NP). Caring and CT are at the core of professional nursing education. The aim of the study was to determine the relationship between NP blended learning methods and CT.

Materials & Methods This study was a quasi-experimental cross-sectional educational evaluation, which was performed on 26 undergraduate students in their third semester at the Ramsar School of Nursing in 2022. According to the training program, these students were divided into four groups. Data were collected by the checklist of NP scores and California Critical Thinking Skills Test; form-B before and after a two-phase, six-day intervention with blended learning.

Findings The paired t-test showed that except for the stage of review and recognition, this difference was significant for other states and the total score, which indicates the effect of the blended method on learning clinical NP in students. Before training, 95.7% of students had strong CT, which reached 100% after training. A significant relationship was observed between the total score of the second stage of clinical NP and deductive reasoning after training ($p=0.04$). There was no significant relationship between the total score of clinical NP and the total score of CT before and after training.

Conclusion Blended learning methods should be considered in nursing curricula, and it seems that traditional methods cannot be successful in learning NP and CT.

Keywords Learning; Nursing Process; Thinking; Students

CITATION LINKS

[1] Application of nursing process and its affecting factors among nurses working in ... [2] The opinions of nursing students regarding the nursing process and ... [3] Enhancing critical thinking in clinical practice: Implications ... [4] Critical thinking in nursing process and ... [5] Determinants towards implementation of ... [6] Critical thinking, clinical reasoning, and clinical judgment: A ... [7] Critical thinking disposition among nurses working in public hospitals ... [8] The effect of gender role orientation on student nurses' caring behaviour and ... [9] Nursing students' disposition toward critical thinking and its relationship ... [10] The relationship between critical thinking skills with creativity and ... [11] Identifying critical thinking indicators and critical thinker ... [12] Relationship between critical thinking and clinical decision making ... [13] Developing critical thinking disposition and emotional intelligence of nursing ... [14] Exploring perceptions and barriers in developing critical thinking and clinical reasoning ... [15] Association of critical thinking with learning ... [16] Emerging innovative teaching strategies ... [17] Application obstacles of nursing process from view of the nursing ... [18] Determination of reliability, validity and norm of California critical ... [19] The impact of the nursing process education on critical thinking ... [20] The effect of critical thinking education on nursing students' ... [21] A comparison of the critical thinking ability in the first and ... [22] The role of critical thinking skills and learning styles of university students ... [23] The impact of evidence-based education on ... [24] Clinical concept mapping: Does it improve discipline-based critical thinking of ... [25] Effectiveness of blended learning on critical thinking skills ... [26] The relationship between critical thinking skills and learning styles ... [27] Investigation of reliability, validity and normality Persian version of the California Critical Thinking Skills ... [28] The effect of human patient simulation on critical thinking and its ... [29] Relationship between problem solving ability, critical thinking disposition, creativity, self-efficacy and nursing ... [30] The correlation of critical thinking disposition and approaches to learning among ... [31] Factors in the critical thinking disposition and skills ...

Introduction

The nursing process (NP) is an appropriate way to explain the nature of nursing, its scientific foundations, technologies, and humanistic assumptions that encourage critical thinking (CT) and creativity [1]. It has many benefits for patients, the nurse, and the nursing student. An accurate NP facilitates solving the patient's problems and enables the provision of systematic care for patients [2]. Used as a framework for clinical judgment, NP helps nurses think about what they do in their practice [3] and has long been important to nursing practice as a problem-solving activity for thinking about a nursing care plan (NCP) [4]. Highly knowledgeable nurses about NP were 8.78 times more likely to implement the NP than those who were not [5]. The NP also is a decision-making approach that promotes critical thinking. CT is the process of searching, obtaining, evaluating, analyzing, synthesizing, and conceptualizing information as a guide for developing one's thinking with self-awareness, and the ability to use this information by adding creativity and taking risks [4]. Alfaro-LeFevre believed "CT does not mean simply being negative or full of criticism. It means not accepting information at face value without carefully evaluating it" [6]. The NP may describe an NCP that provides students with a learning experience that helps them practice CT and decision-making skills. This process consists of five phases: Assessment, nursing diagnosis (NP), planning, implementation, and evaluation [4]. Chabeli described how CT can benefit the framework of the NP. During the assessment phase, the nurse systematically gathers information to identify the health problems and uses CT to analyze the information. During the ND phase, nurses find the patient's problems, etiology, signs, and symptoms to conclude. The planning and implementation of interventions should be mutual, research-based, and realistic, with measurable expected outcomes. The evaluation phase shows the effectiveness of the plan of care and is ongoing as the patient progresses toward goal achievement [3].

Nurses need to think critically to provide effective care. Nurses use CT skills every day to care based on NP [7]. Caring and CT are at the core of professional nursing education [8, 9] and must be one of the main outputs of academic centers [10]. They are essential skills in the NP, but several studies have reported the low level of CT skills of nurses [11], nursing students [12-14], and fresh graduates [14]. The lack of CT among students indicates that nursing education in achieving professional did not succeed and nursing education methods and learning styles must facilitate CT [15], and traditional teaching methods should be shifted to improve learning experiences and facilitate lifelong learning. One of the teaching methods is group discussion (GD). This strategy experienced by "doing" and dialogue with "others" will promote

more significant learning. In this strategy, creativity can be developed, and innovation benefits both students and teachers [16]. Problem-based learning (PBL) is another instructional method for active learning for nursing students to understand the concept, improve the CT, and develop problem-solving skills. PBL develops students' ability to critically apply the cumulative knowledge to actual clinical problems, develops clinical reasoning skills, and enhances self-directed and life-long learning [16]. Using modern methods of teaching can increase the critical thinking skills (CTS) and confidence of students [10]. Thus, student-centered teaching methods have been given more attention in blended education [17].

According to the above-mentioned issues, and considering the limitations of the studies about the relationship between clinical NP education and CT among nursing students, the aim of the present study was to determine the relationship between clinical NP education and CT. The first objective was to determine the relationship between blended learning and clinical NP education and the secondary objective was to determine the relationship between NP blended education methods and CT.

Materials and Methods

This research was a quasi-experimental cross-sectional educational study, which was performed on 26 third-semester undergraduate students of the Ramsar Midwifery Nursing College in 2022. According to the training program, these students were divided into four groups. The curriculum was prepared for a six-day internship in the surgery course, and the instructor, after obtaining permission from the director of the Nursing Department and the Faculty of Education, developed the educational steps. The instructor was the same for all groups. Inclusion criteria were passing the nursing theory and internship course, passing the NP theory course, and obtaining the clinical course of the NP. Exclusion criteria were absence for more than one day in the internship clinical course, failure to provide a nursing care plan for the patient, and failure to complete the questionnaire.

Data collection

Data were collected using the following tools:

1- A researcher-made checklist of NP scores that has been approved by the Nursing Department of Birjand University of Medical Sciences. This checklist includes assessment (five points), ND (five points), planning, including goals (three points) and interventions (seven points), implementation (eight points), and evaluation (two points) items.

2- The California Critical Thinking Skills Test; form-B (CCTST-B). This tool contains 34 multiple-choice questions with five dimensions of evaluation (14 points), analysis (9 points), inference (11 points), inductive reasoning (14 points), and deductive

reasoning (16 points), with a total score of 0-34. A score of 16 or higher indicates strong CT and a score below 16 indicates weak CT. Some questions of this questionnaire are common in several aspects. The reliability and validity of this standard questionnaire in various studies in Iran have also been confirmed [18].

Nursing process stages

First stage: On the first day of the internship, after explaining the goals and educational steps, the objectives of the research were explained. After obtaining verbal consent from students, the CCTST-B was completed by them and collected immediately. Then, the stages of the NP were reviewed and the following steps were followed (Figure 1):

A- The patient assessment form and the latest version of the NANDA list were translated into Persian and made available to students. Then, according to the educational program, the students and the instructor attended the surgery ward of the hospital. Each student was required to take care of a patient according to NP steps. After the evaluation, NDs and goals were set and presented to the group the next day.

B- On the second day, each student introduced his/her patient history, NDs, and goals to the rest of

the group, supervised by the instructor, and GD, and an exchange of views on each of the NDs and goals was performed. In addition to correcting them, they addressed other NDs that had been raised and missed for the patient. In line with PBL, the trainer confronted the students with various clinical problems of the patient and discussed and exchanged opinions according to the steps of NP, which is in line with the steps of problem-solving. At the end of the presentation and GD, it was decided that after correcting and completing the NDs and nursing objectives, students should complete their NCP by referring to valid scientific references and present their internship on the third day. After the presentation and GD, the interventions were well implemented and evaluated. At the end of each stage, the student with the help of the instructor and GD, summarized the strengths and weaknesses of their NCP, and the student's scores were announced.

Second stage

On the fourth day of the internship, after the assessment of another patient, steps A and B were repeated on the fifth and sixth days. At the end of the sixth day, the CCTST-B was completed again by the students and collected immediately. Then, the student's grades were announced.

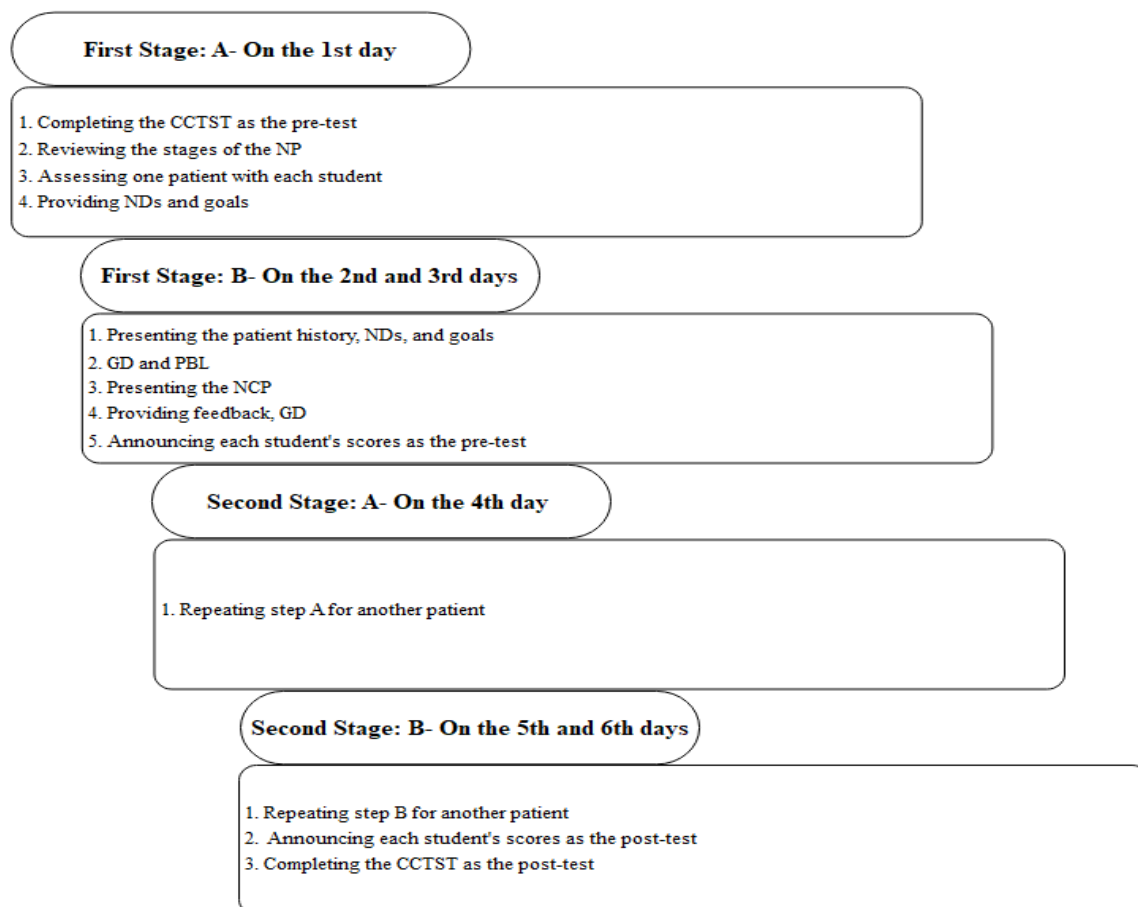


Figure 1. Flow chart of the study. CCTST-B: California Critical Thinking Skills Test; form-B, NP: nursing process, NDs: nursing diagnoses, PBL: problem-based learning, GD group discussion, NCP: nursing care plan.

Statistical analysis

Descriptive statistics were used to classify the test scores as well as calculate the mean and standard deviation and analytic statistics were used to compare the differences in mean scores. Statistical analyses were carried out using SPSS 26. The significance level was considered to be 0.05. The Kolmogorov-Smirnov test indicated the normal distribution of data.

Findings

The number of male and female students was 13 (50%) with an average age of 21.56 ± 3.71 years. One of the students did not attend the clinical course due to COVID-19 and was excluded from the study. Two samples also refused to complete the CCTST after training due to fatigue after the internship; thus, the scores of the clinical nursing process for 25 people and the scores of CT for 23 people were analyzed. Due to the COVID-19 pandemic and implementing the discharge policy for non-COVID-19 patients as soon as possible, in most cases, patients were discharged before the full implementation of the NCP. Therefore, the scores of the implementation and evaluation stages were removed from the scores. Table 1 shows the comparison of the average scores of the students' clinical NCP in the two stages before and after the training.

Table 1. Comparison of the mean scores of the nursing process

Nursing stages	process Before intervention Mean \pm SD Min-Max	After intervention Mean \pm SD Min-Max	Paired t-test
Assessment	4.63 \pm 0.56 3-5	0.87 \pm 2.674 4-5	t=1.68 p=0.1
Nursing diagnosis	4.24 \pm 0.72 2.5-5	4.79 \pm 0.57 2-5	t=2.24 p=0.03
Planning/Goals	2.19 \pm 0.77 0.5-3	2.78 \pm 0.41 1-3	t=2.86 p=0.01
Planning/nursing interventions	5.52 \pm 1.62 1-7	6.88 \pm 0.24 6.25-7	t=3.22 p=0.005
Total	16.59 \pm 2.31 11-20	19.33 \pm 1.09 16-20	t=4.45 p<0.0001

The average score of the NCP in the second stage increased compared to the first stage. The paired t-test showed that except for the stage of review and recognition, this difference was significant for other states and the total score, which indicates the effect of the blended method on learning clinical NP in students. The biggest difference was observed in the average scores related to nursing interventions and the lowest in the evaluation stage.

Before training, 95.7% of students had strong CT, which reached 100% after training.

Table 2 compares the mean scores of the dimensions of CT. Although the mean scores increased after training, the paired t-test results showed no significant relationship between these scores. The biggest difference in scores was observed in the evaluation dimension and the lowest in the two

dimensions of inference and analysis. There was no statistically significant relationship between the total score of the clinical NP and the total score of CT before and after training. Also, a significant relationship was observed between the total score of the second stage of clinical NP and deductive reasoning after training ($p=0.04$). There was no significant relationship between gender and age with NP and CT scores.

Table 2. Comparison of the mean scores of the dimensions of critical thinking

Critical thinking subscales	Before intervention Mean \pm SD Min-Max	After intervention Mean \pm SD Min-Max	Paired t-test
Evaluation	4.73 \pm 1.65 2-7	5.04 \pm 1.02 4-8	t=-0.9 p=0.35
Inference	3.52 \pm 1.44 1-6	3.56 \pm 1.12 2-6	t=-0.9 p=0.35
Analysis	4 \pm 1.65 1-7	4.04 \pm 1.29 1-6	t=-0.00 p=0.89
Deductive Reasoning	6.3 \pm 1.76 3-9	6.47 \pm 1.56 5-10	t=-0.45 p=0.65
Inductive Reasoning	4.56 \pm 1.44 2-8	4.82 \pm .93 3-7	t=-0.86 p=0.39
Total	23.13 \pm 4.57 15-30	23.95 \pm 3.35 19-32	t=-0.74 p=0.46

Discussion

The aim of this study was to determine the relationship between clinical NP training and CT among nursing students using the blended method. The mean score of NP phases and total NP mean score increased after the intervention, which supported the first hypothesis and is consistent with the results of other studies. However, in the present study, except for the assessment phase, there were significant differences in the mean score of other phases and the total score, which is consistent with the results of Ghanbari *et al.* [19]. The reason for this inconsistency can be related to differences in samples, individual characteristics, and research methodology.

In the present study, all students obtained higher CT scores after training. The result is consistent with other studies [13, 19-25] and inconsistent with some others [12, 26]. Today, using traditional methods in nursing education can be one of the basic reasons for the low levels of CTS. However, the findings of the present study showed that the largest mean difference in the evaluation, and inference and analysis subscales showed the minimum difference, which is supported by other studies regarding the evaluation and analysis subscales [12, 22, 26].

CT is an index of cognitive ability. The cognitive ability of nurses, specifically their ability to NP and make decisions, is an important key component of nursing practice [12]. Furthermore, the mean score of CT after increased training, which is consistent with the results of some studies [19, 20]. There was no significant difference in the mean total score of CT before and after the NP blended learning, which is supported by the results of other studies [26-28],

whereas it is inconsistent with other findings [19, 20]. The reason for the difference between the results can be the small sample size and short time for clinical NP in the present study; however, student fatigue at the end of the last clinical NP day and the large number and complexity of questions from the students' perspective should also be considered.

The results of the present study showed no significant relationship between NP blended learning and CT, which rejected the second hypothesis. This finding is consistent with the results of some studies [12, 26, 29] and inconsistent with other research [19, 20]. It is possible that the difference back to small sample size in the present study; therefore, there is a need for a specific measure for CT assessment for nursing students [11, 12, 23].

Also, there was a significant relationship between the total score of the NP, ND, and assessment phase after training and the deductive score of CT. In the study by Shirazi and Heidari, blended learning was effective in deductive scores [26]; however, it is not matched with the results of Hajrezayi *et al.* [25]. Since deductive reasoning represents a type of intellectual activity that leads to details by examining the generality, it seems that in the present study, during the NP clinical blended training, the students were reinforced to explore a general subject to discover details and identify relationships between their components. The difference between our results and those of Hajrezayi *et al.* may be related to different objectives and methodologies.

In the present study, there was not a significant relationship between CT and student's age and gender, which is consistent with other studies [8, 9, 23]. Kabeel and Eisa reported that nurse educators must understand and integrate students' learning approaches into nursing curricula to promote CT and satisfy learning experiences [30].

Study Limitations: 1- Since only one nursing school was investigated and the study was conducted with a small sample size, it is not possible to generalize the findings. 2- The COVID-19 pandemic caused the scores of the implementation and evaluation stages to be removed from the scores.

Strength of the study: The blended learning was evaluated by standard measures.

Conclusion

Contrary to the results of present research, in real settings, ND is related to CT and nurses need to think critically to provide effective care. Learning outcomes can be improved only by matching education methods with the learning subjects. To ensure the development of a CT disposition in nursing, [31] it is necessary to organize CT educational interventions and reorganize other courses to incorporate and raise nursing students' CTs to a high level. To increase the depth of CT learning in theoretical foundations, nursing education should be changed

and should be moved from traditional methods to blended methods. The students' CT, self-directed learning, and learning satisfaction are likely to increase through small group discussions focusing on student-centered learning.

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Conflicts of Interests: There are no conflicts of interests.

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