

ORIGINAL ARTICLE

The Effects of Case Study-based Learning on Nursing Care Plan Ability in Nursing Process of Nursing Students

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ABSTRACT

Introduction: Nursing care planning based on case studies develops students' nursing ability and competence of knowing, understanding, applying, analyzing, and evaluating knowledge. The objectives this Quasi-Experimental research aimed to compare nursing students' ability to create nursing care plans after receiving the development program focused on clinical nursing care planning through case study-based learning. **Methods:** The subjects included 70 third year nursing students, academic year 2019, Boromarajonani College of Nursing Nakhon Phanom, Nakhonphanom University. The data collection was conducted from January – December 2020 using a case study-based development program, data collection record form, knowledge test on critical nursing care and ability test in making nursing care plans. Finally, data were analyzed using wilcoxon matched pairs signed-ranks test. **Results:** The results revealed that the students had a higher level of knowledge of critical nursing care after program participation ($p < .05$) and the ability to create nursing plans also increased after the program participation ($p=05$). **Conclusion:** The findings indicate that this teaching and learning approach was found appropriate to be used in nursing clinical practicum.

Keywords: Case study-based learning, Nursing care plan ability, Nursing process, Nursing students

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INTRODUCTION

Adult nursing clinical practicum II is a compulsory subject in a baccalaureate nursing course, Boromarajonani College of Nursing Nakhon Phanom, Nakhonphanom University. The purposes of this subject require students to practice adult nursing care through holistic nursing process and apply evidence-based nursing care for adults with acute, critical, chronic and terminal health conditions. The practicum took place at the intensive care unit. Students were third year students with limited clinical experience and nursing planning skills. The teachers responsible for teaching adult nursing clinical practicum II, academic year 2018, reported that the students had difficulty developing nursing plans, applying the relevant theories into practicum, and completing nursing planning on time, thereby resulting in fatigue, depression, or health problems. Although having studying nursing process subjects, it seems that they have inadequate essential knowledge. This findings were also reported in the study by Tiansawad et al. (1), who investigated adult nursing clinical practicum I. The findings indicated that the students made incorrect or

incomplete nursing plans and that they identified or diagnosed nursing problems irrelevant to the information derived from patient assessments as they might not fully evaluate patients information or although they did, they failed to link the collected information to the specified problems.

Nursing planning requires analytical skills and knowledge linkage between theoretical materials and nursing practice. Case-based learning (CBL) has been reported to contribute learners know how to analyze and integrate knowledge. CBL, an established learning and studying approach, helps learners to discriminate, evaluate and process information through engagement with authentic settings (2). Case study-based teaching focuses on students' insight into real situations or conditions thereby they can develop comprehensive skills, systematically manage, thoroughly understand problems and situations and confidently make nursing plans (3). This approach is found effective to be used in clinical nursing teaching and to prepare students for nursing practicum since it enhances students analytical and systematic process, relevant skills, and increased confidence in clinical nursing practicum (4). The typical steps of case study-based teaching and learning in relation to nursing include providing learners with authentic case studies, situations relevant to critical nursing care, presenting learners the provided case studies, having

learners analyze the given cases, having learners express their opinions under mentor of teachers, having learners conclude and make care plans (5). Some studies have applied case study-based learning concept in their study and indicated the effectiveness of case-based learning management. According to Malesele. (6), teaching through case studies for nursing students contributes to increased critical thinking skills, intensive integration of learnt theories and practices and increased presentation skill. Particularly, having students create nursing care plans based on case studies not only develops their nursing ability but encourages students to attain Bloom's taxonomy of educational objectives (i.e., competence of knowing, understanding, applying, analyzing, and evaluating knowledge) (7). The objectives of the current study were to compare ability to implement nursing care plans before and after receiving a case study-based development program.

MATERIALS AND METHODS

The current study employed the quasi-experimental research method to compare nursing students' ability to develop nursing care planning before and after receiving the development of clinical nursing process using the case study teaching method for academic year 2019. A total of 70 nursing students enrolled in academic year 2019 at Boromarajonani College of Nursing Nakhon Phanom, Nakhonphanom University constituted the subjects of the study. The study took place from January – May 2020.

Research Instrument

Case study – based development program. It was an education program by integration of case-based learning approach into adult nursing practicum II, academic year 2019. The learning objectives and learning activities include:

- 1) Taking pre-post test
- 2) Dividing students into 10 groups assigned as A-J group
- 3) Assigning the students to study case studies related with neurosurgical system, cardiovascular system, cardiovascular system, respiratory system, urinary tract system, and case studies obtained from E-learning teaching tools in critically ill patient care. In A-E group, the students were given the same case studies but used different worksheet. As for the group F-J, like group A-E, the students were given the same case studies but they were offered different worksheet. The instruction stipulated to the subjects was that each of the group studied the given case studies by using the nursing process to collect data, diagnose laboratory test and assess special investigation, analyze nursing problems, and decide nursing activities appropriate for each case. Moreover, the students were required to collectively participated in group discussion and knowledge exchange as well as search for information related to the case studies. Each group was supervised

by a teacher who assisted to provide advice, counseling, and suggestion.

4) Assigning each group to conclude knowledge based on the provided worksheet

5) Assigning each group to make multimedia presentation

6) After the presentation as per the assigned worksheet, the students were prompted to share and learn knowledge from each other; meanwhile, the teachers played a role as a mentor responsible for connecting knowledge and concluding challenging points during group discussion.

Data Collection Instrument Tool

General data record form: this form was used to record personal data (i.e., age, sex and favorite teaching method).

Critical care nursing knowledge test: The questions comprised two items which dealt with mechanism of mechanical ventilator, one item with arterial blood gas analysis and interpretation, three items with electrocardiogram (ECG) reading and interpretation, three items with nursing care for patients receiving high risk medication; and 11 items with advanced resuscitation skills, respectively. There was a total of 20 items. The students were to select the best answer out of four-option multiple-choice questions. A correct answer was scored 1 point, while an incorrect answer was scored no point. Scores ranged from 0 to 20 points.

Nursing care plan ability test: The authors constructed an assessment form whose questions comprised scoring criteria and three- rating scale. The criteria used to evaluate student ability comprised six areas: 1) data collection and data analysis, 2) problem analysis, 3) writing nursing diagnosis statement, 4) objective setting, 5) setting evaluation criteria, and 6) formulating nursing activities.

Validity of Research Instrument

Assessment tool for critical care nursing, including critical care knowledge test and nursing care plan ability were validated for content appropriateness by a panel of three experts: one nursing teacher with expertise in case study teaching approach, one registered nurse at a medical intensive care unit and one at a surgical intensive care unit. After reviewing, the instruments were revised according to the provided suggestions of the experts and tested for content validity index (CVI). CVI of the critical nursing care knowledge test was 0.98. CVI of the nursing care plan ability test was 1.00.

Tool reliability validity. The research instruments, including critical nursing care knowledge test, nursing care planning ability test, and case study-based learning program were tested for reliability by conducting pilot test among third year nursing students totaling 30 persons who had enrolled in adult nursing care. Critical

nursing care knowledge was tested to obtain index difficulty, and discrimination power of the questions employed 27% percentage technique. We selected the items whose difficulty index ranged from 0.2 to 0.8 and discrimination higher than .02. Afterward, all of the selected items were subjected to reliability test and estimate of consistency coefficients. The reliability was 0.75 based on the Kuder -Richardson formula 20. As for nursing plan ability test: Cronbach's alpha reliability coefficient was 0.82.

Data Collection

This study was performed in accordance with a protocol approved by Nakhon Panom University human research ethic committee (Project reference: 08/63). The authors asked the faculty dean permission to recruit third year nursing students as the research participants. After the approval thereof, we asked the students permission and collaboration for data collection. When agreeing, the participants were declared the study objectives and informed rights protection.

Research Procedure

70 participants were informed of course description of adult nursing practicum II, the research objectives, and of research procedure. No change was made to the course regular activities, but the contents was subjected to place an additional content on student preparation for clinical nursing practicum through case studies.

1) Having students study by themselves through the e-learning platform. To prepare the students for the class, worksheets of case studies were uploaded one week prior to the program start so that they could prepare individual nursing plans for the given case studies.

2) One week following the assignment, submit their nursing plan stated on the worksheet. Before attending a preparedness program, the students were required to take a pre-test examination designed to test knowledge of critical care nursing. The students were then divided into ten sub groups, each of which comprised seven subjects.

3) Assigning the students case studies. There were two case studies. The first group (so called group A-E) was assigned case study 1; the second group (so called group F-J) was assigned case study 2. All students from each group were assigned to study the given case study and complete the assigned task. It was noted that although the same case study was used, the individual group were assigned to study different topics. However, both groups were given the same instructions in that they were required to use the nursing process for data collection, interpreting laboratory results and special tests, analyzing nursing-related problems, and planning nursing activities appropriate to the given case study. During this stage, the students were engaged in group discussion and knowledge change as well as search for information relevant to the given case study for case analysis; simultaneously, a teacher played the role of a mentor in charge of providing advice or suggestions if

needed.

4) Have each group conclude knowledge gain following the given worksheets.

5) Have each group produce presentation media

6) After the presentation, participate in group discussion for exchanging and learning each of the given topics; meanwhile, the teachers were in charge of connecting relevant knowledge and explaining the skeptical points.

7) The teachers concluded the points and issues relevant to nursing problems emerging from each of the case studies and then made a summary of key knowledge in relation to making nursing care plans

8) After the preparation phase, the students attended a clinical adult nursing care practicum II at a medical intensive care unit and a surgical intensive care unit for one month. After the practicum, to assess knowledge of nursing care for critical patients, the students were assigned to take a post- test examination. Moreover, the teachers assessed the students' ability in making clinical nursing care plans. Students' satisfaction with the course management was also investigated using the developed satisfaction questionnaire. To complete both questionnaires, the students needed to scan QR code to take online question basis.

Data analysis

Personal data of the nursing students were collected and analyzed by frequency, percentage, means and standard deviation. To determine whether the students' knowledge of critical nursing care and ability to make nursing care plans improved after the program participation, a comparison of the average score of pretest and posttest before was made. We used Wilcoxon Matched Pairs Signed-Ranks Test and Kolmogorov-Smirnov Test.

RESULTS

The objectives of this research were to compare students' abilities in nursing care planning after receiving the development of clinical nursing process program. The results comprises three domains: 1) general information of the students, 2) knowledge in clinical nursing care obtained from the program participation, and 3) abilities to implement nursing care plans after the program participation.

General Information of the Subjects

According to Table I, the subjects were 70 third year students, 64 (94.29%) of whom were female, aged between 18 and 23 years (mean 20.94) with standard deviation of 0.61 years. The teaching method most preferred by the students (N.57, 81.40%) was learning by doing, while project-based learning was least preferred (N=21, 30%).

Knowledge of critical care nursing before and after receiving the development of clinical nursing process through case study learning method

The knowledge of critical care nursing of 70 students

Table I: Frequency distribution of respondent characteristics (N = 70)

Characteristics	N	%
Age (= 20.94, SD. = 0.61)		
18	1	1.43
20	8	11.43
21	55	78.57
22	5	7.14
23	1	1.43
Sex		
Female	66	94.29
Male	4	5.71
The teaching method most preferred by the students		
Lecture Method	31	44.30
Case study	33	47.10
Learning by doing	57	81.40
Problem-based learning	25	35.70
Brainstorming	33	47.10
Simulation Technique	53	75.70
Game-Based Learning	41	58.60
Project-based Learning	21	30.00

revealed that before the program participation the score of their knowledge was 7.21 with standard deviation of 1.90; the scores after receiving the development was 18.66 with standard deviation of 1.53. Overall, out of 70 students, most of the students (N=66, 94.29%) achieved high scores. Comparing the score before and after program participation, the knowledge before receiving the development program was statistically different from that after program participation ($p < 0.05$) (Table II).

Table II: Comparison of the knowledge of critical care nursing before and after receiving the development of clinical nursing process through case study learning method (N = 70)

Knowledge of critical care nursing	Mean ± SD	Wilcoxon Value	Wilcoxon Prob
Before receiving the development of clinical nursing	7.21 ± 1.90	7.293	0.000*
After receiving the development of clinical nursing	18.66 ± 1.53		

Ability to implement clinical nursing care plans before and after the program participation

According to the analysis results in relation to care planning ability among 70 students, they had the average ability before receiving the development program 11.89 with standard deviation of 1.83; meanwhile, their average score after the program participation was 13.19 with standard deviation of 2.18. Most of the students (N=55, 78.57%) had a high level of clinical care planning ability. Comparing the score of clinical care planning ability after the program participation, there was a statistically significant difference ($p < 0.05$) (Table III).

DISCUSSION

Students’ knowledge of critical care nursing before and after participation

The findings showed that of 70 students, overall

Table III: Comparison of the ability to implement clinic nursing care plans before and after the program participation (N = 70)

Knowledge of critical care nursing	Mean ± SD	Wilcoxon Value	Wilcoxon Prob
Before receiving the development of clinical nursing	11.89 ± 1.83	3.643	0.000*
After receiving the development of clinical nursing	13.19 ± 2.18		

their knowledge of critical nursing care significantly increased after the program participation. A likely explanation is that developing the knowledge through case study approach allowed individual students to prepare their own lessons before group discussion, thus increasing additional learning and analytical skills of nursing process from self-education process and from their group members. Moreover, allowing the students opportunities to inquire and jointly formulate concepts could increase a level of accurate understanding of the nursing process and improve their ability to make holistic nursing plans. According to the knowledge test on critical nursing care after the program participation, the majority of the students (N=66, 94.29%) had a higher level of the knowledge compared to before the program participation. The findings of the current study are consistent with those of Allen and Toth-Cohen (8) who introduced case studies for critical thinking enhancement in occupational therapy students, arguing that case studies helped significantly increase students’ critical thinking, confidence, and reduced anxiety. This study also revealed students viewpoints that case studies assisted them to utilize critical thinking in their fieldwork. The findings from this study also accord with those of Punthasee and Sikaow (9), who found that the use of case studies to improve ability in clinical nursing process among nursing students could significantly increase students’ average scores.

Students’ ability to implement nursing care plans before and after the development program

The results showed that most of the students had, on average, increased ability to create nursing plans after the program participation ($p=05$). The current findings are relevant to the theory of case-based learning, one of the teaching approach used to prepare nursing students prior to nursing practicum in that this method contributes to increased skills and self-confidence as well as analytical ability to be applied in problem solving and improve nursing process in newborn intensive care unit (4). The current results confirm the findings by Rajchawail et al. (10), who had the subject students analyze the case studies on wards and found that after teaching the student concepts, theories, and nursing process, the participants had a relatively higher average score of competency in nursing care planning in relation to before participation. Moreover, our findings support those of Chandee et al. (11), who investigated the effects of case-based learning on student nurses’ ability to apply the nursing process and found that 1) the average scores

after the intervention was significantly higher in relation to before the intervention; 2) the average score of the study group receiving case-based learning intervention was higher than those taught by the traditional methods; and 3) the level of satisfaction was high when they were taught by the mixed method learning including case study - based learning, simulation and authentic learning.

The findings of the study indicate the effectiveness of case study -based learning in that learners seize considerable opportunities to learn from authentic cases, holistically apply their skills, systematically think, accurately understand and critically analyze problems and situations, and confidently implement nursing decisions. It is, therefore, recommended to use this approach to teach clinical nursing so that nursing students are prepared with essential skills for nursing practicum

CONCLUSION

The findings showed that the use of case studies can improve nursing care planning; thus, it is argued that case study-based learning can be introduced into other subjects or applied for preparing nursing students for clinical practices so as to promote systematic and analytical thinking and raise students' confidence in implementing nursing care plans. However, this study experienced some limitations in respect of the small number of sample size and absence of practices in ward settings. Further studies require a greater number of subjects and the mixed method and other approaches e.g., teaching based learning (TBL) can be used so as to practice nursing care planning based on the nursing process for practicum preparedness.

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