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Impact of Guided Reciprocal Peer Questioning on the Disposition of Critical Thinking among Nursing Students

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Background: Critical thinking disposition has been recognized as an essential feature in nursing.
Objectives: We conducted this study to determine the effect of guided questioning on the disposition of critical thinking among nursing students.
Materials and Methods: In this quasi-experimental study, all the second year nursing students (n = 54) from Tabriz nursing and midwifery faculty of Iran in 2010-2011 were selected. In autumn semester, the students (n = 28) were chosen as control group and in the spring semester the students (n = 26) were considered as experimental group. The experimental group was trained for the course of cardiac medical surgery in six days by Guided Reciprocal Peer Questioning (GRPQ) method. The control group was trained with the same course using conventional method. The critical thinking disposition was determined in both groups using California Critical Thinking Disposition Inventory (CCTDI) before and after the intervention. Data were collected and analyzed by SPSS 17.
Results: The mean age of participants was 19.85 years and 55.6% of them were female. There was no significant difference concerning demographic and educational characteristics between the two groups. The mean CCTDI scores for all students in the control group was 267.59 ± 16.66 while in experimental group was 273.90 ± 20.79. Paired t-test between pre-test and post-test data showed significant differences in the overall score of disposition to critical thinking in the experimental group (P = 0.002). But no difference was found in the control group (P = 0.70). Independent t-test did not show differences in CCTDI in the two groups before the intervention (P = 0.8) and after the intervention (P = 0.2).
Conclusions: Students who were trained with GRPQ in clinical settings presented higher level of CCTDI compared to control students. This strategy may be applied to help the nursing students construct and elaborate on their decisions in the clinical fields through using GRPQ process.

Keywords: Thinking; Students; Nursing

1. Background

Nurses are involved in complex situations that require in-depth consideration. Critical thinking is the key for resolving problems in the clinical care (1, 2). The nurses' critical thinking capability directly affects the safety of patients (3) as well as the quality of provided care (4). It helps nurses act independently and calls for strategies that make them potentially compensate for solving the problems (1). Therefore, critical thinking is an expected competency for graduated nurses (5) and is necessary to ensure the nursing students critical thinking ability in new situations (6). Critical thinking includes two aspects: skills and disposition. The skill relies on cognitive strategies such as analyzing, synthesizing and combining (7). Facione et al. explained Critical Thinking Dispositions (CTDs) as internal motivation to think critically when faced with problems to solve, ideas to evaluate, or decisions to make (8). In fact, CTDs includes truth-seeking, open-mindedness, analyticity, systematicity, critical thinking self-confidence, inquisitiveness and maturity (1). On the other hand, active participation of the learners requires thinking critically (9). But most clinical teaching methods could not prepare the nursing students to analyze, prioritize or organize newly emerging knowledge (10). Researchers in the nursing literature support the use of strategic questioning as a method for fostering critical thinking during clinical experiences (11).

Implication for health policy/practice/research/medical education:
One possible way to promote critical thinking is to train nursing students from first years using guided questioning approach beside usual methods.

In the process of Guided Reciprocal Peer Questioning (GRPQ), critical thinking questions make students think beyond the class or the texts facts. Questions at the level of critical thinking will create high-level cognitive processes such as opinion analysis, making comparisons, distinction, inference, prediction, and evaluation. Therefore, training the students for asking proper questions from each other, may improve their critical thinking ability (12). In this regard, higher-level thinking questions should start or end with words or phrases such as “explain”, “compare”, “why”, “what is a solution to the problem” (13). Previous studies have shown that baccalaureate programs may not improve critical thinking among students in Iran (1, 10, 14, 15). However, little attention has been paid to the implementation of active teaching strategies such as GRPQ in the field of nursing education. In the study performed by Vanaki and Taghi, critical thinking skills were promoted via GRPQ in theory courses for one semester (16). Therefore, participation of students in questioning strategies might lead to the promotion of CTDs in clinical fields.

2. Objectives

We conducted this study to explore the effects of GRPQ on the CTDs of Tabriz nursing students in clinical education.

3. Materials and Methods

We performed a pretest-posttest quasi-experimental study to examine the effects of GRPQ on CTD of the nursing students, in the school of nursing and midwifery affiliated to Tabriz University of Medical Sciences, Tabriz, Iran. According to the study performed by Vanaki and Tagi on nursing students, calculated sample size included 25 nursing students for each group (16). However, for increasing the accuracy of the study, all of the 60 students were invited to participate. The students in autumn and spring semesters who had passed the course of nursing care of patients with cardiologic diseases in the previous semester were selected. The students in autumn semester (n = 28) and spring semester (n = 32) were considered as the control and experimental groups, respectively. Six students did not fill in the post-test from the experimental group and were excluded from the study.

Critical Thinking Disposition Inventory (CCTDI) was used for data collection. This questionnaire includes 75 questions, scored from 1 to 6 using a Likert scale from “completely disagree” to “completely agree”, respectively. The questions are organized in seven subscales with 9 - 12 items in each subscale: analyticity (12 questions), critical thinking self confidence (9 questions), inquisitiveness (10 questions), maturity (10 questions), open-mindedness (12 questions), systematicity (11 questions), and truth-seeking (12 questions). Analysis of the CCTDI consists of scores on each of the seven subscales and on the total overall disposition toward critical thinking. To calculate subscale scores, raw scores are multiplied by 10 and divided by the number of items in the subscale. Obtaining over 50 points in each subscale indicates "strong disposition", while 40 - 50 points indicates "positive disposition" (i.e. high subscale scores), 30-39 points and below 30 points indicates "ambivalent disposition" and "strong opposition" toward critical thinking (i.e. low subscale scores), respectively. Total scores range between 70 and 420. In this regard, obtaining more than 350 points demonstrates "strong and stable disposition", while obtaining 281 - 350 points, 211 - 280 points and 70 - 210 points indicates positive inclination”, “ambivalent disposition" and "strong opposition" toward critical thinking, respectively (17).

A previously approved, validated and reliable Farsi version of CCTDI was obtained from CCTDI test designers. Prior to the administration of CCTDI in this study, English versions were submitted to a panel of academics (n = 10) in the disciplines of nursing. One of the panel members was a linguistics expert. They were invited to independently judge the items. To assess how closely the Farsi translation resembled the English CCTDI and to determine the content validity as well as whether the items indeed measured the dispositional aspect of critical thinking, panel members suggested to enhance its clarity and readability. After piloting the guide study on 20 eligible nursing students, the re-reliability of the questionnaire was confirmed using Cronbach’s alpha (r = 0.75).

At the beginning, the aim of study was explained for all the students. Then, the clinical education of students began with GRPQ and routine methods. All of students were assigned in 6 to 7 groups, with 5 - 7 students in each group. The clinical education of each group was comprised of six days (three days in two subsequent weeks). At the beginning of clinical education, CTDs pre-test was obtained from all students. After the clinical education period, the post-test of CTDs was obtained from all students. The instructor and the environmental conditions of clinical education course were identical for both groups. Data obtained from the study were reviewed and analyzed by descriptive and inferential statistical methods using SPSS software version 17.0 (frequency counts, percentage, means and standard deviations, Chi-square, independent t-test, paired t-test).

3.1. Guided Reciprocal Peer Questioning (GRPQ) Approach

In this approach, each student will be asked to answer two questions, using root of questions that covers the lesson plan content at the end of teaching program everyday, under the guidance of researcher. Then, the students will be asked to present the answers to the others. The students are responsible for finding the correct an-

swers for questions of each other. Partners in two guided questioning conditions are trained to generate thought-provoking questions. Thus, the students will practice the strategy of questioning and responding to the debate and discussion about clinical subjects such as nursing care of cardiac patients during the discussion. The discussion would have continued with questions and answers until the researcher stopped the process. In guided questioning, it would be important that the student cannot turn to the next question before full discussion on the topic is provided. The roots of the questions included: What are the strengths and weaknesses of …?, what is the diference between …?, explain why/how …?, what would happen if …?, what is the nature of …?, why is happening…?, what is a new example of …?, how could be used to …?, what are the implications of …?, what is analogous to …? (18).

3.2. Routine Clinical Education Approach

For the control group, a traditional teacher-centered method with the purpose of knowledge transfer was used. In this method, students would only learn the practical care of cardiac patients, and they do not focus on questioning about the lessons or what was asked from the coach.

4. Results

The mean age of participants was 19.85 years and 55.6% of them were female. Participants demographics are presented in Table 1. Chi-square tests showed that there were no significant differences between experimental and control groups in the demographic variables.

Table 1. Demographic Characteristics of Participants

Characteristics	Control Group, Mean ± SD, n = 28	Experimental Group, Mean ± SD, n = 26
Age, y	19.07 (6.3)	20.69 (0.8)
Grade Point Average	16.99 (1.2)	16.41 (0.9)
Gender		
Female	13 (46.4)	17 (65.6)
Male	15 (53.6)	9 (34.4)
Marital status		
Married	7 (25)	2 (7.7)
Non-married	21 (75)	24 (92.3)
Interest in nursing		
Low	8 (28.8)	2 (7.7)
Moderate	13 (46.4)	19 (73.1)
High	7 (25)	5 (19.2)

The mean CCTDI scores for all students in control and experimental groups are shown in Table 2. The minimum score on the overall disposition in post-test of experimental group was 245.44 and in control group was 238.79. The maximum score on the overall disposition in post-test of experimental group was 315.48 and in control group was 311.59. Paired t-test showed significant differences in the overall score of disposition to critical thinking in the experimental group between pre-test and post-test (t = 3.45, P = 0.002); but no difference was found in the control group (t = 0.25, P = 0.7). Independent t-test did not show any significant difference in critical thinking disposition in the two groups before the intervention (t = 0.14, P = 0.8) and after the intervention (t = 1.23, P = 0.2).

Table 2. Overall and Subscales Scores for Critical Thinking Disposition in two Groups

	Experimental Group, Mean ± SD, n = 26			Control Group, Mean ± SD, n = 28		
Subscale	**Pre-Test**	**Post-Test**	**P Value**	**Pre-Test**	**Post-Test**	**P Value**
Truth Seeking	29.08 ± 4.51	30.35 ± 4.62	0.01[a]	29.9 ± 4.4	28.9 ± 4.1	0.10
Open Mindedness	37.10 ± 4.29	38.17 ± 3.01	0.13	36.97 ± 3.8	36.86 ± 3.4	0.30
Analyticity	43.5 ± 5.48	44.5 ± 5.81	0.29	43.3 ± 4.9	42.12 ± 4.6	0.10
Systematicity	38.39 ± 4.73	40.25 ± 4.32	0.03[a]	38.5 ± 5.0	29.2 ± 3.7	0.70
Inquisitiveness	40.90 ± 4.43	40.86 ± 4.75	0.95	40.93 ± 4.08	40.25 ± 4.08	0.20
Maturation	34.60 ± 3.16	35.93 ± 4.08	0.07	35.82 ± 4.2	34.7 ± 7.1	0.10
Self-Confidence	42.40 ± 5.36	43.76 ± 6.23	0.19	41.18 ± 3.9	45.3 ± 6	0.00[a]
Overall Score	266.00 ± 17.19	273.90 ± 20.79	0.002	266.66 ± 16.09	267.59 ± 16.66	0.70

[a] Significant findings

CCTDI subscale scores for control and experimental groups in the study are presented in Table 2. Three of the seven subscale mean scores (open-mindedness, maturity of judgment, and truth-seeking) were found to be below 40 and four of them were above 40 in the experimental group (analyticity, critical thinking self-confidence, inquisitiveness, systematicity). The highest-rated mean score was found for the analyticity subscale (44.5), char-

acterizing an inclined trend toward the use of reasoning when solving problems, and the lowest-rated mean score was observed for the truth-seeking subscale (30.35), indicating negative trend related to seeking the best knowledge and courage to ask questions. Despite having higher scores in the experimental group, results indicated only two areas of significance: the subscale of truth-seeking (t = 2.60, P = 0.01), and systematicity (t = 2.30, P =0.03). In the control group, before and after the test, there was no significant difference between the scores of disposition and critical thinking subscales, except in self-confidence subscale (t = 4.07, P = 0.00).

5. Discussion

In this study, the mean overall CCTDI scores indicated students' "ambivalence inclination" toward critical thinking in the control and experimental groups. These results are consistent with the results of researches conducted by Ip et al. (19), Shin et al. (20), Suliman and Halabi (21), and Barkhordari and Jalalmanesh (22), as their results showed "ambivalence disposition". However, such results do not coincide with the results of studies conducted by Profetto-McGrath (23), Tiwari et al. (24), Ozturk et al. (25), BeŞer and Kissal (26), whose results showed "positive disposition". These studies also showed that the experimental students' scores in CCTDI were more than the control groups' scores. In the Vanaki and Taghi study (16), the CCTDI total of students who were trained by GRPQ was enhanced significantly. Similarly, the results of another study showed that teaching psychology with GRPQ improved the CCTDI of students (12). In other words, the findings of Veld et al. (27) showed that teaching occupational therapy students with GRPQ did not enhance their critical thinking. It should be noted that in all of these studies, GRPQ method was used for theoretical lessons; but in the present study, GRPQ was used in clinical teaching of nursing students.

Learning critical thinking skills through participation in group discussions and active learning situations happened in experimental students as an interpretation of our findings. Interactions in a group increase the learners' ability for reasoning (28). Lecturing is a common method of training in health care professions (29), and teacher–centered teaching methods remain as popular educational methods (30), but results of some studies showed that these methods have no potential ability to enhance the high levels of thinking such as critical thinking (16). Scores for three CCTDI sub-scales (open-mindedness, maturity of judgment, and truth-seeking) fell short of the standard cut score of 40, and were lower than those reported in the other researches (31). The fact that truth-seeking marked the lowest score is in line with the results of the other research (19, 32). This subscale identifies alternatives or different points of views (26). In this study, ambivalence level was obtained in this subscale which is consistent with the studies of Colucciello, (33) and Profetto-McGrath, (23). In fact, the lack of truth-seeking may endanger the patients' lives (34). Despite an emphasis on questioning and information-seeking skills, GRPQ strategy did not impel or attract more students to move from ambivalence to a positive inclination and attitude toward intellectual honesty, and is not better than other educational strategies (25).

Systematicity is important for decision-making in the nursing profession. The nurse should take advantage of organizing features to be able to plan and provide skillful care (34). Facione et al. (35) reported that a person who thinks critically uses these seven dispositions to form and make judgments. As we know, critical thinking will not occur without having a positive disposition to critical thinking (23, 36); thus, in summary, this strategy could be expected to promote understanding and improve achievement by helping students to construct and elaborate on their decisions in clinical fields. Results of a previous study with this strategy (18) indicated that comprehensive effects showed up after only one practical session with the strategy and remained stable over the span of five sessions. Therefore, GRPQ strategy may be able to play a main role in creating organized, disciplined, focused and persistent questions.

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Authors' Contribution

Manizhe Kalantari Meibodi contributed in review of literature and planning the primary design. Sima Lakdizaji contributed in planning the design and methodology and preparing the article. Farahnaz Abdollahzadeh contributed in study framework and providing study questionnaire. Hadi Hassankhanih contributed in determining the study sample size and data analysis. Azad Rahmani contributed in writing the paper. Kathie Lasater contributed in English edition.

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