Original Article

The Effect of Reflective Writing on Anesthesia Students' Critical Thinking Disposition

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[DOR: 20.1001.1.22519521.1400.14.42.6.0]

[DOI: 10.52547/edcj.14.42.78]

Article Info

Article history:
Received 30 Jan 2021
Accepted 22 Aug 2021
Published 10 Sept 2021

Keywords:
Critical Thinking
Reflective Writing
Clinical Education
Anesthesia Students

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Abstract

Background & Objective: Critical thinking development in healthcare professions is a necessity for making effective decisions in high-risk situations. The present study aimed to evaluate the effect of reflective writing with Gibb's cycle on students' critical thinking disposition.

Materials & Methods: This was an interventional research with a pretest-posttest design and. The anesthesia students in the clinical education course were selected, and those entered into the control group received conventional education such as clinical conferences, performing actions and giving performance reports under the supervision of a clinical instructor. On the other hand, a structured reflective writing activity was implemented in the intervention group. Moreover, a critical thinking disposition questionnaire was applied to evaluate the difference in the level of critical thinking disposition and its subscales before and after the intervention.

Results: In the present study, the total mean score of critical thinking disposition and the innovativeness subscale were significantly higher in the test group after the test, compared to the control group ($P<0.05$).

Conclusion: Findings suggested the positive effects of reflective writing as a part of students' learning activities on the development of critical thinking disposition during a clinical education course. It is recommended that reflective writing be used as a part of students' assignments when planning clinical education courses.

Introduction

The promotion of critical thinking is important in the education of health care professions (1). Critical thinking is defined as reasonable reflective thinking focused on deciding about what one believes or does (2). In fact, critical thinking is a set of cognitive tendencies and skills such as analysis, judgment, inference, reasoning, self-regulation, reflection, curiosity, open-mindedness, as well as order, accuracy, and rationality (3, 4). However, critical thinking disposition is an integral part of critical thinking and involves personal inclinations and motivations for critical thinking (5, 6). The necessity of critical thinking skills in solving different problems seems to depend on an intrinsic desire and motivation to use these skills (7). In other words, critical thinking may not occur at all or happen at a level below the standard level if there is no positive inclination toward it (8, 9). Meanwhile, Facione (1995) introduced disposition toward critical thinking as an important element in the curriculum of professional programs (10). Since the development of cognitive skills and preparation of healthcare professions are necessary for effective decision-making in high-risk and challenging situations (11), thinking education must focus on the improvement of students' cognitive abilities and mental habits as much as possible, such that it would result in awareness and desire toward opportunities of thinking application to solve problems (12).

[DOR: 20.1001.1.22519521.1400.14.42.6.0]

[DOI: 10.52547/edcj.14.42.78]

The cognitive processes involved during the conduct of anesthesia are important in both critical and non-critical situations (13). In anesthesia practice, lack of critical thinking may be associated with misdiagnosis, error, or inability to manage a critical situation (13, 14). Educators in professional programs are required to apply approaches that best prepare students to deal with challenges in critical situations (15). In this respect, reflective writing is a learning activity used in this area. In general, reflective writing is a type of personal response to new experiences, situations, events and information, In fact, it is one stage of the process of thinking and learning (16). This type of writing provides opportunities to integrate student thoughts and experiences with academic content (15). In this regard, reflecting on clinical experiences can affect the development of critical thinking skills, own knowing and adjustment to the situation (17-20). In a research by Naber and Wyatt (2014), the reflective writing intervention significantly increased the truth-seeking subscale of nursing students' inclinations toward critical thinking (18). Moreover, Zhang et al. (2017) showed that reflective training during the internship period improved nursing students' disposition of critical thinking (21). Meanwhile, Haugen et al. (2018) reported the lack of significant effect of journaling on critical thinking deposition of students (22).

Even though limited studies have assessed the effect of reflective writing interventions as a learning activity on the development of students' critical thinking disposition, but they have focused on the field of nursing and cannot express the effect of reflective writing on the improvement of critical thinking characteristics and dispositions in healthcare professions asan evidence-based approach in education. Meanwhile, critical thinking disposition, which involves personal desires and motivation toward critical thinking, may affect the use of critical thinking skills in practice (9, 11).

Given the importance of critical thinking and critical thinking disposition in healthcare professions, attention to educational strategies applied to develop such skills as an educational outcome is of utmost importance. Lack of empirical evidence of the effectiveness of reflective writing interventions on the improvement of critical thinking dispositions in students, especially in healthcare professions, shows the need for assessing reflective writing as an educational strategy to enhance critical thinking dispositions. Therefore, the present study aimed to evaluate the effect of reflective writing based on Gibbs' reflective cycle on undergraduate anesthesia students' critical thinking disposition in clinical education.

Materials and Methods

This was an interventional research with a pretest-posttest design and a control group, conducted on fourth-semester students of anesthesia in nursing and midwifery school of Isfahan University of Medical Sciences during the first academic year of 2018-2019. One of the clinical courses during the anesthesia undergraduate program is a 102-hour nursing apprenticeship. During this course, students attend surgical wards and learn the clinical unit under the supervision of an educator in accordance with the content taught in the theoretical credit. Following receiving approval from the ethics committee of Isfahan University of Medical Sciences (code of ethics: IR.MUI.RESEARCH.REC.1397.409), a total of 40 fourth-semester students were enrolled in the research. The inclusion criteria were passing the theoretical credit of nursing skills and work in the operating room and passing the prerequisite credits of this clinical course (microbiology and sterilization). It is noteworthy that none of the students had any previous training on reflection activities. The exclusion criteria were incomplete questionnaires and absence from more than two clinical education sessions. The students attending the surgical wards of the hospital were trained. First,

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the participants in each group were divided into four groups based on the classification done by the nursing school education department based on the regulations and according to the balance in their mean GPAs. Afterwards, the study groups were randomly divided between clinical educators. Therefore, two groups in the intervention group were trained by an instructor using reflective writing while the other two groups in the control group were trained by two clinical instructors using the conventional method during a six-week course. All instructors were homogenous in terms of gender (female), being a fixed instructor of the credit of nursing clinical skills and having at least three years of clinical education experience in this course in surgical wards. The method of teaching and training of apprenticeship objectives in accordance with the lesson plan was reviewed by the first author during the relevant courses in order to standardize performance, and the instructors had similar clinical competencies. The research objectives and implementation methods were explained to the participants over a briefing session, and they were ensured of the confidentiality terms regarding their personal information (providing results anonymously). In addition, informed consent was obtained from all participants.

In this study, data were collected using a two-section questionnaire; the first section included demographic characteristics such as age, gender, mean GPA and marital status. The second section involved the use of Ricketts' Critical Thinking Disposition Inventory to evaluate the level of critical thinking disposition and its subscales. The tool encompasses 33 items with three subscales of engagement, maturity and innovativeness. In addition, its minimum and maximum scores are 33 and 165, respectively. The items are scored based on a five-point Likert scale from completely disagree (one score) to completely agree (five scores). The Cronbach's alpha of the subscales of innovativeness, maturity and engagement was respectively estimated at 0.79, 0.75 and 0.89 in a study by Rudd and Ricketts (2005) (23). Moreover, the validity and reliability of the instrument were measured in various groups in Iran, and the scientific credibility, as well as face and content validity of the tool, were reported to be favorable (24-27). In a research, Pakmehr et al. (2013) reported the Cronbach's alpha of the entire instrument, as well as the subscales of innovativeness, maturity and engagement to be 0.66, 0.64, 0.76 and 0.72, respectively (24). Furthermore, the questionnaire had favorable validity and reliability when used in some health sciences areas in Iran (6, 26, 28). To assess the reliability of the instrument in the present study, 33 anesthesia students filled the questionnaire and the estimation of its Cronbach's alpha was 0.82.

In the next stage, the critical thinking disposition questionnaire was filled by all participants in the two control and intervention groups on the first day of the clinical education course. In the control group, students underwent clinical education in the conventional method, which was accompanied by supervision and feedback from the clinical educator in the form of clinical conferences, preclinical preparations, implementation of measures and performance reports. On the other hand, the reflective writing with Gibbs' reflective cycle was applied in the intervention group. While adapting to the educational objectives of the course, the clinical educator taught reflective writing with the Gibbs framework before clinical education and explained it to the students as part of the learning activity of the course. Before starting course, the clinical educator was prepared for teaching reflective skills, using reflective writing and giving feedback to students. In the intervention group, the students were required to write one of their learning experiences (events) and deliver it to their instructor on each day of clinical education based on Gibbs' reflective cycle (description: writing or having a conversation with another person about the event; expressing feelings and emotions; writing the event with an emphasis on

emotions and thoughts of the person during or after the event; evaluation: judgment about the event and compliance with standards; analysis: evaluation of the details of the event and relationship and comparison of performance based on resources (the relationship between theory and practice); conclusion: providing performance outcomes in a situation or event focusing on the question of "What else could we do in this event?", and action plan: deciding about future actions when facing a similar situation). Every day, the clinical instructor provided feedback on the subjects provided by students in their reflective writings. Feedback was provided in groups and was related to instructor-students' reflective writings. Students' reflective writings helped to identify their clinical problems. Issues such as problem-solving, ineffective communication skills in relation to the patient or nursing staff and other health care professions, decision making in a serious situation and possible mistakes or negligence were considered by clinical instructor, and a new action plan was presented with the facilitation of instructor and collaboration of other students to solve the problem and or learning new. The educators and students of the control group were informed that the students of this group could use reflective writing in clinical education if they wish, for which they should inform the researcher. However, none of the students volunteered to use reflective approaches during the course. Meanwhile, the presentation of feedback and clinical conferences by the instructor was in accordance with the conventional method. During six weeks of clinical education (20 days), the students of the intervention group received feedback about their performance according to the reflective writings in the group sessions and improved their performance. The research questionnaire was re-filled by all participants at the end of the course. It is notable that three students in the control group and the test group avoided filling the questionnaire at the end of the course. Ultimately, 34 students (17 in the test group and 17 in the control group) participated in the study. Data analysis was conducted in SPSS version 18. According to the Kolmogorov-Smirnov test, mean critical thinking disposition and its subscales had a normal distribution. Therefore, data analysis was performed using an independent t-test and paired t-test.

Results

In this research, the mean age of the participants was 20.18±1.69 years in the test group and 20.06±0.75 years in the control group. There was no significant difference between the two groups in terms of mean age, GPA, marital status and place of residence (P>0.05) (Table 1). According to independent t-test results, there was not a significant difference between the two groups regarding the mean total score of critical thinking disposition and its subscales before the intervention (P>0.05). Meanwhile, the results were indicative of a significantly higher total mean score of critical thinking disposition and innovativeness subscale in the test group after the intervention, compared to the control group (P<0.05). However, there was no significant difference between the two groups regarding the mean scores of maturity and engagement subscales (P>0.05) (Table 2). According to the paired t-test results, there was no significant difference in the total mean score of critical thinking disposition and its subscales in the control group before and after the intervention (P>0.05). However, the mean total score of critical thinking disposition and innovativeness subscale was significantly higher in the test group after the intervention, compared to before the intervention (P<0.05). On the other hand, there was no significant difference in the mean scores of the subscales of maturity and engagement in the test group before and after the intervention (Table 3).

[DOR: 20.1001.1.22519521.1400.14.42.6.0]
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Table 1: Comparison of test and Control Groups Regarding Demographic Characteristics

Characteristics	Test Group		Control Group		P value
	Mean	SD	Mean	SD	
Age	20.18	1.59	20.06	0.75	0.78 [a]
Last-semester GPA	16.12	1.35	15.30	1.78	0.33 [a]
Marital status	Married N(%) 3(17.6)	Single N(%) 14(82.4)	Married N(%) 1(5.9)	Single N(%) 16(94.1)	0.30 [b]
Living status	With family N(%) 14(82.4)	Dormitory N(%) 3(17.6)	With family N(%) 11(64.7)	Dormitory N(%) 6(35.3)	0.22 [b]

a: The independent-sample t test; b: Fisher's exact test

Table 2: Between-group Comparison Regarding the Mean Scores of CTD and Its Subscales

CTD and its subscales	Before			After		
	Test Group Mean± SD	Control Group Mean± SD	Independent t test P value	Test Group Mean± SD	Control Group Mean± SD	Independent t test P value
Innovativeness	43.18 3.56±	42.74 ±4.09	0.74	46.59 ±2.65	42.06 ±2.75	<0.001
Maturity	32.51 2.15±	32.41 ±4.69	0.94	32.69 ±2.14	31.94 ±3.15	0.42
Engagement	44.89 3.95±	45.16 ±4.52	0.85	45.94 ±2.77	45.35 ±2.80	0.54
Overall CTD	120.57 7.68±	120.31 10.86±	0.93	125.22 6.16±	119.35 6.51±	0.01

Table3: Within-Group Comparison Regarding the Mean Scores of CTD and Its Subscales

CTD and its subscales	Test Group			Control Group		
	Before Mean± SD	After Mean± SD	paired-sample t test P value	Before Mean± SD	After Mean± SD	paired-sample t test P value
Innovativeness	43.18 ±3.56	46.59 ±2.65	<0.001	42.74 ±4.09	42.06 ±2.75	0.55
Maturity	32.51 ±2.15	32.69 ±2.14	0.73	32.41 ±4.69	31.94 ±3.15	0.50
Engagement	44.89 ±3.95	45.94 ±2.77	0.22	45.16 ±4.52	45.35 ±2.80	0.85
Overall CTD	120.57 7.68±	125.22 6.16±	0.003	120.31 10.86±	119.35 6.51±	0.65

Discussion

The present study applied reflective writing in clinical education to evaluate its effects on students' critical thinking disposition. According to the results, the total score of critical thinking disposition was higher in the test group, compared to the control group, which is consistent with the results obtained by Güven et al. (2020), who marked the effect of daily

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[DOI: 10.52547/edcj.14.42.78]

writing about patient care on improved critical thinking disposition of students (29). In line with our findings, Güven et al. (2020) reported that group discussion and receiving feedback from the instructor as the items considered in the implementation of the intervention, which could justify the similarity of the results. In a study by Zhang et al. (2017), the results were indicative of the effect of reflective training on students' critical thinking disposition in clinical education, which is congruent with our findings (21). Lampert (2007) introduced critical thinking disposition as an educational outcome (30). Reflective writing facilitates the integration of theory and practice, as well as self-reflection, and can make connections between personal experiences and professional values (31, 32). In fact, reflection is a spectrum of the thinking process from knowing what to knowing how and knowing why to give meaning to information, and as a feature of critical thinking, it clarifies the reason for what we did and why we did it and how to differentiate relevant issues in a critical manner (31). In addition to Gibbs' reflective cycle used in the present study, attempts were made to guide students toward making the most appropriate choice by focusing on their own performance and its reasons and distinguishing related contextual items in the feedback provided by the instructor. In a study by Naber and Wyatt (2014), the intervention of reflective writing had no effect on students' critical thinking disposition in a clinical learning environment (18). This lack of congruence might be due to the difference in the reflective writing framework, the difference in students' dealing with the clinical environment and different tools used to measure critical thinking disposition. In this regard, Naber and Wyatt (2014) applied California Critical Thinking Disposition Questionnaire and their reflective writing method was different than what was used in the current research.

In the present study, there was a significant improvement in the subscale of innovativeness following the use of reflective writing in the test group. This increase in the innovativeness score could be related to the relationship between reflective thinking and critical thinking. In a study, Akpur (2020) reported a significant positive relationship between critical thinking, reflective thinking and innovative thinking (33). Moreover, Liu (2020) showed that the implementation of methods that focus on the increase of the sense of curiosity and innovation could improve the formation of innovative products in learners (34). Another issue is the instructors' approach of providing feedback to events and topics, which were written by students in a reflective framework. During the group discussion sessions, the educator used questions such as "what would you do if you were in that situation? And why?" as a facilitator of idea generation by students, who were guided to choose the best and most appropriate response with their own innovation. Idea generation can be observed as creativity in a way that provides an innovative and appropriate response to a heuristic work, and idea implementation can be recognized as innovation (30, 34, 35). Therefore, instructor guidance in the feedback sessions may promote student innovation.

In the current research, there was no significant change in the subscales of maturity and engagement after the intervention. On the other hand, changes in the subscales of critical thinking disposition (innovativeness, maturity and engagement) might have been affected by the educator's teaching method. In a study by Dehghani et al. the subscale of engagement significantly increased following the use of a flipped classroom method. Nonetheless, no significant relationship was observed in the subscales of maturity and innovativeness in this regard (6). Meanwhile, there was a significant increase in students' innovativeness after the use of the reflective writing method, whereas no significant change was observed in the subscales of maturity and engagement. In another study, Mirzaei et al. reported a significant positive relationship between curriculum components (content, objective, method

and evaluation) and improvement of the subscales of critical thinking disposition (36), in a way that changes in the critical thinking disposition subscales might have been affected by these elements.

Conclusion

According to the results of the present study, implementation of a reflective writing intervention with Gibbs' reflective cycle and providing feedback in group discussions in clinical education improved the overall score of critical thinking dispositions and the innovativeness subscale. Accordingly, the manner and model used in student reflective writing, as well as the type of instructor-student feedback to the student in the process of teaching and learning in clinical practice, may affect the improvement of students' critical thinking disposition. Moreover, questions that arouse students' curiosity and generation of innovative ideas may have affected the development of student innovation. Limited studies have been performed to evaluate the effect of reflective writing and feedback provision on students' critical thinking disposition in clinical learning environments. Therefore, it is suggested that more studies be conducted to evaluate the effect of reflective activities on students' critical thinking disposition in other health professions. In addition, the generalizability of the results decreased due to only involving anesthesia students and performing the research in surgical wards.

Acknowledgments

The present study was extracted from a research project approved by Isfahan University of Medical Sciences with the code of 297139, and its costs were covered by the mentioned university. Hereby, we extend our gratitude to all anesthesia students for participating in the research. In addition, we would like to thank Mr. Akbar Hasanzadeh, a faculty at the Department of Epidemiology and Biostatistics, Isfahan University of Medical Sciences for collaborating in analyzing the research data.

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[DOR: 20.1001.1.22519521.1400.14.42.6.0]

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