Iran J Public Health, Vol. 52, No.6, Jun 2023, pp.1140-1149

Original Article

Effects of Handover Education Using the Outcome-Present State Test (OPT) Model and SBAR in Nursing Students: A Quasi-Experimental Design

Yon Hee Seo [1], *Kyeongmin Jang [2], Jung-Won Ahn [3]

1. *Department of Nursing Science, Andong National University, 1375 Gyeongdong-ro, Andong-si, Gyeongsangbuk-do, 36729, Korea*
2. *Department of Nursing, Bucheon University, 56 Sosa-ro, Bucheon-si, Gyeonggi-do 14774, Korea*
3. *Department of Nursing, Gangneung-Wonju National University, 150 Namwon-ro, Heungeop-myeon, Wonju-si, Gangwon-do 26403, Korea*

***Corresponding Author:** Email: kyeongminjang@gmail.com

(Received 12 Nov 2022; accepted 20 Jan 2023)

Abstract

Background: Since most of nursing students lack clinical reasoning competency, for effective handover education, it is necessary to include a strategy to improve the clinical reasoning competency in the practical training course of the nursing department.

Methods: This study used a quasi-experimental research design using a non-equivalent control group pretest-posttest design to verify the effectiveness of the practice education program using the OPT model and SBAR. The subjects were 73 third-year students participating in clinical practice or clinical alternative practice in Korea.

Results: The experimental group showed significantly better communication clarity (t=-12.262, P<.001), communication confidence (t=-12.486, P<.001), problem-solving processes (t=-13.100, P<.001), and team efficacy (t=-6.197, P<.001) compared to before the intervention. However, there was no significant difference between the pre- and post-intervention scores of the control group.

Conclusion: In a situation where clinical practice is difficult for nursing students, the handover education program using the OPT model and SBAR can helps improve their communication clarity, communication confidence, problem- solving process, and team efficacy.

Keywords: Problem solving process; Efficacy; Clinical reasoning; Nursing students; Nursing handover

Introduction

The International Medical Institution Evaluation Committee recommends the use of standardized handover forms, education, and coaching on handovers to prevent communication errors between medical personnel and ensure patient safety (1). Typically, handover education is mostly learned through senior nurses during nursing practice or through observation of fellow nurses during handovers, and there are few cases of education on handovers using standardized forms (2). The absence of systematic handover education in nursing education suggests the necessity of university education for handover (3).

The SBAR consists of four steps: Situation,

Background, Assessment, and Recommendations related to the problem that occurred (4). The accuracy of information transmitted during patient transfer (5) and improvement of communication quality (6), and shorter handover (7) have been recognized as best practices for delivering information about patients in critical situations. However, it is recently pointed out that most studies used handover-related outcome measures (e.g., missing or incorrect information) for evaluating tool efficacy and usability. Such measures only provide localized metrics for ascertaining the efficacy of handover tool and are often unable to provide holistic perspectives regarding their impact on overall quality of patient care (8). Furthermore, it is insufficient to capture the context of nursing when taking over shift work between nurses (9), and that it is difficult to apply it to complex clinical cases that require multifaceted clinical reasoning such as intensive care unit patients (10). Nurses use logical reasoning to determine, whether to report a patient's condition, which requires training to use clinical practice so that nursing students can find nursing problems on their own at an application level, rather than simply applying a handover tool or understanding the knowledge of the patient's disease.

For an effective handover, the ability to select adequate information that needs handover and communication ability to transmit efficiently information is required (11). Especially team efficacy, it emphasizes a reliable relationship with colleagues as a core competency for medical education, and nursing organizations also report that team efficacy along with communication skills is a major factor (12). A nurse's clinical reasoning competency is not only a driving force for making clear decisions in nursing performance but also it is a dynamic thinking process to collect and analyze patients' information, evaluate the importance of the analyzed information, and determine alternative actions (13) and is an important factor in handover. However, most nursing students lack clinical reasoning skills (14) and have difficulties organizing and accurately delivering important clinical clues and data (1), they are unsure of the handover context and lack confidence (15). Therefore, for effective handover education, it is necessary to include strategies to improve the clinical reasoning competency of students as a priority in the clinical training course.

The Outcome-Present State Test (OPT) Model of Clinical Reasoning offers nurses a structure for evaluating and analyzing patient data to identify the current clinical problem and the desired result. The nine components for clinical reasoning are 'Client in context', 'Cue logic', 'Keystone issue', 'Framing', 'Testing', 'Present-state', 'Outcome-state', 'Decision making/Intervention', 'Judgment' (16). The thinking strategy consisted of knowledge work, self-talk, pattern recognition, juxtaposing, reframing, and reflection checks. The thinking strategy of this OPT model provides clinical judgments on outcomes in complex patient situations (17). As a result of previous studies, by thinking at a higher level and thinking about nursing problems from a different perspective (18), students using the OPT model not only increased their knowledge of the patient's disease but also improved their habit of thinking (17) and problem-solving processes in clinical situations (18, 19).

Despite some studies on the importance of clinical reasoning in handover (11) and on handover education for nursing students (3), there is still insufficient research on handover related to clinical reasoning competency. Accordingly, we develop the standardized handover education program in accordance with improvement in clinical reasoning competency. Therefore, this study was conducted to verify the effectiveness of handover training using the OPT model and SBAR protocols in nursing students.

Methods

Research design

This study used a non-equivalent control group pretest-posttest design to verify the effect of a practical training program using the OPT model and SBAR with a quasi-experimental research design.

Study participants

The experimental treatment was carried out for 2 weeks over 2 sessions from April 25 to May 20, 2022. Participants were recruited from the nursing departments of Yeoju Institute of Technology and Shinsung University located in Gyeonggi-do and Chungcheong-do in Korea. All participants who agreed to participate in the study, provided written consent, and met the study selection criteria. The inclusion criteria were as follows: 1) completed the fundamentals of nursing and health assessment courses 2) had no previous experience with the OPT model and SBAR education, and 3) the students who participated in adult nursing clinical practice as a third-year nursing student.

The sample size was calculated as 20 for each group by setting the number of groups=2 (u=1), significance level (α)=.05, power (1-β)=.70, and effect size (d)=.40 as per Cohen's table (20). This study recruited 75 students (45 in the experimental group and 30 in the control group) considering the drop-out rate; two students in the experimental group were excluded due to late attending. The experimental group was assigned to an in-school practice group using case-study, whereas the control group was assigned to students participating in the internal medicine ward of adult nursing during clinical practice (Table 1).

Table 1: Intervention of the experimental group and the control group

	Program Topics			*Week 1 (Hr)*	*Week 2 (Hr)*
Exp.	Program orientation			1	
		Step 1: Knowledge work			
	Week 1	Lecture	OPT model and clinical reasoning web-based education	1	
			Respiratory diseases	1	1
		Self-directed learning	Pre-learning of respiratory disease		
		Step 2: Self-talk			
		Self-directed learning	Understanding the patient situation using the OPT model	1	1
		Step 3: Pattern recognition & Juxtaposing			
		Discussion and co-operative learning	Understanding the patient situation Web-based clinical reasoning of nursing problems		
		Step 4: Reframing & reflection			
		Discussion and co-operative learning	OPT Model and Clinical Inference Web-worksheet feedback Nursing intervention and core nursing skills practice Learning medical terminology	3	3
		Step 5: Handover practice			
		Lecture	Education on SBAR protocol	1	
		Self-directed learning	SBAR protocol pre-learning		
		Discussion and co-operative learning	Handover practice and feedback	1	1
	Week 2		Repeat steps 1-5 using cardiovascular case		
Cont.	Week 2 clinical practice	Clinical practice orientation		1	
		Core nursing skills practice		3	
		Pre-learning and initial assessment on a case study patient		2	2
		Deriving patient's nursing problems, learning medical terminology and practicing handover		2	2
		Feedback			3

Exp.=experimental group; Cont.=control group; Hr=hour; OPT= Outcome-Present-State-Test; SBAR= Situation-Background-Assessment-Recommendation.

Measures

Communication clarity

The communication clarity measurement tool was developed by Marshall et al. (21) and modified by Cho (22). This tool consists of a total of 14 items that employs a Likert scale ranging from 1 (‘not at all’) to 5 (‘strongly agree’). The higher scores indicate higher communication clarity. In this study, Cronbach's alpha was .95.

Communication confidence

The communication confidence refers to the level of confidence in reporting the clinical situation to medical staff according to the standardized SBAR. The score measured on a 10-point numeric rating scale (23), with 0 at the left end being 'not at all confident' and 10 at the right end being 'very confident’.

Problem Solving Process

The problem-solving process measurement tool was developed by Lee (24) and modified by Woo (25). This tool consists of 25 items: 'discovery of problems (5 items), problem definition (5 items), problem solution design (5 items), problem implementation (5 items), and problem-solving review (5 items). Each item was measured on a Likert scale ranging from 1 ('not at all') to 5 ('almost always'). The higher the score, a higher problem-solving ability. In this study, Cronbach's alpha was .98.

Team efficacy

The team efficacy measurement tool was developed by Marshall (21). This tool consists of eight items: team contribution & cooperation (4 items), team knowledge & teamwork skills (4 items). Each item was measured on a Likert scale ranging from 1 (‘not at all’) to 5 (‘strongly agree’), with a higher score indicating a higher sense of team efficacy. In this study, Cronbach's alpha was .92.

Experimental situation and data collection

As shown in Table 1, the experimental and control groups consisted of the same learning content and instructor guidance times for each session. The program education applied to the experimental group consisted of a total of 80 hours for two weeks. The control group participated in clinical practice for 80 hours.

Experimental treatment

The program orientation and pre-survey: 43 nursing students in the experimental group and 30 in the control group were given a program orientation (experimental group) and a clinical practice orientation (control group) including pre-survey for 60 minutes. The experimental group consisted of a smaller group of fewer than five students who participated in discussion, cooperative learning, and self-directed learning using two patient cases. One was a simple respiratory disease and the second was an advanced stage cardiovascular disease case. The experimental and control groups had the same practice time, a total of 80 hours for 2 weeks, including a total of 15 hours of the instructor’s guidance time.

The program provided to the experimental group is as follows. Step 1 Knowledge work: On the first day, 60 minutes of training was provided on the preparation of the OPT model clinical reasoning web worksheet showing the basic patient assessment method, OPT model, and causal relationship to the nursing problem. In addition, for a basic understanding of the patient's disease, a lecture related to respiratory diseases was provided for 60 minutes, and then the participants were asked to study on symptoms and signs, treatment and nursing intervention individually.

Step 2 Self-talk: On the second day, 'self-talk' was conducted to express thoughts through self-directed learning. Self-talk is useful for weaving clinical reasoning webs (17). Using the provided respiratory cases, each individual wrote OPT models and clinical reasoning web worksheets to speak aloud about meaningful nursing problem clues, infer causal relationships, and connect diagnostic hypotheses. The instructor encouraged the participant to think like a nurse using guideline-based Q&A after identifying whether the participant could recognize appropriate clues to deduce the clues about key nursing problem.

Step 3 Pattern recognition and juxtaposing: On

the third day, a major part of clinical reasoning is to link pattern recognition between what has been known and experienced, and what has been observed and assessed (17). Step 3 concentrated on peer-feedback time with only team activities learning in order to improve the participant' clinical reasoning ability. Participants were asked to perform team discussions and cooperative learning activities to whether they wrote the OPT model and clinical reasoning web worksheet correctly or not through self-directed learning on the Step 2. During team activities were induced by focusing on the theoretical basis for deriving nursing problems and whether the assessment was made in accordance with the theoretical basis. We provided the opportunity to revise the OPT model and clinical reasoning web worksheet by self-discovering errors in nursing problems derived during self-directed learning. In addition, the students participated in the nursing skill lab and practiced core fundamental nursing skills for three hours to solve the respiration patient's priority nursing problems.

Step 4 Reframing and reflection check: Frame reconstruction is a thinking strategy that gives different meanings to content and context through a series of clues, decisions, and judgments. The instructor held a conference for 90 minutes and gave feedback on the results of writing on the OPT model and clinical reasoning web. The instructor held the conference sequentially according to the flow chart of the nine steps of the OPT model, and by analyzing the patient's case following each step, the patient's condition was comprehensively identified, and the opportunity was given to revised. Through reflection on the integrated process, self-correction becomes possible, and as a prospective nurse, this helps improve clinical reasoning competency.

Step 5 Handover: On the 5th day, after the training on the SBAR, the nursing problems and priorities of patients with respiratory disease at the basic level were identified and written on the SBAR worksheet for each individual. In addition, through role-play with peers were asked to perform handover practice on the patient's situation, and then the instructor provided direct feedback.

On the 6th to 10th days of the experimental treatment, cardiovascular disease patient's cases were provided as advanced cases, which is recognized to be most difficult by nursing students. The five steps were repeated to promote critical and simultaneous thinking, which students' clinical reasoning competency was also-strengthened.

Control group

The control group participated in 80 hours of clinical practice for two weeks (10 days) in the internal medicine ward at two different hospitals in Korea. The nursing students assessed one of their patients with respiration and cardiovascular diseases and identified the nursing problems as usual. During clinical practice, the control group comprised less than five individuals in each team and the instructor gave a total of 15 hours of instruction for two weeks, including a meeting, similar to the experimental group (Table 1).

Ethical approval

This study was conducted after obtaining ethical approval from the Institutional Review Board of the researcher's affiliated university (IRB No. 1041078-202201-HR-031).

Statistical analysis

The collected data were analyzed using SPSS/Win 25.0 (IBM Corp., Armonk, NY, USA). To verify the homogeneity of the experimental group and the control group, the nominal variables were analyzed using the χ^2-test and the continuous variables using the *t*-test. Continuous measured variables and were analyzed by paired t-test to compare the differences before and after each.

Results

General characteristics, homogeneity of experimental, and control groups

The general characteristics of the experimental and control groups are presented in Table 2. There were no significant differences between

the experimental and control groups for all variables of general characteristics (Table 2).

Table 2: Homogeneity test of general characteristics

Characteristics		*Exp. (n=43)*	*Cont. (n=30)*	χ^2/t	*P*
		n (%), mean (SD)	n (%), mean (SD)		
Gender	Men	7 (16.3)	6 (20.0)	.683	.760
	Women	36 (83.7)	24 (80.0)		
Age (yr)		24.21 (5.43)	27.60 (11.05)	12.204	.128
Average GPA	< 3.0	12 (27.9)	5 (16.7)	1.640	.650
	3.0–3.9	27 (62.8)	22 (73.3)		
	4.0 or higher	4 (9.3)	3 (10.0)		
Level of satisfaction of major	Very satisfied	18 (41.9)	8 (26.7)	4.295	.117
	Satisfied	20 (46.5)	13 (43.3)		
	Moderate	5 (11.6)	9 (30.0)		
Level of satisfaction of clinical practice	Very satisfied	3 (7.0)	10 (33.3)	.765	.682
	Satisfied	20 (46.5)	11 (36.7)		
	Moderate	20 (46.5)	9 (30.0)		

Cont.=control group; Exp.=experimental group; GPA=Grade Point Average; SD=standard deviation.

Pre- and post-comparison of measured variables

The experimental group showed significantly better communication clarity (t=-12.262, P<.001), communication confidence (t=-12.486, P<.001), problem-solving processes (t=-13.100, P<.001), and team efficacy (t= -6.197, P<.001) compared to before the intervention. However, there was no significant difference between the pre- and post-intervention scores of the control group (Table 3).

Table 3: Differences between pretest and posttest

Variables (Ranges)		*Pretest*	*Posttest*	*t*	*P*
		Mean (SD)	Mean (SD)		
Communication clarity (14-70)	Exp.	43.56 (8.59)	61.51 (5.72)	-12.262	<.001
	Cont.	61.70 (9.02)	60.67 (10.34)	0.417	0.680
Communication confidence (0-50)	Exp.	15.77 (8.26)	35.98 (7.96)	-12.486	<.001
	Cont.	34.07 (8.73)	33.30 (8.85)	0.359	0.722
Problem-solving process (25-125)	Exp.	70.53 (13.19)	101.09 (10.27)	-13.100	<.001
	Cont.	92.63 (12.97)	91.73 (13.11)	0.394	0.696
Team efficacy (8-40)	Exp.	28.05 (6.03)	35.28 (5.85)	-6.197	<.001
	Cont.	33.93 (5.78)	34.80 (5.57)	-0.752	0.458

Cont.=control group; Exp.=experimental group; SD=standard deviation.

Discussion

In this study, in a situation where nursing students did not have the opportunity to face patients directly due to the COVID-19 pandemic, a practical education program using the OPT model and SBAR was found to be effective in improving nursing students' communication clarity, communication confidence, problem-solving processes, and teamwork.

The OPT model provides a framework for improving the clinical reasoning competency of nursing students (26), and the SBAR is a structured communication method that can systematically deliver information about the patient (4). In this study, a significant increase in the clarity of communication was observed in the experimental group to which the handover education program was applied using the OPT model and SBAR compared to the control group. These findings are similar to a study conducted by Collins (15), which indicated an improvement in communication accuracy by applying the SBAR in handover and interdisciplinary reporting for nurses. This is also consistent with another study (5) that reported improvements in communication accuracy and completeness. Students in the experimental group learned about the patient's condition by learning the process of judging the patient's situation, nursing diagnosis, rationale, nursing intervention, and expected results through an educational program that conceptualizes the clinical reasoning process of the OPT model. This helps them make clearer decisions.

Nurses are required to have clinical reasoning ability, a dynamic thinking process to determine nursing priorities, by analyzing patient information (13). High-level clinical reasoning ability can be cultivated through the OPT model (26), and communication confidence can be increased by facilitating a change in thinking through an accurate analysis of the patient by the nurse in charge (17). In this study, the experimental group showed a significant increase in communication confidence. These results suggest that the quality of communication was improved by applying the SBAR (27), and clinical competency and communication confidence improved by applying the OPT model. This result is similar to previous study (28), the SBAR step-by-step education program based on Bloom's Revised Taxonomy for nursing students was found to improve communication ability in another study (19).

Communication confidence is an important part of accurate communication in the handover. By using the structured communication method of the SBAR for complex patients, clarity of communication can be secured, and confidence in communication can be increased through an accurate understanding of patients' condition. This study focused on the improving the logistic thinking process and clinical reasoning to develop nursing students' critical thinking first. The education program intervention of experiment group has positive impact in students who they were not exposure to clinical practice.

In this study, the experimental group showed a significant improvement in problem-solving processes. This result is similar to the previous study (19) that reported an improvement in nursing students' problem-solving processes after an education program using the OPT model. In addition, the patients in the experimental group, who applied the SBAR protocol to 106 patients with infectious diseases to improve the problem-solving process, had better social status, development prospects, and mental health compared to the control group. Ji et al.'s study (29) also reported significant improvement in professional recognition. Thus, the OPT model helps apply the knowledge acquired based on the provided patient information to the problem-solving process by focusing on nursing outcomes (30). In addition, the SBAR facilitates problem-solving through accurate information delivery (7) and improvement in quality communication (6) through a four-step process involving analyzing the situation, background, assessment, and recommendation. In this study, the experimental group could also improve their problem-solving processes by systematically identifying patient information through the OPT model and organ-

izing the information to be provided to others through the SBAR.

There are limitations in this study that must be acknowledged. First, because this study was conducted in a limited clinical practice environment due to COVID-19, the study results cannot be generalized. It was a non-randomized controlled trial, and there was a possibility of selection bias. Finally, the experimental group and the control group belonged to different groups, and there was a big difference in the baseline of key variables. However, homogeneity was secured in the general characteristics of the two groups, and a statistically significant increase was shown only in the experimental group when looking at the before and after comparison of the main dependent variables.

In this study, the experimental group showed a significant improvement in team efficiency compared to the control group. This result can be interred in the similar context as previous study (12) that reported the importance in the correlation among communication team efficacy in medical and nursing students. According to Yune et al, it is most essential to improve the trust and team efficiency between health providers, as well as using the structured communication method (12). In this study, by allowing team activities to freely exchange opinions and suggest their opinions on nursing issues through procedures of structured communication tools such as SBAR, students' confidence in communication and team efficacy is improved, which affects nursing students' ability to handover.

Conclusion

The SBAR can improve the accuracy and quality of communication during handovers, and the OPT model can improve the clinical reasoning reversal of nursing students. In a situation where clinical practice is difficult for nursing students, the handover education program using the OPT model and SBAR can help improve nursing students' communication, problem-solving process, and team efficacy. In future research, repeated experiments should be performed with randomly selected participants. This study was conducted during the practice period in the internal medicine ward for third-year nursing students. Further research on whether the same effect is achieved in specialized ward environments, such as emergency rooms and intensive care units, is needed. It is necessary to study if it is helpful for continuous improvement of the effectiveness of communication clarity, communication confidence, problem-solving processes, and team efficacy of prospective nurses by including OPT and SBAR in the nursing curriculum in the long term rather than a one-time program.

Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

Acknowledgments

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of Interest

The authors declare that there is no conflict of interests.

References

1. Lancaster RJ, Westphal J, Jambunathan J (2015). Using SBAR to promote clinical judgment in undergraduate nursing students. *J Nurs Educ*, 54(3):S31-S34.
2. Kim JH, Lee JL, Kim EM (2021). Patients safety culture and handoff evaluation of nurses in small and medium-sized hospital. *Int J Nurs Sci,* 8(1):58-64.
3. Park SN, Kim Y, Im YS (2015). Educational needs assessment in pediatric nursing handoff for nursing students. *Child Health Nurs Res*, 21(3):204-15.

4. Compton J, Copeland K, Flanders S, et al. (2012). Implementing SBAR across a large multihospital health system. *Jt Comm J Qual Patient Saf*, 38(6):261-8.
5. Moseley BD, Smith JH, Diaz-Medina GE, et al (2012). Standardized sign-out improves completeness and perceived accuracy of inpatient neurology handoffs. *Neurology*, 79(10):1060-4.
6. Panesar RS, Albert B, Messina C, et al (2016). The effect of an electronic SBAR communication tool on documentation of acute events in the pediatric intensive care unit. *Am J Med Qual*, 31(1):64-8.
7. Cornell P, Townsend Gervis M, Yates L, et al (2014). Impact of SBAR on nurse shift reports and staff rounding. *Medsurg Nurs,* 23(5):334-42.
8. Abraham J, Kannampallil T, Patel VL (2014). A systematic review of the literature on the evaluation of handoff tools: implications for research and practice. *J Am Med Inform Assoc,* 21(1):154-62.
9. Martin HA, Ciurzynski SM (2015). Situation, background, assessment, and recommendation–guided huddles improve communication and teamwork in the emergency department. *J Emerg Nurs,* 41(6):484-8.
10. Shahid S, Thomas S (2018). Situation, background, assessment, recommendation (SBAR) communication tool for handoff in health care–a narrative review. *Saf Health*, 4(1):1-9.
11. Blouin AS (2011). Improving hand-off communications: new solutions for nurses. *J Nurs Care Qual,* 26(2):97-100.
12. Yune SJ, Lee EY, Park KH (2018). Relationship between communication, interpersonal understanding, proactivity in problem solving, and team efficacy of medical students and nursing students. *AJMAHS,* 8(2):369-78.
13. Simmons B (2010). Clinical reasoning: concept analysis. *J Adv Nurs*, 66(5):1151-8.
14. Kim JA, Ko JK (2015). A study on clinical reasoning ability and academic achievements in nursing students. *JKAIS,* 16(3):1874-83.
15. Collins G (2014). Using simulation to develop handover skills. *Nurs Times,* 110(8):12-4.
16. Pesut DJ, Herman J (1999). *Clinical reasoning: The art and science of critical and creative thinking.* Delmar. New York.
17. Kuiper R, O'Donnell SM, Pesut DJ et al. (2017). *The essentials of clinical reasoning for nurses: using the outcome-present state test model for reflective practice.* Sigma Theta Tau.
18. Kautz D, Kuiper R, Bartlett R, Buck R, et al (2009). Building evidence for the development of clinical reasoning using a rating tool with the outcome-present state-test (OPT) model. *South Online J Nurs Res*, 9(1):1-8.
19. Seo YH, Eom MR (2021). The effect of simulation nursing education using the outcome-present state-test model on clinical reasoning, the problem-solving process, self-efficacy, and clinical competency in Korean nursing students. *Healthcare(Basel),* 9(3):243.
20. Cohen J (1988). Set correlation and contingency tables. *Appl Psychol Meas,* 12(4):425-34.
21. Marshall LC. The relationship between efficacy, teamwork, effort and patient satisfaction [PhD thesis]. The Graduate School, University of Southern California, Los Angeles; 2003.
22. Cho H. The effect of SBAR program education on a nurse's communication clarify and self expression [Master's thesis]. Yonsei University, Seoul; 2013.
23. Kim E. The effect of simulation-based SBAR training program on nursing students communication and clinical judgement [PhD thesis]. Department of Nursing, Graduate School, Chonnam University, Gwangju; 2018.
24. Lee JS. The effects of process behaviors on problem-solving performance in various tests [PhD Thesis]. University of Chicago, USA; 1978.
25. Woo OH. The effects of a Problem-based learning on the porblem solving process of students by their meta-cognitive levels [Master Thesis]. Graduate School of Korea National University of Education, Korea; 2000.
26. Kuiper R, Heinrich C, Matthias A, et al. (2008). Debriefing with the OPT model of clinical reasoning during high fidelity patient simulation. *Int J Nurs Educ Scholarsh,* 5(1).
27. Superville JG. Standardizing nurse-to-nurse patient handoffs in a correctional healthcare setting: a quality improvement project to improve end-of-shift nurse-to-nurse

communication using the SBAR I-5 handoff bundle [PhD thesis]. The University of North Carolina at Chapel Hill, USA; 2017.
28. Abadi HQ, Hassan HB (2021). Instruction Program for Nurses Knowledge about Applying the Communication Strategies (SBAR) in Critical Care Units. *Indian Journal of Forensic Medicine & Toxicology*, 15(4):3299-3305.
29. Ji Y, Han S, Wang B (2021). Effects of situation-background-assessment-recommendation handover combined with detail nursing intervention on patients with infections. *Am J Transl Res,* 13(8):9056-62.
30. Bartlett R, Bland A, Rossen E, et al (2008). Evaluation of the outcome-present state test model as a way to teach clinical reasoning. *J Nurs Educ,* 47(8):337-44.