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Comparison of instructor-led versus peer-led debriefing in nursing students

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ABSTRACT

Despite its widespread support, the most effective simulation-based debriefing method has little evidence to support its efficacy. The purpose of this study was to compare the effect of peer-led (PL) to instructor-led (IL) debriefing among nursing students. The study was conducted with a non-equivalent control group pretest-posttest design. A convenience sample of third-year nursing students was assembled for the study where 65 students enrolled in a two-week clinical placement rotation were randomly assigned to IL group (n=36) or PL group (n=29). Quality of cardiopulmonary resuscitation (CPR) skills, satisfaction with simulation, and quality of debriefing in the PL group were compared to those in the IL group. Group differences at each testing interval were analyzed using independent t test. Nursing students in the IL debriefing group showed better subsequent CPR performance, more satisfaction with simulation experience, and higher debriefing scores compared to the PL group. From our study, IL debriefing is an effective method in improving skills performance, inducing favorable satisfaction, and providing better quality of debriefing among nursing students.

Key words: Debriefing, Nursing Student, Patient Simulation, Performance, Satisfaction

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INTRODUCTION

Post-simulation debriefing provides students with the opportunity to reflect on their simulation experience in relation to practice. A US national survey with 216 educators in traditional baccalaureate nursing programs found that many debriefers are full-time faculty who are facilitating a large number of debriefings with limited support and resources (Wazonis, 2015). In-simulation and post-simulation debriefing methods roughly fall into these groups: instructor-led and verbal, video-assisted instructor, and self-led debriefing (Levett-Jones & Lapkin, 2014). Of these techniques, instructor-led (IL) debriefing is a traditional method through verbal discussion facilitated by an instructor. Although IL debriefing is the most widely practiced method following simulation, there is no evidence in the literature to show that it is the only effective method (Dufrene & Young, 2014; Lusk & Fater, 2013). A meta-analysis suggests that the timelines of the debriefing process and the guidance, feedback, and interaction provided by the facilitator are more relevant to learning than the type of debriefing methods used (Fernandez, 2014).

Approaches such as self-debriefing or peer-led (PL) debriefing that do not require the presence of a facilitator may be a more cost effective alternative to instructor-led or video-facilitated instructor debriefing (Levett-Jones & Lapkin, 2014). To date, relatively few empirical studies have focused on PL debriefing, and from these, the conclusions drawn were mixed (Boet *et al.*, 2011; 2013; Welke *et al.*, 2009). Ha (2014) emphasized that video-assisted IL debriefing does not always positively influence students' learning outcomes.

Despite its widespread use, a popular debriefing method has little evidence to support its efficacy. Therefore, exploring the specific benefits of different types of debriefing would add knowledge to this field.

The purpose of this study was to investigate the effects of PL debriefing compared with IL debriefing among nursing students. Such research will inform and support faculty and facilitators in strategies for the promotion of learning through reflection in post-simulation debriefing.

Literature review

Debriefing is critical to learning from simulation experiences, yet there is little research available describing the best practices within nursing education (Dreifuerst, 2012). Only two nursing studies on the topic were found in a recently updated systematic review (Lusk & Fater, 2013). Of these, Kuiper *et al.* (2008) reported no significant differences on the post-simulation Outcome Present State Test (OPT) model of clinical reasoning among nursing students between authentic clinical experiences and high fidelity patient simulation. Dreifuerst (2012) reported that nursing students using the Debriefing for Meaningful Learning (DML) method scored higher in clinical reasoning than those using the usual method. However, debriefing in nursing education without instructors has not yet been studied in detail.

Effects of IL debriefing: instructor-led vs. video-facilitated

Evidence suggests that various debriefing approaches have been developed with little objective evidence of their effectiveness. Several studies have compared verbal debriefing with video-assisted verbal debriefing. Although IL debriefing is considered the gold standard,

this needs further analysis as results from the available studies have been mixed and inconsistent. For example, Grant *et al.* (2010) reported that participants in an experimental group exposed to video-facilitated instructor debriefing were significantly more likely to demonstrate professional desirable behaviors concerning patient identification, team communication, and vital signs.

A pilot study by Chronister and Brown (2012) suggested that video-facilitated instructor debriefing was more effective for developing nursing skills and response times to a simulated CPR event among nursing students, whilst knowledge retention was more positively affected by instructor-led debriefing. Conversely, there was no statistically significant difference in improvement between instructor-led debriefing and video-facilitated instructor debriefing groups amongst practicing clinicians (Byrne *et al.*, 2002; Savoldelli *et al.*, 2006; Sawyer *et al.*, 2012) and nursing students (Reed *et al.*, 2013). Savoldelli *et al.* (2006) reported that, when teaching Crisis Resource Management principles to anesthesia residents, participants' non-technical skills improved equally after oral feedback or video-assisted oral feedback. Another study also found no significant difference in performance outcomes when using debriefing with and without video playback amongst anaesthetists' performance while managing simulated anaesthetic crises (Byrne *et al.*, 2002). Sawyer *et al.* (2012) also reported no difference in performance scores and times to complete the critical tasks of resuscitation among residents between the oral debriefing alone or video-assisted debriefing groups. Further, Reed *et al.* (2013) reported that although a few differences existed, nursing students reported overall that their debriefing experiences were minimally different between IL debriefing with video and IL debriefing alone.

Comparison between self-debriefing and IL debriefing

Approaches like self-debriefing or use of multimedia resources that do not require the presence of a facilitator may be a more cost-effective alternative to video-facilitated instructor debriefing. Other advantages of self-guided debriefing include allowing participants to control the pace of debriefing and the opportunity for review of self-perceived weaknesses (Levett-Jones & Lapkin, 2014). Self-debriefing has recently been demonstrated to be effective in improving crisis resource management skills of individual anesthesiology trainees during simulated crisis scenarios (Boet *et al.*, 2011). These researchers reported that team performance significantly improved from pretest to posttest regardless of the type of debriefing. Specifically, there was no significant difference in the degree of improvement between within-team debriefing and IL debriefing among operating room teams (Boet *et al.*, 2011). Similarly, in a study by Welke *et al.* (2009), the improvements in total non-technical skills scores were similar for both video-facilitated instructor debriefing group and computer-based multimedia debriefing group in anesthesia residents.

If learners could learn from within-team debriefing (led by the team itself), rather than an instructor, it could improve the cost-effectiveness of simulation and the flexibility of scheduling simulation sessions (Boet *et al.*, 2013). This would be of particular benefit for nursing schools with large student cohorts (Disler *et al.*, 2013; Rochester *et al.*, 2012). Studies involving practicing clinicians suggest that video assisted peer-debriefing may be equally beneficial and a more cost-effective alternative to video-facilitated instructor debriefing (Boet *et al.*, 2011; 2013).

METHODS

Design

This was a non-equivalent control group pretest-posttest design study (Figure 1).

Setting and sample

The study was undertaken at a large urban university in Seoul, Korea. In order to estimate an optimal sample size, we calculated that 26 participants would be required in each group for an effect size of 0.5 with 80% power at a significance level of .05 on a t test using G*Power 3 calculation (Faul *et al.*, 2007). A convenience sample of 65 third-year nursing students enrolled in an intensive care unit (ICU) clinical placement was put together according to their rotation schedule. Participants were randomly assigned to either the IL post-simulation debriefing group (Group A, n= 36) or PL debriefing group (Group B, n= 29). From these sample sizes, the minimum sample size required for a t-test was satisfied. All participants were trained in cardiopulmonary resuscitation (CPR) skills and were tested during the week prior to their ICU clinical placement. Pre- and post-debriefing scores of CPR psychomotor skills were obtained at this time. The American Heart Association (AHA) BLS guidelines were used for the CPR training.

Procedure

A two-hour CPR skills testing session was planned and implemented to introduce two rescuer adult Basic Life Support (BLS) modules to nursing students during their pre-ICU placement orientation. All CPR sessions and data collections occurred between September and December of 2013 and took place at the Nursing Simulation Center at College of Nursing.

For both groups (A and B) the two-hour CPR skills testing session during their pre-ICU placement orientation served as both pretest and posttest events and was video-recorded for assessment of CPR skills by the researchers. **Working in pairs, each student practiced**

his/her CPR skills on sensed ResusciAnneTM adult manikins (Laerdal Medical, Stavanger, Norway) positioned in a hospital bed, for 6 minutes in total, comprising 3 minutes of compressions (rescuer # 1) and 3 minutes of ventilation using a bag valve-mask (rescuer # 2). These pairs remained the same throughout CPR skills testing session. To manage the odd number of student (29) in PL group, the first student who was tested helped the last student for working in pairs.

For Group A (IL post-simulation debriefing group), after completion of the pretest simulation, an experienced instructor led the debriefing session for participants to reflect on their performances. Printouts from the manikin's SkillReporter and the video recording were used to reflect and analyze individual student's performance. The instructor used a standardized debriefing process (description, analysis and application) to lead the discussions (Fanning & Gaba, 2007; Rudolph *et al.*, 2006). The discussions focused on the quality of CPR skills and algorithm of CPR. Individual student's ability to demonstrate CPR skills during the simulation and strategies for future improvement was discussed with the instructor.

Group B underwent PL debriefing, which included two participants comparing their performance with a structured adult BLS video. After the debriefing sessions, the CPR psychomotor skills of both groups were reassessed to identify any differences between the two groups. The posttest questionnaires were then administered. Following the posttest, there was an opportunity for the PL debriefing group to ask questions from the instructor to ensure what they had covered were correct or to resolve any outstanding questions.

To minimize the interaction of tested students from affecting the responses of the next group, all participants were asked to maintain confidentiality on the content of the simulation education. Nursing students who consented completed a self-administered

questionnaire at pretest and posttest. A research assistant distributed and collected the questionnaires at both times.

Measures

Baseline characteristics

The metrics for the subjects included age, gender, body weight, height, CPR knowledge score, and BLS certification. We included body weight and height because one study reported that body weight and body mass index could influence the quality of compression depth in female nursing students (Roh & Lim, 2013).

Quality of CPR psychomotor skills

The CPR performances were assessed by collecting both the data from the ResusciAnne manikin and the LaerdalSkillReporter (Laerdal) and the penalty scores using a numerical scoring system (Madden, 2006). The manikin was designed specifically to monitor artificial ventilation and external chest compression, and was factory calibrated to record a correct score when ventilation produced tidal volumes of between 500 and 600 mL of air per breath and chest compression achieved a depth of 50–60 mm as the values correspond to the 2010 AHA Guidelines for CPR. A numerical scoring system was used to evaluate the quality of CPR psychomotor skills drawing on an approach that uses penalty points for CPR skill errors (Madden, 2006). Nursing student performances were graded according to proficiency in the mean compression rate (between 100 strokes/min and 120 strokes/min), mean compression depth (50–60 mm), percentage of all compressions performed with correct hand placement, adequate chest recoil, compression to breathing ratio of 30:2, and mean ventilation volumes (between 500 and 600 mL) based on the benchmark of 2010 AHA guidelines for BLS skills

(Berg *et al.*, 2010). Value labels were assigned to each skill component: if the skill component was performed correctly, 0 penalty points were given. If the student performed the skill component incorrectly, they were deducted 10 or 20 penalty points depending on the severity of the deviation. The range of penalty points was 0 to 120, with lower penalty scores indicating better quality of CPR psychomotor skills. Two raters evaluated the video-recorded simulations. They were blinded to the group assignments and used the same numerical scoring system for the CPR performance. Intra-class correlation coefficients (ICCs) between the two raters were .946 at pretest and .821 at posttest indicating excellent agreement.

Satisfaction with simulation

We measured this metric using the Korean version of the Satisfaction with Simulation Experience Scale (Levett-Jones *et al.*, 2011; Roh 2012). This scale gauges the satisfaction with simulation on Debriefing and Reflection, Clinical Reasoning, and Clinical Learning. It consists of 18 items, and participants were asked to respond on a 5-point Likert-type scale from 1 (“strongly disagree”) to 5 (“strongly agree”). A higher mean score indicates a higher satisfaction. Alpha coefficients for the scale have been reported as .77 (Levett-Jones *et al.*, 2011), and the alpha coefficient for the present study was .94.

Quality of debriefing

This was assessed using the Debriefing Assessment for Simulation in Healthcare-Student Version (DASH-SV), an instrument that uses a behaviorally anchored rating scale to identify the extent to which students perceive the debriefer. The instrument is comprised of six elements of effective debriefing following simulation experiences: (i) establishment of an engaging learning environment; (ii) maintenance of an engaging learning environment; (iii) structuring the debriefing in an organized way; (iv) provoking engaging discussions; (v)

identifying and exploring performance gaps; and (vi) helping simulation participants achieve or sustain good practice (Brett-Fleegler *et al.*, 2012; Simon *et al.*, 2009). The scale for each element is based on a 7-point effectiveness rating from 1 (“extremely ineffective”) to 7 (“extremely effective”). The sum of the 6 individual questions yields total DASH scores worth a maximum of 42 points. The English version of the instrument required translation. Firstly, an author translated the DASH–SV into Korean. Secondly, a professional translator back translated the Korean version into English. Thirdly, a group of three professionals in simulation-based education compared the translated version and the original for conceptual equivalence.

Data analysis

Descriptive statistics and *t* tests were calculated to summarize the quantitative data using SPSS version 21.0 program (SPSS Inc., Chicago IL, USA). Group differences at each testing interval were analyzed using independent samples *t* tests. A significance level of $p=.05$ was chosen.

Ethical considerations

Ethical approval was obtained from the Institutional Review Board (IRB) of the University. Nursing students were informed that answers to questionnaires would be treated anonymously and confidentially. Voluntary written consent was obtained from each participant. Students were informed that they could refuse to participate or withdraw from participation in the study at any time without penalty.

RESULTS

Homogeneity test for baseline characteristics

The baseline characteristics of participants and the comparison between the IL and PL groups are presented in Table 1. There were no statistically significant differences between the groups in demographics regarding age ($t = .086, p = .931$), gender ($\chi^2 = 2.308, p = .151$), percentage of Basic Life Support certificate holder ($\chi^2 = .000, p = .991$), body weight ($t = -.007, p = .994$), height ($t = 1.372, p = .175$), and knowledge score ($t = -.268, p = .789$).

Comparison of pre and post-test quality of CPR psychomotor skills

The comparison of quality of CPR psychomotor skills between the two groups is presented in Table 2. On item analysis, nursing students in the IL group showed significantly lower mean difference in penalty scores than PL group in ‘check for a pulse’ ($t = 3.093, p = .003$) and ‘chest compression rate’ ($t = 3.588, p = .001$). There were no statistically significant differences in any other items. However, for those in the IL group there was a statistically significant decrease in post-test penalty scores compared to the PL group ($t = 3.779, p = <.001$). In this study, a significance level of $p=.05$ was chosen. When a Bonferroni correction was calculated, same results were identified.

Comparison of satisfaction with simulation and debriefing

The mean score comparison of the Satisfaction with Simulation scale and DASH between the two groups are presented in Table 3. The overall mean score of Satisfaction with Simulation experience in the IL group was significantly higher than for those of the PL group ($t = 2.698, p=.009$). Of the three factors within the Satisfaction with Simulation scale, the mean score for ‘debrief and reflection’ was significantly higher in the IL group than the PL group ($t = 3.403, p = .001$). There was also a difference in students’ perception of the quality of the debriefing

measured by the DASH–SV with the IL debriefing rated higher overall with statistically significant mean scores than the PL debriefing ($t = 4.068, p < .001$).

DISCUSSION

This research investigated the effects of PL debriefing compared with IL debriefing among nursing students. As a result, it was determined that IL debriefing was more effective in improving CPR skills performance, inducing favorable satisfaction, and quality of debriefing than PL debriefing among nursing students.

Following the respective debriefing, the IL group performed better than the PL group in CPR psychomotor skills. Conversely, previous studies have demonstrated that computer-based multimedia debriefing (Welke *et al.*, 2009), self-debriefing (Boet *et al.*, 2011), and within-team debriefing (Boet *et al.*, 2013) were as effective as video-facilitated instructor debriefing. A combination of formative self- and peer assessment at the level of the team composes the within-team debriefing and data suggests that it is also effective in improving team performance (Boet *et al.*, 2013).

In our study, although nursing students were aware of the algorithm and correct BLS skills, and compared their performance with the structured BLS video after pretest simulation, better subsequent performances were observed in the IL group. This may be due to the facilitator's role as the one who can determine the strengths and areas for improvement in student performances. Debriefing is a strategy nursing educators need to master, as efficacious debriefing frameworks can enhance student learning (Neill & Wotton, 2011). The importance of a trainer providing feedback that is directed at specific behaviors or attitudes is

deemed to be more beneficial for refinement and change in practice. This allows identification of performance gaps in terms of technical and non-technical skills alongside strategies for improvement (Arora *et al.*, 2012).

A 17-study analysis of physician self-assessment concluded that the physicians had only a limited ability to self-assess (Davis *et al.*, 2006). Also in nursing students, self-assessment was deemed to be an inaccurate measure of clinical ability (Baxter & Norman, 2011). Self- and peer-assessments are often less objective, and some degree of expert direction may be required (Fanning & Gaba, 2007). Unlike previous studies (Boet *et al.*, 2011; 2013), our participants were undergraduate nursing students; therefore there is a different level of professional experience as well as quality of self- and peer assessment skills, which can be a limiting factor.

In this study, nursing students in the IL group were more satisfied with their simulation experience than the PL group, especially with 'debrief and reflection'. This result supports a finding that the three simulation components that received the highest ratings for contributing to clinical judgment were facilitated debriefing, post-simulation reflection, and guidance by the academic (Kelly *et al.*, 2014). A possible explanation for this may have to do with the facilitator's role in IL debriefing. As advocated by several authors (Arora *et al.*, 2012; Lusk & Fater, 2013; Rudolph *et al.*, 2008), the IL debriefing session in this study was learner-centric and was conducted within a safe environment. The instructor elicited reflection on performance and provided prompt, objective and appropriate feedback or redirection. The students were coached to discover what was right and wrong about their performance and were helped to focus on their performance. These features could induce favorable learner perceptions on simulation experiences in the IL group. It helps that the debriefing phase be well planned with objectives well defined.

Our results demonstrate that overall and mean scores of all DASH elements were significantly higher in the IL group compared to the PL group. This lends support to IL debriefing as an effective teaching and learning strategy for undergraduate nursing students. One previous study demonstrated that compared with faculty-led debriefing, emergency medicine residents were equally effective in facilitating post-case debriefings for simulation exercises for medical students (Cooper *et al.*, 2012). It is important that facilitators consider what kind of questions they ask to promote reflection (Husebø *et al.*, 2013) and students may not have the depth of knowledge or experience to consider the types of questions to elicit reflection. According to Kaufman's (2003) principles to guide teaching practice, learners should be given opportunities to reflect on their practice. Through the process of reflecting both 'in practice' and 'on practice', practitioners continually reshape their approaches and develop 'wisdom' or 'artistry' in their practice. For the individual, reflection is related to self-awareness, self-regulation, self-monitoring and continuous learning (Mann, 2011). Therefore, we suggest that reflective practice is enabled during debriefing with an inclusion of the peers but best if led by teachers. The teachers would interact with the learners possibly in a question and answer format; they would also provide clarification and feedback for practice.

The defining attributes of simulation debriefing are reflection, emotion, reception, integration, and assimilation. All these defining attributes work in tandem during debriefing to create an effective learning experience (Dreifuerst, 2009). The IL debriefing sessions conducted in this study followed recommended practices and were undertaken by experienced nurse academics. Many nursing students may consider themselves underprepared or lack knowledge to give feedback and, hence, may have inadequate self- and peer-assessment skills. By involving peers in debriefing sessions may prompt participants to pose questions and give more feedback (Cooper *et al.*, 2012). Although students in this study

preferred IL debriefing, there remains a need to establish the effects of PL debriefing during simulation-based nursing education.

Study strengths and limitations

This study enabled comparison of debriefing techniques using a control group and re-assessment following an intervention. However, the groups consisted of only one type of health care student (nurses) with limited clinical experience. Although the results are informative, generalizing the findings to other healthcare students or professionals with varying levels of experience may be limited. Also, the study tested the efficacy of debriefing by assessing the acquisition of technical skills immediately following the intervention. Further study is necessary to evaluate whether technical and nontechnical skills of CPR are achieved and retained on a long-term basis following the debriefing. Additionally, a prospective experimental design with larger sample sizes can help strengthen the credibility of the findings and provide valuable data to determine the impact and viability of using different methods of debriefing following simulation. Finally, there is a need to investigate the effects of self- and peer-debriefing after introducing specific guidelines or aids for self-assessment.

CONCLUSION

Debriefing is critical to learning from simulation experiences, yet the literature reports little research describing the best debriefing options within nursing. This study reports student preference for IL debriefing in the light of effectiveness, reflective practice, and feedback to participants. Satisfaction with clinical reasoning and clinical learning were similar in both

groups; however, CPR psychomotor skills were higher in the IL group than the PL group as assessed by the metrics in the study. As simulation-based learning grows within undergraduate nursing programs, there remains a need to establish the effects of PL debriefing as a possible alternative or addition to the curricula. The impact of the level of student experience, for example final year versus more junior students, also needs to be determined if PL debriefing is to be accepted as a viable option within undergraduate nursing education.

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CONTRIBUTIONS

Study design: YSR, EHH

Data collection: YSR, EHH

Manuscript writing: YSR, EHH, MK

REFERENCES

- Arora S, Ahmed M, Paige J *et al.* Objective structured assessment of debriefing: bringing science to the art of debriefing in surgery. *Ann Surg.* 2012; **256**: 982-988.
- Baxter P, Norman G. Self-assessment or self deception? A lack of association between nursing students' self-assessment and performance. *J Adv Nurs.* 2011; **67**: 2406-2413.
- Berg RA, Hemphill R, Abella BS *et al.* Part 5: adult basic life support: 2010 American heart association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation.* 2010; **122**: S685-705.
- Boet S, Bould MD, Bruppacher HR, Desjardins F, Chandra DB, Naik VN. Looking in the mirror: self-debriefing versus instructor debriefing for simulated crises. *Crit Care Med.* 2011; **39**: 1377-1381.
- Boet S, Bould MD, Sharma B *et al.* Within-team debriefing versus instructor-led debriefing for simulation-based education: a randomized controlled trial. *Ann Surg.* 2013; **258**: 53-58.
- Brett-Fleegler M, Rudolph J, Eppich W *et al.* Debriefing assessment for simulation in healthcare: development and psychometric properties. *Simul Healthc.* 2012; **7**: 288-294.
- Byrne AJ, Sellen AJ, Jones JG *et al.* Effect of videotape feedback on anaesthetists' performance while managing simulated anaesthetic crises: a multicentre study. *Anaesthesia.* 2002; **57**: 176-179.
- Chronister C, Brown D. Comparison of simulation debriefing methods. *Clin Simul Nurs.* 2012; **8**: 281-288.

- Cooper DD, Wilson AB, Huffman GN, Humbert AJ. Medical students' perception of residents as teachers: comparing effectiveness of residents and faculty during simulation debriefings. *J Grad Med Educ*. 2012; **4**: 486-489.
- Davis DA, Mazmanian PE, Fordis M, Van Harrison R, Thorpe KE, Perrier L. Accuracy of physician self-assessment compared with observed measures of competence: a systematic review. *JAMA*. 2006; **296**: 1094-1102.
- Disler RT, Rochester SF, Kelly MA, White H, Forber J. Delivering a large cohort simulation - beginning nursing students' experience: a pre-post survey. *J Nurs Educ Pract*. 2013; **3**: 133-142.
- Dreifuerst KT. The essentials of debriefing in simulation learning: a concept analysis. *Nurs Educ Perspect*. 2009; **30**: 109-114.
- Dreifuerst KT. Using debriefing for meaningful learning to foster development of clinical reasoning in simulation. *J Nurs Educ*. 2012; **51**: 326-333.
- Dufrene C, Young A. Successful debriefing - Best methods to achieve positive learning outcomes: a literature review. *Nurse Educ Today*. 2014; **34**: 372-376.
- Fanning RM, Gaba DM. The role of debriefing in simulation-based learning. *Simul Healthc*. 2007; **2**: 115-125.
- Faul F, Erdfelder E, Lang AG, Buchner A. G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behav Res Methods*. 2007; **39**: 175-191.
- Fernandez A. Meta-analysis of simulation debriefing research. Doctoral thesis. Walden

University 2014.

Grant JS, Moss J, Epps C, Watts P. Using video-facilitated feedback to improve student performance following high-fidelity simulation. *Clin Simul Nurs*. 2010; **6**: 177–184.

Ha EH. Attitudes toward video-assisted debriefing after simulation in undergraduate nursing students: an application of Q methodology. *Nurse Educ Today*. 2014; **34**: 978-984.

Husebø SE, Dieckmann P, Rystedt H, Søreide E, Friberg F.. The relationship between facilitators' questions and the level of reflection in postsimulation debriefing. *Simul Healthc*. 2013; **8**: 135-142.

Issenberg SB, McGaghie W, Petrusa E, Gordon DL, Scalese RJ. Features and uses of high fidelity medical simulation that lead to effective learning: a BEME systematic review. *Med Teach*. 2005; **27**: 10-28.

Kaufman DM. Applying educational theory in practice. *BMJ*. 2003; **326**: 213-216.

Kelly MA, Hager P, Gallagher R. What matters most? Students' rankings of simulation components that contribute to clinical judgment. *J Nurs Educ*. 2014; **53**: 97-101.

Kuiper R, Heinrich C, Matthias A, Graham MJ, Bell-Kotwall L. Debriefing with the OPT model of clinical reasoning during high fidelity patient simulation. *Int J Nurs Educ Scholarsh*. 2008; **5**: 1-14.

Levett-Jones T, Lapkin S. A systematic review of the effectiveness of simulation debriefing in health professional education. *Nurse Educ Today*. 2013; **34**: e58-63.

Levett-Jones T, McCoy M, Lapkin S. The development and psychometric testing of the Satisfaction with Simulation Experience Scale. *Nurse Educ Today*. 2011; **31**: 705-710.

- Lusk JM, Fater K. Postsimulation debriefing to maximize clinical judgment development. *Nurse Educ.* 2013; **38**: 16-19.
- Madden C. Undergraduate nursing students' acquisition and retention of CPR knowledge and skills. *Nurse Educ Today.* 2006; **26**: 218-227.
- Mann KV. Theoretical perspectives in medical education: past experience and future possibilities. *Med Educ.* 2011; **45**: 60-68.
- Neill MA, Wotton K. High-fidelity simulation debriefing in nursing education: a literature review. *Clin Simul Nurs.* 2011; **7**: e161-e168.
- Reed SJ, Andrews CM, Ravert P. Debriefing simulations: comparison of debriefing with video and debriefing alone. *Clin Simul Nurs.* 2013; **9**: e585-e591.
- Rochester S, Kelly M, Disler R, White H, Forber J, Matiuk S. Providing simulation experiences for large cohorts of 1st year nursing students: evaluating quality and impact. *Collegian.* 2012; **19**: 117-124.
- Roh YS. Validation of a Korean version of the satisfaction with simulation experience scale. *J Healthc Simul.* 2012; **1**: 6-11.
- Roh YS, Lim EJ. Factors influencing quality of chest compression depth in nursing students. *Int J Nurs Pract.* 2013; **19**: 591-595.
- Rudolph JW, Simon R, Dufresne RL, Raemer DB. There's no such thing as "nonjudgmental" debriefing: a theory and method for debriefing with good judgment. *Simul Healthc.* 2006; **1**: 49-55.

Rudolph JW, Simon R, Raemer DB, Eppich WJ. Debriefing as formative assessment: closing performance gaps in medical education. *Acad Emerg Med*. 2008; **15**: 1010-1016.

Savoldelli GL, Naik VN, Park J, Joo HS, Chow R, Hamstra SJ. Value of debriefing during simulated crisis management: oral versus videoassisted oral feedback. *Anesthesiology*. 2006; **105**: 279 –285.

Sawyer T, Sierocka-Castaneda A, Chan D, Berg B, Lustik M, Thompson M. The effectiveness of video-assisted debriefing versus oral debriefing alone at improving neonatal resuscitation performance: a randomized trial. *Simul Healthc*. 2012; 7: 213-221.

Simon R, Rudolph JW, Raemer DB. Debriefing Assessment for Simulation in Healthcare©– Student Version. Cambridge, MA: Center for Medical Simulation, 2009.

Wazonis AR. Simulation debriefing practices in traditional baccalaureate nursing program: National survey results. *Clin Simul Nurs*. 2015; **11**: 110-119.

Welke TM, LeBlanc VR, Savoldelli GL *et al*. Personalized oral debriefing versus standardized multimedia instruction after patient crisis simulation. *Anesth and Analg*. 2009; **109**: 183-189.

Table1. Baseline characteristics between the Two Groups* (N=65)

Variable	IL group	PL group	t or χ^2	p
	(n=36)	(n=29)		
	M \pm SD or n (%)			
Age	23.22 \pm 3.80	23.14 \pm 4.04	.086	.931
Gender (% of women)	86.1	96.6	2.308	.151
Percentage of BLS certificate holder	31 (86.1%)	25 (86.2%)	.000	.991
Body weight (Kg)	58.81 \pm 22.25	58.84 \pm 22.06	-.007	.994
Height (cm)	162.44 \pm 11.79	156.56 \pm 22.17	1.372	.175
CPR Knowledge (10-item)	5.58 \pm 1.75	5.69 \pm 1.37	-.268	.789

* IL group= Instructor-led group; PL group= Peer-led group
 CPR=Cardiopulmonary resuscitation; BLS=Basic Life Support

Table 2. Comparison of Quality of CPR psychomotor skills (pre- and post-test) (N=65)

Item [†]	Time	IL group	PL Group	t	p*
		(n=36)	(n=29)		
		M ± SD			
1. Check responsiveness (at least 5 seconds but no more than 10 seconds)	Pre	1.46 ± 2.19	3.53 ± 2.17	- 3.822	<.001
	Post	1.53 ± 2.26	3.88 ± 1.96	- 4.425	<.001
	Difference	0.07 ± 2.57	0.34 ± 1.45	.514	.588
2. Get help, activates emergency response system	Pre	9.72 ± 10.00	13.79 ± 9.42	- 1.675	.099
	Post	6.11 ± 9.03	14.48 ± 8.70	- 3.776	<.001
	Difference	- 3.61 ± 12.91	0.69 ± 5.93	1.779	.081
3. Check for a pulse (<10 sec)	Pre	8.06 ± 2.61	9.05 ± 2.16	- 1.649	.104
	Post	5.49 ± 3.82	9.05 ± 1.94	- 4.877	<.001
	Difference	- 2.57 ± 4.33	0.00 ± 2.22	3.093	.003
4. Open airway: Head tilt, chin lift	Pre	9.03 ± 2.88	8.97 ± 2.06	.098	.922
	Post	8.19 ± 2.96	8.45 ± 2.71	- .357	.723
	Difference	- 0.83 ± 3.48	- 0.52 ± 2.79	.397	.686
5. Chest compression rate (/min)	Pre	5.28 ± 5.60	4.14 ± 5.68	.811	.421
	Post	3.89 ± 4.94	9.66 ± 7.31	- 3.782	.000
	Difference	- 1.39 ± 7.98	5.52 ± 7.36	3.588	.001
6. Compression depth (mm)	Pre	15.00 ± 8.78	13.10 ± 9.67	.827	.411
	Post	10.00 ± 10.14	13.10 ± 9.67	- 1.252	.215
	Difference	- 5.00 ± 11.08	0.00 ± 10.69	1.837	.071
7. Compression to breathing ratio of 30:2	Pre	14.44 ± 9.09	13.10 ± 9.67	.575	.568
	Post	7.78 ± 9.89	9.66 ± 10.17	- .751	.455
	Difference	- 6.67 ± 11.71	- 3.45 ± 10.78	1.141	.258
8. Hand placement	Pre	4.72 ± 8.45	3.79 ± 7.28	.468	.641
	Post	4.72 ± 7.36	1.72 ± 4.68	1.994	.051
	Difference	0.00 ± 5.35	- 2.07 ± 8.61	- 1.130	.264
9. Release of chest compressions (%)	Pre	0.28 ± 1.67	0.34 ± 1.86	- .153	.879
	Post	0.00 ± 0.00	0.34 ± 1.86	- 1.000	.326
	Difference	- 0.28 ± 1.67	0.00 ± 2.67	.513	.610
10. Ventilation volume (mL)	Pre	13.33 ± 9.56	13.79 ± 9.42	- .194	.847
	Post	11.67 ± 10.00	14.48 ± 9.10	- 1.174	.245
	Difference	- 1.67 ± 13.84	0.69 ± 12.52	.712	.479
Total penalty score	Pre	81.32 ± 22.10	83.62 ± 22.20	- .417	.678
	Post	59.38 ± 21.16	84.83 ± 17.32	- 5.219	<.001
	Difference	- 21.94 ± 25.56	1.21 ± 23.23	3.779	<.001

IL group= Instructor-led group; PL group= Peer-led group

CPR=Cardiopulmonary resuscitation

*Adjusted p-value is 0.005 when a Bonferroni correction was calculated.

[†] No.1~3 and 5~9 in Item=Rescuer 1, No.4 and 10 in Item=Rescuer 2

Working in pairs, each student practiced his/her CPR skills on sensed ResusciAnneTM adult manikins (Laerdal Medical, Stavanger, Norway) positioned in a hospital bed, for 6 minutes in total, comprising 3 minutes of compressions (rescuer # 1) and 3 minutes of ventilation using a bag valve-mask (rescuer # 2). And then their rescuer role was switched.

Table3. Comparison of Satisfaction with Simulation and Debriefing (N=65)

Variable	Category	IL group	PL Group	t	P
		(n=36)	(n=29)		
		M ± SD			
Satisfaction with simulation experience	Overall	4.56 ± 0.39	4.24 ± 0.54	2.698	.009
	Debrief and reflection	4.70 ± 0.39	4.25 ± 0.62	3.403	.001
	Clinical reasoning	4.26 ± 0.55	4.04 ± 0.64	1.461	.149
	Clinical learning	4.60 ± 0.41	4.47 ± 0.49	1.110	.271
DASH-SV score	Overall	39.00 ± 3.00	34.71 ± 5.11	4.068	<.001
	Element 1	6.44 ± 0.61	5.89 ± 0.79	3.087	.003
	Element 2	6.64 ± 0.55	6.21 ± 0.96	2.064	.045
	Element 3	6.57 ± 0.65	5.68 ± 1.25	3.425	.001
	Element 4	6.11 ± 0.87	5.25 ± 1.24	3.258	.002
	Element 5	6.74 ± 0.51	5.89 ± 1.13	3.686	.001
	Element 6	6.50 ± 0.71	5.79 ± 1.07	45.235	.004

IL group= Instructor-led group; PL group= Peer-led group

DASH-SV=Debriefing Assessment for Simulation in Healthcare (DASH) Student Version