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Review

The Effect of the Debriefing Method of Simulation Nursing Practice Education: A Literature Review

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Abstract: This study aims to understand the contents of debriefing performance in simulation education and its results by comprehensively examining the learning performance of the education according to the difference in the debriefing methods employed in domestic and overseas nursing simulation training. This is a literature review conducted to identify the effect of debriefing of simulation nursing practice education. The existing literature was found in electronic databases using Pubmed, Embase, MEDLINE complete, PsycINFO, Web of Science, CINAHL, the Cochrane Library, KoreaMed, National Discovery for Science Leaders, and Research Information Sharing Service and the key words were "nurse," "nursing student," "simulation," "simulator," "standardized patient," "debriefing." Finally, 32 studies were analyzed. All the studies were conducted from 2012 to 2021. A total of 11 RCT, 17 quasi-experimental studies, 3 mixed method studies and 1 pilot study were identified. The debriefing process used media, structured questionnaires, and a method of teaching or peer-led debriefing. The outcome variables that were statistically significant were skill, performance, knowledge, problem-solving competency, critical thinking disposition, clinical judgement, self-confidence, satisfaction, and debriefing quality evaluation. It is necessary to educate the debriefers who are responsible for strategy development and meeting effective debriefing goals.

Keywords: simulation practice; debriefing; literature review

1. Introduction

1.1. Necessity of the study

A recent development in the diagnostic and treatment technologies in medicine has increased the number of high-severity patients requiring professional and complicated management [1]. This has also raised expectations about nurses with clinical competency to judge the situation and identify and apply the appropriate intervention.

However, due to the growing interest in the safety and rights of the patients, clinical practice aimed at performing nursing tasks in hospitals is focused on observation [2]. Since the 2000s, with the increase in the number of nursing universities and students, there has been a shortage of hospitals that can host clinical practice. To address this problem, the need for various training methods to produce competent nursing students has been emphasized in nursing education [3]. Against this backdrop, simulation practice has been introduced using a virtual clinical setting [4].

Simulation practice education provides a safer environment where learners can experience and study the nursing management of clinical cases, thus strengthening the clinical competency of learners at various levels, from nursing students to practitioners [5]. As the importance of simulation practice education has been noted in order to improve clinical competency, there is a growing body of research centered on simulation practice education methods to promote the development of clinical competency, including critical thinking, decision-making, and therapeutic communication skills [6].

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Simulation practice education consists of briefing, simulation performance, and debriefing [7]. In particular, debriefing is a process of re-evaluation of the performance by the teacher and learner, to enhance the effect of learning through the performance analysis and reflection [8]. During debriefing, learners and teachers can reflect on the simulation experience through discussions and feedback, which enhances learner behavior [8,9], thus enabling the integration of learning and transfer with practice [10]. Furthermore, learners develop the ability to analyze their performances and correct themselves [9,10]. As such, debriefing, in simulation practice education, provides an opportunity to develop the clinical competency of the learners [11]. However, inefficient debriefing hampers sufficient clinical reasoning and effective clinical decision making, thus negatively impacting the learners [8,12].

Debriefing methods, used in simulation practice education, varies depending on the moderator, debriefing type, the use of structured instructions, and media type [13]. Debriefing can be divided into instructor or professor-led debriefing, self-debriefing, or peer-debriefing according to the use of an operator, into in-simulation debriefing and post-simulation debriefing according to the time of debriefing. As for the type of media used, video, reflective journal, scripts, and worksheets are commonly used [14]. Structured instructions for debriefing include the Description, Analysis, Application (DAA) model [9], the 3D (Defusing, Discovering, Deepening) model [15], the Gather, Analyze, Summarize (GAS) model [16], and the Debriefing for Meaningful Learning (DML) model, developed for the meaningful learning of nursing students [17,18], and the Lasater Clinical Judgment Rubric (LCJR) model [19], developed to improve the clinical judgement of nursing students. The outcome of simulation practice education may differ according to the debriefing method employed. Structured debriefing is more effective than general debriefing, and systematic and structured debriefing influences the achievement of learning outcomes [7,20].

Among the previous studies that compared the effect of various debriefing methods in simulation practice education, some found that structured debriefing was significantly more effective in improving knowledge, clinical competency [21,22], and clinical judgement, compared to non-structured debriefing [18,19,21], while others showed no significant difference [20]. As examined, despite the importance of effective debriefing, the result of the previous research has been mixed. This study aims to conduct an integrative review of the literature on the effect of simulation practice education using various debriefing methods, so that the result may serve as the foundation for future research on effective debriefing methods in simulation education.

1.2. Purpose of the study

The purpose of the present study is to conduct an integrative review of the literature on the effect of simulation practice education using various debriefing methods to understand the content and result of simulation practice education and debriefing. To be specific, the purpose of this study can be described as follows:

First, to understand the general characteristics of the domestic and overseas literature on the use of various debriefing methods in nursing simulation practice.

Second, to identify the trend of debriefing methods used in domestic and overseas nursing simulation practice education.

Third, to identify the effects of various debriefing methods used in domestic and overseas nursing simulation practice education.

2. Materials and Methods

2.1. Research design

This study is a methodological research designed to understand the performance and result of simulation practice education and debriefing. To this end, the study conducts an integrative review of the learning outcomes of domestic and overseas nursing simulation practice education using structured debriefing methods.

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2.2. Research procedure

This paper conducted an integrative review in five stages following the method suggested by Whittemore and Knafl [23]: (1) problem identification, (2) literature search and selection, (3) data evaluation, (4) data analysis and interpretation, and (5) extraction of properties through data integration.

2.3. Research subjects

The research question was: "Is there a difference in the improvement of clinical competency according to the debriefing method employed in nursing simulation education?" The literature selection criteria was as follows: (a) research targeting nurses or nursing students, (b) research measuring learning outcomes according to the debriefing method employed in nursing simulation education (e.g., debriefing satisfaction level, clinical competency, confidence in clinical competency, clinical reasoning ability, sense of self-efficacy), and (c) experimental studies, including randomized controlled trials (RCT) or general debriefing (quasi-experimental designs conducted with comparative groups, meaning professor- or instructor-led structured discussion debriefing). "Grey literature," including reports, editorials, or academic research, was excluded.

2.4. Data collection

In this study, we searched domestic and overseas databases for research papers on structured debriefing in nursing simulation education, published between January 1995 and June 30, 2021. Overseas databases (DB) including Pubmed, Embase, MEDLINE complete, PsycINFO, Web of Science, CINAHL, the Cochrane Library, and domestic DBs including KoreaMed, National Discovery for Science Leaders, Research Information Sharing Service were searched using the following keywords: "nurse" OR "nursing student" AND "simulation" OR "simulator" OR "standardized patient" AND "debriefing," as single keywords and combinations using MeSH terms. The literature was limited to studies published in Korean or English. The procedure for selecting the literature of the present study is shown in <Figure 1>.

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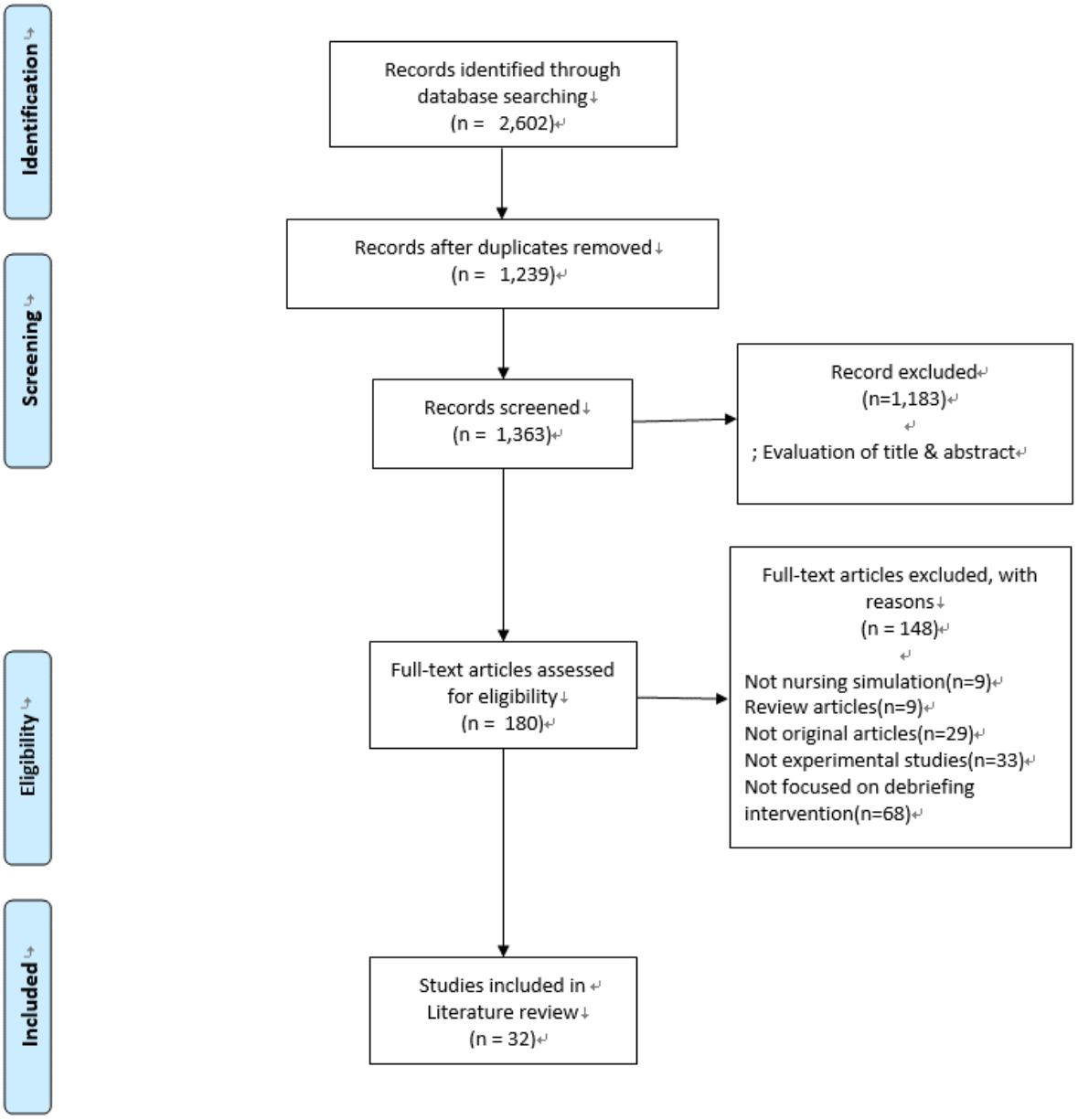

Figure 1. PRISMA flow chart for selection of included studies

2.5. Literature analysis and presentation

The focus of the literature analysis was on identifying the effect of nursing simulation education using different debriefing methods. The literature was analyzed according to the general characteristics of the research, intervention-related characteristics, outcome variables, and research results. As for the general characteristics, the year of publication, publication country, research design, and sample size of the selected papers were examined. As for the characteristics related to intervention, the simulation scenario, debriefing method, debriefing time, and debriefing facilitator were reviewed.

The outcome variables were presented as tools and variables that measured the learning outcomes of the study, along with the final results of each study. The final list of the papers analyzed is presented as Appendix A.

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3. Results

3.1. General characteristics of the research

The result of the analysis of the final papers is shown in <Table 1>. The papers published by June 30, 2021, included 10 domestic and 22 foreign papers. In terms of study design, there were 11 RCT studies, 17 similar experimental studies, 3 mixed studies, and 1 pilot study. The study that applied the mixed method was mediated by the RCT study design. The participants varied from nurses to midwives and nursing students. The nursing students were 2nd to 4th graders. As for the sample size, most studies kept the samples of the intervention group and the control group similar, but Choi and Lee's [24] study included 74 participants in the intervention group and 94 participants in the control group. Meanwhile, Reed [25] divided the participants into 3 groups according to the debriefing methods used: journaling, blogging, and general debriefing groups. Secheresse et al. [26] conducted a study on 4 groups: one with explicit debriefing and evaluation, one with implicit debriefing and evaluation, one with implicit debriefing and explicit evaluation, and one with no debriefing.

3.2. Intervention-related characteristics

The subjects of the included papers included basic nursing skills (7 studies), cardiovascular-related scenarios (3), CPR (4; advanced cardiovascular life support, basic life support, and neonatal resuscitation), respiratory system-related scenarios (1), nervous system-related scenarios (1), electrolyte and endocrine system-related scenarios (3), pre- and post-operative nursing-related scenarios (5). In addition, as for adult-related scenarios, there were one study using an elderly care scenario, an end-of-life nursing scenario, a pain control nursing scenario, and burn patient nursing scenario, each. As for female and child nursing scenarios, the subjects include a postpartum bleeding nursing scenario (1) and child nursing scenario (2), and one study did not reveal the topic of the scenario. In terms of the debriefing methods used, 5 studies compared cases where debriefing was either performed and not, 11 studies compared cases where debriefing was either video-assisted or not, 4 studies discussed the differences according to the key moderator (whether he or she was a peer, senior, nurse, or professor) and 10 studies examined the differences between a structured debriefing questionnaire and general debriefing. Furthermore, one study dealt with the difference between using a journal or blog and not using either during debriefing, and one that dealt with a case where debriefing was performed immediately after the simulation and performed after a certain period of time had elapsed. The debriefing time varied from 20 minutes to 80 minutes, and there was also a study mediated by varying the debriefing time between the experimental group and the control group [27,28]. Key moderators of the debriefing were professors, instructors, or higher-grade nursing students, or a department senior in most studies. In the studies that examine the differences in terms of the moderator, debriefing was performed by the learners themselves (self- debriefing) or peers.

3.3. Outcome variables and research results measurement tools

Outcome variables were measured for nursing skills (6 cases), clinical competency (12 cases), knowledge (10 cases), problem solving ability (3 cases), critical thinking (4 cases), clinical judgment or clinical reasoning (7 cases), teamwork (1 case), attitude (1 case), self-confidence (4 cases), self-reflection (2 cases), self-efficacy (2 cases), anxiety (1 case), stress (2 cases), debriefing quality evaluation (11 cases), satisfaction with debriefing, and education (8 cases).

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Table 1. Characteristics of studies on simulation nursing education included in the literature review

Author/ country	Study design	Participants			Scenario	Debriefing methods					Outcome	Finding
		total	Exp	Con.	Theme	Exp	Cont.	length (time)	Form	operator		
Chronister and Brown [29]/ USA	RCT	37	NR	NR	Cardio-pulmonary arrest	Video debriefing	Usual debriefing (discussion)	30	Group	Faculty	ERRT Skill performance time Knowledge retention	• No significant difference in the ERRT scores among groups. • Experimental group showed significant improvement in skill response time. • Control group showed a significantly higher knowledge retention.
Driefuerst [18]/ USA	Quasi-experimental	238	122	116	Clinical based on didactic content	DML	Usual debriefing (discussion)	30	Group	Clinical instructors	HSRT, DASH-SV, DMLSQ	• Experimental group had significantly higher HSRT, DASH-SV, and DMLSQ.
Kim et al. [3]/ Korea	Quasi-experimental	42	19	23	Blood Transfusion	Video debriefing	No debriefing	60	Group	Faculty	Knowledge Attitude Self-confidence	• No significant difference between the two groups
Mariani et al.[20]/ USA	Quasi-experimental	86	42	44	Post OP Care	DML	Usual debriefing (discussion)	NR	NR	Faculty	LCJR	• No significant difference

Table 1. Characteristics of studies on simulation nursing education included in the literature review (continued)

Author/ country	Study design	Participants			Scenario	Debriefing methods					Outcome	Finding
		total	Exp	Con.	Theme	Exp	Cont.	length (time)	Form	operator		

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Reed et at. [25]/USA	Quasi-experimental	64	32	32	Critical care	Video debriefing	Usual debriefing (discussion)	25	Group	Experienced ICU nurse with at least 1 year of simulation experience	DES	• Significant difference was observed in 3 out of 20 items. Experimental group scored higher on two items, and the control group scored higher on one item.
Grant et al. [30]/USA	Quasi-experimental	48	24	24	Adult pulmonary cardiac	Video debriefing	Usual debriefing (discussion)	NR	Group	Faculty	Clinical simulation evaluation tool	• No significant difference between the two groups
Choi and Lee [24]/ Korea	Quasi-experimental	168	74	94	Myocardial infarction	Video debriefing	Usual debriefing (discussion)	20	Group	Faculty	Clinical performance checklist Debriefing satisfaction	• No significant difference in the clinical performance checklist. • Experimental group experienced significantly higher debriefing satisfaction than the control group.

Table 1. Characteristics of studies on simulation nursing education included in the literature review (continued)

Author/ country	**Study design**	**Participants**			**Scenario**	**Debriefing methods**					**Outcome**	**Finding**
		total	**Exp**	**Cont**	**Theme**	**Exp**	**Cont.**	**length (time)**	**Form**	**operator**		

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Forneris et al. [27]/ USA	Quasi-experimental	153	78	75	NLN's Millie Larsen geriatric	DML	Usual debriefing (discussion)	exp.40 cont.20	Group	exp.: Research team member cont.: faculty	HSRT, DASH-SV	• Experimental group showed significantly higher improvement in all items than the control group.
Ha and Song (2015)/ Korea	Quasi-experimental	76	41	35	electrolyte imbalance, Post OP Care (Pain, high fever, respiratory distress)	Debriefing	Instructor led video debriefing	NR	Group	Faculty	Clinical competency, Specific self-efficacy, General self-efficacy, Educational satisfaction	• Experimental group showed a significantly higher improvement in clinical competency than the control group with no significant difference between the groups on other items.
Morse (2015)/ USA	Quasi-experimental	22	12	10	Clinical simulation case	Debriefing with good judgment	Usual debriefing (discussion)	NR	Group	researcher & another faculty member	DASH-R, GRAS, Learning activities survey	• Experimental group scored significantly higher in most of the DASH-R than the control group and showed a higher level in perspective transformation. • GRAS scores did not differ significantly between groups.

Table 1. Characteristics of studies on simulation nursing education included in the literature review (continued)

Author/ country	Study design	Participants			Scenario	Debriefing methods					Outcome	Finding
		total	Exp	Cont	Theme	Exp	Cont.	length (time)	Form	operator		

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Park and Shin [31]/ Korea	RCT	49	24	25	Peri operative care	Video-based peer assisted debriefing	No debriefing	80	Group	Faculty	Knowledge Performance confidence CCTS	• Experimental group showed a significant difference in knowledge and performance confidence level than the control group. • CCTS scores did not differ significantly between groups.
Reed [25]/ USA	RCT	48	20 (journaling) 13 (blogging)	15	postpartum bleeding	Discussion followed by journaling or blogging	Usual debriefing (discussion)	20	Group	at least 2 years of experience simulation & debriefing.	DES	• Overall DES score was found in the order of discussion only > journaling > blogging. • Control group showed significantly higher levels of total DASH-SV.

Table 1. Characteristics of studies on simulation nursing education included in the literature review (continued)

Author/ country	Study design	Participants			Scenario	Debriefing methods					Outcome	Finding
		total	Exp	Cont	Theme	Exp	Cont.	length (time)	Form	operator		

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Ryoo and Ha [36]/Korea	Quasi-experimental	49	24	25	Neuromuscular/ skeletal	Usual debriefing (discussion)	No debriefing	30	Group	faculty trained in instructor-led deb.	Modified clinical performance competency scale, Self-reflection using Modified clinical competency scale, Modified satisfied with SBL	• Experimental group showed a significantly higher level in SSES. • Experimental group showed a significantly higher level of objective self-reflection than the control group. • Experimental group showed significantly higher debriefing satisfaction.
Weaver [37]/ USA	Quasi-experimental	96	NR	NR	Laboratory section	Video debriefing	Usual debriefing (discussion)	NR	NR	faculty	LCJR, NLN student satisfaction & self-confidence in Learning Instrument, Satisfaction with the model demonstration for only experimental group	• Experimental group had a large change in the clinical judgment score between TIME 1 and TIME 2 compared to the control group. • Satisfaction and confidence did not show significant difference between groups. • In the second simulation, the satisfaction of the experimental group increased significantly more than in the first simulation.

Table 1. Characteristics of studies ON simulation nursing education included in the literature review(continued)

Author/ country	Study design	Participants			Scenario	Debriefing methods					Outcome	Finding
		total	Exp	Con.	Theme	Exp	Cont.	length (time)	Form	operator		

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Choi and Kang [38]/ Korea	Quasi-experimental	63	32	31	Post OP care	Senior debriefing	Instructor debriefing	30	NR	faculty, senior	Problem Solving Competency, Clinical Thinking Competency, Capability to Perform Clinical Nursing Care	• No significant difference between the groups
Eun and Bang [39]/ Korea	Quasi-experimental	60	30	30	Advanced cardiovascular life support	LCJR	Video debriefing	NR	NR	doctoral student & faculty	Critical Thinking disposition Problem Solving skills, LCJR	• Experimental group was significantly higher than the control group in all items.
Koh and Hur [40] /Korea	RCT	36	18	18	BLS	Video debriefing	Usual debriefing (discussion)	30	Group	Faculty & CCNPs with ACLS provider	NTSs, Modified TSs	• Experimental group showed significantly more improvement in all items as compared to the control group.

Table 1. Characteristics of studies ON simulation nursing education included in the literature review(continued)

Author/ country	Study design	Participants			Scenario	Debriefing methods					Outcome	Finding
		total	Exp	Con.	Theme	Exp	Cont.	length (time)	Form	operator		
Roh et al. [11]/Korea	Quasi-experimental	65	29	36	BLS	Peer-led video debriefing	Usual debriefing (discussion)		Group	Exp: Peer group. Cont.; instructor	Penalty points for CPR skill errors SSES, DASH-SV	• The quality of the CPR technique was significantly lower in the control group.

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Jeong and Choi [28]/ Korea	Quasi-experimental	48	25	23	Hospice Care	Structured Debriefing (LCJR model)	Reflection Papers	20~30 / 15~20	Group	Faculty	Knowledge, Clinical performance, LCJR, self-confidence, Satisfaction	• Compared with the control group, the intervention group had significantly higher knowledge, clinical performance, LCJR, and self-confidence, and there was no significant difference in education satisfaction.
Jansson et al. [41]/ Finland	RCT repeated measured	40	20, 11	20, 6	Oral care	Structured Debriefing	Verbal Feedback	60	Group	faculty	Knowledge VBQ, skill performance	• The knowledge score improved in the final f/u process, but the skill score was not significant.

Table 1. Characteristics of studies on simulation nursing education included in the literature review(continued)

Author/ country	Study design	Participants			Scenario	Debriefing methods					Outcome	Finding
		total	Exp	Cont.	Theme	Exp	Cont.	length (time)	Form	operator		
Jansson et al. [42]/ Finland	RCT	40	20(final;11)	20(final;6)	Endo Tracheal critical care	Structured Debriefing	Verbal Feedback	60	NR	2 independent educators	Skill, Knowledge,	• Total mean knowledge score increased, but there was no significant change over time and no g*t significance effect. • Skill score increased in the experimental group but decreased in the control group. No significant change over time.

 doi:10.20944/preprints202205.0133.v1

Rossignol [43]/ USA	RCT re-peated measured	34	15	19	O2 Supply care	VAD ; Video-as-sisted Debriefing	OD Oral Debriefing	NR	NR	NR	Psychological Stress (STAI-Y1), Phys-iological Stress (SBP,DBP,MAP, HR), Perfor-mance score (checklist)	• The difference in stress level between the two groups was not significant. As the sessions were repeated, anxiety de-creased, and performance scores improved.
Corrigan et al. [44]/ NR	RCT	60	21	20	Pain Control	Debriefing	non-Debriefing	NR	individ-ual	faculty	Nursing Confi-dence Question-naires, COWS	• The difference in confidence level between groups was not significant, but the experi-mental group showed higher scores.

Table 1. Characteristics of studies on simulation nursing education included in the literature review (continued)

Author/ country	Study design	Participants			Scenario	Debriefing methods					Outcome	Finding
		total	Exp	Con.	Theme	Exp	Cont.	length (time)	Form	operator		
Janicas & Narchi [45]/ Brazil	RCT cross-over study	120	NR	NR	Pediatric Care	(GAS)	X	NR	Group	faculty	EDC	• It has a significant effect on improving clinical performance
Ha [46]/Korea	Quasi-experi-mental	59명	30	29	Burn care	Hot Debrief-ing	Cold De-briefing	20	Group	faculty	clinical perfor-mance compe-tency, satisfaction (CBL, SBL, De-briefing)	• Clinical performance in-creased after than before the program in both groups but was significantly higher in the control group. The experi-mental group had significantly

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												higher satisfaction with debriefing than the control group.
Zhang et al. [47]/ Singapore	mixed-method	145	72	73	Drug Injection Care	Three-phase video-assisted debriefing (VAD)	Traditional VD(GAS)	NR	Group	Faculty	DES, The stress visual analogue scale (Stress VAS), DASH©SV	• The experimental group had significantly higher DES and DASH scores than the control group. Repeated 3-phase VAD gradually reduce students' stress.

Table 1. Characteristics of studies on simulation nursing education included in the literature review (continued)

Author/ country	Study design	Participants			Scenario	Debriefing methods					Outcome	Finding
		total	Exp	Con.	Theme	Exp	Cont.	length (time)	Form	operator		
Odongkara et al. [48]/ Uganda	cluster RCT	96	44	38	Neonatal resuscitation	Video-debriefing	Question & Answer	NR	NR	Faculty	Knowledge(MCQs), Skill((BMV, OSCE-A 및 OSCE-B (Checklist)	• There was no significant difference in the knowledge score immediately before and after the program, but the experimental group had a higher knowledge score than the control group.
Odreman & Clyens [49]/NR	pilot study	34	17	17	Respiratory Distress	Concept Mapping	Usual Debriefing	50	Group	Faculty	DES	• Significant in the items on thinking and emotion analysis, learning and connecting with clinical concepts.

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Verkuyl et al. [50]/ Canada	mixed-method	NR	NR	NR	Pediatric Care (meningitis)	Self-Debrief + Group Debrief	Group debrief (3D model)	45~50	individual/group	self/faculty	Knowledge, DES,	• Both groups showed an increase in the post-debriefing knowledge score and there was no difference in the score of the debriefing experience scale.

Table 1. Characteristics of studies on simulation nursing education included in the literature review (continued)

Author/ country	Study design	Participants			Scenario	Debriefing methods					Outcome	Finding
		total	Exp	Cont.	Theme	Exp	Cont.	length (time)	Form	operator		
Wilbanks et al. [51]/USA	mixed-method	38명	19	19	NR	Video-Facilitated Reflective Practice	Faculty-Led Debriefing	NR	NR	NR	clinical performance (checklist), satisfaction	• No significant difference between the two groups.
Oh et al. [52]/ Korea	RCT	56	26	30	DM care	Mezirow's 10 phase: TLT Debriefing	Petranek's Debriefing (7 Es); GAS	40	NR	NR	Knowledge, Problem Solving Competency, Clinical thinking Disposition, LCJR	• • There were significant differences in problem-solving ability, critical thinking ability, and clinical judgment ability. There is a repeating effect of education in the experimental group (g*t significant).
Secheresse et al. [26]/ France	A randomized prospective study	136	32/ 36/ 35	33	Post Op Care	explicit D&A/ implicit D&A/ implicit D, explicit A	No debriefing	20	individual	faculty	knowledge, self-efficacy, self-confidence	• All groups improved in Knowledge, SE, and SC. Especially when compared to the control group, there was a significant effect when using explicit analysis.

Exp. = experimental group; Cont. = control group. ACNP = Acute Care Nurse Practitioner; CCNPs = Critical Care Nurse Practitioners; CCTS = Clinical Critical Thinking Skills Test; COW = Clinical Opiate Withdrawal Scale; DASH-R = Debriefing Assessment for Simulation in Healthcare Rater version;

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DASH–SV = Debriefing Assessment for Simulation in Healthcare–Student Version; DES = Debriefing Experience Scale; DMLSQ = Debriefing for Meaningful Learning Supplemental Questions; EDC = Exame de Desempenho (Clinical Performance test); ERPT = Emergency Response Performance Tool; GRAS = Groningen Reflective Ability Scale; HFS = High-Fidelity Simulators; HSRT = Health Sciences Reasoning Test; IV = intra venous; LCJR = Lasater Clinical Judgment Rubric; LFS = low-fidelity simulators; NR = nor reported; NTSs = non-technical skills; RCT = randomized control Trial; SBL = simulation based learning; SP = standardized patient; SSES = Satisfaction with Simulation Experience Scale; TSs = technical skills. VBQ = Ventilator Bundle Questionnaire.

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Nursing skills were mainly evaluated using a checklist, and clinical performance using a checklist or self-report questionnaire. Knowledge was evaluated via the items developed to suit the scenario, and problem-solving ability and critical thinking ability were measured through self-report questionnaires. Clinical reasoning or judgement abilities were measured using the Health Sciences Reasoning Test (HSRT) and the Lasater Clinical Judgment Rubric (LCJR), and the quality of debriefing was assessed using the Debriefing Assessment for Simulation in Healthcare–Student Version (DASH-SV), Debriefing Assessment for Simulation in Healthcare Rater version (DASH-R), Debriefing for Meaningful Learning Supplemental Questions (DMLSQ), and Debriefing Experience Scale (DES).

4. Discussion

In this study, we conducted an integrative literature review to identify the debriefing method that can maximize the learning outcome of simulation nursing practice. Debriefing is a process of reflection that enables learning from the experience of simulation education, occurred in a limited space for a short period of time [32], and this critical exploration has been increasingly highlighted in simulation practice education [33]. Out of the 32 papers analyzed in this study, many examined the effect of debriefing, including 10 domestic papers. This shows a rising awareness of the importance of debriefing in the academia, not only in simulation practice education. Moreover, the research subjects have expanded from nursing students to include ICU nurses and midwives, showing that the importance of debriefing is recognized in simulation practice education in clinical settings as well.

In this study, debriefing methods can be divided according to the use of media, such as video, reflective journal, blog, by the key moderator, according to the use of structured questionnaire, according to time, whether it was conducted immediately or sometime after the completion of the simulation. Lee et al. [13] divided debriefing into instructor- or professor-led debriefing, self-debriefing, or peer-debriefing by the operator, into in-simulation debriefing and post-simulation debriefing by the time, into individual and group debriefing by type, into non-structured and structured debriefing by the use of structured questionnaire, and also by the type of media used (oral, video, journal, script or worksheet, simulator log, chatting or discussion board etc.). In a review of debriefing methods, Waznonis [34] mentioned cases using video, script, worksheet, and media (Internet chat, discussion board, blog, etc.), lectures, games, storytelling, peer feedback, and feedback from educators as well as the method of debriefing performed through simulator log feedback or self-evaluation. These results showed the same results as the debriefing methods identified in this study.

In the studies included in this review, debriefing was found to have a positive effect on learning outcomes, including nursing skills, clinical performance ability, clinical competency, problem solving ability, critical thinking, clinical reasoning and judgment, knowledge, performance confidence, and debriefing quality. In the case of video-assisted debriefing, nursing skills were improved and debriefing quality evaluated higher than the case without a video, showing a higher satisfaction with debriefing among learners. The use of media, including video, has been reported to be useful in enhancing learners' clinical performance and nursing skills in the affective domain [8,29,30]. In addition, when using structured questionnaires, including the GAS model [16], the DML model [17,18], and the LCJR model [19], learners showed greater improvement in clinical reasoning and judgement, critical thinking, level of knowledge, and clinical performance than using non-structured ones, and were likely to score higher in the measurement of debriefing quality, such as the DASH-SV, the DASH-R, the DMLSQ, and the DES. This result can be interpreted as the debriefing model provides the instructors with the information on the organization and procedure of debriefing [35], helping them play the role of a moderator more effectively. Lee et al. [13] reported that video-assisted debriefing and structured debriefing raised the quality of debriefing as well as learning outcomes compared to the general oral debriefing conducted through discussions. However, Lee et al. [13] failed to confirm significant effects of video-assisted debriefing in the result of meta-analysis of the

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studies published up to 2016, and Cheng et al. [36] found no significant results in the meta-analysis of the study (n=4) that compared methods for debriefings using and not using video. This is due to the limitation in the number of studies; it is, therefore, necessary to conduct a meta-analysis on the latest studies.

No difference was reported between the peer-led debriefing and senior student or professor-led debriefing. Peer-led debriefing showed no significant difference in improving critical thinking ability [31], peer-led, video-assisted debriefing was found less efficient than instructor-led, video-assisted debriefing in improving clinical performance and debriefing satisfaction [11], representing the need for training and preparation of the moderator of debriefing. To strengthen the positive learning effect of debriefing, it is necessary to create a systematic instructor education program using simulation as part of nursing education.

In this study, we were unable to confirm the difference in results according to the time of debriefing. In the study by Kim et al. [37], on the practice of instructor's operation of debriefing, 87.5% of debriefing sessions took less than twice the time of simulation, and 34.4% took less than the simulation time. In contrast, nursing students preferred 30 to 60-minute-long debriefing sessions, two to three times longer than the simulation practice of 10 to 20 minutes [37]. In general, debriefing is recommended to be held two to three times the time of scenario operation [14], and 30 minutes at the minimum if it is for a large number of learners [38]. Further studies are needed to analyze the difference in the effect according to the difference in time.

This study aimed to examine learning outcomes using different debriefing methods. According to the literature search, a total of 32 papers were confirmed, showing a growing awareness of the importance of debriefing in academia. The results reported more effective learning outcomes when using media, including video, and structured questionnaire than otherwise. To ensure effective simulation practice education, it is important to continuously develop teaching strategies to standardize appropriate debriefing times and to integrate nursing theory and clinical practice. Furthermore, debriefing education is required to help instructors perform the role of a skilled facilitator to promote discussion among learners in debriefing.

5. Conclusions

Simulation practice education has been developed to enhance nursing competency, but there is a lack of evidence for the most effective debriefing method despite a variety of debriefing methods that are currently used in the simulation nursing education. Against this backdrop, this study suggests structured debriefing as the most effective method. Structured debriefing, between learners and teachers, can improve learning outcomes, including clinical performance, critical thinking, clinical reasoning and clinical judgment ability, satisfaction with simulation and debriefing, problem solving ability, and debriefing quality. As the debriefing process is a crucial part of simulation practice education, it is also important to provide education for debriefers who oversee the development of effective debriefing goals and strategies.

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