

Comparing Effects of Debriefing Methods on Psycho-Motor Skills, Self-Confidence and Satisfaction in Novice Nursing Students: a Quasi-Experimental Study

Shahriar OSTOVAR^a, Atefeh ALLAHBAKHSHIAN^{b*}, Leila GHOLIZADEH^c,
Sima Lak DIZAJI^d, Parvin SARBAKHS^e, Akram GHAHRAMANIAN^f

^aFaculty of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, Iran

^bFaculty of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, Iran

^cFaculty of Health, University of Technology, Sydney, Australia

^dFaculty of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, Iran

^eFaculty of Biostatistics, Department of Statistics and Epidemiology,
School of Public Health, Tabriz University of Medical Sciences, Tabriz, Iran

^fFaculty of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, Iran

ABSTRACT

Purpose: Oral and video-assisted debriefing are commonly used debriefing methods with no evidence of superiority of one to another. The present study aimed to compare the effects of oral and video-assisted debriefing on development of learning outcomes in nursing students.

Methods: This is a quasi-experimental study. Fifty first-year nursing students participated in this study. Participants in the control group participated in oral debriefing and those in the intervention group took part in video-assisted debriefing.

Results: Debriefing improved students' psychomotor skills, self-confidence, and satisfaction in both groups. There was no statistically significant difference between oral debriefing and video-assisted debriefing in study outcomes.

Conclusions: Both oral and video-assisted debriefing methods have a significantly positive impact on simulation outcomes and can increase preparedness of nursing students before entering clinical settings. Given the widespread use of simulation, more studies are needed to evaluate different methods of debriefing to optimize the usefulness of simulation based learning.

Keywords: debriefing, simulation, video, psychomotor skill, self-confidence, satisfaction.

Address for correspondence:

Atefeh Allahbakhshian

Faculty of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, Iran

Address: Nursing and Midwifery Faculty, South Shariati Ave, Tabriz, East Azarbaijan Province, Iran

Tel: +98- 0413796770, Fax: +98- 0413479696

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INTRODUCTION

Background

Nursing education in clinical setting faces multiple challenges, including disproportion of clinical facilitator-student ratio, increased awareness of patients, and demand for high quality health care services. This in turn opens up opportunities to explore and evaluate innovative learning resources to enhance nursing students' preparedness for entering clinical setting (1).

The use of clinical simulations has gained momentum as an effective learning method in education of nursing students and preparing them for real-life clinical patient settings (2).

Preparing nursing students to engage in clinical settings, maintain patient safety, and develop critical thinking skills is considered to be fundamental within the nursing curriculum (3), which can be promoted through the use of simulation-based training.

As a key component of simulation (4, 5), debriefing has the greatest impact on student learning and achievement (6). The primary purpose of debriefing is to consolidate learning objectives and provide feedback on student performance in order to facilitate the realization of learning goals (5). The use of debriefing immediately after simulation leads to a renewal of experience in the mind of students, content integration, and better learning (7). However, without identifying mistakes during simulation and having the chance to correct them, students may transfer their poor performance and knowledge to the clinical setting (8).

Oral and video-assisted debriefing are two common methods of debriefing (4). Oral debriefing (OD) is a traditional technique facilitated by a trained/skilled facilitator. Similarly to other debriefing methods, OD focuses on discussion about positive and negative aspects of student performance, and provides feedback to improve performance (9). Video-assisted debriefing (VAD) includes audiovisual recording of student performance and analyzes it by affirmative self-reflection in order to support learning and help students improve their knowledge, clinical skills, behaviors and self-confidence (10). Basic knowledge is necessary to promote self-confidence,

while confidence alone, without basics knowledge and skills, could not lead to success (11).

Literature review

The use of audiovisual pedagogical technologies has improved the quality of education through enhancing cognitive processing, learning, and student motivation (12). Videos are widely used to support and stimulate learning and comprehension among students (12, 13). Video-assisted debriefing has been shown to enable students to provide a swifter response to critical situations (5) and to help bridge the gap between theory and practice (14). Students are more comfortable in OD than VAD (15). Also, knowledge retention in OD is higher than VAD (5). Both OD and VAD can lead to a higher performance in the resuscitation of neonatal patients (16), better identification of performance deficits (17) as well as improved self-confidence of students (18, 19) and clinical judgment (18).

The results of a systematic review comparing different types of debriefing methods suggest that VAD outcomes are similar to those of non-video-assisted debriefing. However, differences between debriefing methods can be highlighted in different designs of simulation and learner groups (20). Most of the existing debriefing studies relate to resuscitation and critical situations. There are scarce reports on the use of debriefing in nursing procedures.

Theoretical framework

In the present study, Jeffries Simulation Framework (21) was used to guide the study design and preparation of study simulation. According to Jeffries Simulation Framework, a successful simulation is subject to an appropriate design of simulation based on learning objectives, fidelity, complexity, cues, and debriefing. Thus, careful consideration of these factors can lead to achievement of desirable learning outcomes, including knowledge acquisition, skill performance, student satisfaction, critical thinking, and self-confidence (22).

Debriefing promotes knowledge, students' skills and self-confidence, and all these factors seem to be essential for entering to clinical setting. Given the lack of research regarding this group of students, our study aimed to compare the effects of OD and VAD methods on psychomotor skills, self-confidence, and satisfaction of

nursing students through administration of intravenous fluid therapy (IV therapy) in a simulated situation. □

METHODS

Study design

This quasi-experimental study has a pretest and post-test design.

Participants and randomization

In order to estimate the sample size according to Chronister study's data (5), we calculated that 12 participants would be required for each group (power=0.9, confidence interval=95% and $\alpha=0.05$). First year nursing students (n=57) were invited to take part in the study and all of them expressed their interest in participating; seven of them were excluded on grounds of previous experience in clinical work and IV cannulation, because their performance could affect the results in groups. Thus, a total of 50 students have been finally enrolled in the study.

The stratified randomization method was used to control and balance the influence of gender and student's intellectual ability, which was assessed based on their ranking in the national university entrance exam (below or above the median). So, four subgroups were created: a) males with admission scores higher than the median rank (n=13); b) females with admission scores higher than the median rank (n=12); c) males with admission scores lower than the median rank (n=12); and d) females with admission scores lower than the median rank (n=13). Finally, participants in each subgroup were divided into control and intervention groups by computed simple randomization (without replacement). Due to median use in creating subgroups, each group had the same number of participants.

Ethical consideration

Participants received information about the study and provided their written consent. The present study was approved by the Regional Ethics Committee of Tabriz University of Medical Sciences (IR.TBZMED.REC. 1395.1061).

Before the beginning of debriefing, participants were assured that their performance would not affect their scores and that research was the main purpose. To reduce their anxiety, students

were assured that their performance video would be deleted after study completion.

Data collection and study process

The data collection tool consisted of a demographic information questionnaire, an observational checklist for evaluation of performance in administration of IV fluid therapy, and the Satisfaction and Self-confidence in Learning Scale (SCLS) to assess self-confidence and satisfaction of the students during learning experience. The observational checklist was developed based on "fundamentals of nursing"(23); it consisted of 33 items. Each item accomplishment received a score of 1 and while incomplete accomplishment or non-accomplishment a score of 0. Tool content validity was confirmed by six faculty members involved in teaching fundamentals of nursing, and their comments were applied to the final version.

Debriefing was conducted by a faculty member and a master of sciences nursing student. Intra-rater reliability for each item was calculated by Cohen's kappa, ranging between 0.6 and 1 (mean 0.88). Immediately after the procedure, the SCLS was completed by participants. This scale has been developed to evaluate students' self-confidence and satisfaction following a course of simulation. Scale validity and reliability was confirmed by Franklin *et al.* (2014) (24). The tool consists of 13 items; five of them measure student satisfaction and the remaining eight items relate to self-confidence. This scale is scored based on a 5-point Likert scale, ranging from 1 to and 5. To determine the validity of SCLS, the tool was first translated into Farsi and back into English in order to compare these two versions in terms of similarities. The translated scale was sent to six faculty members in the Faculty of Nursing and Midwifery, Tabriz University of Medical Sciences, who were experienced in the field, to assess the questions for clarity and make the necessary modifications. The reliability of the scale was assessed through the test-retest method within two weeks. Cronbach's alphas calculated for the self-confidence and student satisfaction components were 0.95 and 0.90, respectively.

In the current study, each student participated in a baseline simulation and completed administration of an IV fluid including insertion of an IV cannula on mannequin (Infusion trainer IV,

Students feelings about simulation

What do you think about your performance during the simulation?

Review of primary evaluation steps

What steps should be taken before you start? (Checking the physician's order, checking the type of solution)

Review of psychomotor skills

Performance critique based on the checklist (discussion on the strengths and weaknesses of performance)

Free discussion

What did you learn during the simulation?

What was unclear and ambiguous to you during the simulation?

Is there any issue that you would like to discuss?

At the end, subjects were given the opportunity to ask their questions.

TABLE 1.
Debriefing guide

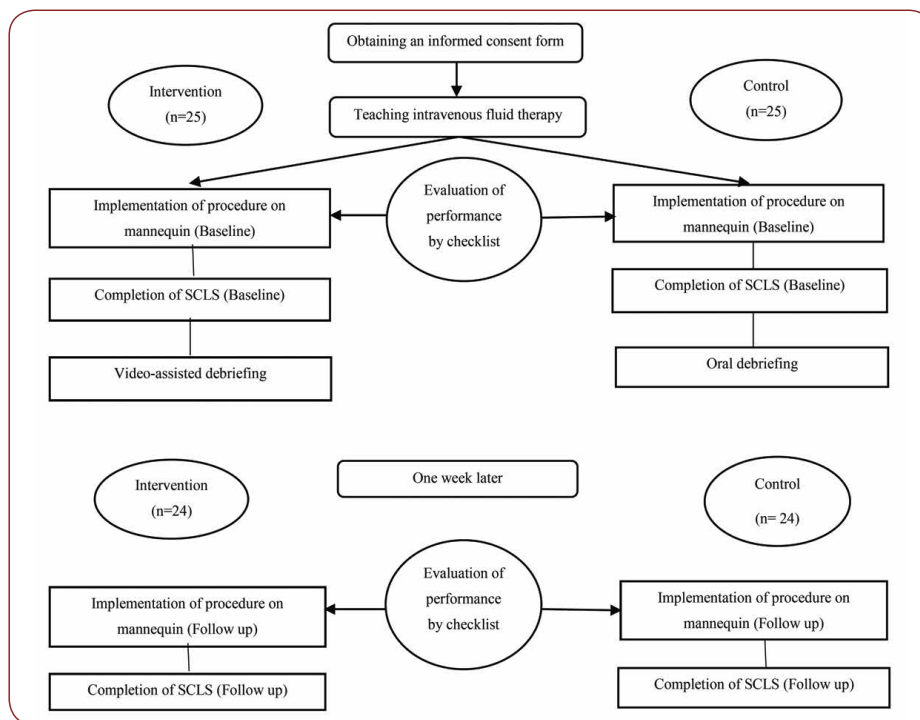


FIGURE 1.
Study process

Adam Rouilly) in the practice room of the faculty. Insertion of IV cannula is an invasive, painful and common procedure in clinical setting, and every patient has an IV cannula from admission to discharge. Their performance during the process was assessed using observational checklist. The performance of participants in the intervention group was recorded using a fixed camera. In the case of confusion during simulations, participants in both intervention and control groups were helped by providing cues. After completion of the simulation, students completed the baseline SCLS. Next, subjects in the control group participated in OD and those in the intervention

group in VAD. Before the beginning of debriefing, participants were briefed on the debriefing process, which was based on principles described in previous studies, and emphasis was placed on correct and incorrect behaviors, psychomotor skill demonstration, and simple decision-makings (6, 8, 25). The guide for the debriefing process is shown in Table 1. The average duration of the debriefing sessions was 15 minutes.

After one week, participants repeated the simulation, and follow up data on their performance skills, self-confidence and satisfaction were collected.

Psychomotor function	Control (mean ±SD)	Intervention (mean ±SD)	t-value	95% confidence interval	P-value
Baseline (N = 48)	19.40±5.98	16.90±6.34	1.17	- 1.47/5.55	0.248
Follow up (N = 48)	26.30±5.20	27.40±3.90	0.81	- 1.60/3.77	0.420
P-value	*P< 0.001	*P< 0.001			
Self-confidence					
Baseline (N = 48)	4.26±0.39	4.27±0.40	0.09	- 0.22/ 0.24	0.930
Follow up (N = 48)	4.57±0.41	4.59±0.36	0.19	- 0.20/ 0.25	0.850
P-value	*P= 0.001	*P= 0.001			
Student satisfaction					
Baseline (N = 48)	4.58± 0.38	4.51± 0.35	- 0.91	- 0.30/ 0.11	0.460
Follow up (N = 48)	4.65± 0.49	4.80± 0.25	Z=- 0.77		0.440
P-value	*P=0.006	*P=0.001			

* P < 0.05

TABLE 2. Inter-group and intra-group comparison of oral and video-assisted debriefing

Factor	Psychomotor		Self-confidence		Satisfaction	
	F	P	F	P	F	P
Group	0.69	0.41	0.64	0.42	0.80	0.37
Time	50.72	*< 0.001	21.01	*< 0.001	9.32	*0.004
Time x Group	0.3	0.58	0.05	0.82	3.81	0.06

TABLE 3. Repeated measure analysis for effects of time and group interaction on variables
*P < 0.05

Two participants (one in the control group and the other one in the intervention group) withdrew from the study after baseline data completion, and therefore, their data were excluded from analysis (attrition rate 4%).

The study process has been summarized in Figure 1.

Data analysis

Data were statistically analyzed using SPSS 18.0. Paired *t*-tests and independent *t*-tests were used to compare mean differences within groups and between groups, respectively. The equivalent nonparametric tests were used for non-normally distributed data. A statistical significance level of 0.05 was considered. □

RESULTS

Participants had a mean age of 19.6 (SD= 1.66), most of them (90%) were single, with an equal female to male ratio. Their baseline characteristics were comparable, as shown in Table 2.

Comparison between baseline and follow up data revealed that one to one debriefing significantly improved students' psychomotor skills, self-confidence, and satisfaction during the fol-

low up simulation (Table 2). Due to non-normality of data on student satisfaction, the Wilcoxon test was used.

The results of independent *t*-tests showed no statically significant difference in any outcome measures between groups (Table 2). The Mann-Whitney U test was used to analyze data regarding student satisfaction.

Repeated measure analysis was used to evaluate the effects of group and time on variables.

The results show that time has a significant effect on all studied variables. There is always a significant difference between the before and after debriefing in both groups, while the effect of the group is not significant. In fact, the groups did not differ significantly. The interaction between time and group was also not meaningful at all (Table 3). □

DISCUSSION

Comparison with other findings

Our findings indicate that both OD and VAD can improve psychomotor skills development, self-confidence, and satisfaction of nursing students with an IV fluid therapy simulation. However, we found no statistically significant dif-

ference between these two methods in terms of the study variables.

In this study, we describe key characteristics of debriefing process. Systematic reviews in this area describe the key characteristics of debriefing. This study is unique in terms of debriefing type (structured for critique) and assessed skills. It is also the first reported use of simulation and debriefing in a nursing procedure among first year nursing students.

In a randomized controlled trial, Rossignol (26) found that both OD and VAD promoted nursing students' performance, but there was no significant difference between these debriefing methods. Chronister *et al.* (5) compared the effects of OD and VAD debriefing on nursing students' skill development, concluding that both debriefing methods improved the subjects' skill quality and CPR responses, while there was no significant difference between groups. In a quasi-experimental study, Weaver *et al.* (18) compared OD and VAD among second year nursing students who were exposed to an unexpected condition; they reported that students' clinical judgment, self-confidence and satisfaction had higher levels in both groups. However, students who participated in VAD had a better clinical judgment and more self-confidence. Another quasi-experimental study conducted by Zulkosky (27) found that OD compared to VAD led to a better performance, self-confidence and satisfaction of nursing students in cardiac care simulation, but there was no significant difference between the two debriefing methods in terms of mean score of students in hypoperfusion simulation. Grant *et al.* (15) compared the effects of OD and VAD in cardiac and pulmonary scenarios on students of anesthesiology and nursing, and noticed that there was no significant difference between the two debriefing methods in terms of overall performance, but participants in the video-assisted group exhibited a better performance in patient identification, team communication, and examination of critical symptoms.

Our findings were consistent with those of previous studies, showing that debriefing, regardless of being oral or video assisted, could improve the psychomotor skills, self-confidence and satisfaction of students in simulation based learning experience.

Students represent contents in a verbal or imaginal form for memorization. Most of the

cognitive processes that regulate behavior are verbal. On the other hand, students may not be encoding during viewing the video, which is important for memorization (28); maybe this can explain why there is no significant difference between OD and VAD in the literature.

There was no significant difference between OD and VAD in self-confidence. Given that self-confidence is built and improved over time by more exposure to simulation experience (29), long term assessment of self-confidence may better reveal the presence or absence of differences in this regard. Satisfaction with learning also presented no significant difference between the two debriefing techniques. An interesting point about this variable is the high score of satisfaction in the baseline assessment which may affect results related to learner's satisfaction.

Implications for practice

The findings of this study support the results of previous studies, confirming the usefulness of simulation and particularly debriefing in improving students' clinical skills, self-confidence and satisfaction. The available evidence suggests that the use of participants' performance videos in debriefing has a minor impact on learning outcomes. Considering the cost of preparing videos, OD seems therefore a more cost-effective method than VAD. Although the time spent on simulation and debriefing can be an obstacle to its routine application, as an effective teaching modality, simulation with debriefing can be used in teaching of selective clinical skills.

Limitations and research prospect

Our study may have not the power to detect between group differences. Due to resource limitations, the study was limited to a single university. Further, we measured the outcome variables just once because of time limitation. Longer and repeated follow ups may have resulted in significant results in favor of the video-assisted group. The self-reporting tool for measuring learners' the self-confidence and satisfaction poses another limitation, which may have affected the results.

Future studies with selection of students from different universities, long term follow up and using objective scale for self-confidence assessment can give more valid results. □

CONCLUSIONS

Both oral and video-assisted debriefing methods improve psychomotor skills, self-confidence, and satisfaction of students after simulation, with no evidence for superiority of one over another. Considering the important role of debriefing in simulation-based learning, the application of debriefing (with or without the help of videos) in fundamentals of nursing can prepare nursing students before entering in a clinical setting. □

Conflicts of interest: none declared.

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