Comparison of the effects of debriefing methods on psychomotor skills, self-confidence, and satisfaction in novice nursing students: A quasi-experimental study

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Abstract

Oral debriefing (OD) and video-assisted debriefing (VAD) are commonly used debriefing methods, with no evidence of superiority of one to another. The present study aimed to compare the effects of OD and VAD on the development of learning outcomes in nursing students. This is a quasi-experimental study. A total of 50 first-year nursing students participated in this study. Participants in the control group participated in OD and those in the intervention group took part in VAD. Debriefing improved psychomotor skills, self-confidence, and student satisfaction in both groups. There was no statistically significant difference between OD and VAD in the study outcomes. Both OD and VAD methods have significantly positive impact on simulation outcomes and can increase preparedness of nursing students before entering the 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.

Key words: Debriefing, psychomotor skill, satisfaction, self-confidence, simulation, video

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 educating 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 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 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,

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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 debriefing (OD) and video-assisted debriefing (VAD) are two common methods of debriefing.[4] OD is a traditional technique facilitated by a trained/skilled facilitator. Like other debriefing methods, OD focuses on discussion about positive and negative aspects of student performance and provides feedback to improve performance.[9] VAD includes audiovisual recording of student performance and analyzing it through affirmative self-reflection to support learning and help students to improve their knowledge, clinical skills, behaviors, as well as self-confidence.[10] Basic knowledge is necessary to promote self-confidence, while confidence, 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] VAD has been shown to enable students a swifter response to critical situations[5] and helps to bridge the gap between theory and practice.[14] In OD in comparison with VAD, students are more comfortable.[15] Further, knowledge retention in OD is higher than VAD.[5] Both OD and VAD can lead to better performance in the resuscitation of neonatal patients[16] and better identification of performance deficits[17] and improve 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 yields outcomes similar to those of non-VAD; however, differences between debriefing methods can be revealed in different designs of simulation and learner groups.[20] Most of the debriefing studies related to resuscitation and critical situations. There is a deficit in 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 the study simulation. According to the 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 the achievement of desirable learning outcomes, including knowledge acquisition, skill performance, student satisfaction, critical thinking, and self-confidence.[22]

Debriefing promotes knowledge, skill, and self-confidence of the students and these factors seem to be essential for entering the clinical setting. Due to lack of study in this group of students, this 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 (IV) therapy in a simulated situation.

METHODS

Study design
This quasi-experimental study has a pretest and posttest design.

Participants and randomization
To estimate the sample size, according to the data of Chronister and Brown,[5] we calculated that 12 participants would be required for each group (power = 0.9, confidence interval = 95%, and α = 0.05). All first-year nursing students (n = 57) in the nursing and midwifery faculty of Tabriz University of Medical Sciences were invited to participate in the study.

All the students expressed their interest to participate in the study; however, seven of these students were excluded because of previous experience of clinical work and IV cannulation. As a result, a total of 50 students were 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 examination (below or above the median). Hence, four subgroups created include male with upper than median rank (n = 13), female with upper than median rank (n = 12), male with lower than median rank (n = 12), and female with lower than median rank (n = 13). Finally, participants in each subgroup divided into control and intervention group with simple randomization (without replacement) by a computer. Because the use of median in creating subgroups, participants in each group were equal.

Ethical consideration
Participants received information about the study and provided 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 the main purpose was research. To reduce their anxiety, students were assured that the video of their performance will be deleted after the study completed.

Data collection and study process
The data collection tool consisted of a demographic information questionnaire, an observational checklist for

the 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 the "fundamentals of nursing;"[23] it consisted of 33 items. Each item accomplishment was given a score of 1 and incomplete accomplishment or nonaccomplishment was given a score of 0. The content validity of the tool 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. Intrarater 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 the self-confidence and student satisfaction following a course of simulation. The validity and reliability of this scale were confirmed by Franklin *et al*.[24] The tool consists of 13 items, five of which 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 5. To determine the validity of the SCLS, the tool was first translated into Farsi and back into English to compare these two versions in terms of similarities. The translated scale was sent to six faculty members in 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 2 weeks. Cronbach's alpha calculated for the self-confidence and student satisfaction components was 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, Adam, Rouilly) in the practice room of faculty. Insertion of IV cannula is an invasive, painful, and common procedure in the clinical setting, and every patient has an IV cannula from admission to discharge. Their performance during the process was assessed using the 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, participants in the control group participated in OD and those in the intervention group took part in VAD.

Before the beginning of debriefing, participants were briefed on the debriefing process. Debriefing process was based on the principles presented in previous studies,

and emphasis was placed on correct and incorrect behaviors, psychomotor skill demonstration, and simple decision-making.[6,8,25] The guide for the debriefing process is shown in Table 1. The average duration of the debriefing sessions was 15 min.

After 1 week, participants repeated the simulation, and follow-up data on their performance skills, self-confidence, and satisfaction were collected.

Two participants (one from the control group and one from the intervention group) withdrew from the study after completion of the baseline data; data from these participants were excluded from the analysis (attrition rate = 4%). The study process is summarized in Figure 1.

Data analysis
The data were statistically analyzed using SPSS 16 (SPSS Inc., Chicago, IL, USA). 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 nonnormally distributed data. A statistical significance level of 0.05 was considered.

RESULTS

The mean age of the participants was 19.6 (standard deviation = 1.66) years. They were mainly single (90%), with an equal number of female and male participants. Baseline characteristics of the participants were comparable as demonstrated in Table 2.

Comparison of the baseline and follow-up data showed that one-to-one debriefing significantly improved students' psychomotor skills, self-confidence, and satisfaction during the follow-up simulation [Table 2]. Due to nonnormality of data on student satisfaction, the Wilcoxon test was used.

Table 1: Debriefing guide

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?
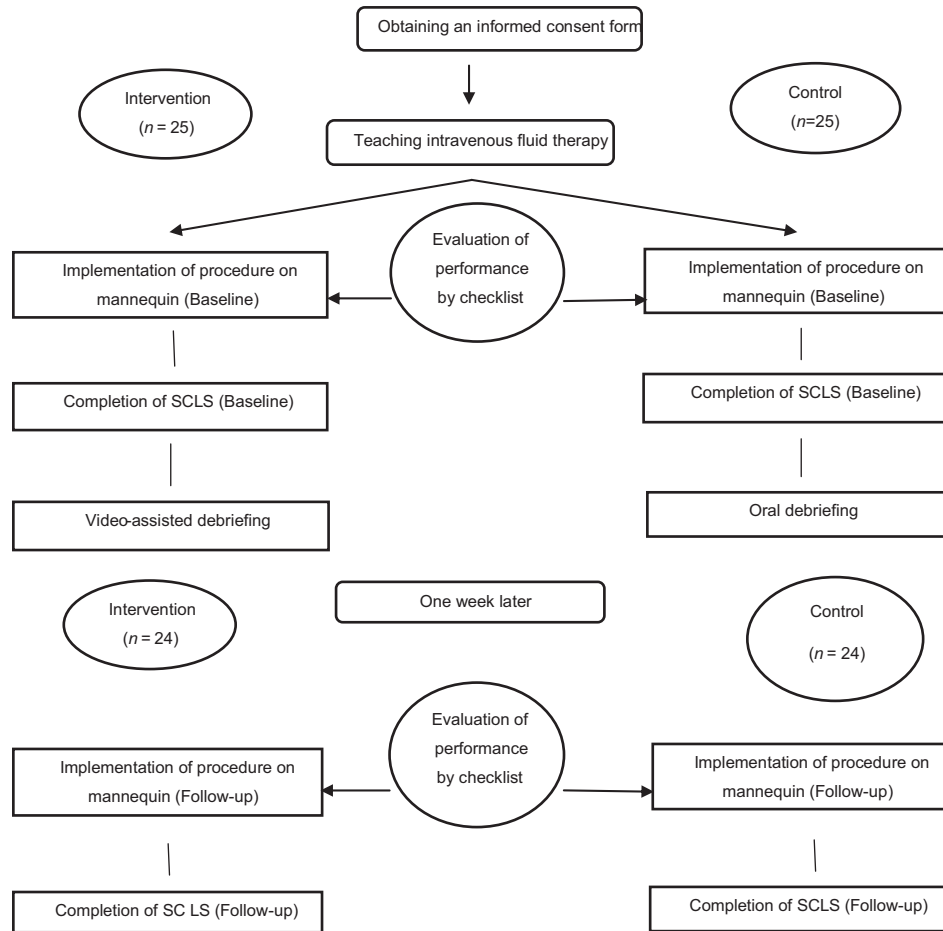 At the end, the subject was given the opportunity to ask their questions

Figure 1: Study process

Table 2: Intergroup and Intragroup comparison of oral and video-assisted debriefing

	Control (mean±SD)	Intervention (mean±SD)	t	CI of 95%	P
Psychomotor function					
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	−1.47/5.55	0.420
P	<0.001*	<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	0.001*	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	0.006*	0.001*			

*$P < 0.05$. CI: Confidence interval, SD: Standard deviation

The results of independent *t*-tests showed no statically significant difference in any outcome measures between the groups [Table 2]. The Mann–Whitney U-test was used to analyze data on 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].

Table 3: Repeated measure analysis for effects of time and group interaction on variables

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 × group	0.3	0.58	0.05	0.82	3.81	0.06

*$P < 0.05$

DISCUSSION

Comparison with other findings

The results of this study indicate that both OD and VAD can improve the psychomotor skill development, self-confidence, and satisfaction of nursing students with an IV fluid therapy simulation; however, there was found no statistically significant difference 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 emphasize on description of key characteristics of debriefing. This study is unique in terms of the type of debriefing (structured for critique) and the skills assessed. This is the first study on use of simulation and debriefing in nursing procedure at the first-year nursing students. In a randomized control trial, Rossignol[26] was found that both OD and VAD promote the performance of nursing students, but there was no significant difference between this debriefing methods. Chronister and Brown[5] compared the effects of oral and video-assisted group debriefing on skill development of nursing students, concluding that both debriefing methods improved skill quality and cardiopulmonary resuscitation responses of the students, while there was no significant difference between groups. In a quasi-experimental study, Weaver[18] compared OD and VAD in the second-year nursing students that exposed to an unexpected condition. They reported that clinical judgment, self-confidence, and satisfaction of students were improved in both groups. However, clinical judgment and self-confidence were improved more in students who participated in VAD. 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 the cardiac care simulation, but there was no significant difference between the two debriefing methods in terms of mean score of students in a hypoperfusion simulation. Grant *et al.*[15] compared the effects of OD and VAD in cardiac and pulmonary scenarios on students of anesthesiology and nursing. The results indicated that there was no significant difference between the two debriefing methods in terms of overall performance, but participants in video-assisted group exhibited better performance in patient identification, team communication, and examination of critical symptoms.

Comparison of the results of the present study against the findings of previous studies shows consistent results, and this is debriefing, regardless of being oral or video assisted, and can improve the psychomotor skills, self-confidence, and satisfaction of students a simulation-based learning experience.

Students represent the contents verbal or imaginal for memorization. Most of the cognitive processes that regulate behavior are verbal; on the other hand, students may not encoding during the viewing the video, which is important for memorization;[28] maybe, this is can explain why there is no significant difference between OD and VAD in studies.

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 the 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 clinical skills, self-confidence, and satisfaction of students. The available evidence suggests that the use of participants' performance videos in debriefing has minuscule impact on learning outcomes. Considering the cost of preparing videos, OD, therefore, seems 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 be under power to detect between-group differences. Due to resource limitations, the study was limited to one university. Further, we measured the outcome variables just once, because time limitation. Longer and repeated follow-ups may have resulted in significant results in favor of video-assisted group. The self-reporting tool for measuring the self-confidence and satisfaction of learners 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.

CONCLUSION

Both OD and VAD methods improve the psychomotor skills, self-confidence, and satisfaction of students

after simulation, with no evidence of superiority of one to 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 the clinical setting.

Conflicts of interests

There are no conflicts of interest.

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