Original Article

Effect of personalized video feedback on tracheal intubation skills and satisfaction of undergraduate anesthesia students: A quasi-experimental study

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Abstract

Background & Objective: Simulation training is currently the most widely used training method for practical skills in the field of medicine and treatment. The present study aimed to determine the effectiveness of personalized video feedback in endotracheal intubation skills and the satisfaction of undergraduate anesthesia students using the video feedback method.

Materials & Methods: This quasi-experimental study was conducted on anesthesia students of Jundishapur University of Medical Sciences in Ahvaz in 2021. A total of 46 students were selected via convenience sampling method and were randomly assigned to two groups (intervention and control) by block method. For the intervention group, a personalized video feedback session was also implemented in addition to a one-session training on endotracheal intubation using a mannequin. To collect data, a questionnaire on students' demographic characteristics, a researcher-made checklist of tracheal intubation skills, and a researcher-made satisfaction questionnaire were used. Data were analyzed in SPSS software (version 25) using statistical tests. A p-value less than 0.05 was considered statistically significant.

Results: Based on the obtained results, no statistically significant difference was observed between the two groups in terms of demographic characteristics. The mean scores of endotracheal intubation skill scores before the intervention were 54.45±7.34 and 52.38±6.06 in the intervention and control groups, respectively, demonstrating no statistically significant difference (P=0.32). After the intervention, the mean skill scores reached 65.36±5.66 and 51.90±3.9 in the intervention and control groups, respectively, illustrating a statistically significant difference (P<0.001). After the intervention, the mean scores of satisfaction with endotracheal intubation training were 117.72±11.68 and 60.57±35.28 in intervention and control groups, respectively, pointing to a statistically significant difference (P<0.001).

Conclusion: Considering the effectiveness of personalized video feedback intervention in the endotracheal intubation skill and satisfaction of undergraduate anesthesia students, it is suggested to implement this method in teaching the tracheal intubation skills among undergraduate anesthesia students.

Keywords: anesthesiology, feedback, simulation, training

Introduction

Every year, airway management is required to provide an open airway in numerous patients for various reasons. There are several methods for airway management and breathing support, including airway management with face mask, laryngeal mask airway, tracheostomy, and tracheal intubation. Among the mentioned methods, tracheal intubation is considered the most reliable and safest method of airway management (1). Treatment staff's inability to perform clinical techniques will have adverse consequences for patients. For instance, in 2002, the joint commission on the accreditation of healthcare organizations reported that the cause of 1609 hospital deaths and injuries was medical personnel's low levels of clinical competence, including patients' intubation (2).

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Learning airway management is an essential skill for many healthcare providers. Failure in airway management remains an important source of morbidity and mortality (3). Successful tracheal intubation assumes critical importance since a failure to successfully intubate the trachea leads to hypoxemia and eventually irreversible damage, such as brain and cardiovascular problems (1). Clinical skills training is critical for learning and acquiring skills in clinical procedures, including endotracheal intubation, in which the student gains necessary experiences in dealing with patients' issues.

Clinical skills training aims to achieve competence and professional skills (4). Although various methods have been used for teaching airway management and tracheal intubation, there is still a considerable gap in this regard. Simulation is one of these educational methods that has been implemented with different methods and plans (5). Simulation-based training allows learners to acquire technical skills by recreating clinical experiences without exposing patients to associated risks. The main purpose of simulation is to create a sense of the user's presence in a real space (6). Simulation is increasingly common in medical science education due to patient safety concerns, the complexity of medical procedures, limited working hours, and other issues that necessitate non-clinical learning (5).

In their study on nursing students, Banan Sharifi and Sahari (2016) pointed out that simulation-based training has an effect on improving the knowledge and skills of nursing students in cardiopulmonary resuscitation (7). Nonetheless, to increase the productivity and lasting educational impact of simulation, the strengthening and enrichment of this educational method has attracted assiduous attention. One of the major weaknesses in simulation-based clinical skill training is the lack of follow-up training and ensuring effective learning in the simulated environment. Feedback is one of the basic components that can form the basis for new interventions in this area, which can be presented in a wide array of qualities, quantities, and methods (8, 9).

The term feedback in education refers to providing opinions on learners' performance. Clinical feedback is defined as specific information about the comparison between a trainee's observed performance and a standard, given with the intent to improve the trainee's performance (10, 11). Feedback provides learners with some information about their performance in a specific task, and they can use it to guide their future performance (12). An expert's verbal and written feedback to the learner is very effective in acquiring medical and clinical skills (13).

Videos are another source of feedback. Personalized video feedback refers to an edited video of each learner's performance with digital voice recordings of instructor-provided feedback. In a study on suturing skills training among general surgical interns, personalized video feedback led to a marked improvement in the training of this skill. Moreover, a statistically significant difference was observed in improved performance and reduced workload in a complex surgical task (stitching) compared to a video that did not provide a demonstration of learners' performance (5).

The effects of personalized video feedback in promoting students' virtual learning were confirmed in the study by Yigit et al. (2021) in Turkey (14). The study by Kam et al. (2019) pinpointed that the use of this method may be effective in improving students' clinical examinations, and more studies are needed to confirm it (15). Moreover, in their study, van Vondel et al. (2018) demonstrated that video feedback has no effect on learners' level of knowledge; therefore, this issue is recognized as a challenge in teaching respiratory care skills (16).

Considering the challenge raised and the importance of learning tracheal intubation skills in the management of patients' airways as the main process of preserving patients' lives and the need to assess the effectiveness of new and diverse methods of practical training, this research aimed to determine the effectiveness of intubation training through personalized video feedback on the skills of undergraduate anesthesia students. If the positive effect of this technique is confirmed, it can be used to enhance students' abilities to successfully learn endotracheal intubation.

Materials & Methods

Design and setting(s)

The present study used a quasi-experimental pre-post design with one experimental group and one control group. It was performed on third-semester anesthesia students in the academic year 2019-2019 at Jundishapur University of Medical Sciences, Ahvaz.

Participants and sampling

The inclusion criteria entailed a willingness to participate in research and necessary cooperation, studying in the third semester of anesthesia at Jundishapor University of Medical Sciences, Ahvaz, and non-reception of previous training on tracheal intubation skills. On the other hand,

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the exclusion criteria were as follows: withdrawing from the study and absence from training sessions. Out of 47 third-semester anesthesia students of Jundishapur University of Medical Sciences, Ahvaz, 43 cases met the inclusion criteria. After explaining the objectives of the study, they signed the informed consent form and entered the study using the convenience sampling method. Thereafter, since participants were matched in terms of age and academic semester, they were assigned to two intervention and control groups using a random number table (n=22 in each group). In this way, a number was randomly selected from the table and included in the intervention group from the list of participants. Following that, the next number was selected from the table, and this time, the student corresponding to that number was assigned to the control group. This process continued until all students were allocated to two groups.

Tools/Instruments

Two instruments were used in this research. The first tool, the checklist of students' skills in tracheal intubation on moulage, was a researcher-made checklist. This checklist consists of 32 items that evaluate the quality of students' work in three stages: before, during, and after tracheal intubation. Each item was graded as "it was done," "unsuccessful attempt," and "it was not done," which were assigned a score of 2, 1, and 0, respectively. The minimum and maximum scores obtained from this tool were 0 and 64. A score of 0-21, 22-43, and 44-64 indicates poor, good, and excellent student performance in tracheal intubation on educational moulage, respectively. The items of this checklist were selected, compiled, and designed according to the existing valid checklists for evaluating the tracheal intubation skill at the patient's bedside. The items were rewritten and modified according to the goals and characteristics of the present study, which was conducted in a simulated environment (17-19).

In order to achieve the validity of the main research tool(i.e., the checklist for checking the quality of students' skills in tracheal intubation on moulage), content validity and face validity methods were used. In order to check the content validity, 10 faculty members of the Anesthesiology Department of Jundishapur University of Medical Sciences, Ahvaz, were given the checklist to express their opinions, and the items were modified accordingly. Moreover, the content validity index (CVI) and content validity ratio (CVR) were calculated. Questions with a CVR value higher than 0.62 were retained. The CVR for the whole instrument was 0.87. The relevance of the questions was also maintained with a CVI higher than 0.79, and the CVI for the entire questionnaire was 0.91.

In order to check face validity, the tool was given to 10 students of the research community who did not participate in the final sample size, and their opinions about the appearance, simplicity, writing style, and framework of the tool were applied. In order to check the reliability of the checklist, the inter-rater reliability method was used in such a way that the Kappa coefficient for the tool was calculated at 0.8 under the supervision of a statistical consultant.

The second questionnaire was about students' satisfaction with the use of personalized video feedback, which contained 27 items. The items were rated on a 5-point Likert scale, where the options "completely agree," "agree," "no opinion," "disagree" and "completely disagree" were scored as 5, 4, 3, 2, and 1. The minimum and maximum scores were obtained at 27 and 135. A score of 27-54, 55-108, and 109-135 indicates low, moderate, and high levels of satisfaction with the video feedback method. This questionnaire was designed based on the valid satisfaction scale questionnaire with high-fidelity clinical simulation (SHF) and adapting the items to the present study (20). In order to achieve the validity of this questionnaire, like the checklist mentioned above, content validity and face validity were used, and its reliability was confirmed, rendering a Cronbach's alpha coefficient of 0.81.

Data collection methods

In order to implement the intervention, practice sessions were held in the clinical skills practice room in small groups of 7 for the students of both the intervention and control groups. The students of the control group (n=21) entered the clinical skills practice room in three groups of seven, and each group practiced tracheal intubation on a mannequin for two hours during the practical session. After a two-hour practical training, all the control group students tubed the mannequin as a pre-test, during which the evaluator completed the checklist, the verbal feedback was provided to the participant at the same moment, and the problems in the comprehensive performance were explained verbally and corrected.

The students of the intervention group (n=22) in two groups of 7 and one group of 8, respectively, after two hours of practical training, tubed the mannequin as a pre-test and received necessary oral feedback with the difference that the entire process of the final practice of students in the intervention group was video recorded

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and after the end of the exercise, the research team observed the video of each student and provided the necessary feedback regarding all the strengths and weaknesses, errors, and possible problems that are pervasive. This time, the feedback was recorded as voiced-over on the film. Following that, the training video of each student with personalized feedback was provided exclusively to the corresponding student.

One week after the first training session, the clinical skills practice room was given to the students of the intervention group and then to the control group separately. Based on what they learned in the previous session and without the presence of evaluators, students practiced drawing on what they learned from the feedback. Again, one week apart (two weeks after the main intervention), the students of the control and intervention groups came to perform the post-test separately (first the intervention group and then the control group). Each of them intubated the mannequin once, and the checklist was completed by an evaluator blinded to grouping (intervention or control) the students. At the end, the satisfaction questionnaire was also provided to the learners to assess their satisfaction with this educational method (Figure 1).

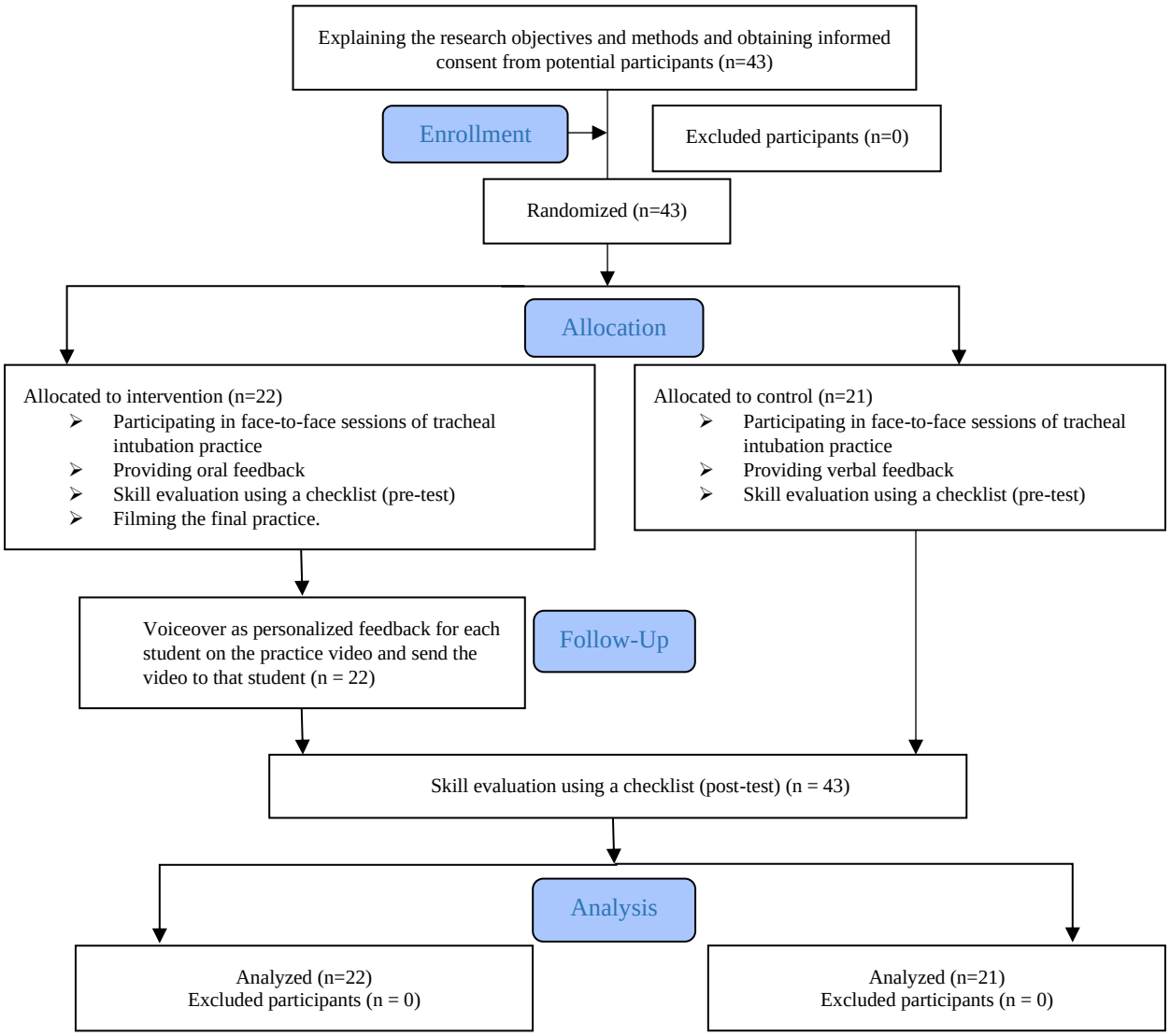

Figure 1. Study diagram

In this study, four evaluators were included, all of whom were anesthesiology experts with 10 years of clinical work experience and had mastered the process of tracheal intubation. Initially, the evaluators participated in a briefing session and were fully familiarized by the research team with the purpose, stages of the research,

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and how to complete the checklist. All these evaluators were blinded to the allocation of students to intervention or control groups in the pre-test and post-test stages.

Data analysis

After data collection, a t-test was used to analyze quantitative variables and compare two groups, and a Chi-square test was used to analyze qualitative variables. In this way, an independent t-test was used to compare the two intervention and control groups before or after the test, and a paired t-test was used to compare each group before and after the test. To eliminate the effect of intervening factors and increase accuracy, covariance analysis was used to compare the main variables in the two groups before and after the test. In this research, data were analyzed in SPSS software (version 25), and the significance level was considered 0.05.

Results

A total of 43 third-semester anesthesia students participated in this study. The mean age scores of subjects in intervention and control groups were 21.31±1.39 and 21.47±0.87 years, respectively. The result of the t-test was not statistically significant (P= 0.661). The GPA of most students was between 16 and 17.99. The GPA scores of subjects in the intervention and control groups were 16.98±0.95 and 17.11±0.87, respectively, which were not significantly different according to the t-test (p = 0.661). (Table 1). In terms of gender, most participants in the intervention group (61.10%) were male, while the majority of students in the control group (56.0%) were female (Table 2).

In determining the normality of the variables, it was found that the data in the pre-test of endotracheal intubation skill had a normal distribution; nonetheless, data distribution in the post-test of endotracheal intubation skill and satisfaction did not have a normal distribution. Therefore, parametric tests were used for normal cases (P>0.05), and non-parametric tests were used for abnormal cases (P<0.05).

The mean scores of endotracheal intubation skill scores before the intervention were 54.45±7.34 and 52.38 ± 6.06 in the intervention and control groups, respectively, which had no statistically significant difference based on independent t-test (P=0.32). After the intervention, the mean skill scores reached 65.36±5.66 and 51.90±3.9 in the test and control groups, respectively, pointing to a significant difference based on the independent t-test (P<0.001). Comparing the mean skill scores in the experimental group using the paired t-test indicated a significant difference between the pre-test and post-test (P<0.001); nonetheless, in the control group, this difference from pre-test to post-test was not significant (p=0.72) (Table 3). After the intervention, the mean scores of students' satisfaction with endotracheal intubation training were 117.72±11.68 and 60.57±35.28 in the intervention and control groups, respectively, illustrating a statistically significant difference between these two groups using the Mann–Whitney U test (P<0.001) (Table 4).

Table 1. Quantitative characteristics of students participating in the study using the t-Test

Variable	Intervention		Control		Sig.**
	Frequency	Mean±SD*	Frequency	Mean±SD*	
Age	22	21.31±1.39	21	21.47±0.87	P**=0.661
Grade point average	22	16.98±0.95	11	17.11±0.78	P**=0.663

Abbreviations: Student′s t – test#: t- Test, SD*; Standard Deviation, Sig.**, P-value**

Table 2. Qualitative characteristics of students participating in the study using chi-square test

Variable		Intervention group		Control group		Sig.
		Frequency	Percentage	Frequency	Percentage	
Gender	**Male**	11	61.10%	7	38.90%	$\chi^{\#}$=1.226
	Female	11	44.00%	14	56.00%	P=358

Abbreviations: Student′s t – test #: t-square, SD*; Standard Deviation, Sig.**: P-value**

Table 3. Comparison of the scores of skill areas before and after the educational intervention

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Stages	Groups	Before intervention		After intervention		Test	
		Mean	SD*	Mean	SD*	P-$_{value}$**	t-Test
Before intubation	Intervention group	25.73	5.25	31.68	2.55	P<0.001	-5.73
	Control group	24.95	3.54	25.48	2.87	0.11	-1.67
	P-value	0.38		P<0.001		-	
	T	-0.87		5.13			
During intubation	Intervention group	21.82	2.80	25.77	3.40	P<0.001	-5.54
	Control group	19.90	3.47	18.05	2.47	0.065	1.95
	P-value	0.053		P<0.001		-	
	T	1.99		8.46			
After intubation	Intervention group	6.91	2.87	7.91	2.04	0.076	-1.77
	Control group	7.52	1.91	8.38	2.03	0.080	-1.74
	P-value*	0.76		0.44		-	
	T	-0.29		-0.76			
Total	Intervention group	54.45	7.34	65.36	5.66	P<0.001	-7.14
	Control group	52.38	6.06	51.90	3.90	0.080	0.36
	P-value*	0.32		P<0.001		-	
	T	1.007		8.98			

Abbreviations: t-Test: Student's t-test , SD*; Standard Deviation, Sig.**: P-value**, Z* :Statistic Z

Table 4. Comparison of the mean scores of students' satisfaction with endotracheal intubation training after intervention in two groups

Variable	Experimental group	Control group	M–W test#
	Mean±SD*	Mean±SD*	
Satisfaction with endotracheal intubation training	117.72±11.68	60.57±35.28	Z*=4.82 P<0.001

Abbreviations: Mann–Whitney test#: M–W test, SD*; Standard Deviation, Sig.**: P-value**, Z*:Statistic Z

Discussion

The results pointed out that before the intervention, personalized video feedback on endotracheal intubation skills of anesthesia students was not significantly different between the two groups. Nonetheless, after the intervention, endotracheal intubation skills scores among students in the intervention group were significantly higher than those in the control group. Moreover, in the intervention group, the mean scores of the post-test were improved compared to the pre-test; however, this change was not significant in the control group. The review of the literature and studies related to the present research highlighted the critical importance of improving practical skills among clinical care students in preserving the lives of patients (12-15).

In this regard, the study by Nik et al. (2017) in the United States of America suggested that the members of the group who received video feedback performed the stitching skill five times faster than their peers who did not (12). In the studies that aimed to determine the effectiveness of using personalized video feedback intervention in the improvement of a procedure in medical majors, the time and place of the research, the target group, the number of students, the intended procedure, and even the research tool were different. Nonetheless, it can be stated that the use of this intervention can help in improving medical procedures.

Video feedback is an effective method for teaching clinical skills and procedures in various medical fields. It leads to learning skills and performing correct and effective tracheal intubation by focusing on repetition and feedback. The findings demonstrated that video feedback not only improves endotracheal intubation skills but also improves the skills in all three stages of this vital procedure (i.e., before, during, and after intubation). When combined with standard verbal feedback, video feedback improves skills compared to standard verbal feedback (13).

Training and feedback are the most important principles of learning skills, and the video feedback method is one of the easiest training methods and the most complete feedback method. In this method, students evaluate themselves many times by reviewing the recorded videos and engaging in self-education in this way (21). This is the main difference between personalized video feedback and other types of feedback. In standard verbal feedbacks, firstly, the feedback is provided by the instructor only once, and neither the student nor the instructor may have the opportunity to record it, and it is easily forgotten or ignored.

Based on experience, many trainers' feedbacks are lost or forgotten in the simulated training environment in the clinical skills practice room and do not achieve their goal. On the other hand, in this environment, instructors

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are faced with many students, unforeseen circumstances, and a large number of intervening factors; therefore, they may not have a sufficient and precise focus on student performance in order to provide sufficient, effective, and lasting feedback on the details of student's performance.

In the present study, in a quiet atmosphere and away from interfering factors, the instructor carefully watched the video of the student's procedure implementation, pointed out the problems, highlighted the positive and negative points of the student's performance, and proposed effective solutions for improving their performance. Therefore, firstly, the feedbacks were much more detailed, accurate, and effective in terms of quantity and quality. Secondly, the feedbacks were recorded and always accessible to the learner. Therefore, this method effectively prevents feedback from being lost or forgotten. Moroever, learners could accurately observe recorded feedbacks in a stress-free and private environment and correct their performance.

Learning in the psychomotor field is very sensitive and vital in anesthesiology. The use of such methods as personalized video feedback enables students to learn the implementation of procedures in a practical environment and benefit from personalized video feedback to consolidate the concepts they are learning and resolve possible problems. The results pointed out that this dynamic teaching method and involving students as much as possible in the teaching-learning process makes them more interested in relevant topics and self-learning (22).

The teacher-centered approach, which focuses primarily on information transfer from the teacher, is currently prevalent in medical sciences universities, and traditional passive methods, such as lectures, memorization, repetition, questions, and answers, are common. Using these methods can lead to fatigue, lack of attention, discouragement, and lack of motivation in the learner. Nonetheless, personalized video feedback can be considered an example of student-centered learning. This approach, which is based on cognitive-social theory and constructivism, involves students in the learning process. The three important features of this approach are active, creative, and social learning.

Education based on constructivism is focused on learners' needs and involves students in the learning process, resulting in teacher-student interaction, academic progress, and educational diversity (23). Another noteworthy point in the results is that although the personalized video feedback had a significant impact on all three areas, it exerted its more marked effect on the first area of the procedure (i.e., pre-intubation procedures) followed by the second area, i.e., during-intubation measures. However, it has a lesser effect on the third area, which includes after-intubation measures. This can be due to the excessive concentration of anesthesia students on the process of performing the main part of the procedure (i.e., until the stage of passing the tube through the vocal cords), and after that, students think that the procedure has been successfully completed; therefore, they are usually less careful and focused on the measures, such as connecting the tube to the ventilator and correct tube placement into the trachea. This has also been reported in other studies aimed at improving the performance of learners in intubation skills (24).

Furthermore, the results demonstrated that after the intervention, students' satisfaction with endotracheal intubation training was significantly higher among the intervention group. This highlights learners' satisfaction with receiving feedbacks they can review on numerous occasions outside the clinical skills practice room and correct their performance in practice sessions. Among the notable limitations of the present study, we can refer to the small sample size and the impossibility of random sampling since only third-semester students were included in the study. Another limitation is the access of control group students to personalized video feedbacks provided to their peers in the intervention group, which may have affected the results.

Conclusion

As evidenced by the results of the present study, personalized video feedback is effective in improving tracheal intubation skills and satisfaction among undergraduate anesthesia students. This means that performing this method as one of the new, simple, cost-effective, and applicable training methods can be effective in improving clinical skills, such as tracheal intubation, along with other common and traditional methods. Since the professors and trainers involved in the education of students should be able to use up-to-date, efficient, and diverse methods, it is suggested to make more extensive use of simulation and personalized video feedback.

Ethical considerations

The study was approved by the Ethics Committee of Jundishapur University of Medical Sciences

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(IR.AJUMS.REC.1400.436). Before participating in the study, the students were informed about the structure of the study (for example, the objectives and method of the study). Finally, all the students who wanted to participate in the study completed the informed consent form. The information in these forms was kept confidential, and only the research team had access to them.

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Conflict of interest

The authors declare that they have no conflict of interest.

Author contributions

Ali Khalafi and Saba Roozbahani were responsible for designing the study and supervising the study. Fereshte Amiri did the final review of the articles, and Mohammad Hossein Haghigizadeh did the data analysis.

Data availability statement

Upon a reasonable request, the corresponding author can provide the datasets analyzed in this study.

References

1. Yi IK, Hwang J, Min SK, et al. Comparison of learning direct laryngoscopy using a McGrath videolaryngoscope as a direct versus indirect laryngoscope: A randomized controlled trial. Journal of International Medical Research. 2021; 49(5): 03000605211016740. [https://doi.org/10.1177/03000605211016740]
2. Rosli NA, Choo TY, Idris DRJIJoNE. Impact of preceptorship models for undergraduate nursing students and its implementation: systematic review. International Journal of Nursing Education. 2022; 14(1). [https://doi.org/10.37506/ijone.v14i1.17764]
3. Ryan RM, Deci ELJCep. Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. Contemporary educational psychology. 2020; 61: 101860. [https://doi.org/10.1016/j.cedpsych.2020.101860]
4. Yaghoubi T, Mojarad FA, Gorji MAH,et al. Nursing students' feedback from the comprehensive clinical competency exam at the end of the undergraduate course in 2019: A cross-sectional study. Tabari Biomedical Student Research Journal. 2020; 2(4): 24-30. [https://doi.org/10.18502/tbsrj.v2i4.5467]
5. Abbott EF, Thompson W, Pandian T, et al. Personalized video feedback and repeated task practice improve laparoscopic knot-tying skills: Two controlled trials. Academic Medicine. 2017; 92(11): 26-32. [https://doi.org/10.1097/ACM.0000000000001924]
6. Fachada S, Bonatto D, Schenkel A, et al. Depth image based view synthesis with multiple reference views for virtual reality. 2018-3DTV-Conference: The True Vision-Capture, Transmission and Display of 3D Video (3DTV-CON); 2018: IEEE. [https://doi.org/10.1109/3DTV.2018.8478484]
7. Banan-Sharifi M, Sahari M. The effects of simulation training on nursing students knowledge and skill in cardiopulmonary resuscitation. Strides in Development of Medical Education. 2017; 13(6): 626-31. [https://doi.org/ 10.52547/unmf.20.10.794]
8. Lehmann M, Sterz J, Stefanescu M-C, et al. Influence of expert video feedback, peer video feedback, standard video feedback and oral feedback on undergraduate medical students' performance of basic surgical skills. Creative Education. 2018; 29; 9(08): 1221. [https://doi.org/10.4236/ce.2018.98091]
9. Nesbitt CI, Phillips AW, Searle RF, Stansby GJJose. Randomized trial to assess the effect of supervised and unsupervised video feedback on teaching practical skills. Journal of surgical education. 2015; 72(4): 697-703. [https://doi.org/10.1016/j.jsurg.2014.12.013]
10. Carless D, Boud DJA, Education EiH. The development of student feedback literacy: enabling uptake of feedback. Assessment & Evaluation in Higher Education. 2018; 17; 43(8): 1315-25. [https://doi.org/10.1080/02602938.2018.1463354]
11. Tavares W, Eppich W, Cheng A, Miller S, Teunissen PW, Watling CJ, et al. Learning conversations: an analysis of the theoretical roots and their manifestations of feedback and debriefing in medical education. Academic Medicine. 2020; 1; 95(7): 1020-5. [https://doi.org/10.1097/ACM.0000000000002932]
12. Naik ND, Abbott EF, Gas BL, Murphy BL, Farley DR, Cook DA. Personalized video feedback improves suturing skills of incoming general surgery trainees. Surgery. 2018; 163(4): 921-6. [https://doi.org/10.1016/j.surg.2017.11.006]
13. Farquharson A, Cresswell A, Beard J, Chan PJJoBS. Randomized trial of the effect of video feedback on the acquisition of surgical skills. Journal of British Surgery. 100(11): 1448-1453. [https://doi.org/10.1002/bjs.9237]
14. Yiğit MF, Seferoğlu SS. Effect of video feedback on students' feedback use in the online learning environment. Innovations in Education and Teaching International. 2023; 60(1): 15-25. [https://doi.org/10.1080/14703297.2021.1966489]
15. Kam BS, Yune SJ, Lee SY, Im SJ, Baek SY. Impact of video feedback system on medical students' perception of their clinical performance assessment.

[DOI: 10.61186/edcj.17.53.45]

BMC Medical Education. 2019; 19(1): 1-7. [https://doi.org/10.1186/s12909-019-1688-6]
16. Van Vondel S, Steenbeek H, van Dijk M, van Geert P. The effects of video feedback coaching for teachers on scientific knowledge of primary students. Research in Science Education. 2018; 48(2): 301-24. [https://doi.org/10.1007/s11165-016-9569-z]
17. Lintern G, Motavalli A, Chua Z, Rantanen EM, Peres SC, Boorman DJ. Rapid development of a hospital checklist in a time of COVID-19. Ergonomics in Design. 2022; 30(4): 5-13. [https://doi.org/10.1177/1064804620963687]
18. Long E, Fitzpatrick P, Cincotta DR, Grindlay J, Barrett MJJSjot, resuscitation, medicine e. A randomised controlled trial of cognitive aids for emergency airway equipment preparation in a paediatric emergency department. Scandinavian journal of trauma, resuscitation and emergency medicine. 2016; 24: 1-7. [https://doi.org/10.1186/s13049-016-0201-z]
19. Higgs A, McGrath B, Goddard C, Rangasami J, Suntharalingam G, Gale R, et al. Guidelines for the management of tracheal intubation in critically ill adults. British Journal of Anaesthesia. 2018; 120(2): 323-52. [https://doi.org/10.1016/j.bja.2017.10.021]
20. Alconero-Camarero AR, Sarabia-Cobo CM, Catalán-Piris MJ, González-Gómez S, González-López JRJIjoer, health p. Nursing students' satisfaction: A comparison between medium-and high-fidelity simulation training. 2021; 18(2): 804. [https://doi.org/10.3390/ijerph18020804]
21. Hemmati Maslak Pak M, Mollazadeh F, Khalkhali H, Abkhiz SJAJoN, Care M. The impact of self-care education with teach-back method on self-esteem in kidney transplant recipients: a clinical trial. Avicenna Journal of Nursing and Midwifery Care. 2020; 10; 28(3): 154-62. [https://doi.org/10.30699/ajnmc.28.3.154]
22. Youssef SC, Aydin A, Canning A, Khan N, Ahmed K, Dasgupta PJSI. Learning surgical skills through video-based education: a systematic review. Surgical Innovation. 2023; 30(2): 220-38. [https://doi.org/10.1177/15533506221120146]
23. Zhang H, Liao AWX, Goh SHL, Yoong SQ, Lim AXM, Wang WJNET. Effectiveness and quality of peer video feedback in health professions education: A systematic review. Nurse Education Today. 2022; 109: 105203. [https://doi.org/10.1016/j.nedt.2021.105203]
24. Bagheri M, Mazloum SJRiME. Comparison of the effect of two educational methods of jigsaw and feedback on the level of satisfaction of nursing and anesthesia students of mashhad school of nursing and midwifery. Research in Medical Education. 2020 Dec 10; 12(4): 16-28. [https://doi.org/10.52547/rme.12.4.16]

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