

Assessing Student Learning With Anatomical Focus in Oral and Nasal Suction Videos

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Abstract

Understanding suctioning techniques and the cannula structure can be challenging. This study aimed to improve students' understanding through instructional videos on nasal and oral anatomy, evaluating the impact on recognizing anatomical importance, motivation to learn, and medical safety awareness. The study involved 105 nursing college students who were divided into two groups: (1) an experimental group of 38 participants who watched a video with an anatomical perspective and (2) a target group of 46 participants who watched a general video. Both groups completed a self-administered questionnaire before and after viewing the video. The questionnaire included the "Nursing Student Risk Sensitivity Scale", and suction-related items. A two-factor analysis of variance was conducted, using "type of video (between participants)" and "before/after viewing (time: within participants)" as independent variables and the score of each factor as the dependent variable. No interaction effects were observed for any of the eight factors. However, we found a significant main effect of time on all eight factors ($F(1,82)=8.60\sim 81.94, p<.001$). In the experimental group, free descriptions revealed comments such as "I learned the length of the catheter to be inserted for nasal suction," etc. Over time, the videos' effects became apparent. Though quantitative analysis did not confirm a direct learning impact, qualitative feedback from the experimental group highlights the educational value of anatomical perspective videos. Future research should improve video content and assessment methods to underscore their significance.

Keywords: Suctioning Techniques, Nursing Students, Anatomical Perspective, Videos

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Introduction

In clinical practice, in which medical technology is becoming more sophisticated and complex at an accelerating pace, nursing professionals, who often bear the ultimate responsibility for providing medical care to patients and home care providers, face growing expectations to ensure medical safety and patient-centered care (Iida, 2004). In clinical practice, mastery of nursing skills that involve biological invasion, such as taking blood samples, intravenous infusions, and oral, nasal, and endotracheal suctioning, has become essential and is also assessed as a skill attainment level upon graduation.

However, with patient safety a major concern, it is practically and ethically unrealistic for nursing students to directly utilize bioinvasive nursing skills with patients. The Ministry of Health, Labour, and Welfare (MHLW; 2007) published a "Study Group Report on the Improvement of Basic Nursing Education," which states that (1) the rapid decline in the birthrate and aging population, advances in medical technology, and other factors require nurses to provide high-quality nursing care from the perspective of patients and that (2) nursing tasks are becoming more complex and diverse, and public awareness of medical safety is increasing. The report points out that "the scope and opportunities for students to practice nursing skills tend to be limited" due to (1) the need to clarify the required skill items and the level of achievement at graduation and (2) the need to conduct clinical practice that is in line with the actual conditions in the field. In other words, it can be said that for those skills that are difficult to train on in clinical practice, there is a need to devise ways to learn them in classes and exercises.

In the field of home health care nursing in Japan, expectations for nurses involved in home health care nursing to acquire skills have increased further in recent years as the number of patients who wish to receive home care increases. One of the nursing skills required for home care patients is suctioning. A previous study reported that 63% of patients receiving home care required suctioning and other procedures (MHLW, 2007), and the percentage of patients who experienced problems when these procedures were being performed tended to be higher than for other home nursing skills (Kobayakawa et al., 2016). Furthermore, appropriate guidance for family members and caregivers from home care nurses is also important for home nursing techniques.

Because suctioning is directly related to life support and is a painful procedure, reliable skill acquisition is required. However, only about 70% of students at the end of their basic nursing education have experienced, performed, or observed suctioning during on-site training (Asakawa et al., 2008), and many new nurses (30%) experience difficulties after obtaining employment (Toki, 2008). Furthermore, suctioning techniques are difficult to understand in terms of the cannula structure, how far to insert the catheter tube during suctioning, and confirming that it is inserted. For this reason, the use of a suction model simulator has been practiced at various universities to support learning (Colley, 2015; Nishiyama et al., 2016), with lectures, viewing of VTRs, and technical exercises being conducted. Furthermore, student learning from on-campus technical exercises in oral, nasal, and endotracheal suctioning using model simulators is evident, and students have a better understanding of the physical and psychological situation of the patient being suctioned (Takizawa et al., 2016).

In a survey of nurses working in hospitals, about 90% of the respondents recognized that an anatomical perspective was necessary, with suctioning, puncture, and excretion, in that order, as the most important care. Nurses with further difficulties indicated that they were not

interested in anatomy or did not feel that it was necessary when they were students (Fujii et al., 2004). At present, there is a dearth of previous research on suctioning among nursing students. Moreover, the simulators used for suctioning exercises are designed to help students acquire skills in suctioning phlegm, and no studies focusing on anatomical perspectives have been found. In addition to the acquisition of suctioning skills using simulators, further improvement of students' nursing knowledge, skills, and attitudes through organizing and conducting exercises that incorporate videos focusing on the anatomical viewpoints of the nasal cavity and oral cavity would be beneficial.

Conventional suction technique videos focus on preparation before and after the procedure, talking to the subject, etc., and few focus on anatomical viewpoints. Therefore, we decided to first produce videos of suction techniques that include an anatomical perspective under the supervision of a physician and to verify the learning effect of such videos. We believe that learning through videos that include an anatomical perspective will lead to improved understanding of suction techniques and recognition of safe behavior by students. The purpose of this study was to clarify the effect of the newly produced videos on students' recognition of the importance of anatomical viewpoints, their motivation to learn, and their awareness of medical safety.

Purpose

In this study, the researchers examined the effects of the suction videos they produced on students' awareness of the importance of anatomical perspectives, their motivation to learn, and their awareness of medical safety.

Method

1. Study Design

Experimental study: Randomized controlled trial (RCT), a prospective study comparing experimental and control groups before and after the study

2. Collaborators

One hundred and five third-year students at the Women's College of Nursing

3. Survey Period

June 2023

4. Procedures

1) Recruitment Procedure: During the class guidance for home health care nursing methodology, it was explained that the class unit included a suction exercise. After the ethical screening was completed, we explained that a research survey would be conducted during the suction exercise unit after the class (approximately 10 minutes during lunch break) and invited the students to participate. We also informed them that they could attend the suction exercise as usual even if they did not participate in the survey.

2) Flow of the Day: After the suction lecture on home nursing methodology, the participants were randomly divided into two groups: (1) those who watched the suction video that included an anatomical perspective (experimental group) and (2) those who watched the general suction video (target group). The participants were asked to complete a self-administered, unmarked questionnaire before and after viewing the video. Only those who gave their consent by marking the "consent box" on the paper questionnaire were analyzed for this survey. Questionnaires were collected by placing collection boxes in each room.

5. Video Content

1) Experimental Group: A suction video approximately 5 minutes long was produced in consideration of anatomical viewpoints. In producing this video, we obtained the cooperation of a physician in the Department of Otorhinolaryngology at the University of A, who assisted in filming. The technique of suctioning from the oral and nasal cavities using simulated sputum on an oral simulator was filmed with an endoscopic camera for otorhinolaryngology. The physician provided anatomical rationales and the accompanying validity of the suction technique, and advice was given. The video was edited so that the viewer can focus on areas where phlegm tends to accumulate when suction is performed and can understand the suction technique while checking the areas at risk during suction (uvula, pharynx, vocal cords, etc.). We believed that this video would enable the acquisition of knowledge from an anatomical perspective.

2) Target Group: As a general suctioning technique, we used the oral and nasal suction videos of the e-nurse trainer, which were approximately 5 minutes long. In this video, participants can learn the nurse's movements before and after suctioning, information on suction preparation items, and how to insert a suction catheter.

6. Evaluation

1) Attributes: The respondents were asked about their experience taking suction classes, their interest in suction, their experience watching videos of suction techniques, and whether they had had any near misses. Age was not requested because it would lead to the determination of the participants, such as students in previous years.

2) Risk Sensitivity Scale for Nursing Students: The Risk Sensitivity Scale for Nursing Students was used to determine nursing students' awareness of medical safety. This nursing student risk sensitivity scale was developed by Minami et al. (2015) and consists of 25 items in six subcategories. The Cronbach's alpha coefficient for the entire scale was high at 0.93. Subordinate items include "ability to carry out safe behaviors" (F1, $\alpha=.88$), "ability to utilize risk experiences" (F2, $\alpha=.90$), "ability to acquire risk information" (F3, $\alpha=.91$), "ability to prepare for risk avoidance" (F4, $\alpha=.86$), "ability to prepare for risk response" (F5, $\alpha=.85$), and "ability to observe risk perception" (F6, $\alpha=.89$) are. It uses a six-point Likert scale ranging from "very applicable" to "not applicable at all," with higher scores indicating greater student awareness and perception of risk avoidance.

3) Oral and Nasal Suctioning Skills Evaluation Scale: Evaluation of oral and nasal suctioning techniques was set up with reference to basic nursing faculty with more than 10 years of experience, books on nursing skills, and previous research. Fourteen items were developed based on the "Table of Evaluation Items and Evaluation Criteria for Oral and

Nasal Suctioning” proposed by the Ministry of Health, Labour, and Welfare (2003) and the evaluation item criteria in the "Suctioning through the Mouth and Nose Pamphlet" developed by the National Institute for Longevity Sciences. Each item was rated on a four-point Likert scale from "able" (four points) to "unable" (one point). The higher the score was, the better the skill acquisition.

4) Free Description: Student opinions were sought regarding understanding of the techniques as well as techniques that can be used in practice, anatomical perspectives, and points that were difficult to understand.

7. Analysis Methods

Descriptive statistics were calculated for the quantitative data, and the statistical software SPSS ver27 was used. Factor analysis was used for the skill evaluation items related to oral and nasal suctioning. A two-factor analysis of variance (ANOVA) was used to test the difference in means before and after the study, with a significance level of $p < .05$. Free descriptions were grouped into categories based on similarity of semantic content.

8. Ethical Considerations

This study was conducted with approval from the Research Ethics Review Committee of Baika Women’s University (2023-0240).

9. Conflicts of Interest

The authors declare no conflicts of interest associated with this manuscript.

Results

1. Attributes

The experimental group consisted of 38 subjects, and the target group consisted of 46 subjects. Chi square test results showed no differences between the groups on the attribute items.

2. Factor Analysis of the Items Evaluating Oral and Nasal Suctioning Techniques

Of the 14 items, one that showed a ceiling effect was deleted, and factor analysis was conducted on the remaining 13 items using the main factor method. The following two factors were extracted by promax rotation based on a fixed value of 1 or more and a factor loading of 0.35 or more (Table 1). Factor 1 was named "Points to Consider During Suction" ($\alpha = .93$) related to the operation during the suctioning procedure, and factor 2 was named "Pre- and Post-Suctioning Coping" ($\alpha = .91$) related to the suctioning procedure.

Table 1: Factor analysis of the items evaluating oral and nasal suctioning techniques

		<i>n</i> =84	
		Suc F1	Suc F2
	Suction with understanding of position	1.04	
	Length of catheter insertion from an anatomical perspective	0.98	
	Confirmation upper and lower tongue where phlegm accumulates	0.78	
Points to consider during suction	Do not place the catheter against the uvula.	0.75	
	Suction with confirmed sputum properties	0.74	
	Proper handling of catheters	0.65	
	Check the position of the nasolarynx, pharynx, and vocal cords and suction	0.57	
	Hold the catheter properly	0.56	
Pre- and post-suctioning coping	Wipe sputum on the outside of the catheter with an alcohol swab		1.06
	Clean catheter with cleaning water.		1.01
	Suction rotated to avoid irritating mucous membranes		0.75
	Adjust suction pressure.		0.71
	Processing of catheter removed from connecting tube		0.63
Interfactorial Correlation			
SucF2		0.64	

3. Verification of the Effectiveness of Anatomical Viewpoint Videos and General Videos

To examine the effects of awareness of the importance of anatomical viewpoints, willingness to learn, and awareness of medical safety in the groups viewing (1) suction videos including anatomical viewpoints (experimental group) and (2) general suction videos (target group), a two-factor ANOVA was conducted using "type of video (video: between subjects)" × "before/after video viewing (period: within subjects)" as independent variables and the scores for each factor as dependent variables (Table 2). As a result, no interaction effects were found for any of the eight factors. Of the nursing students' risk sensitivity scale, a total of seven factors—F2 "Ability to utilize risk experience," F3 "Ability to obtain risk information," F4 "Preparation for risk avoidance," F5 "Preparation for risk response," and F6 "Ability to observe risk perception" as well as SucF1 "Points to keep in mind during suctioning" and ScuF2 "Preparedness before suctioning" of the suctioning evaluation—had significant main effects during the period of the study. All seven factors, SucF1 "Points to Consider During Suction," and ScuF2 "Pre- and Post-Suctioning Coping" showed a significant main effect for the period ($F(1,82)=8.60\sim 81.94, p<.001$).

Table 2: Verification of the effectiveness of anatomical viewpoint videos and general videos

n=84

	General suction		Anatomical viewpoint		Main effects of		interaction effects
	(taeget group: n=46)		(experimental group: n=38)		the video	time	
	pre	post	pre	post	<i>df</i> (1,82)	<i>df</i> (1,82)	<i>df</i> (1,82)
	mean (SD)	mean (SD)	mean (SD)	mean (SD)	<i>F</i> value	<i>F</i> value	<i>F</i> value
F1	4.93 (0.7)	4.93 (0.7)	4.79 (0.7)	4.87 (0.8)	0.42 <i>n.s</i>	0.67 <i>n.s</i>	0.93 <i>n.s</i>
F2	3.89 (1.0)	4.03 (1.1)	3.70 (1.1)	3.93 (1.0)	0.39 <i>n.s</i>	8.60 ***	0.49 <i>n.s</i>
F3	3.64 (1.1)	3.91 (1.1)	3.30 (1.1)	3.70 (1.2)	1.34 <i>n.s</i>	28.50 ***	1.14 <i>n.s</i>
F4	3.67 (0.7)	3.87 (1.1)	3.41 (1.1)	3.72 (1.2)	0.99 <i>n.s</i>	11.65 ***	0.52 <i>n.s</i>
F5	3.95 (0.7)	4.29 (0.8)	3.93 (0.8)	4.15 (0.8)	0.26 <i>n.s</i>	16.51 ***	0.26 <i>n.s</i>
F6	3.86 (0.7)	4.04 (0.9)	3.76 (0.9)	4.16 (0.9)	0.00 <i>n.s</i>	26.25 ***	0.00 <i>n.s</i>
Suc F1	3.18 (0.5)	3.58 (0.7)	3.13 (0.7)	3.62 (0.5)	0.00 <i>n.s</i>	81.95 ***	0.00 <i>n.s</i>
Suc F2	3.38 (0.5)	3.70 (0.5)	3.46 (0.5)	3.70 (0.4)	0.16 <i>n.s</i>	41.19 ***	0.16 <i>n.s</i>

***p<.001

4. Free Description

The table shows the descriptions of the experimental and target groups regarding the anatomical perspective and the techniques that can be used in practice. It also includes excerpts from the students' representative opinions. Supplements by the researcher are added in parentheses.

In the free descriptions of the experimental group, three categories of anatomical viewpoints were listed: "Understanding of anatomy regarding the inside of the oral and nasal cavity," "Points to keep in mind when inserting a catheter based on anatomical viewpoints," and "About the site of sputum retention" (Table 3). The six categories of skills that can be used in practice were "Understanding the suction method from the practitioner's perspective," "Understanding the site where sputum accumulates," "Rotating the catheter while removing it," "Better understanding of precautions when inserting the catheter," "Understanding the length of the catheter to be inserted," and "Techniques that do not cause pain to the patient" (Table 4).

In the target group, two categories of anatomical perspective—"Easier understanding of anatomical models" and "More suction images with anatomical models"—were listed (Table 5). The five categories of techniques that could be used in practice were "How to insert a catheter," "Caring for the patient," "Points to consider when suctioning," "Points to consider when removing a catheter," and "No techniques that could be used" (Table 6).

Table 3: Experimental group: Description of anatomical viewpoints

Categories	Representative code
Understanding of anatomy regarding the inside of the oral and nasal cavity	I think it will lead to suctioning areas that should not be stimulated, nasal cavity, oral cavity, length of catheter insertion, etc. The camera in the oral cavity made it easier to understand from an anatomical point of view. By looking at the uvula and vocal cords, I believe that inhalation can be done to prevent the vomiting reflex from occurring. I knew what was going on in the mouth, how to facilitate insertion, and where to hit to induce bleeding and vomiting. The fiber perspective was available and easy to understand. In addition to the trachea, patients who are unable to expectorate sputum on their own are prone to sputum accumulation in the airways and pharynx.
Points to keep in mind when inserting a catheter based on anatomical viewpoints	I realized that without an anatomical perspective. I knew the length of insertion or the areas that should not be stimulated. I found that inserting the tube downward into the nasal cavity made it easier to insert. I now know where the catheter stops, how to rotate it to make it easier to aspirate phlegm, and where it gets stuck. Knowing the position of the pharynx, glottis, and glottis can help alleviate the patient's distress. Since we don't often see video of the oral cavity during inhalation, I thought it was necessary to link it to the hand movements. Stimulation of the uvula with a catheter can cause the vomiting reflex and patient distress.
About the site of sputum retention	What is the most likely site for sputum production, laryngeal area. I understood in what kind of places phlegm tends to remain. It was easy to imagine with some real phlegm.

Table 4: Experimental group: Description of techniques that can be used in the practice

Categories	Representative code
Understanding the suction method from the practitioner's perspective	It was from the nurse's point of view, so I could see where the suction was being suctioned and passed through and could understand it better. Where you could actually see inside the mouth and see the tube going through. From the implementer's perspective, it was easy to see the point that he was in the pharynx with the camera on. It was easy to understand the actual model with the camera, and it was easy to get an idea of what the suction would look like.
Understanding the site where sputum accumulates	It was easy to understand with specifics on where they tend to accumulate and why they should not be stimulated. Aspirate not only phlegm but also residuals. I thought understanding where sputum tends to accumulate and the position of insertion could be used in practice. Effective use of the tongue depressor to suction the phlegm stored inside both cheeks and on the tongue.
Rotating the catheter while removing it	When suctioning phlegm with a catheter, rotate it so as not to irritate mucous membranes. How to move the catheter at the site of phlegm accumulation Suction is applied while rotating the tube to promote phlegm ejection. Aspirate while rotating the catheter to avoid irritating the mucosa.
Better understanding of precautions when inserting the catheter	The textbook only covered the procedure, but the video was easy to understand with points to keep in mind. It was found that if they hit the epiglottis or other parts of the body, they could cause pain, bleeding, and a vomiting reflex. It was easy to see which one was the epiglottis because it was shown in images, etc., and it was linked to the catheter insertion procedure and dissection. I now understand the suctioning technique, the length of the catheter to be inserted, things to be careful about, and the reason why it can be done in a short time. By checking and observing the actual condition of the airway, I was able to imagine the induction of the vomiting reflex and inflammation of the airway mucosa.
Understanding the length of the catheter to be inserted	Insert catheter 10-15 cm. The catheter should be inserted into the nasal cavity about 15 cm. I understood how to insert the tube and how many cm to insert.
Techniques that do not cause pain to the patient	Note that the tube hitting the uvula can be painful for the patient and cause vomiting reflex, etc. He felt that he needed to learn techniques to avoid causing pain. It was found that when applied to the uvula, it causes a vomiting reflex, which damages the mucous membranes and causes bleeding. Pull the catheter out while rotating it slowly during removal to avoid irritating the mucosa.

Table 5: Target group: Description of anatomical viewpoints

Categories	Typical codes
Easier understanding of anatomical models	The use of anatomical models made it easy to understand. (Dissection model) Since the model was transparent, I thought it would be connected to anatomy. Where I found that I could suction from the side using a model.
More suction images with anatomical models	It was easy to understand where to suction (with the anatomical model). (The anatomy model) gave me an image of the structure of the airway. Since there was a dissection scene in the video, I thought it could be used for the next implementation. I wondered if not knowing the anatomy could easily lead to the risk of breathing problems.

Table 6: Target group: Description of techniques that can be used in the practice

Categories	Typical codes
How to insert a catheter	The site and length of insertion (of the suction tube). It was good to see objectively how to fold the catheter by hand and turn suction on and off. I understood how the catheter was going through the body and noticed the different angles of the catheter, etc. How to proceed with a suction catheter.
Caring for the patient	Talking to the patient before insertion, suctioning procedures. I was able to see the ideal form of nursing by watching them talk to patients and provide assistance smoothly. Call out to the patient, "You will suffer a little," "Please take a deep breath slowly," etc.
Points to consider when suctioning	Do not force them, and do suction with consideration for their sense of shame. How long to insert the catheter, how to hold it, and how to move the hand for suction. To remove the catheter while turning it. Protect myself and my patients by using hand sanitizer and other infection control measures. Connect tubing quickly with aseptic manipulation.
Points to consider when removing a catheter	Pull the catheter while turning it slightly during suctioning. (When suctioning), pull out the catheter while twirling it around. Pull out (the catheter) with a twist.
No techniques that could be used	I couldn't find any techniques (that could be used in actual competition). It does not seem to lead to having an anatomical viewpoint and aspiration. No added knowledge.

Discussion

This study examined the effect of videos on students' recognition of the importance of anatomical perspectives, their willingness to learn, and their awareness of medical safety when suction videos including anatomical perspectives produced by the researchers were used. The following section discusses the effects of the researcher's videos used in the experimental group.

Verification of the Effects of Anatomical Viewpoint Videos and General Videos

In this study, recognition of the importance of anatomical viewpoints and motivation to learn were examined using the "Oral and Nasal Suctioning Skills Evaluation Scale", and the effect of awareness of medical safety was examined using the "Nursing Student Risk Sensitivity Scale". The results of the "type of video (video: between subjects)" × "before/after (time period: within subjects)" analysis showed that the understanding of the suctioning technique and risk sensitivity awareness tended to increase over time, regardless of the type of video, whether it was the researcher's experimental video or a conventional general video. These findings suggest that video viewing has a possible educational effect.

Because no interaction between the two factors was observed in this study, it is difficult to evaluate whether the researcher's videos had an effect on students' perception of technique and medical safety behavior. One reason may be that the students did not develop technical exercises using simulators or other equipment after viewing the videos. In a study by Imai et

al. (2020), the effect of the simulator on nursing students' skills was noted to be linked to "promotion of imaging through actual experience" and "improvement of nursing skills and assessment abilities." Shin et al. (2015) noted in their study that simulation education improves student performance and strengthens mental assessment skills. Currently, time limitations and faculty shortages are major challenges at the colleges. However, by planning classes that combine video viewing and technical exercises, we can expect to maximize the effects of videos and increase students' awareness of the importance of anatomical perspectives, their motivation to learn, and their awareness of medical safety.

Effects of Learning From Free-Text Descriptions

Validation of the scale revealed no direct effect of the researcher's videos on learning effects or awareness of medical safety. However, based on the categories and representative code of the free descriptions, it may be inferred that the awareness of the anatomical perspective was deeper in the experimental group than in the target group.

Suctioning is an important life-support-related care that requires precise techniques. Currently, it is not possible for students to perform suction during exercises. Free descriptions of the target group indicated that training deepened the understanding of basic nursing skills, such as patient care, cleanliness, and how to hold a catheter. In the target group, the model used for suctioning was transparent across the body to introduce the suctioning technique. Although several participants commented that the model was easy to understand, they did not mention it deepening their anatomical understanding of the location of the uvula and vocal cords, which induce bleeding and vomiting reflexes during suctioning. However, in the description of the experimental group, by watching the video using microfibers, students were able to identify the areas where sputum was easily sputumized, such as the laryngeal area, and the areas where sputum tended to remain. Furthermore, the students were able to recognize the high risks associated with suctioning techniques, such as "by looking at the uvula and vocal cords, they can inhale without causing vomiting," and "knowing the position of the pharynx, uvula, and glottis can help alleviate patient distress." In a suctioning survey by Hayashi et al. (2018), nursing students indicated that "understanding the patient receiving suction" was their top priority regarding important factors to consider when performing suction as a nurse. In the experimental group, it is believed that students gained a better understanding of catheter manipulation while considering the risk of bleeding in the uvula, pharynx, and larynx and irritation of the mucous membranes associated with actual suctioning. This may be inferred from the fact that the students were able to learn the suctioning technique based on evidence and have a concrete image of suctioning along with an understanding of its complications, leading to consideration of the patients' pain during suctioning.

Many conventional suctioning videos have introduced basic nursing techniques from the perspective of healthcare professionals. The researcher's video may have led to "understanding of suctioning methods from the practitioner's perspective," as stated by the researcher, "It was easy to understand because it was from the practitioner's perspective and the camera was attached to the pharynx." Regarding videos from the first-person perspective, Komizunai et al. (2019) indicated that teaching suctioning techniques using virtual reality has the effect of enabling participants to relive the modeled technique. Apsari et al. (2023) examined the effect of learning suction techniques using virtual reality and showed an improvement in self-efficacy in performing suction nursing actions. In the future, researcher videos may supplement the lack of learning in textbooks and traditional videos, deepen

students' interest in anatomical perspectives, and lead to patient-oriented and patient-focused assistance as they grow as new nurses.

However, the videos we produced lack some aspects of preparation and consideration before and after suction, such as the perspective of observing the patient's condition. In the future, it will be necessary to add the viewpoints covered in previous videos, edit the videos to include an anatomical viewpoint, and reconsider the assessment indicators. In addition, by simultaneously developing technical exercises that could not be conducted in this study, it is expected that awareness of the importance of anatomical viewpoints and motivation to learn will increase, which will also raise awareness of medical safety.

Conclusion

Regardless of whether the researcher's experimental videos or conventional general videos of any type were used, a trend toward an increased understanding of the suction technique and risk sensitivity awareness were observed over time. However, there was no direct learning effect of the researchers' videos or its impact on the awareness of medical safety. From the free descriptions, the experimental group showed a deeper understanding of the anatomical viewpoints, whereas the conventional videos of the target group showed an understanding of the pre- and post-suction preparation, technique, and consideration for the patient. The acquisition of oral and nasal suctioning techniques, focused on anatomical perspectives, will lead to the provision of safe nursing care. In the future, we would like to improve the researcher's videos by adding missing perspectives, and improving and developing suctioning techniques based on an understanding of anatomical perspectives.

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