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The Effect of Simulation Education on Nursing Students' Perception and Fear of COVID-19: A Randomized Controlled Trial

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ABSTRACT

Aim: This study aims to determine the effect of simulation education on nursing students' perception and fear of the COVID-19 disease.

Method: This study was conducted in a randomized controlled trials with 86 nursing students from a university between November 10 and December 10, 2021. Data were collected using a personal information form and the Approach to COVID-19 Patient Form, which were designed by the researchers, the COVID-19 Disease Perception Scale, and the Fear of COVID-19 Scale.

Results: While the COVID-19 Fear Scale mean score of the intervention and control groups was high before the training, it decreased after the training. After the training process given to the intervention group was completed, the mean score of the COVID -19 Disease Perception Scale increased in both groups. It was found that the simulation education given to the intervention group increased the level of correct implementation of the interventions related to approaching patients after the education.

Conclusion: It was found that the simulation education given to students provided positive improvements in the approach to patients with COVID-19 and disease perception and fear levels.

Key Words: COVID-19, nursing student, simulation.

1. INTRODUCTION

The Adult individuals in Wuhan city, the capital of China's Hubei province presented to hospitals due to serious pneumonia of unknown cause in December 2019, and this epidemic, called coronavirus (COVID-19), was reported to the World Health Organization (WHO) on December 31, 2019. COVID-19 was declared a global pandemic by the WHO on March 12, 2020 (1). The first case in Turkey was seen on March 11, 2020 (2). As of July 2024, the total number of deaths caused by COVID-19 worldwide has been recorded at 6.95 million. In Turkey, a total of 101,492 deaths have been reported since the beginning of the COVID-19 pandemic (3). The COVID-19 pandemic, which has had a great impact on health services all over the world, remains a cause for concern. The psychological impact of COVID-19 on healthcare workers has been severe enough to significantly affect their mental health as they have had to cope with this process and there has been a higher risk of exposure, excessive workloads, and a constant change in their usual work environment (4). This pandemic has affected not only the health sector but

also the education sector. In this process, education programs have been revised and online education has been put into practice in many programs including nursing (5).

With the alleviation of COVID-19, students started to receive face-to-face lessons. Those with applied courses, such as nursing students, also had to do hospital practice. While clinical practice is seen as very stressful for nursing students, even under normal conditions, the thought of going to hospital practice during the pandemic has increased the psychological problems that they already experience. Studies on the effect of COVID-19 on nursing students have shown that students experience psychological problems, such as anxiety, stress, and depression (6-9). It is stated that anxiety levels arising from the accumulated psychological pressure and rapidly increasing workload may be exacerbated by an intense fear of death (10).

Simulation is effective in improving students' cognitive, psychomotor, and attitudinal knowledge and skills by providing a realistic learning environment in which they experience real-life situations (11). Performing the skills in a laboratory environment allows students to practice as much as they want, and it can allow mistakes that are not tolerated on real patients. In addition, it helps students to actively participate in the learning process with repetitive applications and gain experience, increases patient safety by reducing errors that can be made in real life, and enhances students' self-confidence by reducing their anxiety with its environment that supports learning. In addition to these results, simulation provides a medical care service that is consistent with patient rights and where the patient does not take risks (9,12).

A review of the simulation-based studies in the literature has shown that it has a positive effect on the development of students' knowledge and psychomotor levels and addressing and managing certain fears (13,14). For example, a study by Hung et al. showed that using standardized patients in education increased students' self-confidence, communication skills, and learning satisfaction (15). It is stated that education that is given by using simulated patients and which incorporates theory and practice can help prevent current and future pandemics and prepare students for such events. In addition, with this type of education, students will be able to develop emotional strategies to deal with their emotions as well as getting prepared (16). For this reason, we think that it is important to teach nursing students, who are health workers of the future, how to approach patients diagnosed with COVID-19 by using a simulated patient in a laboratory environment before having to come into contact with real patients. Based on this idea, this study was conducted to determine the effect of simulation education regarding how to approach patients with COVID-19 on nursing students' perception of illness and fear of COVID-19.

2. MATERIALS AND METHODS

A randomized controlled trial design was used. The population of the study consisted of 167 students who took the internal medicine nursing course in the nursing department of a university in the fall semester of the 2021-2022 academic year. The sample size of the study was calculated as 90 students based on 95% reliability and power of 80% in the power analysis conducted. The inclusion criteria of the study were being a nursing student and agreeing to participate in the study. The exclusion criteria were refusing to participate in the study or quitting the study. Students who met the inclusion criteria of the study were assigned to intervention and control groups using the simple randomization method performed on software. After the first interview, 3 people from the intervention group quit the study voluntarily. One person from the control group refused to participate in the second interview. Therefore, the study was completed with a total of 86 people, including 42 in the intervention group and 44 in the control group (Figure 1).

2.1. Research Design

Before the study was initiated, a presentation on approaches to patients with COVID-19 was prepared

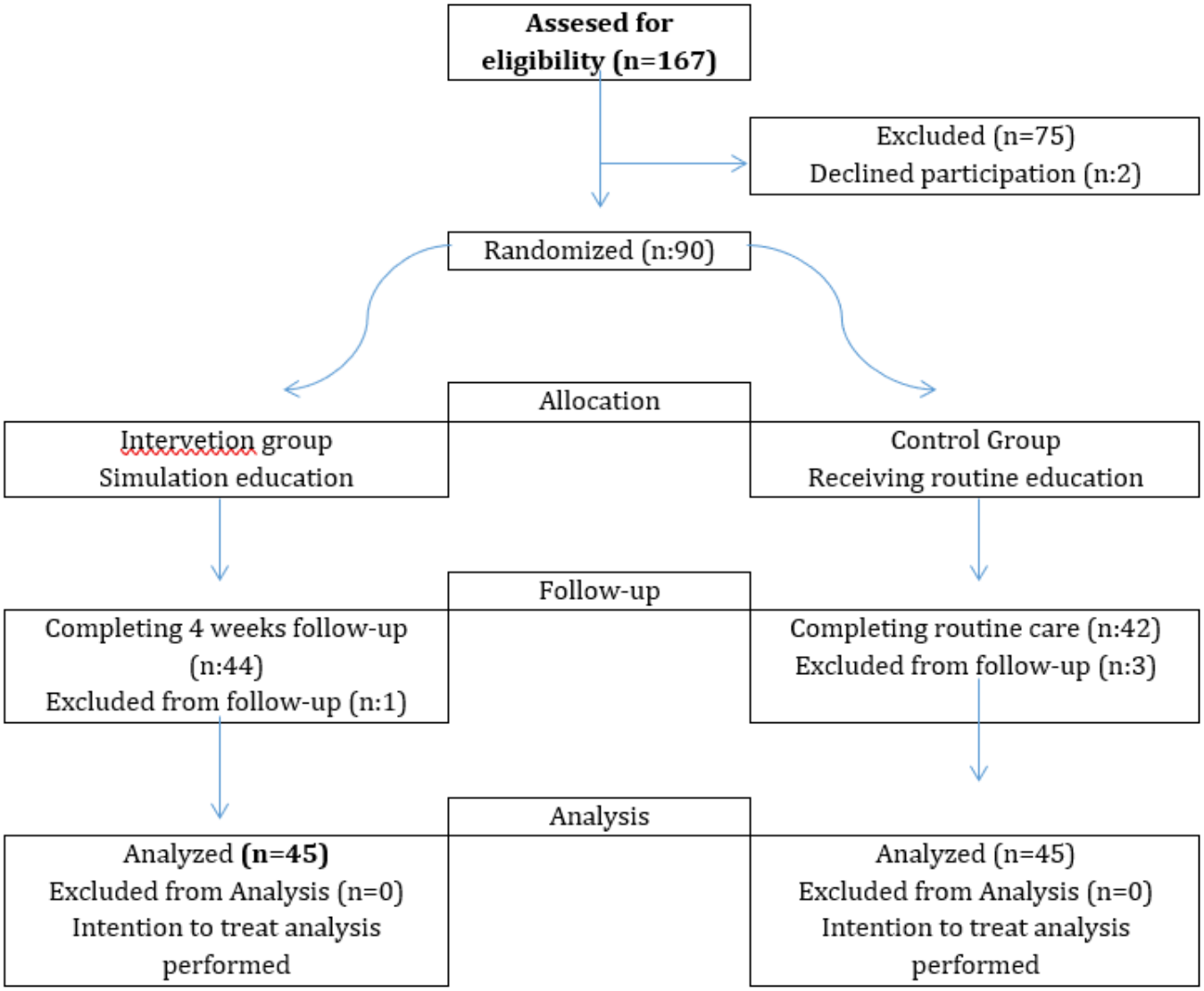

Figure 1: Flow diagram of the randomized controlled study (CONSORT 2010)

based on the literature by the researchers to present to participants. A clinical scenario was prepared for the simulation education to be given to the intervention group. The content of the presentation and the scenario were evaluated for suitability by three nursing faculty members who were not involved in the study. The presentation about approaches to patients with COVID-19 was given by the researchers to all students in a 2-hour theoretical course in the classroom environment using the lecturing method. The pre-test was applied to all students participating in the study to evaluate their knowledge levels. The content of the scenario is given below.

Clinical scenario: Mr. S. is a 62-year-old patient hospitalized in the COVID-19 ward. Patient data, such as vital signs, diagnosis, and age, are in the patient file. The patient, who had symptoms of COVID-19, learned that he was COVID-19 positive at the hospital and he was hospitalized. His blood pressure was recorded as 110/70 mmHg, body temperature as 36.4, heart rate as 84/min, and rate of respiration as 16/min. He is staying alone in the room. The nurse is preparing to enter the patient's room for his treatment. In this process, the focus is on the precautions that the nurse should take before entering the patient's room and the interventions that should be done while in the patient's room and when leaving. While the simulation education was applied to the intervention group within the scope of this scenario, no intervention was conducted in the control group.

Implementation: Expectations regarding the scenario were explained to the participants before the

implementation. They were given information about the standard patient. Roles were distributed, and the implementation time of the scenario was announced. Written permission was obtained from students involved in the scenario. The intervention group was given scenario-based education appropriate for the approach to a standard patient with COVID-19. During the implementation of the scenario, the instructor did not interfere with students, and after the feedback, the "show-do" method was used to improve the incorrect skill steps. Two instructors evaluated students' performance on the standard patient simulation as "achieved-failed" and the application was recorded as a pre-test.

Debriefing stage: Immediately after the implementation of the scenario was completed, the debriefing session was initiated. All students who participated in the clinical simulation and watched the simulation were included in this session. The purpose of the debriefing session was to facilitate the process and encourage participants to participate in the simulated clinical experience and reflect what they learned in their further experience (17). At this stage, students were allowed to discuss and reveal their ideas and thoughts. After the group discussion was completed, students were informed by the relevant faculty member. The debriefing session took approximately 20 minutes.

At the last stage, the application steps of the students were evaluated using forms in the same order and with the same standard. In addition, their performance on the standard patient was observed again. After the theoretical education was given, the study was completed in 1 month, with the pre-test on the first day, the application with standard patient simulation on the second and third days, and the post -test one month after the pre-test.

2. 2. Data Collection Forms

Data were collected using a personal information form and the Approach to COVID-19 Patient Form, which were designed by the researchers, the COVID-19 Disease Perception Scale, and the Fear of COVID-19 Scale.

2.2.1. Personal Information Form

This form was created by the researchers following a review of the literature (11,16,18) to collect data about the demographic characteristics of patients, such as age, gender, school, and school year.

Approach to COVID-19 Patient Form: This form was created by the researchers following a review of the literature (9, 19-22) and was evaluated by 3 experts who had a PhD degree in the field, and necessary improvements were made in line with their suggestions. It consists of 14 items in total. This form includes interventions, such as "The mask should be worn before entering the patient room or care area" and "Disposable respiratory and face masks should be removed and discarded after leaving the patient's room or care area and closing the door." The correct application of these interventions was scored with "1 point" and the incorrect application with "0 points". Scores range between 0 and 14. As the scores increase, the accuracy level of the approach to the patient increases, as well.

2.2.2. The Fear of COVID-19 Scale

This scale was developed by Ahorsu et al. (2022), and its Turkish adaptation, validity, and reliability studies were performed by Ladikli et al. (2020). The scale has a single factor structure and consists of seven 5-point Likert-type (1 = strongly disagree; 5 = strongly agree) items. Scores on the scale range between 7 and 35. The higher the score is, the higher the fear of the COVID-19 pandemic is. Cronbach's alpha value of the scale is 0.82 (22,23). In our study, the reliability coefficient was found to be 0.87.

2.2.3. The COVID-19 Disease Perception Scale

This scale was developed by Geniş et al. (2020). It consists of seven items. It has a five-point Likert-type structure and consists of two sub-dimensions. The total score is calculated by summing the scores of the items on the sub-dimension and dividing the results by the number of items on that sub-dimension. This operation yields a value between 1 and 5. High scores on the dangerousness sub-dimension indicate that the perceived dangerousness of the disease is high, and high scores on the

contagiousness sub-dimension indicate that the perceived contagiousness of the disease is high. Cronbach's alpha value of the original scale is 0.78 (25). In our study, the reliability coefficient was found to be 0.81.

2.3. Data Analysis

Data were analyzed on SPSS 20.0 software package. Descriptive statistics were used to evaluate the study data (arithmetic mean, median, standard deviation, percentage distributions). For the inter-group comparison of mean scores, first Kolmogorov-Smirnov and Shapiro-Wilk tests used to check compliance with normal distribution. In the comparison of baseline data between the two groups, Student's t-test and Mann-Whitney U test were used for continuous variables, and Fisher Exact test and Pearson Chi-Square test were used for categorical variables. The mean scores of more than two independent groups were compared using the ANOVA and Kruskal-Wallis test. In the comparison of repeated measures of independent groups, the dependent groups t-test was used when parametric assumptions were provided and the Wilcoxon test was used when they were not. A level of $p<0.05$ was considered significant in the analysis of data. In addition, Spearman correlation analysis was performed to test the relationship between the scales.

3. RESULT

There was no statistically significant difference between the descriptive features of participants by groups ($p>0.05$). This result showed that participants were placed in the intervention and control groups homogeneously (Table 1).

Table 2 presents the comparison of the rates of correct performance of the steps regarding students' approach to patients with COVID-19 before and after education. It was found that the rate of students' correct performance of the steps increased after the implementation of the education program compared to the pre-education findings and that the difference between them was statistically significant ($p<0.05$). These steps were as follows: "A mask should be worn before entering the patient room or care area," "Disposable respiratory masks and face masks should be removed and discarded after leaving the patient's room or care area and closing the door," "Eye protection equipment (glasses or a disposable face

Table 1. Comparison of Descriptive Characteristics by Groups

		Groups		
		Intervention (n=42)	**Control (n=44)**	***p***
Age	*Mean±SD*	19,92±1,13	20,25±1,24	***[a]0,138***
	Median (Min-Max)	20 (19-24)	20 (19-25)	
Gender	Female	23 (54,8)	31 (70,5)	***[c]0,132***
	Male	19 (45,2)	13 (29,5)	
How covid has affected his psyche in general	Badly affected	26 (61,9)	28 (63,6)	***[c]0,868***
	Did not affect	16 (38,1)	16 (36,4)	
The state of being positive for COVID	Yes	3 (7,1)	7 (15,9)	***[b]0,315***
	No	39 (92,9)	37 (84,1)	
COVID positive in a relative/family	Yes	31 (73,8)	34 (77,3)	***[c]0,709***
	No	11 (26,2)	10 (22,7)	
Previous contact status	Yes	10 (23,8)	13 (29,5)	***[c]0,548***
	No	32 (76,2)	31 (70,5)	
Contact status of a relative/family member	Yes	31 (73,8)	31 (70,5)	***[c]0,729***
	No	11 (26,2)	13 (29,5)	

[a] Mann-Whitney U Test *[b]Fisher Exact Test* *[c]Pearson Chi-Square Test*

Table 2 Comparison of the rates of correct performance of the steps regarding students' approach to patients with COVID-19 before and after education

Process steps	Pre- Training		Post Training		p
	n	%	n	%	
1. A mask should be worn before entering the patient room or care area.	38	90,5	42	100	***0,046***
2. Disposable respiratory masks and face masks should be removed and discarded after leaving the patient's room or care area and closing the	15	35,7	40	95,2	***0,000***
3. Hand hygiene should be applied after discarding the mask or face	36	85,7	40	95,2	0,102
4. Eye protection (glasses or a disposable face shield that covers the front and sides of the face) should be worn at the entrance to the pa-	23	54,8	38	90,5	***0,000***
5. Personal glasses and contact lenses provide adequate eye protection.	25	59,5	23	54,8	0,655
6. Sterile gloves should be worn at the entrance to the patient room or	30	71,4	40	95,2	***0,008***
7. Torn or heavily soiled gloves should be changed.	24	57,1	40	95,2	***0,000***
8. Gloves should be removed and discarded when leaving the patient	30	71,4	40	95,2	***0,008***
9. A clean isolation suit should be worn at the entrance to the patient's room or care area, and if it gets dirty, the isolation suit should be	28	66,7	41	97,6	***0,001***
10. Before leaving the patient's room or care area, the isolation gown	26	61,9	28	66,7	0,637
11. Disposable aprons should be thrown away after use, and cloth	24	57,1	38	90,5	***0,000***
12. The order of wearing the protective equipment is apron-mask-	26	61,9	41	97,6	***0,000***
13. The order of removing the protective equipment is glasses-gloves-	8	19	29	69	***0,000***
14. Patients should cover their mouth and nose with a disposable tissue while coughing and sneezing, and if there is no tissue, they should use	33	78,6	42	100	***0,003***

(Significance level was taken as p<0.05.)

shield that covers the front and sides of the face) should be worn at the entrance to the patient room or care area," "Sterile gloves should be worn at the entrance to the patient room or care area," "Gloves should be changed if they are torn or heavily soiled," "Gloves should be removed and discarded when leaving the patient room or care area and hand hygiene should be applied immediately," "A clean isolation suit should be worn at the entrance to the patient's room or care area, and if it gets dirty, it should be changed," "Disposable aprons should be thrown away after use, and cloth aprons should be washed when dirty," "The order of wearing protective equipment is apron-mask-goggles-face protection-gloves," "The order of removal of protective equipment is glasses-gloves-face protection-apron-mask," and "Patients should cover their mouth and nose with a disposable tissue while coughing and sneezing, and if there is no tissue, they should use the inside of their elbow" (Table 2).

While the difference between the mean scores of the intervention and control groups on the Fear of COVID -19 Scale was not significant in the pre-education period, it was found to be statistically significant in the post-education period (p<0.05). While the mean scores of the intervention group before and after the education increased significantly (p<0.05), there was no significant difference between the mean scores of the individuals in the control group (p>0.05). When the results of the difference analysis of the mean scores of the groups in the study on the Fear of COVID-19 Scale before and after the education were examined, no statistically significant difference was found between the mean scores of the intervention

Table 3 Comparison of the mean scores of Covid-19 Disease Perception and Coronavirus Fear Scale by groups

Scales		Groups		*p*
		Intervention (n=42) *Mean±SD*	**Control (n=44)** *Mean±SD*	
Coronavirus Fear Scale				
Pre-Training		18,42±5,45	19,02±5,56	[e]0,619
Post Training		15,50±3,65	18,59±5,43	***[e]0,003***
	p	***[b]0,000¨***	[b]0,053	
Change Δ		2,92±3,12	0,43±1,43	***[a]0,000¨***
COVID-19 Disease Perception Scale				
Dangerous Sub-Dimension				
Pre-Training		3,85±1,07	3,82±1,02	[a]0,819
Post Training		4,28±0,47	3,86±0,97	[a]0,080
	p	***[w]0,005¨***	[w]0,083	
Change Δ		-0,42±0,90	-0,03±0,12	***[a]0,018***
Infectious Sub-Dimension				
Pre-Training		3,67±1,11	4,08±0,71	[a]0,092
Post Training		4,10±0,58	4,10±0,70	[a]0,611
	p	***[w]0,003¨***	[w]0,109	
Change Δ		-0,43±0,98	-0,02±0,11	***[a]0,010˙***
Total				
Pre-Training		3,72±0,93	4,00±0,65	[a]0,212
Post Training		4,15±0,48	4,03±0,64	[e]0,329
	p	***[w]0,000¨***	***[w]0,041˙***	
Change Δ		-0,43±0,79	-0,02±0,09	***[a]0,001****

[a]Mann Whitney-U Test [e]Student-t Test [w]Wilcoxon Test [b]Paired Samples Test ˙p<0,05 ¨p<0,01

and control groups (p<0.05) (Table 3).

According to our study results, there was no difference between the mean scores of the intervention and control groups on the perceived dangerousness and contagiousness of the disease sub-dimensions of the COVID-19 Disease Perception Scale before and after education. However, it was found that the pre-education mean scores of the intervention group increased significantly in the post-education period. When the difference analysis of both sub-dimensions was evaluated, it was found that there was a significant relationship between the intervention and control groups (p<0.05). The examination of the mean score of the total COVID-19 Disease Perception Scale indicated that the pre-and post-education results between the groups were not significant, while the time-dependent variance between the mean scores of each group was statistically significant. In addition, the time-dependent variance between the groups was found to be significant (p<0.05) (Table 3).

There was no statistically significant correlation between the pre-and post-education scores of the participants on the total Fear of COVID-19 Scale and

Table 4 The Relationship Between the Post-Training Coronavirus Fear Scale and the COVID-19 Illness Perception

		COVID-19 Illness Perception Scale		
		Dangerous	**Infectious**	**Total**
Coronavirus Fear Scale	$r^{\dagger}$	-0,017	0,074	0,047
	p	*0,880*	*0,498*	*0,669*

$r^{\dagger}$: Spearman Correlation Coefficient

the total COVID-19 Disease Perception Scale (p>0.05) (Table 4).

4. DISCUSSION

It is worrisome that nursing students work full time during their clinical practice and are exposed to the virus and additional stressors as much as an average nurse is. For this reason, it is important to simulate the hospital environment by using the simulation method in the laboratory environment and help students experience that feeling before they start hospital practice (16). This study aimed to determine the effect of simulation education on nursing students' perception of illness and fear of COVID-19 when approaching patients with COVID-19.

Considering the conditions in the pandemic process, it is stated that students have been negatively affected by the chaos of the pandemic, no matter how much schools and clinical centers do their best. These concerns have caused students to have fewer learning opportunities and have doubts about their choice to become a nurse (9). For this reason, it is stated that instructors should use different teaching methods so that students can use correct coping strategies in this period of crisis (11). Considering the implementation status of the interventions determined as an approach to patients with COVID-19 in our study, it was found that there were significant improvements in many intervention steps. This result showed us that simulated patient education given to students was effective. Some studies have shown that integrated simulation education can help determine the direction of nursing education during and after the pandemic, as it increases the clinical reasoning and critical thinking dispositions of nurses (26,27). For example, a study indicated that the level of compliance with isolation measures was higher among intern nurses who received education from infection control nurses in the hospital about COVID-19 isolation measures (22). In another study on the effect of simulation-based education on nurses during the COVID-19 pandemic, it was stated that the education provided a 96% positive effect on the approach to patients with COVID-19 (28). In addition, some studies in the literature showed that the simulation education given to nursing students during the COVID-19 process had a positive effect on their self-confidence levels (29). This shows us the importance of the simulation method in nursing education.

In our study, when the time-dependent mean scores of the groups on the COVID-19 Disease Perception Scale were evaluated, it was found that there was a significant positive variance in the intervention group compared to the control group. Artan et al. (2020) stated that people's perceptions and attitudes towards the COVID-19 pandemic were related to psychosocial problems (30). This situation highlights the importance of developing a positive perception of illness in individuals.

Clinical practice is a critical component of nursing students' professional development (31,32). Even under normal conditions, students experience anxiety when they start clinical practice. With the COVID-19 pandemic, this anxiety reached a level that could put students' mental health at risk and caused them to experience feelings such as hopelessness, helplessness, and burnout (33). In a study, the nursing students had a moderate level of fear of COVID-19 during their clinical practices (34). However, in other study conducted with student nurses involved in the fight against COVID-19, it was reported that students were afraid of COVID-19 and the workload of the clinics but were aware of their responsibilities towards society (35). It was found that simulated

patient education in our study had a positive effect on the fear of coronavirus and that the improvement in the intervention group was significantly higher than both the pre-education results and the improvement in the control group. In the study of Casafont et al. (2021), it was determined that nurses experienced sadness and anger, felt inadequate, and had fears because of the empathy they had for patients with COVID-19 (16). In some studies, it was stated that although most students were not actively involved in the care of patients with COVID-19, they had a certain degree of fear of being infected, and this level of fear increased significantly when they were involved in care (19,20). In another study, it was reported that educational strategies to be implemented before clinical education could provide support for students to prevent and manage their fears and anxiety (11). In light of these findings, we think that it is important to teach the correct patient approach to overcome the fear of coronavirus before students start hospital practice.

Since the study covers only the nursing students at a single university, the results cannot be generalized to general population. As the method used in the study could not be compared to any other education methods, it cannot be said that it is more effective than other methods. Although the end of the pandemic seems to be a limitation, the value of this study lies in its potential application to future public health crises. The insights gained from the use of simulation education to alleviate nursing students' fear and improve their perception of the virus are not limited to COVID-19 alone. Rather, these findings can be instrumental in preparing for similar scenarios where infectious diseases pose a significant threat. By emphasizing the applicability of our results to future pandemics or similar situations, we underscore the lasting relevance and importance of our research. This study provides a framework that can help mitigate fear and enhance preparedness among healthcare professionals, thereby improving response efficacy in potential future public health emergencies.

5. CONCLUSION

In conclusion, the examination of the implementation of the interventions determined as an approach to patients with COVID-19 in the student group receiving education indicated that there were significant improvements in many steps of the intervention. In addition, it was found that the simulation education given to students provided an improvement in the perception of the COVID-19 disease and fear levels. For this reason, it is important to simulate the hospital environment by using the simulation method in the laboratory environment and help students experience that feeling before they start hospital practice. It is recommended that nursing schools should support students in this regard with simulation or similar methods. We think that orientation, pre-hospital practice education, and emotional support in crises can significantly help students to overcome stressful feelings.

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