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The effect of live simulation and video demonstration training on nursing students' ability to evaluate vital signs and perceived stress

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Abstract

Background: Vital signs measurements are the basic learning subject for first-year nursing students and include practices in which they touch the patient, communicate, develop social and motor skills. It is known that students use the "live simulation" method by taking measurements from their friends in laboratory applications.
Aim: To find the effect of live simulation and video demonstration training on nursing students' ability to assess vital signs and perceived stress.
Design: The study was conducted experimentally with pretest-posttest control group.
Participants: Nursing 1st year students.
Methods: This study was conducted with 78 first-year students studying at Kahramanmaraş Sütçü İmam University Nursing Department between February 2023 and March 2024. In the study, 78 first grade students were divided into three groups as two intervention groups (Live Simulation and Video Training Groups) and one control group by lot. The first test measurements were determined by drawing lots. Intervention groups were called to different classes for the experiment. First, the training sessions were completed and then the students were asked to perform these skills on an individual. For the evaluation, the instructors were distributed to the groups by lot, and at the end of the evaluation, the post-test measurements of the students were made.
Results: In the comparison of body temperature, respiration, radial pulse, blood pressure and saturation measurement scores between the groups after the intervention; it was found that the scores in the live simulation group were higher than the video group and the control group, and the scores in the video group were higher than the control group and this difference was statistically significant ($p<0.05$). There was no significant difference between the groups in the perceived stress scale scores ($p>0.05$).
Conclusions: As a result of the study, it was determined that the use of live simulation was an effective method in teaching vital signs and it is recommended that this method be used in the training of nursing students.
Keywords: Nursing ability, Perceived stress, Simulation, Video training, Vital signs

Introduction

The first year is considered important for nursing students because it consists of the first "moments" when they start to acquire professional skills. Students think that in the first year they start to become professionals by gaining some basic skills in their own perception. The practices taught to nursing students in the first year (such as blood pressure measurement, respiration and pulse counting, development of hygiene skills ...) not only develop the student's sense of "I am succeeding" but also contribute to the communication with the patient (Gordon et al., 2013; Basak et al., 2018; Bjørk et al., 2014). A wide variety of training methods are tried in nursing practice laboratories. Especially with the introduction of smart technology into our lives, videos can be accessed more easily. This situation allows nursing students to have the opportunity to repeat and learn by seeing after the theoretical subjects (Kim et al., 2017; Lee et al., 2016). Chang et al. (2022) emphasised in their study that video-based nursing training had a significantly positive effect on students' motivation and learning competencies compared to traditional methods. In 2021, Thompson stated that the use of simulation in nursing training significantly reduced anxiety and increased clinical compliance compared to the use of video- based training materials. Ayed et al. (2022) reported that at the end of a training session given over cases using live simulation, students' clinical judgement in the practice field would be more positive and their stress would be less. The use of simulation in the training of nursing students is an easy and realistic way to adapt to the clinic and develop basic skills (Eyikara and Baykara, 2017; Baillie and Curzio, 2009; Lestendar et al., 2016). Vital signs measurements are the basic learning subject for nursing students studying in their first year, as well as applications in which they touch the patient, communicate, develop social and motor skills. Generally, students are trained using "live simulation" in laboratory applications within the curriculum. Live simulation is usually in the form of measurement from friends. However, it seems clear that vital measurements taken from a healthy individual can be interpreted more easily (Wilford and Doyle, 2006; Karadağ et al., 2012; Park et al., 2022). Taking vital signs (blood pressure, pulse, O2 saturation, respiration, fever) in a hospital environment and from individuals who have problems with vital signs increases compliance with the clinic (Clark, 2007).

Simulation improves motor and social skills during vital signs measurements and also positively affects the stress felt by the nursing student who will go to the clinic and encounter a diverse patient population. The use of simulations prepared with real-life scenarios and studies in which the student is followed through a model emphasise the development of nursing students' skills (Clark, 2007; Seybert & Barton, 2007; Kaddoura, 2010; Tonapa et al., 2023).

However, it is thought that live simulation will improve the nursing student at a basic level in subjects such as touching the patient, interpersonal communication, communication with the patient, therapeutic environment, therapeutic communication skills, and will experience less stress while making vital finding evaluations in the first times of the clinic.

It is emphasised that nursing students have cold hands, tremble, sweat,

fear, experience high levels of anxiety and stress and feel themselves in an unsafe environment in their first contact with the patient (Musso et al., 2008; Lourenço & Cuéllar, 1995; Tonapa et al., 2023). Boostel et al. (2018) emphasised that the use of simulation in applied training improves the critical thinking skills of nursing students, increases self-confidence, and reduces perceived stress. When the nursing student repeats an application that he/she has previously done by touching the individual in the clinic, he/she can think that the individual may give different vital results and which vital signs to pay attention to in which symptoms. This enables nursing students to make fewer mistakes and increases their self-confidence (Boostel et al., 2018; WHO, 2011).

At this point, it is important to choose a practical training method that will both increase the ability of first-year nursing students to evaluate basic vital signs and reduce the stress they perceive. For these reasons, the aim of this study was to find the effect of live simulation and video demonstration training on nursing students' ability to assess vital signs and their perceived stress.

Material and Method Method of the Study:

Aim: The aim of this study was to find the effect of live simulation and video demonstration training on nursing students' ability to evaluate vital signs and their perceived stress.

Type of the Study: The study was conducted experimentally with pre-test-post-test control group.

Implementation of the Study The first-year students, determined as the sample in the study, were divided into 3 groups as two intervention groups and one control group by lot method. Descriptive Characteristics Form, Blood Pressure Measurement Assessment Form, Radial Pulse Assessment Form, Assessment Form for Measuring Body Temperature with Tympanic Membrane Thermometer, Assessment Form for Measuring Respiratory Count, Assessment Form for Measuring Oxygen Saturation and Perceived Stress Scale (PSS) developed by the researcher in line with the literature were applied to the two-intervention group and control group students. Afterwards, the expert instructors to be selected for the two intervention groups were determined by lot. The expert instructors called the group to be shown the video for the experiment simultaneously with the group to be intervened using live simulation but in different classes. First, the training sessions were completed and then all students were asked to perform these skills on an individual in a laboratory in a hospital environment. The expert instructors were distributed to the groups by lot for the assessment. When the assessment was completed in 3 groups so that the students would not be affected from each other, the students were taken to the post-test with the Descriptive Characteristics Form, Blood Pressure Measurement Assessment Form, Radial Pulse Assessment Form, Tympanic Membrane Thermometer Body Temperature Measurement Skill Assessment Form, Respiratory Number Taking Skill Assessment Form, Oxygen Saturation Measurement Skill Assessment Form and Perceived Stress Scale (PSS)

developed by the researcher in line with the literature. For the live simulation training, the "healthy individuals" that the nursing students would practice were selected among the 4th grade students of the school and on the basis of volunteerism. Senior students were instructed not to share any information about the study. They were included in the study after verbally questioning whether they had any disease or problem related to vital signs. When the study was completed, both the control group was given live simulation and video demonstration, which they did not receive, and the intervention group was given video demonstration or live simulation training, which they did not receive, and the ethical and curriculum dimension was completed at the end of the study.

Ethical Dimension: The Ethics Committee permission of the study was obtained from Kahramanmaraş İstiklal University and the permission for data collection was obtained from Kahramanmaraş Sütçü İmam University Faculty of Health Sciences. The aim and method of the study and the voluntary nature of participation in the study were explained to the students participating in the study and their consent was obtained.

Place(s) where the study was conducted:
1. Kahramanmaraş Sütçü İmam University, Department of Nursing.

2. Kahramanmaraş İstiklal University, Department of Nursing Vocational Skills Laboratory. (Laboratory environment due to the earthquake)

Universe/Sample/Study Group or Material Analysed:
The study was conducted between February 2023 and March 2024. The population of the study consisted of 110 first-year students studying at Kahramanmaraş Sütçü İmam University, Department of Nursing. The study was conducted with a total of 78 students: 25 from the video group, 25 from the live simulation group and 28 from the control group
Inclusion criteria for the study:

1) Being a first-year student of Kahramanmaraş Sütçü İmam University, Department of Nursing
2) Volunteering to participate in the study Exclusion criteria for the study:
1) Receiving any previous "hands-on vital signs training" (a question for exclusion has been added to Appendix 1)

Not volunteering to participate in the study.

Data Collection Tools:
Descriptive Characteristics Form

The relevant form was developed as a 7-question socio-demographic characteristics data form in accordance with the aim of the study in line with the literature. The form consists of questions about the students' age, gender, place

of residence, income status, willingness to choose the profession and whether they have received a health skills training before.

Blood Pressure Measurement Assessment Form

It is a form that assesses the ability to measure blood pressure, has 10 steps, has been developed by the researcher in accordance with the literature and can be evaluated by the researcher expert. The skill performance of the student was evaluated on a total of 100 points by scoring each application step according to its importance.

Radial Pulse Assessment Form

It is a form that assesses the Radial Pulse Assessment skill, has 6 steps, has been developed by the researcher in accordance with the literature and can be evaluated by the researcher expert. The skill performance of the student was evaluated on a total of 100 points by scoring each application step according to its importance.

Assessment Form for Measuring Body Temperature with Tympanic Membrane Thermometer

It is a form that assesses the ability to measure blood pressure, has 9 steps, has been developed by the researcher in accordance with the literature and can be evaluated by the researcher expert. Skill performance tests were prepared by the researchers considering the skill steps of measuring body temperature with tympanic membrane thermometer. The skill performance of the student was evaluated on a total of 100 points by scoring each application step according to its importance.

Respiratory Count Taking Skill Assessment Form

It is a form that assesses the ability to measure blood pressure, has 8 steps, has been developed by the researcher in accordance with the literature and can be evaluated by the researcher expert. The skill performance of the student was evaluated on a total of 100 points by scoring each application step according to its importance.

Oxygen Saturation Measurement Skill Assessment Form

It is a form that assesses the ability to measure blood pressure, has 5 steps, has been developed by the researcher in accordance with the literature and can be evaluated by the researcher expert. The skill performance of the student was evaluated on a total of 100 points by scoring each application step according to its importance.

Perceived Stress Scale (PSS)

It is a scale consisting of 14 questions developed by Cohen et al. to determine how often individuals experience stress symptoms. The options of each question in the scale are designed to range from 0 (never) to 4 (every day) and 7 items in the scale are reverse scored. A minimum score of 0 and a maximum score of 56

can be obtained from the scale and an increase in the score indicates an increase in perceived stress and a decrease in the score indicates a decrease. The validity and reliability study of the Turkish version of the scale was conducted by Yerlikaya et al. and the reliability coefficient was found to be 84 (Yerlikaya and İnanç, 2007; Cohen et al., 1983).

Data Collection:

The first-year students, determined as the sample in the study, were divided into 3 groups as two intervention groups and one control group by lot method. Descriptive Characteristics Form, Blood Pressure Measurement Assessment Form, Radial Pulse Assessment Form, Assessment Form for Measuring Body Temperature with Tympanic Membrane Thermometer, Assessment Form for Measuring Respiratory Count, Assessment Form for Measuring Oxygen Saturation and Perceived Stress Scale (PSS) developed by the researcher in line with the literature were applied to the two intervention group and control group students. Afterwards, the expert instructors to be selected for the two intervention groups were determined by lot. The expert instructors called the group to be shown the video for the experiment simultaneously with the group to be intervened using live simulation but in different classes. First, the training sessions were completed and then all students were asked to perform these skills on an individual in a laboratory in a hospital environment. The expert instructors were distributed to the groups by lot for the assessment. When the assessment was completed in 3 groups so that the students would not be affected from each other, the students were taken to the post-test with the Descriptive Characteristics Form, Blood Pressure Measurement Assessment Form, Radial Pulse Assessment Form, Tympanic Membrane Thermometer Body Temperature Measurement Skill Assessment Form, Respiratory Number Taking Skill Assessment Form, Oxygen Saturation Measurement Skill Assessment Form and Perceived Stress Scale (PSS) developed by the researcher in line with the literature. For the live simulation training, the "healthy individuals" that the nursing students would practice were selected among the 4th grade students of the school and on the basis of volunteerism. Senior students were instructed not to share any information about the study. They were included in the study after verbally questioning whether they had any disease or problem related to vital signs. When the study was completed, both the control group was given live simulation and video demonstration, which they did not receive, and the intervention group was given video demonstration or live simulation training, which they did not receive, and the ethical and curriculum dimension was completed at the end of the study.

Data Analysis:

IBM SPSS 25.00 package programme was used for data analysis. Descriptive statistics are given as number and percentage distribution, mean, standard deviation, median (Q_1-Q_3) values. Shapiro Wilk normality distribution test was performed to evaluate the conformity of the data to normal distribution and Q-Q graphs were analysed. It was determined that the data did not

show normal distribution. In this context, Kruskal Wallis test was used to determine the differences between the groups and Wilcoxon Signs-Ranked Signs Test was used for within- group comparisons. Dunn-Bonferroni test was used to determine the groups that made difference in multiple comparisons. Chi-square test was used to analyse qualitative data. In case the assumptions regarding the chi-square test were not met, Fisher-Freeman-Halton Exact Test was applied. In the evaluation of the effects of the pre-test variables on the post-test, the pre- test results were accepted as covariance and nonparametric test ANCOVA (Quade's ANCOVA) analysis was performed. Effect size indices were evaluated for the nonparametric test ($r = Z/\sqrt{N}$) and effect sizes showing the effect size were calculated. Values of 0.10, 0.30 and 0.50 were considered as small, medium and large effect size, respectively (Cohen, 1988; 1992). In this study, the Cronbach's alpha value of the Perceived Stress Scale (PSS) was found to be 0.795 for the pre-test and 0.846 for the post-test.

Findings and Discussion

When the descriptive characteristics of the students participating in the study were analysed, it was seen that the groups were homogeneous in terms of age, graduation, reason for choosing the profession and the best learning choice of the profession. It was found that the groups were heterogeneously distributed in terms of fear of caring for individuals (Table 1).

Table 1. Distribution of students' descriptive characteristics

Characteristics	CG (n=28)	VG (n=25)	LSG (n=25)	KW	p
	X̄±SD	X̄±SD	X̄±SD		
Age (min.-max.)	19.28 (1.04) (18-21)	19.20 (0,86) (18-21)	19.12 (2,59) (18-31)	5.699	0.058
Characteristics					
Gender					
Female	20 (71.4)	16 (64.0)	15 (60.0)	0.793	0.697
Male	8 (28.6)	9 (36.0)	10 (40.0)		
Graduation					
General high school	7 (25.0)	3 (12.0)	3 (12.0)	8.748	0.154
Health vocational high school	1 (3.6)	0 (0)	0 (0)		
Science High School	16 (57.1)	22 (88.0)	19 (76.0)		
Other	4 (14.3)	0 (0)	3 (12.0)		
Reason for preferring nursing					
Ease of finding a job	15 (53.6)	13 (52.0)	5 (20.0)		
Whether the score is enough for this department	5 (17.9)	3 (12.0)	6 (24.0)	9.692	0.296
Family request	2 (7.1)	1 (4.0)	3 (12.0)		
Loving the profession	5 (17.9)	5 (20.0)	9 (36.0)		
Other	1 (3.6)	3 (12.0)	2 (8.0)		
Fear/hesitation of caring for individuals					
Yes	7 (25.0)	15 (60.0)	8 (32.0)	7.485	**0.027**
No	21 (75.0)	10 (40.0)	17 (68.0)		
The best learning choice of vocational skill					
Monitoring the person performing the application	4 (14.3)	4 (16.0)	6 (24.0)	3.707	0.463
Doing it myself	17 (60.7)	19 (76.0)	15 (60.0)		
Repeat with friends	7 (25.0)	2 (8.0)	4 (16.0)		

X̄:Mean, SD: Standard Deviation, χ^2: Chi-square test, KW: Kruskal Wallis-H Test

When the comparison of the measurement variables evaluated before the intervention between the groups was analysed, it was found that body temperature and respiratory rate measurement scores were heterogeneously distributed among the groups ($p<0.05$). It was observed that the body temperature measurement scores of the students in the control group were higher than the students in the live simulation group and this difference was statistically significant. It was found that the respiratory rate measurement scores of the students in the video group were higher than the students in the live simulation group and this difference was statistically significant (Table 2).

Table 2. Comparison of variables among groups before intervention (N=78)

Variables	CG (n=28)		VG (n=25)		LSG (n=25)				
	Median (Q_1-Q_3)	$\bar{X}$±SD	Median (Q_1-Q_3)	$\bar{X}$±SD	Median (Q_1-Q_3)	$\bar{X}$±SD	KW	p	Dunn-Bonferroni test
Body temperature measurement score	29.0 (20.0-33.0)	25.96±12.33	20.0 (10.0-30.0)	20.40±13.61	15.0 (10.0-15.0)	13.40±5.86	17.044	**<0.001**	CG-LSG
Respiratory rate measurement score	0.0 (0.0-15.5)	8.46±15.18	0.0 (0.0-20.0)	9.00±11.36	0.0 (0.0-0.0)	1.60±8.00	10.010	**0.007**	VG-LSG
Radial pulse measurement score	22.50 (0.0-43.75)	24.75±23.45	20.0 (10.0-30.0)	19.20±11.24	20.0 (0.0-25.0)	16.40±13.88	1.803	0.406	
Blood pressure measurement score	23.0 (0.0-35.0)	24.28±20.85	20.0 (0.0-30.0)	18.40±17.00	14.0 (0.0-22.5)	12.40±12.52	5.451	0.066	
Saturation measurement score	0.0 (0.0-50.0)	22.07±27.70	30.0 (10.0-30.0)	25.40±20.91	15.0 (0.0-20.0)	11.60±8.86	4.523	0.104	
Perceived Stress Scale score	24.5 (22.0-33.5)	26.89±7.61	28.0 (22.0-33.5)	26.20±7.35	23.0 (19.0-29.0)	23.88±7.12	2.970	0.227	

X̄:Mean, SD: Standard Deviation, KW: Kruskal Wallis-H Test
CG; Control group, VG; Video group, LSG; Live simulation group

When body temperature, radial pulse and blood pressure measurement scores were compared within groups, it was found that the post-test scores of the students in the control group were lower than the pre-test scores, while the post-test mean scores of the students in the VG and LSG groups were significantly higher than the pre-test scores and the difference had a high effect size. When the respiratory rate and saturation measurement scores were compared within groups, it was found that there was no statistically significant difference between the post-test scores and pre-test scores of the students in the control group. It was found that the post-test mean scores of the students with VG and LSG were significantly higher than the pre-test scores and the difference had a high effect size. In addition, it was found that there was no statistically significant difference between the pre-test and post-test scores of the perceived stress scale of the groups (Table 3).

Table 3. Within-group Comparison of Pre-test and Post-test Measurements (N=78)

Variables	Group	Pre-Test		Post-Test		Z	p	Effect Size
		Median (Q_1-Q_3)	$\bar{X}$±SD	Median (Q_1-Q_3)	$\bar{X}$±SD			
Body temperature measurement score	CG (n=28)	29.0 (20.0-33.0)	25.96±12.33	10.0 (10.0-30.0)	16.78±12.71	-2.484	**0.013**	0.46
	VG (n=25)	20.0 (10.0-30.0)	20.40±13.61	50.0 (40.0-65.0)	52.00±13.54	-4.189	**<0.001**	0.83
	LSG (n=25)	15.0 (10.0-15.0)	13.40±5.86	90.0 (67.50-100)	81.00±24.28	-4.354	**<0.001**	0.87
Respiratory rate measurement score	CG (n=28)	0.0 (0.0-15.5)	8.46±15.18	0.0 (0.0-7.50)	6.78±13.35	-0.630	0.529	0.12
	VG (n=25)	0.0 (0.0-20.0)	9.00±11.36	30.0 (30.0-40.0)	31.60±13.44	-4.232	**<0.001**	0.85
	LSG (n=25)	0.0 (0.0-0.0)	1.60±8.00	90.0 (80.0-90.0)	81.24±22.73	-4.318	**<0.001**	0.86
Radial pulse measurement score	CG (n=28)	22.5 (0.0-43.75)	24.75±23.45	0.0 (0.0-20.0)	8.75±12.14	-3.104	**0.002**	0.58
	VG (n=25)	20.0 (10.0-30.0)	19.20±11.24	20.0 (20.0-30.0)	25.20±8.72	-2.614	**0.009**	0.52
	LSG (n=25)	20.0 (0.0-25.0)	16.40±13.88	85.0 (80.0-95.0)	84.40±12.85	-4.382	**<0.001**	0.88
Blood pressure measurement score	CG (n=28)	23.0 (0.0-35.0)	24.28±20.85	0.0 (0.0-30.0)	13.39±19.72	-2.274	**0.023**	0.43
	VG (n=25)	20.0 (0.0-30.0)	18.40±17.00	40.0 (30.0-60.0)	45.20±20.44	-3.631	**<0.001**	0.73
	LSG (n=25)	14.0 (0.0-22.5)	12.40±12.52	90.0 (80.0-93.0)	85.68±10.87	-4.376	**<0.001**	0.88
Saturation measurement score	CG (n=28)	0.0 (0.0-50.0)	22.07±27.70	15.0 (0.50-27.50)	18.46±19.42	-0.488	0.626	0.09
	VG (n=25)	30.0 (10.0-30.0)	25.40±20.91	60.0 (40.0-80.0)	59.60±23.00	-3.883	**<0.001**	0.78
	LSG (n=25)	15.0 (0.0-20.0)	11.60±8.86	100 (100-100)	92.40±16.15	-4.414	**<0.001**	0.88
Perceived Stress Scale score	CG (n=28)	24.5 (22.0-33.5)	26.89±7.61	28.0 (22.25-32.0)	27.43±7.97	-0.764	0.445	0.14
	VG (n=25)	28.0 (22.0-33.5)	26.20±7.35	27.0 (22.50-31.50)	26.36±7.26	-0.163	0.870	0.03
	LSG (n=25)	23.0 (19.0-29.0)	23.88±7.12	24.0 (19.0-28.0)	24.36±6.38	-0.542	0.588	0.11

Z: Wilcoxon Signed-Rank Test, $\bar{X}$: Mean, SD: Standard Deviation CG; Control group, VG; Video group, LSG; Live simulation

In the comparison of body temperature, respiration, radial pulse, blood pressure and saturation measurement scores among the groups after the intervention; it was found that the scores in the live simulation group were higher than the video group and the control group, and the scores in the video group were higher than the control group and this difference was statistically significant ($p<0.05$). There was no significant difference between the groups in the perceived stress scale scores ($p>0.05$). When the pre-test scores were checked, it was observed that there was a statistically significant difference among the groups in body temperature, respiration, radial pulse, blood pressure and saturation measurement scores (Nonparametric ANCOVA $p<0.05$). At the same time, it was found that the effect size of the body temperature measurement score was at medium level, and the effect size of the respiration, radial pulse, blood pressure and saturation measurement scores was at high level (Table 4)

Table 4. Comparison of variables among groups after intervention (N=78)

Variables	CG (n=28)		VG (n=25)		LSG (n=25)						
	Median (Q_1-Q_3)	$\bar{X}$±SD	Median (Q_1-Q_3)	$\bar{X}$±SD	Median (Q_1-Q_3)	$\bar{X}$±SD	KW	p	Dunn-Bonferroni test	Nonparametric ANCOVA p*	Effect Size (Partial η2) #
Body temperature measurement score	10.0 (10.0-30.0)	16.78±12.71	50.0 (40.0-65.0)	52.00±13.54	90.0 (67.50-100)	81.00±24.28	53.647	**<0.001**	CG-VG CG-LSG VG-LSG	**<0.001**	0.488
Respiratory rate measurement score	0.0 (0.0-7.50)	6.78±13.35	30.0 (30.0-40.0)	31.60±13.44	90.0 (80.0-90.0)	81.24±22.73	55.497	**<0.001**	CG-VG CG-LSG VG-LSG	**<0.001**	0.692
Radial pulse measurement score	0.0 (0.0-20.0)	8.75±12.14	20.0 (20.0-30.0)	25.20±8.72	85.0 (80.0-95.0)	84.40±12.85	59.803	**<0.001**	CG-VG CG-LSG VG-LSG	**<0.001**	0.763
Blood pressure measurement score	0.0 (0.0-30.0)	13.39±19.72	40.0 (30.0-60.0)	45.20±20.44	90.0 (80.0-93.0)	85.68±10.87	57.362	**<0.001**	CG-VG CG-LSG VG-LSG	**<0.001**	0.691
Saturation measurement score	15.0 (0.50-27.50)	18.46±19.42	60.0 (40.0-80.0)	59.60±23.00	100 (10(-100)	92.40±16.15	57.557	**<0.001**	CG-VG CG-LSG VG-LSG	**<0.001**	0.747
Perceived Stress Scale score	28.0 (22.25-32.0)	27.43±7.97	27.0 (22.5-31.5)	26.36±7.26	24.0 (19.0-28.0)	24.36±6.38	2.684	0.261	-	0.690	0.010

*p= Nonparametric ANCOVA (Quade's ANCOVA) test (By checking the pre-test results)
Nonparametric ANCOVA (Quade's ANCOVA) test effect size
CG; Control group, VG; Video group, LSG; Live simulation group

Regarding the simulation training of this study, it is thought to reveal important results regarding the evaluation processes of vital signs (body temperature measurement, respiratory rate measurement, radial pulse measurement, blood pressure measurement, saturation measurement) of the students. Firstly, when the socio-demographic data of the LSG, VG and control groups are analysed, it is seen that the groups are homogenous and have the same averages with the literature (Baxter et al., 2009; Padilha et al., 2018; Eyikara et al., 2018; Cole et al.,2023).

In studies evaluating the effectiveness of simulation in the training of nursing students, it is stated that students offer more successful learning outcomes, especially in virtual simulation studies. It is emphasised that the practical training that nursing students apply with scenarios close to reality makes them compatible with technology, helps them develop easily applicable virtual care methods, and improves their ability to produce new and technology-based solutions for care problems (Baxter et al., 2009; Padilha et al., 2018; Cole et al., 2023). However, the results of a descriptive study on various learning environments of Italian nursing students show that virtual simulation, which is effective in the first year practice of nursing students, can only be successful with a good nursing instructor. It is stated that students gain their third year experience in the real hospital environment (Cremonini et al., 2015). In this study, it was observed that nursing students answered "doing it myself" as the best way of learning at a high level (60.7%). In addition, students in LSG learnt to evaluate vital signs at a higher rate than both students in VG and students in the control group. This situation appears as a result of the fact that the first-year nursing students in the sample received training in a "learning by doing" environment in which live simulators (senior nursing students) were used to give feedback when they wanted to communicate.

According to the results of a study with two experimental groups conducted in Türkiye (with a methodology similar to the methodology in our study) and aimed at nursing first-year students learning to evaluate vital signs; students in both experimental groups were found to be more successful in evaluating vital signs than the control group (Eyikara et al., 2018). This study presents similar results. When the results of the study were analysed, it was seen that both LSG and VG experimental groups had higher vital findings application scores in the post-test compared to the control group (Table 3,4). In this study and Eyikara's study, different sources were used as simulators. Eyikara et al. (2018) used an inanimate model simulator in their study, while this study was carried out with live simulators. Despite this, no difference was observed. Similarly, in another study evaluating the effectiveness of nurses' response to worsening patient

condition, no difference was found between web-based simulation training and face-to-face simulation training among nurses (Kinsman et al., 2021). In the systematic review and meta- analysis study conducted by Asegid and Assefa (2021) to prove the effect of simulation training on the practices of nursing students; (according to the results of published studies on this subject) it was stated that simulation improved nursing skills, but the results were uncertain due to high heterogeneity. In the evaluation of the studies on the subject, it is seen that the results in the Turkish literature are also insufficient, but the experimental and control groups in our study were homogenously distributed (Table 1). This increases the reliability of this study. According to similar results of two different studies conducted in Australia in 2010, it has been reported that computer-based or video + simulation-based skills training sessions enable nursing students to recognise the patient's deteriorating vital signs and have significant positive effects on decision-making, improving individual intervention efforts and increasing their awareness. In these two studies, nursing students were selected from senior students (Endacott et al., 2010; Cooper et al., 2010). In this study, the students were first-year students. The results of this study show that LSG received higher scores in terms of evaluating vital signs than VG. This discrepancy with the literature may indicate that as the student's grade increases, the need for training changes depending on the type of simulator in order to ensure that the student can reliably perform autonomous applications and develop more complex skills. However, it may be important to train especially first-year students with live simulators to ensure effective communication with the patient, to get used to the clinical environment and to improve their vital signs assessment skills, which are less risky.

In a study conducted in Spain in 2021, it was reported that nursing students' stress and socio-emotional outcomes affecting clinical simulation practice affect their ability to evaluate vital signs throughout the simulation. The study reported that the practice and learning outcomes of nursing students experiencing pathological stress during the simulation application also showed negative results (Mauriz et al., 2021). When this study is analysed, it is seen that VG, reporting "fear/hesitation of giving care to individuals" the most, was more successful in evaluating vital signs in the post-test compared to the control group. In addition, although the total perceived stress scores of the students in all groups were low in the pre-test, it is thought that VG reported more stress than LSG and control group, but this stress may help in the development of respiratory rate measurement/body temperature measurement skills, which they initially scored lower than the control group.

Difficulties and Limitations Of The Study

This study was conducted on nursing students at a university in Anatolia. Therefore, when generalising, the effects of the city where the university is located and the quality of university teaching should be taken into consideration. In addition, the data of the study were collected after the Kahramanmaraş-centred earthquakes in Türkiye. The fact that most of the students were earthquake victims is another limitation that may have affected the study.

Conclusion and Recommendations

This study revealed significant findings regarding the effectiveness of different training methods in improving first-year nursing students' ability to assess vital signs. The results demonstrated that students who received live simulation training achieved significantly higher scores in evaluating body temperature, respiratory rate, radial pulse, blood pressure, and oxygen saturation compared to both the video training and control groups. Students in the video training group also outperformed those in the control group, indicating that video-based instruction is a beneficial, though comparatively less effective, educational tool.

Notably, no statistically significant differences were found between the groups in terms of perceived stress levels. This suggests that while simulation-based training enhances technical competence, it may not be sufficient on its own to reduce stress in the short term. Interestingly, students in the video group, who initially had lower scores in certain vital sign assessments, showed substantial improvement after training. This highlights the potential of video-based learning to support visual memory and repetition, especially for students who may experience anxiety or hesitation in direct patient care.

Live simulation appears to offer additional benefits beyond skill acquisition. It provides students with opportunities to engage in therapeutic communication, establish physical contact with patients, and adapt to clinical environments—skills that are particularly crucial for first- year students preparing for their initial clinical experiences. Practicing with senior students as live simulators may also foster a more realistic and supportive learning atmosphere.

However, the study has limitations. It was conducted at a single university in the aftermath of the Kahramanmaraş-centered earthquakes, which may have influenced students' emotional

states and learning processes. Additionally, the relatively small sample size limits the generalizability of the findings.

In conclusion, live simulation is recommended as a core method for teaching vital sign assessment to first-year nursing students. Video-based training can serve as a valuable supplementary tool, especially when integrated into a blended learning approach. Future research should involve larger and more diverse samples, explore long-term outcomes, and examine the integration of simulation with stress-reduction strategies such as mindfulness or peer support. Such efforts could enhance both the technical and emotional readiness of nursing students as they transition into clinical practice.

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