The Effect of Scenario-Based Simulation Method on Students' Use of Nursing Diagnoses: A Quasi-Experimental Study

Gülengün Türk [1] [iD], Nihal Taşkıran [1] [iD], Elem Kocaçal [2] [iD], Sercan Özdemir [3]* [iD]

[1]Aydın Adnan Menderes University, Nursing Faculty, Fundemantals of Nursing Department, Aydın, Türkiye
[2]İzmir Demokrasi University, Faculty of Health Sciences, Fundamentals of Nursing, İzmir, Türkiye
[3]Anesthesia Intensive Care Unit, Nazilli State Hospital, Aydın, Türkiye

ABSTRACT:

Purpose: This study was conducted to determine the effect of the scenario-based simulation method on students' use of nursing diagnoses.

Material and Methods: This study was designed as a quasi-experimental research design with control group. The sample of the study consisted of 104 first-year nursing students, including control (n = 52) and experimental (n = 52) groups. A scenario-based simulation method was used for the students in the experimental group in the laboratory practice. The traditional lecturing method and case studies were used in the control group. Data from the study were collected from the care plans that the students had prepared with the data from patients in clinical practice.

Results: The students in the experimental group identified 20 different nursing diagnoses, whereas the students in the control group used 14. A statistically significant difference was found between the experimental and control groups in terms of the total number of nursing diagnoses used (p=0.023, X^2= 19.305).

Conclusion: The scenario-based simulation is an effective method that can be used in teaching nursing diagnoses. Scenario-based simulation has a positive effect on the identification of nursing diagnoses by correctly naming them with the labels and components found as standard in NANDA-I.

Keywords: Nursing diagnosis; simulation training; nursing process; nursing education; nursing students

*Corresponding author: Sercan Özdemir, email: sercanoz15@hotmail.com

INTRODUCTION

The nursing process is a scientific guide used to systematically carry out the care to be given to the patient. This scientific method consists of data collection, diagnosis, planning, implementation, and evaluation stages. The complete collection of the data of individuals in patient care, and the determination of the correct nursing diagnosis are the most basic and critical stages of the nursing process (Erden et al., 2018; Herdman et al., 2021; Kocaçal et al., 2021).

Nursing diagnosis is a clinical judgment of an individual, caregiver, family, group, or community's human response to or sensitivity to health conditions/life processes (Herdman et al., 2021). Determining the nursing diagnosis correctly and in accordance with the priority order is extremely effective in planning, implementing, and evaluating the care to be given to the patient (Herdman et al., 2021; Olmaz and Karakurt, 2019). The use of nursing diagnoses by the students in the clinical practice process of nursing education enables them to analyze the patient's clinical condition, determine his/her needs, and reach care results. However,

nursing students and nurses have difficulty expressing patient problems as a nursing diagnosis (Erden et al., 2018; Herdman et al., 2021; Olmaz and Karakurt, 2019; Türk et al., 2013; Basit, 2020; Çakar and Avşar, 2020; Basit and Korkmaz, 2021; Hsu et al., 2015).

It is the responsibility of nurse academicians to teach nursing diagnoses, which have an important effect on the planning of care, to students. As in the world, NANDA-I diagnoses are widely used in Turkey and comprehensively taught to students in nursing education. NANDA-I Taxonomy II has 13 domains, 47 classes, and 267 approved nursing diagnostic processes (Herdman et al., 2021).

The goal of nursing education programs is to ensure that theoretical information is transferred to practice. Today, with the development of technology, it is necessary to use effective and up-to-date education methods to train them in determining the nursing process and nursing diagnoses for students in nursing education (Ewertsson et al., 2015). In general, simulation has an important place among the effective methods used in nursing education. Simulation is used as a method adopted in the development of students' competencies in patient care management and in gaining competency. With this method, students gain experience with a scenario similar to the real environment before clinical practice; thus, their self-confidence increases and their clinical decision-making skills develop. In the studies conducted, it is stated that the scenario-based simulation method used in nursing education contributes positively to the development of self-confidence through improving critical thinking, clinical decision-making, communication, cooperation, and self-efficacy (Cummings and Connelly, 2016; Haugland and Reime, 2018; Olaussen et al., 2020; Hung et al., 2021; Carpenito, 2023).

Even when the nursing process is taught classically based on examples, it can remain very abstract for students. In this context, scenario-based simulation is very effective in applying the stages of the nursing process in a realistic case by being aware of it. As a more dynamic interactive teaching and learning method, scenario-based teaching focuses on improving students' abilities and skills, including analytical thinking, problem-solving, and team collaboration skills required in today's world. This student-centered teaching strategy also provides students with a great experience by repeating, making mistakes and drawing outcomes from mistakes in a safer learning environment (Haugland and Reime, 2018; Olaussen et al., 2020; Hung et al., 2021).

Determining the correct nursing diagnosis in the planning of care requires the student to think analytically and to be able to make evidence-based clinical decisions. In this direction, the use of cases in "Nursing Process" education has suggested that planned scenario-based education may have an effect on the nursing diagnoses used by students.

This study was conducted to determine the effect of the scenario-based simulation method on students' use of nursing diagnoses. The hypothesis of the study is that the scenario-based simulation has a positive effect on students' skills to use nursing diagnostics. The results of the research will provide more evidence to nursing educators on which method to use in nursing process teaching.

MATERIAL and METHODS
Purpose and Type of the Study
This study was designed as a quasi-experimental research design with control group. This study was conducted to determine the effect of the scenario-based simulation method on students' use of nursing diagnoses.

Variables of the Study
Dependent variables: The dependent variables of the study are the number of nursing diagnoses used. Independent variables: The independent variables of the study are the descriptive characteristics of the students.

Sampling and Participant
The population of the study consisted of 284 first-year nursing students enrolled in the Fundamentals of Nursing Course in the spring semester of the 2021-2022 academic year at a state university in western Turkey. The sample size was determined by G Power. In determining the sample size, the effect size was taken as 0.25, α 0.05, and 1-β 0.95. At total of 104

students, 52 in the experimental group and 52 in the control group consisted the sample of study. Simple random sampling method was used to determine the experimental and control groups. Students whose student numbers ended with an odd number were assigned to the control group and students whose student numbers ended with an even number were assigned to the experimental group. Students who graduated from health vocational high school (26 students) and did not agree to participate (8 students) in the study were excluded from the study.

Procedures

Fundamentals of Nursing course consists of 6 hours of theory, 4 hours of laboratory and 8 hours of clinical practice per week. The course is carried out simultaneously theoretical, laboratory and clinical practice in the spring semester of the first year. Within the scope of this course, the subject of "Nursing Process" is explained to the students in the 4th week of the semester. Following the lecture, students are expected to determine a nursing diagnosis by collecting data from patients in clinical practice, which they continue for 8 hours each week for ten weeks.

The subject of the "Nursing Process" is explained as 6 hours of theoretical explanation (Nursing Process) and 4 hours of practices using with case studies in Fundamental of Nursing course. The theoretical part was the same for both experimental and control groups. For the practical part, a scenario-based simulation method was used in the experimental group in the simulation laboratory. In this study, simulation practices are based on International Nursing Association for Clinical Simulation and Learning standards. In the first stage, the design of the simulation was planned and the framework of the simulation was determined. Student needs were taken into consideration while determining the scenario topics. Scenario topics were identified to fulfil the needs of students to determine nursing diagnoses in a safe environment before clinical practice. Scenarios were created in accordance with this content and learning objectives. Two distinct scenarios were formulated. One of the scenarios addressed the problem-focused nursing diagnosis (nausea), while the other addressed the risk group

nursing diagnosis (risk of falling). Preliminary information was given to orientate the students to the simulation environment and scenario before the simulation. Information was given about simulation aims and goals, roles, characteristics of the patient room and the tools and equipment in pre-briefing. Each scenario lasted an average of 10 minutes. The scenarios were about patient safety and post-op patient care and follow-up. According to the data in the scenarios, it was aimed to determine the needs and problems of the patients and identify the nursing diagnoses by the students. At this stage, students were expected to use critical thinking and problem solving skills by students. After the scenarios, 20-minute debriefing were held with the students. The scenario-based simulation training was completed in the laboratory practice stage of the course. Then, in clinical practice, students were collected data from their patients and prepared a care plan in line with scenario-based simulation training experiences. For the students in the control group, the standard (traditional) method used in teaching the nursing process was used. The practices in this group was made with case studies. Then, the students underwent clinical practice in various departments of a university hospital, including Internal Medicine, General Surgery, Orthopedics, and Cardiology clinics. During their clinical practice, the students compiled care plans that outlined their approach to patient care. In the preparation phase for nursing care, Erdemir and Turk's reference book, which is a translation of Carpenito's Handbook into Turkish, is used (Carpenito, 2021). At the end of the clinical practice, the students gave their care plans for evaluation to the researchers The diagnoses identified by nursing students in their care plans were examined according to NANDA-1 Taxonomy II.

Data Collection Tools

The "Student Introduction Form" and "Care Plan Form" were used to collect the data.

Student Introduction Form: In this form, there are three sociodemographic features including age, gender, and the highest level of formal education of the students.

Care Plan Form: The nursing care plan is a formal process that correctly identifies existing needs and

recognizes potential needs or risks. The form guides students to document the stages of the nursing process which was developed by Ida Jean Orlando in 1958. Nursing process is a systematic guide based on patient-centered care with five steps consisting of assessment, diagnosis, planning, implementation, and evaluation.

The care plan form includes two sections. The first section covered patient data collected by the students based on Gordon's Functional Health Patterns model. Gordon's Functional Health Patterns Model is used by nurses in the nursing process to provide a more comprehensive bio-psychosocial nursing assessment of the patient in a systematic and standardized way. Model consists of 11 functional domains including health perception-health management, nutritional-metabolic, elimination, activity exercise, sleep-rest, cognitive-perceptual, self-perception, role-relationship, sexualityreproductive, coping-stress tolerance, and value-belief. The second part was based on the five steps of the nursing process.

Statistical Analysis

The "Statistical Package for Social Science 25.0 package program" was used to evaluate the data. In the evaluation of the data, number and percentage calculations were used. Chi-square analysis was used to compare the groups. Statistical significance was accepted as $p<0.05$.

Ethical Approval

To conduct the study, approval was obtained from the Non-Interventional Clinical Research Ethics Committee (Approval Number: 2022/05-03) of the Faculty of Health Sciences, and permission was obtained from the institution where the study was conducted and the students participating in the study.

RESULTS

The average age of the students participating in the study was 20.79 ± 1.98 (min=19, max=32), 55.8% were female and 58.7% were Anatolian High School graduates.

The students in the experimental group were determined to have nursing diagnoses in the 8 domains and 140 nursing diagnoses were used (Table 1). The domains of most frequently were used by the experimental group students were "nutrition/metabolism" (74.97%), "health promotion" (61.52%), "self-perception" (38.43%), "perception/cognition", "activity/exercise" (28.82%), and "sleep/rest" (26.92%) (Table 1). The students in the experimental group were used diagnoses were *risk for falls* (50%), *risk for infection* (32.69%), *disturbed sleep pattern* (25%), *fatigue* (23.07%), and *risk for impaired oral mucous membrane integrity* (19.23%). The students did not determine any diagnosis in the domains of "Role/Relationship", "Sexuality/Reproduction", and "Value/Belief" (Table 1).

The students in the control group were determined to have diagnoses in the 8 domains and 132 nursing diagnostic processes were used (Table 1). The domains of most frequently were used by the control group students were "health promotion" (63.44%), "nutrition/metabolism" (61.50%), "activity/exercise" (48.02%), "sleep/rest" (26.92%), and "perception/cognition" (23.06%) (Table 1). The students in the control group were used diagnoses were *risk for falls* (53.84%), *risk for infection* (40.38%), *disturbed sleep pattern* (25%), *acute pain* (17.30%), and *activity intolerance* (13.46%). The students did not determine any diagnosis in the domains of "Role/Relationship", "Coping/Stress tolerance" and "Value/Belief" (Table 1).

When examined in terms of the total number of nursing diagnoses used, it was found that there was a statistically significant difference between the experimental and control groups (p=0.023, X^2= 19.305). In addition, 3 students (5.76%) in the experimental group and 10 students (19.23%) in the control group did not use any nursing diagnosis. Additionally, it was found that the students in the experimental group were able to determine nursing diagnoses with the labels and components that exist as standard in NANDA-I compared to the control group. The number of used nursing diagnoses was compared with the students sociodemographic characteristics, no statistically significant difference was found between the groups (p>0.05), (Table 2).

Table 1. Distribution of Used Nursing Diagnoses (according to NANDA-I Taxonomy II domains)

Nursing Diagnoses*	Experimental group* (n=52)		Control group * (n=52)	
	n	%	n	%
Health promotion				
Risk for disproportionate growth	1	1.92	0	0
Risk for delayed surgical recovery	1	1.92	1	1.92
Obesity	3	5.76	1	1.92
Overweight	0	0	1	1.92
Risk for aspiration	1	1.92	1	1.92
Risk for urinary tract injury	0	0	1	1.92
Risk for falls	**26**	**50.0**	**28**	**53.84**
Total	*32*	*61.52*	*33*	*63.44*
Nutrition/metabolism				
Risk for contamination	1	1.92	0	0
Impaired oral mucous membrane integrity	1	1.92	0	0
Risk for allergy reaction	2	3.84	0	0
Imbalanced nutrition	4	7.69	0	0
Risk for impaired skin integrity	0	0	1	1.92
Risk for dry eye	0	0	1	1.92
Risk for deficient fluid volume	0	0	1	1.92
Deficient fluid volume	2	3.84	1	1.92
Impaired tissue integrity	2	3.84	1	1.92
Impaired skin integrity	0	0	1	1.92
Excess fluid volume	0	0	2	3.84
Risk for impaired oral mucous membrane integrity	**10**	**19.23**	3	5.76
Risk for infection	**17**	**32.69**	**21**	**40.38**
Total	*39*	*74.97*	*32*	*61.50*
Elimination				
Diarrhea	1	1.92	0	0
Chronic functional constipation	1	1.92	0	0
Impaired urinary elimination	2	3.84	1	1.92
Perceived constipation	0	0	2	3.84
Urge urinary incontinence	0	0	3	5.76
Total	*4*	*7.68*	*6*	*11.52*
Activity/exercise				
Risk for ineffective renal perfusion	1	1.92	0	0
Toileting self-care deficit	1	1.92	0	0
Risk for ineffective peripheral tissue perfusion	2	3.84	0	0
Risk for decreased cardiac tissue perfusion	3	5.76	1	1.92
Impaired standing	0	0	1	1.92
Decreased diversional activity engagement	0	0	1	1.92
Wandering	0	0	1	1.92
Impaired physical mobility	2	3.84	1	1.92
Ineffective airway clearance	0	0	1	1.92
Sedentary lifestyle	0	0	1	1.92
Risk for ineffective respiratory function	0	0	2	3.84
Decreased cardiac output	0	0	2	3.84
Ineffective breathing pattern	0	0	2	3.84
Risk for bleeding	0	0	2	3.84
Deficit self-care syndrome	1	1.92	3	5.76
Activity intolerance	5	9.61	**7**	**13.46**
Total	*15*	*28.81*	*25*	*48.02*
Sleep/rest				
Insomnia	1	1.92	1	1.92
Disturbed sleep pattern	**13**	**25.00**	**13**	**25.00**
Total	*14*	*26.92*	*14*	*26.92*
Perception/cognition				
Impaired comfort	2	3.84	0	0
Chronic pain	1	1.92	1	1.92
Nausea	3	5.76	2	3.84
Acute pain	9	17.30	**9**	**17.30**
Total	*15*	*28.82*	*12*	*23.06*

Table 1. (Continued) Distribution of Used Nursing Diagnoses (according to NANDA-I Taxonomy II domains)

Nursing Diagnoses*	Experimental group* (n=52)		Control group * (n=52)	
	n	%	n	%
Self-perception				
Disturbed body image	1	1.92	0	0
Weakness	2	3.84	0	0
Hopelessness	2	3.84	1	1.92
Fear	0	0	1	1.92
Anxiety	3	5.76	3	5.76
Fatigue	**12**	**23.07**	4	7.69
Total	*20*	*38.43*	*9*	*17.29*
Sexuality/reproduction				
Sexual dysfunction	0	0	1	1.92
Total	*0*	*0*	*1*	*1.92*
Coping-stres tolerance				
Impaired mood regulation	1	1.92	0	0
Total	*1*	*1.92*	*0*	*0*
Total number of diagnosis used	140		132	
Total number of diagnosis label used	55			

   * Multiple diagnoses were used.

Table 2. Distribution of the Nursing Diagnoses Numbers According to Groups of Students

	Groups				
Number of nursing diagnosis	Control group (n=52)		Experimental group (n=52)		Test and p value
	n	%	n	%	
Zero	10	19.23	3	5.77	
One- Three	23	44.23	39	75.00	**p=0.023**
Four-Six	19	36.54	6	11.54	$X^2=19.305$
Seven-Ten	0	0	4	7.69	

DISCUSSION

Today, methods such as scenario-based simulation in nursing education are very effective in students' critical thinking skills, especially in complex clinical situations (Adib-Hajbaghery and Sharifi, 2017; Karabacak et al., 2019; Kang et al., 2020). In this study, since clinical decision-making is used extensively in the nursing process, the effect of scenario-based simulation on the nursing process was examined. According to the results, the students in the experimental group used more nursing diagnoses than the group trained with the classical method. This can be interpreted as the scenario-based simulation having a statistically significant effect on nursing students' use of nursing diagnoses. Scenario-based simulation offers students the opportunity to transfer theoretical knowledge into practice in a clinical situation close to reality (Haugland and Reime, 2018; Shinnick et al., 2011;

Maneval et al., 2012). In this way, the use of the nursing process can become more effective. Unless realistic educational methods such as simulation are used, students will have difficulty in making clinical decisions. In fact, Korkut et al. (2021) reported that 31 students encountered difficulties at many stages of the nursing process and that different feedback and messages were given by educators. In this study, the students using scenario-based simulation used more and different nursing diagnoses compared to the students in the control group. In their study, Chang et al. (2021) compared the simulation-based (online interactive animation and a standard patient simulation) method with the case study method in nursing process education. In this study, the success of the students in the group in which simulation was used in preparing the nursing process was found to be better than the group in which only case study was used (Chang et al., 2021).

In studies where scenario-based simulation is not used, it is noteworthy that the ability to determine nursing diagnose is lower. Keskin et al. (2021) found that only 57.6% of the students in their study were able to make the correct nursing diagnoses for an elderly patient in a given case sample. In the same study, the ratio of 21 nursing diagnoses that should be made to the patient in the case, unfortunately, did not exceed 66% (chronic pain nursing diagnosis). Efil (2020) reported that during clinical practice in the scope of an internal medicine nursing course, students used 52 nursing diagnoses under 10 of 13 NANDA-I taxonomy II domains.

After training, students will have a higher ability to determine and apply nursing diagnoses and other stages of the nursing process compared to the groups that do not receive training. Karaca and Aslan (2018) stated that after their training on nursing terminologies and classification systems, students' perception of nursing diagnoses was more positive than those in the group that did not receive training. Although no simulation-based training is provided, the positive perception of the students who receive training is an indication that the training in which the simulation is used will have more superior effects in increasing both the perception of the process and the motivation for learning and practice. Karaca and Aslan (2018) suggested that students should be trained with different teaching methods to comprehensively learn nursing diagnoses, which are the most important step of the nursing process, and to address them correctly. In a study based on four hours of theoretical training and case studies, most of the students (89.6%) were able to make the correct diagnoses (Özkan et al., 2020).

Within the scope of the research, we determined that the most commonly used nursing diagnoses of the students in both the experimental and control groups were "risk for falls", "risk for infection", and "disturbed sleep pattern". Similarly, Özkan et al. (2020) stated in their study that "risk for infection", "acute pain", and "risk for falls" nursing diagnoses are the most commonly used diagnoses by students. While Efil (2020) reported that the first three nursing diagnoses used by students were "activity intolerance", "acute pain", and "disturbed sleep pattern". Keskin et al. (2021) found that "chronic pain", "imbalanced nutrition", "impaired tissue integrity", "risk for impaired skin integrity", and "risk for infection" were the most commonly used nursing diagnoses. Similar to our study, in another study based on simulated patient use and case study, the most commonly used nursing diagnoses of 70 second-grade students were determined as "oral mucous membrane", "ineffective breathing pattern", "disturbed sleep pattern", "imbalanced nutrition: Less than body requirements", "impaired tissue integrity", "pain" and "risk for infection" (Karadağ et al., 2016). In all the results of this study, there are both similarities and differences in the nursing diagnoses used by the students. The main reason for this is thought to be the difference in the content of the education and cases given to the students in these studies.

In the study, it was determined that the students in the experimental group did not use any diagnoses in the domains of "Role/Relationship", "Sexuality/Reproduction", and "Value/Belief", and similarly, the students in the control group did not use any diagnoses in the domains of "Role/Relationship", "Coping/Stress tolerance", and "Value/Belief". In the studies in the literature, it has been determined that students generally use diagnoses in the areas of sexuality, coping-stress tolerance, self-perception, and role-relationship less (Aydın and Akansel, 2013; Efil, 2020; Haesook et al., 2015; Olğun and Türk, 2022; Türk et al., 2013), and they never use diagnoses in the areas of sexuality-reproduction and value-belief (Taşkın Yılmaz et al., 2015; Uysal et al., 2016). However, it is also stated that students have the most difficulty in collecting patient data in the areas of sexuality (73.4%), value-belief (45.7%), and excretion/elimination (42.4%) (Türk, 2020). In our study, the diagnosis of the students in both groups was mostly focus more on the physiological needs. Furthermore, the fact that these areas are more abstract for the student, the mandatory violation of patient privacy, and the inexperience of the students in this method may cause diagnoses to be used less or not at all in these areas. According to Benner's "From Beginner to Expert" model, the student's ability to understand, comprehend, think critically, adopt a holistic approach and intuition develops through in parallel

with experience (Benner, 1984). The students participating in the study were still at the beginning of their professional training, so their experience was limited, and their cognitive skills, which enable them to assess patients holistically and make clinical decisions based on their intuition, were not yet sufficiently developed. It is hypothesised that these factors may have exerted an influence on the results.

CONCLUSION

The research findings indicate that scenario-based simulation increases the number of diagnoses used by students and is an effective method for teaching nursing diagnoses. This method has been demonstrated to have a positive effect on the identification of nursing diagnoses by naming them correctly with the labels and components that are standard in NANDA-I. In line with the results obtained from the research, it is recommended to use the scenario-based simulation method together with classical education in nursing process teaching and to increase the use of the method by educators by integrating it into the nursing program.

Conflict of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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