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# Mobile Serious Game on Nursing Students' Knowledge, Motivation, Satisfaction, and Views: Tracheostomy Care Example

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## ABSTRACT

This study is a pre-posttest without control group intervention research conducted to determine the effect of mobile game application for tracheostomy care on the knowledge, motivation and satisfaction of nursing students. The research was carried out between May and June, 2019. The universe of the research consisted of fourth-year students in the Nursing Department, and the sample consisted of 24 students who had to practice tracheostomy care on the patient. Data were collected with descriptive features form, tracheostomy care knowledge test, mobile learning scale, motivation scale related to teaching material, application evaluation and satisfaction form prepared by the researchers. Permission from the ethics committee and institution, and consent from students was obtained. A mobile game of approximately 10 minutes and six stages prepared by the researchers was loaded onto the mobile phones of the students who filled out the descriptive features form and tracheostomy care knowledge test (pre-test), and they were given four weeks to play. At the end of the period, the students completed the knowledge test (post-test), mobile learning scale, motivation scale about teaching material, application evaluation and satisfaction form. Average measurements and the Wilcoxon test were used to evaluate the data. A statistically significant difference was determined between the pre- and post-knowledge test scores of students playing mobile games ( $p < 0.001$ ). It was determined that the average score of the students from the mobile learning scale was  $169.04 \pm 18.19$  (maximum: 190) and the average score they got from the motivation scale related to the teaching material was  $134.12 \pm 15.31$  (maximum: 165). It was determined that the satisfaction averages of the students in remembering the game and care were  $7.66 \pm 1.71$  (0-10). Mobile educational games allow students to repeat their knowledge whenever and wherever they want. Therefore, it is recommended to develop and implement similar applications.

**Keywords:** Mobile Serious Game, nursing students, knowledge, motivation, satisfaction, tracheostomy care.

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# Mobil Ciddi Oyun Uygulamasının Hemşirelik Öğrencilerinin Bilgi, Motivasyon ve Memnuniyetlerine Etkisi: Trakeostomi Bakımı Örneği

## ÖZ

Bu çalışma, trakeostomi bakımına yönelik mobil oyun uygulamasının hemşirelik öğrencilerinin bilgi, motivasyon ve memnuniyetlerine etkisinin belirlenmesi amacıyla yapılmış, kontrol grupsuz ön-son testli müdahale araştırmasıdır. Araştırma Mayıs-Haziran 2019 tarihleri arasında yapılmıştır. Araştırmanın evrenini, hemşirelik bölümü dördüncü sınıfta okuyan öğrenciler, örneklemini ise trakeostomi bakımını hasta üzerinde uygulayan 24 öğrenci oluşturmuştur. Veriler, araştırmacılar tarafından hazırlanan tanımlayıcı özellikler formu, trakeostomi bakımı bilgi testi, Mobil Öğrenme Ölçeği, Öğretim Materyaline İlişkin Motivasyon Ölçeği, uygulama değerlendirme ve memnuniyet formu ile toplanmıştır. Etik kurul ve kurumdaki izin, öğrencilerden onam alınmıştır. Tanımlayıcı özellikler formu ve trakeostomi bakımı bilgi testini (ön-test) dolduran öğrencilerin cep telefonlarına araştırmacılar tarafından hazırlanmış yaklaşık 10 dakikalık ve altı aşamadan oluşan trakeostomi bakımı mobil oyunu yüklenmiş ve oynamaları için dört haftalık bir süre verilmiştir. Süre sonunda öğrenciler bilgi testi (son-test), mobil öğrenme ölçeği, öğretim materyaline ilişkin motivasyon ölçeği, uygulama değerlendirme ve memnuniyet formunu doldurmuşlardır. Verilerin değerlendirilmesinde ortalama ölçüleri ve Wilcoxon testi kullanılmıştır. Mobil oyunu oynayan öğrencilerin ön ve son bilgi test puanları arasında istatistiksel açıdan anlamlı fark belirlenmiştir ( $p < 0.001$ ). Öğrencilerin Mobil Öğrenme Ölçeğinden aldıkları puan ortalamasının  $169,04 \pm 18,19$  (maksimum:190) olduğu ve Öğretim Materyaline İlişkin Motivasyon Ölçeğinden aldıkları puan ortalamasının  $134,12 \pm 15,31$  (maksimum:165) olduğu belirlenmiştir. Öğrencilerin, oyun ile bakımı hatırlama konusundaki memnuniyet ortalamalarının  $7,66 \pm 1,71$  (0-10) olduğu belirlenmiştir. Mobil öğretici oyunlar, öğrencilerin istedikleri yer ve zamanda bilgilerini tekrar etmelerini sağlamaktadır. Bu nedenle benzer uygulamaların geliştirilmesi ve uygulanması önerilmektedir.

**Anahtar kelimeler:** Mobil ciddi oyun, hemşirelik öğrencileri, bilgi, motivasyon, memnuniyet, trakeostomi bakımı

## 1 Introduction

The teaching methods and techniques commonly used in nursing education include question and answer, discussion, problem-solving, demonstration, role-playing, observation, case study, learning by doing and living, group studies, and educational games [1,2]. Educational games, simulation, and mobile learning are among the modern education methods that have been used in nursing education with developing technology. Z generation nursing students are used to technology and require the integration of technology into education [3]. Z generation students prefer acting individually, learning with games, oriented teaching methods instead of traditional narratives, learning when they want, storytelling rather than memorization, a creativity and innovation [4]. For this purpose, games that increase students' motivation have been used in nursing education in recent studies. These games used for educational purposes are called serious games.

Serious games are a new classification used for games in health education [5]. Studies have shown that serious games increase students' motivation and improve their knowledge and skills [1,6]. Games are a teaching technique that allows the information to be repeated and reinforced in a comfortable environment. Particularly, games ensure that abstract concepts are materialized, and the information learned is retained. Serious games are activities that are prepared according to the characteristics of the subject, have certain rules, and in which students participate voluntarily or individually or as a group based on competition [7]. These kinds of applications are one of the simulation methods aimed at education by using the understanding of entertainment and interaction as a tool. The games are prepared in a virtual environment according to the information targeted to be taught and allow the users to realize

the real-life situations such as analysis, decision-making, and planning [8,9]. These applications are also suitable for the learning styles of new-generation students who have been actively learning with and shaped by technology and have made technology a part of their daily lives [10].

Serious games can be implemented on a computer, tablet, or mobile device. In the literature, it was determined that bed making, aseptic technique, vital signs measurement and oxygen therapy skills [11], drug dose calculations [12], hypertension and diabetes information [2], basic life support [13], cardiopulmonary resuscitation procedure [14], oral care [15], intravenous catheterization [16], neonatal resuscitation [17], and urinary catheterization [18] were taught using a computer, tablet or mobile phone. In particular applications on mobile phones enable students to easily and quickly use them without risking patient safety, as well as to learn whenever and wherever they want [9]. In addition, games give students the opportunity to develop their skills in a virtual environment via mobile without entering the laboratory environment. This provides convenience to students in teaching applications such as tracheostomy care, which is a complex skill that is difficult for students to learn [19]. The games are provided to learn by seeing the results of their mistakes through giving feedback to the students and by living [20]. In addition, because mobile games support distance education, they will be useful and become widespread in nursing education in today's COVID-19 pandemic process.

Studies indicate that mobile games are effective in learning, facilitate learning, enable the transfer of theoretical knowledge into practice, and improve students' knowledge, skill, motivation, self-confidence, self-efficacy and critical thinking skills [1,9,18,19]. Tracheostomy care requires fulfill the checklist in the right order. Because it is important for patient safety that students perform operations in accordance with aseptic skills. Mobile game developed for tracheostomy care allow students to repeat lessons on their mobile phones. For this reason, the aim of this research was to determine the effect of a mobile serious game developed for tracheostomy care on the knowledge levels, motivation, and satisfaction of nursing students, if the teaching method was effective and students' views on the application.

## 2 Methodology

This study a pre-posttest design without control group intervention. The study population comprised 30 of the 200 previous year's senior (mean:  $21.96 \pm 0.65$ ) students in the spring semester of the 2018–2019 academic year in the Nursing Department, at a university in Turkey. The study was conducted between May-June, 2019. 30 students who performed tracheostomy aspiration and care on the patient in clinical practice, met the inclusion criteria and agreed to participate in the study were included in the study. However, 6 students, who did not complete the posttest and evaluation form, were excluded from the study, and the study was terminated with 24 students.

*The inclusion criteria:*

- Participants had to have performed or monitored tracheostomy care in clinical practice.
- Participants had to have an Android mobile phone.
- Participants had to have internet access.
- Participants had to be 18 years or older
- Participants had to be last class students

*The exclusion criteria:*

- Participants who did not the last test and complete the assessment form.
- Students who do not play the mobile game
- Students who have not completed the six stages of the mobile game

The power analysis was carried out using G\*Power 3.1. according to the results of the study it was determined 86% power and a significance level of 0.05, was at least 24 students with an effect size 0.50.

## **2.1 Ethical Approval**

Written approvals for this study were obtained from the university ethics board (Date: 28/03/2019, No: 63582098/299) and from the Department of Nursing where the study was performed. Students with informed consent were included in the study.

## **2.2 Data Collection and Instruments**

The data were collected using the 'Descriptive Characteristics Questionnaire', 'Tracheostomy Care Information Test', 'Mobile Learning Scale', 'Motivation Scale for Teaching Material', and 'Application Evaluation and Self-Evaluation, and View Form'.

The 'Descriptive Characteristics Questionnaire' has 8 questions in total; this part was filled out by the students.

The "Tracheostomy Care Knowledge Test" was created by Bayram and Caliskan 2019 [19]. This test comprises 23, 5-option multiple-choice questions for tracheostomy care. The content of the question consists of the information given in the steps of suctioning, tracheostomy cannula and stoma cleaning. Correct answers in the test are evaluated as 1 point and incorrect answers as 0 points. The lowest possible score on this test is 0, and the highest is 23 points.

The "Mobile Learning Scale" was created by Demir and Akpınar in 2016 [21]. The scale consists of 45 items and 4 factors satisfaction factor (20), learning effect factor (11), motivation factor (7), and usefulness factor (7). The created items are 5-point Likert type items: I completely agree (5), agree (4), partially agree (3), disagree (2) and completely disagree (1) (min: 45-max: 225). The Cronbach  $\alpha$  internal consistency coefficient was examined, and it was concluded to reach 0.95. In our study, Cronbach  $\alpha$  value was found to be 0.91.

The "Motivation Scale for Teaching Material" was created by Keller in 2010. The scale adapted into Turkish by Dincer and Doganay in 2016 [23]. The scale is scored as very correct (5), correct (4), moderately correct (3), slightly correct (2), or not correct (1), and consists of 33 items in total (min: 33-max: 165). The Cronbach  $\alpha$  internal consistency coefficient was examined, and it was concluded to reach 0.97. In our study, Cronbach  $\alpha$  value was found to be 0.63.

The "Application Evaluation, Self-Evaluation and View Form" was created by the researchers according to the literature [2,8]. This form consists of 3 parts. The first part consists of 16 questions 5 rated on Likert-type scale ranging from very correct (5), correct (4), moderately correct (3), slightly correct (2), and not correct (1) regarding opinions on the mobile serious game application. The highest score that students can get in this part is 80. In the study, the average of each Item and the total score was taken.

The second part consists of 3 that self-evaluation questions (sufficient, partially sufficient and insufficient). The students evaluated themselves according to the 3 stages of the tracheostomy care procedure and responded to their repetition and recall status in the clinic. In the views Open-ended questions were asked to the students, including their positive and negative views about the tracheostomy care game application. These questions are as follows:

- What do you think is the positive side of the tracheostomy care game?
- What do you think is the negative side of the tracheostomy care game?

### 2.3 Mobile Serious Game Developed for Tracheostomy Care

A mobile serious game was developed for tracheostomy by authors (<http://trakeostomibakimi.com/>). The researchers prepared a mobile serious game scenario that included pictures, according to the tracheostomy care content. The mobile serious game for tracheostomy care was designed using Adobe Flash Professional CC and Adobe Flash CS6. Authors were conducted study on first grade students and determined that the game increased their knowledge and skill levels [19]. In the game, students must ensure the character of Nurse Demet performs tracheostomy care on a patient, Mrs. Melek, and record the results, following the procedural steps through three stages (Figure 1). An automatic e-mail was sent to the researcher when the students played the game. There was no management panel about the game and no information about the stage at which the students left the game. The researcher could only see the students who completed the six stages of the game.



Figure 1: Mobile serious game screenshot

### 2.4 Intervention

The study was conducted between May and June 2019. First the “Tracheostomy Care Knowledge Test” was applied to the students determined according to the sample selection criteria. Then, the mobile serious game care was loaded by a researcher on to the students’ mobile phones and a duration of 4 weeks was given to each student to play. Students have played the game at least once, and a maximum of 10 times. At the end of the duration, the students received a knowledge test again. Finally, the students filled out the “Tracheostomy Care Information Test”, “Mobile Learning Scale”, “Motivation Scale for Teaching Material”, and “Application Evaluation, Self-Evaluation and View Form”, respectively.

## 2.5 Data analysis

The data obtained from the study were analyzed using the IBM SPSS statistics 23.00 for windows. Number (n), percentage (%), mean, median, and standard deviation (SD) values were used in descriptive statistical evaluation of the data. A one-sample Kolmogorov Smirnov test was used to evaluate data with normal or non-normal distribution. The Wilcoxon test was used for the matched groups to determine the differences between the pre and posttest scores. The data were evaluated at a confidence interval of 95% and at a  $p < 0.05$  significance level.

## 3 Results and Discussion

The results of study explained that 79.2% of participants were women, 66.7% had graduated from high school, and 83.3% chose the nursing profession willingly because not all students in Turkey always get their first choice. Of the participants, 75% use digital tools while studying, the most preferred of which is the mobile phone (62.5%), educational mobile phone or computer (62.5%) and it was determined that 58.3% of them performed hands-on tracheostomy care in clinical practice. The remaining had the opportunity to monitor tracheostomy care but no hands on practice. A statistically significant difference was observed between the pre and posttest knowledge scores ( $p < 0.05$ ) (Table 1).

**Table 1:** Comparison of pre and post-test knowledge scores

Knowledge test score	Mean ± SD	Median	Z /p*
Pretest	11.95 ± 2.94	11 (8-21)	-2.699
Posttest	14.20 ± 3.09	13 (9-22)	.007

\*Wilcoxon test

We determined that the students gave 75 points (min: 20-max: 100) to the satisfaction factor, 43.5 (min: 10-max: 55) to the learning effect factor, 29 (min: 7-max: 35) to the motivation factor and 18.50 (min: 7-max: 35) (to the usability factor on the mobile learning scale. We determined that the total score of the mobile learning scale was 165 (min: 45-max: 225), and these values were above normal with reference to the Mobile Learning Scale by Demir and Akpinar in 2016 [22]. The motivation scale score of the teaching material was 133 (min: 33-max: 165), and this value was above normal with reference to the Motivation Scale for Teaching Material by Dincer and Doganay in 2016 [23]. Students evaluated their satisfaction with game learning as 8 out of 10 (Table 2).

**Table 2:** Mobile learning scale and motivation scale for teaching material and satisfaction scores

Mobile learning scales, and subscales	min-max*	Mean ± SD	Median (min-max)
Satisfaction factor	20-100	76.83 ± 11.49	75 (54-100)
Impact factor on learning	10-55	45.37 ± 5.71	43.50 (34-55)
Motivation factor	7-35	28.45 ± 5.86	29 (7-35)
Usability factor	7-35	18.37 ± 6.95	18.50 (8-35)
Total score	45-225	134.12 ± 15.31	165 (136-210)
<b>Motivation scale for teaching material</b>	33-165	134.12 ± 15.31	133 (100-161)
<b>Satisfaction score</b>	0-10	7.66 ± 1.71	8 (3-10)

\*indicates that learning and motivation increase as the average score approaches towards the maximum value.

In Table 3, student opinions about mobile games are given. When students' opinions about the game are taken I students gave highest  $4.66 \pm 0.73$  points to "I was able to complete the tracheostomy care" (max:

5). The students gave only lowest  $1.28 \pm 0.64$  points to “I found it very unnecessary and complicated”. We determined that the total score given by the students to the mobile serious game application was 58 out of 80 (Table 3).

**Table 3:** Distribution of the means of the students' views for mobile game

The students' views	Mean $\pm$ SD	Median (min-max)
1. It was easy to use.	$3.47 \pm 1.03$	4 (1-5)
2. The text information on the screen was clear.	$3.95 \pm 1.02$	4 (1-5)
3. The information on the screen was easy to read.	$4.61 \pm 0.58$	5 (3-5)
4. I understood what to do at every stage.	$3.23 \pm 1.13$	3 (1-5)
5. I had no technical problems in use.	$2.28 \pm 1.23$	2 (1-5)
6. The visual quality was good.	$4.33 \pm 0.91$	5 (2-5)
7. It was fun to use.	$3.90 \pm 1.22$	4 (2-5)
8. Speed was enough.	$2.28 \pm 1.38$	2 (1-3)
9. It provides the student's preparation for the clinic.	$4.33 \pm 0.79$	4 (2-5)
10. I would like to use it frequently.	$3.90 \pm 0.99$	4 (2-5)
11. I found it very unnecessary and complicated.	$1.28 \pm 0.64$	1 (1-3)
12. It could be used technically without the support of someone.	$4.00 \pm 1.14$	4 (1-5)
13. The environment was visually realistic.	$4.19 \pm 1.16$	5 (1-5)
14. I was able to carry out the tracheostomy care procedure steps.	$4.47 \pm 0.81$	5 (2-5)
15. I was able to complete the tracheostomy care.	$4.66 \pm 0.73$	5 (2-5)
16. The referrals were enough.	$3.23 \pm 1.33$	3 (1-5)
Total score	$58.19 \pm 9.68$	58 (28-73)

In Table 4, students' self-evaluation scores regarding tracheostomy care are given. The students evaluated themselves according to the 3 stages of the tracheostomy care procedure (sufficient, partially sufficient and insufficient). The students stated that 42.9% had sufficient knowledge for peristomal skin care, 47.6% had partially sufficient knowledge for suctioning a tracheostomy tube, and 23.8% for tracheostomy internal cannula cleaning (Table 4).

**Table 4:** The students' self-evaluation on tracheostomy care

Skills	Sufficient		Partially sufficient		Insufficient	
	n	%	n	%	n	%
Suctioning a tracheostomy tube	5	23.8	10	47.6	1	4.2
Inner cannula cleaning	3	14.3	5	23.8	4	19.0
Peristomal skin care	9	42.9	4	19.0	2	9.5

### 3.1 Student's interviews

In the answers given by the students to the open-ended questions including positive and negative thoughts about the mobile serious game application; all the students stated that their friends would be satisfied with the mobile learning environment. A student described his satisfaction as follows: “... I think not everyone can be involved in tracheostomy care in clinics, this and similar applications will be beneficial for everyone in learning stages such as knowing someone by sight and procedure steps” (form number 4). The students stated that the game enabled learning while being entertaining. One student

said “Although the information given when playing a game was a lesson, the experience was more like a game than a lesson. In this way, I think it provides catchy” (form number 11). The students stated that the game contributed to learning more and that it was not sufficient to improve their skills, and one student stated “The game was facilitated learning. It did not contribute to my skill as I could not apply on patient” (form number 20). The students stated that such games should be used in education, and one student wrote, “I believe that it will make a difference in training nurses when it is developed, and it should definitely be used” (form number 11). One of the students explained how he felt when he played the game as follows: “I felt like a real hospital environment. I tried to carefully do the tracheostomy care” (form number 20).

Most of the students stated also that the games were funny and motivating, increased their knowledge and skills, and provided knowledge was retained. On the negative side, the students stated that the game slowed down occasionally, and the tips and directions were not sufficient.

As an active learning method, serious games perform an important role in teaching and transferring knowledge to practice. For this reason, they are frequently used in nursing education studies today [8]. Similar to the results of the literature [2,11,14,24] it was determined that the knowledge levels of the students using the game for tracheostomy care increased significantly.

The information learned in the studies is knowledge level, feedback is received after a wrong application in the virtual environment, and the student learns by seeing the errors in the application [2,11,14,18]. Similarly, in our study, students stated that when they make mistakes, they learn by correcting their mistakes without harming anyone and that the information they learn is knowledge level. The results in the study of Savran and Efe. showed that that the serious game simulation application used in neonatal resuscitation training was effective in raising the students' ventilation and compression performing skills [17]. Ordu and Çalışkan state that virtual gaming simulation increases the mean scores of nursing diagnosis and goal-setting knowledge of the students. Most of the students stated positive statements related to virtual gaming simulations [3]. Min et al., stated that serious games in nurse education to enhance students' knowledge and performance [6]. Kardong-Edgren et al. stated that the 75% of students indicated that the game improved their skills and that they could perform the operation in a short time, they learned the skill by getting feedback when they made a mistake, and then they placed the catheter correctly [18]. In the didactical techniques, nursing students acquire knowledge about patient care, diseases, medications, and treatments [25]. Mobile apps can be used for nursing education purposes to support the educator and provide learning activities [26]. A recent systematic review showed that although game-based education interventions can enhance nursing students' learning experiences, further research should focus on examining the use of specific games in nursing students [27].

For students to gain proficiency by transforming knowledge into skills, game applications also protect patient safety and provide the convenience to practice many times in a virtual environment [20]. In our study, the students were able to play the game as much as they wanted within a month, and they stated that the game was effective in learning ( $p=0.007$ ) (Table 1). The students had sufficient knowledge for peristomal skin care, and partially sufficient knowledge for suctioning a tracheostomy tube and internal cannula cleaning. In some studies, it has been stated that teaching with games increases students' self-efficacy status [12]. In addition to students' seeing themselves as sufficient, it has been stated in the literature that students develop problem-solving skills in the care-giving process [1]. In the study conducted by Kim & Park stated that smartphone-based mobile learning had significantly positive influence on nursing students' knowledge, skills, confidence in performance, and learning attitude [12]. Similarly, in our study, the effect and usefulness score on learning, which is a sub-dimension of the



mobile learning scale, was found to be above normal (133) (Table 2). Motivation is important for students to focus their attention on the subject before learning. Motivating students on the subject before teaching skills, especially in nursing education, which is an applied department, increases learning [1,28]. In our study, similar to the literature, it was determined that students' score for the motivation factor and motivation scale was above normal. İdrissi et al. reported that motivation of students who serious game on the learning of nursing care in pediatrics effected [29]. Kang and Suh stated that the application was useful to students [2], they could follow the patient and learn while having fun. Kardong-Edgren et al. stated that most students wanted to use the game frequently and that the system was easy to use [18].

In this study, the students stated their satisfaction score about mobile learning as high points. Abou Shosha et al. stated that post graduate nursing students' post satisfaction scores are higher than the pre one after using mobile based. Epstein and Bertram found that students in their study ensured that mobile learning helped them to reflect and relate to self, others and their environments which increase their satisfaction level [30]. In our study, all students found the game enjoyable, were able to prepare for the clinic, and were satisfied with the game (Table 3). Kardong-Edgren et al. indicated that most students stated that the game was funny and suitable for their own learning method [18].

In this study, almost half of the students stated that they found themselves sufficient in peristomal skin care and partially sufficient in other applications (Table 4). The use of digital teaching techniques that remind students of knowledge and skills during the application provides them with self-confidence. Students can increase their knowledge level by playing games in a virtual laboratory environment while learning a subject outside the classroom.

## **4 Conclusions**

The tracheostomy game increased students' satisfaction and motivation in nursing education and improves their knowledge and skills. Nursing students transfer the knowledge to practice, gain competence and trust in themselves, and are ready for clinical practice. For this reason, the use of technological methods is becoming widespread for students to repeat processes again whenever and wherever they want. As technological methods are an indispensable source of information for new generation students, they increase students' motivation and satisfaction and ensure their active participation in the course. As we can see from the results of this study, it is recommended to increase the number of studies using active teaching methods and to use different methods such as mobile learning in nursing education.

## **5 Declarations**

### **5.1 Study Limitations**

The study was conducted as a pilot study in a single center and only with students who underwent or monitored tracheostomy. Therefore, the sample of our study was small. This would be a good place to recommend future studies. A larger study is needed in different settings. In addition, the study was not planned as a control group intervention study.

### **5.2 Acknowledgements**

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### 5.3 Funding source

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### 5.4 Competing Interests

There is no conflict of interest in this study.

### 5.5 Authors' Contributions

**Corresponding Author Şule BIYIK BAYRAM:** Developing ideas or hypotheses for the research and/or article, planning the materials and methods to reach the results, taking responsibility for the experiments, organizing and reporting the data, taking responsibility for the explanation and presentation of the results, taking responsibility for the literature review during the research, taking responsibility for the creation of the entire manuscript or the main part, reworking not only in terms of spelling and grammar but also intellectual content.

**Nurcan ÇALIŞKAN:** Developing ideas or hypotheses for the research and/or article, planning the materials and methods to reach the results, reworking not only in terms of spelling and grammar but also intellectual content or other contributions.

## 6 Human and Animal Related Study

### 6.1 Ethical Approval

Written approvals for this study were obtained from the university ethics board (Date: 28/03/2019, No: 63582098/299) and from the University Department of Nursing where the study was performed.

### 6.2 Informed Consent

Informed consent form was obtained from all participants for the study that they agreed to participate in the study.

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