

Effect of Listening to Music on Anxiety Levels of Nursing Students During Their First Experience with Intravenous Catheterization: A Quasi-Experimental Study

Abstract

Background: Nursing education aims to provide knowledge and skills. However, skills training may induce anxiety in nursing students. Listening to music is a method commonly used to reduce anxiety levels among students.

Aim: This study aimed to determine the effect of listening to music on the anxiety levels of nursing students during their first experience with intravenous catheterization.

Methods: This quasi-experimental study included a sample of 73 freshman nursing students. The experimental group (EG) listened to music during intravenous (IV) catheterization skill practice. Data were collected using a Student Information Form and the State-Trait Anxiety Inventory. Statistical analyses included number, percentage, mean, standard deviation, Chi-square test, independent samples test, and paired-sample test.

Results: The mean age of students was 19.11 ± 2.06 years in the experimental group and 19.67 ± 2.62 years in the control group. No differences were found between the groups in terms of sociodemographic variables. The anxiety level of the experimental group was significantly lower, while in the control group, the mean diastolic blood pressure and pulse rate significantly increased.

Conclusion: Listening to music reduced the anxiety levels of nursing students during their first experience with intravenous catheterization. It is recommended that music be used as a strategy to reduce anxiety in nursing students during skills practice.

Keywords: Anxiety, music, nursing education, nursing students, peripheral intravenous catheterization

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Introduction

Nursing education aims to provide vocational information and skills to students.¹ Vocational skills laboratories ensure that theoretical knowledge is safely transferred to practice, preparing nursing students for clinical practice.² Basic nursing skills form the foundation of clinical practice in nursing.³ Therefore, acquiring solid basic nursing skills is crucial in nursing education.⁴ However, students may experience fear and anxiety in the laboratory while transferring theoretical knowledge into practice, despite knowing how to apply such skills in theory.² High anxiety levels can hinder students' learning and their ability to transfer knowledge into practice. This, in turn, decreases academic success and undermines their confidence in applying skills to patients.^{2,5,6}

Intravenous (IV) catheterization is a complex procedure primarily performed by nurses in healthcare settings.⁷ This skill causes the highest anxiety among students during nursing practice.⁸ Among nursing skills, students typically experience lower anxiety levels when measuring vital signs, whereas procedures requiring more complex skills, such as IV catheterization, induce higher anxiety.³ Therefore, various measures should be taken during skills training to reduce anxiety levels in nursing students during their first IV catheterization experience.

Several methods have been explored to reduce anxiety levels in nursing students. The effectiveness of methods such as aromatherapy, emotional freedom techniques, meditation, muscle relaxation, and music therapy has been investigated.^{2,4,9-17} Music has been shown to facilitate relaxation and reduce anxiety.^{4,18} It is an easy-to-use, safe, and

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inexpensive method.^{2,14,16} In the literature, studies have examined the effects of music on anxiety levels during examinations, vital signs, and examination results of nursing students.^{2,4,18} However, there are a limited number of studies investigating the effect of music on anxiety levels during skill training.^{14,19} Additionally, no studies were found that specifically examine the effect of listening to music on the anxiety levels of nursing students during their first IV catheterization experience. This study was conducted based on the assumption that reducing nursing students' anxiety levels would enhance their learning, decrease the stress they experience in clinical settings by improving their confidence, and ultimately improve the quality of nursing education and patient care.

Hypotheses

H₀: Listening to music has no effect on the anxiety levels of the experimental group during their first experience with intravenous catheterization.

H₁: Listening to music has an effect on the anxiety levels of the experimental group during their first experience with intravenous catheterization.

Aim

This study aimed to assess the effect of listening to music on the anxiety levels of nursing students during their first IV catheterization experience in the skills laboratory.

Materials and Methods

Study Type

This was a quasi-experimental study.

Population and Study Sample

This study was conducted in the Faculty of Health Sciences at a university. The study population consisted of 105 freshman nursing students enrolled in the 2018-2019 academic year. After reviewing a study similar to this one,¹⁴ the necessary sample size calculation was performed. The study power was set at 85%, with a Type I error of 5% and an effect size of 0.74, determining the required sample size as 68 individuals. Basic principles and nursing practices were taught in two separate classes. Using a simple random method, one class was assigned as the experimental group (EG) and the other as the control group (CG). The inclusion criteria for the study were as follows:

- Enrolled in the IV catheterization theoretical course for the first time,
- Had not received IV catheterization skills training before,
- Had no prior clinical experience, and
- Agreed to participate in the study.

The final study sample consisted of 73 students (EG: n = 36; CG: n = 37) who met the study criteria (Figure 1).

Data Collection Tools

Data was collected using the Student Information Form and the State-Trait Anxiety Inventory. Additionally, a form was used to record students' blood pressure (BP), pulse, and saturation values.

Student Information Form

This form included questions on sociodemographic characteristics such as gender, age, high school of graduation, willingness to enroll in

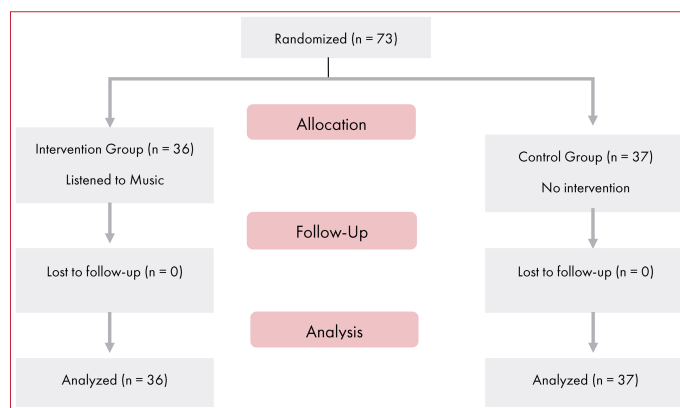


Figure 1. Study flow diagram.

the department, participation in social activities, reasons for choosing the profession, and job satisfaction.

State-Trait Anxiety Inventory

State-Trait Anxiety Inventory (STAI) was developed by Spielberger et al.,²⁰ and its validity and reliability in the Turkish population were assessed by Öner and Le Compte.²¹ The State Anxiety Subscale (SAS) was used in this study. The SAS evaluates how individuals feel in specific situations and at particular moments. Each item in the SAS is scored using one of four options: "none," "somewhat," "quite," and "completely." Higher scores indicate higher anxiety levels.^{20,21} In this study, Cronbach's alpha was found to be 0.88 in the pretest and 0.92 in the posttest.

Data Collection

The study was conducted during the 2018-2019 academic year (April 2019). Students were informed about the study, and those who met the inclusion criteria were identified by the researchers. Students who had graduated from a health sciences school, had previous clinical experience, did not attend classes, or had not learned the theory of intravenous catheterization were excluded from the study. Using a simple random method, one class was assigned as the EG and the other as the CG. Skills training was provided by the researcher, who demonstrated the IV catheterization procedure using a plastic model of an IV injection arm. Both the EG and CG were asked to complete the Student Information Form and the SAS questionnaire. Their blood pressure, pulse, and saturation levels were measured. The EG listened to classical Turkish music (Neva Maqam) via a portable computer, without headphones, under the supervision of researchers. Meanwhile, the CG performed standard skills training without music intervention. Afterward, BP, pulse, and saturation values were measured in both groups, and they were asked to complete the SAS questionnaire once more.

The music selection was based on a review of the relevant literature^{4,14,18,22,23} and expert opinions. Each student in the EG individually performed the IV catheterization procedure in the skills laboratory while listening to music.

Students received six hours of theoretical instruction on IV applications. Only those who attended the theoretical course were included in the study sample group, while those who did not attend were excluded. However, students who missed the theoretical course were provided with a brief theoretical overview by the same instructor

before the application, after which they performed the IV catheterization procedure. All procedures were conducted under the supervision of the researchers.

The IV catheter insertion was performed on a simulation model rather than real patients to account for potential differences in stress levels between working with real patients and using simulation models.

Table 1. Distribution of Students According to Their Sociodemographic Characteristics (n = 73)

Characteristics	Experimental Group (n = 36)		Control Group (n = 37)		Test and p value
	n	%	n	%	
Age					
18 years	17	47.2	10	27.0	$\chi^2 = 4.855$ P = 0.088
19 years	9	25.0	18	48.6	
20 years and above	10	27.8	9	24.4	
Gender					
Female	24	66.7	27	73.0	$\chi^2 = 0.345$ P = 0.557
Male	12	33.3	10	27.0	
High School Type					
Anatolian High School	33	91.6	27	73.0	$\chi^2 = 4.540$ P = 0.103
Basic High School	2	5.6	5	13.5	
Vocational High School	1	2.8	5	13.5	
Enrollment Preference					
Willingly Enrolled	29	80.6	29	78.4	$\chi^2 = 0.053$ P = 0.818
Unwillingly Enrolled	7	19.4	8	21.6	
Social Activity Level					
Sufficient	16	44.4	15	40.5	$\chi^2 = 0.114$ P = 0.736
Insufficient	20	55.6	22	59.5	
Reason for Choosing the Profession					
Personal Interest	16	44.4	19	51.4	$\chi^2 = 0.377$ P = 0.828
Job Security	16	44.4	14	37.8	
Family Influence	4	11.2	4	10.8	
Job Satisfaction					
Satisfied	34	94.4	32	86.5	$\chi^2 = 1.333$ P = 0.248
Unsatisfied	2	5.6	5	13.5	
Academic Performance					
Successful	8	22.2	10	27.0	$\chi^2 = 0.227$ P = 0.893
Average	27	75.0	26	70.3	
Unsuccessful	1	2.8	1	2.7	

X²: Chi-square test; P: Significance level.

Data Analysis

The data obtained from the study were analyzed using IBM's Statistical Package for the Social Sciences Statistics 24 (SPSS IBM, Türkiye). The Kolmogorov-Smirnov test was used to assess the normality of the data, confirming that the data followed a normal distribution. Descriptive statistics, including mean, percentage, and standard deviation were used. The chi-square test was applied to compare descriptive characteristics between groups. The independent samples test was used to compare mean scale scores between groups, while the paired samples test was used to compare mean scale scores within groups.

Ethical Aspect of the Study

To conduct this research, written permission was obtained from the Human Research Ethics Committee of Aksaray University (Approval Number: 2019-28, Date: 22.02.2019) and the dean of the relevant institution where the study was to be carried out. Additionally, the students included in the sample were informed about the study, and written and verbal consent was obtained from those who voluntarily agreed to participate.

Results

The mean age of students was 19.11 ± 2.06 years in the EG and 19.67 ± 2.62 years in the CG. No difference was found between the groups in terms of sociodemographic variables, including gender, age, high school of graduation, willingness to enroll in the department, participation in social activities, reason for choosing the profession, job satisfaction, and academic success status (p > 0.05). Both groups were predominantly female, and most students reported that they willingly enrolled in the department (Table 1).

When comparing the mean pre-test and post-test SAS scores, no significant difference was found between the groups. Additionally, in the CG, no difference was observed in the mean SAS scores within the group. However, in the EG, the mean SAS scores decreased significantly (P < 0.05) (Table 2).

No significant difference was observed in the EG for systolic BP, diastolic BP, pulse rate, and saturation levels. However, in the CG, the mean diastolic BP and pulse rate increased significantly (Table 3).

Discussion

Music is known to facilitate relaxation and reduce anxiety.^{4,18} In this study, anxiety levels significantly decreased with music listening.

Table 2. Comparison of State Anxiety Subscale (SAS) Pre-Test and Post-Test Mean Scores Between Experimental and Control Groups (n = 73)

	Experimental Group (n = 36)		Control Group (n = 37)		Test Value*	p value
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD		
Pre-Test	40.50 ± 4.19	39.10 ± 4.29	t = -1.400	P = 0.166		
Post-Test	37.02 ± 4.50	38.59 ± 4.30	t = 1.519	P = 0.133		
Test Value**	6.050	0.666				
P value	0.000	0.509				

SD: Standard Deviation. *Paired sample t-test. **Independent samples test. P: Significance level. Bold values indicate statistical significance (P < 0.05).

Table 3. Comparison of Blood Pressure (BP), Pulse, and Saturation Findings Between Experimental and Control Groups Before and After Intravenous (IV) Catheterization

		Before Mean ± SD	After Mean ± SD	Test Value*, P
Experimental Group (n = 36)	Pulse	86.30 ± 10.29	84.16 ± 9.61	t = 1.004, P = 0.322
	Systolic BP	110.00 ± 9.56	108.88 ± 11.89	t = 0.539, P = 0.593
	Diastolic BP	68.88 ± 8.20	70.00 ± 8.61	t = -0.725, P = 0.473
	Saturation	97.41 ± 1.36	97.11 ± 1.76	t = 0.814, P = 0.421
Control Group (n = 37)	Pulse	82.64 ± 9.44	88.81 ± 16.35	t = -2.160, P = 0.037
	Systolic BP	118.64 ± 10.58	117.27 ± 14.89	t = 0.706, P = 0.484
	Diastolic BP	68.37 ± 6.87	72.89 ± 11.07	t = -3.127, P = 0.003
	Saturation	96.70 ± 1.97	96.67 ± 3.30	t = 0.046, P = 0.964

BP: Blood Pressure; SD: Standard Deviation. *Paired sample t-test. Bold values indicate statistical significance (P < 0.05).

While no difference was found between the post-test anxiety scale mean scores of the experimental group and the control group, both groups exhibited a reduction in their mean scores. It is believed that the completion of the procedure itself contributed to lowering students' anxiety levels. However, within-group comparisons showed a statistically significant decrease in anxiety levels only in the experimental group. Previous studies have demonstrated that music effectively reduces anxiety levels in different student groups.²⁴⁻²⁶ Aksoy and Ozturk¹⁹ found that listening to music had positive effects on students' anxiety levels. Similarly, İnce and Çevik¹⁴ reported that music reduced anxiety among nursing students during their phlebotomy experience. These findings highlight the importance of music as a tool for anxiety reduction.

Anxiety is an unpleasant emotional state that may be accompanied by psychological, emotional, and physiological symptoms, often involving a sense of hesitation or uncertainty about an unknown event.^{13,27} In this study, music did not affect BP, pulse rate, or saturation of levels in the EG. However, in the CG, diastolic BP and pulse rate increased significantly. The increase in diastolic blood pressure observed in both the experimental group and control groups suggests that students may experience stress during skill training. Learning a new skill can trigger physiological stress responses, leading to an increase in diastolic blood pressure. Inangil et al.² found that music therapy reduced systolic BP, diastolic BP, and mean pulse rate in students, although the reductions were not statistically significant. One study examining the effect of music on anxiety during the first phlebotomy experience of nursing students was conducted in a laboratory setting. The evaluation before and after phlebotomy showed that diastolic BP decreased in the music group.¹⁴ Another study conducted with nursing students reported that listening to music reduced pulse rate.¹⁸ Similarly, Akpınar et al.¹⁹ found that listening to music lowered systolic and diastolic BP, as well as pulse rate, in students. Music has been shown to reduce stress and help regulate BP, pulse rate, and respiration.^{28,29}

Limitations of the Study

This study was conducted at a single center and included only freshman students. Therefore, the results cannot be generalized to other student populations. Additionally, all procedures were conducted under the supervision of researchers, which may have influenced students' stress levels.

Conclusion

This study examined the effect of listening to music, an easy, safe, and inexpensive method, on anxiety levels. The results demonstrated that listening to music reduces anxiety levels. It is recommended that music be used as a strategy to help alleviate anxiety in nursing students during skills practice.

Ethics Committee Approval: Ethics committee approval was obtained from the Human Research Ethics Committee of Aksaray University (Approval Number: 2019-28, Date: 22.02.2019).

Informed Consent: Written and verbal consent was obtained from those who voluntarily agreed to participate.

Peer-review: Externally peer-reviewed.

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Conflict of Interest: The authors have no conflicts of interest to declare.

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