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KORONER ANJİYOGRAFİ UYGULANAN HASTALARDA MÜZİK DİNLEYEN VE DİNLEMEYEN GRUPLARDAKİ AĞRI, ANKSİYETE VE HEMODİNAMİK PARAMETRELERİN DEĞERLENDİRİLMESİ

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Özet

Bu çalışma, koroner anjiyografi sonrası zorunlu yatak istirahatı sürecinde dinletin müziğin hastaların deyimlediği ağrı, anksiyete ve hemodinamik parametrelere etkisini belirlemek amacıyla yapıldı. 80 hasta çalışma ve kontrol grubuna randomize edildi. Çalışma grubundaki hastalara anjiyografi sonrası takip için servise yatırıldıktan yarım saat sonra 20-30 dakika tercih ettikleri müzik (Tasavvufi, rahatlatıcı, doğa sesleri müziği) dinletildi. Kontrol grubuna müzik dinletilmedi. Verilerin toplanmasında Hasta Tanıtım Formu, Visual Analog Scale ve hemodinamik parametreler takip formu kullanıldı. Verilerin değerlendirilmesinde, tanımlayıcı istatistikler, Student t, Mann Whitnet U, Repeat Measurament, Fridman ve Ki-kare testleri kullanıldı. Hastaların ağrı, anksiyete ve hemodinamik parametreleri müzik dinlemeden önce, hemen sonra, bir saat sonra ve taburcu olurken ölçüldü. Araştırmada, başlangıştaki bacak, bel ve kasıkta deneyimledikleri ağrı, anksiyete puan ortalamaları ve hemodinamik parametreler açısından gruplar arasında istatistiksel fark önemli bulunmadı ($p>0.05$). Müzik dinletimi sonrası tüm ölçümlerde gruplar arası ağrı ve anksiyete puan ortalamaları arasındaki farkın önemli olduğu belirlendi ($p<0.05$). Çalışma grubundaki hastaların anksiyete ve ağrı puan ortalamaları daha düşük idi ($p<0.05$). Çalışma grubundaki hastalarda müzik dinletimi sonrası tüm ölçümlerde sistolik ve diyastolik kan basıncı, kalp hızı, solunum sayısında azalma, oksijen satürasyonunda artma saptandı ($p<0.05$).

Anahtar Kelimeler: Kastamonu, Tıbbi ve Aromatik Bitkiler, Doğal Bitkiler, Bitkilerin Kullanım Alanları, Sağlık Amaçlı Tedavi.

EVALUATION OF PAIN, ANXIETY AND HEMODYNAMIC PARAMETERS IN THE GROUPS LİSTENING AND NOT LISTENING TO MUSIC IN PATIENTS UNDERGOING CORONARY ANGIOGRAPHY.

Abstract

This study was conducted to determine the effect of music listened to during compulsory bed rest after coronary angiography on pain, anxiety and hemodynamic parameters experienced by patients. 80 patients were randomized into the music and control groups. The patients in the music group were allowed to listen to music (Sufi, relaxing, sounds of nature) preferred by them for 20-30 minutes half an hour after admission to the service for follow-up after angiography. No music was listened for the control group. The pain, anxiety, and hemodynamic parameters of the patients were measured before, immediately after, one hour after listening to music, and at discharge. Descriptive statistics, Student t, Mann Whitney U, Repeat Measurament, Fridman and Chi-square tests were used to evaluate the data. There was no statistically significant intergroup difference in terms of average scores of pain and anxiety and hemodynamic parameters at the baseline ($p>0.05$). The difference between the average scores of pain and anxiety between groups in all measurements after listening to music was found to be significant ($p<0.05$). The mean anxiety and pain scores of the patients in the study group were lower. In the study group, systolic and diastolic blood pressure, heart rate, respiratory rate decreased, and oxygen saturation increased in all measurements after listening to music ($p<0.05$).

Keywords: Anxiety, coronary angiography, hemodynamic parameters, music, pain.

1. INTODUCTION

Cardiovascular diseases (CVD) are the first cause of death and disease in the world and in our country, and the procedure commonly used in the diagnosis of CVD is coronary angiography (1,2).

Individuals who undergo a coronary angiography (CAG) procedure may experience anxiety due to reasons such as the procedure being an invasive procedure, the possibility of a new diagnosis that may be life-threatening, and the risk of developing complications associated with the procedure (3,4). In addition, the patients may experience pain in the groin, lower back and legs, due to the fact that the no position change is allowed as the intervention is performed through the femoral artery, there is a pressure dressing at the intervention site and the patient has to lie still for 4-6 hours after the procedure (5,6). An increase in heart rate, respiratory rate, blood pressure and oxygen demand of the myocardium may occur as a neurohormonal response to anxiety and pain in order to maintain hemodynamic balance (7,8). Neurohormonal responses which develop in addition to the existing cardiac problems of individuals with CVD may further increase the workload of the heart, causing dysrhythmias and even the development of new coronary events8. In addition, an increased blood pressure in patients undergoing CAG causes an increase in intravascular pressure, and the risk of development of intervention site complications (bleeding, hematoma, ecchymosis, etc.) may increase even more (5,9). Therefore, reducing pain, stress and anxiety is very important in patients who undergo CAG to maintain hemodynamic balance and to prevent/reduce post-procedure complications.

The effects of music on human health have been known since ancient times. In the literature, the music is determined to affect the neuro-endocrine system, reduce anxiety and pain, regulate basic life values, and provide a psychological relief (10-13). Music is frequently used in nursing care as it is an easily accessible, cheap and non-invasive method with no side effect. There are many studies in which the effect of music on stress/anxiety (12-19) and hemodynamic parameters (12,15-17,19) before and during the procedure is investigated. However, no research has been found to determine the effect of music therapy on pain, anxiety and hemodynamic parameters during the compulsory bed rest period after the CAG. Therefore, this study was conducted to determine the effect of music therapy applied during the compulsory bed rest period after the CAG on pain, anxiety and hemodynamic parameters.

1.1. Research questions

2. Is there a difference between the average pain scores of the groups that listen to music and those that do not listen to music in patients undergoing coronary angiography?
3. Is there a difference between the average anxiety scores of the groups that listen to music and those that do not listen to music in patients undergoing coronary angiography?
4. Is there any difference in terms of hemodynamic parameters values (blood pressure, pulse, respiration, oxygen saturation) in the groups that listen to music and not listen to music in patients undergoing coronary angiography?

2. METHODS

2.1. Study design

This study was conducted as a randomized controlled study consisting of a music and control group.

2.2. Sample

The population of the study was comprised of 400 patients who underwent coronary angiography in a City Training and Research Hospital located in the southeast of Turkey between 03 February and 03 April 2020 and stayed in the cardiology service for care, and the sample of the study was comprised of 80 patients who met the inclusion criteria. All patients who came between 03 February and 03 April 2020 and who met the inclusion criteria were included without going to the sample calculation. Individuals were included in the study, who was age of over 18 who first underwent a planned CAG, had no surgery history during the last 6 months, underwent CA through a transfemoral route, were decided to receive a medical treatment, did not use any antipsychotic and analgesic drug, had a place and time orientation, had no psychiatric disease, had no visual and aural problems, and were volunteer to participate in the study. Patients who underwent percutaneous coronary angioplasty and coronary bypass for treatment after the CAG, developed complications such as hematoma and bleeding at the intervention site, and underwent CAG through the radial artery were not included in the study.

2.3. Randomization

All patients who underwent a coronary angiography procedure between 3 February and 3 April, stayed in the angiography unit in a City Training and Research Hospital and met the inclusion criteria for the study were included in the sample without calculating the sample for determining the sample of the study. A 2-stage stratified randomization method was used to ensure that the assignments to the study and control groups were equal and homogeneous. In the first stage, it was divided into two strata as female and male by gender, and the number of patients in both strata was determined. In the second stage, the patients in each stratum were assigned to the study and control groups with equal probabilities according to the 2-block randomization method. For this purpose, two patients were taken every day for five (5) days during the week and assigned to the study and control groups (20). Therefore, a total of 80 patients were included in the study, 40 of them were allowed to listen to music after the procedure, and the remaining 40 patients received a routine nursing care (Figure 1). In the Post-Hoc Power analysis performed with the G-Power program at the end of the study, a type I error of 0.05 and an effect size of 0.70 were found, and the power of the study were found as 87% when 40 patients were taken in each group.

2.4. Intervention

After coronary angiography was applied, a verbal and written consent was obtained from the patients who stayed in the angiography unit for follow-up and who met the research criteria upon an explanation on the study. Then, data on the sociodemographic and clinical characteristics of the patients were collected. Visual Analogue Scale (VAS) was used to evaluate pain and anxiety, and the Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), heart rate (HR), respiratory rate (BR) and Oxygen Saturation (SpO2) values were measured (1st Measurement).

Thereafter, the patients who met the inclusion criteria were divided into two groups as the music (listened to music) and the control (not listened to music) group using the randomization method. The patients in the music group were asked to listen to the music (light instrumental (relaxing) music, sounds of nature and sufi music) previously recorded on a music recorder (mp3) device by the researcher, for 20-30 minutes via headphones. The patients in the music group were informed about the use of the mp3 device. A routine care of the clinic was applied by not playing music to the control group.

Patients in the study group immediately after listening to music (2nd measurement), one hour later (3rd measurement) and at discharge (4th measurement) (same time as in control group); VAS was applied to determine the pain levels experienced in the femoral intervention site, in the leg on the side of the femoral intervention, and in the lower back. Again at the same time, they were asked to

complete the VAS to determine their general anxiety level. Again, SBP, DBP, HR, BR and SpO2 values were measured and recorded in the patients in both the music and control groups during the above-mentioned time periods. Consultancy was received from the State Conservatory Music Department of a university in determining the music types used in the study. In addition, a conformity approval was obtained from the Department of Psychiatry in that the music to be used could be played to the individuals with a heart disease.

2.5. Measurements

Patient Identification Form: The form created by the researchers from the relevant studies includes a total of 10 questions regarding the age, gender, marital status, educational status, diagnosis, other existing health problems, smoking, alcohol use and coronary angiography procedure of the patients (13-19).

Visual Analogue Scale: VAS is a scale developed by Price et al. (1983) and is a simple and easily applicable measurement method. It is a scale used to measure subjective experiences (pain, anxiety, satisfaction, fear, etc.). It is a scale evaluated by individuals by marking on a horizontal or vertical line of 10 cm or 100 mm, with one edge indicating that the patient is very good and the other edge indicating that the patient is very bad (22). In addition, Aydın et al. (2011) made a cultural adaptation of VAS and Affect Grid, and it was stated that mood states (anxiety, tension, fear, happiness) may be evaluated with VAS. The alpha reliability coefficient in the original study was 0.93, and 0.97 in our study (22).

Hemodynamic Parameters Follow-up Form: This form was created to record the patients' heart rate, blood pressure, respiratory rate and oxygen saturation information.

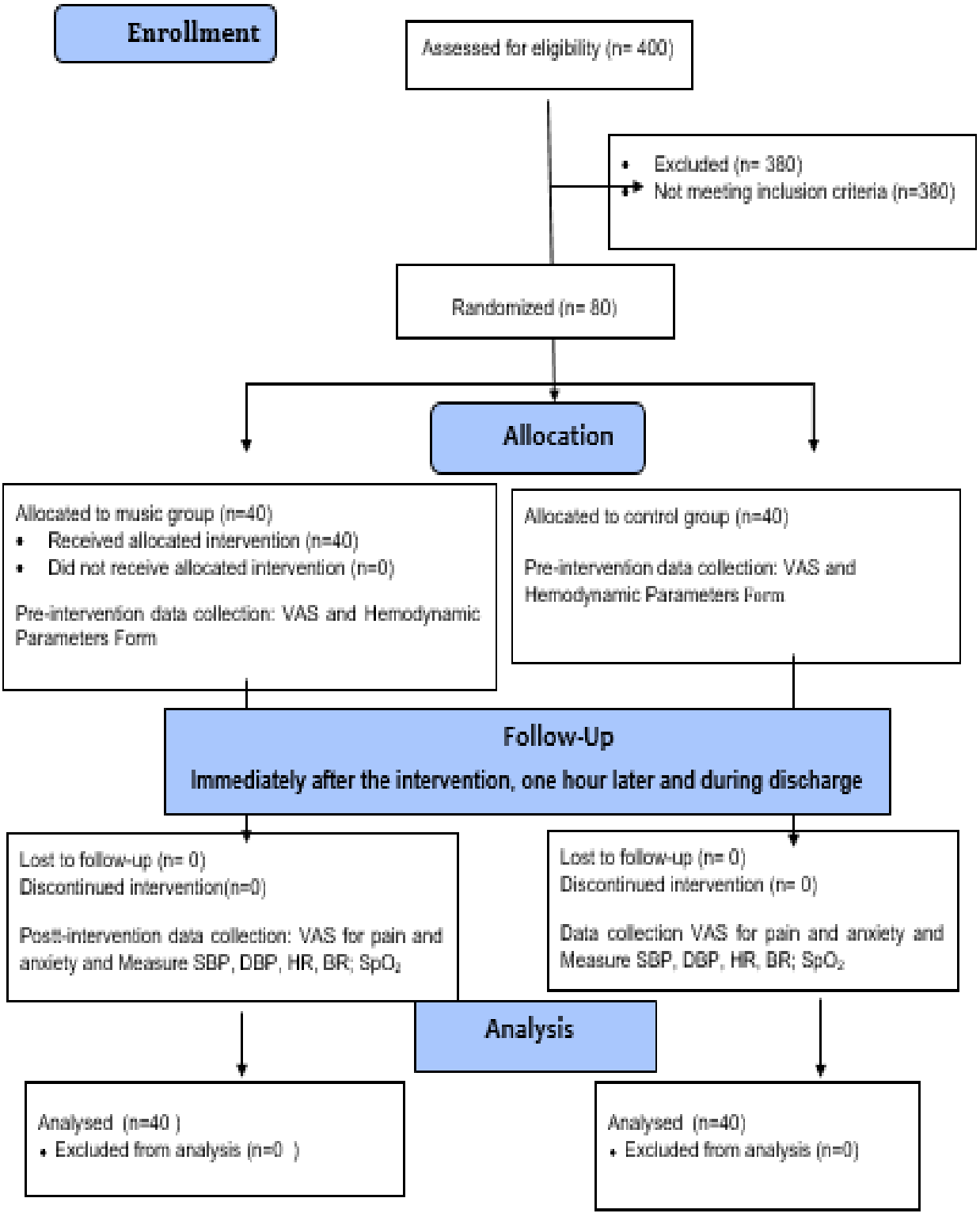
2.6. Ethical considerations

An ethics committee approval was obtained from the Clinical Research Ethichs Committee of Mersin University with a decision no. 78017789/050.01.04/1115187 on 25/07/2019, and the institution permission was taken from the Ministry of Health Mersin Provincial Health Directorate with a decision no. 65355327-604.01.02-E.134 on 26/12/2019. Written and verbal consents were obtained from the patients who accepted the study by informing them about the purpose of the study, how the data collection process would be done and how long it would take, in line with the Helsinki Declaration.

2.7. Statistical analysis

Spss 21.0 demo version was used in the analysis of the data. Normality controls for continuous measurements were tested with the Shapiro Wilk test. In comparisons of hemodynamic parameters, Student's t test was used for the intergroup differences, and Repeated Measurement tests were used for differences between the measurements. A paired t test was used for pair wise comparisons. Mean and standard deviation values were given as descriptive statistics. For comparisons of pain and anxiety scores, Mann Whitney U test was used for the intergroup differences, and Friedman tests were used for differences between the repeated measurements. Wilcoxon Sign rank test was used for pair wise comparisons. Minimum, maximum, mean rank, median and 25-75% percentiles were provided as descriptive statistics. For the differences between categorical variables, Fisher Exact chi-square and Continuity correction Chi-square tests were used. Number and percentage values were given as descriptive statistics. The statistical significance was accepted as $p<0.05$.

Fig. 1. Consort flow diagram


Enrollment
Assessed for eligibility (n= 400)
Excluded (n= 380)
Not meeting inclusion criteria (n=380)
Randomized (n= 80)
Allocation
Allocated to music group (n=40)
Received allocated intervention (n=40)
Did not receive allocated intervention (n=0)
Pre-intervention data collection: VAS and Hemodynamic Parameters Form
Allocated to control group (n=40)
Pre-intervention data collection: VAS and Hemodynamic Parameters Form
Follow-Up
Immediately after the intervention, one hour later and during discharge
Lost to follow-up (n= 0)
Discontinued intervention(n=0)
Posst-intervention data collection: VAS for pain and anxiety and Measure SBP, DBP, HR, BR; SpO2
Lost to follow-up (n= 0)
Discontinued intervention (n= 0)
Data collection VAS for pain and anxiety and Measure SBP, DBP, HR, BR; SpO2
Analysis
Analysed (n=40)
Excluded from analysis (n=0)
Analysed (n=40)
Excluded from analysis (n=0)

3. RESULTS

3.1. Sociodemographic and Clinical Characteristics

No statistical significance was found between the groups for the sociodemographic and clinical characteristics (all p values were p>0.05). Both groups were homogenous for the the sociodemographic and clinical characteristics (Table 1).

Table1. Socio demographic and clinical characteristics of the participants (n=80)

Characteristics		Control Group (n=40)	Study Group (n=40)	Test and Significance
		x̄ ±SS	x̄ ±SS	
Age		58.6 ± 9.3	57.1±7.5	p=0.410
		n (%)	n (%)	
Gender	Female	20(50.0)	20(50.0)	χ^2=0.000[a]
	Male	20(50.0)	20(50.0)	p=1.000
Marital status	Married	40 (100.0)	39(97.5)	χ^2=0.000[b]
	Single	0 (0.0)	1(2.5)	p=1.000
Educational status	Not literate / literate	13(32.5)	9(22.5)	χ^2=5.808[b]
	Primary education			
	High School	20(50.0)	22(55.0)	p=0.121
	Graduate and higher degree	6(15.0)	3(7.5)	
		1(2.5)	6(15.0)	
Additional disease	Yes	29(72.5)	20(50.0)	χ^2=3.371[a]
	No	11(27.5)	20(50.0)	p=0.066
Knowledge about angiography	Yes	20(50.0)	19(47.5)	χ^2=0.000[a]
	No	20(50.0)	21(52.5)	p=1.000
Smoking	Yes	25(62.5)	22(55.0)	χ^2=0.206[a]
	No	15(37.5)	18(45.0)	p=0.650
Alcohol use	Yes	6 (15.0)	3 (7.5)	χ^2=0.501[b]
	No	34(85.0)	37(92.5)	p=0.481

a: Continuity correction Chi-squared test value; b: Fisher Exact Chi-squared test value

3.2. Results related to pain experiences

There was no statistically significant difference between the groups in terms of mean rank values of the pain scores experienced at the femoral intervention site and in the affected leg, lower back and back at the baseline (p >0.05) (Measurement 1) (Table 2). It was determined that the difference between the mean rank values between the groups in the 2nd, 3rd and 4th measurements after listening to music was significant (p<0.05) (Table 2). In addition, it was found that the pain scores of the patients in the music group gradually decreased and the difference between them was statistically significant (p<0.001) during the study, while the pain scores of the control group increased and the difference between them was statistically significant (p<0.001) (Table 2).

Table 2. Comparison of the Median Pain Scores (n=80)

Measurement Times		Music Group (n=40)		Control Group (n=40)		Test and Significant
		Mean Rank	Medyan [% 25-75 Percentiles]	Mean Rank	Medyan [% 25-75 Percentiles]	
Pain in the leg	1st Measurement	38.63	1.2 [0.8-2.1]	42.38	1.2 [0.9-2.0]	Z=-0.723 p= 0.470
	2nd measurement	30.65*	0.8 [0.4-1.5]	50.35*	1.5 [1.1-2.0]	Z=-3.798 **p<0.001**
	3rd measurement	29.23*	0.9 [0.5-1.2]	51.78*	1.4 [1.0-2.0]	Z=-4.348 **p<0.001**

	4th measurement	25.69*,†,‡	0.55 [0.33-0.98]	55.31*,†	1.6 [1.1-2.2]	Z=-5.709 **p<0.001**
	Chi square; p	**χ2: 32.387; p<0.001**		**χ2: 10.704; p=0.013**		
Pain in the waist	1st Measurement	37.78	0.85 [0.6-1.5]	43.23	1.1 [0.7-1.5]	Z=-1.052 p=0.293
	2nd measurement	27.56*	0.50 [0.3-0.78]	53.44	1.1 [0.9-1.5]	Z=-4.989 **p<0.001**
	3rd measurement	26.19*	0.5 [0.3-0.8]	54.81*	1.3 [0.9-1.8]	Z=-5.520 **p<0.001**
	4th measurement	25.78*	0.55 [0.20-0.88]	55.23*,†,‡	1.4 [1.13-1.98]	Z=-5.677 **p<0.001**
	Chi square; p	**χ2: 46.429; p<0.001**		**χ2: 17.888; p<0.001**		
Pain in the groin	1st Measurement	41.33	3.05 [1.63-3.98]	39.68	3 [1.45-3.88]	Z=-0.318 P=0.751
	2nd measurement	34.24*	2.2 [0.95-2.90]	46.76*	3.2 [1.8-4.1]	Z=-2.411 **p=0.016**
	3rd measurement	30.68*,†	1.5 [0.78-2.95]	50.33*,†	3.5 [2.0-4.3]	Z=-3.785 **p<0.001**
	4th measurement	28.03*,†,‡	1.4 [0.50-2.38]	52.98*,†,‡	3.85 [2.20-4.98]	Z=-4.805 **p<0.001**
	Chi square and p	**χ2**: 58.948; **p<0.001**		**χ2**: 33.512; **p<0.001**		

*: differences from the 1st measurement; †: differences from the 2nd measurement; ‡: differences from the 3rd measurement.
Z: Mann Whitney U test value, Chi-Squared test: Friedmann test value

3.3. Results related to anxiety experiences

No statistically significant difference was found between the groups in terms of mean rank values of the anxiety scores (p=0.175) at the baseline. It was determined that the difference between the mean rank values between the groups was significant in the 2nd, 3rd and 4th measurements after listening to music (p<0.05). In addition, it was determined that the anxiety scores of the patients in the music group decreased during the follow-up period and the difference between them was statistically significant (p<0.001), while it increased in the control group and the difference between them was statistically significant (p<0.001) (Table 3).

Table 3. Comparison of the Median Anxiety Scores (n=80)

Measurement Times	Music Group (n=40)		Control Group (n=40)		Test and Significant
	Mean Rank	Medyan [% 25-75 Percentiles]	Mean Rank	Medyan [% 25-75 Percentiles]	
1st Measurement	36.99	0.85 [0.5-1.5]	44.01	1.1 [0.7-1.5]	Z=-1.357 0.175
2nd measurement	28.19*	0.5 [0.3-0.9]	52.81*	1.2 [0.8-1.7]	Z=-4.747 **<0.001**
3rd measurement	27.13*	0.5 [0.3-0.7]	53.88*,†	1.25 [0.9-1.8]	Z=-5.157 **<0.001**
4th measurement	27.74*	0.6 [0.3-0.9]	53.26*,†	1.2 [0.9-2.1]	Z=-4.921 **<0.001**
Chi square and p	χ^2: 31.696**; p <0.001**		$\chi^2$18.278; p **<0.001**		

*: differences from the 1st measurement; †: differences from the 2nd measurement; ‡: differences from the 3rd measurement.
Z: Mann Whitney U test value, Chi-Squared test: Friedmann test value

3.4. Results related to hemodynamic parameters

There was no statistically significant difference between the groups in terms of mean scores for the hemodynamic parameters at the baseline (All p values are p>0.05). It was found that SBP, DBP, HR and respiratory rate were decreased (all p values are <0.001), SpO2 value was increased (p <0.001), in all measurements after the listening to music in the mucic group as compared to before the listening to music, but did not change in the control group (all p values are p>0.05). In addition, it was found that the SBP, DBP, HR and respiratory rate measured at discharge (4th measurement) in the music group were lower and the SpO2 value was higher as compared to the control group (p values are 0.018; 0.016; 0.026 and <0.001, respectively), and the intergroup difference was significant (p<0.001) (Table 4).

Table 4. Comparison of the Hemodynamic Parameters (n=80)

Variables	Measurement Times				Test and Significant
	1st Measurement	2nd measurement	3rd measurement	4th measurement	
	X±SS	X±SS	X±SS	X±SS	
SBP, mmHg					
Music group	135.1 ± 16.1	130.5 ± 14.2*	128.4 ± 14.6*	125.9 ± 13.7*,†,±	F=48.105 **p<0.001**
Control group	133.4 ± 16.6	129.9 ± 24.4	132.3 ± 15.5	133.7 ± 14.9	F=1.731 p=0.195
Test and Significant	t=0.458 p=0.648	t=0.140 p=0.889	t=1.143 p=0.257	t=2.413 **p=0.018**	
DBP, mmHg					
Music group	69.0 ± 8.81	65.7 ± 7.90*	64.2 ± 9.43*,†	63.3 ± 8.72*,†,±	F=33.131 **p<0.001**
Control group	66.9 ± 8.05	67.1 ± 8.11	67.4 ± 7.91	68.0 ± 8.11	F=1.497 p=0.229
Test and Significant	t=1.113 p=0.269	t=0.796 p=0.429	t=1.618 p=0.110	t=2.455 **p=0.016**	
Respiratory rate/minute					
Music group	21.5 ± 1.50	20.5 ± 1.68*	20.2 ± 1.45*	19.9 ± 1.46*,†,±	F=20.502 **p<0.001**
Control group	21.4 ± 1.66	21.0 ± 1.58	21.2 ±2.03	21.4 ± 1.83	F=0.934 p=0.427
Test and Significant	t=0.283 p=0.778	t=1.376 p=0.173	t=2.473 **p=0.016**	t=4.048 **p<0.001**	
Heart rate/minute					
Music group	74.4 ± 10.5	72.6 ±10.0*	71.9 ± 9.5*	71.3± 9.8*,†,±	F=21.082 **p<0.001**
Control group	75.5 ± 10.2	75.2 ± 10.0	75.8 ± 10.4	76.4 ± 10.3	F=2.640 p=0.076
Test and Significant	t=0.477 p=0.634	t=1.158 p=0.251	t=1.756 p=0.083	t=2.270 **p=0.026**	
Oxygen Saturation, %					
Music group	96.3 ±1.87	96.9 ± 1.53*	97.3 ± 1.60*	97.6 ±1.50*,†,±	F=18.384 **p<0.001**
Control group	96.1 1.60	96.0 1.46	95.9 1.83	95.8 1.56	F=1.873 p=0.138
Test and Significant	t=0.514 p=0.609	t=2.616 **p=0.011**	t=3.449 **p=0.001**	t=5.250 **p<0.001**	

*: differences from the 1st measurement; †: differences from the 2nd measurement; ‡: differences from the 3rd measurement.
F: Repeated Measurement test value; t: Student's t test value

4. DISCUSSION

In this study, the music therapy applied during the compulsory bed rest period after the CAG was determined to reduce pain and anxiety, decrease blood pressure, pulse rate and respiratory rate, and increase oxygen saturation.

4.1. The effect of music in reducing pain

In this study, it was determined that listening to music during the compulsory bed rest period after the CAG significantly reduced the level of pain experienced by the patients at the femoral intervention site and in the affected leg, lower back and back. In addition, the average pain scores in the study group were found to be decreased gradually and to be increased in the control group throughout the study.

Patients who undergo a coronary angiography procedure have to have a compulsory bed rest for 4-6 hours to prevent the development of complications (bleeding, hematoma, etc.) associated with the intervention. Patients may experience pain in the back, groin, lower back and legs for reasons such as compulsory bed rest for a long time, the presence of a pressure dressing at the intervention site, and not being allowed to change position associated with puncture of the femoral artery (5,6). In case that the patients experience pain, this may increase blood pressure and intravascular pressure by leading to neurohormonal activity. All of these may lead to complications such as bleeding and hematoma at the intervention site (5-9). Therefore, the result obtained in our study is an extremely important finding in terms of both increasing patient comfort and preventing possible complications after the procedure. In their controlled randomized studies, Dobek et al (23) measured the pain levels of those who did not listen to music and listen to their favorite music during painful stimuli and found that the degree of pain was lower in the group listening to their favorite music. In this study, patients were enabled to listen to the music they prefer among light instrumental (relaxing), sounds of nature and sufi music. This approach may have positively affected the results of our study. In the literature, it has been reported that the music played for the patients undergoing CAG is effective in reducing the pain experienced during the procedure (17,24), or during the application of pressure to the intervention site after the procedure (25). Again, Martin-Saavedra et al. (26) reported that the effect of music was investigated in acute pain that occurs mostly during the procedure in the umbrella review, in which they included 13 systematic reviews and meta-analysis studies. In our study, the music played during the the compulsory bed rest after the CAG was found to be effective in reducing pain. However, there are also studies reporting that listening to music in the post-coronary bypass period reduces the postoperative pain level and analgesic requirement (27,28). The results of our study are consistent with the literature results.

4.2. The effect of music in reducing anxiety

In this study, listening to music during the compulsory bed rest after the CAG was found to significantly decrease the anxiety level of the patients. In addition, the anxiety score averages of the patients in the music group were determined to be gradually decreased and to be increased in the control group throughout the study.

Patients may experience anxiety/stress due to the need to lie still for 4-6 hours in the bed rest period after the CAG, to meet their physiological needs (urination etc.) in the bed and to have a diagnosis for a possible new disease. BP and HR associated with the neuro-endocrine response developed against an increasing stress may cause an increase in respiratory rate and oxygen demand of myocardium. As a result of all these, the risk of developing new coronary events or complications at the femoral intervention site may increase. In the literature, the light instrumental, non-verbal music containing sounds of nature is recommended to be used especially in nursing care to reduce anxiety related to the interventional procedures as it suppresses the sympathetic nervous system and activates the parasympathetic system (11,15,18,19). In the literature, although there are studies reporting that

music therapy decreases the level of anxiety in patients during the waiting period before the procedure (12,18) and during the procedure (14,15,19), there are also studies reporting that it has no effect in reducing anxiety (16,17). In their systematic review and meta-analysis studies conducted to determine the effect of music therapy on anxiety in patients undergoing a cardiac catheterization procedure, Jayakar and Alter (29) found that music therapy was mostly played during the waiting period before the CAG procedure and during the CAG procedure and that the music was an effective and reliable nursing intervention in reducing the anxiety level of patients. In this study, patients were enabled to listen to the music they prefer among light instrumental (relaxing), sounds of nature and sufi music. Therefore, the result obtained in our study is an extremely important finding in terms of both increasing patient comfort and preventing possible complications during the compulsory bed rest after the CAG.

4.3.The effect of music on hemodynamic parameters

In our study, it was determined that SBP, DBP, respiratory rate, heart rate significantly decreased and SpO2 value increased in the music group who listened to music during bed rest after the CAG throughout the study.

Similar to the results of our study, in the RCT, in which Buffum et al. (30) investigated the effect of music to reduce anxiety before the CAG, it was found that the heart rate of the group listening to music was significantly lower than the group who did not listen to music, whereas in the study of Demir and Arslantaş'ın (31), SBP, DBP, heart rate and respiratory rate were found to be significantly reduced in the intervention group listening to music. In the RCT in which the effect of listening to pleasant sounds of nature (chirping of birds, soothing sound of rain) on anxiety and physiological parameters was investigated in patients who underwent CAG, Rejeh et al. (19) determined that there was a significant decrease in SBP and DBP and a significant increase in SpO2 value after the music recital for the intervention group. Again, in the studies on the subject, it is reported that music therapy has a positive effect on physiological parameters (12,17,25,32). The literature and the findings of our study show that music therapy may be used as an effective, reliable and cost-free nursing practice in increasing patient comfort and patient safety.

4.4. Limitations

The study is limited to the data of the patients included in the sample and cannot be generalized. Another limitation is that only the effect of music on pain, anxiety and physiological parameters experienced during the compulsory bed rest after the CAG was investigated. In future studies, it may be suggested to compare the effectiveness of music therapy with different complementary approaches.

5. CONCLUSION

In this study, it was found that listening to the music preferred by the patient during the compulsory bed rest after cardiac catheterization procedure was effective in reducing pain and anxiety, and maintaining the hemodynamic balance. Although there are many studies examining the effectiveness of music therapy before and during the CAG, there are no studies examining the effectiveness of listening to music during bed rest after the CAG. Therefore, this result obtained in our study is extremely important in terms of both increasing patient comfort and preventing possible complications during the compulsory bed rest after the CAG. Music therapy is a non-pharmacological, non-invasive, complementary application with no side effects and may be easily integrated into nursing care.

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