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Evaluation of the effect of music on anxiety level of patients hospitalized in cardiac wards before angiography

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ABSTRACT

Background: Patients experience high levels of anxiety before angiography, which is mostly associated with irreparable effects on health status of such individuals. Use of alternative medicine to reduce stress and anxiety is of paramount importance. Therefore, this study aimed to evaluate the effect of music on anxiety level of patients hospitalized in cardiac wards before angiography.

Methods: This clinical trial was conducted on 70 patients admitted to cardiac wards before angiography in three selected hospitals of Shiraz, Iran in 2015. Samples were selected through randomized and available sampling and divided into two groups of control (n=35) and intervention (n=35). In this study, the intervention group received one hour of music before angiography for 20 minutes, whereas the usual care of ward was provided for the control group. Data was collected using the state-trait anxiety inventory (STAI) by Spielberger one hour before angiography (immediately before the intervention) and 20 minutes after angiography (immediately after the intervention) through interviews with all the participants. Data analysis was performed in SPSS version 22 using descriptive statistics, Chi-square, as well as paired and independent-tests.

Results: In this study, mean anxiety scores of patients in the intervention and control groups before the intervention were 48.45±6.63 and 48.25±6.63, respectively. After the intervention, these scores were changed to 44.28±5.21 and 49.02±7.74 in the intervention (P=0.004) and control (P=0.90) groups, respectively. Therefore, a significant difference was observed between the groups after the intervention (P=0.008).

Conclusion: According to the results of this study, music before angiography could lead to a significant decrease in anxiety level of patients. Therefore, this approach could be used as an effective method to alleviate anxiety in patients.

1. Introduction

cardiovascular diseases are the leading cause of 30% of all global deaths and account for nearly 50% of mortality in Iran.[1, 2] In this group of diseases, the most common disorders are cardiovascular diseases, which are considered as the major healthcare problem in developing countries.[3] This disease is caused by narrowing and blockage of the coronary arteries, leading to decreased and ceased myocardial blood flow, heart muscle necrosis and, eventually, death.[4] However, development and improvement of diagnostic and therapeutic techniques have led to a significant reduction in mortality rate caused by this type of disease.[5, 6]

In this regard, one of the most critical approach is coronary angiography, which is applied as a gold standard technique to diagnose cardiovascular diseases.[6, 7] While coronary angiography is the most reliable diagnostic test, it leads to increased patient anxiety especially in those with no previous experience of such procedures.[8] These individuals experience high levels of anxiety before angiography, followed by a moderate level of anxiety after the procedure.[9]

Anxiety is one of the most important nursing diagnoses in patients with heart diseases, causing changes in overall health status of such individuals.[10] In this regard, severe anxiety (more than usual) causes several mental and physical disorders and could leave adverse effects on different body parts, especially heart.[11]

Anxiety before angiography could be associated with elevated heart rate, increased myocardial oxygen demand and ischemic pain. This phenomenon might generate greater pressure on heart, leading to failed implementation of this technique, lack of definitive diagnosis and even death.[12] Therefore, attention to the physical and mental status of cardiac patients, especially those undergoing invasive processes (e.g., angiography), is of paramount importance. In this regard, Hanifi et al. (2012) indicated that if approaching the time of coronary angiography is not associated with nursing interventions to reduce anxiety, patient anxiety level could be significantly increased. Therefore, it seems necessary to provide anxiety management techniques to prevent high levels of anxiety.[13]

A variety of pharmacological and non-pharmacological methods have been introduced in several studies to control anxiety.[7, 14] Pharmacological approaches include the use of benzodiazepines and sedatives.[15] However, control of by medication could be associated with several side effects.[16] On the other hand, complementary and alternative medicine (CAM) is a harmless treatment method with no negative consequences.[17,18]

One of the non-pharmacological interventions is music, used by human beings from ancient times as a tool to express thoughts and feelings and create comfort and tranquility.[19, 20] This method can be independently applied by patients using simple tools.[21] It is worth mentioning that not only this method can be easy adapted by all patients, but it also leads to no negative consequences and undesirable side effects.[22] In a study by Bradt et al. (2013), it was demonstrated that in addition to its calming and uplifting nature, listening to music could result in decreased heart rate, deeper breaths, as well as reduced depression and anxiety levels in patients.[20]

Literature review has revealed confirmed positive impact of music on cardiac patients, including those with acute coronary syndrome and heart failure.[23, 24] In addition, Mirbagher Ajorpaz et al. (2011) reported that listening to music before surgery led to anxiety level reduction and better control of vital signs.[25] However, some of the previous studies have pointed out the ineffectiveness of music on patient anxiety. In this regard, Nilsson (2012) marked that music had no significant effect on anxiety level of women during angiography.[26] Moreover, Razavian et al. (2012) indicated that music had no significant impact on the level of anxiety in patients.[27]

Given the conflicting results in this research area and far-reaching impact of anxiety on cardiac patients and due to the fact that patients experience high levels of anxiety before angiography,[9, 13] this study aimed to evaluate the effect of music on anxiety level of patients hospitalized in cardiac wards before angiography.

2. Methods

2.1. Design

This clinical trial was conducted on patients undergoing angiography admitted to the cardiac wards of three selected hospitals of Shiraz, Iran in 2015.

2.2. Participants and setting

In this study, Sample size was calculated at 32 based on a study by Rabi'ee et al. (2007)[28] and estimation of mean quantitative variable formula ($Z_{\beta\text{-}1}=0.28$, $Z_{1\text{-}\alpha/2}=1.96$, d=10, standard deviation (SD)=12, $\alpha=0.05$, 80% test power and 0.05 significance level). However, the final sample size was calculated at 70 cases (35 per each group) due to the estimated 10% sample loss.

Samples were selected through randomized available sampling and then divided into two intervention and control groups. To do so, simple cards, on which the letters C and M were written, were provided and each participant was asked to randomly draw a card. Patients with C-letter cards were allocated to the control group, whereas those with M-letter cards were assigned to the intervention group.

Inclusion criteria were aged ≥18, consciousness, no history of previous coronary angiography, no use of invasive procedures (e.g., transesophageal echocardiography) before angiography, no valvular heart disease, no acute myocardial infarction, no acute coronary syndrome, no neuropathy and delirium, no hearing impairment, no mental disorders, no use of narcotics, as well as sleeping or anti-anxiety pills and no addiction to drugs. After evaluation of the mentioned criteria, anxiety inventories were completed by the patients before the initiation of intervention, and those with no anxiety problems (obtained scores: <40) were not enrolled in the study. This data was collected using medical records of patients and interviews with relatives.

Exclusion criteria were impaired consciousness and patient deterioration. All data related to

inclusion and exclusion criteria were evaluated according to medical records, observations and interviews with patients and their companions by the researcher.

2.3. Instruments

Data was collected using demographic data (e.g., age, gender, marital status and educational level) questionnaires and state-trait anxiety inventory (STAI) by Spielberger, first designed by Spielberger and Gorsuch in 1970.[29] This scale consists of two parts which assess state and trait anxiety; however, only the latter part was used in the present study. Trait anxiety can be applied for any chosen time by the clinical specialist and people often have no problem with responding to questions about trait anxiety in a special situation at a unique time and place.[30]

Trait anxiety (A-trait) scale comprise 20 sentences which describe a person's feeling "at the time of response taking". At the time of A-trait scale completion, participants were asked to select an alternative that best describes their feelings. This scale consists of 20 items with positive and negative slope. Each positive item is scored on a 4-point Likert scale within the range of 4 (almost never)-1 (almost always). However, the negative items were scored on a 4-point Likert scale within the range of 1 (almost never)-4 (almost always). The total score of the scale is between 20 (no anxiety) and 80 (highest level of anxiety), with a score of 20-39 indicating mild anxiety, 40-59 signifying moderate anxiety, and 60-80 denoting severe anxiety.[14] Validity and reliability of this scale has been confirmed by tiedeman and Clatworthy (1990) and Dehghan Niri and Adib Haj Bagheri (2011).[31, 32] In addition, its reliability was estimated at a Cronbach alpha of 0.82.

2.4. Data Collection

In this study, music (sound of nature) was provided for the intervention group based on standard music in the study by Mirbagher Ajorpaz et al. (2011) [25] for 20 minutes one hour before angiography in the cardiac ward of selected hospitals using a voice recorder and headphones (IPAD, made in Taiwan). Headphones were disinfected after each time of use in order to prevent infection transmission caused by the use of headphones for patients. Patient anxiety was evaluated and recorded in the intervention group one hour before angiography (immediately before the intervention)[33] and after angiography by our researcher through interviews. However, only usual care of the ward was provided for the control group and anxiety score of the participants was evaluated similar to the intervention group.

2.5. Ethical considerations

Data was collected in order to implement the research after obtaining the approval of ethics committee of Shahid Sadoughi University of Medical Sciences, Yazd, Iran and the affiliated hospital authorities. At first, the objectives of our study were explained to the participants and they were assured that they could withdraw from the research at any time. In addition, written informed consents were obtained from the samples prior to the study.

2.6. Statistical analysis

Data analysis was performed in SPSS version 22 using descriptive statistics and independent t-test (to compare differences between the groups in terms of age and mean anxiety score), paired t-test (for comparison of differences in mean anxiety scores before and after the intervention), Chi-square (to evaluate differences between the groups regarding gender, educational level and age) and Fisher's exact test (for comparison of differences between the groups regarding marital status).

3. Results

In this study, demographics of the participants are provided in Table 1. According to this table, no significant difference was observed between the intervention and control groups in terms of the evaluated variables.

Mean anxiety score of patients in the intervention groups was significantly decreased compared to before the intervention (P=0.004), whereas a significant increase was observed in the anxiety scores of patients in the control group. Therefore, a significant difference was found between the study groups after the intervention (P=0.008) (Table 2).

Table 1. Demographic characteristics of patients

Variable	Group	Intervention N (%)	Control N (%)	P-value
Gender	Female	22 (62.9)	20 (57.1)	*0.613
	Male	13 (37.1)	15 (43.9)	
Marital status	Single	5 (14.3)	2 (5.7)	*0.335
	Married	30 (85.7)	33 (94.3)	
Educational level	Illiterate	4 (11.4)	10 (28.6)	*0.144
	Below diploma	6 (17.1)	8 (22.9)	
	High school diploma	15 (42.9)	13 (37.1)	
	Above diploma	10 (28.6)	4 (11.4)	
Age	M±SD	48.25±6.45	49.68±7.54	**0.686

*Chi-square; ** independent t-test

Table 2. Comparison of anxiety level in patients before and after the intervention

Group	Intervention		Control		**P-value
Anxiety	Before intervention N (%)	After intervention N (%)	Before intervention N (%)	After intervention N (%)	
Mild	4 (11.4)	7 (20)	3 (8.6)	5 (14.3)	0.008
Moderate	30 (85.7)	28 (80)	32 (91.4)	29 (82.8)	
Severe	1 (2.9)	0 (0)	0 (0)	1 (2.9)	
M±SD	48.45±6.63	44.28±5.21	48.25±6.63	49.02±7.74	
*P-value	0.004		0.90		

*Paired t-test; **independent t-test

4. Discussion

According to the results of the present study, listening to music was associated with decreased anxiety level in patients undergoing angiography. Several studies have confirmed these results; in this regard, Mirbagher Ajorpaz *et* al. (2011), indicated that listening to music (sound of nature) before abdominal surgery resulted in reduced preoperative anxiety.[25] In a study by Arab *et* al. (2015), classic music was introduced as a simple and cost-effective method with no side effects to reduce anxiety in patients admitted to the cardiac care unit (CCU).[23] In addition, Motahedian Tabrizi *et* al. (2012) marked that use of music during surgery under spinal anesthesia resulted in alleviated anxiety level.[34]

Najafi Ghezeljhe *et* al. (2014) reported that music significantly decreased anxiety in patients with heart failure[24] while the mentioned studies were different in terms of type of music, their results are in line with our findings. According to the results of the current research, music could have a positive impact on anxiety level before an invasive procedure. This effect of music on patient anxiety before an invasive procedure could be due to the emphasis on focusing on a calming and desirable matter rather than on an unpleasant act, such as surgery. In fact, music before surgery can be considered as a response to the patient needs.[35, 36] some researchers, such as Gillen *et* al. (2008)[37], demonstrated that the cause of reduced anxiety level in patients was the effect of music on central nervous system. Some experts believe that music neutralizes the sympathetic nervous system, leading to reduced adrenergic activity and muscle cramps. On the other hand, release of endorphins is associated with improved sense of well-being.[38-41]

Appropriate music could be used as a tool to eliminate negative feelings and adjust internal processes. In addition, it can boost immunity and provide psycho-social integration through preparing a calming state.[25] This process can be considered as one of the causes of reduced anxiety level in patients.[25, 42, 43] However, some studies have pointed out the ineffectiveness of music. In this regard, Nilsson (2012) demonstrated no significant impact of music on anxiety level in women during angiography.[26] In a study by Razavian *et* al. (2012), music had no impact on anxiety level of patients.[27] Moreover, Besel (2006) reported that using music was not associated with decreased anxiety level in mechanically ventilated patients admitted to the CCU.[44] Taylor (2002) marked that no significant difference was observed in anxiety level of patients undergoing cardiac catheterization after the intervention.[45] In another study by Bally *et* al. (2003), no significant difference was found between the anxiety level in patients, who listened to music during angiography, and samples of the control group.[46] The results of the aforementioned studies are not in congruence with our findings, which might be due to type of music, sample population and differences in environmental, social and cultural conditions of participants. In other words, research settings and differences in culture of participants could lead to different results regarding patient anxiety.

One the major drawbacks of this study was the selected sample size, which limited the generalizability of our findings.

5. Conclusion

According to the results of the current research, listening to music could alleviate anxiety level in patients undergoing coronary angiography. Therefore, it is recommended that music be used as a tool by nurses to reduce patient anxiety due to its cost-effectiveness and applicability.

Conflicts of interest

The authors declare no conflicts of interest.

Authors' contributions

Zahra Pourmovahed: Study design, data analysis, preparation and drafting of the manuscript. Hossein Tavangar: Study design, preparation and drafting of the manuscript. Farzaneh Mozaffari: Study design, implementation, data collection, preparation and drafting of the manuscript.

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