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The effect of music on stress and anxiety of dental patients

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Objectives Dental anxiety often leads to avoidance of patients which may result in significant deterioration of oral health. Non-pharmacological interventions such as music are increasingly used in dental care. The purpose of this study was to investigate the effect of relaxing music on the stress and anxiety level of dental patients.
Methods In this study, 40 adult patients were randomly divided into two groups of music and control (no intervention). Each group included 10 females and 10 males. Subjects in the music group listened to relaxation music throughout their dental procedure while the control group did not. Pre- and post-tests were performed using the Spielberger's State-Trait Anxiety Inventory (STAI) and Hari's stress questionnaire in both groups.
Results There were no significant differences between the two groups for baseline data. The mean age of patients in the music and control groups was 37.70±9.29 years and 39.05±5.36 years, respectively. Comparison of moderated means in the intervention and control groups showed that listening to relaxation music caused a reduction in the mean scores of STAI (x=7.746, SE=416, P<0.05) and stress (x=7.746, SE=2.103, P<0.01) in the intervention compared with the control group.
Conclusion This study indicated that relaxing music can decrease the state anxiety and stress of dental patients.
Keywords Anxiety; Dentistry; Music; Stress, Psychological

Introduction

Dental clinic has always been a stressful environment for most patients, which can be due to factors such as fear of injection or other dental procedures, sounds of drilling and the smell of odors.[1, 2] State anxiety reflects an adaptive emotional response or a condition that is characterized by subjective, consciously perceived feelings of tension. It is different from the trait anxiety, which describes the habitual way to respond to everyday situations and is a relatively stable characteristic of an individual.[3] Stress is defined by personal mental perceptions and interpretation of a situation beyond one's ability that could disrupt the health. [4] Anxiety and stress can decrease patients' willingness to seek treatment. Also, in case of referral of these patients to dental clinics, they may disturb the dentists or prolong the visit.[5, 6]
The available strategies to decrease dental anxiety and stress can be divided into two groups of medical and non-medical strategies; music therapy is in the second group.[7, 8] Music therapy is readily available and non-invasive and has no side effects.[9] Music is an innovative art that exists in all cultures. It has an intrinsic expressive power that can be manifested in a variety of ways both on psychological and physical levels. Listening to music is a spiritual and cultural enrichment and a pleasing experience. It can also change the heart rate and respiration rate, or induce excitement or calmness.[10, 11]
Studies have shown that music has a greater impact on the middle-aged people compared with the elderly and children.[12] It is also more effective in reducing temporary pains such as toothache compared with deep pains such as labor and surgical pain.[5, 13] In one study, the patients who were undergoing root canal treatment along with music therapy experienced significantly less anxiety.[4]
The aim of this study was to find out whether a light piece of Iranian music can effectively decrease the level of anxiety and stress of dental patients.

Materials and Methods

This study was conducted according to the principles of the "Declaration of Helsinki'' and approved by the Ethics Committee of Islamic Azad University, Shahr Qods Branch (28520706952002). All participants signed an informed consent form prior to the study. This experimental study was performed on 20 to 45-year-old patients presenting to dental clinics in Tehran. One municipal district at the center of 5 city districts was randomly selected. Among patients, 40 people were randomly selected according to the inclusion criteria. Then, they were divided into two groups of 20 each, including equal number of men and women [11]. The selection of experimental and control groups was random. The inclusion criteria were age over 20 and under 45 years, no anxiety or mental disorders, no intake of sedatives, and willingness for participation in the study. Also, the exclusion criteria were visit-only patients, intake of sedatives or tranquilizers within the past 72 hours before dental treatment, having illnesses such as common cold or herpes and also people who had hearing problems.
In the first appointment, patients rested for a short time in the waiting room with no musing playing and signed informed consent forms. An examiner then recorded the demographic information of patients. A pre-test was performed using both the Spielberger's State-Trait Anxiety

Inventory (STAI)[14] and Hari's stress questionnaires.[15] STAI has 20 items that are scored using a four-point Likert scale, with the total score ranging from 20 to 80. During the pre-test session, no treatment intervention was performed.

The second appointment was scheduled two weeks later. Dental treatment including tooth restoration following local anesthesia was performed for both groups for 30 minutes. For the experimental group, a soft music (Rain of Love album by Nasser Cheshmazar) was played for 30 minutes at a frequency of 40 dB in the clinic environment during the treatment. The choice of this relaxing piece was because of its compatibility with the Iranian culture. In the post-test phase of the control group, the same dental procedure was done under the same conditions but without music playing.[11] At the end of the appointment, the STAI and stress questionnaires were completed again by both groups.

The data of research were prepared by field and library method [3]. Independent t-test was used to analyze the age difference of the two groups. The effect of music on the scores of patients in STAI and stress questionnaires was analyzed by multivariate ANCOVA and one-way ANCOVA, respectively. SPSS software version 20 (SPSS Inc., IL, USA) was used for statistical analysis.

Results

The mean and standard deviation of state anxiety, trait anxiety and stress scores of the participants in the experimental and control groups in the pre-test and post-test are shown in Table 1.

Table 1- Mean and standard deviation of state anxiety, trait anxiety and stress scores of the two groups in the pre-test and post-test

Test	Statistical Index	Experimental group		Contro; Group	
		Pre-test	Post-test	Pre-test	Pre-test
State-anxiety	Mean	38.90	38.35	31.15	38.10
	Standard Deviation	10.53	10.27	11.46	10.14
Trait-anxiety	Mean	34.45	23.95	32.90	34.15
	Standard Deviation	5.29	7.90	4.42	6
Stress	Mean	95.10	95.65	88.30	96.40
	Standard Deviation	14.03	13.10	5.59	12.44

The normality of data distribution was assessed by the Shapiro-Wilk test. The results showed that the distribution of data in the pre-test and post-test was normal in both groups. In addition, multivariate ANCOVA showed that there was no significant difference between the two groups at baseline (P>0.05).

Multivariate ANCOVA and the assumed homogeneity evaluation for variance-covariance by Box's M showed that the mentioned hypothesis was accepted. (Box's M- 5.023), (F-1.29, P=0.05). The result of Bartlett test of sphericity was significant (P=0.01, X2=32.27). This indicated that there was an acceptable level of correlation between the dependent variables. Thus, multivariate ANCOVA was suitable to compare the levels of dependent variable (anxiety and stress) between the two groups.

Moreover, the results of multivariate ANCOVA showed that F value is meaningful at sig = 0.01. (F (3, 33) = 6.745, P=0.001, partial η2=0.380, Wilks Lambda=0.620). Therefore one-way ANOVA was used in order to compare the two groups in terms of state anxiety, trait anxiety, and stress scores. The results one-way ANOVA showed that despite trait anxiety, state anxiety (P<0.05, F (1, 35)=5.14) has been affected at sig=0.05 and the stress (P<0.01, F (1,35)=12.03) has been affected at sig= 0.01.

Discussion

The present study showed that relaxation music decreased the stress and state anxiety, but not the trait anxiety in dental patients.

State anxiety means the existence or creation of anxiety in different situations, while trait anxiety is considered as an attribute and personality characteristic of an individual. Thus, trait anxiety is relatively stable but state anxiety can be changed as a transient feeling of insecurity [16]. A theory states that anti-anxiety effect of music may be due to the arousal of positive emotions in such a way that it could eliminate the negative emotions [17]. Also, Parrott WG [16] found a significant correlation between the reduction of anxiety and increase of the positive mood in the experimental group. Another study evaluated the impact of music on the stress and anxiety of a recalled population for oral hygiene before dental treatment and showed that listening to music 10 minutes before the procedure was more effective in decreasing anxiety than waiting silently in the clinic.[18] Lahmann et al. (2008)[19] studied the dental anxiety and showed that music based on the STAI decreased the intensity of anxiety of patients. However, its effect on those who had extreme anxiety was not very noticeable.

Some other studies focused on the positive effects of music on stress and anxiety.[11, 20] Maulina et al. (2017) [21] stated that religious music was more effective than classical music on Muslims patients, which suggests the effect of culture on anxiety reduction. Music was also effective for stress and anxiety reduction in patients undergoing surgery [22]. Corah et al. (1979)[23] discussed that people may close their eyes while listening to music to focus on music, and they feel like they are someplace else other than the dental office and that is why they can cope with their anxiety and stress. Music also decreases the unpleasant sound of the hand-piece and other dental instruments [24]. In contrast, a few studies reported that music had no effect on anxiety reduction [25, 26]. Controversy in the results may be related to the different types of dental treatments e.g. endodontic treatment which is more stressful for patients compared with restorative procedures performed in the present study, or patients' age, i.e. children versus adults [25].

During the present study, the relaxing music was played in the environment of the clinic with a frequency of 40 dB,

rather than using headphone individually and decreased the state anxiety of patients. The type of music is also important. The music that was chosen in this study was the "Rain of Love" composed by Nasser Cheshmazar to match the Iranian culture and considering its relaxing effect. One study investigating the influence of different types of music genres, including classical, heavy metals or self-selected music, showed that the group who listened to their chosen music had a decreased anxiety and anger level in comparison with those who were in silence condition or listened to heavy metal music. The personal preference of patients may be different from the played music, some people do not prefer any particular music, but some prefer a special genre [27].

The treatment carried out in this study included restoration of teeth under local anesthesia, which was selected considering its stress level. Also, the pre- and post-tests were performed with a two-week interval [26]. This time interval was considered because the patients could become familiar with the pre-test questions. It helped prevent bias.

Similar studies using different types of music on patients undergoing different types of dental procedures are required. This study was conducted in a private dental clinic; thus, generalization of results to other dental centers should be done with caution.

Therefore, results showed that state anxiety and stress in patients referred to dental clinics would be decreased by music.

Conclusion

According to the current results, music playback in the clinic environment during dental treatment decreases the state anxiety and also individual stress level of patients compared with no music played.

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Conflict of Interests

None Declared ■

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