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The effect of using instrumental music on the pain and anxiety levels of patients with impacted third molar surgery

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Abstract

Background: Anxiety and fear about dentistry are a global problem that affects a large number of people around the world. Music, as a soothing method, can be used as a relaxing treatment to relieve anxiety and discomfort pain of the patient.

Purpose: This analysis aimed to check the instrumental music therapy effect on anxiety and pain levels in patients undergoing surgical treatment of an impacted third molar.

Materials and methods: In this investigation, 88 patients who were contender for third molar extraction were isolated into the mediation and control groups. In the mediation bunch, delicate instrumental music was played from the time the patients went into the working room until the finish of the medical procedure when the patient left the room. Patients' pain and nervousness levels were estimated by the Visual Analog Scale (VAS).

Results: The consequences of this investigation showed that there were no measurably critical difference in depression, pain, preoperative anxiety, and postoperative uneasiness in the control and intervention group (P>0.05); however, preoperative anxiety was basically more noteworthy than postoperative anxiety in the two group (p=0.001).

Conclusion: As per the outcomes, it sems to be that utilizing music doesn't lead to measurably significant difference in the nervousness level in patients going through third molar medical procedure. However, it is suggested that different analysts direct further examinations with larger sample sizes just as choosing the music dependent on the people's preferences.

Introduction

Fear and anxiety about dentistry is a global problem that affects a large number of people [1,2]. Dental health has a positive effect on both general and mental health [3], so it is necessary and beneficial to maintain oral health and try to protect and strengthen it. One way to assess your oral health is to visit your dentist. Going the dentist, being in the dental office, or lying on the dental chair does not make the patient feel good [4].

Epidemiological studies show that about 20-30% of people's experience fear and anxiety about dental treatments that raise certain problems [5]. About 40% of modern Western society is worried about visiting a dentist, and 20% are extremely fearful [6]. Despite advances in dental equipment technology and dental science, dental phobia and dental anxiety still exist among patients [7]. Sometimes fear and anxiety lead to patient behavior that prevents the dentist from providing medical services [8]. This fear can be so intense that it makes patients feel like imminent death and prevents them or their family from going to the dentist or seeking help [9]. Anxiety and fear can affect the patient-dentist relationship; they also lead to more serious injuries such as exacerbation of the disease, impose large financial costs on the patient, lead to misdiagnosis and weaken the dentist's confidence [10,11].

In general, 50% of people suffer from dental fear and about 8-11% of them go to the dentist only in case of serious problems [12]. Research has pointed to various stressors; among them, the sound of dental equipment, non-sterile instruments and the dentist's lack of effective knowledge about treatment were expressed as factors that increase fear [13,14].

Relaxation is one of the non-pharmacological approaches to reducing the level of anxiety [15]. Music therapy is a supportive profession and patients with various physical and mental problems and/or social and emotional problems and disorders can benefit from music therapy services. There is no age limit to receive music therapy services, and patients can be treated using this method from infancy to old age [16]. Music therapy is used to treat many emotional, psychological and physical problems in different people. The most important problems include sadness, communication problems, pain, and anxiety [17].

Fear and anxiety are more common with surgery (such as surgery on a wisdom tooth) than with other dental procedures (such as dental restorations). Therefore, it is very important to find a way to reduce patient anxiety during surgery. Due to the conflicting results of existing studies and the scanty studies conducted in Iran, this study was conducted to investigate the effect of music therapy on pain and anxiety levels caused by surgical treatment of the third molar in patients referred to a private dental office in Sari.

Materials and methods

This clinical study was conducted in 2020. The study population included patients who applied to a private dental office of a maxillofacial surgeon for the removal of the third mandibular molar with mesioanglular-impacted (class 2B according to the Pell and Gregory classification). The reason for choosing this impaction was associated with its relatively high prevalence in the population [18].

Patients

The sample size was estimated at 88 (44 in the intervention group and 44 in the control group) based on the results of a study by Keilani et al. (nineteen). **Inclusion criteria:** age from 18 to 25 years, the presence of a third mandibular molar with a mesio-angle stroke of class 2B according to the Pell and Gregory classification, the absence of somatic, cardiovascular, pulmonary and liver diseases, as well as known hearing impairment according to the patient's opinion, maximum systolic pressure. Blood pressure 15.9 and maximum diastolic blood pressure 10.9 mmHg, suffering from unknown mental disorders, having a moderate level of anxiety (determined using the DASS-21 questionnaire) and wishing to participate in the study. Exclusion criteria included taking medication associated with anxiety (anxiety or anxiety) 72 hours before dental treatment and any dental emergencies such as vasovagal syncope and allergies.

Experimental environment

The study was performed in a clinic room, free from other noises, and the temperature was maintained at 24°C [14]. Patients lay in a supine position on the dental chair, and the procedures were performed at 2:00 PM to minimize the effects of circadian rhythm.

Headphones were used in all procedures and the patients closed their eyes. BP monitoring was carried out throughout the procedure.

Protocol

To homogenize the anxiety level samples, the DASS-21 questionnaire was first completed by all patients; the study included patients with moderate anxiety. The DASS-21 questionnaire consists of 3 parts, each of which contains 7 questions. A score from 0 to 3 is considered for each question, and the final score for each component is obtained by summing the scores for the relevant questions. Since the DASS-21 is a short form of the original 42-item DASS, the final score for each component was doubled and symptom severity was assessed using the corresponding table [20].

The samples were casually divided into a control group (without music) and two intervention groups (with music) depending on the days of treatment. In the intervention group, soft instrumental music sounded from the moment patients entered the operating room until the end of the operation, when the patient finished and left the room. The type of music in the present study was chosen in accordance with a study by Maleki et al., Who studied the effect of Love Rain music on anxiety reduction in endodontic treatment. The "Rain of Love" CD contains 60-90 minutes of instrumental music. In a study by Maleki et al., This music was rated and selected as relaxing music by a neurologist/neuroscientist, dental specialist and psychiatrist [21].

Visual analogue scale analysis

In the present study, the pain and anxiety levels of patients in both groups were measured using a visual analogue scale (VAS) [22]. VAS is a measure with a 10 cm line that ranges from zero to ten, where zero means no pain or anxiety, and ten means most pain or anxiety. The patient determined the intensity of his pain/anxiety on the line. The pain / anxiety intensity was

then calculated to a millimeter from zero. This index was used to determine the level of pre- and postoperative anxiety in patients, as well as their postoperative pain [22].

Surgery procedure

First, lidocaine gel was applied. The patient was then anesthetized using 2 cartridges of 2% lidocaine with epinephrine 1: 80,000 and a 27-gauge long needle in the form of inferior alveolar nerve block and long buccal nerve anesthesia. Then, an envelope flap was inserted into the desired place, and after the removal of the bone and the incision of the tooth, the impacted tooth was removed. As a result, the site was sutured up with a 0.3 suture. It should be noted that all surgical interventions were performed by a maxillofacial surgeon.

Analysis points

Data was fed into SPSS version 25. The data were described using mean, standard deviation, and median. Since the pain and anxiety variables were quantitative, the normal distribution was evaluated by the Shapiro-Wilk test. To analyze the data, Pearson Chi-Square, Mann-Whitney, and repeated measures ANOVA tests were employed with a significance level of less than 0.05.

Relative ration of HR

HR data are expressed as relative ratios of HR at specific time points (administration of local anaesthesia, incision, flap reflection, bone removal, separation of the tooth crown, and extraction) to that at rest. No relevant within-group differences were observed at rest, during local anaesthesia, incision and flap reflection, bone removal, separation of the tooth crown, and extraction) to that at rest. No relevant within-group differences were observed during local anaesthesia, incision and flap reflection, bone removal, separation of the tooth crown, extraction, or suturing in the control and music groups. No relevant between-group differences were observed at rest, during local anaesthesia, incision and flap reflection, bone removal, separation of the tooth crown, extraction, or suturing between the control and music group.

Results

In the present study, 88 patients including 45 women (51.5%) and 43 men (48.9%) took part. According to Table 1, the Pearson Chi-Square test revealed that there were no statistically significant differences in gender (P=0.831), education level (P=0.182), and marital status (p=0.088) between the control and intervention groups.

Post-operative scores

Table 2 demonstrates that the mean scores of pains among patients were 2.09 ± 1.395 and 1.93 ± 1.208 in the control and intervention groups, respectively. Furthermore, the mean score of preoperative anxiety was 2.50 ± 2.006 in the control group, while it was 2.66 ± 1.363 in the intervention group. The mean scores of postoperative anxieties were, respectively, 1.09 ± 1.291 and 1.09 ± 1.074 in the control and intervention groups. Mann-Whitney test showed that the differences in the pain level (P=0.668), preoperative anxiety (p=0.530), and postoperative anxiety (p=0.639) were not statistically significant between the control and intervention groups.

As it is observed in Table 3, repeated measures ANOVA demonstrated that there was no statistically significant difference between patients' anxiety in the control and intervention groups (p=0.774). Moreover, the results of the Wilcoxon test showed that postoperative anxiety was significantly lower than preoperative anxiety in both intervention and control groups (p=0.001).

Table 1: Frequency of gender, education level, and marital status in intervention and control groups.

Variable		control group	Intervention group	Total	P- value
		Frequency (Percent)	Frequency (Percent)	Frequency (Percent)	
Gender	Male	22 (25)	21 (23.9)	43 (48.9)	0.831
	Female	22 (25)	23 (26.1)	45 (55.1)	
	Total	44 (50)	44 (50)	88 (100)	
Marital status	Single	19 (21.6)	27 (30.7)	46 (52.3)	0.088
	Married	25 (28.4)	17 (19.3)	42 (47.7)	
	Total	44 (50)	44 (50)	88 (100)	

Table 2: Mann-Whitney test of study variables between control and intervention groups.

Variable	Group	Median	Mean	Standard deviation	Minimum	Maximum	Z	p-value
Pain level	Control	2	2.09	1.395	0	6	0.428-	0.668
	Intervention	2	1.93	1.208	0	4		
Preoperative anxiety level	Control	2	2.50	2.006	0	7	-0.628	0.530
	Intervention	2	2.66	1.363	0	5		
Postoperative anxiety level	Control	1	1.09	1.291	0	4	-0.470	0.639
	Intervention	1	1.09	1.074	0	4		

Table 3: Repeated measures ANOVA for anxiety level between the control and intervention groups.

Source	Sum of Squares	df	Mean Square	F	sig.
Constant	592.778	1	592.778	176.738	0.000
Group	0.278	1	0.278	0.083	0.774
Error	288.443	86	3.354	-	-

Discussion

Many patients undergo surgery every year; this has always been an unpleasant experience for the patient and his/her family. That is, they experience varying degrees of anxiety, from mild to severe, which is a natural response to any surgery [23]. People are constantly experiencing anxiety throughout their daily life; it is an emotional mental response to stressors. Quite a number of studies have shown that anxiety is a beneficial response to a life-threatening condition [24]. A person's response to stress is directly related to the function of the person's immune system; anxiety activates a large number of hormonal glands as well as nerve nodes throughout the body. Increased stress can lead to increased levels of hormones, including cortisol, in the blood, which can suppress the immune response and wound healing. Preoperative anxiety stimulates the sympathetic, parasympathetic and endocrine systems, which leads to increased heart rate, heart irritability, increased blood pressure and tachypnea, which cause arrhythmia [25].

The results of this study showed that the difference between preoperative anxiety, pain and postoperative anxiety in the intervention group and the control group was not statistically significant. Likewise, a study by Lahmann et al. Found that playing music did not have a significant effect on reducing anxiety in patients who experienced severe anxiety about dental procedures [26]. In a similar vein, Razavian et al. have shown that playing relaxing music does not affect pain and anxiety or heart rate in patients undergoing endodontic treatment [27].

On the other hand, several studies have highlighted the beneficial effects of relaxing music in reducing anxiety and pain during dental treatment. For example, Lai et al. have shown that relaxing music can significantly reduce dental anxiety during treatment [28]. Another study by Gupta et al. Demonstrated that playing music during minor oral surgery significantly reduced patient anxiety, although it did not decrease heart rate in any patient [29]. Moreover, Berbel et al. stated that playing music effectively reduced anxiety, heart rate, blood pressure and cortisol levels in patients in the same way as taking diazepam. The results of these studies contradict the results of our study; the difference can be attributed to different statistical groups and the age range of study participants [30].

Karalar et al. conducted a study and concluded that music therapy using noise canceling headphones significantly reduces pain and anxiety in patients; this was in contrast to the results of our study. The reasons for this discrepancy are the difference in music quality and the elimination of ambient noise in this study. This factor can reduce patient pain and anxiety because the patient did not hear the noise of instruments used during tooth extraction, such as surgical turbines and an aspirator [31].

On the other hand, studies conducted on the effect of playing music on reducing pain and anxiety among children, such as Aitken et al. [32] and Marwah et al. [33] demonstrated that musical accompaniment does not significantly affect dental anxiety in children. This finding is consistent with the results of this study. In contrast, Alkahtani et al. conducted a study titled "The effect of music on children's anxiety during dental procedures" in Saudi Arabia and concluded that listening to music during dental treatment is one of the most effective non-pharmacological methods that can be used to reduce anxiety in children [34].

Conclusion

Knowing the patient's level of pain and anxiety helps to better assess it. Music seems to be a spiritual and psychological way to calm down, as patients have shown an overwhelming response to this therapy practiced in dentistry. The effect of listening to soothing music significantly lowered heart rate and diastolic blood pressure. However, according to the outcome of the present evaluation, it seems that playing music during surgery does not cause a statistically significant difference in the level of pain and anxiety among patients who underwent third molar surgery. However, it is advisable to do further research with larger samples and to select music based on individual preferences.

Highlights

1. As per the outcomes, it sems to be that utilizing music doesn't lead to measurably significant difference in the nervousness level in patients going through third molar medical procedure. However, it is suggested that different analysts' direct further examinations with larger sample sizes just as choosing the music dependent on the people's preferences.
2. The results of this study showed that the difference between preoperative anxiety, pain and postoperative anxiety in the intervention group and the control group was not statistically significant. Likewise, a study by Lahmann et al. Found that playing music did not have a significant effect on reducing anxiety in patients who experienced severe anxiety about dental procedures.
3. The reasons for this discrepancy are the difference in music quality and the elimination of ambient noise in this study. This factor can reduce patient pain and anxiety because the patient did not hear the noise of instruments used during tooth extraction, such as surgical turbines and an aspirator.

Ethical approval and consent to participate: Ethical considerations and the need for informed consent were needed also. All procedures were carried out under the supervision of an expert on radiology and by his direct permission and the ethical code No. 3606 of the Code of Ethics IR.MAZUMS.REC.1399.7424. endorsed by the School of Dentistry and Vice-President of Research and Technology, Mazandaran University of Health Sciences, all patients of this manuscript have content to participate in this research.

Consent for publication: all authors have consent for publication in journal.

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