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THE EFFECT OF MUSIC IN REDUCING PATIENT'S ANXIETY TOWARDS DENTAL TREATMENT

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Abstract: *It is a universal phenomenon people avoid going to see the dentist because of anxiety and fear. Theory suggests that music has an ability to decrease the level of stress, pain, and anxiety by diverting the patient's attention from the source of unpleasing stimuli. This study was design to assess the effect of listening to background music and patient's anxiety level during dental treatment. Sixty patients were randomly divided into a fast beat music group (n=15), slow beat music group (n=15), spiritual music group (n=15) and a control group (n=15). After listening to music for 15 minutes, dental procedures such as anaesthetic injection or drilling sounds were introduced. Patient's blood pressure and heart rate were recorded before, during and after exposure to music intervention. Result revealed that there were no significant effect of music in reducing the anxiety level among the patients except for post-systolic blood pressure was significantly higher in spiritual music group compared to no music group (p= 0.047). These finding suggest that listening to music and different type of music does not have any effect on patient's anxiety level in dental setting.*

Keywords: *dental anxiety, music, dental fear*

Introduction

The term 'anxiety' is referred as unconscious state in which the person will initiate a sort of mechanism of defences response. It will usually arouse if a person is facing a problem, making an important decision, before taking a test and many more. Some general symptoms of anxiety are panic, irrational fear, uneasiness, heart palpitation, dizziness, nausea, persistent worries, difficult to socialize and others. According to Fredric N. Busch et al., (1999) these kind of patient has difficulty in controlling their feelings and thought.

Dental anxiety is one of a problem that do not only affects patient but also dental general practitioner (S.M. Cohen et al., 2000). In one survey conducted by the British Dental Health

Foundation, 36% of them didn't see a dentist regularly due to fear. In America, estimated about 35 million people avoid seeing the dentist because of anxiety and fear.

Factor causes dental anxiety is varies. First, it can be due to undesirable past dental experience by the patient. Those who suffering pain and unpleasantness such as choking, uncertainty and loss of teeth during dental treatment in the past shows higher anxiety level (Jane Wardle. 1982). Dental practitioner should understand that when a patient lay down on the dental chair, they will feel helpless. Being not able to see what is happening inside their own mouth may escalate their curiosity and anxiety level (Australian Research Centre For Population Oral Health [ARCPOH], 2016).

Dental anxiety and fear might also occur due to dental procedure itself. Less exposure to the dental settings (Andrée L & David L, 2000) and lack of confidence towards the skills of dental practitioner contributes in increasing patient's anxiety (ARCPOH, 2016).

Specific procedure and steps in dental treatment may stimulate dental anxiety. Extraction and injection of local anaesthetic were found to be the most appalling procedure (JM Armfield & LJ Heaton. 2013). Invasive treatment in dental procedure such as giving local anaesthetic and drilling of teeth contribute in increasing level of dental anxiety (Steffen Mickenautsch et al., 2007).

Other factors include fear of pain during dental treatment (Shalender Sharma et al., 2015). Regardless of advancement of technique and procedure in giving dental treatment, perception of having pain is still the main concern to some patient (ARCPOH, 2016). According to Aitken J & Wilson S. (2001) patient with high dental anxiety experience more pain than normal patient. The pain also last longer. Negative dental experiences can affect the future expectation, increase anxiety level thus cause more pain. Patients who has undergone painful experience during dental treatment before are more likely to have higher level of anxiety (David Locker et al., 1996).

Music has become a fundamental aspect in human life as it strongly bond to human's relaxation state that is deeply ingrained in all living life (Steffen Mickenautsch et al., 2007). Besides that, music also known as device that relaxing and pleasant beside enhancing the psychological process of relaxation (Shalender Sharma et al., 2015).

Background music exposure is believe can reduce anxiety level and stabilize vital signs of patient. A study published in 2013, four meta-analytic Cochrane reviews consistently reported that anxiety level of patients with coronary heart disease can be reduce by listening to music (Udoye Cl et al., 2005).

There was also study in 2010 where assessment of anxiety during dental treatment were recorded by psychological means and it was concluded that audio distraction significantly reduced the anxiety level in music group for procedure under local anaesthesia (Kaur et al., 2015).

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Problem Statement

Elements that shield individuals from visiting the dentist as frequently as they ought to be are stressed over the agony of the procedure, anxiety and fear. There is increase request from a patient who wants to experience painless dentistry by means of non-pharmacological technique. Theory suggests that music has an ability to decrease the level of stress, pain, and anxiety by diverting the patient's attention from the source of unpleasing stimuli. This investigation was intended to take a gander at an opportunity of utilizing music foundation in the dental setting with expectation that patients' anxiety and fear will be lightened during the dental procedure.

Objectives

The purposes of this study are to assess the effect of listening to music and patient's anxiety level in dental settings. Apart from that, this study is conducted to evaluate the effect of different type of music on anxiety level of patient receiving dental treatment.

Hypothesis

For anxiety patient receiving dental treatment, background music exposure can help to reduce their anxiety level**.**

Methodology

This experimental study has been carried out from April 2017 to December 2017. All data were collected at USIM dental policlinic. This study was approved by the ethical committee from Faculty of Dentistry USIM.

Patients selection

The inclusion criteria's are subject age must be 18 years old and above, patient's score Corah's Dental Anxiety Scale, Revised (DAS-R) are moderate to high anxiety (score 9-14), able to comprehend English, no apparent hearing impairment and not scheduled as a "first case" on dental treatment. Candidates who didn't matched with these criteria were excluded.

Materials

Questionnaires are based on Corah's Dental Anxiety Scale, Revised (DAS-R), by Ronis (1994). It consists of four simple questions with five choice of answers and each answer has its own score. The total score will indicate anxiety level of the patient. Scores between 9 to 12 indicates moderate anxiety, 13 to 14 indicates high anxiety and 15 to 20 indicate severe anxiety.

Study protocol

Assessment of anxiety level

Patient were given Corah's Dental Anxiety Scale, Revised (DAS-R) questionnaire before intervention started. Subjects who fulfilled the criteria were eligible to enrol. Blood pressure and heart rate of the subject were pre recorded (pre-intervention). Recruited subjects were then randomly distribute to assigned groups ; fast beat music group (100-120 beat per minute), slow music group (60-70 beat per minute), spiritual music group (nasyeed/Holy Quran recitation/other religious song), control group (no music) and brought to the surgery room where music background type has been predetermined. They listened to the playing music background for 15 minutes. In the middle during this period of time, blood pressure and heart rate were recorded (intra-intervention). After 15 minutes, dental treatment intervention such as introducing local anaesthesia injection and drill sound from handpiece were introduced. After treatment completed, their blood pressure and heart rate were remeasured and recorded (post-

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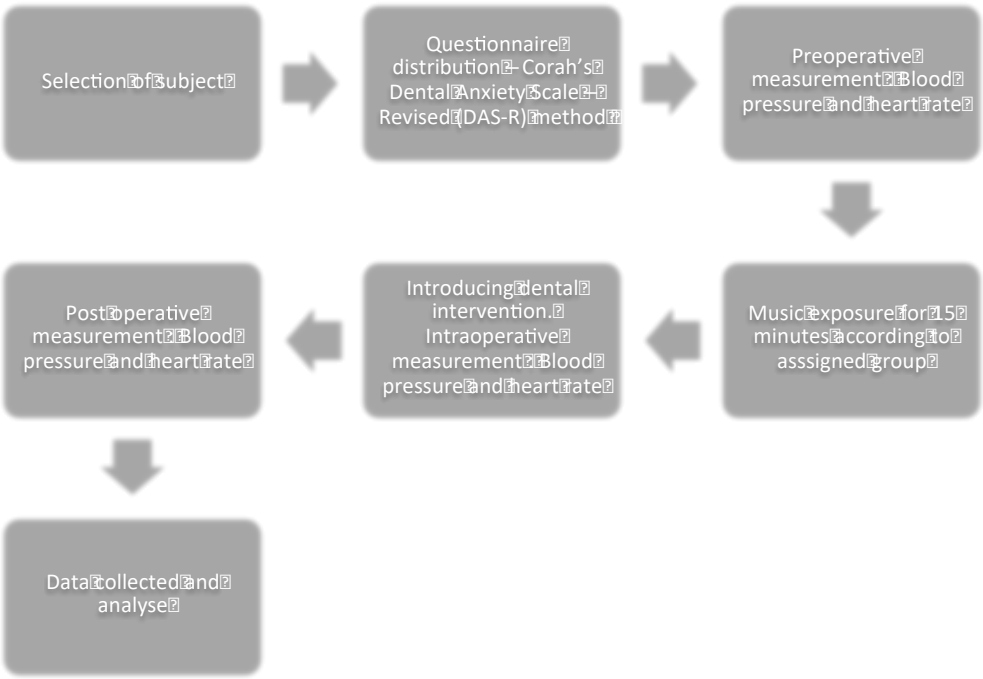
intervention). In all cases, effort were made to ensure the study were conduct in silence within the clinic room to prevent any cofounding sound.

Statistical Analysis

The data entry and analysis was done by Statistical Package for Social Science (SPSS) version 21. ANNOVA test was use for statistical analysis. The $p<0.05$ was considered as significant.

Study protocol chart



Result

Of sixty subjects involved in this study, 23.3% are male and 76.6% are female with age range from 18 to 68 years old. They were divided into equal amount of 4 groups of different type music; slow beat music (N=15), fast beat music (N=15), spiritual music (N=15) and no music (N=15). These 4 groups were analysed according to parameters of dental anxiety measurement; systolic of blood pressure, diastolic of blood pressure and heart rate using repeated measure Anova. There is no significant difference was found between type of music, within group and time interval ($P>0.05$). However, there was a significant difference between spiritual music and no music postoperatively ($P= 0.047$, $P<0.05$). Our study showed, spiritual music has increased anxiety level in patient receiving dental treatment.

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Table 1: Anxiety level of patient on seeking for dental care of different type of music at different time (pre, during and post).

Time of introduction to treatment	Mean (SD)			
	Types of music			
	Slow	Fast	Spiritual	Control
Systolic BP (mmHg)				
Pre-	110.7	112.7	114.9	107.5 (7.7)
During	(14.9)	(9.5)	(16.2)	107.0 (8.3)
Post-	113.7	113.7	117.1	103.3 (8.5)
	(14.9)	(11.0)	(10.6)	
	110.6	106.7	116.5	
	(14.1)	(10.0)	(15.6)	
Diastolic BP (mmHg)	69.4 (8.1)	71.5 (5.7)	74.0 (9.8)	68.6 (5.6)
Pre-	74.4	72.2 (8.0)	75.0 (10.6)	69.7 (5.8)
During	(11.9)	69.5	75.7 (11.7)	66.1 (5.3)
Post-	70.7	(10.6)		
	(12.0)			
Heart rate				
Pre-	79.1	80.7	72.9 (10.3)	75.7 (14.9)
During	(11.8)	(15.7)	75.4 (12.5)	77.5 (14.4)
Post-	81.5	80.9	73.2 (10.4)	73.5 (9.1)
	(13.4)	(12.1)		
	77.7	78.2		
	(10.7)	(10.9)		

Repeated measure ANOVA

Time-effect for Maunchy's test was not significant. Univariate test was done.

Pairwise comparison of post-systolic BP between groups using scheffe test ($p<0.033$).

Significant different found between spiritual music and control [mean difference = 13.13, 95% CI= 0.11, 26.15, p= 0.047].

No significant difference was found for between type of music and within-between types of music.

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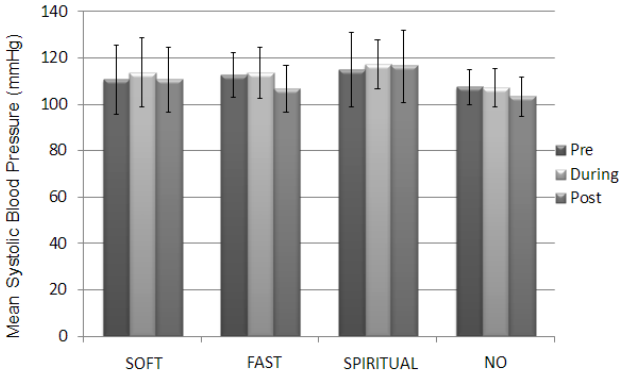

Figure 1: Bar Graph of Mean Systolic Blood Pressure on Different Type of Music at Different Time of Exposure

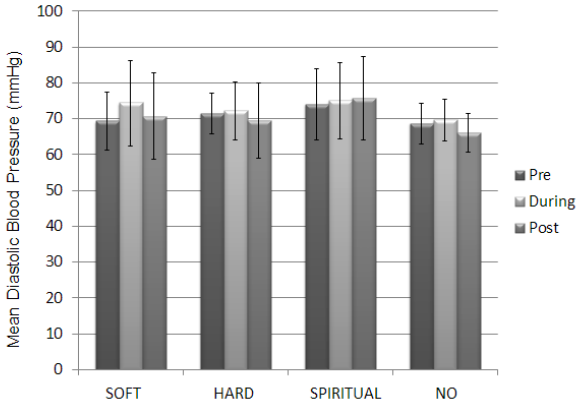

Figure 2: Bar Graph of Mean Diastolic Blood Pressure on Different Type of Music at Different Time of Exposure

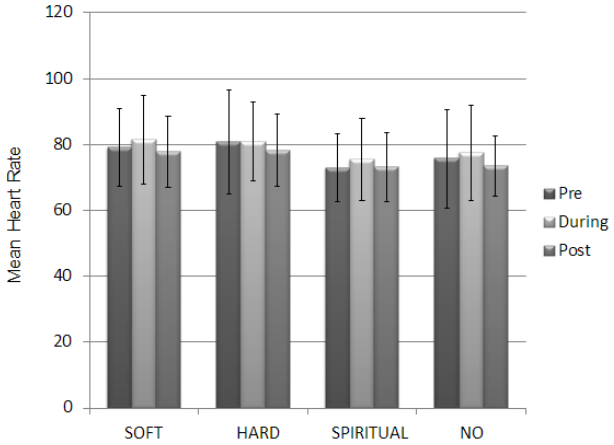

Figure 3: Bar Graph of Mean Heart Rate on Different Type of Music at Different Time of Exposure

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Discussion

Dental anxiety can increase sympathetic and parasympathetic nerve system activities. Increased sympathetic nerves activity and noradrenaline secretion will lead to increase in blood pressure, heart rate, and muscle contractility. In our study, we hypothesized that participants who listened to music prior to dental treatment will show significant different reading in blood pressure (systolic and diastolic) and heart rate. In the presence of background music, the parasympathetic nerve system will be activated. This mechanism will decrease muscle contractility and the heart rate. Hence, in general, listening to music is tend to reduce anxiety (Lai et al., 2008).

Our study showed, different type of music does not decrease anxiety in patient receiving dental treatment. This result is in concordance with Myriam et al. (2013), who stated that listening to music had no effect on psychological measures, including stress perception or anxiety. Our result also similar to study conducted by Aitken & Wilson, (2001) which found there is no significance finding between listening to folk music, relaxing music and no music on 45 participants who undergoing treatment in conservative dentistry. We observed that patients who have moderate to high anxious were not affected by listening to music.

However, our finding seem to be different from many previous studies had reported. Some studies revealed that dental anxiety reduced by music intervention during dental extraction (Tantry et al., 2017). There were also report that listening to background music reduce tension in male patient undergo filling treatment (Bereziewicz W & Bereziewicz E, 2008) and patients who received endodontic treatment (Lai et al., 2008). Insignificant results shown in our study might be due to participants were not given a chance to choose their preferred music, hence this study was not effective in decreasing their anxiety level towards dental treatment. Allen et al. (2001) stated that perceived stress or anxiety can be decreased by allowing persons to listen their own choice of music. This statement was supported by a study in 30 anxious individuals who chose their preferred music showed significantly decline anxiety (Darcy D. 2003). In other study, patients that will undergo dental surgery were given opportunity to listen their own choice of music reduced their anxiety level (Grzesiak & Teodorczyk, 2004). Other than that, there are few others possible reasons why our study did not perceive any significant anxiety reduction associated with music. Dental intervention on the dental chair permits active processing of many sensory inputs by the subject. Although music background was used as tool to distract subjects in this study, they were still able to process the sounds of dental hand piece and gaze at the needle syringe. Hence, it is possible subjects from all four groups were equally anxious as they were aware the dental intervention was taking place.

Listening to spiritual music such as Holy Quran (including recite prayers) and others religious music in different belief is useful for health. For example, studies show that the level of depression and anxiety can be reduced and the level of spirituality can be increased by prayer. This is because negative emotions can be removed through prayers (Peter A et al., 2009). Through prayers, the believers start to asked forgiveness to God thus elevate the positive relationship between believers and God. There's a study showed that listening to religious or spiritual sound had a positive impact on surgery, anaesthesia and stability of the vital signs. Interestingly our study revealed a contradict result as an anxiety level of participant in spiritual music group was higher in comparison than that of no music group postoperatively. Despite the results of present study, the finding from one study conducted in Indonesia by Tantry Maulina et al, (2017) involving 205 participants claimed religious Islamic music was proven in reducing

dental anxiety compared to classical music. Because we couldn't found many study to relate the effect of religious music to dental anxiety to support our present data, this result may be inconclusive. It is essential for researcher to do more study on effect of religious music on dental anxiety in the future.

Conclusion

Our study showed listening to music and different type of music does not have any effect on patient's anxiety level in dental setting. Differences in research methodology (number of subjects, type of music and music duration) can be mentioned as the reasons for the differences between the present study and the aforementioned studies. We would like to recommend additional investigations using a larger sample size and control environment condition to validate these finding.

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