Research Article

ANALYSIS OF DENTAL ANXIETY LEVELS IN PATIENTS RECEIVING PROSTHODONTIC CARE AND EFFECTIVENESS OF MUSIC THERAPY IN REDUCING DENTAL ANXIETY - A CLINICAL STUDY

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ABSTRACT

Objectives: There is a certain degree of dental anxiety that exists in patients receiving prosthodontic treatment. This may be through their previous dental experience or as a result of perceptions and negative beliefs. This study evaluates

- Subjective and objective measures for recording dental anxiety
- Effectiveness of music as a method of reducing dental anxiety in patients receiving prosthodontic care.

Method: Fifty patients, 20-70yrs were selected to receive prosthodontic treatment. To evaluate for subjective level of dental anxiety, a pre-treatment questionnaire based on Corah's dental anxiety scale was filled in by patients and to evaluate objective parameters, patient's blood pressure, heart rate and oxygen saturation levels were measured pre-treatment, during treatment without music therapy and during treatment with music therapy.

Results: The mean total anxiety scale for 50 patients Male 24 and female 26 that were treated was 7.98 (SD= 3.5). Of the 50 patients, 16% had moderate dental anxiety, 10% had high anxiety and 4% had severe anxiety. Multiple comparison Bonferroni test showed a significant difference (p$\Box$0.05) for blood pressure and heart rate took pre-treatment and during treatment with music therapy.

Conclusion: The study highlighted, dental anxiety exists in patients receiving prosthodontic care and that music therapy is an easy, economical and effective aid in reducing dental anxiety levels during prosthodontic treatment.

INTRODUCTION

Patients receiving dental treatment experience varying degree of dental anxiety and fear. It is important as a clinician to address patients anxiety and fear levels at the start of dental treatment to gain patients confidence and to successfully complete dental treatment.

Dental anxiety is an emotional state that precedes the actual encounter with threatening stimuli which sometimes is not even identifiable[1]. It is a frequently encountered problem in dental practice. Treating anxious patients is stressful for the dentist that needs patient co-operation thus taking valuable clinical time and resources[2]. It is important to identify these patients at the earlier consultation and their concerns addressed. The dentist-patient relationship dominated by severe dental anxiety may lead to misdiagnosis and inappropriate treatment according to Eli.[3]

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The degree of dental anxiety may be influenced by previous dental experience or negative beliefs and perception.[4] Several measures and scales have been developed to classify dentally anxious patients and to assess their level of anxiety.[5, 6] Treating and managing patients with dental anxiety is not very easy.[7,8,9] Broadly the management includes psychotherapeutic interventions, pharmacological interventions[10] or a combination of both.[8]

Some of the many subjective methods used for measuring dental anxiety include the Corah dental anxiety scale, the Spielberger state-trait anxiety inventory, the visual analog scale and the Kleinknecht dental fear survey.[5] In 1969, Dr. Norman Corah developed a psychometric questionnaire to measure the relative anxiety of dental patients.[11] The scale contains four multiple-choice questions dealing with the patient's subjective reactions about going to the dentist, waiting in the dentist's office for the procedure, and anticipation of having an injection and drilling. Points are assigned for the patients' choices, with points ranging from one to five points. Total scores range from 4 to 20. Objective measures are used to evaluate a psychological response.[12, 13] The measurement of physiologic function plays an important

role in the field of behavioral assessment. Anxiety produces psychophysiological changes caused as a result of an increase in the activity of the sympathetic branch of the autonomic nervous system.[13] These responses lead to changes in the cardiovascular system (blood pressure and pulse rate), respiratory system (sighs, breathless), digestive system (dry mouth), skin (sweating) and muscle (muscle tone, spasmodic movements)

Music offers an alternative treatment option that has been used in medical specialities[14] to assess physiological, psychological, and spiritual needs of patients. The anxiolytic effects of music have been studied in a variety of medical patients, including surgical[15], cardiac[16], and oncology patients[17]. People of any age may benefit from a music therapy programme regardless of musical skill or background. Music is believed to reduce dental anxiety by either having a relaxing or distracting effect[18] (or both) that in turn reduces the activity of the neuroendocrine and sympathetic nervous systems.[4, 19]

Hence the present study is designed to evaluate dental anxiety levels using subjective and objective scales and to investigate the effectiveness of music in reducing dental anxiety for patients receiving prosthodontic treatment.

MATERIALS AND METHODS

The study was conducted on 50 patients aged between 20-70yrs selected to receive prosthodontic treatment at Dept of Prosthodontics, Navodaya Dental College, Raichur, Karnataka. Written informed and verbal consent was obtained from all patients. The subjective assessment tool consisted of questionnaire form containing the dental anxiety scale modified to prosthodontic needs and was used to measure the level of dental anxiety. It was printed in both English [Image 1] and Kannada language. [Image 2] The translated Kannada version was reviewed by the authors with the translators to eliminate any difference in the meaning of original version. Patients filled out the forms before their treatment in the waiting hall.
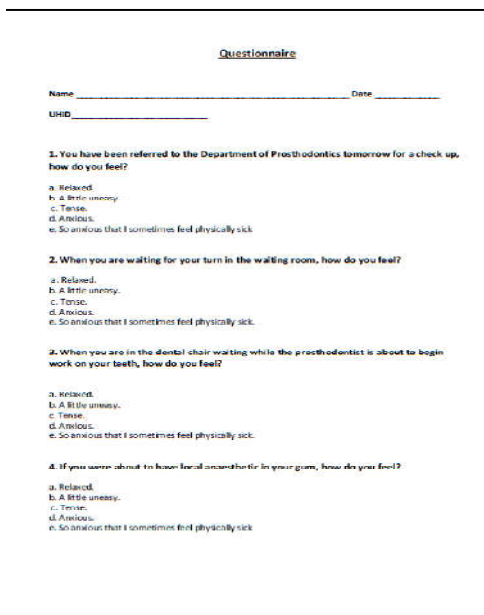

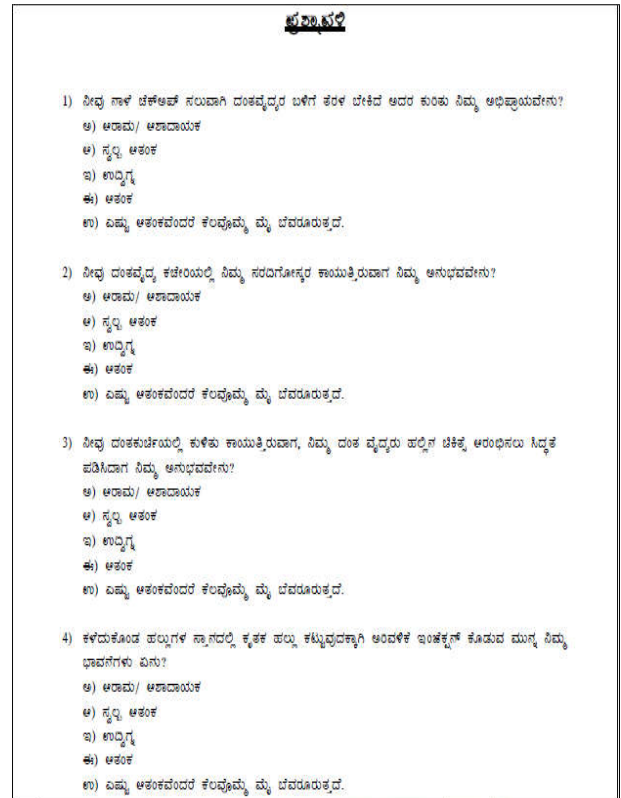**Image 1** English Questionnaire

Image 2 Kannada questionnaire

Vital sign parameters for objective assessment such as blood pressure, heart rate, and oxygen saturation were recorded at three different intervals. Recordings of vital signs were taken before treatment, during treatment without music therapy and during treatment with music therapy. The categories selected for music to be played included devotional, classical and instrumental. Patients were advised to wear headphones and their type or choice of music was played during treatment.The subjective parameter will identify patients with anxiety pre treatment and using objective parameters will evaluate the effectiveness of music therapy in reducing dental anxiety for patients undergoing prosthodontic procedures.

Statistical Analysis

Data is statistically analyzed using SPSS v16.0 software. The chi-square test and one-way Analysis of variance (ANOVA) were used to study the difference in the groups based on their mean total anxiety score. For multiple comparisons, post hoc Bonferroni test was applied. $P < 0.05$ was considered highly significant.

RESULTS

Of the 50 patients anxiety scores calculated, 8 (16%) patients showed moderate anxiety levels, 5 (10%) patients showed high levels and 2 (4%) patients showed severe anxiety levels. (Fig 1) A mean anxiety score of 7.98 (standard deviation 3.5). The female group showed slightly higher anxiety levels. (Fig 2) When anxiety scores were looked for the age group 21-30 yrs and 41-50yrs showed higher anxiety levels. (Fig 3) It indicates that higher anxiety levels in the 21-30yrs age group may be because they were having their first dental check-up. When anxiety scores were compared for procedure undertaken, (Fig 4) crown preparation generated higher scores which may be attributed to sound, vibrations and coolant spray use.
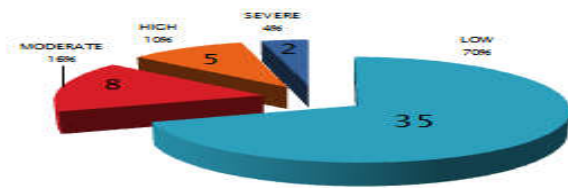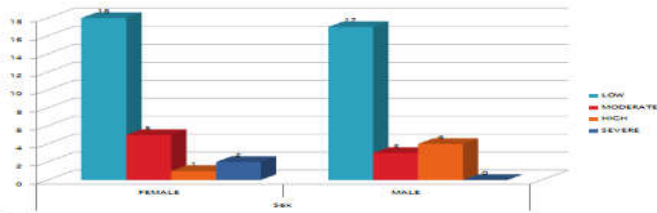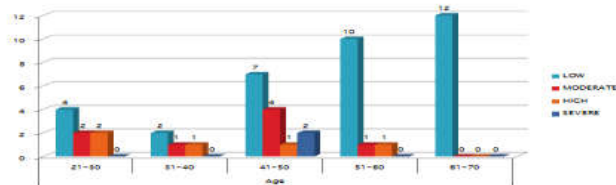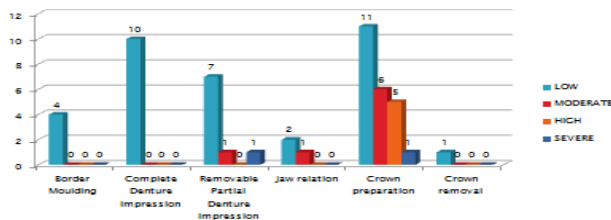
Fig 1

Fig 2

Fig 3

Fig 4

Patients blood pressure i.e. systolic blood pressure (SBP) [Table 1] and diastolic blood pressure (DBP) [Table 2] heart rate [Table 3], and oxygen saturation [Table 4] were recorded using digital blood pressure machine and pulse oximeter. These vital signs were recorded at three different stages of treatment, firstly pre-treatment (SBP1, DBP1, Puls1,Oxy1), secondly during treatment without music therapy(SBP2, DBP2, Puls2, Oxy2) and lastly during treatment with music therapy(SBP3, DBP3, Puls3,Oxy4).

Systolic blood pressure (SBP)

Table 1

Multiple Comparisons

SBP
Bonferroni

(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
SBP1	SBP2	-2.88000	1.64497	.246	-6.8636	1.1036
	SBP3	2.62000	1.64497	.340	-1.3636	6.6036
SBP2	SBP1	2.88000	1.64497	.246	-1.1036	6.8636
	SBP3	5.50000*	1.64497	.003	1.5164	9.4836
SBP3	SBP1	-2.62000	1.64497	.340	-6.6036	1.3636
	SBP2	-5.50000*	1.64497	.003	-9.4836	-1.5164

*. The mean difference is significant at the 0.05 level.

Diastolic Blood Pressure (DBP)

Table 2

Multiple Comparisons

DBP
Bonferroni

(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
DBP1	DBP2	-.72000	1.08748	1.000	-3.3535	1.9135
	DBP3	2.28000	1.08748	.113	-.3535	4.9135
DBP2	DBP1	.72000	1.08748	1.000	-1.9135	3.3535
	DBP3	3.00000*	1.08748	.020	.3665	5.6335
DBP3	DBP1	-2.28000	1.08748	.113	-4.9135	.3535
	DBP2	-3.00000*	1.08748	.020	-5.6335	-.3665

*. The mean difference is significant at the 0.05 level.

Heart rate (HR)

Table 3

Multiple Comparisons

PULSERATE
Bonferroni

(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
PULS1	PULS2	-2.92000	1.70844	.269	-7.0573	1.2173
	PULS3	4.24000*	1.70844	.043	.1027	8.3773
PULS2	PULS1	2.92000	1.70844	.269	-1.2173	7.0573
	PULS3	7.16000*	1.70844	.000	3.0227	11.2973
PULS3	PULS1	-4.24000*	1.70844	.043	-8.3773	-.1027
	PULS2	-7.16000*	1.70844	.000	-11.2973	-3.0227

*. The mean difference is significant at the 0.05 level.

Oxygen Saturation (oxy)

Table 4

Multiple Comparisons

OXYENSATURATION
Bonferroni

(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
OXY1	OXY2	.10000	.25415	1.000	-.5155	.7155
	OXY3	-.02000	.25415	1.000	-.6355	.5955
OXY2	OXY1	-.10000	.25415	1.000	-.7155	.5155
	OXY3	-.12000	.25415	1.000	-.7355	.4955
OXY3	OXY1	.02000	.25415	1.000	-.5955	.6355
	OXY2	.12000	.25415	1.000	-.4955	.7355

A mean of blood pressure (Fig 5), heart rate (Fig 6) and oxygen saturation (Fig 7) is calculated for each stage of the recordings. Treatment carried out with music therapy there is a drop in blood pressure, heart rate and oxygen saturation. The statistical analysis Bonferroni test showed P<0.05 value to be highly significant for Systolic blood pressure and heart rate recordings during treatment with music therapy.
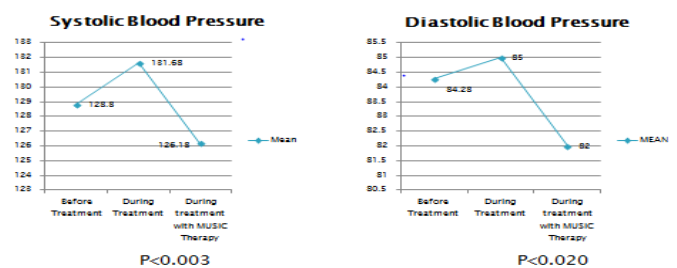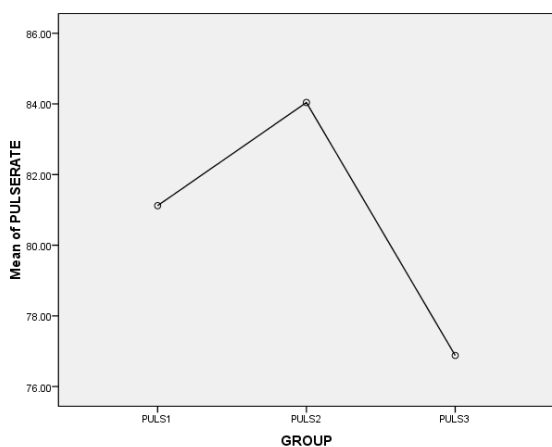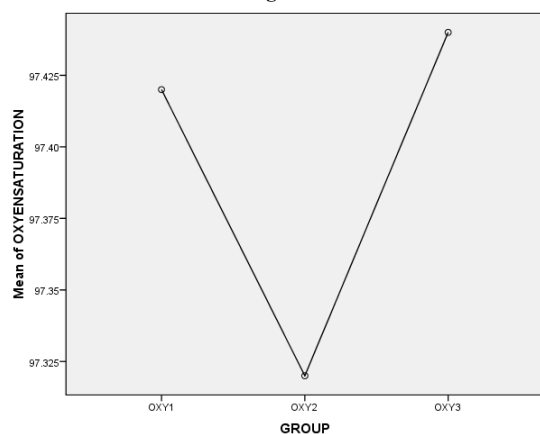

Fig 5

Fig 6

Fig 7

The results showed that a varying degree of dental anxiety exists in patients receiving prosthodontic treatment as obtained from pre-procedural anxiety questionnaire. Dental anxiety generated by prosthodontic procedures in these patients reduced with the use of music therapy during treatment.

DISCUSSION

Prosthodontic procedures generate a varying degree of anxiety in adult patients. On many occasions anxiety prevents them from receiving the necessary dental treatment that makes them vulnerable to poor oral health. Prosthodontists need to be aware of management of patients anxiety in order to carry out successful treatment. For this reason, many measures have been developed to assess the level of dental anxiety suffered by patients when they undergo dental treatment.[5, 6] It has been reported that anxious patients tend to have poorer oral function and aesthetics with an increased number of decayed and missing teeth.[20] In addition dentally anxious patients when compared to non-anxious patients have significantly more missing teeth and fewer filled teeth.[21] Anxiety is a form of emotion that is associated with a physiological change in arterial pressure and heart rate.[23] As a result, the presence of anxiety can be seen from two different viewpoints, either from psychoanalytical or a physiological angle. Studies by Thompson WA and Armfield JM [24, 25] suggest that gender and age are important factors associated with dental anxiety. Both the studies showed female group to be more dentally anxious than males which is consistent with our study. Various authors have studied both aspects over the years and have shown how stress produces anxiety and how this leads to a chain reaction that affects blood pressure and heart rate.[26] Studies carried out

by Messer 1977 and Myers *et al* 1972 on anxiety during dental treatment confirmed that significant changes occur in systolic and diastolic blood pressure and heart rate during treatment, whereas the levels of oxygen saturation remain the same. Authors such as Lufer and Chosack 1964 and McCarthy 1957 obtained similar results and reached the conclusion that heart rate and blood pressure were two reliable and safe indicators of anxiety.

Studies have reported music intervention decreases surgical stress, induces relaxation, decreases blood pressure, heart rate and respiratory rate during an operation in local anaesthesia in medical populations.[23] Also for music to be effective in decreasing anxiety levels, the type, volume and patients choice of music should be considered.[27,28] This study focussed on music therapy or music listening as an easy effective intervention in the management of dental anxiety by recording vital parameters for patients receiving prosthodontic care. Two studies concluded that relaxation, when compared to music, is an effective method of reducing patients anxiety.[4,18] However, one study stated that music, when compared to no intervention, may be beneficial in reducing anxiety and was found to be significantly effective in moderately anxious patients.[4] Another study stated that music at best results in a placebo effect.[18] The authors of this study found that the effect of music was like administering an inactive drug that produced beneficial effects in some patients some of the times. In both the studies, patients were offered their music of choice through headphones who controlled the volume. According to Lahmann the difference in effects between relaxation and music lies in patients experience of a typically anxiety-producing situation coupled with intended decrease in physiological arousal, whereas music distraction operates on a principle of overall distraction by masking fear enhancing noises during treatment. A 2008 systematic review concluded that music intervention was effective in reducing anxiety and pain in children and adults undergoing medical procedures.[29] Further studies should contain large sample size and focus on music therapy as a method of evaluation in reducing dental anxiety.

CONCLUSION

There are numerous measures that are available to assess the level of dental anxiety. Most of these measures display suitable levels of internal consistency, validity and reliability. Study highlights dental anxiety existed in patients receiving prosthodontic care. Blood pressure, heart rate is reliable and easy methods of assessing anxiety levels in patients receiving prosthodontic care. Music therapy is a simple, effective and economical method of reducing dental anxiety.

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