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Research Article

"MUSIC": A STRESS RELIEVING FACTOR IN PATIENTS UNDERGOING DENTAL SURGERIES

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ABSTRACT

Objective: Music is one of the inexpensive, safe, and non-pharmacological stress-reducing factors. Various surgeries increase the stress levels of the patient by increasing their blood pressure and anxiety level. This change in blood pressure can be lowered by certain safe and non-invasive techniques. One of the significant techniques is to listen to music. Hence, the objective of this study is to validate the fact that music help acts a stress relieving factor by decreasing the blood pressure of the patient who is undergoing dental surgeries.

Methods: About 20 participants were selected for the study; out of which, 15 participants participated in this study, and others were excluded as they did not meet the inclusion criteria. The blood pressure was calculated at rest position before the surgery, and then pleasant soft music was played to the patient during the surgery. Then, the blood pressure was measured at an interval of 5 minutes for a span of 15 minutes. The observed blood pressure was recorded. Statistical analysis was done with the recorded data in Statistical Package for the Social Sciences Software (version 20).

Results: Initially, the blood pressure of the patient was found to be at a mean level of 107/65 mmHg which rose to a greater heights of 116/68 mmHg which then lowered down to a mean level of 108/61 mmHg at the end of 15 minutes after the music was played to the patient during the surgery.

Conclusion: This study can conclude by saying that pleasant and soft music has an ability to stabilize the systolic blood pressure of patients undergoing dental surgeries.

Keywords: Systolic blood pressure, Music, Stress, Dental surgeries, Stress busters, Soft music.

INTRODUCTION

Different kinds of surgeries stimulate various degrees of anxiety and stress for the patients who are undergoing the surgery. Scientific studies evident that patients undergoing surgeries experience a high level of anxiety and stress levels, mainly before the surgery [1]. Anxiety emerges out due to the anesthesia process, fear of needles, fear of pain, bad prognosis as well as the post-operative effects after the completion of the surgery [2]. All the above-mentioned factors together increase the stress levels of the patient who is scheduled for the surgery. Blood pressure is one of the factors that are influenced by increasing stress levels, which act a biomarker to show the increase in stress levels.

Music had been an auxiliary method of treatment to relieve the patients from anxiety and stress [3,4]. During the Second World War, music therapy was introduced in various hospitals, and doctors were specially trained to treat patients with this therapy [5]. Later, music was even used in psychiatry and psychology to treat patients. The music therapy was also utilized to treat patients who were affected by Parkinson's disease [6].

Music has a unique relation with the health of the heart. Music of different genres relaxed the heart, which decreased the respiratory pulse, cardiac rate, and the arterial blood pressure of the human body [7]. Older studies prove that music on the coronary units of the heart contributes significantly to the stress reduction when assessed by appropriate psychometric tools [8]. Music has a very significant effect on decreasing stress levels in patients who have undergone open heart surgery [9]. Pleasant music such as vocal music has a better association with the cardiovascular and respiratory centers than another genre of music [5].

Elevated levels of anxiety and stress are often seen in patients who are undergoing surgery, during the pre-operative and post-operative periods. This increase in stress levels is often determined by an increase in blood pressure and an increase in heart rate [10].

Studies have been done to elucidate the positive effects of the therapeutic use of music to treat the pre-operative anxiety [7,11-17]. Music has also been accepted to be as an alternate to anesthetic medicines. Wang *et al.* concluded his study by saying that patients who listened to music before undergoing surgery reported of fewer anxiety levels than that of the people who did not listen to it.

Moreover, a certain genre of music such as meditation music decreases the stress levels in this hectic routine which is faced by almost all humans due to the change in lifestyles.

The purpose of this study is to analyze the effects of music on stress in patients undergoing dental surgeries by measuring their blood pressure, and pulse rate as a means to know the stress levels.

METHODS

Sample and setting

A cross-sectional study was conducted for 2 months from December 2015 to February 2016 in Saveetha Dental College and Hospitals, which serve a population of more than 100 patients a day.

The population of study sample has about 15 patients who underwent a 1-day Dental Surgery in Saveetha Dental College and Hospitals. Patients with severe diseases such as diabetes and renal disorder where not included in the study.

Ethical consideration

The research protocol was submitted to the Committee of Ethics of Saveetha Dental College and Hospitals, and necessary permission to conduct the study was obtained. Furthermore, an informed concern was obtained from the participants of the study.

Process

All the patients who are scheduled to undergo dental surgery were informed about the research, if the patient agrees to participate in the study, then information consent was obtained from the patient.

On the day of surgery:

First, the patient's normal arterial blood pressure was measured using digital blood pressure apparatus during the surgery.

Then, pleasant music was played to the patient via headphones, and the surgery was initiated.

- 5 minutes later the blood pressure was recorded.
- 10 minutes later the blood pressure was recorded.
- 15 minutes later the blood pressure was recorded.

Later, the recorded data were analyzed using Statistical Package for the Social Sciences software version 20 software for windows.

The following results were tabulated (Tables 1-4).

Statistical analysis

The recorded data were analyzed using Statistical Package for the Social Sciences software version 20 software with one-way ANOVA test

RESULTS

The patients participated in this study were patients who were undergoing Dental Surgery at Saveetha Dental College and Hospital. Patients with hypertension also participated in the study. Out of 20 candidates selected for the study, 3 patients were excluded from the study due to their severe diseases such as renal disorder and diabetes, and 2 patients refused to participate in the study. So, 15 patients who underwent dental surgery had participated in this study.

Initially, the patient's blood pressure During the surgery without music was at mean level was 107/65 mmHg with a heart rate of 74 beats/minutes, with a range of systolic pressure from 82 to 125 mmHg, while the diastolic pressure was in the range 52-70 mmHg and the heart rate at the range 69-84 beats/minutes.

However, after the initiation of the surgery, a pleasant music was played to the patient through headphones. Henceforth, the blood pressure of the patient after 5 minutes after the music was played was recorded and a mean level of 116/68 mmHg, with the heart rate at 84 beat/minutes, with a range of systolic pressure from 87 to 144 mmHg, while the diastolic pressure was in the range 51-97 mmHg and the heart rate at the range of 71-102 beats/minutes.

After another 5 minutes interval, the patient's blood pressure was found to be at a mean level 108/65 mmHg, while the heart rate was 79 beats/minutes, with a range of systolic pressure from 86 to 123 mmHg, while the diastolic pressure was in the range 51-85 mmHg and the heart rate at the range of 71-97 beats/minutes.

After 15 minutes from the time of music played, the blood pressure was observed to be at a mean level of 108/61 mmHg, while the heart rate was observed to be 76 beats/minutes, with a range of systolic pressure from 80 to 130 mmHg, while the diastolic pressure was in the range 49-72 mmHg and the heart rate at the range of 70-85 beats/minutes.

The blood pressure during the first 5 minutes of the surgery with pleasant music played was increasing while the blood pressure at the 15 minutes after the music was played shows a similar blood pressure to the blood pressure recorded during the resting phase before the patient underwent the surgery.

There was a significant change in the systolic blood pressure recorded during the 10^{th} and 15^{th} minutes during the surgery with music played to the patient when compared with the systolic pressure during the Non-Music phase before the surgery with a $p<0.05$ which proves it to be statistically significant (Fig.1).

DISCUSSIONS

The results of our study prove that pleasant soft music may have effects on stabilizing blood pressure caused by the anxiety and stress produced due the dental surgery undergone by the patient.

Studies have been done, and these studies report on the beneficial effects of listening to music during minor dental surgeries.

This is a first of a kind of this study which studies the effect of pleasant soft music on the blood pressure and heart rate of patients undergoing minor dental surgeries. Patients who underwent the surgery with pleasant soft music reported of pleasant feeling and relaxing experiences. Studies conducted by Bella *et al.* reported that patients

Table 1: Observation of blood pressure during rest

Measures	Time of assessment	Mean rates at 95% CI
Systolic blood pressure (mmHg)	During surgery without music	107 mmHg (82-125 mmHg)
Diastolic blood pressure (mmHg)	During surgery without music	65 mmHg (52-70 mmHg)
Heart rate (beats/minutes)	During surgery without music	74 beats/minutes (69-84 beats/minutes)

CI: Confidence interval

Table 2: Observation of blood pressure with music after 5 minutes

Measures	Time of assessment	Mean rates at 95% CI
Systolic blood pressure (mmHg)	After 5 minutes with music	116 mmHg (87-144 mmHg)
Diastolic blood pressure (mmHg)	After 5 minutes with music	68 mmHg (51-97 mmHg)
Heart rate (beats/minutes)	After 5 minutes with music	84 beats/minutes (71-102 beats/minutes)

CI: Confidence interval

Table 3: Observation of blood pressure with music after 10 minutes

Measures	Time of assessment	Mean rates at 95% CI
Systolic blood pressure (mmHg)	After 10 minutes with music	108 mmHg (86-123 mmHg)
Diastolic blood pressure (mmHg)	After 10 minutes with music	65 mmHg (51-85 mmHg)
Heart rate (beats/minutes)	After 10 minutes with music	79 beats/minutes (68-97 beats/minutes)

CI: Confidence interval

Table 4: Observation of blood pressure with music after 15 minutes

Measures	Time of assessment	Mean rates at 95% CI
Systolic blood pressure (mmHg)	After 15 minutes with music	108 mmHg (80-130 mmHg)
Diastolic blood pressure (mmHg)	After 15 minutes with music	61 mmHg (49-72 mmHg)
Heart rate (beats/minutes)	After 15 minutes with music	76 beats/minutes (70-85 beats/minutes)

CI: Confidence interval

		Sum of Squares	df	Mean Square	F	Sig.
SYSTOLIC PRESSURE WITH MUSIC AFTER 5 MINS	Between Groups	3452.933	10	345.293	20.311	.005
	Within Groups	68.000	4	17.000		
	Total	3520.933	14			
SYSTOLIC PRESSURE WITH MUSIC AFTER 10 MINS	Between Groups	1511.000	10	151.100	22.385	.004
	Within Groups	27.000	4	6.750		
	Total	1538.000	14			
SYSTOLIC PRESSURE WITH MUSIC AFTER 15 MINS	Between Groups	2731.067	10	273.107	24.457	.004
	Within Groups	44.667	4	11.167		
	Total	2775.733	14			

Fig. 1: One-way ANOVA statistical test for systolic pressure in 5 minutes interval

		Sum of Squares	df	Mean Square	F	Sig.
DIASTOLIC PRESSURE WITH MUSIC AFTER 5 MINS	Between Groups	1008.067	6	168.011	1.005	.483
	Within Groups	1337.667	8	167.208		
	Total	2345.733	14			
DIASTOLIC PRESSURE WITH MUSIC AFTER 10 MINS	Between Groups	1150.433	6	191.739	4.058	.036
	Within Groups	377.967	8	47.246		
	Total	1528.400	14			
DIASTOLIC PRESSURE WITH MUSIC AFTER 15 MINS	Between Groups	589.233	6	98.206	2.137	.158
	Within Groups	367.700	8	45.963		
	Total	956.933	14			

Fig. 2: One-way ANOVA statistical test for diastolic pressure in 5 minutes interval

		Sum of Squares	df	Mean Square	F	Sig.
PULSE RATE WITH MUSIC AFTER 5 MINS	Between Groups	918.600	8	114.825	1.501	.319
	Within Groups	459.000	6	76.500		
	Total	1377.600	14			
PULSE RATE WITH MUSIC AFTER 10 MINS	Between Groups	555.533	8	69.442	.639	.728
	Within Groups	652.200	6	108.700		
	Total	1207.733	14			
PULSE RATE WITH MUSIC AFTER 15 MINS	Between Groups	164.033	8	20.504	1.583	.296
	Within Groups	77.700	6	12.950		
	Total	241.733	14			

Fig. 3: One-way ANOVA statistical test for heart rate in 5 minutes interval

had decreased anxiety when they were listening to music before undergoing cataract surgery [18].

A similar study was conducted on elderly patients undergoing cataract surgery, where felt much satisfied to listen to music while undergoing surgery [19].

A cohort study of 121 patients was conducted by cruise *et al*. reported that had less anxiety and stress while undergoing surgery with listening to music. Studies had been conducted to study the decrease in pre-operative blood pressure of patients who were listening to the piano [20].

The findings of the current study prove that entering the operation theater, and the surgical procedures prove to be stressful to the patient which increased the blood pressure of the patient. It appears to be pleasant soft music helps to lower the blood pressure of the excited patient after a span of time listening to music helps them relaxing and soothing them. Mainly, it helped in stabilizing the systolic and diastolic pressure of the patient. Other studies also prove that music helps to lower blood pressure and pulse rate and stress levels of the patient [21-23].

Some studies prove the use of relaxation music is more effective than pre-surgical medication in lower stress levels.

Milk-Kolasa *et al.* report patient listening to music had decreased levels of salivary cortisol levels in saliva which marks decrease in stress levels of an individual [22].

There was a significant decrease in the systolic pressure of the patients who listened to music when compared to blood pressure before entering the operation theater. Allen *et al.*, who investigated the normalization of hypertension response through music in patients without resting blood pressure during surgery. A recent study on the effect of music on blood pressure reveals that music of different genres, different tempo and dynamics, stable rhythms, and melodic lines show different alterations in blood pressure when they are listening to it [24].

There was no statistical difference in the heart rate as well as diastolic pressure as it was not that much influenced by the music (Figs 2 and 3).

CONCLUSION

According to the current findings, we can conclude by saying that pleasant and soft music has an ability to stabilize the systolic blood pressure of patients undergoing dental surgeries. This pleasant and soft music may be a promising for patients undergoing the pre-operative stress due to increased anxiety and blood pressure and will have a vital capacity to reduce blood pressure. This research proves to be significant to investigate and explore the effects of music therapy on pre-operative stress in different types of anesthesia and surgeries.

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