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RESEARCH ARTICLE

A CROSS SECTIONAL OBSERVATIONAL STUDY ON THE EFFECT OF MUSIC ON THE ANXIETY STATE OF PATIENTS ADMITTED FOR COVID 19 IN A TERTIARY CARE HOSPITAL IN NEW DELHI

Nimmi A. Jose, Rashmi Prakash, Pranjali Bansal and Mohd Yavar Khan

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Abstract

Background: COVID 19 has led to dramatic changes in the lives of people leading to an increase in stress and anxiety. Music intervention is a non-medicated method for relieving anxiety. This current study aims to understand whether music can be effectively used to alleviate anxiety in admitted COVID-19 patients.

Objective: To study the effect of music on anxiety in patients admitted for COVID-19 in a tertiary care hospital in New Delhi

Method: 34 patients (17 females & 17 males) were randomly divided into two groups, a control (N=17) and a music group (N=17). Vitals of all the patients were noted. Patients of the music group were asked to listen to relaxing instrumental for 30 minutes, while patients of the control group were asked to relax for 30 minutes. Vitals of all the patients were noted again. Patients were asked to fill State Trait Anxiety Inventory (STAI) before and after intervention.

Results: The post-intervention mean scores of STAI after the music session were lower in the music group than the control group [95.06 (SD 8.5)) versus 102.37 (SD 10.3)]. The differences in mean values of pre- to post-intervention changes between both groups after music session were statistically significant.

Conclusions: Our findings suggest that listening to music lowers anxiety. As music is non-invasive and free of side-effects we recommend that music intervention service should be used to improve health care quality.

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Introduction:-

COVID 19 has led to dramatic changes in the lives of people across the globe in an unprecedented manner. Several regulations have been implemented by the government to slow COVID 19's spread, like, restricted travel, lockdowns, mask mandates, and physical distancing protocols. In some people, the isolation, fear of contracting SARS-CoV-2, uncertainty, death of loved ones, loss of livelihood during the pandemic have led to an increase in stress and anxiety. Patients directly infected with SARS COV-2 are at particular risk of psychiatric complications during both the acute and recovery phases of illness. Several hypotheses have been postulated as to how COVID-19 may induce psychiatric symptoms, including, direct effect of the virus on the central nervous system, systemic and central nervous system inflammation induced neuropsychiatric effects, the psychologic impact of isolation and the stigma of infectious disease, and social role disruption and impairment in function associated with serious illness.^[1] Patients admitted in hospital for COVID-19 are at particular risk of developing psychiatric symptoms due to

uncertainty of the disease, stress of hospitalization, isolation from family, and the possibility of psychiatric effects of medications and other interventions.^[2] Seeking help and support of coping mechanisms during trauma or crisis is a way of survival.^[3] There are various techniques and methods for handling stress and anxiety. Music intervention is a safe and non-medicated method for relieving anxiety. It can reduce catecholamine secretion and thereby improve physiological responses like respiratory rate, heart rate, blood pressure, body temperature, and muscle tension.^[4] Music is known to have an effect on psychological, physiological, social, and spiritual aspects of people.^[3] Music resonates emotions within the brain, increases attention span, helps to sustain moods and relieves tension.^[5] The intricate structure and patterns of music can bring about a sense of meaning, thereby contributing to the healing process.^[6] Listening to music has been shown to have an effect on the autonomic nervous system and to decrease state-anxiety.^[6] Studies that evaluated the changes on brain have brought out the mechanism on the use of music on emotions. The effect of music has been found to have an effect on the alpha and theta waves, which proves that brain waves (EEG) can be altered with music relaxation. Studies have found that brain waves (EEG) can be altered by music while another study found the alpha and theta brain waves increased with the use of relaxing music or other relaxation techniques.^[9-11] Meta-analysis has found that music-based interventions are effective in reducing human stress responses.^[2,12] This current study aims to understand whether music can be effectively used to alleviate anxiety in admitted COVID-19 patients.

Aim:-

To study the effect of music on anxiety in patients admitted for COVID 19 in a tertiary care hospital in New Delhi

Objectives:-

1. To estimate the presence and severity of anxiety in patients admitted for COVID 19 in a tertiary care hospital in New Delhi.
2. To estimate the effect of music on anxiety in patients admitted for COVID 19 in a tertiary care hospital in New Delhi

Materials & Methods:-

Study design

This study was a cross sectional observational study. 34 patients who fulfilled the inclusion criteria were explained about the purpose of the study and a written informed consent was obtained. The patients were randomly divided into two groups, a control group (N=17) and a music group (N=17). Blood pressure, pulse rate, respiratory rate and SpO2 levels of all the patients were noted. All patients were given proforma and questionnaire to be filled for assessment by the psychiatrist. Those who were unable to complete the questionnaire by themselves, the questions were read out carefully and the patient's answer were recorded. All patients of the music group were asked to listen to calm relaxing instrumental music for 30 minutes, while the patients of the control group were asked to relax in their beds for 30 minutes. The patients were asked to fill the questionnaire again after the session. Blood pressure, pulse rate, respiratory rate and SpO2 levels of all the patients were noted again.

Inclusion criteria

1. Patients diagnosed with COVID 19 (positive reverse transcriptase, polymerase chain reaction (RT-PCR) assay of nasopharyngeal swabs) and admitted in COVID ward of HAH Hospital, New Delhi.
2. Patients of any sex of ages 18 years and above.
3. Patients having stable consciousness states, no visual nor auditory impairment.
4. Patients capable of understanding the questionnaire.
5. Patients willing to give informed consent.

Exclusion criteria

1. Patients on any psychotropic medications.

Tools and Instruments

1. Semi structured proforma specially designed for the study for demographic details like gender, age, education, religion, marital status, etc
2. State Trait Anxiety Inventory- This is a self-reported inventory established by Spielberger. The Cronbach's α of this questionnaire is between 0.90 and 0.86. Each inventory consists of 20 emotional scenarios that are scored on a Likert 1-4 scale ranging from 20 to 80, where the higher the score corresponds to higher level of anxiety.

The anxiety ranges were defined as: 0–19 is “no anxiety”, 20–39 is “minor anxiety”, 40–59 is “moderate anxiety”, 60–79 is “high anxiety”, and higher than 80 is panic.

Ethical considerations

This research was approved by the institute’s ethics board.

Data analysis

The SPSS 16.0 for Windows software package was used to analyse data. The descriptive statistical analysis included categorical variable analysis represented as frequency and percentage, and isometric variable analysis was represented as mean and standard deviation. The inferential statistical analysis included independent t-test and Chi-square test to determine the presence of significant differences in demographic data among the patients. Paired t-test was used for evaluating whether there were differences between pre- and post-operation STAI scores or physiological indices within the experimental group and the control group.

Results:-

Our study comprised of 34 patients, with 17 patients in the control group and 17 patients in the music group. The difference in the distribution of demographic characteristics between the 2 groups was not statistically significant (Table 1). The control group had a mean age of 56.9 (SD 12.7) years versus 57.8 (SD 13.0) years of music group. There was no significant difference in the sex distribution (8 men and 9 women in the control group and 10 men and 7 women in the music group).

Table 1:- Demographic variables.

VARIABLE	Control Group (n= 34) Frequency (%) /mean ± SD	Test Group (n=34) Frequency (%) /mean ± SD	p Value
AGE	56.9±12.7	57.8±13	0.813
GENDER			
Female	9 (47.1)	7 (41.2%)	0.727
Male	8 (52.9)	10 (58.8%)	
MARITAL STATUS			
Married	17 (100)	13 (76.5%)	0.125
Single	0	4 (23.5%)	
SES			
Lower	7 (41.2)	4 (23.5)	0.145
Middle	10 (58.8)	11 (64.7)	
Upper	0	2 (11.8)	
OTHER FAMILY MEMBERS AFFECTED WITH COVID-19			
Yes	8 (23.5)	2 (11.8)	0.109
No	9 (26.5)	15 (88.2)	

In the control group males had higher anxiety score compared to female (102 ± 7.2 vs 91.1 ± 10.9) and it was statistically significant. In the test group, females had higher anxiety scores than men (98.0 ± 2.0 vs 95.0 ± 4.4), but it was not statistically significant. No significant difference was seen in the physiological parameters like blood pressure, respiratory rate, pulse rate and SpO₂ levels of the two groups before the intervention. However, the difference of means of pulse rate and respiratory rate before and after the intervention were found to be significant. (Table 2)

Table 2:- Physiological Parameters.

VARIABLE	Control Group (n= 34) mean ± SD	Test Group (n=34) mean ± SD	P Value
SYSTOLIC Blood Pressure Pre	120.5± 11.8	121.5± 9.2	0.708

Post	120.5± 11.8	121.4± 9.1	0.737
Mean Difference (Pre-Post)	0.00	0.12	0.332
DIASTOLIC Blood Pressure			
Pre	82.9±7.1	82.8 ± 7.4	0.959
Post	82.9± 7.1	82.8± 7.4	0.959
Mean Difference (Pre-Post)	0.06	0.00	0.332
PULSE RATE			
Pre	76.8± 10.9	78.2± 10.8	0.707
Post	76.8± 10.9	76.2± 10.2	0.862
Mean Difference (Pre-Post)	0.00	2.06	0.012
RESPIRATORY RATE			
Pre	15.8± 3.4	16.2±3.1	0.622
Post	15.8± 3.4	15.3± 3.5	0.619
Mean Difference (Pre-Post)	0.00	0.88	0.002
SPO2			
Pre	91.5±5.3	93.2±5.1	0.428
Post	91.6±5.2	93.5±4.9	0.362
Mean Difference (Pre-Post)	0.23	0.35	0.58

Majority of the patients of both test and control groups had moderate anxiety levels (88.2% and 94% respectively).

Before music session, descriptive statistics showed that the difference in the pre-intervention mean scores of State Trait Anxiety Inventory (STAI) in the music group and the control group was not statistically significant, with 96.2 ± 11.1 in controls and 96.2 ± 10.7 in the music group. The post-intervention mean scores of STAI after the music session, however, were lower in the music group than the control group [94.3 ± 10.4 versus 99.9 ± 12.9]. The differences in mean values of pre- to post-intervention changes between both groups after music session were statistically significant. Similarly, before music session, descriptive statistics showed that the difference in the pre-intervention mean scores of State anxiety scores of the music group and the control group was not statistically significant, with 47.8 (SD 5.7) in controls and 47.2 (SD 5.5) in the music group. The post-intervention mean scores of State Anxiety after the music session, however, were lower in the music group than the control group [46.7 (SD 6.5) versus 50.5 (SD 7.1)]. The differences in mean values of pre- to post-intervention changes between both groups after music session were statistically significant. (Table 3)

Table 3:- Association of STAI* scores with music.

VARIABLE	Control Group (n= 34) mean ± SD	Test Group (n=34) mean ± SD	P Value
STAI Pre	96.2 ± 10.7	96.2 ± 11.1	1
STAI Post	99.9 ± 12.9	94.3 ± 10.4	0.121
Difference of Means	3.47	- 1.88	0.0001
State Anxiety Pre	47.8 ± 5.7	47.2 ± 5.5	0.178
State Anxiety Post	50.5 ± 7.1	46.7 ± 6.5	0.084
Difference of Means	2.64	-1.65	0.002

*STAI- State Trait Anxiety Inventory

There was a weakly positive but nonsignificant relationship between age and state and trait anxiety scores in the control group (Pearson correlation, $r = 0.065$, $p = 0.81$). However, in the test group there was a weakly negative but nonsignificant relationship between age and state and trait anxiety scores (Pearson correlation, $r = -0.111$, $p = 0.67$).

Overall, the findings from both the music and control groups showed that the group that received the music intervention experienced a decrease in anxiety levels whereas those without music did not.

Discussion:-

Our study comprised of 34 patients with a mean age of 57.4 ± 12.7 years. This was comparable to a prospective cohort study done on admitted COVID-19 patients in New York, comprising of 44 patients with a mean age of 59 years.^[13] Majority of the patients of both test and control groups had moderate anxiety levels (88.2% and 94%

respectively). This was quite high when compared to the study done in New York in which 36% of the participants had clinically significant anxiety.^[13] The possible reason for the high figures in our study could be because this study was conducted in New Delhi when it was going through its 2nd wave of the pandemic and there was acute shortage of beds and oxygen supply and an exceptionally high mortality rate.

The purpose of this study was to examine the effect of music on the levels of anxiety in COVID 19 patients admitted in hospital. There was no significant difference in the anxiety scores in both the groups prior to music intervention. Our results revealed positive outcomes on the differences between the pre-intervention–post-intervention STAI score for anxiety in the music group. The differences in mean values of pre- to post-intervention changes between both groups after music session were statistically significant. Also, the difference of means of pulse rate and respiratory rate before and after the intervention were found to be significant.

Numerous studies have shown that music is effective in reducing stress or anxiety prior to surgery or any other invasive intervention. A study conducted on 38 patients undergoing awake craniotomy revealed that after music listening there was significant decrease in the heart rate and respiratory rate as well as the level of anxiety.^[11] Another study on 70 patients undergoing spinal surgeries determined that music intervention can be used to significantly reduce patient's heart rate and thus in turn reduce preoperative anxiety.^[14] A study which investigated the effect of music intervention on 60 myocardial infarction patients determined that music can effectively reduce patients heart rate, respiratory rate and anxiety.^[15] Another study which analysed the effect music intervention on 170 patients undergoing cardiovascular imaging determined that music intervention can effectively reduce patient heart rate and anxiety level.^[16] Another similar study which investigated the effect of music intervention for 80 patients undergoing local surgeries determined that it can effectively reduce patient's anxiety level.^[17] No studies have been conducted on COVID-19 patients to determine the effect of music on anxiety. The results of a study conducted on 1868 Spanish citizens during COVID-19 lockdown indicated that during participants reported using music to cope with the lockdown as it helped them to relax.^[18] A study conducted 34 Italian clinical staff working with COVID-19 patients indicated a significant decrease in the intensity of tiredness, worry, sadness and fear after receptive music therapy intervention.^[19]

Limitations

Since this present study is a pilot study its results cannot be said to be conclusive. As the study was single centred, the study sample was not representative of all patients with COVID-19 in India, hence limiting its generalizability. Also, the study had a relatively small number of subjects and the assessment was based on a single measurement scale. Also, the choice of music was not provided to the patients. A large-scale study is needed to validate our results.

Conclusions:-

According to the results of this study, listening to music lowers anxiety. As music is non- invasive and free of side-effects, it can be used as an effective intervention to lower anxiety in patients admitted in hospitals. We recommend that music intervention service should be provided in inpatient wards to reduce patient anxiety and improve health care qualities.

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