EFFECTIVENESS OF BINAURAL AUDIO BEATS ON ANXIETY AMONG PATIENTS UNDERGOING CATARACT SURGERY AT SELECTED HOSPITALS IN ERODE, TAMIL NADU

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ABSTRACT

Background: *Awareness of surroundings during pre-operative period is a well-known stressor for the surgical patients, especially during surgery. Apart from the sedative agents, audio therapy can be used as a supportive therapy to reduce the level of anxiety among patients undergoing cataract surgery.* ***Objectives:*** *To assess the effectiveness of binaural audio beats in reducing anxiety among patients undergoing cataract surgery.* ***Design:*** *Quasi-experimental design, where Pre-test Post-test Non-equivalent Group design was adopted.* ***Setting:*** *Hospitals in Erode, Tamilnadu.*

Participants: *Thirty patients undergoing cataract surgery fulfilling the inclusion criteria.* ***Selection criteria:*** *Patients undergoing cataract surgery in the age group of 20-60 years and both genders were included. Patients with hearing and visual impairment, sedation and unstable vital parameters were excluded.* ***Methods:*** *Out of 30 patients, 15 patients were selected in experimental group and 15 patients were selected in control group by convenient sampling technique. Experimental group was administered audio therapy by using portable head phones. Level of anxiety was measured by Spielberger State-trait Anxiety Inventory (STAI-S) before and after the procedure.* ***Results:*** *The results show that most of the patients who underwent cataract surgeries were males, non-medical workers and most of their surgeries had completed in less than an hour. In post-test, 53% had no/ low anxiety in control group, whereas 87% had no/ low anxiety in experimental group. The patients' level of anxiety reduced from the mean value of 36.33±8.96 and 35.67±7.78 to 34.33±8.06 and 28.07±5.54, in control and experimental group respectively. Paired 't' test score was 10.43 and unpaired 't' test score was 2.42, which proved significantly effective at P<0.05. Chi-square test showed only trait anxiety in control group and duration of surgery & trait anxiety in experimental group had significant association (P<0.05); and other demographic variables (age, gender, previous history of surgery, occupation) showed no significant (P>0.05) association with post-test score of level of anxiety in both control and experimental groups.* ***Conclusion****: Audio therapy is an effective intervention to reduce the level of anxiety among patients undergoing cataract surgery.* ***Clinical applications:*** *Audio therapy can be employed as a diversional therapy instead of using pharmacological interventions and all kinds of painful medical and surgical procedures.*

Key Words: *Binaural Audio beats, Anxiety, Cataract Surgery.*

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INTRODUCTION

"Life is ten percent what you experience and ninety percent how you respond to it"

— Dorothy M. Neddermeyer

Eye is the window to the external world. It is the most sensitive and highly specialised sense organ. The eye converts images into a set of electrical signals, and transmits these signals to the brain through complex neural pathways that connect the eye via the optic nerve to the visual cortex and other areas of the brain. Human eye is often exposed to various disorders which may lead to impaired vision. Cataract is the most common eye disorder leading to diminished vision.

Cataract, being the most common cause of blindness is conventionally treated by surgery and accounts for most of the ophthalmic operations. Patients can experience anxiety preoperatively, intra- operatively and postoperatively. The various reasons for anxiety could be fear of blindness, premorbid personality traits, and inadequate knowledge about surgery.

Preoperative anxiety is associated with problems such as difficult venous access, delayed jaw relaxation, coughing during induction of anaesthesia, autonomic fluctuations and increased anaesthetic requirement. Every person who undergoes surgery suffers from anxiety, irrespective of sex, caste, religion or status. The 21st century is described as the age of anxiety and stress as every person experiences anxiety and stress at some point of life.

Need for the Study:

Preoperative anxiety around cataract surgery affects a large proportion of patients, despite advances in technique and administration of anaesthesia. Anxiety is a well-known preoperative sentiment, and is present regardless of perceived intrusiveness of the operation.

Binaural beats therapy comes with many benefits relating to anxiety; some of the most common ones being anxiety eliminated in entirety, anxiety symptoms alleviated, stress reduced and the mood improved.

Application of auditory beat stimulation has been speculated to provide a promising new tool to alleviate symptoms of anxiety with, and enhance cognition.

OBJECTIVES

1. To assess the level of anxiety among patients undergoing cataract surgery in control and experimental groups before and after binaural audio beats.
2. To determine the efficacy of binaural audio beats to act on anxiety among patients undergoing cataract surgery in both the groups
3. To find out the association between the post-test scores of anxiety among control and experimental group patients undergoing cataract surgery and their selected demographic variables

HYPOTHESIS

H_1- There is a significant level of anxiety among patients undergoing cataract surgery in control and experimental groups before and after binaural audio beats.

H_2- There is a significant effectiveness of binaural audio beats to act on anxiety among patients undergoing cataract surgery in both the groups

H_3- There is a significant association between the post-test anxiety scores among control and experimental group patients undergoing cataract surgery and their selected demographic variables

DELIMITATIONS

The study is delimited to

a) Assess the effectiveness of binaural audio beats.
b) Identify the changes in level of pre-operative anxiety
c) Patients those who are undergoing cataract surgery
d) Patients in Government headquarters hospital, Erode.

CONCEPTUAL FRAMEWORK

The conceptual framework set up for the present study is the Sister Callista Roy's adaptation model. There are four major elements in this Roy's adaptation model that is the person or system, nursing, health and environment. Systems, coping mechanisms, and adaptive modes are used to address these elements.

MATERIALS AND METHODS OF THE STUDY

Research Design: The Research Design selected for the present study was a *Quasi- experimental design***,** where *Pre-test Post-test Non-equivalent Group design* was selected to evaluate the effectiveness of binaural audio beats to act on anxiety among patients undergoing cataract surgery.

Population

Population for the present study was patients undergoing cataract surgery and those present during the period of data collection.

Sample

The sample selected for this study was the patients *undergoing cataract surgery at* selected hospitals in Erode.

Sample Size

The sample size comprises 30 patients undergoing cataract surgery, out of which 15 patients were in control group and 15 patients were in experimental group.

Sampling Technique

Convenient sampling technique was used for the present study, to select the patients,

Sampling Criteria

Inclusion Criteria:

Patients undergoing cataract surgery —

1. In the age group of 40-60 years.
2. Of both genders
3. Those present during the period of data collection
4. Those who gave consent to participate in this study.
5. Those able to read Tamil.

Exclusion Criteria

Patient undergoing cataract surgery with —

1. Hearing impairment
2. Unstable vital parameters
3. Complications during surgery
4. Sedation
5. Mental illness.

Description of the Tool

Structured interview schedule consisting of the following sections —

Section A - it consists of characteristics of patient undergoing cataract surgery such as age, sex, duration of surgery, previous history of surgery, trait anxiety (I) and occupation.

Section B - It comprises *Spielberger State Anxiety Inventory (STAI-S)* which consists of 20 self-reporting statements, and the answers to those are used to determine a patient's current anxiety level.

Scoring Procedure

STAI-S consists of 9 positive statements and 11 negative statements.

For the purpose of scoring and interpretation, positive statements are reverse-scored (i.e., a 4 scores 1 point and a 1 scores 4 points etc.)

The overall (total) score for STAI ranges from a minimum of 20 to a maximum of 80; STAI scores are commonly classified as 'no or low anxiety' (20–37), 'moderate anxiety' (38–44), and 'high anxiety' (45–80).

Table – 1: Level of anxiety scores based on percentage

Level of anxiety	Actual scores	Percentage
No/ Low anxiety	20-37	25-46%
Moderate anxiety	38-44	47-55%
High anxiety	45-80	56-100%

DATA ANALYSIS

The findings revealed that the mean post test scores of level of anxiety among patients who had undergone cataract surgery in control group was 34.33±8.06, whereas in experimental group the post-test mean score of level of anxiety was 28.07±5.54. It indicates that intra- binaural audio beats was effective among patients who underwent cataract surgery. The paired 't' test and unpaired 't' test showed, there was a significant effectiveness of binaural audio beats on anxiety among patients that had undergone cataract surgery. Chi square test showed only trait anxiety in control group, and duration of surgery and trait anxiety in experimental group, had significant associations with their post test scores of level of anxiety, and other demographic variables have no significant association with the post test score of level of anxiety in both control and experimental groups.

Section – A:

Description of Sample Characteristics

Table – 2: Frequency and percentage distribution of control and experimental group of patients undergoing cataract surgery according to their demographic variables (N_1= 15, N_2=15)

Sl. No.	Demographic variables		Control group		Experimental group	
			Frequency (N_1)	Percentage (%)	Frequency (N_2)	Percentage (%)
1.	**Age in years**	41- 50	1	7	3	20
		51- 60	9	60	8	53
		Above 60 years	5	33	4	27
2.	**Gender**	Male	9	60	8	53
		Female	6	40	7	47
3.	**Duration of surgery**	Less than 1 hour	12	80	13	87
		1-2 hour	3	20	2	13
		More than 2 hours	0	0	0	0
4.	**Previous history of surgery**	Yes	6	40	9	60
		No	9	60	6	40
5.	**Trait anxiety**	No/ low anxiety	7	47	8	53
		Moderate	7	47	5	33
		High anxiety	1	06	2	14
6.	**Occupation**	Medical	1	06	0	0
		Nonmedical	14	94	15	100

Section-B

Assess the level of anxiety among Control and Experimental Group of patients that had undergone Cataract Surgery before and after *Binaural Audio Beats*

Table – 3: Frequency and percentage distribution of the control group pre-test and post-test scores of level of anxiety among patients that had undergone cataract surgery (N_1=15)

Level of anxiety	Control group			
	Pre-test scores		Post-test scores	
	Frequency (N_1)	Percentage %	Frequency (N_1)	Percentage (%)
No/Low anxiety	7	47	10	67
Moderate anxiety	7	47	4	27
High anxiety	1	06	1	06

Table – 4.: Frequency and percentage distribution of the experimental group pre-test and post-test scores of level of anxiety among patients that had undergone cataract surgery (N_2=15)

Level of anxiety	Experimental group			
	Pre-test		Post-test	
	Frequency (N_2)	Percentage %	Frequency (N_2)	Percentage (%)
No/Low anxiety	8	53	13	87
Moderate anxiety	5	33	2	13
High anxiety	2	14	0	0

Table – 5: Frequency and percentage distribution of the control group and experimental group post-test scores of level of anxiety among patients who had undergone cataract surgery. (N_1=15) (N_2=15)

Level of anxiety	Post-test scores			
	Control group		Experimental group	
	Frequency (N_1)	Percentage %	Frequency (N_2)	Percentage (%)
No/Low anxiety	10	67	13	87
Moderate anxiety	4	27	2	13
High anxiety	1	06	0	0

Table – 6: Paired 't' test value of pre- and post-test scores of level of anxiety in control and experimental groups

Patients undergone cataract surgery	Paired 't' value	Table value	Level of significance (P)
Control group	6.83	2.15	P < 0.05 **significant**
Experimental group	10.43	2.15	P < 0.05 **significant**

Df = 14 **Table value = 2.15** **P<0.05 significant**

Table – 7: Comparison of mean, standard deviation, and mean percentage of level of anxiety among control and experimental groups pre- and post-test.

Patient undergone cataract surgery	Max scores	Pre-test			Post-test			Difference in mean %
		Mean	SD	Mean %	Mean	SD	Mean %	
Control group	80	36.33	8.96	45.41	34.33	8.06	42.91	2.50
Experimental group	80	35.67	7.78	44.59	28.07	5.54	35.09	9.50

Table – 8: Unpaired 't' test value of post-test scores of anxiety in control group and experimental group.

Level of anxiety	Unpaired 't' value	Table value	Level of significant (P)
Post test scores of anxiety in experimental and control group	2.42	2.05	P<0.05 **Significant**

Df = 28 **Table value = 2.05** **P<0.05significant**

Table – 9: Chi-square value of association between control group post-test scores and their demographic variables.

Demographic variables	DF	2	Table value	Level of significance
Age	1	0.51	3.84	P > 0.05 Not significant
Gender	1	0.51	3.84	P>0.05 Not significant
Duration of surgery	1	1.36	3.84	P>0.05 Not Significant
Previous history of surgery	1	0.51	3.84	P>0.05 Not significant
Trait anxiety (stai-t)	1	6.03	3.84	P<0.05 **Significant**
Occupation	1	0.46	3.84	P>0.05 Not significant

Table – 10: Chi-square value of association between experimental group post-test scores and their demographic variables.

Demographic variables	DF	2	Table value	Level of significance
Age	1	0.00	3.84	P > 0.05 Not significant
Gender	1	3.50	3.84	P>0.05 Not significant
Duration of surgery	1	4.29	3.84	P<0.05 **Significant**
Previous history of surgery	1	0.00	3.84	P>0.05 Not significant
Trait anxiety (stai-t)	1	8.80	3.84	P<0.05 **Significant**
Occupation	1	0.00	3.84	P>0.05 Not significant

DISCUSSION

Objective - 1: To assess the level of anxiety among patients undergoing cataract surgery in control and experimental groups before and after binaural audio beats.

The findings are —

- **In Control group:**
  - In pre-test majority (47% and 47%) of patients had no/ low anxiety and moderate anxiety respectively and only 6% of patients had high anxiety.
  - In post-test majority (67%) of patients had no/ low anxiety, 27% of them had moderate anxiety and only 6% of patients had high anxiety.
- **In Experimental group:**
  - In pre-test majority (53%) of patients had no/ low anxiety, 33 percent of patients had moderate anxiety and only 14% of patients had high anxiety.
  - In post-test most of them (87%) had no/ low anxiety, 13% of patients had moderate anxiety and none of them had high anxiety

Hypothesis – 1:

There was a significant level of anxiety among patients undergoing cataract surgery in control and experimental groups before and after binaural audio beats. So the hypothesis was accepted.

Objective - 2: To determine the effectiveness of binaural audio beats on anxiety among patients undergoing cataract surgery in both the groups.

The results are —

- **In Control group:**
  - Paired 't' test value was 6.83, when compared to table value (2.15), in Pre-test the mean score was 36.33 ± 8.96, which is 45.41%
  - In Post-test the mean score was 34.33 ± 8.06, which is 42.91%,
  - Mean difference was 2.5%
  - It seems that without intervention also there was mild change in the level of anxiety among patients that had undergone cataract surgery.
- **In Experimental group:**
  - Paired 't' test value was 10.43, when compared to table value (2.15); it is high
  - Pre-test the mean score was 35.67± 7.78, which is 44.59%
  - Post-test the mean score was 28.07 ± 5.54, which is 35.09%,
  - Mean difference was 9.50%
  - It seems that binaural audio beats were moderately effective on anxiety among patients that had undergone cataract surgery.
- The unpaired 't' test value was 2.42, when compared to table value (2.05); it is high. It seems that there was a significant effectiveness of binaural audio beats acting on anxiety among patients who had undergone cataract surgery.

Hypothesis – 2:

There was a significant effectiveness of binaural audio beats acting on anxiety among patients undergoing cataract surgery in experimental than control groups. So the hypothesis was accepted.

Objective 3: There is a significant association between the post-test anxiety scores among control and experimental group patients that had undergone cataract surgery, and their selected demographic variables

Hence, the differences observed in the mean score values were only due to chance and were not true differences. It seems that binaural audio beats were effective for all the patients undergoing cataract surgery, irrespective of their demographic variables.

Hypothesis 3:

There was no significant association between the post-test scores of anxiety among control and experimental group of patients undergoing cataract surgery, and their demographic variables. Hence, the hypothesis was rejected.

CONCLUSION

From the findings of the study it can be concluded that —

Most of the patients that had undergone cataract surgery were males and most of their surgeries had finished in less than an hour. In control group, most of the patients were in the age group of 21-30 years and 41-50 years; most of them did not have previous history of surgery and most of them had no/ low and moderate trait anxiety. In experimental group most of them were in the age group of 51-60 years; most of them had previous history of surgery and most of them had no/ low trait anxiety.

There was a significant effectiveness of *binaural audio beats to act* on anxiety among patients undergoing cataract surgery. There was a significant association between the post-test scores of anxiety and trait anxiety. There was a significant association between the post-test scores of anxiety and duration of surgery in the control group.

There was no significant association between post-test scores of anxiety and variables like age, gender, previous history of surgery and occupation. There was no significant association between post-test scores of anxiety and duration of surgery in the experimental group.

Implications for nursing

Nursing service

- Video therapy can be used by the Nursing professionals who are working in all hospital and clinical settings while doing various medical and surgical procedures.

Nursing Education

- Nurse educator should educate the students regarding audio therapy and its implementation.
- Nurse educator should encourage the Nursing personnel to practice the video therapy in their clinical settings.

Nursing Administration

- Nurse administer can review the policies to include audio therapy as a protocol for non pharmacological intervention against pre- and post-operative anxiety.
- Nurse administer can support the researcher to conduct the research on various problems faced by the pre- and post-operative patients.

Nursing Research

- The study may be used for further reference.
- Further large scale study can be done in different settings.

REFERENCES

1. Anderson KN, Anderson LE, Glanze WD (1994). *Mosby's Medical, Nursing & Allied Health Dictionary*. 4th Edition. Orlando: Mosby Inc.
2. Agarwal A, (2005). Acupressure for prevention of pre-operative anxiety: a prospective, randomised, placebo controlled study. Anaesthesia.- 60(10).
3. Barbara Kozier et.al, (1999). *Fundamentals of Nursing Concepts, Process and* Practice. 7th edition. J.B. Lippincott Company, Philadelphia.
4. Black M Joyce, and Hawks Hokans on (2005). *Medical-Surgical Nursing.* 7th edition, W B Saunders Company, Missouri.
5. Brenda G Bare (1998). *Medical Surgical Nursing.* 9th edition. Lippincott Company; Philadelphia