The effect of music on preoperative anxiety in adolescent same-day surgery patients

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Abstract

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This author investigated the effects of music on the state anxiety of a sample of 160 adolescent patients awaiting same-day surgical services at a Northwest Iowa surgical center. The patients were randomly assigned to either a control group or experimental group. Males and females were randomized separately to assure that the numbers of each gender were represented equally in each group. The adolescents in the experimental group were given a 30-minute music based intervention in their assigned room, whereas the adolescents in the control group received the customary preoperative care. The researcher measured blood pressure, heart rate, EKG activity, respiratory rate, and oxygen saturation in both groups, and participants completed the State portion of the self-administered State-Trait Anxiety Inventory (STAI). After patients competed the 30 minutes of music or of preoperative care without music, the researcher again measured the participants’ vital signs and the patients completed the STAI. The researchers expected findings indicated that the posttest state anxiety scores were significantly lower than those of the patients in the control group but no significant differences in vital signs were found between the two groups.
CHAPTER 1
INTRODUCTION

It is well known that adolescent patients undergoing surgical procedures frequently experience anxiety. It is also well known that music has the ability to affect moods and emotions. This chapter will discuss the background and significance of the related issues and the purpose of the study.

Background and Significance

Many surgical procedures today take place in same-day surgery areas. The Department of Health (2000) stated in the National Health Service Plan, “around three-quarters of operations will be carried out on a day-care basis with no overnight stay required” (Department of Health, 2000, p. 19). While more same-day surgical cases are being performed, there is less time for direct patient contact, thus, less time to give preoperative teaching and less time to offer cognitive interventions that help reduce anxiety (Mitchell, 2003).

Anxiety is often experienced by patients undergoing surgical procedures (Augustin & Hains, 1996). Preoperative anxiety has been found to be a predictor for adverse physiological and psychological responses to surgery. Physiologically, anxiety causes adrenaline to be released, creating a change in vital signs such as increased blood pressure, temperature, and sweating. Psychologically, anxiety can create irritability and an inability to concentrate as well as behavior and personality changes (Vaughn, Wichowski, & Bosworth, 2007). Patients who experience increased preoperative anxiety also have longer recovery periods, more postoperative complications (Parris, Matt, Jamison, & Maxon, 1988), and increased anesthetic requirements (Maranets & Kain, 1999). Feeling a loss of control, as well as fear of the unknown, is a
contributing factor for preoperative anxiety (Durling, Milne, Hutton, & Ryan, 2007; Augustin & Hains, 1996).

Fear of the unknown and loss of control are feelings many adolescents experience during the teenage years. Adolescents are at a unique developmental stage where they are gaining mental awareness and the ability to process information. They focus on body image, desiring privacy, and self-control. Therefore, these developmental stages need to be considered when an adolescent is participating in the preoperative experience (O’Conner-Von, 2008).

Adolescents use coping strategies to deal with stressful life experiences. Improved psychological outcomes to stress are found when an adolescent has different types of coping strategies to choose from. Listening to music as a form of distraction is a coping strategy that is used by adolescents to help reduce the effects of stress (Yahaw & Cohen, 2008). Augustin & Hains (1996) suggest that listening to self-selected music can be beneficial in reducing preoperative anxiety.

Nearly half of teen activities are technology related and listening to music is the most popular of those activities (Canon Communications LLC, 2008). Digital media and electronic equipment such as iPods and MP3 players have found a permanent place in youth culture. These have become the new form of socialization for teens as they seek autonomy, identity, and self-expression (The MacArthur Foundation, 2008).

Statement of the problem

Few studies have targeted adolescent preoperative anxiety (O’Conner-Von, 2008). There is a gap in the research regarding adolescent preoperative anxiety and little evidence is available about the effectiveness of adolescents listening to music as a form of anxiety reduction preoperatively in a same-day surgery setting.
Purpose of the study

The purpose of this research is to describe the effects of listening to self-selected music to reduce anxiety in adolescent patients having same-day surgical services. As more surgery has become elective and completed under scheduled circumstances, there is time to encourage adolescents to bring their personal players and music with them to the surgical centers.

Research Question

Do adolescent same-day surgery patients who listen to self-selected music preoperatively experience a reduction in anxiety symptoms?

Definitions

*Adolescent* - a teenage child between the ages of 13-19.

*Preoperative* - the period of time after a patient arrives in the assigned patient room but before leaving for the intra-operative suite.

*Same-day surgery* – A surgical procedure considered minor in nature with a minimal operating room time of 1 hour or less in the operating suite. Patients typically will go home the same day as surgery is performed.
CHAPTER 2

REVIEW OF THE LITERATURE

This researcher completed a thorough literature review using the keywords: “preoperative”, “anxiety”, “preoperative anxiety”, “music”, “music therapy”, “surgery”, and “adolescent”, using the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, Health Source, and Greenfile databases. An internet search of the keywords was also performed in the Google Scholar search engine. The resulting review will be divided into two literature areas, theoretical and empirical.

Theoretical Literature

Since ancient times, music has been recognized as having therapeutic value. The New American Bible recounts that David would be summoned to play his harp for King Saul to help him ‘feel better’ (1 Samuel 16:23). Among the ancient Greeks, the god Apollo was most associated with the arts of music and medicine (United Nations of Roma Victrix [UNRV], 2008). Even in early nursing, Florence Nightingale used music as a nursing intervention as part of the healing process for wounded soldiers of the Crimean War. She described how her nurses used melodies to ease pain. Music was considered part of the environment and Nightingale felt that nursing should control the environment to put the patient in the best place for healing to occur (McCaffrey & Locsin, 2002). Currently, the American Music Therapy Association is promoting music for the treatment of cognitive disorders and neurological impairments such as dementia, stroke, and Parkinson’s disease. Music therapy is also being recommended for stress relief and pain control (Marwick, 2000).

The modern healthcare environment, with its new technologies and demand for cost effective initiatives, has led to an increase in same-day surgery cases. This has created a
decreased amount of nursing time for direct patient contact and preoperative education. Measuring anxiety has become difficult with the increase in short stay cases as well. New ways to measure anxiety, such as brief emotional assessments, may need to be considered. Self-care interventions are becoming important for positive modern elective surgery. Listening to music is a simple and inexpensive intervention that has been found to reduce preoperative anxiety. Further research must be conducted to examine the patient’s emotional response to such subtle therapeutic interventions (Mitchell, 2003).

Nilsson (2008) conducted a review to identify randomized controlled studies that assessed the effects of music on peri-operative pain and anxiety. The author found that nearly half of the studies reported a reduction in anxiety with a music intervention. The author also found that the music genre and duration of listening time did not influence the effects of the music intervention. It was recommended that the music used in clinical practice be slow and flowing at 60 to 80 beats per minute, non-lyrical, self-selected with guidance, a volume level not to exceed 60 decibels, a minimum duration of 30 minutes of listening time and, with suitable equipment and documentation of the effects.

A meta-analysis could not be completed in the 42 studies chosen because the types of music differed, the listening times differed, and the patients’ care differed within each study. The studies were instead reviewed for the quality of their methodology and analyzed according to outcome measures. The studies in the review included 3,936 patients between the ages of 34 to 76 years old. All patients in the studies underwent different types of elective surgeries. The preoperative music intervention period was included in 14 of the studies with the other studies addressing intra-operative and postoperative music listening respectively. A variety of music was listened to through headphones including, slow rhythmical, piano, new age, self selected choices.
of Eastern and Western, easy listening, Chinese popular, classical, environmental, instrumental, and country western. There were many different methodological differences between the studies. Most of the studies used the State-Trait Anxiety Inventory (STAI) and measurement of vital signs to assess anxiety. It was recommended that further research is needed to evaluate the effects of specifically composed music designed for individual patients, groups and settings. Future research should also evaluate the effects of music interventions related to patient gender, age and ethnicity (Nilsson, 2008).

Empirical Literature

In an experimental study on the effects of music during surgery, 40 patients age 18 and older, undergoing minor local anesthesia, were non-randomly assigned into groups. The first week, 20 patients were assigned to the experimental group. They were given a choice of musical categories to listen to during their surgery via headphones. The musical categories included classical music, contemporary popular music, or Chinese popular music. The second week, 20 patients were assigned to the control group and did not listen to music during their surgery, nor did they wear headphones. Patients in the group wearing headphones and listening to music had significantly lower anxiety, blood pressure, and heart rate levels than those who did not listen to music. A two-sample t-test was completed to detect any baseline differences in pre-test variables (p<0.05). A t-test for paired samples compared pre-test and post-test variables for both groups. In the experimental group, patients were given an evaluation questionnaire following their surgical experience, it was found that listening to music was a patient satisfier found to be helpful, but respecting musical choice should be given consideration (Mok & Wong, 2003).

In a quasi-experimental study on the effects of music on preoperative anxiety, 93 patients, ages 18-35, were randomly assigned into an experimental group or a control group. All
patients were asked to bring their favorite music to the hospital. Groups were assigned to rooms where they could read or visit. Their families could wait with them. The experimental group listened to self-selected music via headphones for 30 minutes prior to surgery. All surgeries were minor in nature and documented as ear-nose-throat surgery, orthopedics, plastics, and other general minor surgeries. It was found, on the State-Trait Anxiety Inventory (STAI), that patients who listened to music reported being less anxious. However, there were no significant differences between the control group and the experimental group with regard to the physiological signs of anxiety such as blood pressure, heart rate, and electro dermal activity, or neuroendocrine variables such as cortisol, epinephrine, and norepinephrine. A two-way repeated Analysis of Variance (ANOVA) was performed for both behavioral outcomes and physiological outcomes (p < 0.05). It was recommended that self-selected music can be used to reduce anxiety preoperatively (Wang, Kulkarni, Dolev, & Kain, 2002).

In another experimental design, 42 patients were randomly assigned to the experimental and control groups. The experimental group was given preoperative instruction coupled with listening to music, while the control group was only given the preoperative instruction. All patients were given the STAI and vital signs were assessed, followed by the nurse performing the routine admission procedures and preoperative instruction.

The patients in the experimental group were given a choice of music to listen to via headphones for 15 to 30 minutes before surgery while resting in reclining chairs. The selection of music consisted of classical, environmental, new age, country-western, and general easy-listening. Vital signs and STAI scores were obtained 10 minutes before surgery began. Patients in the control group were not given music to listen to and their activities were not monitored.
Friends and relatives were allowed to remain with the patients in the control group but the study did not state if family was allowed to remain with the experimental group.

Two-sample t-tests for independent groups compared pre-test and post-test scores. Group means and standard deviations for dependent samples on the experimental and control group were completed. It was found that patients in the experimental group had a significant decrease in heart rate and approached significant decreases in respiratory rate and diastolic blood pressure.

This study suggests that preoperative teaching in itself can decrease preoperative anxiety but listening to self-selected music appears to be more beneficial than teaching alone. This study did not ask patients their perception of the use of music and found that some individuals did not want to be distracted by music, but instead wanted to be aware of everything that was going on around them. A limitation of the study was not accounting for the impact of the presence of friends and family or other relaxation measures that could have contributed to the control groups decreased variables. Other limitations recognized included a small sample size and no inclusion of various ethnic backgrounds (Augustin & Hains, 1996).

Summary of the Literature Review

This researcher found a great amount of literature that supports using music to reduce anxiety. Due to the wide differences in the delivery of health care, it is hard to know whether this research can be generalized. Future research needs to strengthen the studies by standardizing the health care provided, including better randomization, larger sample sizes, and also make inclusion for gender, age and ethnicity. There were no studies found on the effects of music on preoperative anxiety in adolescents as a target group, nor were adolescents noted as included in the studies reviewed.
Conceptual framework

A theoretical basis for music therapy has been linked to lower heart rates, decreased blood pressure, and stress reduction, including pain control. Music has a direct physiological effect through the autonomous nervous system. Auditory stimulation of music occupies the neurotransmitters diverting feelings of anxiety, fear, and pain resulting in a more positive experience. Allowing one’s self to listen to a soothing musical sound will decrease the respiratory rate, lower the blood pressure, and create a deeply relaxed state (Priesnitz, 2006).

Leininger’s Culture Care Theory can also be used to guide this study. Adolescents form a subculture in society, sharing a distinct lifestyle makes them a unique group within a larger culture. Understanding the meanings and experiences of adolescents is important in order to provide culturally relevant care (Rosenbaum & Carty, 1996).

Transcultural nursing is focused on “making professional nursing knowledge and practices culturally based, conceptualized, planned and practiced” (Marriner-Tomey, 1994, p. 428). Since adolescents in particular use music as a form of identity and relaxation, music therapy may be a powerful nursing intervention to reduce preoperative anxiety when adolescents are faced with needing surgical services.
CHAPTER 3

RESEARCH METHODOLOGY

This chapter will discuss the research methodology for this study. It will be explained in detail and broken into parts starting with the design, sample, study setting, and study procedure. The variables and instruments will be described, followed by the projected analysis and expected results.

Research Design

The study’s design is quasi-experimental. It includes an intervention group and a control group. The intervention group will listen to personal self-selected music preoperatively, while the control group will not listen to music. Efforts will be made to control extraneous variables such as environmental temperatures, activity levels, number of family members allowed to remain with the patient preoperatively, and participant contact with the nursing staff after the necessary preoperative teaching and admission process is completed.

Sample

The sample will be a randomized assignment. The target population will be adolescent same-day surgery patients who meet the sample criteria and consent to participate in the study. The sample criteria are nonexclusive to gender or ethnic background. The sample inclusion criteria consist of: (a) being a same-day surgical patient with a scheduled surgery taking less than 1 hour, (b) being an adolescent between 13 and 19 years of age, (c) having not been given or taken any anti-anxiety medications within 6 hours prior to admission for surgery, (d) having no hearing impairment, and (e) being able to read and write English in order to complete the self-administered questionnaire. To determine the sample size used in the study, a power analysis will be performed. A power level of 0.8, \( P < 0.5 \), and effect size 0.4 calculated a sample size of 160.
Study Setting

The data will be collected in a Northwest Iowa same-day surgery center located within a fully accredited and licensed hospital. Each participant will be assigned to a private room. The treatment and recordable data will be gathered while the patient remains in the private room until they are taken to the surgical suite.

Study Procedure

The day before a scheduled adolescent surgery, each potential participant will be contacted and asked if they would like to participate in the study. They will be asked to bring with them a music device with headphones and any music they would like to listen to. It will be explained that when they arrive they may or may not be able to listen to the music they brought along. IRB permission and approval to conduct the study will be obtained by all necessary facilities, organizations and departments. Each participant, parent and/or guardian will be given informed consent. Parents and/or guardians will sign the consent and each minor participant will sign and assent to participate in the study.

A research assistant who does not participate in data collection will use a permuted block random assignment assisted by a computer generated list to assign each participant to an intervention or control group. Males and females will be randomized separately to assure that numbers of each gender are represented equally in each group. Because of the nature of the intervention, participants cannot be blinded to group assignment, thus bias is a potential issue.

Participants will be assigned a private room and each participant may have two parents in the room with them, no other family or friends may be in the private room during the preoperative period. Each room will have the thermostat set at 70 degrees and each participant will be provided a warmed blanket for comfort. After admission to the room, the nursing staff
will complete the routine admission assessment and give necessary preoperative teaching. The nursing staff will not re-enter the patient room or have patient contact after this admission until it is time for the patient to go to the surgical suite. The researcher will then have the patient complete the state portion of the State-Trait Anxiety Inventory (STAI) and connect the participant to the Datascope monitor and record a baseline set of vital signs. After the initial STAI and baseline vitals, the intervention group will be instructed to apply the headphones and proceed to listen to the music of their choice, which will occur for 30 minutes prior to surgery. The control group will be allowed to visit with their parents or watch the television available within their private room. The Datascope monitor will be set to automatically obtain vital signs every 10 minutes during the preoperative period. Vital signs will again be taken just before the participant leaves for the surgical suite. The state portion of the STAI will be self-administered once again just prior to leaving for the surgical suite.

Variables

*Definition of independent variables*

**Music**

*Conceptual Definition.* Music has psychological effects including the induction and modification of moods and emotions.

*Operational Definition.* Music is the science or art of ordering tones or sounds in succession, in combination, and in temporal relationships to produce a composition having unity and continuity.

*Definition of dependent variables*

**Anxiety**
Conceptual Definition. Anxiety is fear surrounding an unfamiliar environment, loss of control, and fear of death or disfigurement.

Operational Definition. Anxiety is an abnormal and overwhelming sense of apprehension and fear often marked by physiological signs (as sweating, tension, increased blood pressure, respirations, and heart rate), by doubt concerning the reality and nature of the threat, and by self-doubt about one's capacity to cope with it.

Instruments

Instruments will include: a recordable electronic Hewlett-Packard Datascope monitor and the State-Trait Anxiety Inventory questionnaire. The electronic monitor will automatically record blood pressure, heart rate, EKG activity, oxygen saturation, and respiratory rate. Normal physiological values are set by the National Bureau of Standards (Burns & Grove, 2009).

The State-Trait Anxiety Inventory (STAI) tool will record anxiety before and after the preoperative period of time. The state portion of the STAI measures how a person feels at the time of its completion. It is a 20-item inventory rated on a four-point scale. Items are summed to obtain overall scores ranging from 20 to 80 (higher scores indicating higher levels of anxiety). This instrument has been extensively used in clinical settings to measure feelings of apprehension, nervousness, tension and worry. The internal consistency alpha coefficients of the state portion range from 0.86 to 0.92. Its validity has been well established and it is simple to use, generally taking less than 5 minutes to complete, and easy to score.

Projected Analysis

The Mann-Whitney test will be used to determine any significant differences in the dependent variables between the music and control groups at the pre and post tests. A Wilcoxon
Signed-Rank test will be used to compare all dependent variables for both groups on the pre and post tests. P < 0.05 will be considered statistically significant.

Expected Results

It is expected that the intervention group will show a significant decrease in anxiety on the state portion of the STAI after listening to the self-selected music, and the control group will have no significant change in anxiety levels on the state portion of the STAI throughout the preoperative experience. Physiological measures will have no significant changes throughout the testing period in both the intervention and control groups.
References


