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The Effects of Music Therapy on Anxiety in Surgical Patients

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**THE EFFECTS OF MUSIC THERAPY ON ANXIETY
IN SURGICAL PATIENTS**

By

Mary Kay Williams

A THESIS

**Submitted to
Grand Valley State University
In partial fulfillment of the requirements for the
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ABSTRACT
THE EFFECTS OF MUSIC THERAPY ON ANXIETY
IN SURGICAL PATIENTS

By

Mary Kay Williams

The purpose of this study was to evaluate the effects of music therapy on cosmetic/reconstructive surgery patients' preoperative anxiety. In this descriptive study, 48 patients were assigned to either the experimental or control group. Patients in the experimental group listened to patient-selected music for 30 minutes in the preoperative period. A comparison was made between the patients' vital signs and self-reports of anxiety, which was measured using the state portion of the State-Trait Anxiety Inventory. This was a partial replication of a study by Kaempf and Amodei (1989).

Betty Neuman's health care systems model (1980) served as the theoretical framework for this study. In this study, the intervention of music therapy to reduce anxiety associated with surgery illustrates the use of nursing theory in practice.

The analysis of covariance (ANCOVA) revealed no statistical difference in the levels of anxiety between the groups. The relationship between each variable measured showed only the respiratory rate nearing statistical difference between the groups.

The results of this study neither support nor refute the effectiveness of music as a therapeutic intervention. However, since the results cannot prove or disprove music therapy as a therapeutic intervention to reduce anxiety, further research is implicated.

To my mother-in-law, June Rose Williams, who dedicated her life to her family.

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CHAPTER ONE

INTRODUCTION

Anxiety has been defined as a perceived threat or danger (Lazarus, 1991). The basic threat is related to a potential loss or uncertainty, which makes one feel powerless. According to Lazarus (1991), anxiety is referred to as a stress emotion and has often been treated as the basis of psychopathology. Anxiety is characterized by subjective, consciously perceived feelings of apprehension and tension associated with autonomic nervous system arousal. Anxiety has been found to be a risk factor in several major illnesses of the western world (Moss, 1987).

Anxiety is a presenting variable in the surgical patient. The surgical process can be both frightening and alien to the preoperative patient producing increased anxiety. In caring for the surgical patient, techniques have been developed to prepare patients for surgical procedures to reduce anxiety, such as, providing education, coping strategies, and relaxation techniques. Research has demonstrated that surgical patients who are given additional information and support generally experience a more positive operative course and are more cooperative with treatment (Volcier, 1977). Most recently, the holistic approach to patient care has promoted the use of therapeutic modalities with traditional practices. One such modality that has been associated with the treatment of disease since ancient times is music therapy (Standley, 1986).

Music therapy focuses on the systematic application of music to aid in the physiologic, psychologic, and emotional aspects of individuals during the treatment of an

illness or disability (Munro & Mount, 1978). Throughout history, music has been used in a variety of settings for therapeutic purposes. References to music and healing have been recorded in the Bible, the writing of Plato, Confucius, and Aristotle (Cook, 1981). Florence Nightingale recognized the impact of music in the hospital wards in the 19th century. In "Notes on Nursing" (1854) she describes the types of music that can be helpful as well as those that can be harmful to the hospitalized patient. Music therapy is now used to treat a variety of clinical disorders (Reilly, 1999).

The therapeutic use of music has been recognized and used clinically. The pain guidelines compiled by the United States Department of Health and Human Services Agency for Health Care Policy and Research (AHCPR, 1992) entitled "Acute Pain Management: Operative or Medical Procedures and Trauma" give added support to the effectiveness of music therapy as a therapeutic modality. Music is categorized as one of several cognitive behavioral therapies that promote relaxation and improve postoperative pain. Included under relaxation, music is thought to be effective because it is a relatively simple approach and takes only a few minutes to teach with patient-preferred and "easy listening music" being effective in reducing mild to moderate pain (1992, p. 23). Researchers have found that music can successfully be used to reduce anxiety levels of patients and possibly promote healing and speed recovery time (Locsin, 1981; Moss, 1988; Munro & Mount, 1978). Nurses have traditionally provided both psychological and physical care to patients. The application of music as therapy to reduce anxiety is relevant with regard to a more individualized and holistic approach to health care.

Betty Neuman's health care systems model (1972) will serve as the theoretical framework for this study. According to Neuman (1995), the conceptual framework for

nursing is predominately wellness-oriented or holistic. The model emphasizes stressors in the environment and the reaction of each client system to these stressors.

Purpose

The purpose of this study is to evaluate the effects of music therapy on cosmetic/reconstructive surgery patients' preoperative anxiety. This study built on previous studies will add to the body of knowledge of the therapeutic use of music as a nursing intervention to decrease a person's response to stress.

Significance to Nursing

The results of this study will add to the body of knowledge of the effects of music therapy as a preoperative relaxation agent. The Neuman systems model focuses on the reactions of individuals to stress and on the conditions that influence the reduction of stress and the restoration of health (Reed, 1993). According to the Neuman model, health status is reflected by the client's level of wellness. Wellness is defined as "the condition in which all system parts and subparts are in harmony with the whole system of the client" (Neuman, 1995, p. 47). Specific nursing interventions, described by Neuman as primary prevention, assists the client to prepare for a stressor and avoid a negative reaction or reduce the intensity of the reaction (Reed, 1993). In this study, the intervention of music therapy as primary prevention to reduce anxiety associated with surgery illustrates the use of nursing theory in practice.

CHAPTER TWO

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

Conceptual Framework

The Betty Neuman health care systems model (1980) will serve as the conceptual framework for this study. According to Neuman (1995), the conceptual framework for nursing is predominately wellness-oriented or holistic. The overall goal of the nurse and the patient is to work together to achieve optimal wellness for the client. In the model, an individual or group is referred to as a system. The client system is identified as having five variables: physiologic condition, cognitive skills, sociocultural influences, developmental state and spiritual considerations (Neuman, 1995). In this study, the client is the preoperative surgical patient.

The model emphasizes stressors in the environment and the reaction of each client system to these stressors. Stressors are defined as “tension-producing stimuli with the potential for causing system instability” (Neuman, 1995). The model defines environmental stressors as (a) intrapersonal or stress reactions occurring within the client, (b) interpersonal or stress reactions occurring outside the client at a proximal range, and (c) extrapersonal or stress reactions occurring at a distal range from the client (Neuman, 1995, p. 23). In this model, the client maintains balance and harmony between internal and external environments by adjusting to stress and by defending against tension-

producing stimuli. The patient's stressor in this study is the surgical procedure. For the purpose of this study, the stress reaction is anxiety.

According to Neuman, individuals possess lines of defense to resist stressors. The outer boundary of protection is labeled as the flexible line of defense, which can be altered over a relatively short period of time and can be controlled by the individual by interventions such as adequate rest and therapies. The flexible line of defense is defined as "a protective, accordion-like mechanism that surrounds and protects the normal line of defense from invasion by stressors" (Neuman, 1995, p. 46). The normal line of defense depicts individuals in their normal or steady state. It includes an individual's life style and coping patterns. The normal line of defense is depicted as the measurement for "wellness-deviance determination" (Neuman, 1995). The third boundary is considered the lines of resistance, which are activated only when the stressors are strong enough to penetrate the normal line of defense. The nursing intervention of music as a therapeutic modality will be used in this study to strengthen the client's normal line of defense.

Neuman (1995) describes three levels of nursing intervention as primary, secondary, and tertiary. The goal of primary prevention is to deter the stressor from penetrating the flexible line of defense by eliminating the stressor or strengthening the defense. Secondary prevention is appropriate after a reaction has occurred. Nursing interventions are aimed at strengthening the lines of resistance. Tertiary prevention occurs following treatment of a stressor reaction. This includes adaptation or rehabilitation and education. The nursing intervention in this study, music therapy, is identified as secondary prevention.

Theoretical Definitions. Based on the Neuman systems model in relating the impact of a stressor on the stability of the individual, the study variables are defined as: (a) cosmetic/reconstructive surgery, (b) anxiety, an unpleasant emotional state consisting of feelings of tension, apprehension, nervousness and worry, (c) physical responses, physiological changes in the sympathetic nervous system in response to a stressor that include heart rate, blood pressure, and respiratory rate, (d) psychological responses, emotional response to a stressor measured by alterations in anxiety, (e) music therapy, the functional application of music to influence the physiologic and psychological status of an individual.

Literature Review

This literature review examines relevant information regarding the use of music therapy for therapeutic purposes. Music therapy as defined by Munro and Mount (1978), is the controlled use of music and its influence on the human being to aid in physiologic, psychological, and emotional integration of the individual during treatment of an illness or disability. Standley (1986) presented an analysis on the application of music therapy in medical and dental treatments. Since the end of the nineteenth century, the effects of music on cardiac output, respiratory rate, pulse rate, and blood pressure have been clinically documented (Standley, 1986). The nursing pioneer, Florence Nightingale, recognized the therapeutic impact of music. In "Notes on Nursing" (1854) she wrote, "The effect of music upon the sick has been scarcely at all noticed. . . . wind instruments, including the human voice, and stringed instruments, capable of continuous sound, have generally a beneficent effect – while the piano-forte playing will damage the sick " (p. 57-58).

Several studies have documented the use of music of a calm, soothing variety used clinically to reduce anxiety (Augustin & Hains, 1996; Beck, 1991; Locsin, 1981; Mullooly, 1988; Standley, 1986; Updike, 1987; White, 1992). A preliminary study on the benefits of music as an adjunct to anesthesia conducted by Bonny and McCarron (1983), reported statistically significant change from a negative to more positive state in the anxiety category of the Emotional Condition Rating Scale in 25 patients (p ranged from <0.01 to 0.05).

Mullooly, Levin, and Feldman (1988) conducted a study to examine the role of music on postoperative pain and anxiety. The basic premise for this study was that conditions that increase anxiety also increase pain. Music employed as a distraction or anxiety reducer would then be an effective method of pain relief. The study consisted of 28 women who underwent elective abdominal hysterectomies. The ratings for pain and anxiety were obtained using visual analog scales (VAS). After listening to taped music for 10 minutes, patients in the experimental group again rated their pain and anxiety. Patients in the control group also completed the two rating scales 10 minutes apart without any intervention. The results indicated a statistically significant decrease in anxiety on post-operative days one and two for the patients in the experimental group (p ranged from 0.00 to 0.03). The results obtained support the use of music as an accessible nursing intervention to reduce anxiety and pain in the surgical patient.

White (1992) also reported a statistically significant decrease on the state anxiety of patients with acute myocardial infarction (MI). Forty adult patients diagnosed with acute myocardial infarction in stable condition participated in the study. Anxiety was measured by the Spielberger State-Trait Anxiety Inventory (STAI), as well as heart rate

and respiratory rate. The experimental group listened to music selected by the investigator for 25 minutes while the control group was offered a quiet, uninterrupted 25-minute rest period without music. The results of this study resulted in statistically significant reductions in the experimental group for all three dependent variables measured ($p < 0.05$). These results indicate that music therapy may be an effective intervention for the acute MI patient. The results also suggest the effect of anxiety on patient outcomes.

Urdike (1990) studied the effects of taped music on the physiologic and emotional status of critically ill patients in coronary and surgical intensive care units. The study showed significant decreases in systolic blood pressure, mean arterial pressure (MAP), and double product index (DPI) (product of the heart rate and systolic blood pressure divided by 100) from pre- to post-test measures of the paired t-test analysis ($p < .01$, t-Value 2.74 to 7.91). Emotional status assessments also indicated a shift in the patients' moods towards a more desirable state of well being. A limitation of this study was the lack of a control group.

Oncology offers numerous opportunities for the therapeutic use of music therapy. Cook (1986) outlined the use of music therapy as an intervention in the oncology setting. She supported the use of music to help individuals cope with both psychological and physiological problems suggesting that "the free and open expression of feeling and thoughts is essential in the process of coming to terms with cancer" (p. 25). Beck (1991) conducted a study to evaluate the use of music for cancer-related pain. Although the results of the study indicated the effect of music on pain varied by individual, a statistically significant decrease in pain was achieved by music intervention ($p < 0.02$).

The study supports the use of music as a nonpharmacologic intervention for the management of pain.

Several studies have been done focusing on specific therapeutic music interventions that address preoperative and postoperative anxiety. The result of a study by Locsin (1981) addressed the use of music as a method of focusing attention away from pain. The study was based on the premise that anxiety, fear, and pain create a vicious cycle producing emotional and physiological responses. The sample involved 24 obstetric and gynecologic patients who underwent surgery by abdominal incision (i.e. caesarean section, abdominal hysterectomy, exploratory laparotomy, excision of ovarian cyst, oophorectomy, and appendectomy). The 12 experimental subjects were exposed to music 30 minutes after the closure of the skin incision and every two hours for 15 minutes following surgery. The Overt Pain Reaction Rating Scale (OPRRS) was used to evaluate the musculo-skeletal, verbal and physiological/autonomic responses to pain. Blood pressure, pulse rate, respiratory rate, and pain medications were recorded for both groups. A postoperative questionnaire was administered to all experimental subjects to obtain subjective data. Although not statistically different, the OPRRS data showed a clinical difference with less overt pain reactions when music was provided. The blood pressure and pulse rates showed significantly less increases in the experimental group (p values ranged from < 0.01 to < 0.05). Most importantly, the patients who listened to music used less pain medication. The subjective data showed patients preferred instrumental music. Locsin recommended music therapy for patients during the first 48 hours postoperatively.

A study by Updike and Charles (1987) measured the physiological and emotional responses preoperatively of a group of patients undergoing an elective plastic surgery procedure. The study was a replication of the pilot study by Bonny (1984). Quantitative data included physiological measurements on heart rate, blood pressure, mean arterial pressure (MAP), and double product index (DPI) before and after listening to music. Qualitative data to measure the patients' emotional responses were obtained with the Emotional Condition Rating Scale (ECRS). Results of the study demonstrated reductions in all variables in agreement with the study by Bonny ($p < .001$, t-values ranged from 4.67 to 24.65). The authors acknowledged the absence of a control group as a general weakness of the study. They felt, however, the results indicated a significant shift in the emotional states "from one of anxiety, apprehension, sadness, and preoccupation with pain to one of relaxation, calmness, and altered experience of anticipated pain" (p. 32).

The effects of music as an adjuvant therapy to reduce surgical patients' pain and anxiety levels, and promote their sense of well-being during the perioperative period, was studied by Heizer, Chiles, Fudge and Gray (1997). Patients in the experimental group listened to music intraoperatively, during the last 30 minutes of their surgery, and postoperatively, during the first hour in recovery. Although the results of the study demonstrated no differences between the two groups in the variables measured, the patients in the treatment group stated that music helped them relax. The researchers cited several limitations to their design interfering with their ability to collect complete data. They summarized that music was reported to be a "noninvasive, nonpharmacologic intervention" to manage surgical patients' postoperative pain.

The results of data obtained in a study by Moss (1987) did not statistically support the hypothesis that sedative music decreases anxiety. The author attributed the negative outcome to the type of methodology employed. The study involved 17 patients admitted for arthroscopic surgery. Sedative music was begun during the perioperative and continued until the postanesthesia time period. The state and trait portions of the STAI were administered to measure the anxiety levels of the experimental and control groups. A t test on the postoperative state scores revealed no statistically significant difference in anxiety (p values ranged from 0.241 to 0.517). This study was repeated by Moss (1988) using a paired t test. The results supported the hypothesis that patients exposed to sedative music preoperatively would exhibit significantly less anxiety postoperatively than those not exposed to music ($p = 0.005$).

Steelman (1990) attempted to determine the effectiveness of music for conscious patients under local or regional anesthesia. The study involved 43 subjects undergoing orthopedic procedures. The effects of music on anxiety were measured by the STAI and the effects of music on the physiological response was measured by blood pressure recordings. The participants in the experimental group listened to music throughout the operation. The control group received routine nursing care including verbal distraction for anxiety management. The results indicated a reduction in anxiety in both groups involving music or verbal distraction. The experimental group showed a significant reduction in both systolic and diastolic blood pressure listening to music (p values ranged from < 0.01 to < 0.024 , SD ranged from 11.272 to 22.418).

Heitz, Symreng, and Scamman (1992) studied the effects of music on pain, hemodynamic variables and respirations of patients in the postanesthesia care unit

(PACU), and the patients' recall of their PACU experience. The patients in the experimental group selected the type of music from two classical music tapes on the preoperative visit. The subjects were randomly placed into three groups. Group one had no music intervention, group two wore headphones but had no music intervention, and group three wore headphones and listened to music. The nurse caring for the patient was partially blinded only knowing whether or not the subject had headphones, and not knowing which subjects received music. A visual analogue pain scale (VAS) was completed by the subjects every 15 minutes while in the PACU to rate their pain. The subjects completed a questionnaire at twenty-four hours and one month postoperatively. The results indicated that music in the postoperative period offers some low-grade pain relief. Although not statistically different, the authors noted the most significant effect of music in the postoperative setting was to alter one's perception of the PACU experience.

A qualitative study by Eisenman and Cohen (1995) revealed the use of music to "convert potentially traumatic and stressful experiences to more pleasant ones" (p. 949). The evaluation questionnaire administered to 30 patients undergoing orthopedic surgical procedures revealed that music helped to minimize patient anxiety. The researchers noted the most positive feedback was documented by the anesthesiologists as more stable pulse rates and blood pressures and less anesthesia required during surgery.

Augustin and Hains (1996) investigated music as a method to reduce anxiety in ambulatory surgery patients. The control group received the standard preoperative teaching while the experimental group received preoperative teaching and listened to patient-selected music. The study consisted of 42 patients in each group. Differences were noted in pulse rates, blood pressures, and respiratory rates between the groups. The

STAI was used to measure patients' anxiety. The patients in the experimental group demonstrated a significant decrease in all variables (p values ranged from $< .0005$ to $< .025$, SD ranged from 9.44 to 15.47). The results indicated that listening to self-selected music reduces preoperative anxiety and appears to be more beneficial than preoperative teaching alone.

The clinical application of music in nursing must be grounded in research and theory. The historical precedent has been set for the therapeutic use of music as Florence Nightingale proposed the use of specific instruments to create an environment to decrease stressors (Reilly, 1999). Several studies have documented the physiologic and psychologic effects of music. Further study is needed to develop, refine and validate the use of music to influence the psychological and physiological status of an individual. The goal of music as primary prevention based on Neuman's model is to influence the reduction of stress and the restoration of health (Neuman, 1995).

Research Question. The research question for this study is: What is the effect of music therapy on preoperative anxiety in cosmetic/reconstructive surgery patients? The research question generated from the Neuman systems model (1972) is based upon partial replication of a study by Kaempf and Amodei (1989). The Kaempf and Amodei (1989) study described the effects of sedative music on the anxiety of patients in the operating room holding area. The hypothesis was that patients exposed to sedative music would have a greater decrease in anxiety than patients not exposed to music. Administration of the state portion of the state-trait anxiety inventory (STAI) and recordings of blood pressure, heart rate, and respirations will be used to measure patients' anxiety.

CHAPTER THREE

METHODOLOGY

Research Design

This research design utilized a quasi-experimental design to examine the effects of music played during the perioperative period for patients undergoing cosmetic/reconstructive surgery. The advantages of the quasi-experimental design will allow some control over extraneous variables.

Sample and Setting

The sample for this study was a convenience sample of 48 patients with no attempt at randomization. The sample population consisted of patients scheduled for cosmetic/reconstructive surgery. Demographic data included age, gender, type of procedure, and music preference (see Appendix A). All subjects were 18 years of age or older and will consent to participate in the study.

Prior to data collection, the study proposal was approved by the Grand Valley State University Human Research Review Committee and the Internal Review Board of Munson Medical Center (see Appendix B).

The subjects were identified during their advanced registration and testing interview at Munson Medical Center, a 368 bed, acute care medical center in northwestern Michigan. Criteria for subject inclusion included: (a) a patient scheduled for cosmetic/reconstructive surgery, (b) at least 18 years of age, and (c) ability to speak, read, and understand English.

The 48 participants were predominately female (85%; n=41). The age of the subjects ranged from 19 to 80 years, and had an average age of 45 (M=45; SD=16). Twenty three percent (n=11) had cosmetic procedures and sixty nine percent (n=33) had reconstructive procedures. There was an 8% (n=4) missing value reported on the type of procedure. Twenty five percent (n=12) of the subjects preferred to listen to country music. There was a 4% (n=2) missing value in the musical preference category. With the exception of age, the demographic characteristics are summarized in Table 1.

Table 1**Demographic Characteristics (N=48)**

Characteristic	Frequency	Percent
<u>Gender</u>		
Male	7	15
Female	41	85
<u>Type of Procedure</u>		
Cosmetic	11	23
Reconstructive	33	69
Missing Data	4	8
<u>Musical Preference</u>		
Blues	1	2
Easy Rock	10	21
Country	12	25
Classical	5	10
Soft Jazz	9	19
Rock & Roll	6	13
New Age	3	6
Missing Data	2	4

Procedure

Access to subjects was authorized by Munson Medical Center's Institutional Review Board (see Appendix C). The researcher was notified by the surgical scheduler of the day and time of the surgery. Those who met criteria were greeted by the researcher face-to-face on the day of surgery. A consent form was signed by each subject agreeing to participate in the study (see Appendix D). To be consistent that all subjects were treated equally, each subject was given a copy of the verbal script while the researcher read the script explaining the purpose of the study, methodology, risks, potential benefits, and anonymity (see Appendix E).

Subjects were assigned to either the control or the experimental group. Subjects having their surgery the first week of the study were placed in the experimental group. Subjects having their surgery during the second week of the study were placed in the control group. Assignment to the groups alternated weekly until there were 24 participants in each group. In addition, subjects in the experimental group were questioned about their music preference and given a choice of taped music to listen to through headphones. The selection of tapes consisted of classical, new age, blues, easy rock, country, soft jazz, and rock. Subjects in the experimental group were able to choose the type of music that was most preferable and relaxing to them.

Data collection included the following: First, the researcher greeted each subject on the day of surgery. Second, blood pressure, pulse rate, and respiratory rate were recorded. Third, the subject was asked to complete the 20-item state portion of the Spielberger State-Trait-Anxiety Inventory (STAI) (see Appendix F). The personal (demographic) data sheet was also completed by the subject at the time of instrument

completion. Fourth, blood pressure, pulse rate, and respiratory rate were recorded after 30 minutes of music listening. Fifth, the subject completed the state portion of the STAI a second time to determine whether there was a significant difference in anxiety levels related to the intervention of music. The protocol was the same for both groups except that during the 30-minute waiting period, the experimental group listened to patient selected music. The patients in the control group were exposed to the normal activities of the perioperative unit including watching television, conversations with staff, and viewing magazines.

Instrument

The State-Trait Anxiety Inventory (STAI) developed by Spielberger (1966) was the instrument used in this study. The STAI has been used extensively in research and clinical practice (Spielberger & Gorsuch, 1966). The S-Anxiety scale consists of twenty statements that evaluate how respondents feel “right now, at this moment.” The T-Anxiety scale consists of twenty statements that assess how people generally feel. The S-Anxiety form was used in this study. The complete S-Anxiety and T-Anxiety score are printed on opposite sides of a single-page test form. The subjects were asked to complete only the S-Anxiety form. The complete STAI Questionnaire is found as Appendix F.

The S-Anxiety scale has been found to be a sensitive indicator of changes in transitory anxiety (Spielberger, 1983). The scale has been used extensively by researchers for over a decade to assess the level of state anxiety induced by stressful situations such as imminent surgery (Auerbach, 1973; Spielberger, Auerbach, Wadsworth, Dunn & Taulbee, 1973; Chapman & Cox, 1977).

Content validity and standardization of the STAI was established after testing more than 5,000 subjects. Individual STAI items were required to meet validity criteria. The 20 items that best met the criteria for measuring S-Anxiety were retained. Internal consistency studies reported alpha coefficients above 0.90 with a mean coefficient of 0.93 (Spielberger, 1983). The means, standard deviations, and alpha reliabilities of S-Anxiety scores from data collected representing samples of working adults, college students, high school students, and military recruits revealed correlations greater than .90, indicating evidence of congruence and support for the state-trait distinction in the measurement of anxiety (Spielberger, 1983). The STAI has been adapted in more than thirty languages for cross-cultural research and clinical practice (Spielberger & Diaz-Guerrero, 1983).

For this study, Cronbach's alpha reliability coefficient was calculated at .90 pretest and .88 posttest. Polit & Hunger (1995) indicate reliability coefficients above .70 as satisfactory. The correlation coefficients obtained from the two sets of scores indicate a level of congruence and support the STAI as a measurement of anxiety for this study.

The STAI is written at the sixth grade level. Subjects were asked to complete the 20 question inventory by selecting the number that best describes the intensity of their feelings: (1) not at all; (2) somewhat; (3) moderately so; (4) very much so. Each of the questions is given a weighted score of one to four. A rating of one indicates the absence of anxiety, and a rating of four indicates the presence of high anxiety. Scores range from 20 to 80, with higher scores indicating higher levels of anxiety (Spielberger, 1983). The results of the scores will be discussed in the following chapters.

CHAPTER FOUR

RESULTS

The purpose of this research was to identify the effects of music therapy on preoperative anxiety in cosmetic/reconstructive surgery patients. Data analysis for this study was completed using the Statistical Package for Social Sciences (SPSS) software. Significance was set at $p < .05$ for all tests.

The hypothesis was that patients who listened to their choices of music while waiting for surgery would have significantly lower anxiety levels than patients who did not listen to music. Patients' anxiety levels were measured objectively by comparing their vital signs and subjectively by their responses to the state portion of the State Trait Anxiety Inventory (STAI).

The scores for the S-Anxiety scale range from a minimum of 20 indicating least anxiety to a maximum of 80 or a high level of anxiety. The results of the pretest anxiety scores of the experimental group ranged from 23 to 69 with a mean of 38.7 and standard deviation (SD) of 10.3. Post-test anxiety scores ranged from 20 to 51 with a mean of 35.2 and SD of 8.6.

The range of scores for the control group on the pretest anxiety was from 20 to 51 with a mean of 33.3, SD of 8.7. Post-test anxiety scores ranged from 20 to 44 with a mean of 31.1, SD 7.1. Table 2 illustrates the results of the frequencies of the pre and posttest anxiety scores between the groups.

Table 2**Frequencies of Pre and Posttest Anxiety Scores**

Group	Pretest			Posttest		
	STAI	Mean	SD	STAI	Mean	SD
Experimental	23 – 69	38.7	10.3	20 – 51	35.2	8.6
Control	20 – 51	33.3	8.7	20 – 44	31.1	7.1

The analysis of covariance (ANCOVA) was performed to statistically control for any differences between the experimental and control groups. The results indicated that there was not a statistical difference in their levels of anxiety following the intervention with $F = .56$; $p = .46$. The relationship between each variable measured showed only the respiratory rate nearing statistical difference between the groups. Table 3 illustrates the results of the analysis of covariance between the groups.

Table 3**Analysis of Covariance**

Category	F-value	p-value
Anxiety	.56	.460
Systolic blood pressure	.40	.531
Diastolic blood pressure	.87	.357
Heart rate	.56	.458
Respiratory rate	3.19	.081

Based on the study done by Kaempf and Amodei (1989), the researcher compared the outcome variables for the experimental and control groups using the paired t-test to measure the differences between the means within the groups. Results for the experimental group showed a statistically significant difference in heart rate ($t = 2.81$; $df = 23$; $p = .01$), respiratory rate ($t = 2.65$; $df = 23$; $p = .01$), and anxiety scores ($t = 3.03$; $df = 22$; $p = .00$).

Before and after outcome variables for the control group were compared showing a statistically significant difference in systolic blood pressure, heart rate, and anxiety scores. The results indicated an increase in systolic blood pressure ($t = -3.57$; $df = 23$; $p = .00$), an increase in heart rate ($t = -3.06$; $df = 23$; $p = .00$), and a decrease in anxiety ($t = 2.72$; $df = 23$; $p = .01$). A summary of the results of the paired t-tests for the experimental and control groups is found in Table 4 and 5 respectively.

Table 4

Experimental Group Means Before and After 30-Minutes of Music Therapy

Variable	Before	After	t-value	p-value
Systolic blood pressure	118.7	116.3	1.25	.22
Diastolic blood pressure	75.5	76.9	-.89	.38
Heart rate	72.7	67	2.81	.01*
Respiratory rate	17.5	15.6	2.65	.01*
Anxiety score	38.7	34.6	3.03	.00*
*p-value < .05				

Table 5

Control Group Means Before and After 30-Minute Waiting Period

Variable	Before	After	t-value	p-value
Systolic blood pressure	126.0	132.1	-3.57	.00*
Diastolic blood pressure	76.5	79.7	-1.48	.15
Heart rate	69.6	73.5	-3.06	.00*
Respiratory rate	16.5	16.6	-.32	.74
Anxiety score	33.3	31.1	2.72	.01*
*p-value < .05				

There were no significant relationships found between the variables of the experimental and control groups.

Summary

The results showed that vital signs and anxiety scores decreased for both groups. The mean differences in scores between the two groups did not support the hypothesis. This may have been due to a small sample size and/or to limited sensitivity of the instrument used in this research study.

CHAPTER FIVE

DISCUSSION

The purpose of this study was to evaluate the effects of music therapy on anxiety during the perioperative period on selected cosmetic/reconstructive surgery patients. The hypothesis was that patients exposed to music during the perioperative period would have a greater decrease in anxiety than those not exposed to the music as measured by the scores on the State-Trait Anxiety Inventory. It was also predicted that the recordings of blood pressure, heart rates, and respiratory rates of the experimental group would reveal a statistical significance difference than the control group after treatment.

Two statistical methods of analysis were utilized to analyze the differences among group means. The analysis of covariance (ANCOVA) revealed no statistical difference in the levels of anxiety between the groups. The advantages that ANCOVA presents over other techniques to reduce the error variance and to increase the power of the analysis was considered a benefit in this study. A possible explanation is a violation of the assumption that the covariate and the dependent variable did not show a linear relationship. Polit & Hunger (1995) indicate the test to be most effective when the relationship between the covariate and dependent variable lies above $r = 0.30$. Further analysis of variance reveals the posttest respiratory rate ($r = .1$) to be in violation of this assumption. The r -value of the remaining variables ranged from .3 to .7 violating the assumption of a linear correlation between music as the covariate and anxiety as the

outcome variable. A larger sample size may have met the assumptions necessary to ensure valid interpretation of ANCOVA results.

The data were analyzed using a paired t-test to compare pretest and posttest variables for both groups. Patients in the experimental group had statistically significant decreases in their heart rates and respiratory rates after treatment. The control group had statistically significant increases in their systolic blood pressure readings and heart rates with no treatment. The anxiety test scores for the experimental and control groups revealed a level of statistical significance within each group.

These results are very similar to those of the Kaempf & Amodei (1989) study. There was a statistical difference in the experimental group respiratory rates and anxiety test scores. Systolic blood pressure readings and anxiety test scores for the control group showed a significant difference. This suggests that there may be a natural decrease in anxiety during a 30-minute interval in the perioperative waiting period.

Various studies have been reported on the therapeutic use of patient-selected music (Locsin, 1981; Standley, 1986; Mornhinweg, 1992) to be more effective than researcher controlled music in achieving a state of relaxation. This study revealed country music (n = 12) to be the preferred musical preference. The researcher noted that the type of music selected for this study was not necessarily the type of music indicated as their preference. The researcher concluded that the tone of the music selected may have been preferred over country music in the surgical setting.

Relationship of the Findings to Previous Studies

Several studies have documented the use of music in the clinical setting to reduce anxiety (Augustin & Hains, 1966; Beck, 1991; Locsin, 1981; Mullooly, 1988; Standley,

1986; Updike, 1987; White, 1992). The studies were a combination of physiological and psychological outcome measurements. Physiological data included: heart rate, blood pressure, respiratory rate, skin temperature, and oxygen saturation. The psychological data included anxiety level, mood, or emotional state. All of the studies focused on adult patients of 18 years and older. The studies varied in percentage of males and females. Sample size ranged from 20 – 75 patients.

Changes in anxiety following music as an intervention were measured using the State-Trait Anxiety Inventory in several studies. Mullooly et al. (1988) reported a statistically significant decrease in anxiety on post-operative days one and two. White (1992) also reported a statistically significant decrease for both the control and experimental group with a greater decrease in anxiety scores for the experimental group. A study by Bonny (1983) utilized the Emotional Condition Rating Scale to measure the effect of music on anxiety. The result indicated a statistically significant change from a negative to a more positive state following music intervention. Like the findings of Kaempf & Amodei (1989), the anxiety scores of the experimental and control groups were statistically significant. This finding could suggest that there is a natural decrease in anxiety during a 30-minute interval from the time of arrival for surgery.

The effect of music on the physiologic variables revealed inconsistent findings. The studies reviewed found no significant change in heart rate. Zimmerman et al. (1988) reported a trend towards a decreased rate. The findings by Heitz et al. (1992) suggested that variables such as pain would cause an elevation in heart rate. White (1991) reported a statistically significant decrease in respiratory rates. The findings in this study are consistent with the research by Kaempf & Amodei (1989) which used a small sample size

(n = 33). None of the studies revealed statistically significant decreases in blood pressure, although some researchers noted a trend for decreases. Blood pressure may have been difficult to measure related to changes occurring with chronic illness, effect of medications, and age. The findings in this study revealed a statistically significant increase in systolic blood pressure in the control group.

Relationship of the Findings to the Theoretical Framework

Betty Neuman's health care systems model (1980) served as the theoretical framework for this study. The model focuses on the reactions of individuals to stress and on the conditions in the environment that influence the reduction of stress and the restoration of health. The model defines environmental stressors as (a) intrapersonal or stress reactions occurring within the client, (b) interpersonal or stress reactions occurring outside the client at a proximal range, and (c) extrapersonal or stress reactions occurring at a distal range from the client (Neuman, 1995, p. 23). The patient's stressor in this study was their surgical procedure and the measured response to stress was their anxiety.

According to Neuman, individuals possess lines of defense to resist stressors. The person's flexible lines of defense defined as "a protective, accordion-like mechanism and protects the normal line of defense from invasion by stressors" can be altered by interventions (Neuman, 1995). The flexible line of defense is represented in this study as the individual's level of stress. The normal line of defense depicts individuals in their normal or steady state. It includes an individual's life style and coping patterns. The normal line of defense is depicted as the measurement for wellness-deviance determination" (Neuman, 1995). The third boundary is considered the lines of resistance, which are activated only when the stressors are strong enough to penetrate the normal

line of defense. The nursing intervention of music as a therapeutic modality was used in this study to strengthen the client's normal line of defense.

Neuman (1995) describes three levels of nursing intervention as primary, secondary, and tertiary. The goal of primary prevention is to deter the stressor from penetrating the flexible line of defense by eliminating the stressor or strengthening the defense. Secondary prevention is appropriate after a reaction has occurred. Nursing interventions are aimed at strengthening the lines of resistance. In this study, music therapy is viewed as the nursing intervention to strengthen the normal line of defense. The impact of the secondary prevention strategy (music therapy) on one's stress reaction is indicated by the measurement of anxiety.

This research identified anxiety as a stress reaction capable of causing instability by penetrating the patient's normal line of defense. The results of this study showed a moderate level of anxiety in the experimental and control groups reported on the STAI. Statistically significant decreases in the anxiety levels of both groups occurred after the 30-minute wait with and without music intervention.

The research identified physiological changes in the sympathetic nervous system in response to a stressor monitored by heart rate, blood pressure, and respiratory rate. The findings indicated a statistically significant increase in the systolic blood pressure of the control group ($p = .00$), and a decrease in the respiratory rate of the experimental group ($p = .01$).

The goal of Neuman's model (1980) is system stability between the patient and his or her internal and external environments. This stability is affected by stress and one's reaction to stress. The intervention of music therapy as secondary prevention to

reduce the level of anxiety in the surgical patients illustrates the use of nursing theory in practice.

Limitations and Recommendations

This study utilized a convenience sample. Limitations exist with convenience sampling because the subjects may be highly atypical of the population with regard to measured variables (Polit & Hungler, 1995). The subjects were relatively homogenous in demographics, therefore, generalizability of the study results is limited. The researcher recommends replication of this study by randomization and expanding the number to a larger sample to enhance the generalizability of the results.

A second consideration is the anxiety levels of the subjects. According to the STAI manual, scores for low anxiety generally range from 20 to 39; moderate anxiety, 40 to 59; and high anxiety, 60 to 80. The results of the pretest anxiety scores of the experimental group ranged from 23 to 69 with a mean of 38.7. For the control group, the results of the pretest anxiety scores were from 20 to 51 with a mean of 33.3. Different results may have been obtained if the subjects with high anxiety were included in the study.

The self-report questionnaire format of the STAI may have influenced the reported levels of anxiety. Responses to some of the questions are socially more acceptable or desirable than others. It is likely that the patients may not have wanted to appear anxious, unhappy, depressed, or confused as some of the questions suggested.

The self-reports of anxiety may have been skewed by the perceived seriousness of surgery. In the experimental group, 25% of the surgeries were cosmetic surgeries and 58% reconstructive. In the control group, 21% of the surgeries were cosmetic and 80%

were considered reconstructive. The types of surgeries ranged from breast augmentations to breast reconstruction related to cancer. The variance in the levels of anxiety may have been related to the types of surgeries in this study. More significant results in the level of anxiety may have been obtained if the type of surgery were more homogeneous.

Another consideration is whether the State-Trait Anxiety Inventory is a valid measure of anxiety for this population. The STAI has been used extensively in research and clinical practice for more than fifteen years (Spielberger & Gorsuch, 1966). One would question if the nature of anxiety has changed with this generation altering the sensitivity of the questionnaire to measure state anxiety in the younger population.

The methodology used in this study of informing the subject of the study on the same day of surgery may have affected the level of anxiety. The researcher was often hurriedly explaining the study to the patient to accommodate changes in surgical schedules and interruptions for laboratory services and preoperative teaching.

Another variable to consider is that listening to music may not be considered a form of relaxation to all individuals. The control group was distracted by visiting with family, watching television, or reading prior to their surgery which may have alleviated some of their anxiety. The control group may have used other relaxation methods that could have contributed to their decrease in anxiety.

Decreases in the physiological variables for the experimental group only showed a statistically significant change in respiratory rate and systolic blood pressure. However, the researcher did not take into account the past medical history including current medications of the subjects which may have altered these findings.

Implications for Nursing

According to Neuman (1995), the conceptual framework for nursing is predominately wellness-oriented or holistic. The overall goal of nursing is to help persons achieve optimal wellness. The identification of interventions to strengthen an individual's defense mechanisms is an important nursing strategy. The results of this study neither support nor refute the effectiveness of music as a therapeutic intervention. However, since the results cannot prove or disprove music therapy as a therapeutic intervention to reduce anxiety, further research is implicated.

Results of this study are inconclusive on the effects of music therapy to reduce the physiological and psychological effects of anxiety on the surgical patient. One of the challenges nurses face is finding methods to minimize patient anxiety. This study acknowledges the importance of reducing patients' anxiety in the surgical setting. Experience has shown that allowing patients to listen to music is a nursing intervention to further decrease preoperative patients' anxiety.

Florence Nightingale (1854) recognized that certain instruments have a beneficent effect on the sick. Assessing the patient's musical preference and allowing them to select the music is an important consideration. Allowing patients to bring their own music would promote a positive element of pleasure and normalcy.

The study results indicate that music therapy may be beneficial in reducing patients' preoperative anxiety. Even though the results of this study were not statistically significant, music therapy can be used as a valuable nursing intervention towards achieving holistic patient care and provide an additional link between theory and empirical data.

APPENDICES

APPENDIX A

Personal Data Sheet

ID# _____

PERSONAL DATA SHEET

The completion and return of this data sheet constitutes your consent to participate in this study.

1. How old are you? _____
2. _____ 1. Male _____ 2. Female
3. Type of procedure: _____
4. What type of music do you prefer to listen to? _____



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APPENDIX B

August 2, 2000

Mary Kay Williams
2174 Kewaunee
Traverse City, MI 49686

RE: Proposal # 01-07-H

Dear Mary Kay:

Your proposed project entitled **Music Therapy: An Intervention to Reduce Anxiety in the Surgical Patient** has been reviewed. It has been approved as a study which is exempt from the regulations by section 46.101 of the Federal Register 46(16):8336, January 26, 1981.

Sincerely,

A black rectangular box redacting the signature of Paul A. Huizenga.

Paul A. Huizenga, Chair
Human Research Review Committee

APPENDIX D

INFORMED CONSENT

I understand that this is a study on music therapy for patients undergoing cosmetic/reconstructive surgery at Munson Medical Center. The knowledge gained from this study is expected to enable nurses to offer better care to me as a patient.

I also understand that:

- 1. participation in this study will involve completing a self-evaluation questionnaire and recording my blood pressure, pulse rate, and respiratory rate one hour prior to my surgery and 30 minutes prior to my surgery.**
- 2. participation in this study may involve listening to music with a headset and automatic reverse tape player.**
- 3. that I have been selected to participate in this study because I am 18 years of age or older**
- 4. it is not anticipated that this study will pose any physical or emotional harm**
- 5. the information I provide will be kept strictly confidential and the data will be coded so that identification of individuals will not be possible**

I acknowledge that:

"I have been given the opportunity to ask questions regarding this research study, and that these questions have been answered to my satisfaction."

"In giving my consent, I understand that my participation in this study is voluntary and that I may withdraw at any time, without affecting the care I receive from my physician or the staff at Munson Medical Center."

"I hereby authorize the investigator to release information obtained in this study to Munson's surgery department and scientific literature. I understand that I will not be identified by name."

"I have been given the phone numbers the investigator, Mary Kay Williams, and the Chairman of Human Research Review, Professor Paul Huizenga."

I acknowledge that I have read and understand the above information, and that I agree to participate in this study.

Witness

Participant's Signature

Date

Date

APPENDIX E

Verbal Script

VERBAL SCRIPT

My name is Mary Kay Williams and I am a registered nurse. I am currently a Graduate nursing student at Grand Valley State University. As part of the requirement for my masters degree, I am conducting a study on music therapy.

Your agreement to participate will involve completing a self-evaluation questionnaire. The questionnaire lists 20 statements used to describe how you feel. You will be asked to complete questions about how you feel one hour prior to your surgery and again 30 minutes prior to your surgery. Your blood pressure, pulse rate, and respiratory rate will also be recorded.

Your participation is strictly voluntary. Your decision to participate or not will have no influence on the care you receive during your surgery. Your answers will be kept confidential and all documents will be coded by number. There will be no identification of you by name.

I would like to thank you for considering participation in this study. The information obtained is important to enable nurses to offer better care to you as a patient. If you have any questions concerning your rights as a participant, you may contact Professor Paul Huizenga, Chairman of Human Research Review, at 1-616-895-2472.

**Mary Kay Williams, BSN
Grand Valley State University
Kirkhoff School of Nursing
1-231-941-0699 (H)**

SELF-EVALUATION QUESTIONNAIRE

STAI Form Y-1

DIRECTIONS:

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel *right now*, that is, *at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I feel calm	1	2	3	4
2. I feel secure	1	2	3	4
3. I am tense	1	2	3	4
4. I feel strained	1	2	3	4
5. I feel at ease	1	2	3	4
6. I feel upset	1	2	3	4
7. I am presently worrying over possible misfortunes	1	2	3	4
8. I feel satisfied	1	2	3	4
9. I feel frightened	1	2	3	4
10. I feel comfortable	1	2	3	4
11. I feel self-confident	1	2	3	4
12. I feel nervous	1	2	3	4
13. I am jittery	1	2	3	4
14. I feel indecisive	1	2	3	4
15. I am relaxed	1	2	3	4
16. I feel content	1	2	3	4
17. I am worried	1	2	3	4
18. I feel confused	1	2	3	4
19. I feel steady	1	2	3	4
20. I feel pleasant	1	2	3	4

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