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Pain Management through Music Therapy

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The project and the manuscript have been successfully completed and meet the standards of the School of Nursing University. The project demonstrates the application of professional knowledge, clinical expertise, and scholarly thinking. An abstract of the project and two copies of the manuscript are attached.

Elizabeth O. Dietz — 5/18/04

ADVISOR'S SIGNAURE **DATE**

Christine Hooper — 5/19/04

ADVISOR'S SIGNAURE **DATE**

Please submit the form to the Graduate Coordinator. Attach abstract, two copies of the manuscript, and the documentation of submission to the journal (i.e., postal receipt).

Pain Management through Music Therapy

A Research Proposal

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The Faculty of the Division of

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Nursing Research

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By

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Abstract

In 1999, approximately three quarters of patients admitted to emergency departments reported pain (Joint Commission on Accreditation of Healthcare Organizations, 2000). Managing pain pharmacologically alone may not be enough because pain perception is a complex phenomenon that consists of both physiological and psychological components (Trauger-Querry & Haghighi, 1999). Music therapy is one of the systematic applications in treatment of physiological and psychological aspects of an illness or disability (Cook, 1981).

The objectives of this study were to measure the pain intensity index PPI (Melzack) level before after the intervention with music therapy to investigate if music therapy is effective for pain management; and to compare the mean PPI gain scores between the music intervention group and the non-music intervention group.

A quantitative research design, with twenty-six randomly selected patients with acute abdominal or acute chest pain, was used to test the research question, "Is pain intensity lower among patients with pain who are provided with a combination of both medications and music therapy sessions than the patients who are provided with medications alone?"

By using the independent sample test, it showed there was a significant difference in Pain Intensity Index gain scores ($t = 2.867$, $df = 24$, $p < .05$) between the study and the control group. Therefore, music therapy was indicated to have some degree of usefulness in pain management; and the validity of the research question was supported with a significance level at $p < .05$. Health providers may now consider incorporating music therapy as an alternative way of managing pain in addition to the routine analgesic.

Pain affects millions of Americans everyday. In 1999, approximately three quarters of patients admitted to emergency departments reported pain (Joint Commission on Accreditation of Healthcare Organizations, 2000). Pain may be caused by nerve damage, inflammation, surgeries, or diseases such as cancer, or be related to lack of blood or oxygen circulation. Pain is a common accompaniment to many illnesses and potentially impacts upon every aspect of the patients' quality of life. It can precipitate job loss leading to financial hardship; loss of social life with the destruction of intimate relationships leading to anxiety, depression, and even hostility due to preoccupation with pain and distress (Nash & Yates, 1999).

Three out of the most common five principal reasons for emergency department or clinic visits were associated with pain. Abdominal pain was the most frequent reported reason for visiting the emergency departments, followed by chest pain, fever, headache, and shortness of breath (National Center for Injury Prevention and Control, 2000). Myocardial infarction associated with acute chest pain is the most common life-threatening disease in United States. Heart attacks occur suddenly and are usually accompanied by chest pain and distress. Prompt and effective pain management is essential. Besides the physiological components, the emotional stress caused by the pain may extend the original infarct by increasing myocardial oxygen demand leading to a more severe damage (Cornock, 1996).

Headache is also one of the most common principal reasons for clinic and emergency department visits. Headache can result from distortion, stretching, inflammation, or destruction of pain-sensitive nerve endings. The pain may be constantly present for days, weeks, or months; and may impair patients' daily functioning and

activity. In spite of advances in medicine, drug therapy alone is unlikely to remedy these problems because pain perception is a complex phenomenon. It consists not only of the physiological component or the original sensation, but also of the resultant psychological, social, and emotional responses (Trauger-Querry & Haghighi, 1999). Thus, it is imperative that health care clinicians become more aware of the clinical significance of pain and important that they take appropriate steps to alleviate the patient's pain through a comprehensive process of pain management.

In 2000, the Illinois-based Joint Commission on Accreditation of Healthcare Organizations (JCAHO) developed standards for pain management. The standards refer to pain intensity ratings as the "fifth vital sign" next to heart rate, temperature, blood pressure, and respiration rate (JCAHO, 2000). Current California Board of Registered Nursing regulations require registered nurses to monitor all five vital signs and take appropriate action when the patient's pain is not being managed according to the agreed upon comfort level (Board of Registered Nursing, 2003).

The International Association for the Study of Pain defines pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage. Pain is always subjective." If pain is related to perception, anything that affects perception can affect the individual's experience of and response to pain (Cornock, 1996). Some people may even experience pain without any known physiological precursors; their pain may be a response to psychosocial or emotional upheaval. Whatever the origin, one's experience of pain perception is real. Due to a wide range of individual differences in pain experiences, effective treatment with combination of pharmacological and non-

pharmacological intervention must address both physiological and psychological aspects (O'Callaghan, 1996).

Traditionally, pain is first addressed physiologically and treated pharmacologically. As stated earlier, three out of the most common five principal reasons for emergency department or clinic visits were associated with pain and three quarters of patients admitted to emergency departments reported pain, with 32% of these patients in severe pain-related distress, despite the prescription of analgesics. Meanwhile, many health care clinicians express reluctance to use narcotic analgesics for the relief of patients' pain and hesitate to furnish the maximum dosage prescribed due to fear of addiction and respiratory depression (Nash & Yates, 1999).

Besides the unwanted side effects from over medicating with analgesics, managing pain pharmacologically alone is just not enough. In 1986, a National Institutes of Health consensus conference on pain acknowledged the importance of an integrated approach to the management of chronic pain – an approach that makes the most effective use of collaborative pharmacological and non-pharmacological interventions (Beck, 1991). As nurse practitioners, we strive to implement a more holistic and non-pharmacological approach that focuses more on the psychosocial aspects. One of the effective non-pharmacological interventions is the therapy called "Music Therapy" (Magill-Levreault, 1998). By definition, music therapy is the systematic application of music in the treatment of the physiological and psychological aspects of an illness or disability (Cook, 1981).

Relevant Literature

Music is said to be as old as human culture itself (Biley, 2000). Most of us share a deep need to create and experience those unique combinations of sounds called music. Music, a very powerful tool, has the ability to alter our emotions and actions. Music with the right rhythm makes people dance; music with meaningful lyrics makes people happy or sad; and music with a soothing melody helps people relax. Throughout history, music has been used in a variety of ways for therapeutic purposes, having long been recognized for its physiological and psychological effects. In health care, music therapy is an independent non-pharmacological intervention that is being used to improve levels of comfort and enhance the patient's sense of well-being (Magill-Levreault, 1998).

The existence of music therapy goes back to perhaps 10,000 B.C. when our early ancestors began to attribute magical powers to sounds that were perceived to be able to control the spirit and natural worlds and to create and sustain life. Not only was music regarded as pleasing but also was the "physic of the soul" (Biley, 2000, p. 2). Hindus called this basic life force sound, "Om," the Egyptians called it "The World of the Gods," and the Greeks called it "The Music of the Spheres" (Biley, 2000, p.2). The Greeks were actually the first to investigate and use music scientifically and systematically. Plato, in The Republic, expressed the belief that health in body and mind could be obtained through music (Cook, 1981).

In mid 19th century, Florence Nightingale, a pioneer in compassionate nursing, recognized the potential of music in caring for the sick and wrote "wind instruments, including the human voice, and stringed instruments, capable of continuous sound, have generally a beneficial effect...an air...will sensibly soothe" (Biley, 2000, p. 2). In late

19th century, one of the early experiments into the therapeutic use of music was published by Pargiter and Dogiel. They suggested that the physiological responses to music included an influence on the circulation of blood, and an alteration in blood pressure (Biley, 2000).

In this century, music has been found to alter physiological responses such as heart rate and respiration rate; and it also alters mood by eliciting relaxation responses (Cook, 1981). Numerous health providers and therapists have witnessed the effect of music on patients' psychological, physiological, cognitive, and emotional perceptions of chronic pain. Numerous studies have researched the effects of music therapy in chronic or cancer-related pain.

In a 1991 study, "The therapeutic use of music for cancer related pain," Beck found the therapeutic use of music, aimed at "the restoration, maintenance, and improvement of mental and physical health," has been acknowledged and supported in a variety of settings. She described music as multi-dimensional stimuli consisting of affective, cognitive, and sensory effects that stimulate endorphin production and the endogenous mechanisms for pain modulation. Her primary aim was to evaluate the effect of the therapeutic use of music on cancer-related pain; her secondary aim was to evaluate the effect on mood that was viewed as an intervening variable (Beck, 1991).

In this quantitative research study, fifteen adult outpatients with cancer-related pain were selected. Data were collected on each participant during four three-day treatment phases including an initial baseline phase, an intervention (music) phase, control (sound) phase, and a follow up phase. All participants, with the exception of one who did not use any analgesics, were on scheduled medications to relieve his/her pain

level. Participants were randomly assigned to listen to the selected music or sound, two to three times daily, and to rate their pain and mood before and after the music by using the Abbreviated Version of the McGill Pain Questionnaire (Melzack, 1987) which contained verbal descriptors corresponding to numbers ranging from zero (no pain) to five (excruciating pain). The Mood Visual Analogue Scale (Melzack, 1987) with verbal descriptors of relaxing, distracting, or feeling of being in control, was used to measure different types of moods. The music selections were chosen by a registered music therapist by using 45-minute cassette recordings of variety of music such as classical, jazz, folk, rock, country western, easy listening, and new age.

Results from this study indicated that nearly three-fourths of the participants had at least some decrease in pain, and nearly one-half had a moderate to great response to the music, while only one-fifth of the participants had a moderate to great response to the sound. All but one participant claimed that the music was relaxing. Four-fifths of the participants claimed that the music was distracting while one-third felt that the music was effective for increasing their sense of control. This study concluded that music, to some degree, could decrease the level of reported pain by providing a sense of relaxation, distraction, and feeling of being in control.

In another study by M. Cornock (1996), the author stated music therapy is one of the non-pharmacological approaches for pain management that is being used to improve levels of comfort in other pharmacologic methods of pain control. The author found that myocardial infarctions in patients occurred suddenly and were usually accompanied by pain and distress. Prompt and effective pain management was vital, not just for the patient's comfort but the emotional stress caused by the pain might extend the original

infarct by increasing myocardial oxygen demand. Thus, it was imperative to improve patient's level of comfort promptly and effectively.

In this study, patients were assigned to listen to music of their choice in conjunction with analgesics for their pain management. Results from this study showed that patients appeared to find it helpful to listen to music of their own choice and music was reported to produce behavioral, emotional, and physiologic changes through distraction. Even distraction did not remove pain directly, but it provided some relief by increasing the patient's pain tolerance by releasing endorphins to the nervous system as a direct result of music stimulation (Cornock, 1996).

Theoretical Framework

The theoretical framework selected for the use of music therapy in pain management is based on "The therapeutic use of music for cancer-related pain," by Beck (1991). Adapting "The psychologic and physiologic pain theory," Beck proposed a model that music may alter components of the total pain experience by three possible interactive pathways as shown in Figure 1.

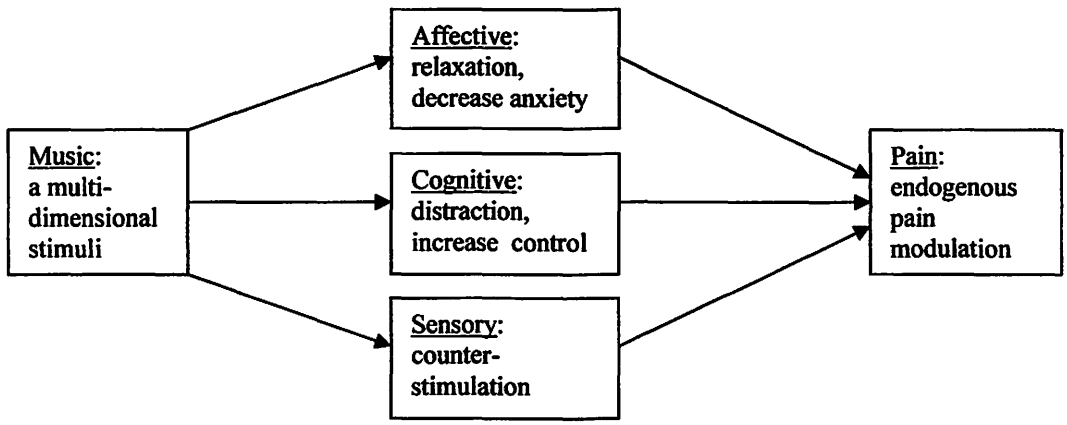

Figure 1. The possible effects of music on pain (Magill-Levreault, 1998).

1. *Affective*: Similar to other cognitive and behavioral interventions, music can diminish tension and alter mood disturbances such as depression, fear, anger, and sadness by lifting depressive symptoms, promoting relaxation, and decreasing anxiety.
2. *Cognitive*: Music provides a mechanism for improving patient's sense of control by engaging familiar skills such as prior music skills for music performers, music listeners, or music eventer (one who associates music with important events in life through self-expression). Additionally, music also provides a means for distracting attention away from pain.
3. *Sensory*: According to "The Gate Control Theory," by Melzack (1963), pain impulses flow to the brain via a 'gate' at the spinal level where the nociceptors (nerve endings) are widely branching in the afferent nervous system pathways. If the counter-stimulation (as shown in Figure 1) of the afferent fibers, such as music, reaches the gate before the pain stimulus, it closes the gate and prevents onward transmission of pain impulses. If the event occurs, the pain will not be perceived in the brain (Cornock, 1996). Also if a person is viewed as an energy field, the harmonizing effects of music might serve to decrease pain by rebalancing energy and reestablishing rhythms (Beck, 1991).

These three proposed pathways are interactive with each other where music may activate the endogenous system of pain modulation by a combination of musical elements such as rhythm, melody, tone, pitch, harmony, and sometimes lyrics (Magill-Levreault, 1998). These multi-dimensional stimuli have the capability to reach the thalamus, mid-brain, and neurological centers to fulfill their use as therapeutic medium. In short, music

may reach and alter the affective, cognitive, and sensory pathways to facilitate a change in the perception of pain (Beck, 1991).

Methods

Sample and Settings

Because the hospital's Human Research Institute Review Board (IRB) limited the setting to the Transitional Care Unit only and the participants to patients with illnesses associated with acute abdominal or acute chest pain only, the data collection process would have taken longer than practical to achieve the proposed population size. In addition, at least twenty patients did not participate because they did not want to sign a consent.

The study's proposed population size was ninety randomly selected hospitalized patients with acute pain. Due to the limited setting and patient enrollment constraints mentioned above, twenty-six patients were recruited to complete this study. Because the admission date for each patient with acute pain was random, the first patient with acute pain was placed in the study group and the next one was placed in the control group. This alternation continued until a population of twenty-six was achieved. Thirteen patients of the study group were provided with combination of both medications and music therapy sessions for their pain management. The remaining thirteen patients, the control group, were provided with medications alone. The criteria for participation were:

1. Documented with acute pain by having a minimum Pain Intensity Index level of 2 out of scale of 0 to 10 on admission to the unit,
2. An ability to hear and to communicate in English,
3. A regularly scheduled analgesics schedule, and

4. Age equal to or greater than 18 years of age (See Table B for demographic background).

Instruments / Tools

The independent variable, the therapeutic use of music, was operationalized by using compact discs of various soothing music of the patient's musical preference along with a compact disc player. Music was obtained by the principal investigator with selections of prerecorded compact discs consisting of classical, jazz, gospel, light rock, and instrumental. Sixteen CD players were donated by the transitional care unit manager. The charge nurse had access to both music selections and CD players. Patients could also bring their own choice of music and CD players based on their preference. The dependent variable was the Pain Intensity Index (PPI) that contained verbal descriptors corresponding to numbers ranging from zero (no pain) to ten (excruciating pain) to measure changes in pain intensity before and after the intervention.

The independent sample *t*-test was used to compare the mean PPI gain scores between the control and the study group. The gain scores were obtained by subtracting the pre-intervention PPI scores from the post-intervention PPI scores. Then mean PPI gain scores are calculated for each group. If the mean PPI gain scores of the study group were sufficiently greater than that of the control group, the *t*-test would yield a significant difference. The validity of the research question then would be supported. If the PPI mean gain scores of both groups were too close, there would be no significant difference. Then the validity of the research question would be rejected.

Procedures

On admission, patient's baseline comfort zone (the PPI level of 0 to 10 that patients are comfortable with) was collected from both groups. If the selected patient had a Pain Intensity Index level of 2 or greater, he/she was provided with pain medications to relieve pain to an acceptable comfort level before being given a verbal description of the study. Those who agreed to participate signed a written consent.

The following were the pain management steps administered once per day for two days for the study group:

a. Pain level was assessed with the first Pain Intensity Index PPI (Form A) before providing both analgesics and music therapy session, then the second PPI (Form B) was administered 30 minutes after the intervention according to hospital pain management protocol.
b. If pain was at an acceptable level after first 30 minutes, the patient continued listening to the music and no additional analgesics were provided. The patient's pain level was reassessed with the third PPI (Form C) at the end of additional 30 minutes.
c. If pain was not relieved after first 30 minutes, the patient was provided with additional analgesics and continued listening to the music for an additional 30 minutes. The patient's pain level was reassessed with the third PPI (Form C) at the end of additional 30 minutes.
d. If pain was not relieved within an hour, the nursing staff notified the physician to change the frequency, dosage, or type of analgesics until the patient's pain level returned to his/her comfort level.

The control group followed the same procedure as in steps A through D, except no music therapy was provided.

Results

Data Collection

The three PPI forms and one demographic form were filled out by each participant before intervention, 30-minutes after intervention, and 60-minutes after the intervention. The data were separated by control and study group. Mean gain scores and standard deviation were calculated for each group at the end of each day treatment. The mean gain scores between the two groups were then compared and analyzed by using the independent sample t-tests (See Table A, B & C).

Data Analysis

Demographic Background data (Table D & E) revealed that 11 out of 26 participants (42%) did not fill out the Demographic Background form. Out of the 15 participants who responded to the demographic questions, there were eight males (53%) and seven females (47%). The majority, 10 participants (66.7 %) were between the ages of 60 to 79. Four participants (44%) had a Bachelor's degree and three participants (33%) graduated from high school. Seven participants (50%) were Pacific Islanders, two participants (14%) were Black, and two participants (14%) were Chicano.

On day one, the control group (n = 13) had a mean Pain Intensity Index (PPI) gain score of –3.20 after intervention with only analgesics while the study group (n = 13) had a mean PPI gain score of –4.81 after intervention with both analgesics and music sessions. The mean PPI gain scores of the two groups showed a significant difference in PPI scores ($t = 2.867$, $df = 24$, $p = .009$ *or* $< .05$) on day one.

On day two, the control group (n = 11) had a mean PPI gain score of –3.58 after the intervention while the study group (n = 11) had a mean PPI gain score of –4.44 on day two after the intervention. However, the mean PPI gain scores of the two groups did not show a significant difference in PPI scores ($t = 1.289$, $df = 20$, $p = .212$ *or* $> .05$) on day two because of the smaller sample size (n = 22) as four selected patients did not complete the study on day two due to discharged to home or transferred out to a different unit.

Discussion

By using the independent sample *t*-test to compare the mean PPI gain scores between the control and the study group, the results showed that there was a significant difference at $p < .05$ on day one but no significant difference at $p > .05$ on day two. Therefore the validity of the research question, "Pain intensity is lower among patients who are provided with combination of both medications and music therapy sessions than the patients who are just provided with medications alone" was supported in day one but was rejected in day two. The results of this study also showed that with a larger population size in day one leading to a significant difference at $p < 0.5$, music therapy indicated some degree of usefulness in pain management in addition to routine analgesics.

The management of pain is the prime concern for nurse practitioners and health care team members in caring for patients with acute pain. As stated earlier that managing pain pharmacologically alone may not be enough because pain perception is a complex phenomenon that consists of both physiological and psychological components. Both historical evidence and recent experimental studies have shown the effectiveness of

music therapy for better patient pain management in addition to routine analgesics. Thus, I believe that music therapy does have a degree of usefulness in pain management. As health providers, we may now consider incorporating music therapy as an alternative way of managing pain for patients with illnesses associated with acute pain.

It is also hoped that this study will allow other health care team members additional approaches for a more effective pain management and a greater use of music therapy, a holistic and non-pharmacological intervention that transcends the physiological limitations to care for the mind, body, and soul; and to improve the quality of life of our patients.

Limitations

Because the hospital's Human Research Institute Review Board (IRB) limited the setting to the Transitional Care Unit only, and the participants to patients with illnesses associated with acute abdominal or acute chest pain only, the data collection process would have taken longer than practical to achieve the proposed population size. In addition, at least twenty patients did not participate because they did not want to sign a consent.

The study's proposed population size was ninety randomly selected hospitalized patients with acute pain. Due to the limited setting and patient enrollment constraints mentioned above, twenty-six patients were recruited and completed this study. Furthermore, this study also did not measure variables such as different types of pain, differences between males and females, length of illness, length of hospital stay other than the minimum stay required to complete this study, and amount of psychological and social support available. The resources for music selection were also limited. Therefore,

more control in these areas may be needed to further expand this study to examine the therapeutic use of music therapy in pain management in the care of patients with other illnesses associated with acute pain.

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Form A

Kaiser Permanente Foundation Hospital
And
San Jose State University
School of Nursing
Research Study: Pain Management through Music Therapy

Pain Assessment Questionnaire Before Intervention

Patient # _____ Day # _____

- Rate your pain level by circling the number in the following scale and check the appropriate box that best describe your pain level

No Pain \0 –1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10/ Worst Pain Possible

0	**No Pain**	☐
1 - 2	**Mild**	☐
3 - 4	**Discomfort**	☐
5 - 6	**Distressing**	☐
7 - 8	**Horrible**	☐
9 - 10	**Excruciating**	☐

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Form B

Kaiser Permanente Foundation Hospital
And
San Jose State University
School of Nursing
Research Study: Pain Management through Music Therapy

Pain Assessment Questionnaire 30 minutes After Intervention

Patient # _____ Day # _____

- Rate your pain level by circling the number in the following scale and check the appropriate box that best describe your pain level

No Pain \0 –1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10/ Worst Pain Possible

0	**No Pain**	☐
1 - 2	**Mild**	☐
3 - 4	**Discomfort**	☐
5 - 6	**Distressing**	☐
7 - 8	**Horrible**	☐
9 - 10	**Excruciating**	☐

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Form C

Kaiser Permanente Foundation Hospital
And
San Jose State University
School of Nursing
Research Study: Pain Management through Music Therapy

Pain Assessment Questionnaire 60 minutes After Intervention

Patient # _____ Day # _____

- Rate your pain level by circling the number in the following scale and check the appropriate box that best describe your pain level

No Pain \0 –1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10/ Worst Pain Possible

0	**No Pain**	☐
1 - 2	**Mild**	☐
3 - 4	**Discomfort**	☐
5 - 6	**Distressing**	☐
7 - 8	**Horrible**	☐
9 - 10	**Excruciating**	☐

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Form D

Kaiser Permanente Foundation Hospital
And
San Jose State University
School of Nursing
Research Study: Pain Management through Music Therapy

Demographic Background

Patient # _____

- Check the appropriate box that best describe your demographic background

Sex:
☐ Male
☐ Female

Age in years:
18 ☐ – 29
30 ☐ – 39
40 ☐ – 49
50 ☐ – 59
60 ☐ – 69
70 ☐ – 79
80 ☐ and over

Ethnic Origin:
☐ American Indian or Alaskan Native
☐ Black Non-Hispanic
☐ Chicano, Mexican-American
☐ Other Hispanic
☐ Asian
☐ Pacific Islander
☐ White Non-Hispanic
☐ Other: _____

Education:
☐ Less than high school
☐ High school graduate
☐ Associate degree
☐ Bachelor's degree
☐ Graduate degree
☐ Doctorate or higher

Table A

Pain Intensity Index Scores for Day 1 and 2
For Pain Management through Music Therapy

Patient's #	S/C	PI A1	PI B1	PI C1	PI A2	PI B2	PI C2
1	C	4	0	1	4	2	1
3	C	6	4	6	5	2	2
5	C	4	3	2	NA		
8	C	2	2	0	2	2	0
12	C	7	3	1	6	2	0
14	C	6	3	1	5	1	1
16	C	6	4	0	5	2	1
17	C	8	5	0	7	5	0
18	C	4	3	0	NA		
20	C	7	5	0	4	2	0
22	C	4	2	0	4	0	0
24	C	5	3	1	4	2	0
26	C	8	5	1	8	5	1

Patient's #	S/C	PI A1	PI B1	PI C1	PI A2	PI B2	PI C2
2	S	6	0	0	4	0	0
4	S	6	4	0	NA		
6	S	7	3	1	6	1	1
7	S	6	0	2	NA		
9	S	5	3	2	5	2	0
10	S	7	3	1	6	2	0
11	S	4	1	3	0	0	0
13	S	4	4	0	6	4	0
15	S	5	0	0	6	0	0
19	S	5	2	0	8	3	0
21	S	10	4	1	8	3	0
23	S	6	3	0	4	2	0
25	S	8	4	1	6	3	1

C = Control group who are provided with only analgesics
S = Study group who are provided with both analgesics and music therapy
PI A1 = Pain intensity Index score before intervention on day 1,
PI B1 = Pain intensity Index score 30 minutes after intervention on day 1
PI C1 = Pain intensity Index score 60 minutes after intervention on day 1
PI A2 = Pain intensity Index score before intervention on day 2
PI B2 = Pain intensity Index score 30 minutes after intervention on day 2
PI C2 = Pain intensity Index score 60 minutes after intervention on day 2

Table B

Mean Pain Intensity Index Scores and Mean Gain Scores For Pain Management through Music Therapy

	Mean PI A1	Mean PI B1	Mean PI C1	Mean Gain score	Mean PI A1	Mean PI B1	Mean PI C1	Mean Gain score
Control	5.33	3.27	1.00	-3.20	5.00	2.38	0.46	-3.58
Study	6.36	2.18	0.91	-4.82	5.33	1.56	0.22	-4.44

Mean gain scores = obtained by subtracting the pre-intervention PPI scores from the post-intervention PPI scores

Table C

Independent Sample *t*-Test for Pain Management Through Music Therapy

t-test for Equality of Means	t	df	2-tailed sig.	Mean Difference
Day 1 Gain score (Equal variances assumed)	2.867	24	0.009	1.6182
Day 2 Gain Score (Equal variances assumed)	1.289	20	0.212	0.8675

Table D

Demographic Background for Sex, Age, and Ethnic Origin for Pain Management Through Music Therapy

Sex	Frequency	Total Percent	Percent of Respondents	Cumulative Percent
Valid 1. Male	8	30.8	53.3	53.3
2. Female	7	26.9	46.7	100
Total	15	57.7	100	
Participants who did not respond	11	42.3		
Total	26	100		

Years of Age	Frequency	Total Percent	Percent of Respondents	Cumulative Percent
Valid 1. 18 - 29	0	0	0	0
2. 30 - 39	2	7.7	13.3	13.3
3. 40 - 49	1	3.8	6.7	20
4. 50 - 59	2	7.7	13.3	33.3
5. 60 - 69	5	19.2	33.3	66.7
6. 70 - 79	5	19.2	33.3	100
7. 80 and over	0	0	0	0
Total	15	57.7	100	
Participants who did not respond	11	42.3		
Total	26	100		

Ethnic Origin	Frequency	Total Percent	Percent of Respondents	Cumulative Percent
Valid 1. American Indian	0	0	0	0
2. Black Non-Hispanic	2	7.7	14.3	14.3
3. Chicano, Mexican-American	2	7.7	14.3	28.6
4. Other Hispanic	1	3.8	7.1	35.7
5. Asian	1	3.8	7.1	42.9
6. Pacific Islander	7	26.9	50	92.9
7. White Non-Hispanic	1	3.8	7.1	100
8. Other	0	0	0	
Total	14	53.8	100	
Participants who did not respond	12	46.2		
Total	26	100		

Table E

Demographic Background for Education for Pain Management Through Music Therapy

Education	Frequency	Total Percent	Percent of Respondents	Cumulative Percent
Valid 1. Less than High School	0	0	0	0
2. High School graduate	3	11.5	33.3	33.3
3. Associate degree	1	3.8	11.1	44.4
4. Bachelor's degree	4	15.4	44.4	88.9
5. Masters degree	1	3.8	11.1	100
6. Doctorate or higher	0	0	0	
Total	9	34.6	100	
Participants who did not respond	17	65.4		
Total	26	100		