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Music Therapy for Pain and Anxiety Management in Postoperative Orthopedic Patients

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Music Therapy for Pain and Anxiety Management in Postoperative Orthopedic Patients

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Contents

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Executive Summary

One of the most critical tasks of orthopedic nursing is pain management. Patients undergoing extensive back surgery, total hip replacement, or total knee replacement often experience a level of pain that is both physically and emotionally overwhelming. This leads to anxiety which only intensifies the patient's experience of pain. There is significant muscle and skeletal tissue involved in orthopedic surgeries, and they are often cited as some of the most painful surgeries a person can undergo (Schneider, 2018). Consequently, managing pain and anxiety in orthopedic patients is particularly challenging. Patients are at significant risk for sedation and confusion in this target population because patients are given such high doses of opioids and analgesics to try to control the pain. Often, however, pharmacological interventions alone are not enough to manage pain. Pain is multifactorial, and to manage it effectively, nonpharmacological techniques must be incorporated (Schneider, 2018). Each patient's plan of care must be individualized because each patient's experience of pain is unique. Nurses must use their professional judgement to ensure patient safety and improve patient outcomes. This led to the following clinical question: In orthopedic patients (P), how does music therapy (I) compared to no music therapy (C) affect pain management and anxiety (O) within the first 48 hours after surgery (T)? This benchmark project will focus on integrating music therapy at Texas Spine and Joint Hospital (TSJH) in Tyler, Texas to increase patient comfort, decrease anxiety, and ensure patient safety after orthopedic surgery.

Music Therapy for Pain and Anxiety Management in Postoperative Orthopedic Patients

TSJH is a relatively small hospital with a thirty-bed inpatient care unit, and yet, twelve patients from 10/1/2019 to 9/29/2020 had to receive Narcan due to over sedation. This data indicating narcotic risks to patients may help to build the case that change is warranted. There is no data currently available documenting how many patients experience confusion in this orthopedic population due to narcotics, but it is a known problem at the facility. Older patients are particularly more susceptible to confusion when receiving large doses of narcotics. Clinical guidelines note the importance of utilizing multimodal strategies for managing acute surgical pain which include both pharmacological and nonpharmacological interventions (Laframboise-Otto et al., 2021). Presently, nurse rely heavily on medications and often do not incorporate nonpharmacological interventions due to time constraints and lack of familiarity regarding their effectiveness. Integrating music therapy could reduce patients' pain and anxiety after surgery and contribute to better patient outcomes

Rationale for the Project

It is estimated that 50-75% of postoperative patients feel they are not receiving adequate pain relief (Schneider, 2018). Both patients and nurses feel overwhelmed when pain is not well managed. Lack of pain control can be an obstacle to early mobilization which helps to accelerate the healing process and minimize surgical complications. Lack of pain control can also contribute to a financial burden with prolonged hospital stays and increased rates of hospital readmissions (Fan & Chen, 2020). However, there are several risks and side effects associated with narcotic administration including nausea, vomiting, constipation, sedation, respiratory depression, hypotension, ileus, urinary retention, and/or dehydration (Trasolini et al., 2018).

Incorporating nonpharmacological interventions could potentially help to reduce these risks (Lin et al., 2020).

Music therapy is a nonpharmacological intervention that focuses on mind-body integration to optimize healing (Mondanaro et al., 2017). Music acts as a distracter and interrupts the pain impulses which helps to decrease an individual's perception of pain (Schneider, 2018). It can also be a great way to help someone relax and ease anxiety. Listening to music can release endorphins, and according to neuromatrix theory, music can soothe emotional distress through regulating the endogenous opioid circulation to increase the dopamine reward pathways in the central nervous system (Lin et al, 2020). It can be difficult to distinguish the difference between what is merely listening to music versus utilizing music in a truly evidence-based manner. Each patient's experience of pain is unique, and therefore, each plan of care must be individualized to effectively manage pain. Board-certified music therapists can individualize music therapy in such a way as to maximize the positive benefits of listening to music (Gallagher et al., 2018). The literature suggests the music should be harmonious, easy to listen to, 60-80 beats per minute, without strong rhythm/drumming, and encourage relaxation (Aris et al., 2019; Schneider, 2018). Music therapy is safe, inexpensive, and has the potential to be easily incorporated into the nursing plan of care (Hole, Hirsch, Ball, & Meads, 2015).

Literature Synthesis.

There are statistically significant findings that music decreases pain throughout the literature (Ames et al., 2017; Aris et al., 2019; Dai et al., 2020; Gallagher et al., 2018; Hole et al., 2015; Hsu et al., 2019; Laframboise-Otto et al., 2021; Leonard, 2019; Lin et al., 2020; Mondanaro et al., 2017; Poulsen & Coto, 2017; Schneider, 2018). Presently, there is an increasing volume of literature indicating music therapy effectiveness specific to the orthopedic

population (Aris et al., 2019; Gallagher et al., 2018; Hsu et al., 2019; Laframboise-Otto et al., 2021; Leonard, 2019; Lin et al., 2020; Mondanaro et al., 2017; 2017; Schneider, 2018). A systematic review (Hole et al., 2015) and randomized control trial (Gallagher et al., 2018) demonstrate that music therapy may decrease anxiety as well. The timing of the music intervention does not alter the outcomes, and subsequently, it is easily adaptable to a variety of settings (Hole et al., 2015). This finding is supported by each of the articles found because the music intervention was delivered in different forms, at different times, and yet, yielded similar positive results. An updated literature search generated a new systematic review specifically looking at the effects of music therapy on the orthopedic population and indicated that utilizing music therapy decreases both pain and anxiety (Lin et al., 2020). This level one evidence increases the credibility of smaller studies that suggest a correlation between music therapy and decreased pain in postoperative orthopedic patients (Aris et al., 2019; Gallagher et al., 2018; Hsu et al., 2019; Laframboise-Otto et al., 2021; Leonard, 2019; Mondanaro et al., 2017; Schneider, 2018).

Project Stakeholders

Patients, families, and nurses are all stakeholders in this project. Patients and their families expect their healthcare team to do everything they can to safely manage their postoperative pain and recover well from surgery. Patients are most directly impacted by evidence-based change initiatives that improve patient care and safety. Nurses are also directly impacted by evidence-based change initiatives because their distress is alleviated when their patient's pain and anxiety is well managed, and complications avoided.

The key stakeholders are also the physicians, Aaron Fleet (Chief Nursing Officer), Dancel Grigsby (Assistant Chief Nursing Officer), Deanna Hamilton (Inpatient Care Unit

Director), charge nurses, and the change-project leader. The change-project leader will need to obtain permission from the physicians, because it is a physician-owned hospital, and the nurse leaders listed above. This project would benefit from inter-professional collaboration. A physician with a shared vision for the project would be invaluable. The nursing director and a charge nurse could use their leadership and experience to help implement the project effectively on the inpatient care unit. Finally, the change project leader could take ownership of the initiative and oversee each step in implementation with the support of the physician, nursing director, and charge nurses. The patients, families, and bedside nurses can provide critical feedback regarding music therapy intervention effectiveness and suggestions for improvement through the discharge satisfaction survey evaluation.

Implementation Plan

Music therapy playlists will be created on Spotify. All patients will be issued a tablet, if they do not have access to a personal smartphone or tablet, and quality headphones so they can listen to the music therapy at any time. A laminated instruction page will also be distributed providing instructions. The instruction page will contain a QR code that takes patients directly to the Spotify music therapy playlists. Multiple playlists with different genres of music therapy will be available to meet individual preferences. The patients will be able to access and utilize the music therapy at any time to help manage their postoperative pain and anxiety. Patients will return all headphones and tablets to the hospital at discharge along with their discharge satisfactions surveys.

Timetable/Flowchart

The evidence indicates that utilizing music therapists is effective for yielding significant results to decrease postoperative pain and anxiety after orthopedic surgery (Aris et al.,

2019; Gallagher et al., 2018; Lin et al., 2020; Mondanaro et al., 2017). It a necessary component to make this change truly evidence based. Therefore, the first step toward implementation is to explore collaboration opportunities with faculty and students in licensed music therapy programs. Both Southern Methodist University and Texas Women's University have music therapy programs. This would be a cost-effective way of ensuring the music chosen for the playlists on Spotify contain all the qualities necessary to maximize the effectiveness of the music therapy intervention. Spotify is a free service and can be easily accessed on multiple devices. Ideally, multiple playlists with different genres of music could be created to meet individual preferences. Lin et al. (2020) indicates that the patient's ability to choose the music impacts the effectiveness of the intervention. If collaboration opportunities with faculty and students in licensed music therapy programs cannot be established, the next step would be to hire a music therapist to develop the music therapy playlists on Spotify.

The next step would be to draft a proposal to solicit support from leadership at Texas Spine and Joint Hospital. The capstone benchmark project paper could be utilized as a resource to be given to leadership as well as a simplified one-page flyer highlighting the benefits of music therapy and its potential to have a positive impact on pain and anxiety management after surgery. Ideally, in this first week or two of implementation, a meeting with leadership could be scheduled to solicit buy in and brainstorm a plan for successful implementation of music therapy at the hospital. During this time, it is also crucial to begin researching and securing funding for the project.

Once funding for equipment is secured, and the hospital approves the project, a staff meeting will be held. The goal is to hold this meeting in weeks 3-4 of the project implementation. All the nurses in the inpatient care unit will be educated on the effectiveness of

music therapy and familiarized with how to use the tablets, headphones, and QR code to access the music therapy playlists on Spotify at the monthly staff meeting. At this time an inter-professional team could be formed based on leadership and staff interest in helping to promote the success of the project. Once funding is secured, tablets and quality headphones can be ordered.

In weeks 5-6, a meeting with the inter-professional team would be held to brainstorm how to effectively implement the project on the unit. This will help the change project leader see any deficiencies or holes in the plan and utilize everyone's strengths for effective evidence-based change implementation. The music therapist (or music therapy students) would finalize the playlists at this time on Spotify. As soon as the equipment arrives and the playlists are finalized, the staff can be trained at the monthly staff meeting on how to use the equipment and integrate music therapy into their nursing plan of care to benefit all patients at the facility.

The goal is to initiate offering music therapy to patients after surgery beginning week 7. The change project leader will offer technical support and address any concerns with the inter-professional team during this time. Evaluations (discharge satisfaction surveys) will also be distributed to each patient who agrees to try utilizing the music therapy. Evaluations and equipment will be collected at discharge.

Weeks 8-11 will continue implementation, trouble shooting, and collecting patient surveys. During week 12, the inter-professional team will meet to review all the surveys and analyze patient satisfaction with the music therapy intervention. The inter-professional team can discuss the effectiveness of the project for reducing pain and anxiety, analyze potential cost savings, and discuss ways to improve and continue the evidence-based change at the facility.

Weeks 1-2	• Contact faculty at Southern Methodist University, or Texas Woman's University, to explore collaboration opportunities with students in licensed music therapy programs to create playlists on Spotify. • Draft a proposal to solicit support from leadership at TSJH. • Begin researching/securing funding for the project.
Weeks 3-4	• Attend the Inpatient Care Unit staff meeting, educate staff on effectiveness of music therapy for pain and anxiety management, and solicit support to form an inter-professional team. • Secure funding for the project. Order tablets and quality headphones.
Weeks 5-6	• Hold a meeting with the inter-professional team to brainstorm how to effectively implement the project on the unit and initiate a plan. • Finalize music therapy playlists. • Train staff on how to use equipment and integrate music therapy.
Week 7	• Initiate offering music therapy to patients after surgery. Change project leader will offer technical support and addresses concerns with inter-professional team.
Weeks 8-11	• Continue implementation, trouble shooting, and collecting patient surveys.
Week 12	• Review all the surveys and analyze patient satisfaction with music therapy in a meeting with the inter-professional team. Discuss the effectiveness of the project for reducing pain and anxiety, potential cost savings, and ways to improve and continue the change.

Data Collection Methods

The data collection and evaluation process will begin at admission. Patients at TSJH will receive a laminated instruction page with a QR code that takes them directly to the music therapy playlists on Spotify, hospital-issued headphones, and a discharge satisfaction survey as soon as they arrive at the hospital. Patients who do not own a personal smartphone or tablet will be issued a tablet as well. Each patient is given a folder upon admission at TSJH that organizes their paperwork. Therefore, these items could easily be filed and accessed post-surgery.

The discharge satisfaction surveys can be filled out by the patients prior to discharge to evaluate the effectiveness of the music therapy intervention. A reminder could also be placed on the patients' charts to remind the nurses to collect the surveys prior to discharge. The surveys will contain five questions addressing patient satisfaction, effectiveness of the music therapy intervention, if the patient would recommend the music therapy intervention to others, and suggestions for improvement.

The evidence-based change project leader would collect the surveys and review the results with the leadership team. Adjustments to the change project could be implemented based on the evaluations if need be. Hopefully, the results from the discharge satisfaction surveys can be utilized to continue to motivate nurses and patients to utilize the music therapy intervention to increase patient comfort, decrease anxiety, and ensure patient safety after orthopedic surgery.

The personal at the front desk can distribute one discharge satisfaction survey to each patient upon admission. At this time, stacks of surveys can also be placed on IPCU 1, 2, and 3 so that nurses can easily access them at discharge if one has been misplaced. Surveys will be completed by the patients and the nurses will collect the surveys prior to discharge when hospital issued headphones and/or tablets are collected as well. There will be three labeled red envelopes placed on the wall on IPCU 1, 2, and 3 where nurses can place the collected surveys.

Then, each week (for four consecutive weeks), the evidence-based change project leader would collect the surveys from the three envelopes and review the results with the inter-professional team in a meeting. The results will be shared with the entire staff at the staff meeting about one month after implementation of the project. If possible, data indicating narcotic cost savings per patient, and the number of patients who had to receive Narcan during

this trial would be helpful to reflect the project's success and strengthen the case to continue offering music therapy at the hospital.

Means and standard deviations will be utilized for the reported pain scores for both before and after the music therapy intervention. The standard deviation results will demonstrate how much pain improved after the music therapy intervention. A paired sample *t* test could be utilized to determine if the results are significant. Simple percentages could be utilized to evaluate the other questions from the survey and determine music therapy effectiveness and patient satisfaction. Individual comments/suggestions for improvements will be listed and discussed in the leadership meeting for continual improvement of project implementation.

Cost/Benefit Discussion

One possible barrier to the project's implementation is the cost. The ramifications of COVID19 have put even more budgetary constraints on healthcare organizations. The change project leader intends to give a detailed account to leadership of potential costs, savings, and funding sources in the form of grants or other resources. Ideally, funding would include a couple of tablets, 30 noise-canceling headphones (for a 30-bed unit), and funding to laminate 30 instruction pages with the QR code. The projected costs are the following: 4 Amazon Kindle Fire 8 in Tablets at $60 each, 30 Sony noise canceling on ear headphones at $40 each, and $50 for laminated instructions with a QR code. The total cost is projected to be approximately $1,490 if collaboration opportunities with music therapy students can be established. If collaboration opportunities cannot be arranged, there would be an additional cost in hiring a licensed music therapist to create the playlists on Spotify. The change project leader will investigate potential bulk savings or non-profit discounts as well. There would be minimal ongoing costs for sustaining the change so long as the equipment was not damaged or lost.

Thousands of patients have their surgeries at TSJH every year. Therefore, when you consider the cost of implementing the project per patient, the cost to the hospital would be less than a dollar per patient. This is minimal, and the project has the potential to save money on costs associated with narcotic medication administration and reducing the risk of harm to patients.

Discussion of Results

The Inpatient Care Unit Director was not open to implementing the music therapy project due to the cost and current staffing shortage at TSJH due to COVID19. This is a particularly stressful time for both administrators and nurses. Hopefully, now that the benchmark project is complete, the change project leader can better address objections and make the case that change is warranted. The change project leader has learned a lot this semester about transformational leadership, communication skills, and learned more about how to successfully implement an evidence-based change project. The change project leader expects to learn more about personal leadership strengths and weaknesses while taking on more of a leadership role as a master's prepared nurse and hopes to implement music therapy at TSJH in the near future.

Conclusions/Recommendations

The change project leader recommends contacting leadership at TSJH and offering to hold a presentation where the project idea can be introduced to key stakeholders, address questions/objections, and establish next steps for implementing the evidence-based change project at the facility. The change project leader recommends integrating music therapy as an adjunct to pain management for all orthopedic patients, utilizing music therapists, allowing patients to choose the music to meet individual preferences, and gather more data on the effectiveness of utilizing music therapy to reduce anxiety in the orthopedic population.

The first recommendation is to integrate music therapy as an adjunct to pain management in orthopedic patients. There was a statistically significant finding that music decreased postoperative pain throughout the literature (Aris et al., 2019; Dai et al, 2020; Gallagher et al., 2018; Hole et al, 2015; Hsu et al, 2019; Laframboise-Otto et al., 2021; Lin et al, 2020; Mondanaro et al., 2017; Schneider, 2018). Music therapy is an easy, safe, low-cost, and effective nonpharmacological therapy that can be utilized to reduce pain in orthopedic patients (Lin et al., 2020).

The second recommendation is to utilize board-certified music therapists and then allow patients to choose the music. This is notable because it is difficult to distinguish the difference between what is merely listening to music versus utilizing music in a truly evidence-based manner. The evidence indicates that utilizing music therapists is effective for yielding significant results (Aris et al., 2019; Gallagher et al., 2018; Mondanaro et al., 2017). It is a necessary component to make this change truly evidence based. Each patient's experience of pain is unique, and therefore, each plan of care must be individualized to effectively manage pain. Board-certified music therapists can individualize music therapy in such a way as to maximize its positive benefits. The evidence also indicates that the patient's ability to choose the music impacts the effectiveness of the intervention (Lin et al., 2020). If the patient chooses from the music selected by the music therapist, that will enhance the effectiveness of the music therapy intervention.

Finally, further research is needed to determine whether music therapy reduces anxiety in the orthopedic population because the results from some of the studies are inconclusive. Many of the studies had small sample sizes. It is possible that a larger effect size would produce clearer results. Lin et al. (2020), Dai et al. (2020), Gallagher et al. (2018) and Hole et al. (2015)

had larger sample sizes relative to the other studies and demonstrated statistically significant findings for reducing anxiety. The level of pain orthopedic patients experience after surgery can be emotionally overwhelming, and anxiety only intensifies the patient's experience of pain. There is a lot of evidence from the literature that indicates that music therapy can help to reduce anxiety after surgery (Lin et al., 2020). More research is needed to confirm whether this is generalizable to the orthopedic population as well.

The priority of safe and effective pain management in orthopedic patients cannot be overstated. Pain management in the orthopedic population is particularly challenging because orthopedic patients are undergoing some of the most painful surgeries one can undergo, postoperative patients often feel that their pain is not adequately managed, and there are significant risks associated with receiving large quantities of narcotic and analgesic medications to try and control pain. Clinical guidelines suggest the importance of utilizing multimodal approaches to manage acute surgical pain. The literature also supports music therapy as an effective aid in managing postsurgical pain, and possibly anxiety as well, in orthopedic patients. Music therapy is safe, effective, and can easily be incorporated into the nursing care plan. Receiving buy-in from stakeholders and establishing a strong inter-professional team at TSJH could make this project of integrating music therapy as an adjunct to pain and anxiety management a success.

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Appendix A

Synthesis Table

PICOT Question: In orthopedic patients (P), how does music therapy (I) compared to no music therapy (C) affect pain management and anxiety (O) within the first 48 hours after surgery (T)?

Studies	Design	Sample	Intervention	Outcome
A	systematic review with meta-analysis	N: 534	MM and MT	Pain ↓* in both MM and MT groups ♦ Anxiety ↓* in MT group
B	randomized controlled trial	N: 56	MT	Pain ↓*, Anxiety X
C	randomized controlled trial	N: 292	MT	Pain ↓*, Anxiety ↓*, MI ↑*
D	randomized controlled trial	N: 60	MT	Pain ↓*, Anxiety X
E	quasi-experimental	N: 42	ML	Pain ↓* and PS ↑*
F	systematic review with meta-analysis	4261 citations 73 RCTs included *n* = 20-485	Music	Pain ↓*, Anxiety ↓*, AG/TDN ↓*, PS ↑* ♦
G	quasi-experimental	N: 49	ML	Pain ↓*, HRV ↓*, and ROM ↑*
H	retrospective cohort	N:99	MT	Pain ↓*, Anxiety ↓*, and Depression ↓*
I	randomized controlled trial	N: 50	ML	Pain ↓*, AG/TDN X
J	randomized controlled trial	N: 32	Live MT during CPM	Pain X, OP ↓*, PA X
K	literature review	4 SR, 51 RCT, and BPR	MT	calming, soft tones, 60-80 BPM, at least 2x daily, 15-30 min, and individualizing music impacts results
L	randomized controlled trial	N: 59	LM	Limited; Pain ↓ at some time points

Outcomes Table: Effect of Music Therapy

	A ♦	**B**	**C**	**D**	**E**	**F ♦**	**G**	**H**	**I**	**J**	**K**	**L**
Pain	↓*	↓*	↓*	↓*	↓*	↓*	↓*	↓*	↓*	X	↓	↓
Anxiety	↓*	X	↓*	X	*NE*	↓*	*NE*	↓*	*NE*	*NE*	*NE*	*NE*
AG/TDN	X	*NE*	X	*NE*	*NE*	↓*	*NE*	*NE*	X	*NE*	*NE*	*NE*
PS	*NE*	*NE*	*NE*	*NE*	↑	↑*	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*
LOS	X	*NE*	X	*NE*	*NE*	X	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*
MI	*NE*	*NE*	↑*	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*
HRV	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	↓*	*NE*	*NE*	*NE*	*NE*	*NE*
ROM	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	↑*	*NE*	*NE*	*NE*	*NE*	*NE*
Depression	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	↓*	*NE*	*NE*	*NE*	*NE*
OP	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	↓*	*NE*	*NE*
PA	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	X	*NE*	*NE*

Legend:

AG/TDN: Analgesia or Total Dose Narcotics
PS: Patient Satisfaction
LOS: Length of Stay
MI: Mood Improvement
HRV: Heart Rate Variability
ROM: Range of Motion
OP: Observed Pain
PA: Pedaling Adherence
ML: Music Listening
MM: Music Medicine
MT: Music Therapy
NE: Not Evaluated
X: No significant change
* = statistically significant findings ♦ = higher level evidence

A. Lin et al. (2020)
B. Aris et al. (2019)
C. Gallagher et al. (2018)
D. Mondanaro et al. (2017)
E. Schneider (2018)
F. Hole et al. (2015)
G. Hsu et al. (2019)
H. Dai et al. (2020)
I. Laframboise-Otto et al. (2021)
J. Leonard (2019)
K. Poulsen & Coto (2017)
L. Ames et al. (2017)

Recommendations

The first recommendation is to integrate music therapy as an adjunct to pain management in orthopedic patients. There was a statistically significant finding that music decreased postoperative pain (Aris et al., 2019; Dai et al, 2020; Gallagher et al., 2018; Hole et al, 2015; Hsu et al, 2019; Laframboise-Otto et al., 2021; Lin et al, 2020; Mondanaro et al., 2017; Schneider, 2018) throughout the literature. The timing of the music intervention did not alter the outcomes, and subsequently, music is easily adaptable to a variety of settings (Hole et al., 2015). This finding is supported by each of the articles because the music intervention was delivered in different forms, at different times, and yet, yielded similar positive results. Music therapy is an easy, safe, low-cost, and effective nonpharmacological therapy that can be utilized to reduce pain in orthopedic patients (Lin et al., 2020).

The second recommendation is to utilize board-certified music therapists and then allow patients to choose the music. This is notable because it is difficult to distinguish the difference between what is merely listening to music versus utilizing music in a truly evidence-based manner. The evidence indicates that utilizing music therapists is effective for yielding significant results (Aris et al., 2019; Gallagher et al., 2018; Mondanaro et al., 2017). It is a necessary component to make this change truly evidence based. Each patient's experience of pain is unique, and therefore, each plan of care must be individualized to effectively manage pain. Board-certified music therapists can individualize music therapy in such a way as to maximize its positive benefits. The evidence also indicates that the patient's ability to choose the music impacts the effectiveness of the intervention (Lin et al., 2020). If the patient chooses from the music selected by the music therapist, that will enhance the effectiveness of the music therapy intervention.

Finally, further research is needed to determine whether music therapy reduces anxiety in orthopedic patients because the results from these studies are inconclusive. Many of the studies had small sample sizes. It is possible that a larger effect size would produce clearer results. Lin et al. (2020), Dai et al. (2020), Gallagher et al. (2018) and Hole et al. (2015) had larger sample sizes relative to the other studies and demonstrated statistically significant findings for reducing anxiety. The level of pain orthopedic patients experience after surgery can be emotionally overwhelming, and anxiety only intensifies the patient's experience of pain. There is a lot of evidence from the literature that indicates that music therapy can help to reduce anxiety after surgery. More research is needed to confirm whether this is generalizable to the orthopedic population as well.

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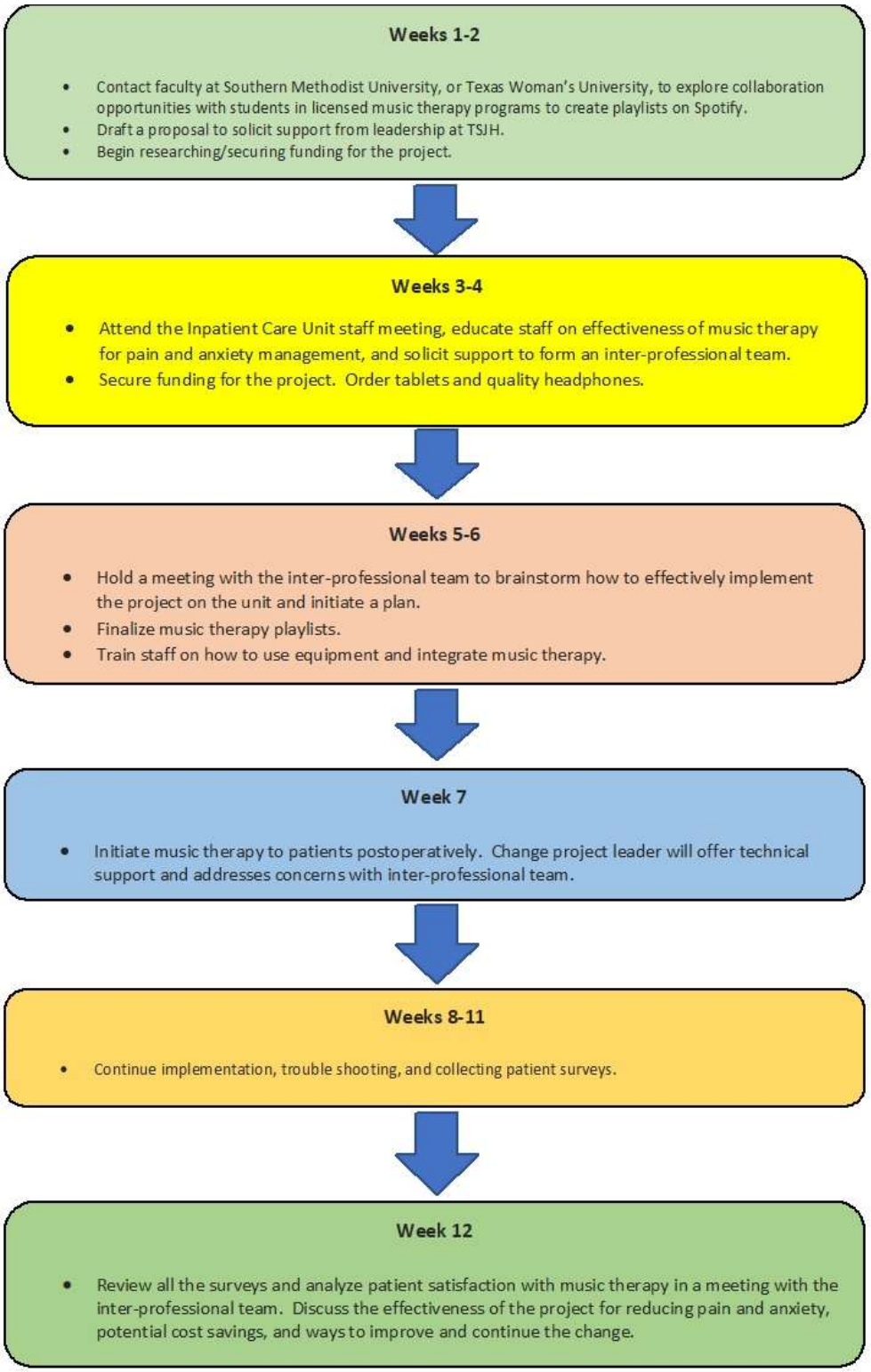
Appendix B

Flowchart



Appendix C

Instrument- Discharge Satisfaction Survey

1. How satisfied were you with your pain control during this hospital stay on a scale of 0-5 *(5 being completely satisfied)*? 0 1 2 3 4 5
2. Did you find that listening to the music helped with pain relief *(0 not at all- 5 extremely helpful*)? 0 1 2 3 4 5
3. How would you rate your pain on a scale of 0-10 before and after the music therapy intervention?

   BEFORE music therapy intervention

   0 1 2 3 4 5 6 7 8 9 10

   AFTER music therapy intervention

   0 1 2 3 4 5 6 7 8 9 10
4. Would you recommend this music therapy intervention to others?

   Please circle YES or NO
5. What comments/suggestions do you have for improving pain and anxiety management postoperatively at TSJH.

This satisfaction survey is adapted from a similar survey utilized in the article "The Effect of Listening to Music on Postoperative Pain in Adult Orthopedic Patients" (Schneider, 2018) which allowed the researcher to identify strengths and weakness of the music listening study.