Evaluation of the Effectiveness of Non-Pharmacological Pain Interventions on Patient Reported Pain Scores and Opioid Use in Hospitalized Adult Patients

An Integrative Review

Submitted to the

Faculty of Liberty University

In partial fulfillment of

The requirements for the degree of

Doctor of Nursing Practice

By

Tammy J. Anderson

Liberty University

Lynchburg, VA

April, 2022

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Scholarly Project Chair Approval:

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Abstract

The purpose of this integrative review is to research, critique, and synthesize current literature to ascertain the effectiveness of nonpharmacological pain management interventions on hospitalized patient reported pain scores and the use of opioids. Patients report pain while hospitalized for a variety of reasons. In order to become an active participant in their recovery, patients must have their pain adequately controlled. The use of opioids for main management may be required but alternatives exist. These alternatives do not have the same risk factors as opioid pain management. Nonpharmacological interventions included music, virtual reality, massage, guided imagery/hypnosis, and psychological interventions. All showed effectiveness on pain reduction.

Keywords: Nonpharmacological pain interventions, hospitalized adults, pain scores, opioid use, pain therapies.

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Dedication

This body of work is dedicated to all of the healthcare workers who strive every day to provide exceptional care to patients. May you remain dedicated and appreciated by all of those who receive your care. Thank you for putting the patient first and continuing to build a trusting relationship with those who require care.

Acknowledgements

To the dedicated staff at Liberty University, I thank you for your leadership and support throughout my educational journey. The Christian worldview shared by faculty was a grounding force during my time at Liberty University. It is very evident you are all Champions for Christ and a beacon of hope for all. To Dr. Ken Thompson, a special thank you for your assistance and guidance while completing this integrative review. I cannot thank you enough for all of your time and talent you shared with me over the course of this project. Your kindness, generosity, faith, and patience were a special gift I could cling to when feeling overwhelmed. To my husband, Dan, you have been beyond patient with me throughout the past two years. For that, I will always be grateful for you and your love. To my children and grandchildren, thank you for your love that makes my life worth living. To my Lord and Savior, Jesus Christ, you continue to be my rock and shelter and make all things possible.

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SECTION ONE: FORMULATING THE REVIEW QUESTION

Introduction

Patients in the hospital need adequate pain management interventions so they can participate in recovery activities to reduce complications and promote healing. Patients actively participate in mobility and health promoting activities to prevent surgical and immobility complication such as deep vein thrombosis (DVT), pneumonia, ileus development, and skin breakdown. Satisfactory pain management is imperative for patients so active participation in recovery is possible.

Traditionally, opioids have been the method of choice to help manage pain. Compton and Manseau (2019) explained how the U.S. finds itself in the middle of an opioid crisis due to many contributing factors. Natural opioids were developed that eventually led to synthetic opioid development with increasingly potent compounds. This expansion in strength and availability has led to an opioid overdose epidemic that annually has more fatalities than all deaths realized by America in the Vietnam War. There has been a 200% increase in overdose deaths related to opioids from 2000 to 2014, which includes prescription opioids. The estimated annual dollar expenditure is approximately $1 trillion. This does not take into account the human suffering by the individual and families when addiction and death occurs, as costs related to this are immeasurable (Compton & Manseau, 2019). The assumption is that the overdose deaths are related to illicit drug use, but the Centers for Disease Control and Prevention (CDC) reported approximately 30% of overdoses are to individuals with a prescription (Compton & Manseau, 2019). The CDC also reported that opioid prescriptions increased four-fold from 1999 to 2010. Americans are prescribed more opioids than residents of any other country in the world. The

opioid epidemic has increased emergency department (ED) visits related to opioid-related reasons by over 99% from 2005 to 2014.

The Joint Commission issued new standards in 2017 related to pain management and assessment in the hospital setting. The standard, as described in R3 Issue 11 states, "The hospital provides nonpharmacologic pain treatment modalities" (Joint Commission, 2017, p.2). Hospitals have this mandate to offer nonpharmacological treatment options to the hospitalized population. Another important consideration for hospitals is the use of Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) scores. The purpose of the HCAHPS is to provide a standardized way in which to collect data and make comparisons that reflect the patient's perspective of care received in the hospital (CMS, 2021). The datum are collected in the same way from each organization that provides the opportunity for standardized analysis. The results are publicly reported and provide a transparent way for consumers to compare organizations and choose where they want to receive care.

Reducing opioid use in hospitalized patients is an area that has been researched pertaining to the effectiveness, but further evaluation of the evidence is needed. The effect of nonpharmacological pain interventions for hospitalized adult patients is the topic of this integrative review (IR). The question guiding this integrative review is: How does the use of nonpharmacological pain interventions affect opioid use and patient reported pain scores in patients in the hospital that are reporting pain?

Defining Concepts and Variables

The concept of pain was the phenomenon of interest for this integrative review. An accurate definition of pain must be established to eliminate any ambiguity on what concepts the

IR included. Pain is subjective and the individual experiencing the pain is the only one who can appropriately rate and describe what is being experienced. For each individual, his/her experience with pain is influenced by life experiences, psychological, social, and biological factors. Pain is a very personal experience. The International Association for the Study of Pain (IASP) updated the definition of pain in 2020, which is now reflected in the following statement, "An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage" (Raja et al., 2020, p. 1978).

Pain is a subjective experience and only the person experiencing the pain can report the severity and associated symptoms. Pain scales were developed to transfer the subjective data to a measurable, objective format and identify one of the operational variables that was evaluated in this IR. The numeric pain scale is a simple and common pain scale used with verbal patients to convey their perception of the pain they are experiencing. Using numbers 0 through 10, with 0 being no pain and 10 being the worst pain imaginable, numbers are reported by patients in an effort to help implement appropriate pain interventions (Walker et al, 2019). The other operational variable that was evaluated in this IR included the amount of opioids used by patients while hospitalized.

Rationale for Conducting the Review

Conducting an IR has historical significance and is a robust technique for advancing knowledge and furthering research on a particular topic domain. The IR not only identifies current research, but provides an opportunity for critical analysis and new discernments of existing data (Elsbach & Knippenberg, 2020). The rationale for conducting an IR related to the use of nonpharmacological pain interventions for hospitalized adult patients and the effect on patient reported pain scores and opioid usage includes the fact that this question is a broad based

question. Although there are other types of reviews, the IR provides a basis to look at empirical evidence and identify knowledge gaps and opportunities for further research (Toronto & Remington, 2020). Review of the evidence thus far shows some research is available on this topic, but more research is needed to establish quality, empirical evidence for the usage of nonpharmacological interventions for pain management.

Purpose and Review Questions

Pain management is a topic of interest, as patient-centered care and regulatory agencies use this information in which to base reimbursements and determine the quality of nursing care provided. The purpose of this IR was to examine the effect of nonpharmacological pain interventions for the management of pain for hospitalized adult patients and the effect on patient reported pain scores and opioid use. Two questions addressed in this IR included: "What effect do nonpharmacologic pain management interventions have on patient reported pain scores?" and "What effect do nonpharmacologic pain management interventions have on opioid use?"

Formulate Inclusion and Exclusion Criteria of the Literature

Studies were considered if the population was adult, those over 18-years-old. Other inclusion criteria included a population that is hospitalized and reporting pain. Types of studies incorporated include meta-analysis, systematic reviews, retrospective cohort studies, single, qualitative studies; single, randomized control studies; and descriptive studies. The outcomes of interest explicitly related to pain management at the patient level include pain assessment and reassessments, type of nonpharmacological pain interventions, type of analgesia provided, patient reported pain ratings, and opioid usage amounts. Exclusion criteria included pediatric populations, patients with chronic pain, and studies more than five years old.

Conceptual Framework

Conducting an IR includes the summarization of previously developed empirical or theoretical research that gives an increased insight to understanding a particular healthcare problem or phenomenon of interest. Using a defined methodology in which to conduct the IR helps to ensure a comprehensive review and application to practice (Whittemore & Knafl, 2005). As the amount of evidence-based practice (EBP) initiatives increase, the need for review of such literature has also increased. Broad-based in nature, IRs allow for the integration of both experimental and non-experimental research that provides a more comprehensive interpretation of a topic of interest. Specifically, this IR identified and clarified the use of nonpharmacological pain interventions in hospitalized adult patients reporting pain. This process is defined by Whittemore and Knafl (2005), and includes the following five stages: (a) problem identification, (b) literature search, (c) data evaluation, (d) data analysis, and (e) presentation of results.

Problem Identification

Clearly identifying a problem is key when embarking on the IR process. The identified problem directed the process and ensured the phenomenon of interest was being addressed. During this stage the variables of interest were defined along with the target population (Whittemore & Knafl, 2005). For this IR, the problem identified is the management of pain in hospitalized adult populations. Variables of interest are nonpharmacological pain interventions that include but are not limited to music therapy, distraction, spinal manipulation, hot/cold therapy, repositioning, breathing and meditation, massage, and guided imagery. Other variables included patient reported pain scores and opioid usage.

The purpose of this IR was to raise awareness of the use of nonpharmacological pain interventions for hospitalized adult patients to reduce the usage of opioid medications and

prevent complications related to opioid use and addiction. Having a well-defined process for review and the inclusion of variables of interest provided the framework for determining pertinent information that must be included, and also for defining what information is irrelevant and what should be left out.

Literature Search

Including all relevant literature related to the topic of interest provided an enhanced review but due to a variety of constraints, may not be realized. Unfortunately, incomplete results may lead to biased research and inaccurate review (Whittemore & Knafl, 2005). The use of computerized databases provided a comprehensive tool for data collection. Justification for the review process was identified and documented to provide evidence of rigor during research collection.

Data Evaluation

In the IR, when varied primary sources are included, it increases the complexity of evaluation. Included in this stage are empirical and theoretical reports. Empirical reports include those utilizing a range of design methods, which consist of case studies and cross-sectional research (Whittemore & Knafl, 2005). When evaluating the quality of research results, two criteria are given consideration. Both *methodology* or *theoretical rigor* and *data relevance* were considered. Criteria were evaluated using a 2-point scale (high or low). Whittemore and Knafl (2005) reported there is not an identified gold standard for the interpretation of quality in research reviews.

Data Analysis

During this phase of the research process, data must be put into an ordering system to facilitate integrating conclusions from primary sources. This process was complete and free from

bias to ensure results were error free. Before embarking on the review process it is imperative to identify the systematic analytic method that will be utilized (Whittemore & Knafl, 2005). When conducting an IR, a constant comparison method is an approach that is utilized to organize data into systematic categories to allow for identification of relationships, similarities, differences, and comparisons (Whittemore & Knafl, 2005).

Data Reduction. Data reduction uses two phases for classification and extraction and coding of research from varying methodologies. The first phase of data reduction identifies a classification system to help manage the data into subgroups. This system must be logical and facilitate eventual analysis. The second phase includes the extraction and coding of data from sources into a manageable framework. Applying this approach provides the ability to compare primary sources related to sample characteristics and variables (Whittemore & Knafl, 2005).

Data Display. Data displays will vary based on the subgroup classification and provide visualization of patterns and relationships that exist within primary data sources and will be the springboard for data interpretation.

Data Comparison. Various strategies may be employed for an iterative process for examining data displays of primary sources that will allow for identification of patterns, relationships, and themes. Patterns will be able to be identified with the use of concept maps, clustering, comparisons, and counting (Whittemore & Knafl, 2005).

Conclusion Drawing and Verification. As the IR progressed to the final phase of data analysis, conclusions were drawn and verifications made. Each subgroup had commonalties evident and differences were highlighted. Once the subgroup analysis was completed, an IR of the important elements and conclusions of each subgroup were finalized to provide a summation of the important elements related to the phenomenon of interest (Whittemore & Knafl, 2005).

Presentation

A variety of presentation methods are utilized for the results of this IR. Various presentation techniques include tables or diagrams, which provide for a verifiable logical chain of evidence as a means in which the reader may interpret the results. Using valid presentation methods provides the reader with the tools needed to evaluate the results to ensure the conclusions correctly articulate the research results.

SECTION TWO: COMPREHENSIVE AND SYSTEMATIC SEARCH

Search Organization Reporting Strategies

Conducting a literature search can be a daunting task. It is essential the researcher utilize all available resources during the process. Using an academic library provides the resources needed to find quality information. Enlisting the help of a librarian can offer needed guidance and make the literature search more efficient. Saving database searches provides the needed information so reporting on the research methods can be accurate.

Detailed reporting of the search process for the IR must be detailed. The researcher will provide a narrative description of all sources and databases utilized in the search. The language, publication date, publication status, and search terms employed during the search are documented and organized. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) is a research reporting model often utilized for a reporting model that provides a visual flow diagram of research collection (Whittemore & Knafl, 2005).

Terminology

Starting the research collection for this IR included using data bases, platforms, and search engines. The Cumulative Index to Nursing and Allied Health Literature (CINAHL) as

well as EBSCO Host were utilized during the initial literature search. The search engine Google Scholar was used, but all results were verified through the Liberty University Library. Limiters were employed to narrow search results to full-text, peer reviewed, and a date range that included results from the last five years. Search words included: adult inpatients, nonpharmacological pain interventions, patient pain scores, complications of opioid use, and patient satisfaction. Using these search criteria, 18 articles were included for this IR.

The collected articles included five Meta-Analysis or Systematic Reviews (Fan & Chen, 2020; Lee, 2016; Lin et al., 2020; Patiyal et al., 2021; and Scheffler et al., 2018). Four of the resources were randomized control trials (RCT; Ames et al., 2017; Gogoularadja & Bakshi, 2020; Merry & Silverman, 2021; Sfakianakis, 2019). Also included were one descriptive study (Bojorquez et al. 2020), one IR (Carpenter et al., 2017), one convenience sample (Golino et al., 2019), one observational study (McMillan et al., 2018), one literature review (Poulsen & Coto, 2018), and one comparative cohort study (Tashjian et al., 2017).

SECTION THREE: MANAGING THE COLLECTED DATA

For this IR, the keywords used to conduct a comprehensive search of the databases were “non-pharmacologic pain interventions” , “patient pain scores”, “hospitalized adult patients”, and “opioid use”. Inclusion criteria were: (a) scholarly works published in a peer-reviewed journal, (b) works published written in English, (c) works published within the last five years, (d) quantitative studies consisting of systematic reviews, meta-analyses, or randomized control trials (RCTs); (e) qualitative studies, (f) patients with reports of pain, and (g) adults. Exclusion criteria were: (a) opinion articles, (b) pediatric patients, (c) chronic pain, and (d) articles published before September 1, 2016.

The CINAHL search was conducted using the Boolean/Phrase function for the selected key words, and the initial search did not provide any results. SmartText Searching was used based on the keywords and eight articles were noted. Of these, one article met the inclusion criteria. The Jerry Falwell Library home page "search all databases" was utilized with the advanced search and key words boxes. Limiters added included full text availability, peer reviewed publications, and publication date within the past five years. Using this approach provided 1,089 sample results which included delirium prevention so only two articles were selected.

Using EBSCO host and signed in with an account resulted in 1,210 results when the advanced search and the limiters of full text, peer reviewed, published within the past five years, and written in English were applied. Results related to pediatrics and delirium were eliminated. This resulted in six articles for review. Using MEDLINE in the advanced search mode and the limiters of last five years, full text, peer reviewed, humans, and English resulted in 50 articles, four of which were selected for further review.

The Cochrane Library advanced search was utilized. Key words of nonpharmacological and pain management were used. The limiter of the last five years was added. This resulted in 24 Cochrane Reviews; however, these were eliminated due to the topics of the articles being about labor and chronic pain. There were 576 trials that reduced to 480 once the limiter of "year first published" was added. Most of the results related to pain during labor and chronic pain. The limiter of "acute" was added with 28 trials identified. Of this number, three trials went through further review.

SECTION FOUR: QUALITY APPRAISAL

When conducting this IR, it was important to remember that studies vary in the level of reliability and relevancy to the phenomenon of interest. Toronto and Remington (2020) reported that careful analysis of collected studies must be completed to ensure a balanced and accurate synthesis of the literature. “Including poor quality studies in the review may distort the synthesis, whereas excluding studies of poor quality may bias the synthesis” (Toronto & Remington, 2020, p. 45). After applying the exclusion and inclusion criteria, the number of articles selected for this IR was low and included lower-quality studies while being aware of the possibility of skewed results. A point of reference for the search and evaluation of quality while keeping in mind the original research questions. How does the use of nonpharmacological pain interventions affect patient reported pain scores and opioid use in hospitalized patients? When articles were reviewed, both the inclusion criteria and the questions of interest were applied. Following this process helped keep the IR focused in the right direction and avoided data nor relevant to the questions of interest.

Sources of Bias

Evaluating for sources of bias for this IR was initiated at the start of the research process. Toronto and Remington (2020) described four types of trustworthiness in qualitative research: transferability, credibility, dependability, and confirmability. Toronto and Remington also explained there are four potential types of bias in quantitative studies, including: selection, measurement, attrition, and performance. All four of these areas must be evaluated and any bias should be transparent and reproducible. Following this process provides reassurance that the findings are believable. The MeInyk Level of Evidence Table (Appendix A) targets the study’s

purpose, sample characteristics of the participants, methods, results, limitations, and strengths of the articles included in the IR.

Ames et al. (2017) conducted a RCT evaluating the effectiveness of music therapy on patient in an intensive care unit (ICU). Possible bias noted was the concurrent use of opioid pain medication and music therapy. Music therapy was used as an adjunct to pharmacological interventions according to a study reported by Bojorquez et al., (2020); however, participants were not randomized. An IR conducted by Carpenter et al. (2017) examined the effectiveness of guided imagery (GI) on pain reduction and reported potential bias related to how the pain was measured. The process was varied in the studies and the time intervals were not consistent.

In a systematic review (SR) of non-pharmacological interventions for pain management, Fan and Chen (2020) explained that due to the heterogeneity of the studies and multiple study types, potential bias in selection and measurement were possible. Garland et al. (2017) explained that in the RCT addressing mindfulness training and hypnotic suggestions for pain control had possible bias related to the placebo effect. In a RCT studying the efficacy of music therapy (MT) on pain and anxiety, the music interventions were not standardized so measurement bias was possible (Gogoularadja et al., 2020). Golino et al. (2019) evaluated the use of MT for ICU patients and used a convenience sample which may have led to selection and performance bias.

Lee (2016) conducted a meta-analysis of the effects of music on pain, and performed an in-depth analysis of possible bias in the included studies, ranking the bias risk from low to high. Mixed results were noted related to randomization, as 70% of the studies were rated as having been clearly defined as having random allocation, while 29% did not. Bias related to attrition is possible as several studies did not clearly describe the withdrawals. Patiyal et al. (2021) included 13 studies in a meta-analysis of the effect of music therapy on pain, anxiety, and opioid use.

Reported in this article were the risks of bias. Five of the studies were determined to be low-risk for bias; two were unclear; and the remaining six were considered high-risk for incomplete outcome data.

Internal Validity

Believability and focus on bias related to results is expressed as internal validity. Toronto and Remington (2020) explained that validity indicates how closely study results are relayed as truthful to the phenomenon of interest. Proper scientific methods must be demonstrated throughout the data collection so validity is not compromised. If individual studies are biased, this may result in bias of the completed IR. If internal validity is not maintained, the results may lead to incorrect estimations of the effect of the phenomenon of interest (Toronto & Remington, 2020). Either over estimation or underestimation are possibilities, and may render the research problematic.

Appraisal Tools

Although there is no defined consensus on the best way to appraise study quality, there is agreement that critical appraisal of the evidence is done in a systematic way with the use of a critical appraisal tool. Toronto and Remington (2020) and Whittemore and Knafl (2005) agreed that a variety of methods are used as no gold standard for evaluation of study results exist. When conducting an IR, the most appropriate critical appraisal tool should be used. For the novice evaluator, this can be a challenging process. With proper identification and application of an appropriate critical appraisal tool, study results can be evaluated and results disseminated that are valid. Best practice dictates two reviewers apply a critical evaluation tool independently of each other and compare the results. Toronto and Remington (2020) expressed the need for discussion when disagreements occur in the evaluation of a study.

The critical evaluation tool utilized for this IR was the Rapid Critical Appraisal Checklist by MeInyk and Fineout-Overholt (2015). Each article included in this IR was thoroughly evaluated for accuracy, data rigor, and application to practice. Toronto and Remington (2020) describe a 2-point scale that may be utilized when evaluating for rigor and relevance. This evaluation method provides a means of ensuring the identified questions are addressed.

Applicability of Results

Toronto and Remington (2020) addressed the issue of applicability of results. As was noted previously, there are a considerable number of critical appraisal tools that can be utilized when completing an IR. Although a variety of tools exist, there are several elements that are commonly used. Most critical appraisal tools start with the title, text, or abstract. An introduction is provided, along with a description of the research design and sample group. The data collection method and ethical issues are included. Results are explained and discussed related to application to practice and relevancy to the guiding questions upon which the IR was initially based.

The essence of research is to provide direction and application to practice. Providing patient-centered care includes various interventions to improve patient satisfaction and outcomes. Applicable data were revealed in the process of this IR related to the use of nonpharmacological pain interventions to reduce patient reported pain scores and opioid use in adult hospitalized patients. Consensus agreed that nonpharmacological pain interventions were appropriate to include for patients.

Music therapy (MT) was reported as having statistically significant benefits to patients for pain control and reduction in opioid usage, and is considered to be safe, inexpensive complementary intervention (Ames et al., 2017; Bojorquez et al., 2020; Gogoularadja & Bakshi,

2020; Golino et al., 2019; Lee, 2016; Lin et al., 2019; Merry & Silverman, 2020; Patiyal et al., 2021; Poulsen & Coto, 2017; Sfakianakis et al., 2017). When evaluating the use of MT, which has been used as an adjuvant treatment for pain relief, evidence suggests music therapy may be effective for patients with acute pain from a disease process or surgery. Important considerations for applicability to practice include how the patient listens to the music. Sfakianakis et al. (2017) indicated the use of headphones as being the most effective way to listen to music. The type of music selected for MT is another consideration. For example, when the patient chose the music for MT, there was greater pain relief (Lin et al., 2019). In addition, MT can be active, which includes engaging patients in singing and composing; or passive, when patients simply listen to music (Lee, 2016). Patient preferred music selection was reported to decrease many physiological symptoms for patients (Merry & Silverman, 2020).

McMillan et al. (2018) explained that soft tissue massage enhanced healing and is another nonpharmacological pain management intervention used to reduce pain scores and improve patient satisfaction.. In addition, when incorporated into a patient's plan of care, massage can also reduce anxiety levels and improve the patient's quality of life perception.

Hypnosis, distraction, and guided imagery are nonpharmacological interventions that have also shown effectiveness in pain management (Carpenter et al., 2017, Fan & Chen, 2019; Garland et al., 2017; Scheffler et al., 2017). Implementation of the previously mentioned nonpharmacological pain interventions is becoming increasingly popular as alternatives to pharmacologic interventions due to the reduction of the associated side-effects .

The use of psychological interventions for pain management utilizing relaxation therapy, psychoeducation, and cognitive behavioral therapy were reviewed in a meta-analysis and revealed that preoperative use of these methods reduced opioid consumption and patient reported

pain scores in the postoperative period (Gorsky et al., 2021). These three distinct techniques show greatest benefit when preoperative anxiety is also addressed.

Reporting Guidelines

Reporting guidelines are an important element of consideration when conducting an IR. The Melnyk Level of Evidence (LOE) table was utilized for this IR based on the recommendation from Toronto and Remington (2020). This LOE table includes pertinent information such as the study's purpose, design, sampling method, participants, LOE, interventions and outcomes, results, and strengths and weaknesses. This information is more pertinent to the purpose of an IR. Based on the information presented by Toronto and Remington, the Preferred Reporting Items for Systematic Reviews and Meta- Analyses (PRISMA) are not as applicable to the IR process as the research report cannot be assumed to reveal the quality of the research. As explained by Toronto and Remington, the PRISMA guideline determined characteristics that were to be included in the systematic review report. See Figure 1.

SECTION FIVE: DATA ANALYSIS AND SYNTHESIS

Toronto and Remington (2020) and Whittemore and Knafl (2005) both noted that the process of data analysis and synthesis is underdeveloped. To facilitate a beginning point, it is imperative to understand the primary goal of the IR, which is to achieve a better understanding of the phenomenon of interest. In this IR, the phenomenon of interest was the effect of nonpharmacological pain interventions on patient reported pain scores and opioid use. Articles in this IR were not evaluated individually but as a whole. According to Toronto and Remington, "The goal is to make a new whole by integrating smaller pieces of data from different literature sources" (pp. 58-59).

Thematic Analysis

The data analysis method utilized in this IR followed the thematic method. Toronto and Remington (2020) explained this is a flexible and popular method. The thematic analysis method may be used for both qualitative and quantitative literature. Whatever method is used, Whittemore and Knafl (2005) and supported by Toronto and Remington (2020) explained the importance of ensuring the data analysis procedures are clearly defined and research methods are transparent. Five themes were identified in the selected literature. The nonpharmacological methods of music, virtual reality, massage, guided imagery/hypnosis, and psychological interventions for pain reduction all showed clinically significant effectiveness for pain management.

Descriptive Results

Research reports have a defined format in which the results are reported but as Toronto and Remington (2020) reported, there are no standardized structures in which IR reports are presented. Whittemore and Knafl (2005) also noted that there is no gold standard when calculating quality scores as this process is complex and research designs vary in criteria.

Musical Interventions

Music therapy is defined as an active process in which a patient and a therapist work together in a planned environment to experience music. This can involve singing, song-writing, or playing an instrument (Lee, 2016). Music medicine is defined as listening to music, which is a passive experience. Both music therapy and music medicine have been shown to reduce pain levels. Pain relief is an important consideration for patients. Pain levels have a significant impact on patient satisfaction and outcomes and must be treated to the patient's perceived acceptable level. Lee explained many patients suffer from unnecessary pain due to treatments and

procedures. Left untreated, pain can cause changes to the immune and neural systems that are correlated with chronic pain. Untreated pain can also adversely affect the gastrointestinal, urinary, and cardiac systems (Lee, 2016).

Of the 17 articles selected, 10 were about musical interventions for pain management. The literature shows music therapy and music medicine as having a positive effect on patients. Patients who were experiencing pain related to various issues were included in the studies which evaluated pain in post-operative patients and those undergoing cancer treatment. The visual analogue scale (VAS) was used to measure patient reported pain levels before and after the music intervention. Patients reported lower levels of pain (Ames et al., 2017; see also Bojorquez et al., 2020; Gogoularadja & Bakshi, 2020; Golino, 2019; Lee, 2016; Lin et al., 2019; Merry & Silverman, 2020; Poulsen & Coto, 2017; Patiyal et al., 2021; and Sfakianakis et al., 2017). Surgical patients who received musical interventions preoperatively, perioperatively, and postoperatively, especially, benefited from the music intervention (Poulsen & Coto, 2017; see also Ames et al., 2017; and Lin et al., 2019).

Music Medicine. The type of music and the selection of the music for music medicine was another factor evaluated in the literature. Gogoularadja and Bakshi (2020) describe how the use of patient selected music and the use of headphones significantly reduced postoperative pain scores (see also Lin et al., 2019; and Merry & Silverman, 2020). Sfakianakis et al., (2017) reported that researcher selected music along with headphones was the intervention evaluated. Other literature supported the use of researcher selected music as an effective nonpharmacological pain intervention (Ames et al., 2017; Poulsen & Coto, 2017; Sfakianakis et al., 2017).

Music Therapy. The literature supports the use of music therapy to help reduce patient reported pain. Golino et al. (2019) discussed the psychological stress patients in critical care units endure and the lasting effects that continue after discharge. Reducing the impact of the stressors is an important consideration for patients. Music therapy is one of the most common nonpharmacological pain interventions currently utilized. The music therapist is a specially trained person who has earned board certification and training (Golino et al., 2019). Working in partnership with the patient, the music therapist can play an instrument, facilitate the patient writing music, discussing the lyrics, or actively listening to music (Bojorquez et al., 2020). A meta-analysis conducted by Patiyal et al., (2021) showed how effective music therapy is on reducing pain and anxiety, and recommended its routine use, especially for orthopedic patients (see also Golino et al., 2019; and Bojorquez et al., 2020).

Collectively, the literature demonstrated the effectiveness of music interventions for patients in reducing pain and anxiety. Music interventions are effective, low-cost, and with almost no risk of harming the patient. For the forementioned reasons, research shows recommendation of music interventions should be included in standardized patient care protocols (Ames et al., 2017; see also Bojorquez et al., 2020; Gogoularadja & Bakshi, 2020; Golino, 2019; Lee, 2016; Lin et al., 2019; Merry & Silverman, 2020; Poulsen & Coto, 2017; Patiyal et al., 2021; Sfakianakis et al., 2017).

Virtual Reality

Tashjian et al., (2017) explained that hospitalized patients are under stress related to pain, illness, and feelings of lost autonomy. Providing holistic care to patients requires the incorporation of multifactorial interventions to provide optimum care. Virtual reality (VR) technology provides a 3-D experience for the viewer where they are immersed in the 3-D

environment. Using a Samsung phone and an Occulus headset, researchers compared the VR intervention to a standard 2-D viewing experience that utilized a 14-inch flat-screen monitor playing a nature video. Although both interventions showed statistically significant reductions in pain scores, the 3-D group was superior in pain reduction (Tashjian et al., 2017). As with musical interventions, patients reported no adverse reactions to the VR therapy.

Massage Therapy

Massage therapy is defined as manipulation of soft body tissues to facilitate healing and increase health. Previously included in nursing care, nurses until the 1990s included massage in daily personal care provided to patients. In an observational study, McMillen et al. (2018) noted that patients reported pain scores showed statistically significant reduction when massage therapy was included in their care. Due to limitations of insurance payments for massage therapists, it is recommended to reincorporate massage therapy into nursing care. There needs to be careful consideration for the use of massage therapy, as not all patients are appropriate for this intervention (McMillen et al., 2018).

Guided Imagery/Hypnosis

Pain management is a challenge for clinicians to address, as pain is a subjective experience with varied responses by patients. Carpenter et al. (2017) supported by Garland et al. (2017) and Scheffler et al. (2017), explained the usefulness of hypnosis and guided imagery as nonpharmacological pain management methods. It is recognized that poor pain management reduces the patient's ability to engage in post-operative activities designed to return to previous levels of functioning (Carpenter et al., 2017). The researchers did recommend additional studies to determine the most effective time-frames needed to produce optimal results. The effect of hypnosis and guided imagery on pain reduction was clearly shown, but evidence to show

reduction of opioid use has not been thoroughly demonstrated (Carpenter et al., 2017; Fan & Chen, 2019; Garland et al., 2017; Scheffler et al., 2017).

Psychological Interventions

Since 1999, opioid overdoses have tripled in North America (Gorsky et al., 2021). Unfortunately, this increase is associated with using opioids to treat postoperative pain. There are many risk factors to using opioids, including dependency, tolerance, and addiction. Gorsky et al. explained that negative emotions also increase pain perception and decrease the effectiveness of analgesic pain management. For these reasons, additional pain management alternatives are required that address pain and anxiety, as these two factors are clinically intertwined. Looking specifically at relaxation therapy, psychoeducation, and cognitive behavior therapy, reducing pain and anxiety preoperatively has a significant effect on reducing pain levels and increasing a patient's pain threshold (Gorsky et al., 2021).

Synthesis

In accordance to maintaining a systematic approach to conducting this IR, the thematic synthesis will be reviewed and discussion related to alignment of the purpose of this IR. The purpose of this IR was to evaluate the effectiveness of nonpharmacological pain interventions on patient reported pain scores and opioid usage. After evaluating the common themes of music, massage, virtual reality, guided imagery/hypnosis, and psychological interventions, research shows that nonpharmacological pain interventions can be effective at reducing patient reported pain scores. Nonpharmacological pain interventions are low cost and pose minimal risk to patients. (Ames et al., 2017; see also Bojorquez et al., 2020; Carpenter et al., 2017;Fan & Chen, 2019; Gogoularadja & Bakshi, 2020; Garland et al., 2017; Golino, 2019; Gorsky et al., 2021;

Lee, 2016; Lin et al., 2019; McMillan et al., 2018; Merry & Silverman, 2020; Poulsen & Coto, 2017; Patiyal et al., 2021; Poulsen & Coto, 2017; Sfakianakis et al., 2017; Tashjian et al., 2017).

Untreated or undertreated pain can have significant implications for patients. The use of opioid pain medication comes with risks. Patients with cancer pain and those undergoing surgical procedures received music interventions. Ames et al. (2017) reported both music therapy, an active approach, and music medication, a passive approach, were shown to reduce patient reported pain scores when evaluated on a VAS (see also Bojorquez et al., 2020; Gogoularadja & Bakshi, 2020; Golino, 2019; Lee, 2016; Lin et al., 2019; Merry & Silverman, 2020; Poulsen & Coto, 2017; Patiyal et al., 2021; Sfakianakis et al., 2017). Music interventions are low-cost and did not show adverse reactions in patients.

Music medicine can be incorporated using different approaches. Gogoularadja and Bakshi (2020) described the use of patient selected music and headphones. The use of headphones and patient selected music is also supported by the research of Lin et al., (2019) and Merry & Silverman (2020). Ames et al. (2017) described the use of researcher selected music that patients were exposed to during therapy. Researcher selected music was supported by studies completed by Poulsen and Coto (2017) and Sfakianakis et al. (2017).

Due to multiple stressors while in the hospital, especially in a critical care unit, music therapy can help reduce these stressors as long-term adverse repercussions can affect patients following discharge (Golino et al., 2019) A music therapist is specially trained and certified to have the required knowledge to lead this intervention. Music therapy can include playing an instrument, writing lyrics, lyric discussion, or active listening (Bojorquez et al., 2020). A meta-analysis by Patiyal et al. (2021) recommended the routine use of music therapy due to the

effectiveness of reducing pain and anxiety, which was also supported by Golino et al. (2019) and Bojorquez et al. (2020).

Virtual reality is another nonpharmacological pain intervention that Tashjian et al., (2017) reported as being effective for pain management. The use of 3-D technology via cell-phone and headset provided statistically significant pain relief, especially as compared to 2-D screen viewing. Once again, virtual reality is a safe intervention to implement.

McMillen et al. (2018) evaluated the effect of massage therapy and it was shown to provide relief to patients. When soft tissue is manipulated by a massage therapist, it can facilitate healing and improve health outcomes. Unfortunately, insurance companies do not pay for massage therapy; therefore, McMillen et al. (2018) recommended that nursing return to the former practice of massage therapy inclusion during routine daily care.

Guided imagery and hypnosis are useful interventions for pain management. Carpenter et al. (2017) stressed the importance of patient participation in recovery activities. Adding guided imagery and hypnosis as two nonpharmacological pain interventions is effective at reducing pain. When the patients perceived level of pain is acceptable, this provides an environment in which the patient can engage fully in their recovery (Carpenter et al., 2017; Fan & Chen, 2019; Garland et al., 2017; Scheffler et al., 2017).

There are several psychological interventions that have been shown to be effective in reducing pain and anxiety in patients. Relaxation therapy, psychoeducation, and cognitive behavior are nonpharmacological pain interventions that can be implemented for patients. These low-cost, low-risk alternatives have been shown to reduce pain and anxiety. Related to opioid use, when a patients pain and anxiety level were controlled preoperatively, postoperative pain

management was increased, which showed a direct correlation to reduced consumption of patient opioid use (Gorsky et al., 2021).

Ethical Considerations

The importance of adhering to ethical principles when conducting research cannot be over emphasized. Human research may involve an ethical dilemma. Institutional Review Boards (IRBs) must review all research and use designated protocols to ensure the protection of human subjects (White, 2020). For this IR, an application was submitted to the Liberty University (LU) IRB for review and was determined to be in agreement with the Office for Human Research Protections (OHRP) and the Food and Drug Administration (FDA) regulations and found this study did not classify as human subject research (See Appendix B). Along with this approval by the IRB, Collaborative Institutional Training Initiative (CITI) training on biosafety was competed (See Appendix C).

TIMELINE

The completion of the IR must be done in an organized, timely fashion. To facilitate adherence and recognition of the tasks remaining, a timeline was developed and approved by my department chair, Dr. Kenneth Thompson (See Appendix D).

SECTION SIX: DISCUSSION

The purpose of this IR was to evaluate, analyze, and synthesize the effectiveness of nonpharmacological pain interventions on patient reported pain scores and opioid use in hospitalized adult patients. Following a review of the literature, it has been shown that various nonpharmacological interventions such as music therapy, distraction, guided imagery, massage, and psychological methods can be effective alternatives and/or additions to pharmacologic pain

management interventions (Gorsky et al., 2021). Healthcare providers are ethically bound to help manage patients' pain and comfort. It has been shown that long-term opioid use for acute pain can lead to addiction and abuse (Blackburn 2020). Utilizing nonpharmacological pain interventions reduces opioid use, thus reducing the risk for addiction and abuse. Small and Laycock (2019) explained that for surgical patients, it is imperative to start pain management interventions in the pre- and perioperative periods to enhance the benefits of nonpharmacological pain interventions postoperatively. Continued research is recommended related to the use and effectiveness of nonpharmacological pain interventions to bring increased awareness and implementation of these methods of pain management.

Limitations

Toronto and Remington (2020) reported that when discussing the limitations of an IR, limitations should be directed at the limitations of the IR, not the limitations of each individual study. It is important for those conducting an IR to be transparent in the limitations to provide an increase in credibility and strength as limitations to the IR may be related to weaknesses in the individually selected studies or by the actual review completed (Toronto & Remington, 2020).

For this novice reviewer, although resources were used in the directing of this IR, collecting the original research and subsequent inclusion and exclusion of initial articles provided a possible means for bias to occur. The phenomenon of interest was the driving force for the literature search, but only one review was involved in this IR. As articles were evaluated, it become apparent that those containing supporting evidence for the phenomenon of interest were more desired to be included.

Implications for Practice/Future Work

Healthcare providers are responsible for providing reasonable and effective pain management interventions for patients to promote healing and return to former functioning levels. Implementing nonpharmacological pain interventions for pain management for adult patients is a focus that should continue to be explored. Effective implementation is imperative to success; therefore, continued research related to the most appropriate method and techniques is required. Current literature is showing the effectiveness of MT, meditation, distraction, massage therapy, virtual reality, and hypnosis on pain management. Reducing the amount of usage will also reduce untoward side effects of opioids which may lead to improved patient satisfaction and health outcomes. As research continues on the use of nonpharmacological pain management methods, knowledge will move from theorical to empirical.

DNP Essentials

The American Association of Colleges of Nursing (AACN) defined elements required of Doctoral Education for Advanced Nursing Practice that include foundational competencies each graduate should acquire during their education (2006). There are eight essentials listed and described, and have been applied to this IR.

Essential I: Scientific Underpinnings for Practice

Advanced nursing practice is complex and requires the DNP graduate to integrate, describe, evaluate, and apply scientific knowledge. As an academic terminal degree, knowledge and experience gained during the DNP education provides an opportunity for rapid and efficient translation of evidence into practice to improve patient outcomes. Following completion of this

IR, the results can be used to provide improved care for patients in regard to safer pain control measures that are cost-effective and appropriate.

Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking

To improve patient outcomes, practitioners must have the knowledge and talent to work with and serve as a leader within an organization. Implementing policy and leading quality improvement initiatives is an important aspect for advanced practice nurses. Using data from this IR on nonpharmacological pain interventions and applying it to practice will require innovative approaches to pain management. The DNP has the competencies to function as a leader and implement change.

Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice

This IR has provided evidence that nonpharmacological interventions for pain management are effective. The discovery of new phenomena and applying them to practice can be complicated. This IR has provided knowledge related to pain management that the DNP can use and apply to practice when designing and implementing evidence-based practice related to pain management.

Essential IV: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care

This IR required the use of information systems to gather and evaluate evidence. The reviewer was required to gather information from a variety of databases and determine credible resources. Several of the studies included the collection of patient pain scores following implementation of identified interventions. The reviewer understood how to perform a literature search and apply it to organizational decision making.

Essential V: Health Care Policy for Advocacy in Health Care

Health care policy can be developed at the micro, meso, and macro level. The Joint Commission has required that nonpharmacological pain interventions must be included into each hospitalized patients plan of care. This IR supports the use of nonpharmacological pain interventions and shows the effectiveness and practical application for patients.

Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes

Providing patient-centered care along with improving population outcomes requires collaboration of multiple healthcare providers. Due to the complicated healthcare system in which we are involved, professionals must work together. The completion of this IR shows the reviewers ability to gather and disseminate research to other disciplines.

Essential VII: Clinical Prevention and Population Health for Improving the Nation's Health

This IR shows the effectiveness of nonpharmacological pain interventions that can reduce the use of opioids and the associated risks of addiction and abuse. Opioid addiction is a national health crisis. Using the information from this IR can lower death rates and improve population health and outcomes.

Essential VIII: Advanced Nursing Practice

The information gathered from this IR can be applied in many clinical settings. Providing education to nurses on the appropriate use of nonpharmacological pain interventions and guiding by practice and mentoring will provide an opportunity to improve patient care for pain management while reducing the risk of complications related to opioid use.

Dissemination

The final stage of research is the dissemination of data to a targeted audience (Toronto & Remington, 2020). There are a variety of methods for this process. It is the intention of this reviewer to disseminate this information to multiple scholarly journals and professional conference poster presentations. The dissemination of results to appropriate and receptive audiences is imperative to facilitating the translation of evidence into practice.

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Appendix A

Strengths of Evidence Table

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
Article 1 Ames, N., Shuford, R., Yang, L., Moriyama, B., Frey, M., Wilson, F., Sundaramurthi, T., Gori, D., Mannes, A., Ranucci, A., Koziol, D., & Wallen, G. R. (2017). Music listening among postoperative patients in the intensive care unit: A randomized	To evaluate the use of music therapy for pain management for post-	This study was conducted over a period of 18 months (August 2011 to February 2013). Study approval was	This study was a randomized, controlled trial that evaluated the effects of music listening on eligible	There was no significant difference in pain, opioid intake, distress, or anxiety scores between the control and	*Level 2* Randomized control trial	The major limitations of this study include not only decreased sample size, but also lack	This article along with the other evidence could be used to support a

controlled trial with mixed-methods analysis. *Integrative Medicine Insights, 2017*(12), 1178633717716455-1178633717716455. https://doi.org/10.1177/1178633717716455	operative patients.	obtained from the National Cancer Institute's intramural Institutional Review Board (NCT01409044, ClinicalTrials.gov). The principal investigator screened and evaluated lists of surgical patients admitted to the NIH Clinical Center (CC) on a weekly basis, contacted eligible patients	surgical patients' opioid use and self-reported pain, distress, and anxiety. Participants were consented preoperatively, but randomized postoperatively to either a music listening or a control group. The control group received standard postoperative care supplemented by an approximate	music listening groups during the first 4 time points of the study. However, a mixed modeling analysis examining the pre- and post-intervention scores at the first time point revealed a significant interaction in the Numeric Rating Scale (NRS) for pain between the music and the control groups (P = .037).		of choice of music type, duration of listening, and lack of an objective measure of pain. The most important limitation in this study was sample size.	practice change.

		preoperatively, and invited them to participate. Adult (18 years of age or older) surgical patients at the NIH CC who understood and spoke English or Spanish, with an anticipated postoperative ICU stay of 24 to 48 hours, and anticipated use of a patient-controlled analgesia (PCA) device for	ly 50-minute period of rest instituted to match the 50-minute music listening period of the experimental group.				

		postoperative pain management were considered eligible. Eligible patients were consented prior to surgery and data collection by the principal investigator or a trained associate investigator.					
Article 2 Carpenter, J. J., Hines, S. H., & Lan, V. M. (2017). Guided imagery for pain management in postoperative orthopedic patients: An integrative literature review. *Journal of Holistic Nursing, 35*(4), 342-351.	This integrative review, informed by Watson's theory of human caring, identifies	The types of studies reviewed included randomized controlled trials, quasi-experimental, and nonrandomiz	An integrative literature search was conducted. Twenty-two studies were identified as potentially relevant to	Five of the nine studies found a statistically significant reduction in pain levels in those patients receiving GI, relaxation	*Level 1* Review of RTC		

https://doi.org/10.1177/0898010116675462	evidence that either supports or refutes the use of guided imagery as a supplement to pharmaceutical pain management for postoperative orthopedic patients	ed controlled studies. Inclusion criteria were peer-reviewed, English language studies examining the effectiveness of GI, hypnosis, and/or relaxation techniques for pain management of patients who underwent orthopedic surgery. Studies involving relaxation techniques and hypnosis	this study. Nine of the articles met all inclusion criteria and were included in this study	therapy, or hypnosis (the intervention group).			

		were included in this study due to their similarities with GI					
Article 3 Fan, M., & Chen, Z. (2020). A systematic review of non-pharmacological interventions used for pain relief after orthopedic surgical procedures. *Experimental and Therapeutic Medicine*, *20*(5), 1-1. https://doi.org/10.3892/etm.2020.9163	The purpose of the present review was to evaluate the available evidence on the efficacy of various non-pharmacological interventions to relieve pain after orthopedic surgical procedures.	N=273 Patients undergoing orthopedic surgical procedures.	An electronic search of the PubMed, Embase and Cochrane library databases was performed to retrieve studies of all types assessing the role of non-pharmacological intervention s for pain relief after orthopedic	The results of the present review indicated that several different strategies of non-pharmacological interventions have been used in orthopedic patients and all such complementary therapies may have certain benefits in the reduction	*Level 1* Systematic Review	1. Only five studies were included. 2. Significant heterogeneity related to patient population. 3. Three studies were RCT, two were single-arm studies. 4. Lack of control group.	This is a systematic review so this would be good evidence to support a practice change.

			surgical procedures.	of post-operative pain.		5. Only studies published in the English language were included.	
Article 4 Bojorquez, G. R., Jackson, K. E., & Andrews, A. K. (2020). Music therapy for surgical patients: Approach for managing pain and anxiety. *Critical Care Nursing Quarterly*, *43*(1), 81-85. https://doi.org/10.1097/CNQ.0000000000000294	The purpose of this project was to incorporate and evaluate MT as an adjunct intervention to address pain and anxiety in adult surgical step-down patients.	N=32 Patients in a level 1 trauma step-down unit. A convenience sample.	Evaluation of MT included paired t-test and Wilcoxon signed-rank score comparisons of the numerical pain rating scale and the DSM-5 Patient Reported Outcome Measurement Information	Among patients who received MT (n = 42), there was a statistically significant reduction in pain.	*Level 6* A single, descriptive study	1. Only one study. 2. Small sample size. 3. Requires skilled staff which may not be available.	This study can be used to enhance other evidence in support of music therapy for pain management.

			System Anxiety short form before and after the MT encounter. A single descriptive study.				
Article 5 Gogoularadja, A., & Bakshi, S. S. (2020). A randomized study on the efficacy of music therapy on pain and anxiety in nasal septal surgery. *International Archives of Otorhinolaryngology*, *24*(2), e232-e236. https://doi.org/10.1055/s-0039-3402438	Music therapy is an exciting and inexpensive modality in this regard, but scientific evidence in terms of randomized clinical trials is still lacking for common otolaryngology	Adult patients 18 – 55 undergoing nasal septum surgery. The sample of our study was composed of 59 patients, 30 of which were submitted to conventional medicine, while the remaining 29 were	This was performed using the generalized anxiety disorder-7 scale and the pain visual analogue scale until postoperative day 2, when the patients were discharged from the hospital.	On comparing the anxiety and pain scores between the two groups, the group who underwent music therapy showed a statistically significant reduction in anxiety both preoperatively ($p < 0.0001$)	*Level 2* Randomized control study	1. Limited sample size. 2. Music was not standardized. 3. Only studied post-operative pain, not other types of pain	This is high level of evidence and could support a practice change.

	surgeries. Hence, we performed the present study.	submitted to both conventional medicine and music therapy.		and postoperatively ($p < 0.0001$), as well as reduced postoperative pain starting from day 0 ($p < 0.001$), which continued until postoperative day 2 ($p < 0.001$).			
Article 6 Golino, A. J., Leone, R., Gollenberg, A., Christopher, C., Stanger, D., Davis, T. M., Meadows, A., Zhang, Z., & Friesen, M. A. (2019). Impact of an active music therapy intervention on intensive care patients. *American Journal of Critical Care, 28*(1), 48-55.	To examine the effect of an active music therapy intervention on physiological parameters	The setting of this study was an American Association of Critical-Care Nurses Beacon Award–winning, 12-bed adult medical-	A study was conducted using a pretest-posttest, within-subject, single-group design. Study participants received a	After the intervention, significant decreases (all P <.001) were found in respiratory rate (mean difference, 3.7 [95% CI, 2.6–4.7] breaths per	*Level 3* Quasi-experimental	The lack of a control or comparison group limits the intervention outcomes and prevents direct	Yes, this is in support of a change.

https://doi.org/10.4037/ajcc2019792	and self-reported pain and anxiety levels of patients in the intensive care unit.	surgical ICU in a Magnet-designated community hospital in the Washington, DC, suburbs. The intervention took place during daytime hours, primarily between 10 AM and 3 PM. A total of 52 English-speaking adults who had been admitted to the ICU were recruited to participate in the study as a	30-minute music therapy session consisting of either a relaxation intervention or a "song choice" intervention. The music therapist recorded the patients' vital signs before and after the intervention, and patients completed self-assessments of their pain and anxiety levels before and after the intervention.	minute), heart rate (5.9 [4.0–7.8] beats per minute), and self-reported pain (1.2 [0.8–1.6] points) and anxiety levels (2.7 [2.2–3.3] points).		examination of the differential treatment effects of a music therapy intervention versus a music listening intervention.	

		convenience sample.					
Article 7 Lee, J. H. (2016). The effects of music on pain: A meta-analysis. *The Journal of Music Therapy*, *53*(4), 430-477. https://doi.org/10.1093/jmt/thw012	The aim of this meta-analysis was to examine published RCT studies investigating the effect of music on pain.	97 RTC.	The present study included RCTs published between 1995 and 2014. Studies were obtained by searching 12 databases and hand-searching related journals and reference lists. Main outcomes were pain intensity, emotional distress from pain, vital signs, and amount	Results from the 97 trials suggest that music interventions overall have beneficial effects on pain intensity, emotional distress from pain, use of anesthetic, opioid and non-opioid agents, heart rate, systolic and diastolic blood pressure, and respiration rate.	*Level 1* Meta-Analysis	1. Heterogeneous outcomes. 2. Some RCT only include a few studies. 3. Only English language studies include.	This is a high level of evidence and may be used to support a practice change.

			of analgesic intake. Study quality was evaluated according to the Cochrane Collaboration guidelines.				
Article 8 Sfakianakis, M. Z., Karteraki, M., Panayiota, K., Christaki, O., Sorrou, E., Chatzikou, V., & Melidoniotis, E. (2017). Effect of music therapy intervention in acute postoperative pain among obese patients. *International Journal of Caring Sciences, 10*(2), 937.	To determine the effect of music therapy in postoperative pain among obese patients who underwent a major abdomen surgery.	N = 87. Adult, obese patients undergoing surgical procedures.	A prospective randomized clinical trial.	The patients in two groups had normal mean values in heart rate, respiration rate and SpO2, before and after the intervention, without any special abnormalities. Those patients who received music	*Level 2* One randomized control trial.	1. Study done in Greece.	This is a high level of evidence and could be used to support a practice change.

				therapy, twice postoperatively, referred more decreased Δ-VAS score = -1.78 units (VAS after – VAS before 2.64 - 4.42), in compare to the non-music patients group, which their Δ-VAS score was less decreased, only for -0.22 units (VAS after - VAS before: 3.76 - 3.98). From all study			

				variables, only “Mean Arterial Pressure” and “VAS” were found to be affected by the music therapy intervention.			
Article 9 Lin, C., Hwang, S., Jiang, P., & Hsiung, N. (2020). Effect of music therapy on pain after orthopedic Surgery—A systematic review and Meta-Analysis. *Pain Practice, 20(*4), 422-436. https://doi.org/10.1111/papr.12864	This systematic review aimed to examine the effects of music therapy on pain after orthopedic surgery.	Nine randomized controlled trials were selected.	The Cochrane Library, PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Nursing Reference Center (NRC), Airiti Library, and National	Music can relieve pain significantly for both music medicine (MM; SMD = −0.41, 95% CI [−0.75, −0.07], P = 0.02) and music therapy (MT; SMD = −0.31, 95% CI [−0.57, 0.04], P = 0.02). (2) Music chosen	*Level 1* Meta-analysis of RCTs.	Due to the fact that the search process and screening were limited to Chinese- and English-language articles, literature in other languages was not included in	Further literature would enhance the strength of the evidence and make it possible to explore its relevance in greater depth.

			Digital Library of Theses and Dissertations in Taiwan were searched up to August 2019. The risk of bias from the Cochrane Handbook for Randomized Controlled Trials of Interventions was used. A standard mean difference (SMD) with 95% confidence intervals (CIs) was applied as a summary	by the subjects showed significant differences for both MM (P = 0.002) and MT (P = 0.02). (3) Anxiety improved significantly among patients using MT (SMD = 0.44, 95% CI [−0.75, −0.13], P = 0.005).		the study, which may cause gaps in the literature.	

			effect on postoperative pain and anxiety using RevMan version 5.3. A meta-analysis was also carried out using subgroup analysis.				
Article 10 McMillan, K., Glaser, D., & Radovich, P. (2018). The effect of massage on pain and anxiety in hospitalized patients: An observational study. *Medsurg Nursing*, *27*(1), 14-18.	The effects of massage therapy on hospitalized patients.	Participants in the convenience sample of all patients on the unit were alert and awake, allowing informed verbal consent, and had projected hospital length of	This descriptive explorational study.	Participants indicated satisfaction with their massage experience (M=4.83; SD=0.437). Using repeated measures, a reduction in participants' pain intensity score after	*Level 6* Descriptive, exploratory study.	The unit identified for this study was expected to provide a homogeneous group of participants. However, because the unit	This was one of relatively few studies examining pain and anxiety as well as the effects of massage on distress

		stay of 2-8 days. Included participants were at least age 18; could read, write, and speak English; were medically stable; and were able to participate for at least 48 hours.		massage was statistically significant (p=0.000). A significant increase (p=0.004) in daily function was identified after the initial massage. Anxiety was reduced following the second massage session (p=0.002).		was used as overflow for medical and surgical patients, a wide variety of diagnoses was seen. A second limitation was the ability of participants to provide written feedback on their experience.	and daily function. Findings add to knowledge regarding the effects of therapeutic massage. Although a level 6, this added to the evidence for change.
Article 11 Merry, M., & Silverman, M. J. (2021). Effects of patient-preferred live music on positive	The purpose of this single-session	Research participants (N = 44) were adult	Positive and negative affect were measured	PPLM session can be an effective	*Level 2* Randomized experime	One of these limitations is the small	Although a small sample, this

and negative affect and pain with adults on a post-surgical oncology unit: A randomized study. *The Arts in Psychotherapy, 72*, 101739. https://doi.org/10.1016/j.aip.2020.101739	randomized study was to determine the immediate effects of patient-preferred live music (PPLM) on positive and negative affect and pain in adults hospitalized on a post-surgical oncology unit.	inpatients on the surgical oncology unit of a large teaching hospital in the Midwestern region of the United States.	using the Global Mood Scale (GMS; Denollet, 1993). The GMS is comprised of 10 negative and 10 positive mood terms. Participants rated each term on a scale of 1–4, with a score of 1 indicating not at all and 4 indicating extremely. Items from each subscale are summed to comprise scores for	nonpharmacological intervention for immediately addressing affect and pain in patients on a post-surgical oncology unit.	ntal study	sample size, which may have contributed to the lack of a between-group significant difference in pain. Other limitations include the lack of follow-up measures to determine maintenance of treatment gains and the dual role of the PI, who acted as both a clinician	article has support for a practice change.

			positive affect and negative affect. The GMS is a reliable scale and correlations with existing measures of emotional functioning and self-deception indicated its convergent and discriminant validity. This study used a single-session two-group pre-posttest randomized experimenta			and researcher.	

			l design with a wait-list control.				
Article 12 Patiyal, N., Kalyani, V., Mishra, R., Kataria, N., Sharma, S., Parashar, A., & Kumari, P. (2021). Effect of music therapy on pain, anxiety, and use of opioids among patients underwent orthopedic surgery: A systematic review and meta-analysis. *Curēus (Palo Alto, CA), 13(*9), e18377-e18377. https://doi.org/10.7759/cureus.18377	This study aimed to examine the effect of music therapy on pain, anxiety, and the use of opioids among patients who underwent orthopedic surgery.	Results of the study included 13 studies, having a total of 778 patients included in a systematic review comprising ten RCTs and three quasi-experimental studies. Meta-analysis was performed on ten RCTs.	Randomized controlled trials (RCTs) and quasi-experimental studies published until December 2020 in the English language regarding music therapy in comparison to standard care on pain, anxiety, and opioid use among postoperative orthopedic patients	Conclusion of the current evidence demonstrated that music therapy significantly reduces pain and anxiety among postoperative orthopedic patients.	*Level 1* Meta-analysis	This study is limited to only English-language articles. There can be difficulty in generalizing the findings for all the postoperative orthopedic patients due to variability in the duration, frequency, timing, follow-up,	Yes, this is high level evidence to support a practice change.

						type of music, and type of surgery. Out of ten RCTs, four of the studies did not perform sample size calculations, and only one study has mentioned the sampling technique, which may affect the quality of trials	
Article 13 Poulsen, M. J., & Coto, J. (2018). Nursing music protocol and postoperative pain. *Pain*	This paper is an in-depth literature review	The inclusion criteria for articles in	A systematic review was completed	This evidence suggests that proper use of music therapy	*Level 1*	Study limited to English language	Yes, this is high level evidence

Management Nursing, *19*(2), 172-176. https://doi.org/10.1016/j.pmn.2017.09.003	assessing a best practice recommendation and protocol that establishes a consensus in the use of music therapy.	this review included systematic reviews, meta-analysis, and best practice recommendations. This article focuses on the adult patient population older than age 18, any surgical intervention, and therapeutic music intervention used to reduce perioperative pain.	to evaluate the effect of music on acute, chronic, or cancer pain. The authors focused on pain intensity, relief, and opioid requirements.	can significantly reduce surgical pain. Implementing these protocols and allowing the freedom of nursing staff to use them may lead to greater reductions in surgical pain and anxiety and a reduction in opioid use.	Systematic review of RCT	publications.	to support practice change.
Article 14	The aim of the present meta-	Eligible studies were	Through a comprehensi	Random effects meta-	*Level 1*	The meta-analysis	Yes, this is

Scheffler, M., Koranyi, S., Meissner, W., Strauß, B., & Rosendahl, J. (2018). Efficacy of non-pharmacological interventions for procedural pain relief in adults undergoing burn wound care: A systematic review and meta-analysis of randomized controlled trials. *Burns (03054179), 44*(7), 1709–1720. https://doi.org/10.1016/j.burns.2017.11.019	analysis was to investigate the efficacy of non-pharmacological interventions for procedural pain relief in adults undergoing burn wound care compared to standard care alone or an attention control	randomized controlled trials that investigated non-pharmacological interventions to adult patients (mean age of the study sample ≥21 years) undergoing burn wound care.	ve literature search in various electronic databases 21 eligible randomized controlled trials (RCTs) were included	analyses revealed significant positive treatment effects on pain outcomes, Hedges' g = 0.58, 95% CI [0.33; 0.84]. Heterogeneity of study effects was substantial, I2 = 72%. Effects were significantly larger for comparisons against treatment as usual (TAU), g = 0.69, CI 95% [0.40; 0.98] than for comparisons against attention	Meta-analysis of RCTs	reported here combines data across studies in order to estimate treatment effects with more precision than is possible in a single study. The main limitation of this meta-analysis, as with any overview, is that the patient populations, the settings, the applied interventio	evidence to support a practice change.

				control groups, g = 0.21 [−0.11; 0.54], p < 0.001. Distraction interventions, particularly those using virtual reality, and hypnosis revealed the largest effects on pain relief. Non-pharmacological interventions further resulted in a significant small, homogeneous effect on anxiety reduction, g =		ns and the outcome definitions are not the same across studies.	

				0.36 [0.20; 0.52].			
Article 15 Tashjian, V. C., Mosadeghi, S., Howard, A. R., Lopez, M., Dupuy, T., Reid, M., Martinez, B., Ahmed, S., Dailey, F., Robbins, K., Rosen, B., Fuller, G., Danovitch, I., IsHak, W., & Spiegel, B. (2017). Virtual reality for management of pain in hospitalized patients: Results of a controlled trial. *JMIR Mental Health, 4*(1), e9-e9. https://doi.org/10.2196/mental.7387	The objective of the study was to measure the impact of a onetime 3D VR intervention versus a two-dimensional (2D) distraction video for pain in hospitalized patients	Urban teaching hospital in medical inpatients with an average pain score of ≥3/10 from any cause.	A nonrandomized, comparative cohort study over a 6-month period to compare a 3D VR pain distraction experience (administered during the first 3-month recruitment period) with a 2D high-definition nature video on a 14-in screen placed in easy viewing	Use of VR in hospitalized patients significantly reduces pain versus a control distraction condition. These results indicate that VR is an effective and safe adjunctive therapy for pain management in the acute inpatient setting.	*Level 3* Quasi-experimental comparative study.	Study was not a randomized control trial, intervention was only 15 minutes, did not look at use of pain medication use, did not track reason for refusal to use by patients.	Yes, this offers some good evidence to support a practice change.

			proximity (administered during the second 3-month period), described further below. In both cohorts, we recruited adults (18+ years) admitted to the Inpatient Specialty Program at Cedars-Sinai Medical Center, a large, urban, tertiary care medical center.				
Article 16 Garland, E., Baker, A., Larsen, P., Riquino, M., Priddy, S.,	We hypothesized that a single,	The study was conducted in	This was a single-site, three-arm,	Participants in the mind-body	*Level 2*	The study had some limitations.	Yes, this is a high-level

Thomas, E., Hanley, A., Galbraith, P., Wanner, N., Nakamura, Y., Garland, E. L., Baker, A. K., Riquino, M. R., Priddy, S. E., & Hanley, A. W. (2017). Randomized controlled trial of brief mindfulness training and hypnotic suggestion for acute pain relief in the hospital setting. *JGIM: Journal of General Internal Medicine*, *32*(10), 1106–1113. https://doi.org/10.1007/s11606-017-4116-9	scripted session of mindfulness training focused on acceptance of pain or hypnotic suggestion focused on changing pain sensations through imagery would significantly reduce acute pain intensity and unpleasantness compared to a psychoeducation pain coping control. We also hypothesized that mindfulnes	Salt Lake City from October 2015 through October 2016. The hospital where the study took place had historically performed below the national average in patient ratings of their acute pain management when compared to other academic medical centers, prompting providers at this	parallel-group randomized controlled trial (RCT). The randomization sequence was generated by computer before the start of the trial via simple random allocation to the study conditions.	interventions reported significantly lower baseline-adjusted pain intensity post-intervention than those assigned to psychoeducation ($p < 0.001$, percentage pain reduction: mindfulness = 23%, suggestion = 29%, education = 9%), and lower baseline-adjusted pain unpleasantness ($p < 0.001$). Intervention	A single, RCT	First, without follow-up data, the duration of the observed therapeutic effects is unknown, although it is unlikely that a brief single-session intervention would result in long-lasting pain relief. Additional research is needed to determine whether effects can be prolonged	article to support a practice change.

	s and suggestion would produce significant improvements in secondary outcomes including relaxation, pleasant body sensations, anxiety, and desire for opioids, compared to the control condition.	institution to seek new non-opioid options for addressing acute pain. English-speaking adult inpatients (≥18 years) at a public hospital reporting "intolerable pain" or "inadequate pain control" (on the Clinically Aligned Pain Assessment tool,20 a clinical assessment of pain employed at this hospital) were		conditions differed significantly with regard to relaxation ($p < 0.001$), pleasurable body sensations ($p = 0.001$), and desire for opioids ($p = 0.015$), but all three interventions were associated with a significant reduction in anxiety ($p < 0.001$).		or intensified with larger or repeated doses. Second, the suggestion and mindfulness interventions contained some overlapping instructions for focused attention and monitoring of body sensations, including a similar introduction that	

		included in this trial.				framed both interventions as a form of "concentration"; this overlap was intended to engender similar levels of perceived credibility between the two experimental conditions.	
Article 17 Gorsky, K., Black, N. D., Niazi, A., Saripella, A., Englesakis, M., Leroux, T., Chung, F., & Niazi, A. U. (2021). Psychological interventions to reduce postoperative pain and opioid consumption: A narrative review	This review explores the efficacy of psychological interventions for reducing	Included studies were limited to those investigating adult human subjects, and those	An extensive literature search was conducted in MEDLINE, Cochrane Central	Some preoperative psychological interventions can reduce pain scores and opioid	*Level 1* Narrative Review	Limitations to our review include several of the included studies	In conclusion, certain psychological interventions can reduce

of literature. *Regional Anesthesia and Pain Medicine*, https://doi.org/10.1136/rapm-2020-102434	postoperative pain and opioid use in the acute postoperative period.	published in English.	Register of Controlled Trials, Cochrane Database of Systematic Reviews, Medline In-Process/ePubs, Embase, Ovid Emcare Nursing, and PsycINFO, Web of Science (Clarivate), PubMed-NOT-Medline (NLM), CINAHL and ERIC, and two trials registries, ClinicalTrials.Gov (NIH)	consumption in the acute postoperative period; however, there is a clear need to strengthen the evidence for these interventions. The optimal technique, strategies, timing and interface requires further investigation.		being published by the same authors and institution. These studies from Good et al. represent a significant number of the papers examining music and relaxation therapy and represent four out of the seven positive results for music and relaxation	pain and opioid consumption, possibly by reducing preoperative anxiety by a person-to-person interaction. Opioid counseling and education have shown to be of benefit as they improve patient's knowled

			and WHO ICTRP.			pain reduction.	ge on how to appropriately use their prescribed narcotics and supplement with non-opioid analgesics, thus limiting their opioid consumption in the postoperative period.

Appendix B

IRB Approval

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

December 1, 2021

Tammy Anderson
Kenneth Thompson

Re: IRB Application - IRB-FY21-22-486 Evaluation of the Effectiveness of Non-Pharmacological Pain Interventions on Patient Reported Pain Scores and Opioid Use in Hospitalized Adult Patients

Dear Tammy Anderson and Kenneth Thompson,

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study does not classify as human subjects research. This means you may begin your project with the data safeguarding methods mentioned in your IRB application.

Decision: No Human Subjects Research

Explanation: Your study is not considered human subjects research for the following reason:

(4) "Scholarly and journalistic activities (e.g., oral history, journalism, biography, literary criticism, legal research, and historical scholarship), including the collection and use of information, that focus directly on the specific individuals about whom the information is collected," are not considered research according to 45 CFR 46.102(l)(1).

Please note that this decision only applies to your current application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued non-human subjects research status. You may report these changes by completing a modification submission through your Cayuse IRB account.

Also, although you are welcome to use our recruitment and consent templates, you are not required to do so. If you choose to use our documents, please replace the word *research* with the word *project* throughout both documents.

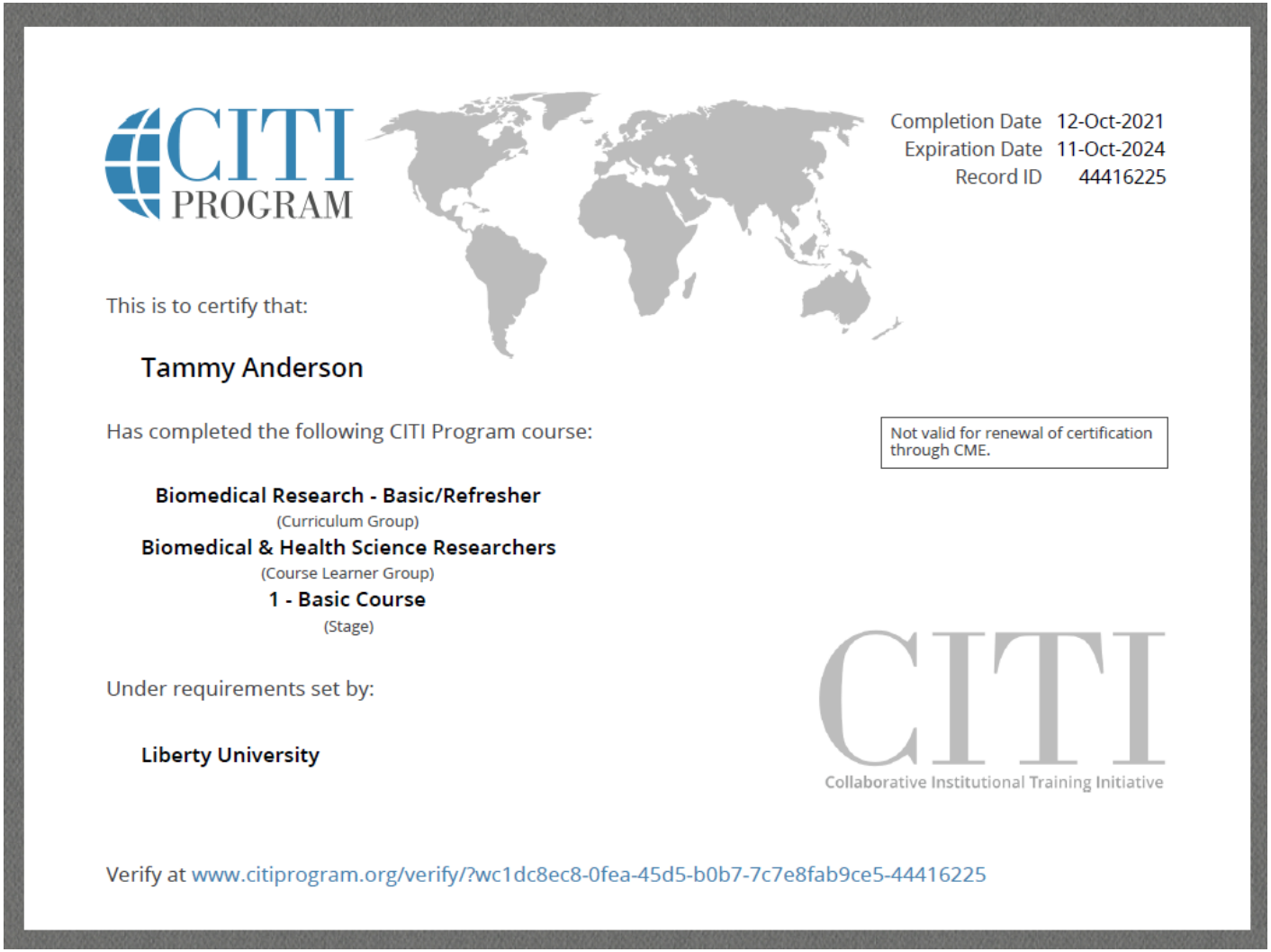
If you have any questions about this determination or need assistance in determining whether possible modifications to your protocol would change your application's status, please email us at irb@liberty.edu.

Sincerely,

G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
Research Ethics Office

Appendix C

CITI Training



Appendix D

Timeline

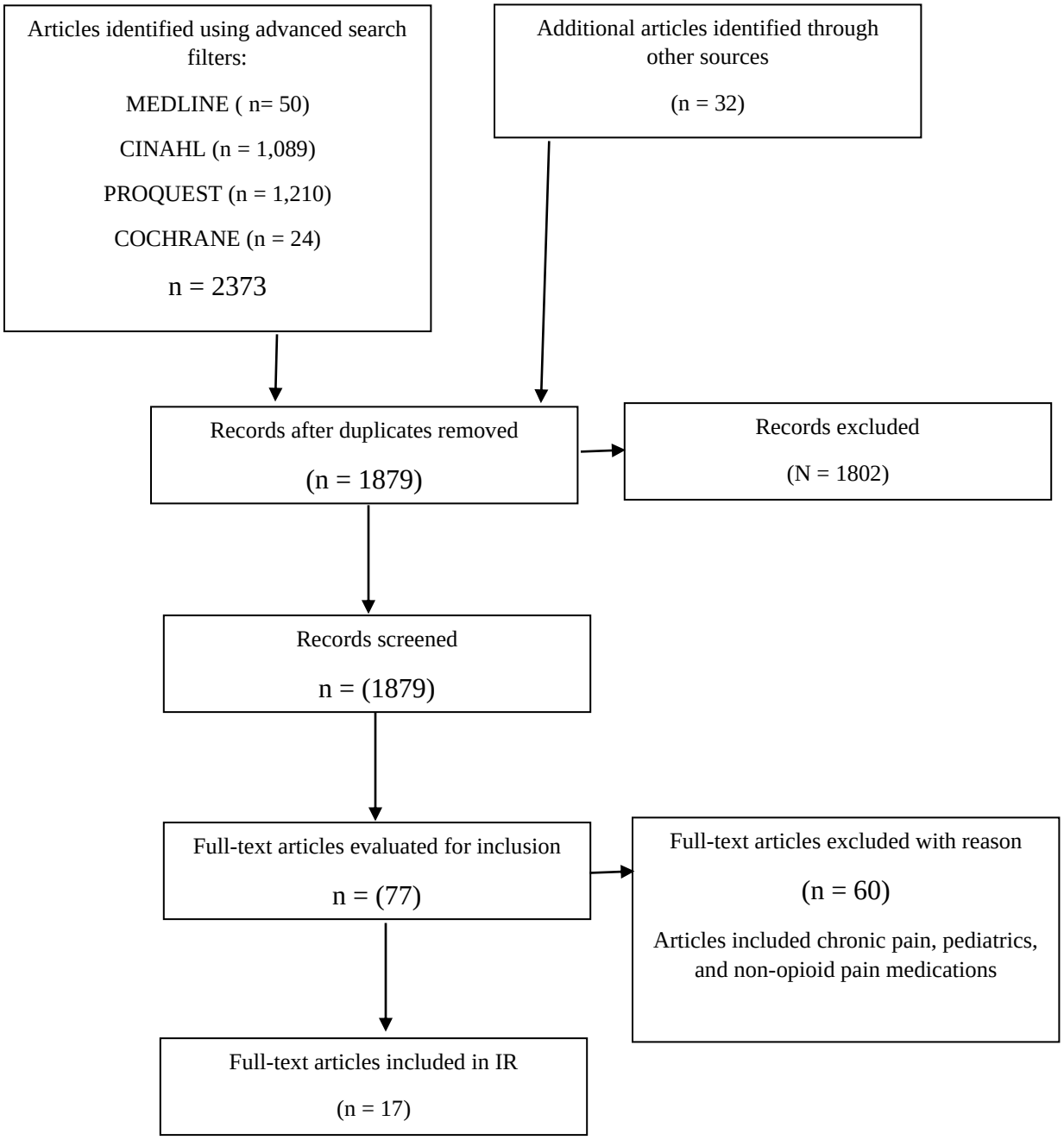
Milestone	Deliverable	Description	Estimated Completion Date
CITI Training	Certificate of Completion for CITI Training	The Collaborative Institutional Training Initiative (CITI) is a resource for colleges, healthcare organizations, and others that provides training compliance related to ethics and research.	October 25, 2021
Update of Proposal	Canvas Assignments	Submit assignments in Canvas related to updates for project.	October 31, 2021
Project Work	Rough Draft of Project	During this time period, I will be updating and refining my first three sections of my paper and will submit as needed for feedback and approval from my chair.	November 21, 2021
Project Update	Canvas Assignments	Midterm Progress Update: Finishing revisions and sending and update with unexpected barriers to chair.	November 21, 2021
Sections 1 – 3 Final	IR Sections 1 – 3 revised.	Sections 1 – 3 of IR will be revised, completed and submitted.	November 28, 2021
IR PowerPoint	IR PowerPoint	Submit IR PowerPoint that will be used for Defense Proposal	December 5, 2021
Project Update	Canvas Assignments	Progress Update: Finishing revisions and sending and update with unexpected barriers to chair.	December 5, 2021
IRB	IRP Application	A request for IRB approval will be sent but will not be necessary due to this being an IR.	December 12, 2021
IRB	Approval Confirmation	Submission of IRB approval.	December 17, 2021
Progress Update and End of Course	Canvas Assignment	Progress Update: Finishing revisions and sending and update with unexpected barriers to chair.	December 17, 2021
IR Project	Revision of Sections 1 - 3	Submitting Revised IR Paper, sections 1 -3	1/16/2022
Update of Proposal	Canvas Assignments	Initial Progress Update: Finishing revisions and sending and update with unexpected barriers to chair.	1/16/2022

IR Project Data Summary	**Data Summary Spreadsheet**	**Submitting IR Project Data Summary**	**2/13/2022**
Project Update	**Canvas Assignments**	**Midterm Progress Update: Finishing revisions and sending and update with unexpected barriers to chair.**	**2/13/2022**
IR Draft	**IR Sections 1 – 5 with Appendices revised.**	**Draft of Sections 1 – 5 with appendices will be submitted.**	**2/13/2022**
Quiz	**Defense Announcement**	**Reading the DNP Scholarly Defense Announcement Template**	**2/25/2022**
Defense PowerPoint	**PowerPoint of Defense of IR**	**PowerPoint to be used in final defense will be completed.**	**2/27/2022**
Progress Update and End of Course	**Canvas Assignment**	**Progress Update: Finishing revisions and sending and update with unexpected barriers to chair.**	**3/4/2022**
Final Edited Assignment	**Final IR project sections 1 - 5 with Appendices**	**Submission of final IR project**	**3/4/2022**

Appendix E

Figure 1

PRISMA Flow Diagram



Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. PLOS Medicine 2021;18(3):e1003583. doi: 10.1371/journal.pmed.1003583