The Effect of a Pain Management Education Session on Knowledge and Attitude in Managing Nonmalignant Chronic Pain and Safe Opioid Prescribing Practices

by

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Abstract

**Background:** Chronic pain significantly impacts individuals physically, emotionally, and financially. The management of chronic pain is a complex, multi-faceted issue that includes the risk of opioid addiction and often requires a multi-disciplinary approach. Despite the numerous available treatment options, the number of patients requiring pain medications has continuously increased along with doubling overdose cases. Lack of knowledge and confidence of providers to manage chronic pain effectively and safely have been identified as barriers to poor patient outcomes in this population. Appraisal of the curriculum for healthcare providers, including family nurse practitioners (FNP), identified gaps in pain management content, including addressing various modalities to support successful pain management and appropriate risk mitigation strategies for safe prescribing practices. **Purposes/Methods:** A quasi-experimental one-group pre-test/post-test study was conducted to evaluate the effects of a 4-hour didactic and hands-on educational session on FNP students' knowledge and attitude regarding chronic pain management. The effects of the educational session were measured using a modified Knowledge and Attitudes Survey Regarding Pain (KASRP) at both pre- and post-intervention. A paired, two-tailed *t*-test evaluated the effect of the educational session with a *p-value* < 0.05. **Findings:** The total KASRP scores and KASRP knowledge scores improved after the educational session, increasing from 71.7% to 77.7% correct ($p = 0.0071$) and 62.1% to 71.7% correct, respectively. However, the post KASRP score remained suboptimal, with less than 80% correct, consistent with findings from other studies. Students in the younger age group and those with less RN experience exhibited greater improvement in knowledge and overall KASRP scores than their counterparts. Also, students with prior addiction training had a more significant increase in knowledge (from 57.8% to 75.7%) and overall scores (from 70% to 80%) after the intervention,

compared to those without previous addiction training. **Clinical Implication/Conclusions:** This study concluded that higher overall and knowledge scores of chronic pain management do not correlate to more years of RN experience. Additionally, these findings suggest that a single educational session may not be sufficient to achieve the optimal level of knowledge and skills when managing chronic pain. Repetition of material is critical to achieving optimal knowledge and skill acquisition of chronic pain management. Furthermore, attitude persuasion was more complicated than increasing knowledge.

*Keywords*: chronic pain, chronic pain management, nursing educational interventions, knowledge, attitudes, nurse practitioner students, Knowledge and Attitude Survey Regarding Pain (KASRP)

## Dedication

I dedicate this endeavor to my family. To my husband, Rush, where do I begin? You have been instrumental in completing this work. Your unfailing support, strength, prayers, and love throughout this grueling process encouraged and motivated me at my weakest moments. God truly blessed me with you, and I am thankful to have you as my partner and best friend. For my children, you have been my continuous cheering section, always inspiring me to "just finish, mom." Thank you for your sacrifice and unconditional love, even when I wasn't so lovable. To my parents, thank you for your unfailing love, support, and for always being my sounding board when I just needed someone to listen. You taught me always to strive to be the best I could be and the work ethic to conquer whatever challenges I faced. Those life lessons have been invaluable and ones I hope to pass to my children through this process. Gina, I cannot express how much you have impacted my life over the last several years. I am grateful to you for teaching me the importance of caring for those with chronic pain and entrusting me to care for you. To my dear friends, I cannot tell you how your prayers, texts, meals, love, and encouragement uplifted me when I needed it the most. Thank you for listening to my incessant rambling and brainstorming about chronic pain, my project, and yes, my paper for the thousandth time, even though it didn't mean anything to you. You all have been such an instrumental part of my journey. I know that without God's grace and all of you, I would not be here today.

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## Chapter 1: Introduction

Chronic pain significantly impacts individuals physically, emotionally, and financially. There is also a financial burden to society with the rising cost of healthcare, increasing hospitalization rates, emergency room visits, and lost workdays. The management of chronic pain is a complex, multi-faceted problem that involves the risk of opioid addiction and often requires a multi-disciplinary approach. The number of controlled substances prescribed in the United States has increased by more than 300% between 1999 and 2010 (Betses & Brennan, 2013). Similarly, in the last 25 years, the number of opioid prescriptions has tripled from 75 million in 1991 to 259 million in 2012 (Hooten, Eldrige, Moeschler, & Pearson, 2016). With the rise in controlled substance prescriptions, the number of overdoses has doubled from 6.0 per 100,000 in 1999 to 13.8 in 2013 (Paulozzi, Strickler, Kreiner, & Koris, 2015).

Several factors have contributed to the rise in the number of controlled substance prescriptions written and overdoses. One explanation for this increase is a shift in patient care focused on managing pain (Betses & Brennan, 2013). In the mid-1990s, professional organizations, including the American Pain Society, launched campaigns for improving pain measurement. Pain became the fifth vital sign, and those movements led to increasing awareness among healthcare professionals that patients with pain must be better identified and managed more appropriately (Mandell, 2016; Nuseir, Kassab, & Almomani, 2016). The American Pain Society highlighted the importance of consistently assessing pain in patients in physician offices and the postoperative setting (Mandell, 2016). The Joint Commission of Hospital Accreditation also emphasized the importance of measuring pain values, accepting the self-report of the patients' pain, and treating it like other vital signs (Mandell, 2016). Management of pain has been considered an essential element of patient satisfaction by patients as well as an indicator of

quality care. With this shift, the pendulum has swung to the overtreatment of pain with controlled substances, resulting in an inappropriate number of opioids prescribed.

Another reason for the increase in the over-prescribing of opioids is, in part, due to the limited availability of providers competent in the management of pain combined with the rise in numbers of patients with chronic nonmalignant pain (Toye, Seers, & Barker, 2017). Multiple studies reported deficiencies in healthcare providers' knowledge and competencies in managing patients with chronic pain (Duke, Haas, Yarbrough, & Northam, 2013; Kumar et al., 2011; Schreiber et al., 2014). Additionally, providers also exhibit widespread dissatisfaction with their lack of confidence in managing chronic pain and uncertainty in appropriate prescribing practices (Alford et al., 2019; Ebbert et al., 2018; Jamison et al., 2016; Pearson et al., 2017). The lack of a standard curriculum on chronic pain management and safe opioid prescribing practice in healthcare programs is noted despite the extreme rise in the prevalence and the severe social and individual impacts of chronic pain (Toye et al., 2017). Studies also showed that general or family practitioners prescribed greater than 40% of opioids, although most of those providers reported insufficient formal training in proper prescribing practices (Hooten et al., 2016). The lack of available providers to proficiently manage chronic pain leads to adverse outcomes for patients and increased risk of addiction and overdose.

Appropriate chronic pain management with safe opioid prescribing practice is critical to improving patient outcomes by supporting pain control, maintaining functionality, and preventing job loss while decreasing the risk of addiction and overdose. Providers in primary care settings must be competent in using proper medications and risk mitigation strategies to manage chronic pain while preventing over-prescribing and overdose of analgesics.

## Purpose of the Study

The purpose of this study was to examine the effect of a 4-hour education session addressing chronic nonmalignant pain management and safe opioid prescribing practices on family nurse practitioners (FNP) students' knowledge and attitude. The educational intervention included didactic and hands-on sessions. The education session's effects were evaluated by comparing knowledge and attitude in managing chronic nonmalignant pain scores among nurse practitioner students before and after the intervention.

The PICO question of the proposed study is as follows: In FNP students (Population), does the completion of a chronic pain management education session (Intervention) affect the knowledge and attitude (Outcomes) of managing patients with chronic nonmalignant pain when compared with the pre-intervention baseline (Comparison)?

The null hypothesis is as follows: The educational session will not affect the FNP students' knowledge and attitude. This project's alternative hypothesis is the following: The educational session will affect the FNP students' knowledge and attitude.

## Conceptual Framework

Patricia Benner's theory of "novice to expert" shows how "nurses develop skills and understanding of patient care over time through a proper educational background as well as a multitude of experiences" (Petiprin, 2016, para. 3). This theory shows how the educational background contributes to the practitioner's abilities to develop higher level competencies in conjunction with past experiences. The application of knowledge attained in the classroom to the clinical area of expertise leads to an intuitive sense of what needs to happen based on past experiences, confidence, and education.

The five levels of competency in this theory include novice, advanced beginner, competent, proficient, and expert. The novice nurse is rule-guided and has an inadequate ability to anticipate future problems with certain patient situations. The subtle changes in patients will go unrecognized by the novice nurse. The advanced beginner nurse has some experience and can recognize patterns and associate symptoms in clinical situations. At this level, the nurses still rely on guidelines and rules and are slightly less restricted but remain inflexible with the treatment plan. The competent nurse responds to subtle changes and has an awareness of patients' potential outcomes based on experiences. At this level, the nurses do not exhibit proficient nurses' speed and responsiveness but can approach situations with more confidence based on exposure to more patients. At the proficient level, the nurse is capable of examining a patient with a holistic approach. Based on past experiences, this nurse can correlate the changes in a patient's condition with an expected outcome allowing her to make better-informed decisions. The nurse at the expert level does not lean on rules or guidelines to make decisions. Instead, this nurse has the inherent ability to react appropriately, quickly, and without research or guidance to certain patient situations (Petiprin, 2016).

Nurse practitioners are expected to practice at the advanced beginner stage of the theory when graduating from their respective nurse practitioner programs of study. However, as they progress with patient care opportunities and their careers, they should grow to more advanced competence levels and then expert professionals (Petiprin, 2016). Providers must not remain stagnant in their knowledge but continue to investigate, research, and advance with the ever-changing treatment options, medications, and chronic musculoskeletal pain management. While not every nurse or nurse practitioner will attain the expert level in a field of practice, this theory

shows the level of attainment possible with clinical experience and exposure to different situations.

**Theoretical Definition of the Study Variables**

*Medical knowledge* is defined as "an investigative and analytical approach to clinical problem solving and knowledge acquisition, with the ability to apply medical knowledge to clinical situations, and an ability to teach others" (Medical knowledge, 2016, para. 5). Nurse Practitioners must display more than familiarity with pain management. Based on acquired knowledge from academia, they must also translate the ever-evolving information appropriately to clinical situations to manage the complexity of chronic pain.

*Attitude* is a "tendency, based on one's beliefs and experience, to react to events in certain ways and approach or avoid events that confirm or challenge personal values" (Attitude, 2011, para. 3). The patient-practitioner relationship is essential to the proper management of pain. In many instances, if there is a strain in the relationship between the patient and provider, the patient will most often not follow the prescribed treatment plan. A practitioner must be up-to-date with the knowledge and evidence-based practice-guidelines and exude an attitude of acceptance and confidence in the knowledge obtained through the educational process to convey the treatment plan adequately to patients.

## Chapter 2: Literature Review

### Search Strategies and Outcomes

A search was conducted using the Cumulative Index to Nursing and Allied Health Literature, PubMed, Medline, and Google Scholar. The purpose of the initial search was to look for evidence of educational interventions' effectiveness on the knowledge and attitudes on chronic pain management of nursing students, nurse practitioner students, and medical students. Given the limited research available on the topic that included students, a second search was performed involving healthcare professionals. Studies included (a) published peer-reviewed articles written in English, (b) were conducted in health-related program students or healthcare providers, (c) where the educational intervention focused on chronic nonmalignant pain with the use of opioids, and (d) studies completed between 2010 and 2020. Study exclusions included educational interventions involving the following populations: pediatrics, geriatrics, malignant (cancer) pain, acute pain, post-surgical pain, and long-term care facility residents.

The search revealed 1,295 articles. Additionally, 35 articles were identified through reference tracking strategies. After reviewing the title and abstracts, removing the duplicate studies and the ones irrelevant to the topic, 63 items remained. Among the remaining research articles, the full reports were obtained and reviewed for appropriateness. See Appendix A for further details regarding the study selection process.

Among the studies, a total of 13 studies (N = 13) met the inclusion criteria and were incorporated for the final analysis, including two systematic reviews, three quasi-experimental studies without randomization, one observational cohort study, five descriptive survey studies, one chart review, and one qualitative study. See Table 1 (Appendix B) for study summaries on chronic pain management and safe opioid practice. Additionally, the pain management best

practices inter-agency task force report, published by the United States Department of Health and Human Services (2019), and the Centers for Disease Control (CDC, 2016) guidelines for managing chronic pain were also appraised and included.

**Synthesis of Evidence**

Numerous reports established an increase in opioid overprescribing, related overdose, and deaths when managing chronic pain. The CDC (2016) and the Pain Management Task Force (2019) recommended guidelines for chronic pain management and safe opioid prescribing practice with appropriate risk mitigation strategies to address the public health crisis. However, overwhelming evidence from the literature reviewed demonstrated a continued gap in providers' knowledge of appropriate chronic pain management and lack of compliance with the recommended guidelines for chronic pain management, therefore hindering the patient-provider relationship leading to declining quality patient care and outcomes (Alford et al., 2019; Duke et al., 2013; Ebbert et al., 2017; Jamison et al., 2015; Kumar et al., 2011; Schreiber et al., 2014). Despite sufficient evidence on the gap of providers' knowledge, there is limited research that examined the effects of educational interventions on chronic pain management among graduate nursing students, medical students, or healthcare providers, which lends to the importance of performing this research. The proposed study aimed to address that research gap.

**Chronic Pain and its Impact**

Chronic pain is defined as any pain lasting more than three months or longer than the expected healing time for the specific injury (Chronic Pain Information page, 2019). Chronic pain can occur after an injury or without specific causes (Rash et al., 2018). Many comorbidities and complications often accompany chronic pain, including fatigue, sleep disturbance,

hypertension, anxiety, depression, other mood disorders, lack of productivity, job loss, low self-esteem, and hopelessness, contributing to pain management's challenges (Duke et al., 2013).

Chronic pain also brings financial burdens to the patient as well as his/her family. According to the Institute of Medicine (2011), "approximately 100 million U.S. adults are affected by chronic pain, which accounts for the cost of $560-635 billion annually including direct medical costs and the lost productivity" (p. 2). The large volume of patients who experience chronic pain has led to an increase in the number of prescription drugs written by family practitioners to help manage the pain and improve the patient's functionality. However, the increase in pain medications has led to abuse, overdose, and, therefore, a public health crisis (National Institute on Drug Abuse, 2019). Healthcare providers must diligently seek opportunities to combat the opiate crisis and bridge the knowledge gap, therefore decreasing the risk of overprescribing medications.

**Barriers to Appropriate Chronic Pain Management and Safe Opioid Prescribing Practice**

Pain is a subjective feeling that leads to difficulty with describing precisely how the pain feels. The struggle with explanation often contributes to misunderstandings and miscommunication between the provider and the patient. The inability to communicate effectively produces an increase in the patient and the provider's stress, leading to providers' reluctance to manage this complicated problem. Several studies demonstrate large percentages of providers exhibit insufficient knowledge and attitudes in prescribing practices and show widespread dissatisfaction in their practice when managing chronic pain (Alford et al., 2019; Ebbert et al., 2018; Jamison et al., 2016; Pearson et al., 2017). The displeasure and fear in managing chronic pain by healthcare providers often leads to the reluctance and refusal of opioid

prescribing. Therefore, pushing the patient to seek alternative pain relief measures, including illicit drug use and risky lifestyle choices.

**Lack of knowledge of providers.** Various studies revealed the lack of knowledge of healthcare providers regarding the management of chronic nonmalignant pain. Nusier, Kassab, and Almomani (2016) assessed the overall understanding of pain management among 662 providers surveyed was 28.7% using a 14-item knowledge measurement questionnaire. Among the providers who completed the survey, 60% were nurses, 27% physicians, and 9% pharmacists. The mean of correct responses was 46.6%, with medical doctors scoring 36.1%, pharmacists with 35.5%, and nurses with 24.1% accurate. The weakest area of knowledge was pharmacology, mainly narcotics/opioids. There was also a significant inadequacy of knowledge about the differences between tolerance and dependence and acute versus chronic pain noted (Nusier, Kassab, & Almomani, 2016).

Similarly, multiple other studies reported a lack of knowledge in managing chronic pain among healthcare providers. In one study, 56 primary care providers demonstrated common opioid knowledge on the Test of Opioid Knowledge, with results showing 17.2 out of 25 (68.8%) items correct (Jamison et al., 2016). The participants included in this study comprised 78.6% internal medicine physicians, 14.3% nurse practitioners, and 7.2% physician assistants (Jamison et al., 2016). Another study of 131 non-pain specialty providers attending a continuing medical education seminar revealed almost identical scores of 69% correct on the 18 questions regarding opioids, with scores of 72% correct on the 32 non-opioid treatment questions and 74% accurate on the seven medicolegal opioid items (Pearson, Eldridge, Moeschler, & Hooten, 2016). Furthermore, another study showed that 40% of more than 700 family medicine providers could only answer two of nine items on a knowledge assessment of opioids correctly (Rash et al.,

2018). While several studies evaluated healthcare providers' knowledge either at continuing education conferences or in practice settings, there is limited research available investigating educational intervention's effectiveness by administering a pre- and post-education survey.

**Lack of confidence of providers.** The lack of healthcare providers' confidence to handle the complexity of chronic pain properly is another significant barrier to effective pain management (Compton & Blacher, 2019; Duke et al., 2013). Only 47% of clinicians expressed confidence when providing care to patients with chronic noncancer pain (Ebbert et al., 2018). Another study revealed 60.8% of the 69 providers did not feel proficient in overseeing patients with chronic pain (Pearson et al., 2017). In a report by Jamison et al. (2016), eight nurse practitioners affirmed inadequate training and deficiency in confidence in treating chronic pain. Similarly, Rash et al. (2018) noted that 54% of primary care providers studied in Massachusetts expressed inadequate preparation in prescribing opiates. The lack of confidence resulting from inexperience, insufficient knowledge, and training in managing chronic pain has led to overprescribing and inappropriate patient management.

**Lack of standardized curriculum.** In 2019, the Pain Management Task Force recognized the importance of integrating comprehensive content on pain management in the curriculum so that providers can receive evidence-based education and feel more confident with prescribing medications and appropriate risk mitigation strategies (U.S. Department of Health and Human Services [USDHHS], 2019). In their report, among the over one million practitioners licensed to prescribe scheduled drugs, less than 20% of prescribers were found to have education on the proper prescribing practices of these high-risk medications (USDHHS, 2019). The Pain Management Task Force further discussed the benefits and best practice recommendations for aligning healthcare curriculums with core competencies in pain

management for prelicensure, post-licensure, and providers at the practice level (USDHHS, 2019). Despite those recommendations, professional organizations did not issue standard guidelines on the number of hours necessary or the specific content requirements warranted to exhibit competence in pain management.

**Gaps in Healthcare Students' Competencies of Chronic Pain Management**

Students need expanded educational offerings on chronic pain. Multiple studies focusing on nursing students revealed the lack of adequate knowledge of pain management upon completing their undergraduate program of study. Plaisance and Logan (2006) measured pain management knowledge among 313 nursing students from associate and baccalaureate programs, showing students, on average, answered 64% of knowledge questions correctly. One of the most significant weaknesses identified was pharmacology, including the adverse effects of medications and the best prescribing methods. Similarly, Al-Khawaldeh et al. (2013), in their study among 240 baccalaureate nursing students in Jordan, reported a low average score of 34.1% on the Knowledge and Attitude Survey Regarding Pain (KARSP), revised edition.

Additionally, Duke et al. (2013) investigated the pain management knowledge of 162 baccalaureate students and 16 nursing faculty members and reported that both groups demonstrated an inadequate understanding of managing pain. The average KASRP score was 22.4 out of 36 correct (62.2%) among the participants, with senior nursing students responding correctly on merely 68% of the items and faculty accuracy of 71%. Although there was no significant difference between the senior-level students and the faculty, there was a considerable increase of knowledge between the first semester junior-level students and the faculty (59.7% vs. 71%; $p < 0.05$). Congruent with previous studies, the most frequently missed questions were related to pharmacology. With the generally accepted score for the KASRP being 80%, the

results showed that the knowledge level of chronic pain management in baccalaureate students and faculty is suboptimal, requiring more training (Duke et al., 2013).

Medical students confirmed a lack of knowledge and confidence regarding managing patients with chronic pain, including effective treatment protocols. A group of 70 medical students, divided into six focus groups, revealed that they were uneasy with the diverse management of pain among multiple providers and unsure when converting dosages from one medication to another (Tellier et al., 2013). The students also expressed the need for further instruction and exposure to additional clinical scenarios to improve knowledge and confidence (Tellier et al., 2013). As nursing students, the medical students showed a lack of knowledge and confidence, requiring the need for enhanced education on pain management in the curriculum in healthcare education programs. However, there were no recommendations by accrediting institutions or professional organizations regarding the content, subject matter, or appropriate training, placement, or timing of the pain management integration in the curriculum of healthcare providers.

**Educational Interventions to Improve Chronic Pain Management Competencies**

Although limited research is available evaluating the effects of education on knowledge and attitudes of FNPs regarding chronic nonmalignant pain, one can conclude the effectiveness of incorporating pain management education in healthcare programs of study (see Appendix C, Table 2). Duke et al. (2013) noted that pain management content was embedded in every nursing program semester, as evident in the difference between the junior-level (59.7%) and senior-level student scores (68%). Another study revealed higher scores in students who had received additional pain training than those who had not (M = 35.8% and M = 31.3%) (Al-Kawaldeh et al., 2013). Although the average scores show improvement with a self-report of

additional pain training, there is no further explanation of what supplementary education was included.

The lack of knowledge on pain management is a global problem, noted in the literature by an Ethiopian University Hospital (Germossa, Sjetne, & Helleso, 2018). A pre- and post-survey education session was offered to 165 nurses, of which 111 completed both pre- and post-surveys (Germossa et al., 2018). The pain management educational material was presented in three ways: (a) two successive days of face-to-face education totaling 16 hours of learning, (b) reading materials supplied to the participants, and (c) an 8-hour repeat training in 4 weeks (Germossa et al., 2018, p. 2). The results revealed that 98.2% of the participants exhibited a substantial increase in pain knowledge after the education (Germossa et al., 2018, p. 2). While the average correct scores increased from pre-survey (41.4%) to post-survey (63%), it remains unclear which portion of the education was most impactful, as there was indeterminant information available to assess the effectiveness of individual education components (Germossa et al., 2018, p. 5). Although this study concluded the impact that educational interventions have had on nurses' knowledge of pain, there is a need for further works to substantiate specific pain instructional materials required to increase the knowledge level above the accepted passing rate.

**Current Clinical Practice Guidelines for Chronic Pain Management**

The appropriate assessment and management of nonmalignant chronic pain while ensuring the safe use of opiates is a challenge for providers. Current Clinical Practice Guidelines (CPGs) recommend using opioid-risk assessment screening tools for depression, previous history or family history of a substance use disorder, or prior overdose before beginning opioid therapy for chronic pain (USDHHS, 2019). Several studies addressed the importance of evaluating

CPGs and risk mitigation strategies before and periodically while managing chronic pain (see Appendix D, Table 3).

After obtaining a thorough history and physical, establishing an individualized care plan is essential and must be discussed in detail with the patient and caregivers (CDC, 2016). Initial treatment plans include but are not limited to the following options: physical therapy, exercise management, cognitive behavioral therapy, injections, and non-opioid medication management. Before initiating opioid therapy, the provider and patient must develop realistic goals for functionality and pain control and discuss the risks versus benefits of potential medications prescribed (CDC, 2016). Honest and open communication with shared decision-making is essential to the effective management of pain.

The CDC guidelines continue with recommendations for selecting appropriate medications to manage not only acute but chronic pain conditions (CDC, 2016). The medication management strategies must be on a case-by-case basis and not a one-treatment-plan-fits-all approach. Patients need to be active participants in their care and acknowledge all of the treatment plan's risks versus benefits as prepared. When prescribing medication, the first step is to use non-opioid options before moving to an immediate-release low-dose opioid, especially when managing mild to moderate pain (CDC, 2016; USDHHS, 2019). When the patient requires daily medication management for moderate to severe pain, the recommendations are to keep the Morphine Milligram Equivalent (MME) less than 50 and not exceed 90 MME per day. When daily dosing with higher dosages of opioid medications are required, an appropriate justification and documentation of the risks versus benefits of higher doses of medicines should be in place (CDC, 2016).

Lastly, the CDC (2016) recommends using caution with the concomitant use of benzodiazepines with opiates due to the increased risk of respiratory depression. If both medications are necessary, there must be appropriate justification and documentation of the combined therapy risks versus benefits. The guidelines also recommend a prescription of Naloxone for those patients and the patients on higher than 90 MME per day to minimize the risk of respiratory depression (CDC, 2016). Education for the patient and the family regarding the use of Naloxone is essential for emergencies as well (CDC, 2016; USDHHS, 2019). Additionally, the guidelines encourage providers to be aware of available treatment resources for patients seeking care for opioid use disorders (CDC, 2016).

The Pain Management Best Practices Inter-Agency Task Force (USDHHS, 2019) advises providers to consider an individualized approach and use caution when implementing the guidelines regarding removing benzodiazepines for patients and using proper medical judgment when adjusting or tapering medications. The Pain Management Task Force (2019) reiterated the importance of an individualized plan of care based on patient-specific situations while considering the recommended guidelines for opioid prescribing (USDHHS, 2019). When it is necessary to prescribe benzodiazepines simultaneously with opioids for pain, it is recommended to justify actions contrary to the guideline's intent (USDHHS, 2019). Again, the patient plan of care is individualized, and the recommendations are not a mandatory set of rules without provider consideration of each patient situation. Proper communication with the patient and caregivers and appropriate documentation is vital in establishing, reviewing, and updating the plan of care.

The CDC (2016) and the USDHHS (2019) identified the major components of safe opioid prescribing practice, including risk assessment, medication prescribing and monitoring,

patient education, and proper storage and handling of medicines for those with chronic nonmalignant pain. The details are as follows:

- training on the appropriate handling and disposal of unused medications, including the safe-keeping of prescribed drugs;
- discussing and prescribing Naloxone for those with high-risk factors, such as a history of overdose, higher doses of medications (> 90 MME), or the use of benzodiazepines in conjunction with opioids;
- frequent monitoring for adverse effects of medications, the risks of overdose, addiction, tolerance, dependence, and drug diversion;
- establishing patient contracts, collecting urine drug screens, and utilizing prescription monitoring programs (PMP) according to state regulations;
- properly converting dosages and calculating the MME, continuing education requirements, and ensuring patient awareness of the plan of care with suitable goals for the management of their pain (CDC; 2016; Hudspeth, 2016; U.S. Department of Health and Human Services, 2019).

All of the above listed elements are essential protocol requirements to consider during a routine patient visit for chronic pain management.

Additionally, CPGs have also been established by the U.S. Department of Veterans Affairs and the U.S. Department of Defense, incorporating a biopsychosocial model of managing chronic pain. This model stressed the importance of a multimodal and multi-disciplinary stepped care approach to ensure the collaboration of the pain management team (USDHHS, 2019). The practice guidelines stressed five areas of the biopsychosocial model: (a) medications, (b) restorative therapies, (c) interventional procedures, (d) behavioral health approaches, and (e)

complementary and integrative health (USDHHS, 2019). Appropriate referral and collaborative care, including physical therapy, complementary medicine, mental health, and addiction services, should be considered to manage pain when available to improve patient outcomes.

**Gaps in Current Pain Management Practice and Safe Opioid Prescribing Practice**

The CDC pain management guidelines have been readily available since their inception in 2016. However, there are still gaps in implementing risk mitigation strategies when evaluating and managing patients with chronic pain. Ebbert et al. (2018) reported that among a group of 961 providers, which consisted of medical doctors (65%) and nurse practitioners/ physician assistants (35%), only 67% were familiar with the 2016 CDC recommendations. Of those aware of the guidelines, 74% reported they abide by the CDC's directives. A total of 55% were registered in their state PMP program, and 98% of all providers rarely or never prescribed Naloxone to prevent overdose. Of those aware of the CDC guidelines, 44% prescribed opioids and benzodiazepines together, and 68% were more concerned about the potential for addiction than managing the patient's pain and functionality (Ebbert et al., 2018).

Similarly, Alford et al. (2019) discussed the necessity of further education and training using five specific risk mitigation practices related to chronic pain management and opioid use. In the participants from the Safe and Competent Opioid Prescribing Education (SCOPE) conference over 3 years, Alford et al. (2019) conducted a survey study evaluating providers' prescribing practices for chronic pain management in the following five measurements: (a) establishing a patient-provider agreement on appropriate opioid use and risk mitigation strategies, (b) discussion of the importance of taking medications exactly as directed (no more or less), (c) instruction on the safe handling practices of the drug, (d) risks of potential adverse effects (addiction, tolerance, dependence, overdose, or respiratory suppression), and (e)

clarifying the methodology to prevent abuse by conducting urine drug screens, random pill counts, and review of the PMP (Alford et al., 2019).

A total of 6,889 providers from all 50 states participated in the project. Seventy percent of participants were physicians, 20% nurse practitioners, and 10% physician assistants. Almost three-fourths (71%) of the included providers practiced in family practice or internal medicine office. Among those, 68% of the practitioners self-reported they conveyed the use of four of five guidelines on "most or all patients," and only 28% completed all five procedures for all patients (Alford et al., 2019, p. 910). Analysis of the compliance rate for five practice measures with "most of the patients" ranged between 70% and 94%. The lowest score was implementing a patient-prescriber agreement (70%), and the highest-scoring was for emphasizing the importance of taking medications as instructed (94%). The compliance rates for "all" patients were significantly lower, ranging from 51% to 79%: the highest being medication instruction (79%), followed by risk/side effect education (66%), patient-provider agreements (54%), safe opioid-practice measures (53%), and the lowest was storage-discard education (51%) (Alford et al., 2019). These findings indicate that despite the presence of safe opioid prescribing practice guidelines, there is a lack of adherence to the risk mitigation strategies among providers. Integrating education on pain management into healthcare providers' curriculum along with continuing education is critical to reinforce the compliance of the safe opioid prescribing practice.

In a retrospective chart review of 50 patients, Creech et al. (2011) examined nurse practitioners' practice and chronic pain management in uninsured patients. The study assessed various treatments provided for pain management performed by nurse practitioners and the documented utilization of risk mitigation strategies. The study revealed that 45 of the 50 patients

received opioids. Of those, 88% had a patient-provider agreement in place and had received an order for physical therapy. Although almost all of the patients had been prescribed opioids, only eight patients (16%) had any documentation of nonpharmacologic measures offered. Likewise, only 14 of the 50 (28%) received a referral to specialists (pain management clinic, surgery, neurology, chiropractic care) to manage their pain. Some possible reasons for the small percentage of patients referred to a specialist included lack of funding, inability to travel to a specialist, or oversight in the provider's documentation (Creech et al., 2011).

As part of evaluating a patient with chronic nonmalignant pain, the Pain Management Task Force recommends implementing the assessment and management of depression using a depression screening tool (USDHHS, 2019). Creech et al. (2011) observed that 20 percent were concomitantly given an antidepressant while managing chronic nonmalignant pain. However, the author did not identify screening tools to aid in diagnosing depression in this population. Although there was also no documentation regarding any other stressful life events that could lead to depressive symptoms, there was documentation of a discussion concerning current or past use of substances. In the same study, patients with chronic pain self-reported the use of alcohol in 56% of the patients, 64% used tobacco, and 40% reported using illicit drugs. Patients who experience chronic pain tend to present other concurrent comorbidities, which can also, in return, exacerbate the pain issues. Holistic approaches are required in chronic pain management since it holds a complex level of assessment and management of physical, emotional, and social health.

## Future Directions to Improve Chronic Pain Management and Safe Opioid Prescribing Practice through Curriculum Reform

Education reform is essential to the improvement of assessing and managing patients suffering from chronic pain. The significant gaps in the providers' knowledge of pain

management and prescribing practices regarding controlled substances that lead to ineffective pain management have been observed and identified as barriers to providing effective chronic pain management (Alford et al., 2019; Darnall et al., 2016; Jamison et al., 2016; Hooten et al., 2016; Institute of Medicine, 2011; Nuseir, Kassab & Almomani, 2016; Schreiber et al., 2014; Tellier et al., 2013). In 2011, the Institute of Medicine issued a report concluding that healthcare professionals lack training and clinical expertise in understanding the best evidence-based prevention and treatment options available for the management of patients with chronic pain. The Nurse Practitioner Healthcare Foundation (2017) reiterated the importance of including core competencies in chronic pain management in healthcare curricula by integrating standardized pain management educational content into nurse practitioner programs. Similarly, in 2018, the American Association of Colleges of Nursing recognized the importance of including the goal that all nursing programs implement an enhanced pain management curriculum to combat the opioid crisis (Compton & Blacher, 2019).

Multiple research studies agree that the barriers to effective pain management include, but are not limited to, knowledge level, the ability to translate the knowledge into clinical application to control pain, and insufficient confidence to manage this complex dilemma (Alford et al., 2019; Duke et al., 2013; Kumar et al., 2011; Nuseir, Kassab, & Almomani, 2016; Schreiber et al., 2014; Tellier et al., 2013). Curriculum changes need to be geared more toward the clinical applications and proper use of opioids than the medicolegal aspects of pain (Hooten et al., 2016). Appropriate knowledge base and clinical application of best practice evidence can significantly improve pain management and patients' quality of life.

The education program curriculum for health providers, including nurse practitioners, should include pharmacotherapy and non-pharmacological multimodal therapy options for

effective chronic pain management. The curriculum should also address the five significant components of safe opioid prescribing practice strategies recommended by the CDC (2016) and the USDHHS (2019), including risk assessment, medication prescribing and monitoring, patient education, and the proper storage and handling of medicines in chronic nonmalignant pain management.

The pre- and post-doctoral programs of study need to transform their curriculum, incorporating more content on the psychological aspects of pain and pain management (Darnell et al., 2016). Graduate education for healthcare providers should embrace a holistic approach to pain management with its impact, significance, risks to physical and mental health, and patients' quality of life. In terms of education timing, O'Rourke et al. (2007) observed that primary care providers who were most comfortable with the comprehensive management of chronic pain had received additional educational programs after residency, stressing the importance of additional education after residency.

**Literature Review Summary**

The literature on pain management is vast. Overwhelming evidence from the literature concluded a consistent gap in providers' knowledge and compliance with the recommended guidelines for chronic pain management (Alford et al., 2019; Duke et al., 2013; Ebbert et al., 2017; Jamison et al., 2015; Kumar et al., 2011; Schreiber et al., 2014). The knowledge gap is hindering the patient-provider relationship leading to declining quality patient care and outcomes. Despite sufficient evidence on the lack of providers' knowledge, there is limited research that examined the effects of educational interventions on chronic pain management among graduate nursing students, medical students, or healthcare providers, which lends to the importance of performing the proposed research.

Changes in education and curriculum are inevitable. However, consensus does not exist on how to achieve the final educational goal related to pain management. Currently, there are recommendations regarding the incorporation of pain management content in prelicensure nursing programs according to the Interprofessional Consensus of Core Competencies (Herr et al., 2015). Still, no such guidelines are available for advanced practice nurses (Compton & Blacher, 2019). There are limited research studies available regarding incorporating an intervention in the pain management curriculum of post-graduate programs.

In this project, a 4-hour education session on chronic nonmalignant pain management and safe opioid prescribing practices was developed and included as part of the on-campus workshop for family nurse practitioner students. The guidelines set forth by the CDC (2016) and the best practice recommendations by the Pain Management Task Force (USDHHS, 2019) guided the development of the course content. The session's effectiveness was evaluated by comparing nurse practitioner students' knowledge and attitude with a pre- and post-education session survey.

# Chapter 3: Methodology

## Study Design

A quasi-experimental one-group, pre-test/post-test study design was selected to examine the effects of an education session addressing chronic nonmalignant pain management and safe opioid prescribing practices on FNP students' knowledge and attitudes. The educational session included a 4-hour pain management education program, including didactic and hands-on skills training for students enrolled in Radford University's graduate nursing programs. See Appendix E for specific topics and educational objectives covered during the session. The participants' knowledge and attitude were measured before and after the educational session to examine the intervention's effectiveness using the Knowledge and Attitudes Survey Regarding Pain (KASRP) survey, developed by Ferrell and McCaffery (2014). The researcher informed the students that the educational workshop was part of the FNP curriculum and was not a portion of the research. Only the demographic and the pre- and post-surveys were considered part of the study.

## Study Subject & Settings

The project included a convenience sample of all 26 FNP students from Radford University or Radford University Carilion, including full-time and part-time students attending a master or doctoral level nurse practitioner program. Therefore, a power analysis was not calculated. The students attended and completed the chronic pain management educational session as a part of the FNP primary care office procedure intensive workshop offered in the fall semester of 2020 and were invited to complete the surveys. The educational offering included lectures, clinical scenarios, and hands-on sessions. The study subjects consisted of full-time and

part-time FNP students in either a master's or doctorate program of study. Post-Masters-DNP students who were currently practicing FNPs were excluded from this study.

**Intervention and Procedures**

**Preparation phase.** Verbal agreement from the FNP Program Coordinators at Radford University and Radford University Carilion was received, allowing implementation of the study during the fall semester. An official letter of support was then attained to implement the study project from Dr. Iris Mullins, interim Director of the School of Nursing at Radford University (Appendix F). Radford University's Institutional Review Board (IRB) approval was obtained before implementing the study (Appendix G).

**Recruitment.** Radford University's family nurse practitioner program commonly provides a workshop of standard primary care office procedures, including suturing, chest x-ray interpretation, dermatology procedures, orthopedic procedures, and joint injections. The 4-hour chronic pain management education session was a portion of the FNP intensive workshop as a face-to-face, group session. Before delivering the chronic nonmalignant pain management educational session, a member of the research team explained the study overview, procedures, time to complete the survey, educational offering, risk, benefit to the students, and the voluntary nature of participation before attaining informed consent. The students were notified that participating in the educational session is a part of the curriculum, and the survey was the only part of the research. The students were also informed of the voluntary nature of participation, and there would be no penalty for not participating in the research study. Completion of the survey served as informed consent. See Appendix H for the recruitment script.

**Pre-survey.** The research portion of the study only included the pre- and post-survey. The survey was anonymous without the collection of any human-identified information. A

preassigned study identification number was placed in the right upper corner of the demographic data and the pre- and post-survey pages, serving as a specific participant code to complete the surveys. The FNP students also received a copy of the informed consent (Appendix I). After reading the informed consent, the participants then completed the demographic information and a pre-survey, including the 30 questions from the revised KASRP tool in the color-coded paper copy (white) before the educational session. Demographic data included age, the highest level of education, years of experience as an RN, previous knowledge with addiction training, and prior pain management education or certification (Appendix J). Gender was removed to deidentify the male student. The pre-survey was collected before the educational session and placed in the provided envelope. The envelope was sealed before being submitted to the researcher. The students had 15 minutes to complete the pre-survey.

**Educational session.** The 4-hour education session on chronic pain management and safe opioid prescribing practice was provided as part of the family nurse practitioner students' intensive workshop. The session included lectures, clinical scenarios with analysis, and a hands-on portion. There was a question and answer opportunity for 15 minutes after the education and before distributing the post-survey.

**Post-survey.** After attending the chronic pain management educational opportunity, the participants were invited to complete a color-coded paper copy of the post-education questionnaire (blue) on chronic pain management. The survey remained anonymous without the collection of any human-identified information. The post-intervention survey was completed and placed in an envelope. The envelope was sealed before being turned in to the researcher. The students had 15 minutes to complete the survey.

## Study Tool

**The knowledge and attitude survey regarding pain (KASRP) tool.** KASRP is an evaluation tool used when assessing educational interventions (Ferrell & McCaffery, 2014). The original tool included a total of 39 questions with 22 true and false questions and 17 multiple-choice questions to measure a true reflection of knowledge and attitudes in the management of chronic pain and safe opioid practice. The evaluation tool was created in 1987 and has undergone several revisions with the advancement of pain management (Ferrell & McCaffery, 2014). The generally acceptable KASRP score indicating adequate knowledge and attitude for pain management is 80% correct (Ferrell & McCaffery, 2014).

The validity and reliability of the KASRP were well established by several pain management associations, including the American Pain Society, the World Health Organization, and the National Comprehensive Cancer Network Pain Guidelines (Ferrell & McCaffery, 2014). "The reliability was established at alpha $r$ >.80 by repeat testing in a continuing education class of staff nurses (N = 60). Internal consistency reliability was established (alpha $r$ > .70) with items that reflect both knowledge and attitude domains" (Ferrell & McCaffery, 2014, para. 2).

The revised KASRP version with 39 questions was modified into 30 questions for the present study to include only questions relevant to nonmalignant chronic pain management. Questions regarding pediatrics or oncology were eliminated in this study due to the irrelevance of the purpose of the educational session. The modified KASRP survey tool includes 19 knowledge questions and 11 attitude questions. Permission to use and modify the KASRP tool was obtained from the authors. See Appendix K for consent and the revised KASRP version.

**Human Protection & Data Security**

The chronic pain management educational session was provided to all FNP students during the on-campus intensive office procedure workshop in fall 2020 as a part of the FNP students' curriculum. The research portion of the study only included the survey. The completion of the questionnaire was voluntary, with no penalty if not completed. Participants were notified of the ability to withdraw from the study at any time in the project process. The students also had the opportunity to ask questions before deciding to participate or not.

No more than minimal risk was involved in the participation of the educational intervention and questionnaire completion. For those that experienced emotional distress from lack of knowledge or past experiences, counseling services were available in the Radford University Counseling Center. No identifiable information was collected, confidentiality was maintained, and privacy was reassured throughout the study. While there were no direct benefits to participating in the research, students were exposed to effective chronic pain management strategies and safe opioid prescribing practices during the education session. The education was evidence-based, incorporating current practice guidelines from professional organizations. Another benefit will be for future generations of students to receive a refined program of study.

Every participant received a color-coded paper copy of the survey, pre-survey (white), and post-survey (blue). The pre- and post-survey were completed anonymously and matched with the study identification number previously assigned and written at the top right-hand corner of the survey. All of the study variables, including demographic information, knowledge and attitude data, and hard copies of the surveys, remained confidential and stored in a locked filing cabinet in a locked room. The data was entered into an Excel spreadsheet and uploaded into the

Radford University H drive on a password-protected computer. Access to any data was limited to the research team only.

**Budget Implemented**

The budget included printed handouts, slides, case studies, and pre- and post-survey hard copies with envelopes, totaling $200 to $250. Computer access was required to present the information to the participants. The program clinical coordinator reserved a classroom on Radford University Carilion's campus to present the workshop's material.

**Timeline Implemented**

The timeline of the project implementation was as follows:

- July 2020; submitted the project proposal for IRB approval
- August 2020; finalized educational course materials, PowerPoint presentation, and case studies
- September 2020; met with the project team and reviewed the information to be presented and scheduled day for the educational session
- October 2020; completed the 4-hour educational offering, collected data, and began data analysis
- October 2020 - December 2020; completed data analysis
- December 2020 - February 2021; finalized data analysis
- March 2021; completed and submitted the abstract and manuscript for presentation and publication
- April 2021; capstone project defense at Radford University School of Nursing

## Sustainability Plan

The project's goal is to incorporate chronic pain management education into the FNP curriculum at Radford University School of Nursing, with the potential for expansion to an interdisciplinary course to advance the overall knowledge of pain management among healthcare providers.

## Evaluation Plan

**Study Variables.** The study's independent variable was pain management education, and the dependent variables were knowledge and attitude in the management of chronic nonmalignant pain. Using the 30 questions correctly answered, the participant's knowledge and attitude were scored as continuous variables between 0 and 30.

**Data Analysis.** Demographic data were described using descriptive statistics frequency and percentage for nominal or categorical variables, and mean and standard deviation for continuous variables. Mean and standard deviation were also used to calculate the nurse practitioner students' knowledge and attitude scores of chronic pain management, measured by the KASRP tool. From inferential statistics, the paired t-test was used to evaluate the effect of the pain management educational session by comparing the means of the pre- and post-survey knowledge and attitude KASRP scores.

Further data analysis was completed using Pearson's *r* correlation test and Linear Regression analysis to evaluate the relationship between the demographic variables, educational background, and the pre- and post-survey KASRP score differences (i.e., "post-minus-pre KASRP score"). The effect size was measured using the correlation coefficient *r* score and Cohen's *d* (standardized mean differences) to measure the level of correlation between variables. The "correlation coefficient *r*" was measured from the *Pearson's* correlation *r* score. The

correlation between two variables is considered minimal if the *r* value is 0.10 to 0.29, medium if the *r* value is between 0.30 and 0.49, and large if the *r* value is greater than 0.5 (Statistics Solutions, 2013). Cohen's *d* value was also measured from the linear regression as the effect size. It is suggested that a Cohen's *d* value between 0.2 and 0.5 is considered "small" effect size, scores between 0.50 and 0.79 are "medium" effect size, and 0.8 or higher has a "large" effect size (Statistics Solutions, 2013). All statistical tests were performed using a two-tailed test with an established significance of $p = 0.05$.

## Chapter 4: Study Results

A total of 26 students participated in the pain management education session as part of the fall FNP intensive workshop. All students were invited to complete the pre-survey, the educational session, and the post-survey. Of the 26 FNP students invited to participate, all students completed the pre- and post-KASRP survey, leading to a 100% completion rate.

### Demographic Characteristics

The participants' mean age was 32.8 ± 8.1 years (range: 24-52), with 46% being 31 years of age or older. More than half of the students (54%) were 30 years old or younger. The average years of RN experience of the 26 participants were 9.1 ± 7.1 years (range: 3-25). Around 31% of the students had 9 years or greater experience as an RN, whereas more than two-thirds (69%) had 8 years or fewer.

Most of the 26 FNP students who participated in the study held a bachelor's degree (92.3%). One student had previously completed a master's degree, and one student held a doctoral degree. More than one-third of the students had previous addiction training (n = 10, 38%) or prior pain management education (n = 10, 38%). However, none of the students had attained any pain management certification.

### Pre-KASRP Score Within Demographic Groups (Table 4 and 5)

The average pre-KASRP total score for the 26 FNP student participants was 21.5 (71.6% correct), with 30 as the highest score. Specifically, the average pre-KASRP knowledge score was low at 11.8 (62.1% accurate), with 19 as the highest possible score. In comparison, the average pre-KASRP attitude score was significantly higher at 9.7 (88.2% correct), with 11 as the highest possible score.

Table 4

*Demographic Characteristics*

| Items | Group Total N=26 | n, Frequency (Percentage, %) | Mean (μ) ± S.D. |
|---|---|---|---|
| Age (Years) | Total (N = 26; 100%) | - | 32.8±8.1 |
| | 31 or above (n = 12; 46%) | - | 39.4±7.5 |
| | 30 or less (n = 14; 54%) | - | 27.2±1.6 |
| Years of R.N. experiences (Years) | Total (N = 26; 100%) | - | 9.1±7.1 |
| | 9 years or above (n = 8; 31%) | - | 18.1±6.4 |
| | 8 years or below (n = 18; 69%) | - | 5.1±1.5 |
| Degree | Bachelor's Degree | n =24 (92.3%) | - |
| | Master's Degree | n = 1 (3.3%) | - |
| | Doctoral Degree | n = 1 (3.3%) | - |
| Prior Addiction Training | Yes | n = 10 (38%) | - |
| | No | n = 16 (62%) | - |
| Prior Pain Mgt Education | Yes | n = 10 (38%) | - |
| | No | n = 16 (62%) | - |
| Pain Management Certification | Yes | n = 0 (0%) | - |
| | No | n = 26 (100%) | - |

*Note:* N-total population, n-sample size, %-percentage, μ-Mean, S.D.-Standard Deviation

The pre-KASRP total score was higher among those in the younger age group (age ≤ 30) than those in the older age group (age ≥ 31) [22.2 (74% correct) vs. 20.6 (68% correct), $p$ = 0.8131]. The students with less RN experience (≤ 8 years) scored higher on the pre-survey KASRP total score than those with greater RN experience (≥ 9 years) (73% and 69%, respectively). Although, there was no statistical significance observed ($p$ = 0.9571).

Participants without prior addiction training (21.7 ± 3.9, 72%) had similar pre-KASRP total scores to those with previous addiction training (21.1 ± 1.7, 70%). However, a statistical significance existed in the pre-KASRP total score differences ($p$ = 0.03332).

There was a limited analysis of the differences among the educational background groups and the groups with and without pain management certification due to the small sample size. None of the participants held pain management certification. A bachelor's degree was the

highest education level among the participants, except for two students, limiting the statistical analysis.

Table 5

*Pre-KASRP Score Differences Within Demographic Group*

| | Group (n) | Pre-KASRP total Score Mean (μ) ± SD (Convert to % Correct Score) | *P*-value |
|---|---|---|---|
| **All** | Total (N = 26) | 21.5±3.2 (71.7%) | - |
| Age (Years) | 31 or above (n = 12) | 20.6±2.4 (68%) | 0.8131 |
| | 30 or less (n =14) | 22.2±3.7 (74%) | |
| Years of RN experiences (Years) | 9 years or above (n = 8) | 20.8±2.1 (69%) | 0.9571 |
| | 8 years or below (n = 18) | 21.8±3.6 (73%) | |
| Degree | Bachelor's Degree (n = 24) | 21.7±3.2 (72%) | N/A |
| | Master's Degree (n = 1) | 16.0±0 (53%) | |
| | Doctoral Degree (n = 1) | 22.0±0 (73%) | |
| Prior Addiction Training | Yes (n = 10) | 21.1±1.7 (70%) | 0.03332* |
| | No (n = 16) | 21.7±3.9 (72%) | |
| Prior Pain Mgt Education | Yes (n = 10) | 20.9±1.6 (70%) | 0.25541 |
| | No (n = 16) | 21.8±3.9 (73%) | |
| Pain Management Certification | Yes (n = 0) | n/a | N/A |
| | No (n = 26) | 21.5±3.2 (71.6%) | |

*Note:* N-total population, n-sample size, %-percentage, μ-Mean, SD = Standard Deviation
*$p$-value < 0.05

**Pain Management Education Intervention Effect on Post-KASRP Score (Table 6)**

The post-KASRP total score improved significantly compared to the pre-KASRP total score. After the educational session, the KASRP total score increased from 21.5 ± 3.2 (71.7% correct) to 23.3 ± 3.2 (77.7% correct) ($p$ = 0.0071), rejecting the null hypothesis (H0). Similarly, the post-KASRP knowledge scores also improved from 11.8 (62.1% correct) to 13.6 (71.7% correct), although the significance was marginal with a $p$-value of 0.0544. In contrast, no statistically significant difference was observed in the post-KASRP attitude score before and after the pain management education session (9.7 vs. 9.8 respectively; $p$ = 0.8354). However, the attitude scores were substantially high at 89% correct at both pre- and post-intervention surveys.

Table 6

*Pain Management Education Intervention Effect on Post-KASRP Scores (N = 26)*

| | | Pre KASRP Score: Mean (μ) ± SD, Max Score=30, (Converted to % Score) | Post KASRP Score: Mean (μ) ± SD, Max Score =30, (Converted to % Score) | Paired *t*-test statistic | *p*-value |
|---|---|---|---|---|---|
| **Overall (N=26)** | | | | | |
| Total_KASRP Score (Max score = 30) | | 21.5±3.2 (71.7%) | 23.3±3.2 (77.7%) | *t*(15) = -3.113 | 0.0071* |
| Knowledge_KASRP (Max score = 19) | | 11.8±3.1 (62.1%) | 13.6 ± 3.3 (71.6%) | *t*(15) = -2.0868 | 0.0544** |
| Attitude_KASRP (Max score = 11) | | 9.7 ± 1.1 (88.2%) | 9.8 ±0.9 (89%) | *t*(15) = -0.2112 | 0.8354 |
| **By Sub-Group** | | Pre KASRP Total Score | Post KASRP Total Score | ***t-value*** | ***p*-value** |
| Age | Age ≥ 31 (n = 12) | 20.6±2.4 (68%) | 22.5±2.5 (75%) | *t*(7) =-2.2866 | 0.0561** |
| | Age ≤ 30 (n = 14) | 22.2±3.7 (74%) | 24.1±3.6 (80%) | *t*(9) = -1.8556 | 0.0965 |
| Years of experiences | RN years ≥ 9 (n = 8) | 20.8±2.1 (69%) | 22.8±2.9 (76%) | *t*(5) = -1.1286 | 0.3103 |
| | RN years ≤ 8 (n =18) | 21.8±3.6 (73%) | 23.6±3.3 (79%) | *t*(11)= -2.0838 | 0.0613 |
| Degree | BSN (n = 24) | 21.7±3.2 (72%) | 23.3±3.2 (77.7%) | t(15)=-3.0513 | 0.00808* |
| | MSN (n = 1) | 16.0±0 (53%) | 21.0±0 (70%) | n/a | n/a |
| | Doctoral (n = 1) | 22.0±0 (73%) | 27.0±0 (90%) | n/a | n/a |
| Prior Addiction Training | Yes (n = 10) | 21.1±1.7 (70%) | 24.1±2.6 (80%) | *t*(5) = -3.0202 | 0.0294* |
| | No (n = 16) | 21.7±3.9 (72%) | 22.9±3.5 (76%) | *t*(9) = -1.2 | 0.2608 |
| Prior Pain Mgt Education | Yes (n = 10) | 20.9±1.6 (70%) | 23.8±2.9 (79%) | *t*(5) = -2.026 | 0.0987 |
| | No (n = 16) | 21.8±3.9 (73%) | 23.1±3.4 (77%) | *t*(9) = -1.4343 | 0.1853 |
| Pain Mgt Certification | Yes (n = 0) | n/a | n/a | n/a | n/a |
| | No (N = 26) | 21.5±3.2 (71.7%) | 23.3±3.2 (77.7%) | *t*(15) = -3.113 | 0.0071* |

*$p$-value is equal to or less than 0.05; **$p$-value is borderline between 0.05 and 0.06

Further analysis was conducted to evaluate whether substantial educational effects were observed in the subgroups with different demographic characteristics. There was a consistent improvement in total KASRP scores after the education session in all subgroups, including (a) older (≥ 31 years) and younger age (≤ 30 years) groups, (b) greater (≥ 9 years) and lower RN experience (≤ 8 years) groups, (c) BSN, MSN, and doctoral degree groups, (d) groups with and without prior addiction training, (e) groups with and without prior pain management education, and groups with and without having pain management certification. However, statistical significances of the pre- and post-KASRP total score differences were not found ($p > 0.05$) in all subgroups except the group with prior addiction training. Although all participants' post-KASRP

total scores improved, the scores of those participants with prior addiction training (n = 10) increased substantially from 70% to 80% ($p$ = 0.0294). The participants without prior addiction training had marginal improvement in the post-KASRP total scores (73% vs. 77%) with no statistical significance noted ($p$ = 0.2608).

**Correlation between Demographic Factors and Educational Interventions' Effect (Table 7)**

A thorough analysis was performed to evaluate the correlation between demographic factors and the educational intervention's effect. The pain management education session's effect was measured by the post-minus-pre KASRP score, which was calculated by extracting the pre-KASRP score from the post-KASRP scores.

**Post-minus-Pre KASRP Total Score.** A weak negative correlation was observed in the post-minus-pre KASRP total score, along with age and RN experience, although there were no statistical significances. The improvement in KASRP total scores were greater in the younger age group than in the older group (r = - 0.001, $p$ = 0.9962) and in the lower RN experience group than the higher RN experience group (r = - 0.023, $p$ = 0.9119). Similar findings were observed using linear regression. The effect size of the post-minus-pre KASRP total score differences within demographic subgroups was small with no statistical significance (Cohen's $d < 0.30$, $p$ = 0.8131).

A weak positive correlation was demonstrated between post-minus-pre KASRP total score, prior addiction training, and prior pain management education. The improvement of total KASRP scores was observed greater in participants who had prior addiction training (r = 0.2368, $p$ = 0.2442) and prior pain management education (r = 0.2155, $p$ = 0.2893), although no significance existed. Similarly, with further analysis using linear regression, the effect size using

standardized mean differences between the groups with and without prior addiction training was moderate at 0.51. It was statistically significant ($p = 0.0333$).

Table 7

*Correlation between Demographic Factors and Education Interventions Effect (Measured by Post-minus-Pre KASRP Scores)'¥*

| | **Correlation Coefficient R (Pearson R)** | ***p*-value** | **F-test statistic (Linear Regression)** | ***p*-value** | **Effect Size Cohen's *d*** |
|---|---|---|---|---|---|
| **Improvement in KASRP Total Score (Post-minus-Pre KASRP Total Score)** | | | | | |
| Age | -0.0010 | 0.9962 | F(1,15.82)=0.0578 | 0.8131 | 0.23 |
| RN experience | -0.0230 | 0.9119 | F(1,10)=0.003 | 0.9571 | 0.28 |
| Degree | n/a | n/a | n/a | n/a | n/a |
| Prior Addiction Training | 0.2368 | 0.2442 | F(2,13.85)= 5.5829 | **0.0333*** | **0.51** |
| Prior Pain Mgt Education | 0.2155 | 0.2903 | F(1,9.85)= 1.4582 | 0.2554 | 0.30 |
| Prior Pain Mgt Cert | n/a | n/a | n/a | n/a | n/a |
| **Improvement in KASRP Knowledge Score (Post-minus-Pre KASRP Knowledge Score)** | | | | | |
| Age | 0.1425 | 0.49219 | F(1,16)=0.0169 | 0.89804 | 0.22 |
| RN experience | 0.1463 | 0.48069 | F(1,8.52)= 0.5731 | 0.4693 | 0.32 |
| Degree | n/a | n/a | n/a | n/a | n/a |
| Prior Addiction Training | 0.3284 | 0.1014 | F(1,13.35)=9.588 | **0.0083*** | **0.72** |
| Prior Pain Mgt Education | 0.2459 | 0.2259 | F(1,10.58)=1.5873 | 0.2348 | 0.44 |
| Prior Pain Mgt Cert | n/a | n/a | n/a | n/a | |
| **Improvement in KARSP Attitude Score (Post-minus-Pre KASRP Attitude Score)** | | | | | |
| Age | -0.2971 | 0.14969 | F(1,14.77)=0.6585 | 0.4299 | 0.26 |
| RN experience | -0.3248 | 0.11465 | F (1,10.67)= 4.0971 | 0.0687 | 0.49 |
| Degree | n/a | n/a | n/a | n/a | n/a |
| Prior Addiction Training | -0.3046 | 0.1303 | F(1,13.91) = 4.7525 | **0.0469*** | **0.53** |
| Prior Pain Mgt Education | -0.1130 | 0.5826 | F(1,10.67)=0.5915 | 0.4585 | 0.29 |
| Prior Pain Mgt Cert | n/a | n/a | n/a | n/a | n/a |

**p*-value is equal to or less than 0.05; (¥= Post-minus-Pre KASRP Scores, calculated by the formula of 'Post-KASRP score minus Pre-KASRP score.')

**Post-minus-Pre KASRP Knowledge Scores**. A weak positive correlation was noted between the post-minus-pre KASRP knowledge score and age (r = 0.1425, $p = 0.49219$), RN experience (r = 0.1463, $p = 0.11465$), and prior pain management education groups (r = 0.2459, $p = 0.2259$), although there were no statistical significances. Differently, a moderate positive correlation existed between the post-minus-pre KASRP knowledge score and the prior addiction training group, although statistical significance was not found (r = 0.3284, $p = 0.1014$). The finding was similar when using linear regression. The results demonstrated a moderate effect

size (0.72) of the mean KASRP knowledge score differences between the groups with and without prior addiction training using Cohen's *d* value. There was statistical significance demonstrated ($p = 0.0083$).

**Post-minus-Pre KASRP Attitude Scores.** A weak negative correlation was observed between the post-minus-pre KASRP attitude scores and among the age as well as RN experience, although no statistical significance was noted ($r = -0.2971$, $p = 0.14969$, and $r = -0.3248$, $p = 0.11465$, respectively).

A weak positive correlation was noted on the post-minus-pre KASRP attitude scores with the prior pain management education groups ($r = 0.1130$, $p = 0.5826$) and a moderate positive correlation with prior addiction training group ($r = .3046$, $p = .1303$). Similarly, using linear regression, a moderate effect size in post-minus-pre KASRP attitude score differences was observed between groups with and without prior addiction training (Cohen's $d = 0.53$, $p = 0.0469$), with statistical significance.

## Chapter 5: Discussion

Chronic nonmalignant pain continues to significantly impact patients and families. Among the top five reasons for consulting a provider in primary care settings are arthritis and back pain, with back pain being the second most prominent reason for a provider visit (Finley et al., 2018). The opiate crisis has led to substantial stigma causing 20.5% of people with chronic pain to avoid treatment, thus suffering from pain (USDHHS, 2019). Additionally, approximately 17% of patients with chronic nonmalignant pain worry about family or friends' potential negative opinions (USDHHS, 2019). Furthermore, the provider's stigma and fear also lead to reluctance to manage patients' pain, leading to the need for increased knowledge of the appropriate management and risk mitigation strategies (USDHHS, 2019).

Limited interventional studies exist that provided structured educational sessions and measured chronic pain management knowledge and attitude effectiveness. This study evaluated the effect of a chronic nonmalignant pain management educational session among 26 FNP students on improving knowledge and attitude of managing chronic pain using a KASRP tool. In this study, the participants showed statistically significant improvement in the total KASRP score ($p = 0.0071$) and the knowledge KASRP score ($p = 0.0544$). The baseline KASRP total scores improved from 71.7% to 77.7% correct after the educational intervention. Predominantly, the baseline KASRP knowledge score increased significantly from 62.1% to 71.6%. These findings are similar to Germossa et al. (2018), with 111 nurses working in an Ethiopian University Hospital, which revealed significant improvement in KASRP scores after the educational intervention ($p < 0.001$).

Several studies measured chronic management knowledge and attitudes using KASRP tools. Although the baseline KASRP total scores in this study (71.7% correct) were greater than

those reported by Germossa et al. (2018) at baseline (41.4% correct), the scores continue to show insufficient knowledge and attitude of managing chronic pain effectively, considering 80% correct as exhibiting competence in managing chronic pain. Comparatively, Duke et al. (2013) scores were reported among nursing students at various grade levels, with 59.7% correct for juniors, increasing to 68% correct for seniors. This study's scores were comparable to the scores among nursing faculty (71%) from a study conducted by Duke et al. (2013). These findings indicate that the KASRP score increase with higher educational levels and higher degrees.

Differently, this study observed that the higher KASRP score was not correlated with older age and greater years of RN experience. Rather, the baseline KASRP score was higher in the younger age group (74% vs. 68% correct, $p = 0.8131$) and individuals with fewer years of RN experiences (73% vs. 69% correct, $p = 0.9571$). Consistent findings by Germossa et al. (2018) revealed that baseline KASRP scores among nurses with 6 to 10 years of experience were higher than those with greater than 10 years of experience (44.3% vs. 37.7% correct scores, respectively). These findings indicate that younger nurses, who are more likely to have less RN experience, have increased knowledge of chronic pain management. This increase in knowledge finding suggests that there may have been an increase in educational material presented in the current curriculum regarding chronic pain management secondary to the opioid crisis. Another potential cause for this increase could be that continuing education requirements for licensure by the State Boards of Nursing have encouraged nurses to pursue educational opportunities.

Knowledge and attitude scores in this study were measured separately. In the KASRP survey tool used in this study, there were 11 attitude-specific questions identified. No specific improvement in the KASRP attitude score was observed before (88.2%) and after the educational session (89.0%, $p = 0.8354$). However, the KASRP attitude scores exceeded the acceptable pass

rate of 80% correct both at baseline and after the educational session. Further analysis revealed that the KASRP attitude score was higher in the younger age group than the older age group. Although the improvement in the attitude scores was marginal after the intervention, the KASRP attitude scores increased from 88% to 90% correct among the younger age group and RNs with less experience. Inversely, the older age group KASRP attitude scores decreased from 88% to 87% after the educational session. These findings supported a conclusion that the younger age group and individuals with less RN experiences were more receptive to the educational material presented regarding chronic pain management. Nurses who have been practicing longer were more resistant to change and acceptance of the educational intervention.

The FNP students in this study who participated in previous pain management education demonstrated a considerable improvement in the total scores from 70% pre-educational intervention to 79% post-education. However, even after participating in the educational session, the FNP students did not achieve the 80% success rate on the KASRP survey tool, and the results were not statistically significant ($p = 0.0987$). Similarly, the Germossa et al. (2018) study revealed pre- and post-education KASRP total scores (41.4% vs. 63%) among nurses were also lower than the 80% acceptable pass rate. In other aspects, this study observed that students with prior addiction training had a more significant increase in knowledge (from 57.8% to 75.7%) and overall scores (from 70% to 80%) after the intervention, compared to those without previous addiction training, despite the lower baseline scores. These findings suggest that a single educational session may not be sufficient to achieve the optimal level of knowledge and skills when managing chronic pain and demonstrated that repetition is an integral component for adult learners.

## Study Limitations and Strengths

**Study Limitations**. The study had several limitations. The original version of the revised KASRP tool was 39 questions but was modified to 30 questions for this study to measure the chronic nonmalignant pain management educational session's effectiveness appropriately. Questions from the revised KASRP survey tool regarding pediatrics or oncology were removed for this study. Therefore, there are limitations to generalization to include the effects of educational sessions outside of chronic nonmalignant pain management.

Convenient and purposeful sampling can also limit the generalization of the study findings outside of the study setting. In this study, convenient sampling was used to improve the study setting's curriculum by incorporating the chronic pain management education session as part of the quality improvement program and evaluating its effects. Participants of this study represent a typical student cohort of FNP programs in the United States, supporting the relevance of generalization of our study findings to FNP students in the United States.

Lastly, this study holds a threat to internal validity by using the same questionnaire in the same group at both pre- and post-intervention without a comparison group. The participants could become desensitized to the material presented and exhibit changes in their attitude based on what the researcher wishes to see, not from their true attitude toward pain management. This effect can make it difficult to segregate the true effects of the educational intervention on attitude.

**Strengths.** This study included several strengths. One strength of this study is the completion rate of the surveys. Although there was a small sample size, 100% of the invited participants completed the pre- and post-intervention study tool. Another strength is the ability to generalize the study based on the study participants representing the typical student cohort of

FNP programs in the United States. Lastly is the capability to replicate this study. The educational session included evidence-based information and current practice guidelines according to the CDC and HHS. The contents of the educational session and other instructional materials were reviewed and approved by two experts. Researchers could duplicate the chronic nonmalignant pain education for further studies in different clinical settings and with larger sample sizes.

**Clinical Implications**

Chronic pain has a substantial impact on individuals, families, and society today. The appropriate management of chronic pain can significantly improve patients' quality of life with chronic pain, financially and socially. Improving providers' knowledge and attitudes regarding chronic pain management can positively impact patient outcomes while limiting adverse events.

This study suggests that threading chronic pain management throughout the curriculum can improve FNP students' knowledge and attitude, although the change in attitude is minimal. However, the improved post-education KASRP score did not reach the acceptable passing score of 80% correct, similar to previous studies' findings. This study concluded that effective chronic pain management's knowledge and attitude did not correlate to years of RN experience. However, prior addiction training or pain management education leads to greater improvement in chronic pain management knowledge and attitude when exposed to additional education training. These findings suggest that repetition is crucial to adult learners' education and can increase the implementation of appropriate practice guidelines into the advanced practice role. This study's structured educational course material outline followed the most updated CDC and USDHHS practice guidelines. Though conducting this study with a small number of participants was a limitation, it reinforces the importance of further research studies on a larger scale to improve the

learner's chronic pain management competencies with safe opioid prescribing and determine educational session's effectiveness.

## Conclusions

Management of chronic pain involves physical, mental, emotional, functional, financial, and social risks, including stigma. A multimodal, interdisciplinary approach is essential for the appropriate management and care for patients who experience chronic nonmalignant pain. Despite the rise in the number of patients with chronic pain, fewer than 20% of healthcare providers licensed to prescribe controlled substances are trained to prescribe opioids safely and effectively (USDHHS, 2019). Along with previous studies, this study supported that one-time education is insufficient in achieving the optimal level of competencies necessary for proper chronic nonmalignant pain management. However, prior education or training boosts the learning effects with repetitious exposure to similar material.

Proper training and education play a vital role in improving knowledge, attitudes, and competencies of the providers tasked with managing this complex issue. While more educational intervention studies are needed on a larger scale, this study aimed to influence the transformation of the curriculum for FNP students and healthcare providers to increase education regarding the management of chronic nonmalignant pain. Educators must be diligent in identifying gaps in the curriculum and incorporating the current practice guidelines and best evidence practices that reflect the needs of individuals and society suffering from chronic pain. Providers should seek continuing education opportunities regularly to improve competence with managing patients with chronic pain.

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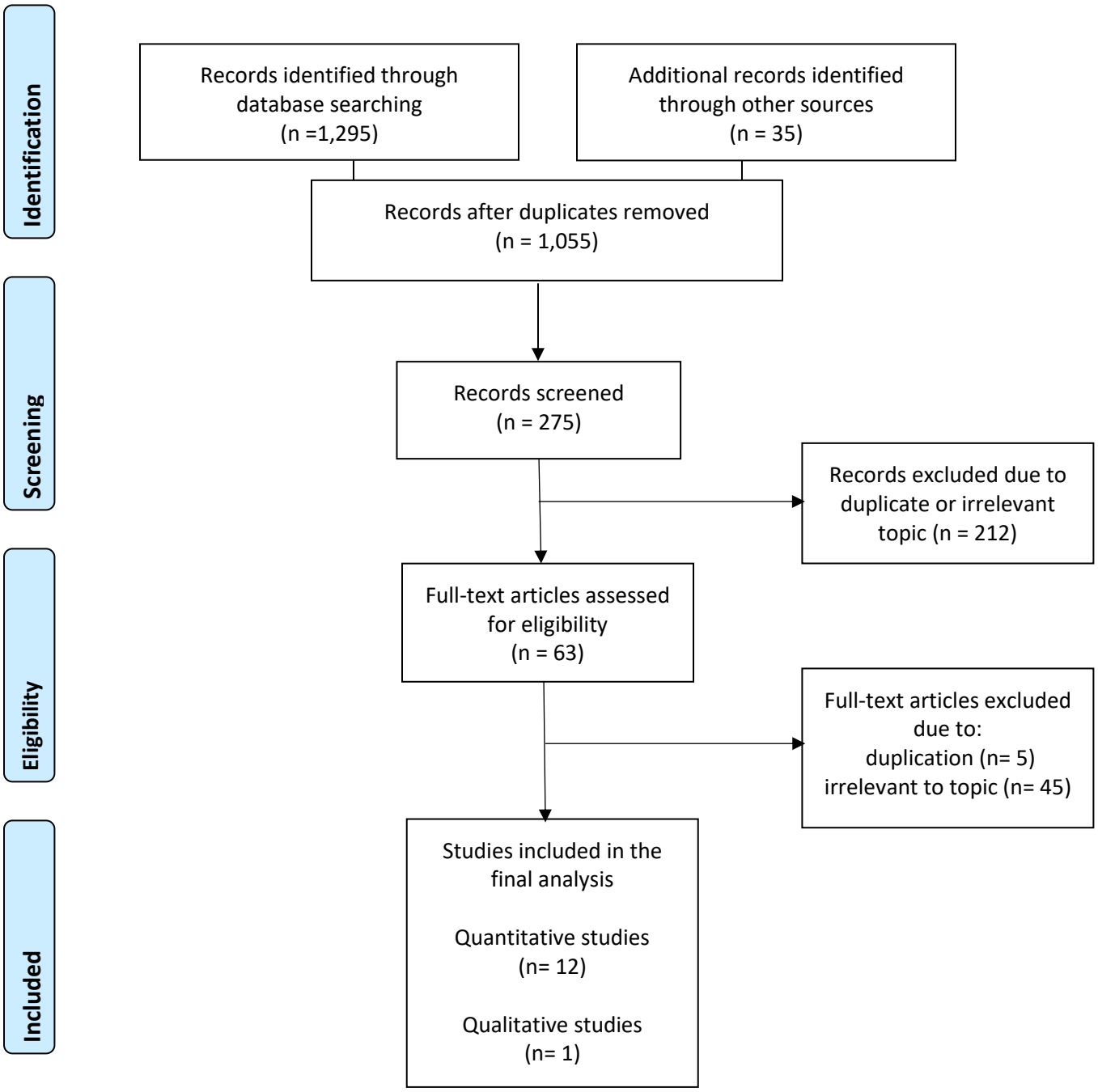
Appendix A: PRISMA Flow Diagram



# Appendix B

Table 1. *Summaries of Studies on Chronic Pain Management and Safe Opioids Prescribing Practice*

| **Citation** | **Evidence** | **Design/ Method** | **Sample/Setting** | **Major Variables Studied and Definitions** | **Measurement of Major Variables** | **Intervention** | **Data Analysis** | **Study Findings** | **Conclusion Recommendation Worth to Practice Strengths/Weaknesses** |
|---|---|---|---|---|---|---|---|---|---|
| Alford, 2019 | IV | Cohort:<br><br>Purpose: Assessment of tendencies in risk mitigation strategies, attitudes/behaviors of prescriber | 6,889 SCOPE of Pain Registrants<br>• Physicians: 70%<br>• Nurse Practitioners: 20%<br>• Physician Assistants: 10%<br><br>71% were Family Practice Practitioners or Internal Medicine SCOPE | 1) provider self-reported risk mitigation strategy use<br>a. Implement a patient/ prescriber agreement<br>b. informed pt about taking prescription opioids exactly as prescribed<br>c. educated patients about safe storage and disposal of prescription opioids<br>d. counseled patients about opioid-related risks of respiratory depression and overdose<br>e. explains to patients the methods they use to monitor for prescription opioid misuse<br><br>2) Pain management attitudes<br>* are patients with chronic pain able to provide accurate self-assessments of pain<br>* time-consumption and frustration of managing chronic pain<br>* responsibility of educating patient's families<br>* confidence in assessing opioid misuse risk<br>* preference of not managing patients that have misused opioids | 4 point Likert scale:<br><br>1= none of my patients<br>2= with my high-risk patients only<br>3= most of my patients<br>4= all of my patients<br><br>5 point Likert scale:<br><br>1: completely disagree through<br>5: completely agree | N/A | * 3 yearly cohorts<br><br>*frequencies and cross-tabulations using SPSS 22<br><br>* Chi-square between the three-yearly cohorts and between subgroups<br><br>* Pair-wise post-hoc analyses between the three annual groups | 70% implemented patient-prescriber agreement for most patients<br>54% for "all"<br><br>71% educated on the safe handling of meds for most<br>51% for "all"<br><br>87% counseled about respiratory distress and overdose "most or all of the time"<br>66% for "all"<br><br>49% on 5/5 strategies for "most or all" patients<br>68%: + on 4/5 opioid risk mitigation strategies for "most or all" of the patients<br>45% at least four practices with "all" patients<br>28% performed all five practices with "all" of the patients<br><br>43% unsure with assessing for misuse<br>59% would stop treating patients with chronic pain | Despite increased national discussion regarding prescription opioid misuse, no significant temporal trends in the use of opioid risk mitigation practices<br><br>Many practitioners report high levels of guideline-based opioid risk mitigation practices but lack clinical understanding of chronic pain management<br><br>Increased gaps in knowledge and insufficient knowledge, and lack of confidence in prescribing practices for patients with chronic pain<br><br>Limitations: social desirability bias,<br>Generalizability to non-registrants, |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | + reported gaps in knowledge leading to nonadherence with the guidelines | |
| Creech, 2011 | Chart Review | Chart Review<br><br>Purpose: To explore the management of pain by Nurse practitioners in a chart review<br><br>Evaluation of the utilization of services and treatment regimens | Records of 50 uninsured patients | Chronic musculoskeletal pain management treatment options and risk mitigation strategies used:<br>Opioid contract<br>Opioid prescriptions<br>Non-opioid prescriptions<br>Antidepressant medications<br>Nonpharmacologic treatments<br>Specialist referrals<br>PT referrals<br>Alcohol use<br>Tobacco use<br>Illicit drug use<br><br>Treating providers were Nurse Practitioners | Chart review tool<br>Progress reports were reviewed for over one year | N/A | Chart review | Pain management contracts for 88% of the 45 patients<br>96% prescribed at least one opioid<br>58% prescribed at least one non-opioid<br>20% prescribed at least one antidepressant<br>8 of 50 patients were prescribed at least one nonpharmacologic treatment<br>28% received at least one referrals<br>PT prescribed for 88% of the patients<br><br>56% used alcohol<br>64% tobacco use<br>40% illicit drug use | Limitations: Small sample size<br>Convenience sample, generalizability is limited and inadequate, limited usefulness is identifying depression<br><br>Need additional studies for additional data on depression and chronic pain<br><br>Potential reasons for the lack of referral included: lack of ability to travel, limited funds due to no insurance<br><br>Need more education regarding treatment options, including referrals for chronic pain |
| Darnall, 2016 | VI | Cross-sectional<br><br>Purpose:<br>To describe therapist level of training, perceptions of expertise, and comfort with addressing pain<br><br>To address primary care providers | 1,991 surveys<br>• Individuals with chronic pain: 1,086<br>• Physicians: 221<br>• Physician Assistants: 203<br>• Psychologists: 323<br>• Nurse Practitioners: 96 | Needs assessment for training, services, and resources<br><br>Are you aware of pain psychologists in your area?<br>Are you aware of pain psychology as a treatment option for patients with pain?<br>Do you think this could be valuable for your patients in pain?<br>Are there any barriers to referring to a pain psychologist? | Six surveys ( one for each of the groups surveyed) | N/A | Survey results reported | 93% of providers saw high value in having patients work with a psychologist<br><br>37% of providers were unaware of pain psychology as a treatment option<br><br>30% of patients were reluctant to see a pain psychologist | Limitations: sample selection bias, response bias, unable to calculate response rates for most of the surveys, and qualitative data<br><br>Need for increased education on non-pharmacologic treatment options for pain management, including pain psychology<br>Barriers to treatment of pain due to limited providers (pain psychologists), insurance |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | perceptions of psychology needs with the treatment of pain | • Directors of psychology programs: 62 | Have you referred to a pain psychologist?<br>Rate the importance of a pain psychologist<br>Do you think patients could benefit from having more pain psychologists?<br>Would you value a website to identify pain psychologists in your area? | | | | | reimbursement, and patient reluctance |
| Duke, 2013 | VI | Descriptive (Survey)<br><br>Purpose: To determine the knowledge of and attitudes of nursing students and faculty to help with integrating comprehensive pain management curriculum | 162 Junior and Senior Undergraduate Nursing Students (First and second-semester juniors, first-semester senior nursing students)<br><br>16 Nursing Faculty | Knowledge and Attitudes regarding pain management<br>Assessment of patients in pain in case studies | KASRP (Knowledge and Attitudes Survey Regarding Pain) | N/A | Survey results reported | + significant differences between junior and senior students and between the junior students and the faculty<br><br>Senior students scored: 68% (80% was considered acceptable)<br><br>Faculty scored: 71%<br><br>Nine items missed by > 60% of the students; primarily related to pain medications and administration of medications<br>Students scored poorly on the assessment of pain n patients<br>All faculty accurately assessed the patient in the case study. | Limitations: generalizability, internal consistency for the instrument was low (0.429).<br><br>Gaps in knowledge and assessment skills of nursing students support the need for a change in curriculum regarding pain management with patients<br><br>Need for evidence-based practice changes with teaching regarding pain management<br><br>Adequate preparation of faculty needs to be addressed with future studies as well |

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| Ebbert, 2017 | VI | Descriptive (Survey)<br><br>Purpose: Assessment of provider attitudes, beliefs, practice styles, and concerns about the CDC guidelines for pain | 961 clinicians from a large academic medical institution<br><br>65% physicians<br>35% NP/PA | Assess:<br>Clinician attitudes<br>Beliefs<br>Practice styles<br>Concerns about opioid prescribing since the CDC guidelines for the management of chronic pain<br>Screening for substance use disorder or depression<br>Confidence in managing patients in chronic pain | E-mailed electronic survey<br><br>29 questions: clinician characteristics, attitudes and beliefs, practice styles, and provider concerns | N/A | Chi-square tests of independence | 47% were confident in the ability to care for a pt with CNCP<br>63% screened for Substance use disorder<br>66% worried about the dependence of the patient<br>58% concerned about addiction<br>55% enrolled in the PMP<br>62% did not believe opioids were helpful for chronic pain<br>82% reluctant to write an opioid<br><br>Higher confidence= increased knowledge of the CDC guidelines<br>74% vs. 61% chi-square: 12.4<br>*(P* < 0.01)<br><br>74% followed the CDC guidelines | Higher confidence with providers that were aware of the CDC guidelines<br><br>Increased knowledge leads to increased confidence in managing CNCP.<br><br>Education needs to be a cornerstone in the management of the opioid epidemic |
| Germossa, 2018 | III | One-group pre-test and post-test without randomization | Quasi-experimental pre-and post-survey interventional educational session<br><br>111 nurses completed three forms of education on pain management<br><br>KASRP pre-and post-surveys completed | Assess: Knowledge and attitude regarding pain management<br>Pre-and post-education session | KASRP survey<br>Pre-and post-survey | Three forms of education:<br>- face-to-face education (16 hours)<br>- supplemental reading materials<br>- follow-up training (8 hours) | Wilcoxon signed-rank test *p*< .05<br><br>*Z* = -9.08,<br>*p* < .001 | + improvement of 98.2% of the participants after the intervention<br><br>Scores:<br>Pre-survey: M= 41.4%<br>Post-survey: M=63% after educational program | Pain management education improved knowledge<br><br>Unaware which form of education impacted the nurses more; unable to assess from the survey.<br><br>Limitations: lack of randomization; lack of control group |

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| Hooten, 2016 | VI | Descriptive (Survey)<br><br>Purpose: assess knowledge about the use of opioids for chronic pain | 131 non-pain specialists attending a Continuing Medical Education Conference<br>• 108 physicians<br>• 20 NP/PA | General knowledge about pain medication (32)<br>- medicolegal (7)<br>- clinical (11) | 32 questions related to general knowledge about pain medicine<br><br>18 questions related to opioid management<br><br>Five multiple-choice questions: points from 0-5<br>45 questions: 5 point Likert scale | N/A | Survey results | 72% correct responses<br><br>Nonopioid questions correct (32): 74%<br><br>Opioid questions correct (18): 69%<br>Medicolegal opioid questions: 74%<br><br>11 clinical opioid questions correct 67% | Non-pain specialists scored lower on questions about opioids compared with non-opioid related questions<br><br>Lower scores on the clinical questions compared with the medicolegal questions<br><br>Knowledge gaps among providers<br><br>Lower scores on clinically based questions indicate the need for focused educational content |
| Jamison, 2015 | III | Controlled trial without randomization<br><br>Purpose: investigate the benefits of interventions (structured monthly monitoring compliance checklists) or the use of risk mitigation strategies to improve provider confidence in managing chronic pain | 56 Primary Care Providers<br>• 44 internal medicine physicians<br>• 8 Nurse Practitioners<br>• 4 Physician Assistants<br><br>253 chronic pain patients | 1-monthly patient summary reports:<br>a. pain<br>b. mood<br>c. activity level<br>d. healthcare utilization<br>e. results of the Opioid Compliance Checklist<br>- care coordination of patients<br>- monitoring with provider feedback<br>- practitioner education<br><br>Specialist group: primary care providers had access to the specialist for guidance, direction, mentorship, and referral<br><br>Generalist group: Control group; "treatment as usual" no changes | Prescribers:<br>1. Background and prescribing practices questionnaire<br>2. General Health Questionnaire<br>3. Opioid Therapy Survey<br>4. Concerns about Analgesic Prescriptions<br>5. Test of opioid knowledge<br><br>Patients completed eight surveys | Practitioner education on the management of chronic pain<br><br>Handouts about opioid risk statistics<br>Risk factors for opioid abuse<br><br>Use of risk assessment tools in clinical practice<br><br>Universal precautions, components, and benefits of an opioid protocol, Role of UDS Interpreting UDS results<br><br>Generalists: no educational sessions, no monthly patient evaluations | Parametric (*t*-test) and non-parametric (Chi-square or Wilcoxon Signed rank tests) | The Nurse Practitioners felt insufficiently trained in prescription opioids and lacked confidence with prescribing opioids compared with physicians ($p < 0.05$)<br><br>PCPs showed only adequate knowledge on the Test of Opioid Knowledge (TOK) 68.8%<br>After one year: More providers that had access to the specialists felt more comfortable with prescribing opioids ($p < 0.05$) and better able to identify patient risk for misuse ($p < 0.05$)<br><br>Unable to assess if there were improvements in general knowledge of opioids by the end of the study. | The intervention seemed to make little difference with the specialist arm of the study.<br><br>Need for an increase in education among PCPs about pain management in general and opioid prescribing.<br>Support the importance of providing more training among PCPs.<br><br>Need for continued research about the training included for providers |

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| | | | | | | Five Specialist centers were recruited to be available for the primary care providers to offer assistance and for referral of patients as a part of the pain management "team" | | | |
| Nuseir, 2016 | VI | Descriptive (Survey)<br><br>Purpose: Evaluate the knowledge and attitudes of HCPs toward pain management in Jordan | 662 Healthcare Providers in 7 hospitals in Jordan<br><br>* Physicians (27%) completed surveys<br>* Pharmacists (9%) completed surveys<br>* Nurses (60%) completed surveys | Knowledge and attitudes of providers | Self-completed 16 item questionnaire: 5 point Likert scale From strongly agree to strongly disagree<br><br>-Demographic data<br>-HCP knowledge of pain and pain management<br>-Current practices | N/A | Categorical variables analyzed with: Chi-square test or Fisher's exact test<br><br>Binary logistic regression (Odds Ratio and 95% confidence intervals) to analyze associations between HCP's knowledge and possible influence | Overall knowledge of all HCPs: 28.7%<br><br>No HCPs answered all questions correctly<br>Mean number correct: 6.52<br><br>MDs most knowledgeable (36.1%)<br>Pharmacists: (35.5%)<br>Nurses: 24.1% | Poor knowledge of pain and pain management<br><br>Questionnaires exploring knowledge and attitudes are considered good predictors of proper pain management practices<br><br>Nurses scored the lowest in knowledge of pain management, showing deficiencies in knowledge and practice regarding pain management |
| Pearson, 2017 | VI | Descriptive (Survey)<br><br>Purpose: Investigation of the associations of provider confidence in managing chronic pain with practice behaviors and demographics | 103 attendees of the Continuing Medical Education Course; Physicians, Pas, and NPs<br><br>83 completed the survey<br>14 surveys were excluded<br>Total included: 69 surveys for a 67% completion rate<br><br>Participants completed the survey before the conference | Provider confidence in managing pain<br>Practice behaviors | Survey about opioid management practices and opinions<br><br>Demographic data:<br>Age, sex, race, years in practice, Practice setting, hours worked/week, number of weekly patient encounters, and | N/A | Spearman's rho<br>Two-sided tests<br><br>$P < 0.05$ | 55% were women<br>92.9% Caucasian<br>56.5% physicians<br><br>39.1% practice in small cities<br>26.1% rural areas<br><br>42% private practice<br>56.5% primary care providers<br><br>44.9% had > 8 hours of additional pain management training | Limitations: No evaluation of providers' competence in prescribing for patients with chronic pain<br>Potential increased motivation to improve the opioid prescribing compared to the general population<br><br>Results: the majority of the providers were not confident in their ability to manage chronic pain. |

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| | | | | | previous training in pain management<br><br>Opioid Therapy Survey: 10 question survey about providers' practice behaviors and confidence in managing patients on opioid therapy<br>5 point Likert scale 1= strongly agree<br>5= strongly disagree | | | 34.8% had state requirement for opioid-related continuing education<br><br>60.8%: treating pain patients is a problem in my practice<br><br>60.8% were not confident in their ability to manage chronic pain and did not improve<br><br>Additional post-training education in pain management and the presence of state opioid-related CME requirements did not show any correlation in increased knowledge | The effectiveness of Continuing education courses should be evaluated. |
| Rash, 2018 | I | Systematic Review (Protocol for the development of systemic review)<br><br>Purpose: To develop a protocol for a systematic review to evaluate adherence for the safe prescription of opioid medication for the management of | HCPs that prescribe opioid medications (physician, dentist, nurse practitioners, as well as medical residents) | * Elucidate factors associated with prescribing opioid analgesics following Clinical Practice Guidelines (CPG)<br>* Explore the effectiveness of interventions intended to improve the uptake of CPG recommendations for the prescription of opioids to manage chronic non-cancer pain<br>* Guide the development of novel interventions<br>* Identify gaps in knowledge about the prescription of opioid analgesics | Inclusion criteria:<br>Rx of opioid medication for adults > 18 y.o.a.<br>At least one of the following: knowledge, attitudes, beliefs, practices<br>Original data<br>Conducted in North America<br><br>Exclusion criteria:<br>Non-medical opioid use<br>Suboxone or methadone<br>Conference Abstracts | N/A | * Cochrane risk of bias tool by Clinical Advances through Research and Information Translation Group McMaster University<br>* Quality of Cohort Studies Joanna Briggs Institute Checklist for cohort studies<br>* Q-test for heterogeneity of proportions<br>Means and Standard Deviations or | Meta-analysis will be performed if > 3 studies are identified that evaluate a similar intervention.<br><br>Confidence in the Evidence from Qualitative Review approach to assessing confidence in synthesized qualitative results.<br>1. methodological limitations of individual studies<br>2. relevance of the review question of individual studies<br>3. coherence of review results | Increased understanding of the concerns that Healthcare providers have about prescribing opioid medications<br><br>Behavior change principles that can be integrated into existing interventions and education that has proven effective<br>Changes in education to improve knowledge<br>Optimize opioid prescribing practices to prevent opioid-related morbidity and mortality without restricting the provider's ability to select the most appropriate treatment for patients. |

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| | | chronic non-cancer pain | | | | | median and Interquartile range for continuous data<br>* Frequencies and percentages will be reported for categorical variables | 4. adequacy of data supporting a review result. | |
| Schreiber, 2014 | III | Controlled Trial without randomization<br><br>Purpose: evaluate an educational intervention to improve the management of pain in an acute care setting | Quasi-experimental pre- and post-intervention design<br><br>341 Med-Surg and Critical care nurses before the intervention and three months after the educational experience<br>Brockopp-Warden Pain Knowledge/Bias Questionnaire<br><br>Patient chart review also completed comparing patients' pain assessments with nurses' documentation | 1. Are nurses charting the same pain score patients are reporting?<br>2. What is the level of knowledge regarding the effective management of pain among medical-surgical and critical care nurses?<br>3. What are the biases among med-Surg and critical care nurses regarding pain control toward specific patient populations? | Brockopp-Warden Knowledge/Bias Questionnaire<br><br>Pain Knowledge<br><br>Biases of Healthcare Providers<br><br>Congruency between patients' and nurses' pain assessment | National Pain management Expert; 2 days working with nurses to improve the management of pain<br>* Focus: pharmacology, knowledge with treating pain, common biases held by healthcare providers toward specific patient groups,<br>* 10 anecdotal cases of ineffective management of pain | * Descriptive and inferential statistics<br><br>* *T*-tests to compare pre- and post-intervention differences between patient assessment and nurses' documentation and nurses' knowledge of pain management<br>* $X^2$ analysis to compare the pre- and post-intervention responses on the BWPKBQ questions<br><br>SPSS 19 | 52.2% AND 36.7% BSN<br><br>Congruency ratings: 40% decrease in inconsistency following intervention inpatient pain ratings and nurses' charting<br><br>No statistical significance on the BWPKBQ scores pre- and post-intervention<br><br>No statistical differences in pre- and post-intervention knowledge scores<br>> 20% of nurses answered 6/18 items incorrectly | Limitations: convenience sample and one data collection site, minimal demographic data collected on patients and nurses, fairly homogeneous and limits generalizability, insufficient time allotted for changes in knowledge and biases to occur, and a one-time intervention instead of a series of activities<br><br>Lack of continuing, mandatory education on the topic of pain management needs to be addressed. There is still a lack of appropriate education for the management of pain among Healthcare providers. |
| Tellier, 2013 | VI | Qualitative Study | Six focus groups with third and fourth-year medical students | 1. assessment of physical and psychosocial aspects of pain | Semi-structured interviews<br><br>Focus group interviews with | N/A | *Audio recorded interviews transcribed verbatim | The consensus among educators and students that the training about pain | Limitations: single academic institution limiting the transferability of the findings to other medical schools, sampling frame may give rise to bias |

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| | | Purpose:<br>Identify gaps in knowledge about pain management as perceived by students, patients, and educators | Four focus groups with patients and individual semi-structured interviews with nine educators<br><br>70 individuals: | 2. clinical management of pain with pharmacology and alternative therapies<br>3. communication and the development of a good therapeutic relationship<br>4. ethical considerations surrounding pain<br>5. institutional context of medical education about pain | students, patients, and nine educators were audiotaped, and an inductive thematic analysis was performed<br><br>Qualitative descriptive study | | * Inductive thematic analysis<br>* Recurring major themes in answers and conversations were highlighted, final interpretations were discussed among all the researchers during several research team meetings.<br>* Excerpts were used as examples of the themes to represent recurrent opinions and ideas | management is inadequate<br>1. assessment: subjectiveness of pain scales and experiences is a challenge<br>2. pain management: students called for more exposure and practice dealing with standard pharmacological options and more information about interdisciplinary and alternative options<br>3. patient-centered approach is supported by excellent communication skills is central when caring for a patient<br>4. students did not believe they were well prepared to deal with the feelings that encountering suffering would generate; dealing with patients that have chronic pain can trigger adverse personal reactions<br>5. pain tends to be approached as a nuisance rather than as an essential symptom and potential disease of his own | because of holding a particular interest in conveying a message regarding pain education<br><br>All participants recognize the need for additional medical education about pain assessment and management with the five areas mentioned in the variables that were studied.<br><br>This study helped to define the aspects of pain assessment, management, and communication needed to be included in undergraduate curriculum to improve patient care and prepare healthcare providers to deal with this complex process. |

Appendix C

Table 2. *Interventions Used for Better Chronic Pain Management Practice and Safe Opioid Prescribing Practice*

| **Author** | **Year** | **Study Subjects** | **Study Design** | **Intervention** | **Knowledge** | **Confidence** |
|---|---|---|---|---|---|---|
| Germossa | 2018 | 111 Nurses at an Ethiopian University Hospital | Quasi-experimental One-group pre- and post-educational session | Three methods of education: 16 hours of face-to-face education, supplemental readings, and 8-hour follow-up in 4 weeks | ↑ knowledge after education session by 98.2% of the participants | No discussion |
| Jamison | 2015 | 44 Internal Medicine Physicians<br><br>8 Nurse Practitioners<br><br>4 Physician Assistants | Questionnaires to complete and mail-in<br><br>Aim of the study: to obtain information about attitudes and concerns about prescription opioids for chronic pain patients of providers that receive monthly monitoring reports of compliance, specialty support, and risk assessment management | Experimental group: Monthly patient summary reports consisting of mood, pain, activity levels, healthcare utilization, and results of the Opioid Compliance Checklist<br><br>Control Group: no monthly reports | ↑ knowledge after one year | No change |
| Schreiber | 2014 | 341 Med-Surg and Critical Care Nurses | Quasi-experimental pre- and post-intervention design | 2-day pain management expert educational intervention<br>Ten anecdotal cases of ineffective management of pain | No change | No change |

# Appendix D

Table 3. *Components of Chronic Pain Management and Safe Opioid Practices in Literature*

| | Author | **Patient History and Screening** | | | | | **Guidelines and Mitigation Strategies Used** | | | | | | | | | | | |
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| | | Depression | Tobacco | Alcohol | Hx Overdose | Hx Substance Use Disorder | Safe handling of medication and disposal | Patient-Provider Contract | Monitoring of medication, Adverse effects, functionality, Drug diversion | Nonopioid medication Trial | Nonpharmacologic Treatment utilization | PMP | Urine Drug Test | Naloxone Rx | MME | Referral | Informed of risks of addiction, dependence, tolerance, and respiratory overdose | Use of benzodiazepine and opiate together |
| 1 | Alford et al., 2019 | | | | | | X | X | X | | | X | X | | | | X | |
| 2 | Creech et al., 2011 | X | X | X | X | X | | X | | X | X | | | | | X | | |
| 3 | Darnall et al., 2016 | | | | | | | | | | | | | | | X | | |
| 4 | Duke et al., 2013 | X | | | | | | | X | | | | | | | | | |
| 5 | Ebbert et al., 2018 | X | X | X | X | X | X | X | X | | | X | | X | | | X | X |
| 6 | Germossa et al., 2018 | | | | | | | | | | X | | | | | | | |
| 7 | Hooten et al., 2016 | X | | | | | | | | | | | | | | | | |
| 8 | Jamison et al., 2015 | X | X | X | | X | | | | | | | | | | | | |
| 9 | Nuseir et al., 2016 | | | | | | | | | | | | | | | | | |
| 10 | Pearson et al., 2017 | | | | | | | | X | | | | X | | | | X | |
| 11 | Rash et al., 2018 | | | | | | | X | X | | | | X | | X | | | |
| 12 | Schreiber et al., 2014 | | | | | | | | | | | | | | | | | |

# Appendix E: Chronic Pain Management Education Session

Workshop description: Nurse Practitioner students will improve knowledge and attitudes towards the management of chronic non-malignant pain and safe opioid practices. Pharmacologic and non-pharmacologic treatment options, complementary therapies, and CDC guidelines for appropriate risk mitigation strategies in the proper management of chronic non-malignant pain will be examined.

| Workshop Objectives<br>At the completion of the workshop, the students will | Learning Objectives | Teaching Plan | Time Spent | Question |
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| 1. Demonstrate knowledge of the fundamental concepts of chronic pain management. | 1. Differentiate between different types of acute and chronic pain.<br>2. Appraise pharmacologic treatment options for chronic pain management<br>3. Evaluate cultural differences in the management of pain<br>4. Compare treatment plans for different chronic pain disorders | 1.1 Define acute pain vs. chronic pain<br>1.2 Compare nociceptive (somatic, visceral) pain and neuropathic pain<br>2.1 Review non-opioid medication options, including dosage, side effects, and drug interactions, including:<br>a. NSAIDs<br>b. Lidoderm<br>c. Flector<br>d. topical ointments<br>2.2 Examine opioid medication options, including dosage, side effects and drug interactions:<br>a. Norco<br>b. Oxycodone<br>c. Fentanyl<br>d. Morphine<br>e. Methadone<br>f. Tramadol<br>g. Dilaudid<br>2.3 Discuss other medications options, including dosage, side effects and drug interactions:<br>a. Cymbalta<br>b. gabapentin<br>c. Nortriptyline<br>3.1 Assess cultural considerations when caring for patients in pain<br>3.2 Reinforce the importance of recognizing spiritual aspects of the individual and pain management<br>4.1 Expand on treatment options for multiple disorders:<br>a. Fibromyalgia<br>b. Neuropathic pain<br>c. Lumbar DDD with radiculopathy<br>d. Post-polio Syndrome | 10 min<br><br>10 min<br><br>15 min<br><br>10 min<br><br>5 min<br>5 min<br>10 min | Q 13<br>Q 14, 15, 21<br>Q 5<br>Q 5, 6, 7,11, 13,19, 20, 25, 26, 27, 28<br>Q 15<br>Q 22, 29, 30<br>Q 10<br>Q14, 15 |
| 2. Evaluate opioid risk mitigation strategies. | 1. Integrate the CDC guidelines regarding safe opioid practice and risk mitigation strategies into practice<br>2. Appraise safe and effective prescribing of opioids for chronic pain management | 1.1 Establish realistic goals with patient<br>1.2 Prioritize medication management options including non-opioid and opioids<br>1.3 Calculate Morphine Milligram Equivalent (MME) based on medication and dosage | 1.1-1.7: 15 min | Q 7, 14, 8,<br>Q 5, 6, 7,11, 13,19, 20, 25, 26, 27, 28 |

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| | | 1.4 Appraise risks vs. benefits with the patient and collaborate the plan of care<br>1.5 Examine the recommendations to avoid concomitant use of benzodiazepines with opioids<br>1.6 Critique appropriate resources for patients with substance use disorder<br>1.7 Explain when the need for Naloxone is indicated<br>2.1 Evaluate urine drug testing protocol<br>2.2 Examine the Virginia Prescription Monitoring Program<br>2.3 Expand on the Morphine Milligram Equivalent (MME)<br>2.4 Evaluate the CAGE tool<br>2.5 Compare provider-patient pain agreements<br>2.6 Evaluate methods to prevent drug diversion<br>a. lockbox<br>b. No sharing of medication even with family/friends | 2.1-2.5 30 min | Q 16<br>Q 7, 24<br>Q 7, 24 |
| 3. Incorporate conservative measures and alternative treatments in the pain management treatment plan of care. | 1. Evaluate non-pharmacologic conservative treatment options for chronic pain.<br>2. Examine complementary therapies available for the management of chronic pain. | 1.1 Evaluate non-pharmacologic treatment options for chronic pain<br>a. Physical Therapy<br>b. Chiropractor<br>c. Massage Therapy<br>d. Behavioral Cognitive Therapy<br>1.2 Simulate injection techniques:<br>a. Trigger point<br>b. Joint injections<br>2.1 Discuss alternative therapies, including the following:<br>a. Turmeric<br>b. CBD oil | 15 min<br>30 min<br>15 min | Q2, 9<br>Q2, 5<br>Q 5 |
| 4. Analyze clinical scenarios to better manage patients with chronic musculoskeletal pain | 1. Integrate knowledge into clinical case scenarios to best assess and manage patients with chronic pain. | 1.1 Create diagnosis and treatment plan for patients in case study<br>1.2 Calculate medication doses and MME based on diagnosis | 30 min | Q 29, 30<br>Q 19 |

Appendix F: Approval Letter

*Waldron College of Health and Human Services*
*School of Nursing*

RADFORD
UNIVERSITY

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*Roanoke Higher Education Center site*
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*(540) 767-6179 fax*
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*Clinical Simulation Center – RU West Campus*
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*(540) 831-7604 fax*

**Letter of Support**

June 15, 2020

Mrs. Ida Sutherland, DNP Student
Dr. Euna Lee
Dr. Milena Staykova
Dr. Christine Fish-Huson
Radford University
School of Nursing

I as the Interim Director of Radford University School of Nursing support Mrs. Ida Sutherland's DNP project, titled as "*The Effects of a Pain Management Education Session on Nurse Practitioner Students' Knowledge and Attitude in Managing Non-Malignant Chronic Pain and Safe Opioid Prescribing Practice*", being implemented in the Radford and Radford University Carilion campuses BSN DNP FNP and Master's FNP programs.

Mrs. Ida Sutherland's DNP project aims to develop and implement the evidence-based, structured education session for chronic pain management and safe opioid prescribing practice to family nurse practitioners. The effect of education session will be measured by assessing the knowledge and attitude for chronic pain management before and after the education session.

Dr. Euna Lee is Mrs. Sutherland's DNP Project Team Leader for the project and currently, Ms. Sutherland is working on developing proposal and education session with Dr. Lee, Dr. Staykova, and Dr. Fish-Huson in summer 2020. Drs. Lee, Staykova, and Fish-Huson agreed to schedule Mrs. Sutherland's pain education workshop for both programs' FNP students during the intensive workshop week in fall 2020. The pain education workshop will take four hours to complete.

In conclusion, I am supporting Mrs. Ida Sutherland implementation of her project at Radford University and the Radford University Carilion in the family nurse practitioner programs intensive workshop in fall 2020.

Sincerely,

Iris C. Mullins

Iris Mullins, PhD, RN

Interim Director of Radford University School of Nursing
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Appendix G

RADFORD UNIVERSITY
Research Compliance Office

*Institutional Animal Care and Use Committee / Institutional Review Board*

19-August-2020

| | |
|---|---|
| TO: | Eunyoung Lee |
| RE: | Initial Expedited Approval |
| STUDY TITLE: | The Effect of a Pain Management Education Session on Knowledge and Attitude in Managing Non-malignant Chronic Pain and Safe Opioid Prescribing Practices |
| IRB REFERENCE #: | 2020-196 / FY20-128 |
| SUBMISSION TYPE: | Initial Submission |
| ACTION: | A pproved |
| APPROVAL DATE: | 18 -August-2020 |

The above-referenced study has been approved by Radford University's Institutional Review Board (IRB). Please note that if your research includes stamped materials, they will be provided with this letter and must be used when conducting your research. A copy of your approved IRB protocol is available for your records in IRBManager under your dashboard of active protocols.

Your study has been approved under Expedited Category 7: Research is on individual or group characteristics of behavior (including, but not limited to research on perception, cognition, motivation, identity, communication, cultural beliefs or practices, and social behavior) or the research employs survey, interviews, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies).

Should you need to make changes in your protocol, you must submit a request for amendment for review and approval before implementing the changes. Amendments must be submitted via the IRBManager system.

As the principal investigator for this project, you are ultimately responsible

for ensuring that your study is conducted in an ethical manner. You are also responsible for filing all reports related to this project.

If you have any questions, please contact the Research Compliance Office at 540.831.5290 or irb-iacuc@radford.edu. Please include your study title and reference number in all correspondence with this office.

Good luck with this project!

Anna Marie Lee

Anna Marie Lee,
MHA, CPIA Research
Compliance Manager
Radford University
https://www.radford.edu/content/research-compliance/home.html

Radford University

IRB

Approval Date: 18-August-2020

## Appendix H: Script for Recruitment

You are being invited to participate in a research study today. I am a nurse practitioner having 20 years of experience in family medicine and also specialized in pain management. I am also currently pursuing a doctoral degree in nursing practice, and this project is a part of the DNP final scholarly project.

As part of the Family Nurse Practitioner Curriculum, you all will be participating in a 4-hour educational session on chronic pain management. This workshop session was developed to meet the current needs for safe opioid prescribing practice and effective chronic pain management.

As part of the research, this study is attempting to evaluate the effect of a pain management education session on knowledge and attitude. The research portion of this study includes the completion of a pre-and post-survey and demographic information. Each survey will take approximately 15 minutes to complete. Please note again that the research portion of the study is the survey only. There is no penalty for not completing the survey, and you may withdraw from the research at any point. You will receive the educational session whether you choose or decline to complete the survey.

There will be minimal risk to the completion of the survey, and all information will be collected anonymously and remain confidential. After all of your questions have been answered and you choose to participate in this study, please go on to the demographic questions. Your consent to participate is indicated by your participation and completion of the surveys. Therefore, please keep the informed consent with you, and you don't need to turn the informed consent form to the researcher.

Pre-Survey

You all received the research package already, which include informed consent form, demographic survey, pre-survey, post-survey, and two envelopes. After you complete the pre-survey and demographic survey, please enclose it in the first envelop and turn it into the researcher when you completed it. If you choose not to participate in the survey, you are still instructed to put the blank pre-survey and demographic survey into the first envelope. Once you turn it into the researcher, you are welcome to leave the room or wait in the room. The education session will start 15 minutes from now.

Post-Survey

Now, all pain education session was completed. The post-survey has been provided to you. Again, after you complete the post-survey, please enclose it in the second envelope and turn it into the researcher when you completed it. If you choose not to participate in the survey, please put the blank post-survey in the second envelope and turn it into the researcher. Once you turn it into the researcher, you are welcome to leave the room at any time. Thanks for your time and for participating in this project.

Appendix I: Informed Consent

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**Informed Consent**

Title of Research: The Effect of a Pain Management Education Session on Knowledge and Attitude in Managing Non-malignant Chronic Pain and Safe Opioid Prescribing Practices

Researcher(s): Dr. Eunyoung Lee, PhD, FNP, ACNP, ANP, FAHA elee7@radford.edu
Ida Sutherland, MSN, RN, FNP-BC Student Researcher: isutherland@radford.edu

**Purpose:**
You are asked to be a volunteer in a research study designed to: evaluate the effects on knowledge and attitudes of family nurse practitioner students before and after an educational intervention regarding chronic non-malignant pain management.

**Procedures:**
If you decide to be in the study, you will be asked to complete a color-coded paper copy of the pre-survey (white) including the revised 30-item questionnaires of KASRP along with a demographic survey questionnaire before the educational session. Demographic information will include age, the highest level of education, years of experience as an RN, previous knowledge with addiction training, and prior pain management exposure or certification. The completion of the pre-survey will take fifteen minutes. You will then participate in a four-hour education session on chronic pain management, and safe opioid prescribing practice as part of the family nurse practitioner student fall intensive workshop. The education session will include lectures, clinical scenarios with analysis, and a hands-on portion. There will be a question and answer opportunity for 15 minutes after the education and before the post-surveys will be distributed. After attending the chronic pain management education session, the participants will complete a color-coded paper copy of the post-education survey (blue) on chronic pain management. The pre- and post-survey will have the pre-assigned study identification number on the top right section to match the pre and post-survey while keeping the anonymity. The survey will not collect any human identified information. The pre-survey will be collected before the educational session and placed in the sealed envelope before being submitted to the researcher. After the educational session, the post-survey will be completed and placed in another separate envelope before being turned in to the researcher. After the collection of all the data, the surveys will be matched by identification number with no other identifying information attached. The participants will be given 15 minutes to complete the survey. The research portion of the study includes the survey only, and there will be no penalty for not completing the questionnaire.

**Risks or Discomforts:**
This study has no more than the minimal risk involved in the participation of the educational intervention and questionnaire completion. For those who experience emotional distress from completion of survey due to lack of knowledge or past experiences, the participants can stop the completion of the survey and withdraw from the study at any time and will be referred to the

Counseling Center, if applicable. Counseling services will be available in the Counseling Center at Radford University at 540.831.5226.

The completion of the questionnaire is voluntary, with no penalty if not completed. Participants will be notified of the ability to withdraw from the study at any time in the project process.

**Compensation to You:**
There is no compensation from being in this study.

**Benefits:**
There are no direct benefits to you for participating in the research. However, students may gain knowledge of effective chronic pain management and safe opioid prescribing practice from the workshop, based on current practice guidelines from the professional organization and the evidence from the studies. The benefit will be for future generations of students to receive a refined program of study.

**Confidentiality:**
When you complete the survey, all faculty researcher will be asked to leave the room. All the completed survey will be collected by the DNP student researcher of this project. No personal protected information will be collected. The data collected from the surveys in this study are anonymous and will be only collected under the study identification number. The paper copy of the pre- and post-survey will be matched only by the pre-assigned study identification number in the top right corner. The pre-survey will be collected before the educational session and placed in the sealed envelope before being submitted to the researcher. After the educational session, the post-survey will be completed and placed in another separate envelope before being turned in to the researcher. After the collection of all the data, the surveys will be matched by identification number with no other identifying information attached.

You can choose not to be in this study. If you decide to be in this study, you may choose not to answer certain questions or not to be in certain parts of this study.

If you decide to be in this study, what you tell us will be kept private. If we present or publish the results of this study, your name will not be linked in any way to what we present.

**Costs to You:**
There are no costs to you for being in this study.

**Questions about Your Rights as a Research Participant:**
If at any time you want to stop being in this study, you may stop being in the study without penalty or loss of benefits by not completing the questionnaire. If you choose not to participate or decide to withdraw, there will be no impact on your grades or academic standing in the School of Nursing. You will be permitted to continue with the educational session whether you choose or decline to complete the survey.

If you have questions now about this study, ask before completing the survey.

If you have any questions later, you may contact Dr. Euna Lee @ 540-831-7711 or elee7@radford.edu. If this study raised some issues that you would like to discuss with a professional, please contact the Counseling Center at 540.831.5226.

This study was approved by the Radford University Committee for the Review of Human Subjects Research. If you have questions or concerns about your rights as a research subject or have complaints about this study, you should contact Dr. Ben Caldwell, Institutional Official and Dean of the College of Graduate Studies and Research, bcaldwell13@radford.edu, 1.540.831.57

It is your choice whether or not to be in this study. What you choose will not affect any current or future relationship with Radford University.

You will be given a copy of this information to keep for your records.

If all of your questions have been answered and you would like to take part in this study, please go on to the demographic questions. Your consent to participate is indicated by your participation in the surveys.

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Appendix J: Demographic Information

1. What is your age? _____

2. What is your highest degree? a. High School
b. Bachelor Degree
c. Master Degree
d. Doctoral Degree

3. What are your years of experience as a Registered Nurse? _____

4. Have you ever received any addiction training before? a. Yes b. No

5. Have you ever received any pain management education or training before? a. Yes b. No

6. Are you a certified pain management nursing specialist, provided by a national certifying board
(i.e. ANCC)? a. Yes b. No

Appendix K: Knowledge and Attitude Survey Regarding Pain

July 2014

The "Knowledge and Attitudes Survey Regarding Pain" tool can be used to assess nurses and other professionals in your setting and as a pre and post test evaluation measure for educational programs. The tool was developed in 1987 and has been used extensively from 1987 - present. The tool has been revised over the years to reflect changes in pain management practice.

Regarding issues of reliability and validity: This tool has been developed over several years. Content validity has been established by review of pain experts. The content of the tool is derived from current standards of pain management such as the American Pain Society, the World Health Organization, and the National Comprehensive Cancer Network Pain Guidelines. Construct validity has been established by comparing scores of nurses at various levels of expertise such as students, new graduates, oncology nurses, graduate students, and senior pain experts. The tool was identified as discriminating between levels of expertise. Test-retest reliability was established (r>.80) by repeat testing in a continuing education class of staff nurses (N=60). Internal consistency reliability was established (alpha r>.70) with items reflecting both knowledge and attitude domains.

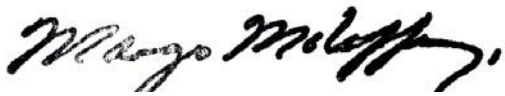
Regarding analysis of data: We have found that it is most helpful to avoid distinguishing items as measuring either knowledge or attitudes. Many items such as one measuring the incidence of addiction really measures both knowledge of addiction and attitude about addiction. Therefore, we have found the most benefit to be gained from analyzing the data in terms of the percentage of complete scores as well as in analyzing individual items. For example, we have found it very helpful to isolate those items with the least number of correct responses and those items with the best scores to guide your educational needs.

Enclosed for your use is a copy of our instrument and an answer key. You may use and duplicate the tool for any purpose you desire in whole or in part. References to some of our studies which have included this tool or similar versions are included below. We have received hundreds of requests for the tool and additional use of the tool can be found in other published literature. We also acknowledge the assistance of several of our pain colleagues including Judy Paice, Chris Pasero, and Nessa Coyle in the revisions over the years. If using or publishing the tool results please cite the reference as **"Knowledge and Attitudes Survey Regarding Pain" developed by Betty Ferrell, RN, PhD, FAAN and Margo McCaffery, RN, MS, FAAN, (http://prc.coh.org), revised 2014.**

We hope that our tool will be a useful aid in your efforts to improve pain management in your setting.

Sincerely,

Betty R. Ferrell, RN, PhD, FAAN
Research Scientist



Margo McCaffery, RN, MS, FAAN
Lecturer and Consultant

## Knowledge and Attitudes Survey Regarding Pain

**True/False – Circle the correct answer.**

**T F** 1. Vital signs are always reliable indicators of the intensity of a patient's pain.

**T F** 2. Patients who can be distracted from pain usually do not have severe pain.

**T F** 3. Patients may sleep in spite of severe pain.

**T F** 4. Respiratory depression rarely occurs in patients who have been receiving stable doses of opioids over a period of months.

**T F** 5. Combining analgesics that work by different mechanisms (e.g., combining an NSAID with an opioid) may result in better pain control with fewer side effects than using a single analgesic agent.

**T F** 6. The usual duration of analgesia of 1-2 mg morphine IV is 4-5 hours.

**T F** 7. Opioids should not be used in patients with a history of substance abuse.

**T F** 8. Elderly patients cannot tolerate opioids for pain relief.

**T F** 9. Patients should be encouraged to endure as much pain as possible before using an opioid.

**T F** 10. Patients' spiritual beliefs may lead them to think pain and suffering are necessary.

**T F** 11. After an initial dose of opioid analgesic is given, subsequent doses should be adjusted in accordance with the individual patient's response.

**T F** 12. Giving patients sterile water by injection (placebo) is a useful test to determine if the pain is real.

**T F** 13. Norco (hydrocodone 5 mg + acetaminophen 300 mg) PO is approximately equal to 5-10 mg of morphine PO.

**T F** 14. If the source of the patient's pain is unknown, opioids should not be used during the pain evaluation period, as this could mask the ability to correctly diagnose the cause of pain.

**T F** 15. Anticonvulsant drugs such as gabapentin (Neurontin) produce optimal pain relief after a single dose.

**T F** 16. Benzodiazepines are not effective pain relievers and are rarely recommended as part of an analgesic regiment.

**T F** 17. Narcotic/opioid addiction is defined as a chronic neurobiologic disease, characterized by behaviors that include one or more of the following: impaired control over drug use, compulsive use, continued use despite harm, and craving.

**T F** 18. The term 'equianalgesia' means approximately equal analgesia and is used when referring to the doses of various analgesics that provide approximately the same amount of pain relief.

**Multiple Choice – Place a check by the correct answer.**

19. A 30 mg dose of oral morphine is approximately equivalent to:
    a. Morphine 5 mg IV
    b. Morphine 10 mg IV
    c. Morphine 30 mg IV
    d. Morphine 60 mg IV

20. A patient with persistent cancer pain has been receiving daily opioid analgesics for 2 months. Yesterday the patient was receiving morphine 200 mg/hour intravenously. Today he has receiving 250 mg/hour intravenously. The likelihood of the patient developing clinically significant respiratory depression in the absence of new comorbidity is
    a. less than 1%
    b. 1-10%
    c. 11-20%
    d. 21-40%
    e. > 41%

21. The <u>most likely</u> reason a patient with pain would request increased doses of pain medication is
    a. The patient is experiencing increased pain.
    b. The patient is experiencing increased anxiety or depression.
    c. The patient is requesting more staff attention.
    d. The patient's requests are related to addiction.

22. The most accurate judge of the intensity of the patient's pain is
    a. the treating physician
    b. the patient's primary nurse
    c. the patient

d. the pharmacist
e. the patient's spouse or family

23. Which of the following describes the best approach for cultural considerations in caring for patients in pain:
    a. There are no longer cultural influences in the U.S. due to the diversity of the population.
    b. Cultural influences can be determined by an individual's ethnicity (e.g., Asians are stoic, Italians are expressive, etc.).
    c. Patients should be individually assessed to determine cultural influences.
    d. Cultural influences can be determined by an individual's socioeconomic status (e.g., blue collar workers report more pain than white collar workers).

24. How likely is it that patients who develop pain already have an alcohol and/or drug abuse problem?

    < 1%  5 – 15%  25 - 50%  75 - 100%

25. The time to peak effect for morphine given IV is
    a. 15 min.
    b. 45 min.
    c. 1 hour
    d. 2 hours

26. The time to peak effect for morphine given orally is
    a. 5 min.
    b. 30 min.
    c. 1 – 2 hours
    d. 3 hours

27. Following abrupt discontinuation of an opioid, physical dependence is manifested by the following:
    a. sweating, yawning, diarrhea and agitation with patients when the opioid is abruptly discontinued.
    b. Impaired control over drug use, compulsive use, and craving.
    c. The need for higher doses to achieve the same effect.
    d. a and b

28. Which statement is true regarding opioid induced respiratory depression:
    a. More common several nights after surgery due to accumulation of opioid.
    b. Obstructive sleep apnea is an important risk factor.
    c. Occurs more frequently in those already on higher doses of opioids before surgery.
    d. Can be easily assessed using intermittent pulse oximetry.

**Case Studies**

Two patient case studies are presented. For each patient you are asked to make decisions about pain and medication.

**Directions:** Please select one answer for each question.

29. Patient A: Andrew is 25 years old and this is his first day following abdominal surgery. As you enter his room, he smiles at you and continues talking and joking with his visitor. Your assessment reveals the following information: BP = 120/80; HR=80; R = 18; on a scale of 0 to 10 (0 = no pain/discomfort, 10 = worst pain/discomfort) he rates his pain as 8.

On the patient's record you must mark his pain on the scale below. Circle the number that represents your assessment of Andrew's pain.

0 1 2 3 4 5 6 7 8 9 10

---

No pain/discomfort Worst Pain/discomfort

a. Your assessment, above, is made two hours after he received morphine 2 mg IV. Half hourly pain ratings following the injection ranged from 6 to 8 and he had no clinically significant respiratory depression, sedation, or other untoward side effects. He has identified 2/10 as an acceptable level of pain relief. His physician's order for analgesia is "morphine IV 1-3 mg q1h PRN pain relief." Check the action you will take at this time.
    i. Administer no morphine at this time.
    ii. Administer morphine 1 mg IV now.
    iii. Administer morphine 2 mg IV now.
    iv. Administer morphine 3 mg IV now.

30. Patient B: Robert is 25 years old and this is his first day following abdominal surgery. As you enter his room, he is lying quietly in bed and grimaces as he turns in bed. Your assessment reveals the following information: BP = 120/80; HR = 80; R = 18; on a scale of 0 to 10 (0 = no pain/discomfort, 10 = worst pain/discomfort) he rates his pain as 8.

On the patient's record you must mark his pain on the scale below. Circle the number that represents your assessment of Robert's pain:

0 1 2 3 4 5 6 7 8 9 10

---

No pain/discomfort Worst Pain/Discomfort

b. Your assessment, above, is made two hours after he received morphine 2 mg IV. Half hourly pain ratings following the injection ranged from 6 to 8 and he had no clinically significant respiratory depression, sedation, or other untoward side effects. He has identified 2/10 as an acceptable level of pain relief. His physician's order for analgesia is "morphine IV 1-3 mg q1h PRN pain relief." Check the action you will take at this time:

   i. Administer no morphine at this time.
   ii. Administer morphine 1 mg IV now.
   iii. Administer morphine 2 mg IV now.
   iv. Administer morphine 3 mg IV now.

**Answer Key**

Knowledge and Attitudes Survey Regarding Pain

**True/False – Circle the correct answer.**

**F** 1. Vital signs are always reliable indicators of the intensity of a patient's pain.

**F** 2. Patients who can be distracted from pain usually do not have severe pain.

**T** 3. Patients may sleep in spite of severe pain.

**T** 4. Respiratory depression rarely occurs in patients who have been receiving stable doses of opioids over a period of months.

**T** 5. Combining analgesics that work by different mechanisms (e.g., combining an NSAID with an opioid) may result in better pain control with fewer side effects than using a single analgesic agent.

**F** 6. The usual duration of analgesia of 1-2 mg morphine IV is 4-5 hours.

**F** 7. Opioids should not be used in patients with a history of substance abuse.

**F** 8. Elderly patients cannot tolerate opioids for pain relief.

**F** 9. Patients should be encouraged to endure as much pain as possible before using an opioid.

**T** 10. Patient's spiritual beliefs may lead them to think pain and suffering are necessary.

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**T** 16. Benzodiazepines are not effective pain relievers and are rarely recommended as part of an analgesic regiment.

**T** 17. Narcotic/opioid addiction is defined as a chronic neurobiologic disease, characterized by behaviors that includes one or more of the following: impaired control over drug use, compulsive use, continued use despite harm, and craving.

**T** 18. The term 'equianalgesia' means approximately equal analgesia and is used when referring to the doses of various analgesics that provide approximately the same amount of pain relief.

## Answer Key

Knowledge and Attitudes Survey Regarding Pain

**Multiple Choice – Place a check by the correct answer.**

19. A 30 mg dose of oral morphine is approximately equivalent to:
    a. Morphine 5mg IV
    *b. Morphine 10 mg IV
    c. Morphine 30 mg IV
    d. Morphine 60 mg IV

20. Analgesics for post-operative pain should initially be given
    *a. around the clock on a fixed schedule
    b. only when the patient asks for the medication
    c. only when the nurse determines that the patient has moderate or greater discomfort

21. The most likely reason a patient with pain would request increased doses of pain medication is
    *a. The patient is experiencing increased pain.
    b. The patient is experiencing increased anxiety or depression.
    c. The patient is requesting more staff attention.
    d. The patient's requests are related to addiction.

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    a. the treating physician
    b. the patient's primary nurse
    *c. the patient
    d. the pharmacist
    e. the patient's spouse or family

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are stoic, Italians are expressive, etc).

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< 1% * **5 - 15%** 25 - 50% 75 - 100%

25. The time to peak effect for morphine given IV is

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b. 45 min.

c. 1 hour

d. 2 hours

26. The time to peak effect for morphine given orally is

a. 5 min.

b. 30 min

* c. 1 – 2 hours

d. 3 hours

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**Directions:** Please select one answer for each question.

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    a. On the patient's record you must mark his pain on the scale below. Circle the number that represents your assessment of Andrew's pain.

0 1 2 3 4 5 6 7 ***8** 9 10

---

No pain/discomfort Worst Pain/Discomfort

    b. Your assessment, above, is made two hours after he received morphine 2 mg IV. Half hourly pain ratings following the injection ranged from 6 to 8 and he had no clinically significant respiratory depression, sedation, or other untoward side effects. He has identified 2/10 as an acceptable level of pain relief. His physician's order for analgesia is "morphine IV 1-3 mg q1h PRN pain relief." Check the action you will take at this time.

1. Administer no morphine at this time.
2. Administer morphine 1 mg IV now.
3. Administer morphine 2 mg IV now.
*4. Administer morphine 3 mg IV now.

30. Patient B: Robert is 25 years old and this is his first day following abdominal surgery. As you enter his room, he is lying quietly in bed and grimaces as he turns in bed. Your assessment reveals the following information: BP = 120/80; HR = 80; R = 18; on a scale of 0 to 10 (0 = no pain/discomfort, 10 = worst pain/discomfort) he rates his pain as 8.

    c. On the patient's record you must mark his pain on the scale below. Circle the number that represents your assessment of Robert's pain:

0 1 2 3 4 5 6 7 ***8** 9 10

---

No pain/discomfort Worst Pain/Discomfort

    d. Your assessment, above, is made two hours after he received morphine 2 mg IV. Half hourly pain ratings following the injection ranged from 6 to 8 and he had no clinically significant respiratory depression, sedation, or other untoward side effects. He has identified 2/10 as an acceptable level of pain relief. His physician's order for analgesia is "morphine IV 1-3 mg q1h PRN pain relief." Check the action you will take at this time:

1. Administer no morphine at this time.
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*4. Administer morphine 3 mg IV now