

Provider Education to Increase Knowledge of Chronic Pain Assessment in a Pain Clinic: A
Quality Improvement Project

A Scholarly Project Presented to the Faculty of the Nicole Wertheim College of Nursing and
Health Sciences

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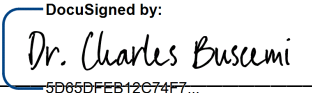
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Abstract

Suboptimal pain management is a significant problem, even in specialized settings including pain clinics. To improve provider knowledge of effective pain management techniques for patients, education has been highlighted in the literature as a means to enhance provider understanding of the topic and to improve patient care. This quality improvement project sought to implement a provider education program in a pain management clinic to help enhance provider knowledge of effective pain management practices. Using a sample of 10 medical providers (medical students and advanced practice registered nurses) from a specialty pain clinic operating in South Florida, a pre-/post-intervention design was employed to measure provider knowledge before and following an educational program. The results of this project indicated that mean knowledge scores from providers increased from a pre-intervention mean of 4.6 to a post-intervention mean of 9.0. This result was found to be statistically significant at $p = 0.0001$, suggesting that the educational program was effective for improving provider knowledge. The implications of these findings are discussed with recommendations for expanding research on the topic and for expanding the program to further enhance provider knowledge of the topic.

Keywords: nursing, pain management, provider education, quality improvement

Provider Education to Increase Knowledge of Chronic Pain Assessment in a Pain Clinic

Pain is a common symptom reported by patients in all clinical settings. Pain is defined as an unpleasant sensory and emotional experience that can result in significant damage and alterations in normal physiological and psychological functioning (Finnerup, 2019). Evidence indicates that pain can be classified in various ways based on the specific manner in which it impacts the patient (Finnerup, 2019). In particular, pain can be acute or chronic (Finnerup, 2019). Regardless of the type of pain experienced by the patient, the principle focus of treatment is often pharmacological in nature (Hylands-White et al., 2017). Scholars note that opioids are highly effective at blocking pain signals in the brain; however, these medications pose significant risk to the patient including the potential for addiction (Collier, 2018). Other nonpharmacological methods of pain management have been proposed in the literature and do show promise for reducing symptoms of pain while also limiting the use of pharmacological tools to combat the problem (Hylands-White et al., 2017).

Despite the presence of various pharmacological and nonpharmacological approaches to pain management, few providers have a comprehensive understanding of the scope and efficacy of various evidence-based interventions for the treatment of pain (Nuseir et al., 2016). This situation has had a systemic impact on providers, patients, and the healthcare system in general. Specifically, scholars note that reliance on opioids for the treatment of pain has created a situation in which pain management for the patient has become a challenge for balancing patient comfort and relief with the harms of opioids (Barth et al., 2017). In many instances, patient pain is undertreated as providers take a conservative approach to pharmacological management of pain (Carnago et al., 2021). When this occurs providers deliver care that is suboptimal and patient pain remains unaddressed (Carnago et al., 2021). Pain has been shown to have a broad

impact on patient health and well-being resulting in increases in morbidity and poorer patient quality of life (Almeida et al., 2020). Improving provider capabilities for effective pain management is therefore essential to improving the care of patients who experience pain.

Problem Statement

Pain is one of the major health issues affecting patients and forcing them to seek medical treatment. In clinical settings offering pain management care, AbuBaker et al. (2019) explain that nurse practitioners and other healthcare providers have a fundamental role in assessing patients to establish the location, severity, and nature of pain before planning and executing evidence-based interventions to alleviate pain and suffering. Assessment of pain is a crucial step for further planning and implementing treatment since causes, precipitators, or relieving factors influence health care decisions (Fu et al., 2018). Despite this most providers lack fundamental knowledge of evidence-based interventions for the holistic and comprehensive assessment and treatment of pain (Kim et al., 2021). Consequently, a closer look at this problem is warranted. Included here is a consideration of the problem identification, background, scope of the problem, consequences of the problem, knowledge gaps, and proposed solution.

Problem Identification

According to Mills et al. (2019), chronic pain is a complex distressing problem that manifests as a result of disease or injury damaging body tissues. Although alleviating pain through pain-relieving interventions is appropriate for maintaining optimal levels of quality of life by mitigating suffering, many patients experience challenges in achieving high levels of pain relief (Fu et al., 2018). Consequently, these patients continue experiencing mental, social, and physical functioning impairments, thus, reducing the quality of their lives (AbuBaker et al., 2019). Scholars argue that in order for the treatment and management of pain to be effective,

providers must attend to more than just the physical symptoms of pain reported by the patient (Paul-Savoie et al., 2018). More specifically, providers need to treat the patient holistically, utilizing a biopsychosocial approach to care that not only integrates the physical elements of pain but also considers the psychological and social factors involved in the patient's experience of pain (Paul-Savoie et al., 2018). Only by comprehensively attending to the needs of the patient can pain be effectively managed in clinical practice (Paul-Savoie et al., 2018).

Eaton et al. (2020) acknowledge that most providers are unprepared to manage pain in the clinical setting due, in large part, to a lack of training and education on the subject along with limited resources to deliver care. Hsu et al. (2019) further assert that most evidence-based practice guidelines for the treatment of various types of pain focus on the use of interdisciplinary care along with multimodal interventions such as physical therapy and psychological counseling along with safe opioid prescribing practices to effectively manage pain. The goal for pain management is to alleviate patient distress while providing sustainable interventions that limit the side effects of treatment (Hsu et al., 2019). Despite clear guidance on the treatment of pain, most providers continue to rely heavily on pharmacological interventions for treatment including opioids (Seal et al., 2017). While opioids have been shown to be effective for controlling the physical discomfort associated with pain, these medications carry with them notable side effects including potential kidney and liver damage along with the potential for addiction (Bachi et al., 2017).

Background

Chronic pain is an outcome of multiple events and processes resulting in tissue damage. According to Mills et al. (2019), chronic pain varies in intensity, duration, and effects on social, emotional, psychological, and physical spheres of life, which healthcare providers should know

to plan and implement appropriate pain-relieving treatments. High impact chronic pain is one that has lasted for over three months or longer and is accompanied by at least one major activity restriction, such as being unable to do household chores, go to school, or unable to work outside the home (Pitcher et al., 2018). The primary goal of assessing and treating patients with chronic pain is to recognize the causes, intensity, duration, and location of the pain, as well as relieving and precipitating factors as a strategy to determine whether specific treatments can contribute to improvements (Mills et al., 2019). Bifulco et al. (2021) explain that research on people experiencing chronic pain reveals the disproportionate burden of the disease in vulnerable, underserved populations, such as those without health insurance, lower levels of education, and low socioeconomic status. Additionally, treating chronic pain in these patients is more challenging because of poor assessment, especially when healthcare professionals fail to comply with pain assessment guidelines (Bifulco et al., 2021).

Beginning in the late 1990s and early 2000s, the use of opioids for the treatment of chronic pain became more common place (Jones et al., 2018). While opioids had successfully been used as part of the treatment of acute pain, new opioid medications promising fewer side effects and less potential for addiction were introduced (Jones et al., 2018). The medications were initially viewed as a panacea for treating pain providing effective symptom relief at a low cost (Jones et al., 2018). Although pharmacological management of pain was viewed as being essential to helping patients with chronic pain, by the mid- to late 2010s, an alarming public health crisis began to emerge in which opioid overdose deaths began increasing at a substantial rate (Tompkins et al., 2017). Data indicate that between 1999 and 2017 the number of drug overdoses occurring in the United States increased sixfold (Tompkins et al., 2017). Through a

review of the data, experts were able to identify a high rate of opioid prescribing as the primary culprit of this public health crisis (Tompkins et al., 2017).

Scope of the Problem

Chronic pain affects a huge number of adults in the United States and worldwide. Based on the 2016 global burden of disease study, the worldwide prevalence of chronic pain is high, with more than 1.9 billion adults experiencing recurrent headaches and other forms of pain. In the United States, the statistical evidence of the year 2016 reveals that 20.4% of the adult population, which constitutes 50 million people, experience chronic pain (Bifulco et al., 2021). About 8% of this adult population have experienced high-impact chronic pain that limits life activities including work; whose prevalence increase with advancing age, comprise more than 196 million people (Dahlhamer et al., 2018). The statistical evidence on the prevalence of adults with chronic pain reveals the significant size of this health problem to attract the attention of nurse practitioners and medical residents in finding and implementing evidence-based interventions.

Populations of adults are affected by chronic pain differently, majorly due to disparities in social determinants of health. The variation in pain perceptions between people of different racial-ethnic and socioeconomic status as well as the differences in the occurrence of disease causing chronic pain are part of the reason for disparities in chronic pain occurrence (Kuehn, 2018). The 2016 National Health Interview Survey reveals that non-Hispanic whites are one of the highly affected racial-ethnic groups of adults with a 21% prevalence rate of chronic pain; however, no differences are recognized in the rate of high-impact chronic pain between racial-ethnic groups (Kuehn, 2018). Although veterans are more likely to report chronic pain when seeking medical care at a rate of 26%, many did not experience high-impact chronic pain

(Kuehn, 2018). Bifulco et al. (2021) explain that social determinants of health further influence the prevalence of chronic pain in adult Americans by affecting the vulnerability to diseases associated with the causation of chronic pain. For example, 29.6% of adults living below the poverty line are directly affected by chronic pain, while 24% are in rural areas (Kuehn, 2018). Therefore, chronic pain is a widespread health problem affecting millions of adults in all parts of the country.

Consequences of the Problem

Chronic pain has adverse health and economic consequences to individuals, families, and the entire healthcare system. According to Mills et al. (2019), chronic pain is a major cause of patients seeking medical services. However, pain-relieving treatments are costly (Bifulco et al., 2021). Apart from the costly healthcare services, chronic pain contributes to substantial disabilities impairing the functional abilities of adult patients. As a result, these patients are economically unproductive, which leads to productivity losses. The United States incurs about \$560-\$635 billion every year indirect and direct costs of chronic pain compared to €200 billion in Europe (Hadi et al., 2019). Moreover, chronic pain causes immense stress on families while depriving the economy of a productive workforce to enhance economic growth and development.

People with chronic pain experience many challenges, thus, lowering the quality of life of their families. Mills et al. (2019) explain that chronic pain is among the top 10 reasons for disability in adults that lowers the quality of life. According to Salduker et al. (2019), chronic pain has a bidirectional relationship with insomnia, depression, and anxiety, which further worsen the health status of adults. Additionally, chronic pain is associated with increased prescription of opioid medications worsening the opioid crisis in healthcare. According to

Salduker et al., the prolonged use of opioid analgesics induces central sensitization, promoting hyperalgesia, and persistent pain. According to Salduker et al., pain is a primarily unpleasant emotional and sensory experience of discomfort attributed to potential or actual damage to tissues. Such unpleasant feelings and experiences are considered chronic pain if they persist beyond the normal time anticipated for healing, namely, more than three months (Salduker et al., 2019). This pain affects more than 50% of patients impairing their functional abilities and forcing them to seek primary care services (AbuBaker et al., 2019). Therefore, inappropriate assessment and management of pain can exacerbate the adverse effects of chronic pain in adults.

Knowledge Gaps

Current knowledge gaps in the assessment and management of chronic pain appear to stem from a lack of provider knowledge regarding this topic (Eaton et al., 2020). In a recent study of 5,571 clinicians across multiple care settings, Williamson et al. (2021) examined the scope and impact of gaps in provider knowledge, providing important insight into the current situation. According to Williamson et al., providers in all care settings demonstrated persistent and profound knowledge gaps in critical areas related to pain management including, the mechanisms of pain, general principles of analgesic pharmacotherapy, and the potential harms of opioid treatment. Additional data provided by Vacek et al. (2021) highlights knowledge gaps for nurses providing care for patients with pain. According to these authors, nurses often have targeted knowledge regarding how to treat pain in specific patients. When pain management outside of the nurse's specialization is needed, most nurses lack critical understanding of how to effectively and comprehensively assess and manage pain.

The knowledge gaps noted here clearly have implications for the effective management of pain in various patient groups. Pain management in clinical practice has been noted to be

suboptimal (Anderson et al., 2019). These results have been noted even in pain management clinics where practitioners are focused specifically on this issue (Fernández-Castillo et al., 2020). Given the systemic impact of pain on the patient and population well-being, efforts to improve chronic pain assessment and management will be vital not only for improving the care that patients receive but also for addressing the broader implications that pain has for society and on rising healthcare costs.

Proposal Solution

The proposed solution to the current gaps in knowledge is to provide clinician education to expand knowledge regarding evidence-based treatment of chronic pain. A cursory overview of the literature on this topic does indicate that there is considerable support for provider education to address this issue in practice (McCalmont et al., 2018; Trudeau et al., 2017). McCalmont et al. (2018), for instance, evaluate the use of a web-based training program to evaluate knowledge gains made by providers regarding pain management. The results of the study confirm that knowledge levels of providers did increase, suggesting that the educational intervention was effective. Further, Trudeau et al. (2017) provided an online educational program to increase provider knowledge of patient pain management and assessment in clinical practice. Data obtained from this study indicated that significant gains were made in knowledge and attitudes toward pain management. Further a four-month follow-up following the educational program revealed that pain knowledge did result in changes to practitioner practice through an increase in nonpharmacological interventions to treat pain as well as better safe opioid prescribing practices (Trudeau et al., 2017). Through the use of provider education programs, improvements in provider knowledge that translate into changes in practice may be achievable, leading to higher quality care for patients.

Literature Review

The development of evidence-based practice requires a consideration of what has been shown through research to be effective for managing a specific health issue or condition. Consequently, to support the use of education to improve provider knowledge of pain assessment and management, it is vital to review what other scholars have noted about the intervention and its efficaciousness. A review of the evidence base to support the proposed intervention—provider education—is included here along with a consideration of the search strategy employed to identify relevant literature on the subject. Through a review of the literature available on the topic of provider education to increase knowledge of pain assessment and management, it will be possible to demonstrate the efficaciousness of the proposed solution and to highlight the importance of making this evidence-based change in clinical practice.

Search Strategy

To identify a solid evidence, base on the topic of provider education to increase knowledge of pain assessment and management, five health and nursing related electronic journal databases were first identified: CINAHL, Medline, Ovid, ProQuest, and ScienceDirect. The databases were searched utilizing limiters including date of publication (2015-2022), article published in a peer reviewed journal, article written in English, and article available in full-text. Searches undertaken of the identified electronic article databases utilized targeted terms for the project associated with Boolean operators such as AND, OR, and NOT and included “provider education,” and “chronic pain,” and “knowledge.” Synonyms were also used including “provider training,” and “pain” and “comprehension” or “awareness.”

All searches listed articles based on relevance to the search terms. In instances where more than 200 results were returned, the first 200 article abstracts were reviewed. If the abstract

indicated that a primary study involving provider education regarding pain assessment and management were used, the abstract was placed in a folder for full-text review. After all searches had been completed duplicates were removed and a review of the full-text of the article was undertaken. Articles that were not relevant were excluded and the remaining articles were assessed for level of evidence using Polit and Beck's (2017) taxonomy. Articles with the highest level of evidence and quality were included in this literature review.

Summary of the Literature

A review of the literature on the use of provider education or training to improve pain assessment and management does indicate that there have been myriad high-quality studies to support the use of this intervention in practice. For the purposes of this literature review, three systematic reviews (Joypaul et al., 2019; Ruben et al., 2015; Ruben et al., 2019) as well as five randomized controlled trials (Anderson et al., 2016; Chiasson et al., 2020; Dear et al., 2018; Gunnarsdottir et al., 2017; Trudeau et al., 2017) examining the use of provider education were located. These studies represent the highest level of evidence for building evidence-based practice and were therefore included in this review (Polit & Beck, 2017). Synthesis of the information located regarding this topic is included below.

As noted three systematic reviews were included regarding the use of provider education or training to help increase knowledge of pain assessment and management (Joypaul et al., 2019; Ruben et al., 2015; Ruben et al., 2019). The first systematic review evaluated was written by Joypaul et al. (2019) and focused on the use of provider education to improve the management of patient pain. A total of 27 studies were included in the review with the results indicating that 86% of the articles support the use of provider education as useful for augmenting knowledge and improving the way in which providers deliver care for patients. The articles included

providers from different specializations including primary care and pain management clinics. Ruben et al. (2015) further completed a systematic review on provider factors that contribute to the accuracy of pain assessment in practice. In this review, 60 articles involving physicians and nurses from multiple areas of specialization were included. The authors argue that in most (75%) of the studies reviewed provider education was noted to play a significant role in the ability of providers to accurately assess patient pain. These results were also supported by Ruben et al. (2019) who included the results of 76 articles in a systematic review on provider education in pain assessment. According to these authors, training is needed for providers to effectively and comprehensively assess patient pain.

Five randomized controlled trials were also identified for inclusion in this literature review (Anderson et al., 2016; Chiasson et al., 2020; Dear et al., 2018; Gunnarsdottir et al., 2017; Trudeau et al., 2017). A review of these studies demonstrates overwhelming support for the use of provider education as a means to augment pain assessment and management in clinical practice. For instance, Anderson et al. (2016) evaluated the use of a specific provider educational program known as the Stepped Care Model for Pain Management (SCM-PM) implemented at a multisite federally funded qualified healthcare center. In this study 25 providers agreed to undergo the multicomponent intervention including education on pain care and protocols for pain assessment and management to evaluate provider knowledge scores as well as practice characteristics including the use of behavioral health providers and follow-up for treating pain. Results were compared against a control group that did not participate in the program. The results indicated that for those enrolled in the training program there was an 11% increase in knowledge. Further, pain documentation increased in the education group along with referrals for

interdisciplinary management of the patient (6.96%, $p = 0.009$). The results support the use of education to improve pain management in the clinical setting.

Further research conducted by Chaisson et al. (2020) provides additional support for using provider education to enhance pain assessment and management in clinical practice. In particular, Chiasson et al. (2020) evaluated the outcomes of an 11-hour integrative pain management (IPM) online course in which 22-medical residents were randomized to either an education group ($n = 11$) or a control group that did not receive education ($n = 11$). The intervention group made statistically significant gains ($P < 0.05$) in medical knowledge, attitudes toward pain patients, and self-efficacy in providing nonpharmacological therapies for the treatment of pain. The intervention group experienced no changes in any of these variables. The authors conclude that education to improve provider capabilities for pain management should be considered to help enhance patient care.

An additional randomized controlled trial conducted by Dear et al. (2018) further utilized a randomized controlled trial to provide 12 month internet delivered pain management program for clinicians: the Pain Course. In this study, treatment outcomes for patients were measured to assess changes in outcomes as a result of training for providers who did and did not use the program. The results suggest that in patients that worked with providers who received the training overall pain levels declined 21% ($d \geq .67$) along with patient disability levels (27%, $d \geq .67$), depression (36%, $d \geq .80$), and patient anxiety levels (38%, $d \geq .67$). when compared with patients enrolled in groups where providers did not receive the training. Based on these outcomes it is possible to see that provider education can have a systemic impact on patient outcomes as better pain management not only reduces pain symptoms but also results in improvements in other psychosocial outcomes for the patient.

Gunnarsdottir et al. (2017) also utilized a randomized controlled trial framework to evaluate changes in nurse knowledge of pain management in the hospital setting. In this research 12 nurses were randomly assigned to an education group and 11 were assigned to a waitlist or control group in which no education was provided. The purpose of the study was to evaluate improvements in nurse knowledge, attitudes, assessment practices, and adequacy of patient pain management. Data obtained from this study indicates that pain knowledge among nurses increased 25% overall for the intervention group and actually declined by 5% in the waitlist group. While the results do not specifically indicate what specific outcomes will result for patients as a result of implementing the educational program, it is anticipated that this improvement in knowledge will result in changes to practice that will improve pain management practices used by nurses (Gunnarsdottir et al., 2017).

The final randomized controlled trial reviewed was conducted by Trudeau et al. (2017) and included the effects of an online education program for pain management in primary care providers. A total of 238 primary care providers were recruited and randomized to either an education (experimental) or no education (control) group. Providers enrolled in the education group made statistically significant gains ($P < 0.05$) in knowledge of pain, attitudes toward pain, and pain practice behaviors four months after completing the training when compared with providers who were not enrolled in the educational program. The authors conclude that training programs will have a positive impact on the ability of providers to effectively deliver patient care to help improve pain assessment and management.

Strengths and Limitations

A review of the strengths and limitations of the studies acquired for building this quality improvement project is warranted. As noted, all of the studies included were noted to be of the

highest level for building evidence-based practice (Polit & Beck, 2017). Additionally, each of the studies reviewed does support the use of provider education as a means to help improve not only provider knowledge of pain assessment and management but also to improve care practices provided to patients. Further, a review of the information provided does indicate that various approaches to education can be effective including the use of online (Chaisson et al., 2020; Dear et al., 2018; Joypaul et al., 2019; Ruben et al., 2015; Ruben et al., 2019; Trudeau et al., 2017) or direct provider education (Anderson et al., 2016; Gunnarsdottir et al., 2017; Joypaul et al., 2019; Ruben et al., 2015; Ruben et al., 2019). This would suggest that any format used to deliver education may be effective for ensuring that providers are able to improve knowledge and practice.

Despite the strengths of the evidence to support a practice change, there are some drawbacks that must be considered. When reviewing the systematic reviews, it was noted that providers included in the research were from various specializations (Joypaul et al., 2019; Ruben et al., 2015; Ruben et al., 2019). Further, when looking at the randomized controlled trials reviewed it was noted that providers involved in education came from areas of specialization outside of pain clinics (Anderson et al., 2016; Chiasson et al., 2020; Dear et al., 2018; Gunnarsdottir et al., 2017; Trudeau et al., 2017). The focus of this practice project is on a pain management clinic and the lack of evidence regarding this specific setting does create some concern over the translation of the evidence into practice. However, it is important to note that even in specialized settings such as pain management clinics, providers often lack critical knowledge regarding effective and comprehensive pain management (Hadi et al., 2017). Consequently, it is reasonable to believe that the evidence provided here could be translated to this clinical setting. Other limitations in the research include the use of small samples which may

limit the generalizability of the findings (Anderson et al., 2016; Chiasson et al., 2020; Gunnarsdottir et al., 2017).

Purpose/PICO/Objectives

Provider lack of knowledge regarding evidence-based treatment of chronic pain is a significant concern that can impact both patient and population health. Therefore, the purpose of this quality improvement project was to provide education for clinicians treating patients with pain in a pain clinic. Evidence indicates that even in specialized care settings such as pain clinics, providers may lack critical knowledge of evidence-based approaches to treating and managing patient pain (Hadi et al., 2017). Consequently, delivering provider education regarding evidence-based approaches to pain management in this setting should serve as the basis for increasing provider knowledge with the potential to improve care delivered to patients. To support this purpose statement, the following PICO (population, intervention, comparison, outcome) question was formulated:

- Among healthcare providers working in a pain management clinic does the use of an educational program to enhance provider knowledge of chronic pain assessment and management result in an increase in knowledge when compared with an assessment of provider knowledge before the educational intervention?

Elements of the PICO question are identified as follows: population, healthcare providers working in a pain clinic; intervention, provider education; comparison, provider knowledge of chronic pain assessment and management before the intervention; and outcome, increase in provider knowledge.

Based on this purpose and PICO question, the following objectives were also identified for this quality improvement project:

- Assessment of providers at the pain assessment clinic to establish current knowledge levels regarding pain assessment and management.
- Creation and implementation of an educational program to enhance provider knowledge of pain assessment and management.
- Evaluation of provider knowledge following the educational program to compare knowledge scores recorded at baseline.

Definition of Terms

Chronic Pain: Unpleasant or discomfort sensations, feelings, and experiences persisting longer than the anticipated time for tissue healing. This pain persists for more than three months or 12 weeks (Pitcher et al., 2018).

Pain: An unpleasant sensory and emotional experience that can result in significant damage and alterations in normal physiological and psychological functioning (Finnerup, 2019).

Pain Management: A medical approach involving the interdisciplinary care of the patient for the purposes of managing, diagnosing, and preventing pain (Collier, 2018).

Conceptual Underpinning and Theoretical Framework

The theory of comfort by Katherine Kolcaba will be used as a theoretical framework for this quality improvement project. This middle-range theory resonates well with the concepts of pain and discomfort, with the nurse practitioner and medical resident playing a critical role in managing pain to improve patient comfort levels (Wensley et al., 2020). This nursing theory fundamentally describes comfort as the state in which patients experience relaxation without discomfort or pain. Kolcaba defines comfort as the experience of a patient or a person strengthened by meeting the needs of ease, relief, and transcendence in environmental, sociocultural, psychospiritual, and physical contexts (Wensley et al., 2020). Usually, patients

experience comfort as a dynamic but transient state associated with ease from pain, physical and emotional distress, and an emerging sense of acceptance, strengths, and safety of one's situation.

Based on this nursing theory, nurse practitioners and medical residents should effectively address pain through the implementation of the nursing process to promote comfort in patients with pain or discomfort. Berntzen et al. (2020) explains how healthcare providers should focus on improving the comfort of patients. The theory of comfort aligns well with all areas of the nursing process ranging from patient assessment, diagnosis of health issues, planning, executing, and evaluating care (Wensley et al., 2020). This project focuses on delivering provider education to help improve pain assessment and management. Evidence regarding this intervention does suggest that when education is used it has direct implications for patient care practices (Dear et al., 2018; Trudeau et al., 2017). Consequently, it is reasonable to assume that through the use of this educational intervention, it will be possible for healthcare providers to foster the comfort of the patient far beyond simply alleviating the physical experience of pain.

Methodology

Setting and Participants

All nurse practitioners and medical residents at Enzo Abad, DO were recruited to participate in this project. A letter of site approval was acquired and can be found in Appendix A. Fundamentally, nurse practitioners and medical residents assess patients for chronic pain before offering treatments to improve patient comfort making them an appropriate group of participants for education to improve pain assessment and management. A convenience sample of 10 nurse practitioners and medical residents were recruited based on the current staff working at the facility. Participants voluntarily agreed to participate in the project. A power analysis was used to determine the sample size needed to demonstrate statistical significance in the results.

Perugini et al. (2018) state that a G-power of 80% or 0.80 at a significance level of 0.05 is desired to achieve a desired effect size of 20%. Since this project will likely experience a decrease in the sample of recruited healthcare professionals for the experiment due to the voluntary withdrawal, the final desired sample will comprise at least 13 participants after factoring in a 103% dropout or rejection rate. Unfortunately, this sample size was not acquired for this project.

Description of the Project Approach and Project Procedures

This project investigator completed a project proposal for ethical review and approval before implementation at Enzo Abad, DO. Approval for the project was sought from the Institutional Review Board (IRB) at Florida International University (FIU) and granted on April 18th, 2022 and can be found in Appendix B. Additionally, the investigator contacted the management of the physician's office at Enzo Abad, DO to seek and obtain permission to implement the project at its premises. This engagement enabled the principal investigator to acquire permission to conduct the project at the premises of Enzo Abad, DO. Site approval for the project was acquired on April 18th, 2022 (Appendix A). Following the acquisition of site and IRB approval (Appendix B), recruitment and implementation of the project was undertaken. The project was initiated by sending an email outlining the details of the project to all nurse practitioners and medical residents currently practicing at the facility (Appendix C). Using an internal email directory of staff, emails were sent to foster staff interest and participation in the program.

For staff agreeing to participate in the project an email was sent with a link for a demographic questionnaire (Appendix D) and a pain management knowledge assessment tool (Appendix E) provided via an online survey platform Qualtrics. Participants were asked to

complete the assessment within two weeks. Reminders were sent after one week to ensure that all participants complete the survey. Participants failing to complete these assessments were to be excluded from the project. However, at this point in time, all staff members agreeing to participate in the project completed the initial assessments. After all initial demographic surveys and knowledge assessments were collected, participants were given a link to an online presentation for training. The presentation was created by the investigator and included evidence-based information for pain assessment and management that provider should know. Providers had two weeks to view the video and complete the training. An email was sent after one week as a reminder to view the training video. All participants were asked to send an email confirming when they have viewed the presentation and all participants completed the educational training.

After a week, the participants were sent a final email with a link to Qualtrics to complete the post-intervention assessment (Appendix E). The assessment was the same as the pre-intervention knowledge assessment with the exception that the questions were placed in a different order. Participants had one week to complete the final knowledge assessment. All participants completed the final knowledge assessments, and all recruited participant information was retained for the final analysis of the data.

Protection of Human Subjects

The project investigator upheld all the ethical standards of clinical projects involving human subjects by adhering to the recommendations of the Declaration of Helsinki. This declaration recommends obtaining ethical approval from the relevant institutional review board to ensure the protection of human rights and interests through a better design before project implementation (Wu et al., 2019). Secondly, all human subjects recruited to participate in

clinical projects should be guaranteed the right to be informed of all aspects of the project (Wu et al., 2019). In this case, the investigator informed nurse practitioners and medical residents about all aspects of the project before recruitment ranging from its goals and objectives to the procedures for education, data collection, data analysis, and presentation or dissemination of data findings.

This project ensured all participants were protected from potential harm. The project investigator respected the right of participants to decline participation or withdraw from the project without the need to explain their decision or be coerced through undue influence. Brothers et al. (2019) explain that project investigators of clinical projects should protect participants from any harm by ensuring the privacy of information through confidentiality and the provision of safe treatments or interventions. Education of providers to increase knowledge of pain assessment and management has been supported in the literature with little evidence that there are any significant drawbacks to this type of program (Anderson et al., 2016; Chiasson et al., 2020; Joypaul et al., 2019). Participants were also not asked or required to provide any personal identifying information. Data for the final report was aggregated such that no specific piece of datum could be associated with a specific participant.

Data Collection

Data collection was completed through the use of a demographic questionnaire and a knowledge test of provider understanding of pain assessment and management. This was achieved through the use of an online survey platform: Qualtrics. Data captured through the demographic questionnaire enabled the investigator to describe the attributes of the sample. The knowledge assessments were completed before and after the educational program such that baseline knowledge levels could be compared with post-intervention knowledge gained from the

educational program. Comparison of the data was undertaken to provide insight regarding any changes (positive or negative) that have resulted as a consequence of utilizing the educational intervention.

Data Management and Analysis Plan

Data for the project was stored on a password protected laptop to which only the investigator has access. All hardcopy forms were be stored in a locked filing cabinet at the project site and were only accessible by the investigator. Data will be kept for five years following the completion of the project. At which time the hard drive of the computer will be professionally reset and all hardcopy documents from the project will be shredded. To manage the confidentiality of participants for the project, the names of providers participating in the study were transferred to an Excel spreadsheet and each provider was assigned a random three-digit code. This spreadsheet is currently stored on the password protected laptop to which only the investigator will have access.

Data analysis for the project included the use descriptive and inferential statistics. Descriptive statistics include mean, frequency, and standard deviation and were used to describe the sample as well as the results from the pre- and post-test assessments of knowledge. Comparison of the changes in knowledge were made through the use of inferential statistics including a paired t-test. The paired t-test is a parametric assessment of sample means that are related, i.e., pre-test/post-test (Mishra et al., 2019). The use of the paired t-test facilitated the comparison of mean scores for each of the participants before and after the educational intervention (Mishra et al., 2019). Excel was used to tabulate the parametric results and the data was considered to be statistically significant through the use of an alpha value of 0.05.

Discussion of the Results

Collectively, the evidence reviewed to support this project indicates that knowledge for providers should increase as a result of education. Therefore, it was anticipated that the results of this quality improvement project would demonstrate an increase in knowledge for providers following the educational program. It is further anticipated that these results would be statistically significant at the $P < 0.05$ level and will demonstrate the utility of education to improve provider knowledge. The evidence provided for this project further suggests that changes in practice are often associated with increased knowledge scores (Dear et al., 2018; Trudeau et al., 2017). Consequently, it was anticipated that provider practice will change as a result of the educational program, leading to improvements in patient care and the ability of patients to holistically improve their well-being and quality of life through better pain management.

Results

As noted, when reviewing the methods for data analysis, descriptive and inferential statistics were used to evaluate the data collected from this project. Looking first at the demographic data, summary descriptive statistics found in Table 1 indicate that there were a total of $n = 10$ participants. Of this 70% ($n = 7$) were male. Further, of the sample 60% ($n = 6$) were medical residents and 40% ($n = 4$) were advanced practice registered nurses. A majority of the participants (60%, $n = 6$) were between the ages of 30 and 40. Further, a majority of those included in the project (50%, $n = 5$) identified as Latino/Hispanic.

Table 1*Summary of Demographic Data (n = 10)*

Gender	Number n=10	Percentage
Male	7	70%
Female	3	30%
Profession	Number n=10	
APRNs	4	40%
Medical Residents	6	60%
Age	Number n=10	Percentage
20-30 years old	1	10%
30-40 years old	6	60%
40+	2	20%
Prefer not to answer	1	10%
Ethnicity	Number n=10	Percentage
Caucasian	2	20%
African-American	1	10%
Latino or Hispano	5	50%
Asian	1	10%
Prefer not to answer	1	10%

Descriptive statistics were also used to evaluate the pre- and post-intervention knowledge scores for n = 10 participants. Figure 1 provides a bar graph that compares the individual pre- and post-intervention knowledge scores for each of the participants. This figure does demonstrate that scores for each individual participant in the project did increase from the pre- to post-intervention stage, indicating that knowledge for providers did increase following education. Table 2 includes a descriptive statistical analysis of the aggregate pre- and post-intervention knowledge scores. What is highlighted in Table 2 is the fact that the mean post-test score increased to 9.0 from the mean pre-test score of 4.6. Both mean pre- and post-test scores

have low standard deviation, 1.78 and 1.05, respectively suggesting that the scores for all 10 participants were similar. Figure 2 provides a direct comparison of the mean scores from the pre- and post-intervention assessment. This data clearly indicates that there was an increase in mean score following education.

Figure 2

Pre- and Post-Test Results for Individual Participants (n = 10)

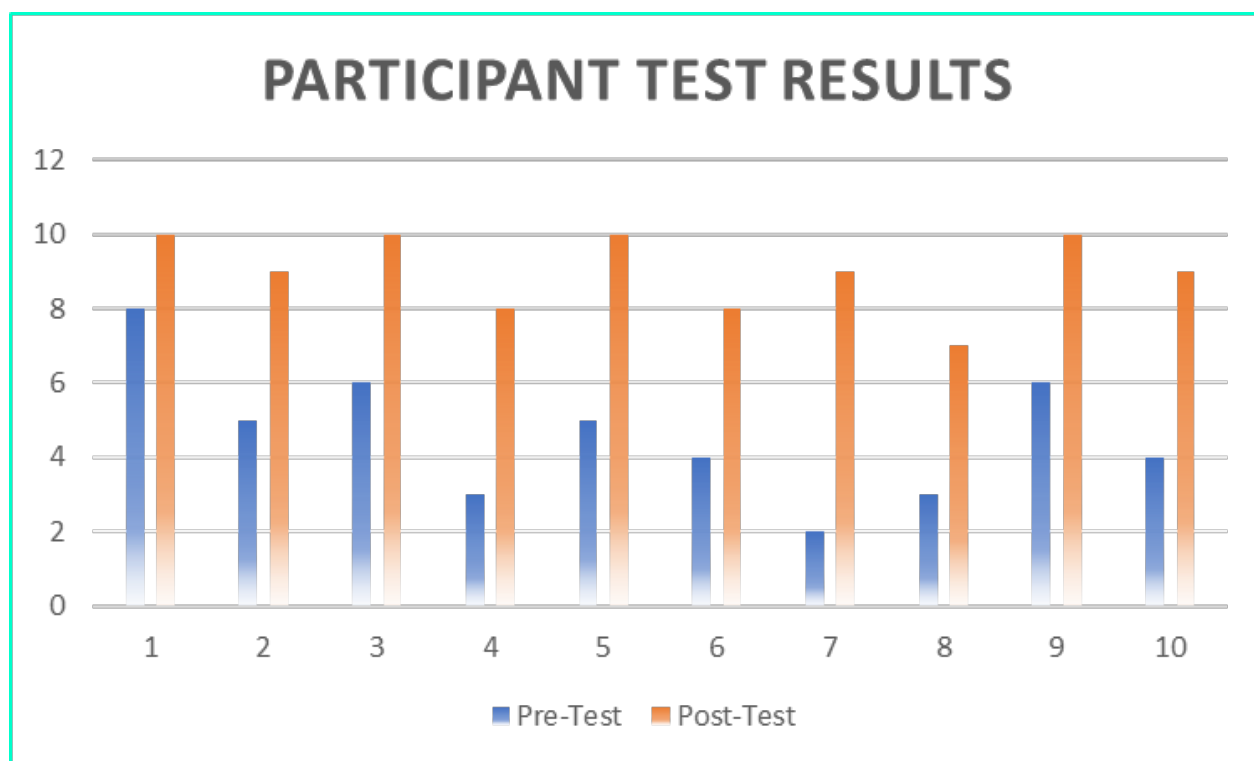


Table 2

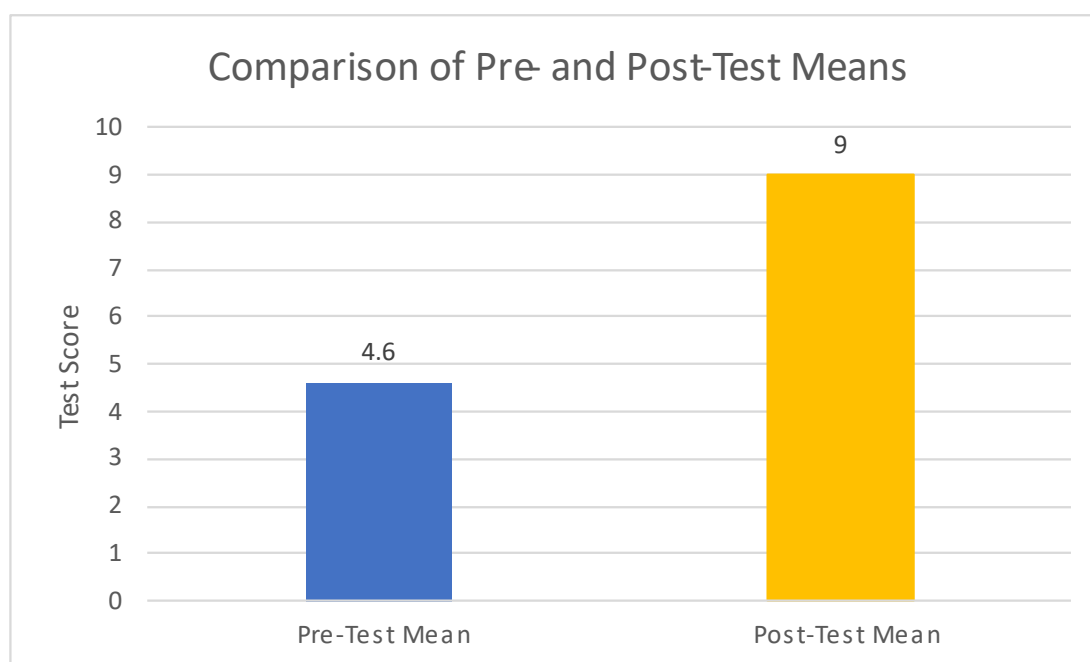
Descriptive Statistics for Pre- and Post-Intervention Knowledge Assessment (n = 10)

	Pre-Test	Post-Test
Minimum	2	7
Maximum	8	10

Mean	4.6	9
Standard Deviation	1.78	1.05
Standard Error Mean	0.56	0.33
N	10	10

Figure 2

Comparison of Mean Pre- and Post-test Scores (n = 10)



While the descriptive analysis of the pre- and post-test knowledge scores does indicate that knowledge for providers did indeed increase following education, an inferential analysis of the data was needed to determine if the results were statistically significant or the result of something other than chance. As stated previously, a paired t-test was selected for comparing the pre- and post-intervention test scores. The p-value calculated from the paired t-test was > 0.0001 , which is considered to be extremely statistically significant, especially when compared with an

alpha value of 0.05. Table 3 provide a summary of the pertinent statistics captured from the paired t-test.

Table 3

Relevant T-test Data

<i>P value and statistical significance:</i>
<i>The two-tailed P value is less than 0.0001</i>
<i>By conventional criteria, this difference is considered to be extremely statistically significant.</i>
<i>Confidence interval:</i>
<i>The mean of Pre-Test minus Post-Test equals -4.40</i>
<i>95% confidence interval of this difference: From -5.30 to -3.50</i>
<i>Intermediate values used in calculations:</i>
<i>t = 11.0000</i>
<i>df = 9</i>
<i>standard error of difference = 0.400</i>

Discussion

As anticipated, the results of this quality improvement project do indicate that provider education to improve pain management is effective for increasing knowledge among advanced practice nurses and medical students working in a pain clinic. The results of this project are supported by an evidence base that not only indicates that education is effective for increasing

provider knowledge of the topic (McCalmont et al., 2018; Trudeau et al., 2017) but also that this change in practice is needed to help ensure that providers are able to provide patients with the best supports for optimizing pain management (Hadi et al., 2017). Despite the need for providers to effectively manage patient pain, current evidence does indicate that this outcome can be challenging for providers and patients to achieve (Hadi et al., 2017). Consequently, this project reinforces the literature on provider education to enhance provider knowledge and practice, indicating that efforts should be made to not only educate providers in the current practice setting, but also to expand the current project to include other pain clinics and healthcare facilities, i.e., primary care facilities, which may benefit from enhancing provider knowledge of this subject.

The purpose of evidence-based quality improvement is to utilize the current evidence on a topic to make a data-driven change in practice where gaps in care exist (Leming-Lee & Watters, 2019). This project illustrates a culmination of action to achieve this outcome facilitating the ability of the principal investigator to fully demonstrate the competencies of a Doctor of Nursing Practice (DNP)-prepared nurse. In addition to making a relevant practice change to enhance provider practice and patient care, the principal investigator was able to lead systems level change through collaboration and scholarship to enhance the utility of the practitioner-scholar in the clinical setting. By undertaking this change in practice, it was possible to experience the process of implementing evidence-based practice change to fully comprehend what is required to undertake these types of project as a DNP nurse working in clinical practice.

Limitations

Even though data from the project did indicate that the educational program provided did increase participant knowledge and further that the knowledge gained from the educational

program was caused by something more than chance, the project does have several limitations that must be discussed. Two pertinent limitations to the study stem from methodological weaknesses associated with the project. The sample was recruited from a single site and was small, especially in terms of the post hoc power analysis. More specifically, the post-hoc power analysis indicated that a sample size of 13 would be needed to ensure that the results were statistically significant. This threshold was not met as there were only 10 staff members willing to participate in the project. Sample recruitment (convenience sample) and the use of a single site is indicative of the fact that the sample is not representative of the larger population from which the sample was drawn. Collectively all of these factors make it difficult to generalize the findings of this project beyond the site where it was implemented. In short, it is not possible to state with certainty that the same program implemented at a different setting would have similar results.

Limitations of this project can also be seen when considering that there was a lack of a formal control group. Control groups typically do not receive an intervention and provide a useful means for demonstrating a cause-effect relationship in an experiment. In the current project, a comparison of outcomes was assessed through the use of the intervention group (education) as the comparison group by measuring education levels at baseline. Although this does provide a point for comparison, the lack of a control group makes it difficult to state with certainty that the educational program is what resulted in the change in knowledge for participants. While this assumption can be made, there are an overabundance of variables outside of the control of the principal investigator that were not assessed as part of this project. Consequently, it is not possible to definitively state that the educational program caused the increase in knowledge scores that occurred for the group.

Implications for Practice

The implications of the results for clinical practice should be viewed systemically. The results support the current literature regarding the use of provider education to improve knowledge of pain management. This suggests that, at the practice site, some effort should be made to expand the program and to educate as many providers as possible. A review of the limitations of the project provided above does indicate that it is not possible to state with certainty that the results can be applied outside of the pain clinic. Consequently, an effort to pilot-test the program at different practice sites may need to be considered. Using a pilot program to implement the educational intervention in a similar pain clinic setting or in a primary care setting may provide important insight regarding the effectiveness of the program as well as the potential to make changes to the program including augmenting content based on the educational needs of different provider groups.

While immediate action to continue the program in practice would be warranted, the results of the project also suggest that there are other areas for investigation and evaluation of the project that should be considered as well as the potential to consider systemic change in nursing practice and education. In terms of other areas for investigation and evaluation, it would seem feasible to argue that some effort should be made to determine the impact of provider education on patient outcomes. For instance, improving provider education should result in a change in practice to promote better patient care. This may manifest in increases in patient satisfaction with care, increased referrals for specialty care, or reductions in opioid prescribing. Linking provider education with patient outcomes within the facility would enable leaders to acquire a more complete understanding of the implications of the program, with the potential to motivate efforts to enhance and support provider education programs over the long-term.

Other areas for investigating the topic would include the application of different methodologies to further quantify the impact of the educational program. For example, a randomized controlled trial in which providers at two different practice sites serve as the experimental (intervention) or control (no intervention) groups could be undertaken to not only evaluate knowledge outcomes but also outcomes for patients in terms of the type of care that they receive. This use of this methodology would address some of the key weaknesses of the current project including the need for a control group to demonstrate a cause-effect relationship between the educational program and a specific outcome. Improving research by enhancing the rigor of the methodology should strengthen efforts to offer and expand provider education programs throughout the healthcare system.

Even though the results of this project have implications for the clinical site and locally for enhancing the healthcare system in terms of improving the management of patient pain, the results of the project also prompt some consideration of the systemic changes to healthcare that may be needed to address the current gap that has evolved when it comes to effective pain management for patients. What is evident is that there are knowledge gaps for providers that should be addressed before the provider enters practice. This would suggest that gaps in provider knowledge regarding pain management should be addressed before providers enter the practice setting or in the educational setting. While it may not be feasible to provide the same training used in this project in the classroom for medical and nursing students, there may be an opportunity to improve education such that students seeking roles as healthcare providers are able to have access to this information before entering practice.

In spite of the need to expand the project in terms of both functionality and research, the results of this project do indicate that through provider education, it should be possible to

enhance patient care. This quality improvement project did demonstrate true value for increasing provider knowledge which should lead to better patient care and outcomes. Over time, this should also lead to better population health outcomes. Pain is a difficult symptom to effectively manage and, therefore, determining what works to optimize pain management for patients is extremely important. Based on this assessment, some effort will be needed to disseminate the project and to ensure that it is sustained over the long-term.

Dissemination and Sustainability

Dissemination and sustainability are two important considerations for completing the DNP project. Dissemination provides a foundation for nurses to share their work and to educate others about what works in practice (Dowling et al., 2017). Dissemination of this work will include providing staff at the facility with a written summary of the project and its results and presenting the results of the project at a formal staff meeting. This will ensure that staff are aware of the project and what was accomplished in terms of improving operations at the facility. In addition to internally disseminating the project, an effort will be made to publish the findings in a scholarly peer-reviewed journal such as *The Journal of Pain* or *Pain Management Nursing*. In addition, dissemination of the project will be sought through the presentation of a poster at a national nursing conference. One upcoming conference that could be considered is the American Society for Pain Management Nursing which will be held September 14-17, 2022, in California.

Sustaining the practice change at the clinical site will require a consideration of what is required to ensure that providers continue to have access to the information provided in the educational program. One action would be to make the training mandatory so that all providers working at the facility follow similar practices based on their knowledge. A second action to achieve this goal would be making the training mandatory for all new hires at the facility. This

training could be included in new hire orientation and would help to ensure that all staff at the facility are utilizing the same standard of care when it comes to managing patient pain. Policy changes at the facility regarding the use of training will help to ensure that the project is sustained over the long-term.

Conclusion

The effective management of patient pain is critical for improving patient health and overall well-being. Although pain specialists should be well-versed on current practice guidelines for the treatment of pain, this is not always the case. Providing education to medical practitioners working in a pain clinic can be helpful for improving provider knowledge. This practice change is supported by the current literature and the findings from this project serve to further reinforce this literature. While it is evident that there are multiple areas for further research and exploration of the topic, there is ample support for sustaining the practice change at the current site. By making these changes in practice, it should be possible to enhance patient and population health outcomes through direct nursing care of the patient.

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Appendix A: Site Letter of Approval**ENZO L. ABAD, DO
Interventional Spine and
Musculoskeletal Medicine**

Date: 02/02/2022

Derrick C. Glymph, DNAP, CRNA, APRN, COL., USAR, FAANA, FAAN

Clinical Associate Professor

Nicole Wertheim College of Nursing & Health

Sciences Florida International University

Dear Dr. Glymph:

Thank you for inviting Enzo Abad, DO to participate in the DNP Project of Itsvan Tejera. I understand that this student will be conducting this project as part of the requirements for the Doctor of Nursing Practice program at Florida International University (FIU). After reviewing the project's proposal titled *"Provider Education to Increase Knowledge of Chronic Pain Assessment at a Pain Clinic: A quality improvement project."* I have warranted him permission to conduct the project in this company.

We understand that the project will be developed in our setting and will occur in one session, and probably be implemented afterward. We are also aware of our staff participation in supporting the student to complete this project, including grant the student access to our facilities, give consent, deliver the pre-test questionnaire, provide the educational intervention and the posttest questionnaire to the recruited participants. We will provide a peaceful and safe environment to safeguard our participants' privacy and adequate area to conduct the educational activity.

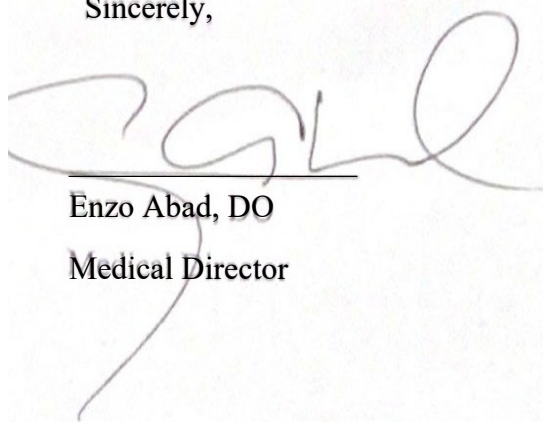
This project intends to evaluate if a structured educational program targeting Nurse Practitioners and Medical Residents will increase cognitive assessment tools and help into the diagnosis and treatment at the pain clinic. Before implementing this project, the Florida International University Institutional Review Board will evaluate and approve the procedures to

conduct the project. Evidence suggests that training providers on pain at the pain clinic is fundamental to provide an accurate diagnosis and corresponding treatment. Furthermore, this training will not only expand providers knowledge, but it will also decrease patients' pain and improve their outcome and quality of life.

The educational intervention will be done via YouTube video and will last 20-60 minutes. The student will provide the educational materials to each participant. Any data collected by Itsvan Tejera will be kept confidential and stored in a password-protected computer.

We expect that Itsvan Tejera will not interfere with the normal office performance. Furthermore, Mr. Tejera will behave professionally and follow the office standards of care. As the Medical Director, I support our Nurse Practitioners and Medical Residents participation in this project and look forward to work with you.

Sincerely,

A handwritten signature in black ink, appearing to read 'Enzo Abad', is written over a horizontal line. The signature is fluid and cursive.

Enzo Abad, DO
Medical Director

Appendix B: IRB Approval Letter




**Office of Research Integrity
Research Compliance, MARC 414**

MEMORANDUM

To: Dr. Derrick Glymph

CC: Itsvan Tejera

From: Elizabeth Juhasz, Ph.D., IRB Coordinator 

Date: April 18, 2022

Protocol Title: **"Provider Education to Increase Knowledge of Chronic Pain Assessment in a Pain Clinic"**

The Florida International University Office of Research Integrity has reviewed your research study for the use of human subjects and deemed it Exempt via the **Exempt Review** process.

IRB Protocol Exemption #: IRB-22-0161 **IRB Exemption Date:** 04/18/22
TOPAZ Reference #: 111581

As a requirement of IRB Exemption you are required to:

- 1) Submit an IRB Exempt Amendment Form for all proposed additions or changes in the procedures involving human subjects. All additions and changes must be reviewed and approved prior to implementation.
- 2) Promptly submit an IRB Exempt Event Report Form for every serious or unusual or unanticipated adverse event, problems with the rights or welfare of the human subjects, and/or deviations from the approved protocol.
- 3) Submit an IRB Exempt Project Completion Report Form when the study is finished or discontinued.

Special Conditions: N/A

For further information, you may visit the IRB website at <http://research.fiu.edu/irb>.

EJ

Appendix C: Email Recruitment Letter

Dear Provider,

Thank you for taking the time to answer the survey on Pain Management. This survey is composed of three phases: Pre-Test (10 questions multiple choice), PowerPoint Presentation, and Post-Test (same 10 questions as the Pre-test). Please use the link below. Your personal information will not be shared in this study. If you encounter any problems during the survey, please do not hesitate to reach out to me.

Regards

Itsvan Tejera

Appendix D: Demographic Questionnaire**Please select below:**

- A. I am a Medical Provider
- B. I am an Advance Practice Register Nurse

What is your age?

- A. 20 - 30 years old
- B. 30 - 40 years old
- C. 40+ years old
- D. Prefer not to answer

What gender do you identify as?

- A. Male
- B. Female
- C. Transgender
- D. Not Listed
- E. Prefer not to answer.

Please specify your ethnicity:

- A. Caucasian
- B. African-American
- C. Latino or Hispanic
- D. Asian
- E. Native American
- F. Other
- G. Prefer not to say

Appendix E: Pre- and Post- Intervention Knowledge Tests

No	Question	Answer T or F
1	The ASIA is a tool utilized to measure pain level of spinal cord injuries.	F
2	The ASIA tool covers all nerves from C2 through S5.	T
3	Healthy patients can get a maximum score of 50 points when utilizing the ASIA tool to assess upper limbs muscle strength of the right and left extremities.	T
4	VINDICATE is the mnemonic utilized by many providers to help identify the diagnosis of patients suffering from pain.	T
5	The meaning of each of the letters of VINDICATE means Vascular, Infection, Neoplastic, Degenerative, Iatrogenic/Intoxication, Congenital, Autoimmune, Traumatic, and Endocrine/Metabolic.	T
6	Past/current medical and surgical history are NOT important when assessing pain	F
7	Psychiatric and psychosocial elements can influence pain such as Depression or past suicidal ideation.	T
8	Upon successful facet lumbar block, the patient may continue to complain of pain at the exact location unrelated to the initial treatment.	T
9	After a repeat nerve block, patients' pain relief time will always be the same.	F
10	Past/Current medical and surgical history are not important when assessing pain.	F