Development and Evaluation of an Evidence-Based Practice Pain Algorithm Tool: Assisting Nurses with better Pain Management in Hospitalized Patients

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Abstract

Background: Approximately 10 million individuals are affected by chronic and acute pain each year. The individuals suffering from chronic and acute pain have been healthcare-heavy system users. The inconsistencies witnessed include a lack of direction, education, and guidance to deliver qualified care. One pain regimen assessment tool can guide nurses to provide appropriate and effective care. Despite advancements in science controlling pain, there is a lack of standardized education focusing on pain and symptom management in patients with acute and chronic pain. Subsequently, utilizing the right tools and effective educational resources for healthcare workers, primarily nurses, plays a significant role in delivering quality care. This study aims to examine nurses' perceptions and knowledge of the current pain regimen management by utilizing a new algorithm to assess the pain regimen and its effectiveness in improving pain scores in hospitalized patients.

Methodology: This quality improvement project utilized a questionnaire to identify gaps in education in the nursing staff's pain management knowledge, followed by providing educational material with an embedded algorithm to nurses within the designated facility. The nurses implemented the algorithm on eligible patients and communicated with providers for possible changes in the regimen based on the algorithm's recommendations. The algorithm's effectiveness was measured by monitoring pain scores in the EMR before and after the implementation using the RASS pain assessment tool from admission to discharge.

Intervention: Questionnaire scores were collected before and after administering the educational material. Continued academic reinforcement was provided regarding the

utilization of the algorithm during the implementation process. The pre-and post-pain scores were monitored during the implementation process utilizing the algorithm.

Results: Descriptive statistics were used to describe the survey findings. Post-education scores outdistanced pre-education scores, with a median score of 40 for pre-education and 80 for post-education. There were 10 eligible patients for algorithm administration. Five (5) patients' pain regimens were adjusted based on the algorithm's recommendations, and 5 patients did not see their regimen adjusted according to the algorithm. The 5 in the algorithm group all saw their pain scores decrease across their hospital stay. Pre-intervention pain scores in this group averaged 7.7 and decreased to 5.4 post-intervention. Conversely, in the non-algorithm group, all 5 patients saw their pain scores either remain constant or increase across their hospital stay. Pre-intervention pain scores in this group averaged 7.5 and increased slightly to 7.6 post-intervention.

Conclusion: Continuous educational reinforcement significantly improved the nurses' knowledge of pain management. Although pain assessment protocols have been studied in many settings separately, the benefits of using pain regimen assessment tools have not been investigated plentifully. Further, this study demonstrated promising results in pain control with the administration of the algorithm, although in a limited sample. This algorithm may assist providers and nurses in offering treatment options for improving pain and associated symptoms to improve patient quality of care and increase patient satisfaction.

Key terms: Pain Management; Algorithm; Nurse Education; Pain Score

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The medical and economic cost of acute and chronic pain has been estimated between $560 billion and $635 billion annually (Jones et al., 2019). Pharmacological modality remains the most used treatment with limited proven effectiveness and has contributed to an estimated 2.1 million people's dependency on prescription opioids (Jones et al., 2019). In 2016, 61 million prescriptions were prescribed, associated with 134 deaths from prescription opioids (Jones et al., 2019). Garland et al. (2017) demonstrated that in more than half of hospitalized patients treated with opioids, 14% of these patients experienced at least one adverse event with possible opioid dependency. Furthermore, he demonstrated that poorly managed pain could lead to an increased length of stay, poor patient satisfaction, persistent uncontrolled pain, and increased hospitalization costs (Garland et al., 2017).

Stakeholders implemented a multitude of system-level policies to address the U.S. opioid overdose epidemic (Barnett et al., 2019). The crisis was fueled by prescribing opioids and medications for opioid addiction. Understanding prescriber perceptions of policies in these domains is critical to creating an essential prevention and treatment strategy (Barnett et al.,2019). Approximately 20% of patients discharged with pain prescriptions misuse their prescription and are associated with long-term use (Centers for Disease Control and Prevention [CDC], 2017). Front-liners, including nurses and physicians, are pivotal in providing care for pain-related complaints. Despite existing guidelines for pain management, there is still a lack of understanding regarding acute pain prescribing (Burnie & Clark, 2019).

According to Solberg et al. (2017), over 33,000 deaths per year in the United States are attributed to illegal opioids, and the other half are attributable to prescription opioids. Federal and state governments have only recently begun to grasp the magnitude of this public health crisis (Soelberg et al.,2017).

Background

Pain management knowledge plays a significant role for healthcare workers, especially nurses, who are the primary caregivers in the acute care setting and deliver direct patient care (Machira et al., 2013). Patient satisfaction is correlated to nurses' knowledge regarding pain. However, poor pain management has been correlated to passive participation in assessing pain (Kahsay& Pitkäjärvi, 2019). The disparities witnessed include poor leadership, lack of direction, education, and guidance to deliver qualified care. Pain management knowledge and utilizing the right tools play a significant role for healthcare workers, primarily nurses, who are the primary caregivers in the acute care setting, and deliver direct patient care. Thus, implementing educational pain management programs for healthcare workers is essential in treating pain (Machira et al., 2013). According to Eckard et al. (2016), using technology to provide continuous education and feedback to supplement traditional therapy has empowered patients with a greater sense of control. Pain management software can be vital for keeping efficient records and marked improvement in patient outcomes, allowing providers, nurses, and hospitals to optimize care (Eckard et al., 2016).

Problem Statement

According to Carvalho et al. (2018), 40% to 85% of older patients living in a nursing home report pain daily, and 25% of these older adults receive no intervention for pain relief. The authors further revealed that 80% of postoperative patients reported the severity of their pain as moderate, severe, or extreme. Cancer pain management remains discouraging; nearly one in two patients with cancer pain has uncontrolled pain. Poor pain management leads to physiological and psychological harmful effects, including impaired wound care, fluid retention, increased cardiac output, chronic pain, anxiety, and depression (Christie et al.,2018). According to Christie et al. (2018), most nurses assess their patient's pain; however, only 4% use an assessment tool. One of the other factors in not utilizing nursing assessment tools in an acute care setting is the lack of time and nursing workload (Hutchinson & Maisano, 2020).

According to Sharplin, G. et al. (2019), organizational or workforce challenges such as lack of organizational commitment to the educational program at the administrative level, staff turnover, and not available staff to attend training have limited nurses from providing advanced care, thus leading to the overall decrease in the demand for advanced care and inadequate pain management**.** To overcome organizational barriers, involving the organization's management and building trust during the implementation of evidence-based practice can help plan a better project and implementation strategy. Involving trained mentors familiar with the institutional culture will help bring the desired change to facilitate the uptake of evidence-based practice (Sharplin G. et al., 2019).

Purpose Statement

This project aims to assess and evaluate nurses' perception and knowledge of current practice and help them understand and comply with the new protocol. Documentation in EMR of patients' pain scores and record of decision-making using the protocol algorithm will provide evidence of compliance with the new pain assessment protocol.

Project Question

In nurses caring for hospitalized patients, does the implementation of an evidence-based pain regimen assessment algorithm utilizing evidence-based pain presentation, compared to current practice, result in an increase in nursing pain knowledge, pain score, and assessment of scores from admission to discharge in a four-week timeframe?

Search Methods

The literature review was conducted using the databases PUBMED/MEDLINE, EBSCO Host, National Guidelines, Google Scholar, and CINAL. Additional articles were identified from reference lists of the collected articles searched. The inclusion criteria were full-text availability, peer-reviewed literature, database from 2015 to 2021, and English language. The applied terms included opioid crisis, an evidence-based pain management protocol, electronic documentation, evidence pain management assessment algorithm, nurse-driven protocols, pain intensity, healthcare worker education, patient satisfaction, hospitalized patients, cost, and economics. These terms were joined with ""r"" and ""nd"" which yielded 500 results. Exclusion criteria included the articles designated to measure or treat the pain of a specific body part. The exclusion criteria also included the articles that did not pertain to the inpatient population of adults (20 +) or did not address pain assessment and management.

After applying the criteria, all duplicates were removed from the search pool, resulting in a total of 36 articles used for this literature review.

Review Synthesis

A cross-sectional survey was carried out in several hospitals to assess the effect of education and knowledge of healthcare workers on pain assessment. This study revealed the main lack of knowledge and inappropriate practice focusing on differentiating acute and chronic pain and utilizing the appropriate assessment tool (Nuseir et al., 2016). Another cross-sectional study on postoperative patients showed that utilizing solely NRS could lead to undertreatment pain. Factors including patient knowledge and acceptability of pain must be considered while assessing and managing the pain. Thus, multidimensional pain assessment, including patients' functional level outcome assessment, needs to be implemented in the current assessment tools (Van et al., 2017).

A descriptive cross-sectional design was used to review documentation of pain assessment that was required every eight hours by nurses. The documents were based on a valid pain scale character, pain location, and functional assessment. However, the post-intervention document did not match the time the pain intervention was conducted. Also, the functional assessment documentation was non-specific. The detail of a functional assessment, such as the functional status associated with a focused pain assessment result, was not documented, which could affect the treatment plan and discharge (Song et al., 2015).

Literature Theme Development

Impact of the Problem

In October 2017, the opioid crisis was declared a national public health emergency by the President of the United States (U. S.). Opioid overdose death reached 47,000, increasing 20% from 2016 to 2017, resulting in decreased life expectancy in the United States. According to Hernandez (2017), readmission and subsequent emergency department visits are higher in patients that experienced persistent or unresolved pain during their inpatient stay. The Interagency Research Coordinating Committees brought stakeholders' attention to healthcare professionals to acknowledge acute pain as a major health problem during hospitalization. Acute pain assessment and effective treatment are imperative due to the likeliness of acute pain progressing to chronic pain (Jungquist et al., 2017).

Addressing the Problem with Current Evidence

According to Stoicea et al. (2019), overdose and misuse of drugs remain a vital challenge; men have a higher substance abuse addiction rate of 77% versus women at 44%. A significant number of bipolar and schizophrenic patients also have a higher rate of abusing opioids compared with general clinical patients (Stoicea et al., 2019).

The leading cause of unintentional injury is opioid-related. From 2021 to 2012, 660,000 hospitalizations in the U.S. were secondary to opioid overdose, costing more than $700 million in healthcare dollars yearly (Stoicea et al., 2019). To this extent, therefore, it is fair to say that this is an area that needs the utmost attention and assistance for affected patients. According to Marcondes et al. (2017), the disparities witnessed include poor leadership, lack of direction, education, and guidance to deliver qualified care. Providing best practices for patients through healthcare-provider collaboration and proper pain regimen

assessment is paramount. Many healthcare workers and nurses lack adequate knowledge and training about pain, leading to the undertreatment of pain (Nuseir et al., 2016).

Eleven percent of inpatients in the U. S. have substance use disorders unrelated to alcohol or tobacco. They either have a diagnosis of an opioid use disorder or they will exhibit drug-seeking behaviors (Donroe et al., 2016). According to Tyson et al. (2021), pseudo-addiction is an iatrogenic syndrome correlated with the undertreatment of pain. Most physicians and providers undertreat the pain by having negative attitudes toward prescribing opioids. One of the common complications of not taking care of a patient with substance abuse disorder in a hospital setting is going through life-threatening withdrawal symptoms (Donroe et al., 2016).

Blaming patients for addiction, inadequate pain regimen evaluation skills, and fear of prescribing are barriers leading to inadequate pain management and the opioid crisis. The lack of educational programs in the clinical setting and medical programs is a significant barrier to treating pain. According to Stoicea et al. (2019), physicians report a lack of education in pain management through their medical training; therefore, most types of pain (e.g., postoperative, chronic, traumatic, non-cancer, cancer, and end-of-life) remain unrelieved. Evaluation of a pain management regimen provides a review of current practice and seeks opportunities for optimization, including and not limited to multimodal therapy and expert consultation.

Current Recommendations and the Benefits

Pharmacologic therapy, including opioids, remains the primary treatment for acute pain. Most providers tailor therapy to the type and severity of pain. Different guidelines have been introduced for better pain management. These guidelines include prescribing the lowest

dose of opioids combined with non-opioid-based multimodal analgesic regimens (Song et al., 2015).

When it comes to pain management, using the proper assessment, indicators, and instruments, in concert with quantitative, validated methods, and consideration for behavioral and physiological changes in patients, is paramount (Marcondes et al., 2017). According to Scher et al. (2020), patients should undergo a full biopsychosocial pain assessment per the Department of Veterans Affairs recommendation to determine the appropriate regimen. According to the Acute Pain Clinical Practice Guideline recommendations, the Joint Commission established pain standards for assessment and management. The hospitals must use the same guidelines across all departments per The Joint Commission. NRS, Wong-Baker, FACES scale, and a verbal descriptor scale is the most commonly used ones. The nurse should select an appropriate guideline based on the organization's policy and the patient's condition (Nuseir et al., 2016). Developing a multidimensional pain regimen assessment is beneficial considering the increasing evidence that initiated the current initiatives to promote pain assessment that needs further improvement (Scher et al., 2018). A dynamic pain regimen evaluation and review ensures that current practices align with updated evidence-based guidelines.

Factors that lead to ineffective pain control and relief, such as lack of knowledge, practical pain assessment, and inadequate communication between multidisciplinary teams, can be corrected through education and appropriate assessment regimens (Christie et al., 2018). The nurse needs to assess the patient's functional level in pain. Treated pain promotes recovery and long-term complications (Song et al., 2015). The pain regimen evaluation must consider the patient’s physical, emotional, and cognitive status and preference. Numeric and

Visual Scale Ratings are not as valid for patients who are alert but unable to talk, such as intubated persons (Christie et al., 2018).

Review of Study

According to Burnie & Clark (2019), it has been estimated that pain medication prescription misuse is rising in the U.S. An average of 115 Americans die from opioid overdose, consequently making this five times higher than in 1999 (Burnie & Clark. 2019). A cross-sectional quantitative studied educational level, perceived barriers, and attitudes related to pain management confirmed the importance of education in reducing the suffering of patients (Kahsay & Pitkäjärvi, 2019).

According to Modanloo et al. (2019), an interventional study revealed that 50% of patients do not receive a proper pain assessment due to nurses underestimating or overestimating pain intensity. It showed that 35% to 55% of nurses often use improper and biased methods to assess pain in patients. Most nurses underestimate or overestimate the pain intensity instead of using a valid assessment tool (Modanloo et al., 2019).

An integrative literature review revealed that nurses with inadequate analgesia knowledge cared for patients with poorly controlled pain. Evidence-based pain education was provided to nurses, emphasizing the importance of documentation and using the proper pain regimen evaluation improved nursing practice and pain management (Fitzgerald et al., 2017).

According to a quality improvement project, healthcare institutions struggle with pain management satisfaction scores despite currently available pain assessment tools for nursing staff (Topham & Drew, 2017). A descriptive study used multistage sampling techniques to assess the pain regimen evaluation and recognize the factors affecting regimen utilization.

Sixty-eight percent of the nurses identified nursing workload, lack of tool availability, and an unsupportive working environment as barriers to utilizing a pain assessment tool (Christie et al., 2018).

Most inpatient pain assessment evaluations are one-dimensional, based on pain intensity, including the visual analog scale, faces pain scale, verbal descriptor scale, and Iowa pain scale. Thus, sociocultural, psychological, developmental, and biological factors must be considered to mediate an improved pain regimen assessment. Pain is subjective and is based on the patient's experience; therefore, a number given by a patient may not reflect the patient's functional status (Topham & Drew, 2017).

Furthermore, nurses are reluctant to use pain regimen evaluations, lack in-depth questioning, and use alternative approaches for patients with communication barriers, such as the elderly with hearing disabilities and language barriers. Documentation also is a potential facilitator for assessing the pain. Consequently, inadequate pain assessment tools result in increasing the odds of an opioid prescription for patients at the time of discharge (Fitzgerald et al., 2017)

Though the current guidelines instituted by the (CDC) for prescribing opioids for chronic pain have been somewhat helpful, acute pain prescribing still is a challenge. Therefore, it is imperative to assess the individual risk factors for opioid misuse prior to prescribing inpatients with opioids at discharge. An opioid regimen risk assessment integrated into an electronic medical record can be beneficial (Burnie & Clark, 2019).

A quasi-experimental retrospective pre–post-analysis of 24 months determining the modification of opioid prescribing and electronic health records, including reducing the

duration of treatment for an opioid prescription based on the proper assessment tool, significantly reduced the opioid dependency post-discharge (Slovis et al., 2021).

Significance to the Profession

Nurses are in a unique position to play a pivotal role as advocates, caregivers, and educators in influencing the pain experience of individuals with pain. Nurses can modify the care plan by observing, interpreting, and evaluating patient pain and functional level through communication with a multidisciplinary team (Christie et al., 2018). However, the question is if nurses are prepared to fulfill the task. According to Modanloo et al. (2019), nurses lack the education and proper assessment tools to provide the proper care. Thus, in the hospitalized patient, implementing an evidence-based pain regimen evaluation algorithm utilizing evidence pain management presentation and guidelines will assist nurses' knowledge of pain management and empower nurses to advocate for improvements in their patients' pain.

A pain regimen evaluation entails more than just measuring pain intensity. It requires interdisciplinary communication and coordination. Modifying a pain regimen evaluation requires adopting evidence-based practices involving the multidisciplinary team and ongoing educational strategies and opportunities (Topham & Drew, 2017). A pain management regimen algorithm creates a visual pathway for facilitating this type of communication and care coordination**.** Effective pain management and assessment are also economically beneficial. Adequate pain relief will help hospitals save more by preventing extended hospital stays, readmissions, and emergency room visits (Scher et al., 2020).

Project Aims

This project aims to assess and evaluate the nurse's perception and knowledge of current practice and help understand the new protocol with decision-making on how to utilize the new pain assessment protocol. This project also aims to improve nurses' knowledge of pharmacological and non-pharmacological pain control modalities using the evidence-based pain assessment protocol.

Project Objectives

1. Implement an evidence-based pain assessment protocol for nurses to initiate pain management consults for patients continuing to endorse pain, despite the current pain regimen ordered by hospital providers.
2. Administer an education seminar to improve nurses' knowledge and compliance with the new pain assessment protocol.
3. Improve the nurses' compliance, proper adherence to the protocol, and documentation of patients' pain scores in the EMR.
4. Evaluate nursing compliance with the protocol with a goal of at least 50% compliance on assessing patients' pain scores and protocol documentation in the EMR within a 4-week time frame.

Demonstrate a 20% increase in general nursing knowledge and understanding of pain management, as evidenced by an increase in test scores from the pre- to the post-test.

Theoretical Framework

The Stetler Model is the most used evidence-based practice model by providers and nurses to determine if research findings can be applied in implementing formal organizational changes (Stetler, 2010). The Stetler Model is based on practice setting and provider attributes (Indra, 2018). This project will emphasize nursing attributes to pain regimen management in the acute care setting. The model will be used to guide the implementation of this project.

Historical Development

Stetler and Marram originally developed the Stetler Model in 1976 to assist nurses in research utilization and the relationship between research use and evidence-based informed practice (Stetler, 2001). Despite two different concepts, combining these two will enhance the overall application. Initially, the model included three essential phases of critical thinking concerning research findings. These phases included: validation, comparative evaluation, and decision-making (Stetler, 2001). According to Stetler (1994), initially, it was not based on a conceptual framework that studied casual hypotheses and research until it was modified in 1994, focusing on conceptual underpinnings and a set of assumptions. In 2001, refinements were made to fit better into the EBP paradigm using research findings and sustaining a critical-thinking process core to facilitate the safe and effective use of research (Schaffer et al., 2013; Stetler, 2001).

Applicability of Theory to DNP Project

According to Stetler (2010), addressing a problem involves validating evidence that pain is a significant economic issue. According to the National Institute for Occupational Safety and Health, pain costs $100 billion annually in lost workdays, medical expenses, and other benefit-cost (Booker, 2015). The best available evidence will be combined with the

clinical judgment that necessitates competent knowledge application, including translating research into best practice and evaluation, improving healthcare liability, and participating in collaborative research (Schaffer et al.,2013). This project includes steps from the Stetler Model to warrant that it is carried out with validity and strength.

Tenets of the Theory

Five Phases of the Stetler Model

The model has five phases: (I) preparation, (II) validation, (III) comparative evaluation and decision-making, (IV) translation and application, and (V) evaluation (Indra,2018).

Phase I determines a purpose or problem of significance by selecting sources of research evidence and defining the purpose and measurable outcomes (Stetler, 2010). In this phase, the clinician identifies a project team participating in each decision-making phase to disseminate and implement the new knowledge into the practice setting (Schaffer, 2013).

Phase II, the validation phase, approves existing research findings focusing on utilization and whether to accept or reject the study in guiding practice (Stetler, 2001). According to Stetler (2001), Phase III synthesizes findings, compares, and evaluates decision-making for the feasibility of the evidence, and determines how the evidence fits with the current practice. The third phase is comparative and decision-making (Grove et al., 2015). Phase IV, the translation/application phase, is completed by confirming the type, level, and method of application and disseminating new knowledge into practice at an organizational level. (Grove et al., 2015; Indra, 2018).

Phase V, the evaluation phase, involves evaluating and identifying the goals of the project outcomes. The decision is made on whether to implement the change formally, informally, individually, or institutionally (Indra, 2018).

Assumptions

The Stetler Model makes six practitioner-based assumptions.

1. Formal organizations may or may not be involved in the individual's research utilization.
2. Utilization may be conceptual and/or symbolic, or instrumental.
3. The effect of internal and external factors on an individual or group.
4. Research and evaluation provide probabilistic information, not absolutes.
5. A lack of knowledge and skill can lead to inappropriate and ineffective research use (Grove et al., 2015; Indra, 2018; Stetler, 2001).

Strengths and Limitations of the Model

The Stetler Model provides an easy-to-follow process based on critical thinking and decision-making. It can be used in inpatient and outpatient settings from an individualized and organizational perspective. No limitations were identified for using the model as it applies to this project.

Application of Theory to DNP Project

Phase I: Preparation

The PICOT format was used to identify the project question for the literature review.

P-What is the population? Inpatient medical-surgical nurses are implementing the evidence-based pain regimen assessment algorithm utilizing an evidence-based practice pain management presentation at University-affiliated medical center.

I-What is the application of the project? Applying an evidence-based pain regimen algorithm utilizing the evidence-based education presentation

C-What is the comparison on interest? Minimal current pain regimen evaluation practice

O-What is the outcome of the project? Improve nurses' pain knowledge and compliance using the pain assessment algorithm to reduce patient pain.

T: What is the timeframe of the project? From admission to discharge, measured over a four-week timeframe (Indra,2018; Stetler, 2001).

According to Stetler (2001), internal and external factors that could affect the project's outcome should be considered during the preparation phase. This project aims to address gaps in knowledge regarding a pain regimen evaluation, particularly for those with uncontrolled pain. Internal factors include a lack of recognition that a knowledge gap exists regarding the need for a pain regimen evaluation, staff fatigue from competing educational presentations and institutional priorities, limited time to finish an educational activity due to competing clinical demands, and lack of buy-in from stakeholders. The lack of agreement between providers and nurses who recommend a consultation to involve the pain management team could be a problem. The External factors that could affect the outcome could include a lack of structural empowerment regarding doctoral projects at the implementation site and changes in laws related to prescriptive authority. However, once there is institutional buy-in due to identifying the benefits of an evidence-based implementation that aligns with national initiatives to improve pain scores and decrease hospital length of stay readmissions, the strength of the evidence can be reinforced (Grove et al., 2015).

Phase II: Validation

The second phase involves critiquing the designated literature using three essential elements: approval of the data, corresponding with the healthcare setting, and the feasibility of using the study conclusion in conjunction with current practice (Grove et al., 2015; Indra, 2018).

Stakeholders are incentivized to change practice when evidence-based education is provided synchronously and asynchronously through various forms of resources. This project will provide evidence to change practices at the implementation site and receive support for the implementation. The positive reinforcement will be through unit leadership and the multidisciplinary stakeholders.

Phase III: Comparative Evaluation/Decision Making

Phase III is used to translate current evidence-based knowledge into clinical practice. Therefore, nurses' current pain management knowledge needs to be evaluated and compared to the knowledge acquired post-implementation.

Phase IV: Translation/Application

Dissemination of evidence-based recommendations into practice can be accomplished through facilitation by nursing leadership and stakeholder buy-in for executive support. Implementing a direct comprehensive education program is more effective than an indirect approach (Grove et al., 2015; Stetler, 2001). Nursing leadership will be provided with an evidence-based PowerPoint education presentation for bedside nurses. A pain regimen evaluation presentation can increase general pain management knowledge and opportunities for pain optimization utilizing multiple-line therapy and multidisciplinary collaboration with acute and chronic pain management services. An evidence-based pain regimen presentation followed by a pain management regimen algorithm will be provided for visual learners for easy utilization at the bedside.

Evaluation of current pain regimen assessment and development of the pain regimen assessment and outcome

The evaluation process can be formal and informal. Stakeholders include unit managers, clinical nurse specialists, bedside nurses, advanced practice providers, and multidisciplinary health providers, including the acute and chronic pain management team. The project aims to use evidence-based research to facilitate a change in nursing knowledge and practice and ultimately improve the management of acute and chronic pain regimens in the inpatient setting.

Phase V: Evaluation

The evaluation will examine outcomes measured on the day of the PowerPoint education and during the subsequent four-week period. The difference in nurses' pain knowledge will be measured immediately before the PowerPoint education and four weeks later. Compliance will be measured as the percentage of patients treated by the respective nurses where the algorithm is utilized, as documented via the compliance form (Appendix F). The algorithm's effectiveness will be measured by the change in pain scores in patients currently on a pain regimen with uncontrolled pain using the RASS pain assessment tool from admission to discharge.

Project and Study Design

Population of Interest

The population of interest is the bedside inpatient medical-surgical nursing staff in an academically affiliated medical center. The inclusion criteria include inpatient bedside nurses in the medical-surgical unit. Each floor comprises approximately 56 registered nurses working day and night shifts. Exclusion criteria include clinical nurse specialists, pain management nursing coordinators, medical directors, LVNs, CNAs, advanced practice providers, and physicians. The RNs are the direct population that will utilize the pain regimen evaluation PowerPoint education for increased knowledge. The indirect population is the patients in the units where the project will be taking place. The outcome will be a change in pain knowledge from utilizing an evidence-based educational presentation with an embedded pain management regimen flowsheet from baseline.

The project objectives will be accomplished by demonstrating a change in the pain regimen assessment knowledge. Education will be provided to the nursing staff following implementation.

Setting

This project will take place in an inpatient medical-surgical unit at an academically affiliated suburban medical center located in Santa Monica, California, exclusively in Service Planning Area (SPA) 5 of Los Angeles County. It has 281 inpatient beds, including 22 beds in the adult ICU, 25 beds in the pediatric unit, 4 for acutely ill children, 26 beds in oncology, and 16 operating rooms. Santa Monica-UCLA Hospital is not a trauma center (UCLA Health Organization, 2019). According to the UCLA Health Organization (2019), the top 3 community-based priorities for the institution are mental health, access to health care,

housing, and homelessness. Two percent of adults in SPA5 had experienced serious mental health diagnoses, and 46.3% of service area households spent 30% or more of their income on housing. Substance use and misuse of prescriptions are among society's most persistent health and social concerns. In SPA 5, 21% of the population had misused prescription drugs. Caucasians accounted for over half of the population (59.4%), Hispanics/Latinos 16.7%, Asians 13.6%, and Black/African Americans 5.6%. Children and youths (ages 0-18) made up 15.5%, seniors (65 years and above) 69.3%, adults ages 18-64 with Medicare 0.6 %, and adults ages 18-64 with Medi-Cal 10.4% . Fifty-one-point-four percent had employment-based insurance, and 12% had private-purchase insurance rates. Eighty-three-point percent of children and 81.1% of adults had a regular source of health care, including employment-based and private insurance coverage (UCLA Health Organization, 2019). The medical center provides comprehensive services for multiple populations, from the neonatal to the geriatric population. The project site utilizes an electronic health system, CareConnect, developed by Epic Systems Corp. The project will be implemented in 1 unit with 25 beds and diverse ethnicity of patients with different diagnoses.

Stakeholders

The key stakeholders in this quality improvement project are the inpatient bedside medical surgical nursing staff, nursing leadership, including unit directors and clinical nurse specialists, and the acute and chronic pain management service. All stakeholders have been involved in the project's planning and support of the initiative. Stakeholders will review this project for its applicability and feasibility in the unit.

The bedside staff nurses are the primary targets in implementing the project. These nurses will utilize the pain regimen assessment algorithm. One of the main goals of this

project is for nurses to utilize an evidence-based recommended pain assessment tool to facilitate optimized pain care. The clinical nurse specialist plays a leadership role in their units and guides evidence-based research and clinical practice changes. They influence change at multiple levels, from the unit level to the health system and engagement with the community. The clinical nurse specialist functions as a practice expert and oversees the applicability of evidence-based education and research within the unit. The unit directors will notify the nurses when it is appropriate to implement the project, facilitate the bedside nursing PowerPoint education presentation and algorithm throughout implementation, and assist with any obstacles to implementation. The bedside nurses will complete a pre-test prior to presenting the PowerPoint presentation, then fill out a post-test four weeks following the implementation of the PowerPoint. The nurses will implement the algorithm on one patient's current active regimen. Patients are regarded as equal partners in this project as stakeholders. Although patients in this project are an indirect population, patients are impacted by the change in knowledge of the evidence-based pain regimen presentation with an embedded pain management regimen algorithm for utilization at the bedside. Permission to conduct the project was obtained through an affiliation agreement formed with the medical center.

Interventions

The implementation phase will last for four weeks. Nursing leadership approved this DNP nursing quality improvement project at an academically affiliated inpatient medical-surgical unit (See Appendix A). Based on the census, the medical-surgical unit where this project will take place has 8-15 nurses for dayshift. The convenience sampling strategy aims to recruit as many dayshift nursing staff as possible to participate in the quality project in collaboration with the unit director's agreement. On the first day of week 1 of

implementation, the nurses and nursing leadership on the unit will receive an in-person introduction, education, and review of the quality improvement project from the DNP student (Appendix B).

On the second and third days of week 1, the DNP student will provide the pretest and the study packet for the quality improvement project to all the dayshift nursing staff in the unit who volunteered to participate. This study packet will include the DNP student's contact information and instructions to get an online copy of the educational PowerPoints if they choose so they can access it from any workstation and reach the DNP student if they have questions regarding the algorithm during the implementation phase (Appendix B). The study packet included the PowerPoint and algorithm (Appendix C &E). On day 2, the nurses who volunteer to participate in the quality improvement project will be provided their paper pre-tests immediately (Appendix D) upon volunteering. The pretest is to be completed within 24 hours and returned to the DNP student by depositing them in a central secured area by the nurse's workstation. On day 3, Pre-tests will be collected, and knowledge scores will be recorded in an Excel sheet (Appendix G). On day 3, upon completion of the pre-test, the educational presentation will be provided live with the study packet. The nurses will be provided food and drinks during the PowerPoint presentation.

Subsequent to completing the presentation, volunteers will be given the rest of week one to review the educational presentation. They will be allowed to review the presentation, and the algorithm during their workday provided by paper or can request an emailed PowerPoint presentation from the DNP student whose information is attached to the paper study packets (Appendix B, C& E). From day 4^{TH} to 7^{TH} of week 1, the nurses will also

choose one sample patient with a current pain regimen to train on using the pain regimen algorithm.

During Week 2, the implementation of the algorithm starts with volunteered nurses. The nurse will apply the algorithm and contact the hospitalist for pain management consult if a consultation is appropriate based on the algorithm recommendation. The pain scores data documentation based on chart reviews in the EMR on eligible patients will be recorded weekly pre-and post-algorithm implementation in an Excel sheet (Appendix H). The nursing compliance scores data will be recorded weekly on an excel sheet (Appendix F). The DNP student will be available to provide live support and guidance on implementing the pain regimen algorithm on the eligible patient's current regimen.

Week 3 will include the continuation of the implementation of the algorithm on eligible patients. The collection of the nursing compliance scores and pain scores data based on chart reviews in the EMR on eligible patients will be recorded on excel sheets (Appendix H&F). The DNP student will be available to provide live support and guidance on implementing the pain regimen algorithm on the eligible patient's current regimen.

In week 4, the nurses will continue implementing the algorithm until the 5th day of the week. The nurse will contact the hospitalist for a pain management consult if the consultation is appropriate based on the algorithm recommendation. The pain score data in the EMR chart on eligible patients will be recorded pre-and post-algorithm implementation on an Excel sheet until day 5TH (Appendix H). The nursing compliance data scores will be recorded until day 5Th on the Excel sheet (Appendix F). On the 6thday, the post-tests (Appendix D) will be provided and collected on the same day, and knowledge scores will be recorded in the Excel sheet (Appendix G). On the 7th day, the DNP student will compute all

the nursing compliance scores and pain scores data from weeks 2 to 4 for the efficacy of the educational program for nurses and the pain scores data based on algorithm recommendations for final data analysis. This project is a quality improvement initiative leading to a practice change in nurses' management of patients' pain that poses no risk to the nurses' jobs or patients.

Tools

Nurses will increase their general knowledge of pain management by utilizing an evidence-based PowerPoint presentation (Appendix C) and completing a pre-and post-intervention test (Appendix D). The nurse will implement a pain regimen assessment algorithm (Appendix E) to evaluate the patient's current regimen and effectiveness. Nursing compliance with the algorithm will be measured by evaluating the total number of patients for whom the nurse utilized the algorithm out of the total of patients that could have benefited from the algorithm, captured with a self-administered compliance form (Appendix F). The pain score data on EMR on eligible patients will be recorded weekly pre-and post-algorithm implementation after the modified regimen in an Excel sheet (Appendix H) utilizing the standard pain scale measurement (Numeral Rating Scale)(Appendix I) used at the affiliated facility from weeks 2-4. An evidence-based pain regimen evaluation can transform clinical practice and improve patient and institutional outcomes.

Pain Management Education Presentation

The tools utilized to implement this project include a PowerPoint pain management education presentation with an embedded pain regimen evaluation algorithm reviewing comprehensive pain management principles and guidelines (See Appendix C). All types of pain, indications for opioid use in chronic and acute pain, recognizing inadequate pain

control, and pharmacological and non-pharmacological pain treatments will be addressed. Understanding the gap between the pain regimen and the ongoing assessment of patients treated with an opioid regimen is critical. These evidence-based recommendations are based on CDC guidelines for managing acute and chronic pain (CDC, 2016). This will help nurses evaluate their current pain management regimen prior to implementation and empower them to optimize pain control safely and effectively.

Pre- and Post-Pain Knowledge Test

A PowerPoint presentation will provide nurses with an algorithm describing a decision-making process to achieve the possible desired patient outcome. To measure the outcome of this DNP project, the participants will be asked to complete a pre-and post-intervention pain knowledge test (Appendix D) that focuses on information conveyed during the PowerPoint presentation. A ten-question test will be administered prior to the educational session and four weeks after the education session. The test format is multiple choice, the most common assessment method used in nursing (Thulaseedharan et al., 2019). All of the questions will be highly relevant, and the content validity ratio of the questions will indicate that. Nursing compliance with the algorithm will be measured by evaluating the total number of patients for whom the nurse utilized the algorithm out of the total of patients that could have benefited from the algorithm, captured with a self-administered compliance form (Appendix F).

Pain Assessment Algorithm

A project lead must promote a safe, effective, patient-centered, timely, efficient, and practical interdisciplinary education program (Chism, L.A. 2019). This pain regimen evaluation algorithm allows nurses to utilize evidence-based literature and education to

evaluate the current pain regimen. The pain regimen algorithm will direct the assessment and management of uncontrolled pain. According to Jablonski et al., 2011, one of the benefits of algorithmic is valuable for new nurses who may lack experience in their decision-making. A pain assessment algorithm utilizing a flow diagram will provide nurses with a decision-making tool for the possible desired outcome (Jablonski et al., 2011). It requires the nurse to answer questions with 'yes' or 'no answers to one branch of the decision tree, leading to a recommended action (Jablonski et al., 2011). The DNP student will develop the pain regimen algorithm, which will be presented to staff nurses in a PowerPoint pain presentation (Appendix C& E). It uses a step-by-step algorithm for nurses to assess and evaluate the current pain regime based on evidence-based literature and educational material. The algorithm will direct the assessment and management of uncontrolled pain. The algorithm is validated by the clinical pain management nurse specialist, the project mentor at UCLA, and Touro University project mentors Dr. Hill and Dr. Tarrant to implement. The algorithm requires nurses to use their critical skills and apply their knowledge safely and efficiently.

The pain assessment algorithm focuses on evidence-based pain management treatment modalities. It requires nurses to know the basic pain physiology and treatment modalities to assess and direct the care to recommended actions. A nurse's relationship with physicians and advanced practice providers affects the patient's pain management. Providers who do not involve nurses in the care plan are significantly more likely to encounter barriers such as undertreated pain and inadequate prescription of analgesic medications (Eckard, C., 2016). The PowerPoint presentation and pain regimen algorithm can facilitate communication between nurses and providers with evidence-based guidelines leading to improved patient care.

Data Collection

The pre-implementation data collection will consist of pre-test scores for nurses on an Excel sheet immediately prior to the PowerPoint pain education presentation and the post-test scores following the presentation (Appendix G). The pre-and post-implementation pain scores will be measured based on the Numerical Rating Scale pain score assessments tool (Appendix I), which spans four-hour intervals during the patient's in-patient stay and while under nurse's care per algorithm recommendation will be determined from chart reviews of EMR data throughout weeks 2-4 implementation period. Data collection will commence at the end of day 6Th of week 4 with completed pre-and post-tests, compliance scores, and pre-and post-algorithm implementation pain scores. Once all data has been collected, it will be analyzed, and the results will be evaluated on day 7TH. Collected data will be protected on an encrypted computer placed in the locked area of the lead project office, with only the project lead having access to the information. There will be no identifying information on any data collected or data analyzed.

Ethics/Human Subjects Protection of Human Subjects

A web-based Collaborative Institutional Training Initiative (CITI) Program on human protection was completed to ensure human subjects' protection. This program ensures that human research subjects, including vulnerable populations, and their data are protected. This quality improvement project focuses on subjects who are nurses who will record the patient's pain score with the use of the new pain assessment algorithm. The intervention will be provided to nurses on a volunteer basis, without compensation, and with no job risk if they decline to participate. Nurses may benefit directly from the intervention by optimizing their pain regimen evaluation practice and multidisciplinary communication and collaboration. The

project consent, assent, and screening template process are exempt from IRB review by the UCLA Office of the Human Research Protection Program. This project should also be exempt from the Touro University IRB review as it is considered a QI project providing no direct patient care.

Data Analysis

Efficacy of Educational Program for Nurses & The Pain Scores Data Based on Algorithm Recommendations

We measured several different outcomes: (1) the fraction of nurses in the department willing to finish the workshop, which we can call the 'nurse compliance rate'; (2) the change in performance on a knowledge questionnaire, measured by the difference in score from a pre-test to a post-test; (3) the fraction of eligible patients, the 'patient eligibility rate'; (4) the fraction of nurse recommendations that doctors will accept, the 'doctor compliance rate'; and finally (5) the change in self-reported pain score is the primary dependent variable of interest. For the data analysis and visualization, R version 4.0.5 with the graphics package ggplot2. To estimate (1), (3), and (4), we used the sample proportion from our pilot study at the UCLA surgical department. For (5), since we have only 5 data points, we simply report them. Summary statistics on a set of 5 numbers did not add much insight. The doctors decided who would receive the treatment, so assignment to intervention and no-intervention groups was not random, and statistical inferences were not meaningful. For (2), we calculated summary statistics on the pre-test, the post-test, and the pairwise differences or changes. Because of the nature of the data (discrete scores) and the small sample size (14), we did not assume the normality of the underlying population for any of the analyses, and we did not rely on large-

sample normal approximations for inference. Instead, we used nonparametric methods. We constructed nonparametric 95% confidence intervals using bootstrapping. With this technique, we drew a large number (here, 100,000) of resamples with replacements from the sample data and calculated the mean of each. The distribution of these resampled means approaches the distribution of the sample mean, and so taking the .025 and .975 quantiles of the resampled means gives a 95% confidence interval for the population mean.

We also performed two nonparametric hypothesis tests, with the null hypothesis that the mean (or median) change is zero. These tests are the Wilcoxon signed rank test and a particular one-sample permutation test (an alternative to the t-test). We did not set significance thresholds in advance. The Wilcoxon test is well-known, but the permutation test is less so. In the permutation test, the null hypothesis is that the pre-intervention and post-intervention scores are drawn from the same population. In that case, observing pre-post is equally probable to observing post-pre, which is the opposite of the observed change (the observed difference times -1). For each iteration, we randomly chose either the observed change or its opposite and then took the mean. We performed a large number of iterations (here, 100,000), which gave us a distribution of means. The p-value is the fraction of these generated means that are more extreme than the mean we observed.

Analysis of Results

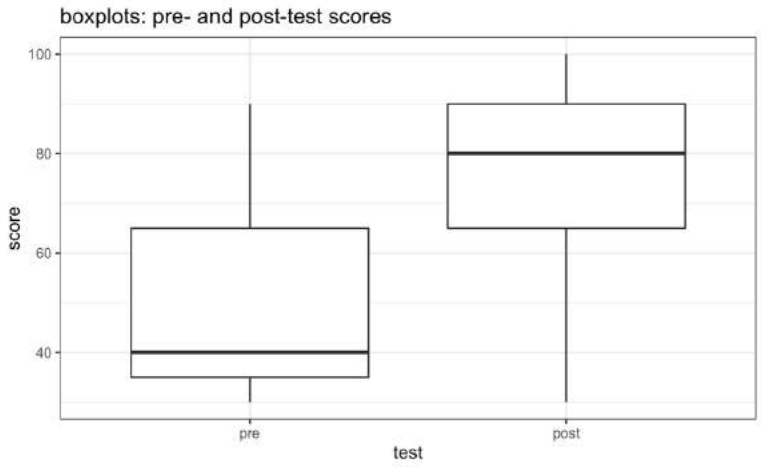
Evidence of compliance with the new pain assessment protocol was determined by a review of the patient's pain scores pre- and post-implementation and upon utilization of the protocol algorithm in the EMR. Out of 20 nurses in the department, 15 agreed to take the pre-test and post-test, and 14 also decided to attempt to use the algorithm on their patients. The nurse compliance rate was 70% (n=14). Each of these nurses randomly selected two patients

from their care and evaluated them for uncontrolled pain. They found that a total of 10 out of 28 met the criteria. The patient eligibility rate was 36%. For those 10 patients, the nurses applied the algorithm and recommended a change in the pain management regimen. In 5 cases, the doctors agreed to the change. The doctor compliance rate" was 50%. An estimate of the proportion of patients who would receive a change in treatment if the nurses applied the technique to all their patients (instead of just 2) is 12.5%. Below are summary statistics of the participating nurses' pre-test scores, post-test scores, and score differences (post-test score minus pre-test score) (see Table 1). Figure 1 shows paired boxplots that illustrate the difference in Q1, median, and Q3 between the pre-test and post-test score distributions. It is clear from both that the post-test scores were substantially higher. The median score is 40 for the pre-test and 80 for the post-test.

Table 1*: The Nurses' Educational Scores Results*

	Pre-test	Post-test	Change
minimum	30	30	-10
Q1	35	65	15
median	40	80	20
mean	50.7	75.3	24.7
Q3	65	90	35
maximum	90	100	60
95% CI for mean	(41.3, 61.3)	(64.7, 84.7)	(14.7, 35.3)

Figure 1: *The Nurses' Educational Scores Results*



We use inferential statistics to determine whether this sample difference reflects a population difference. Consider the population of all compliant nurses. In performing the hypothesis tests, we make the (possibly invalid) assumption that our 15 nurses constitute a random sample of this population, and their pretest and posttest scores are, therefore, a random sample of how all such nurses would perform. If the workshop did not affect the outcome measured by the pre-test and post-test, then the mean change score and median change score would both be 0. The Wilcoxon test tells us that the probability of a sample median change score greater than 20 (or less than -20) is $p = 0.002$. The paired permutation test tells us that the probability of a sample mean change score greater than 24.7 (or less than -24.7) is $p = 0.0008$. A nonparametric bootstrap 95% confidence interval for the mean change score is (14.7, 35.3), and since this interval does not include 0, it is equivalent to a *p*-value of less than 0.05 for the null hypothesis that the true mean change score is 0. So, according to all three inferences, we have strong evidence that the educational intervention had an effect on the nurses' mastery of the content as measured by the questionnaire.

Analysis of Algorithm Recommendations Results

Upon utilization of the algorithm, the nurses considered 10 patients to be in uncontrolled pain. Of these, the doctors accepted the nurse's recommendation for a change in pain management regimen in half the patients (5 patients). In the other 5 cases, the doctors did not agree with the recommendation. We can consider the latter 5 patients as a comparison group, although they are not a true control group. We recorded the patients' self-reported pain levels before the intervention based on the algorithm recommendation and monitored them throughout their in-patient stays for an average of 3-4 days. When the algorithm was implemented, it displayed promising results. (see Tables 2,3 & Figure 2).

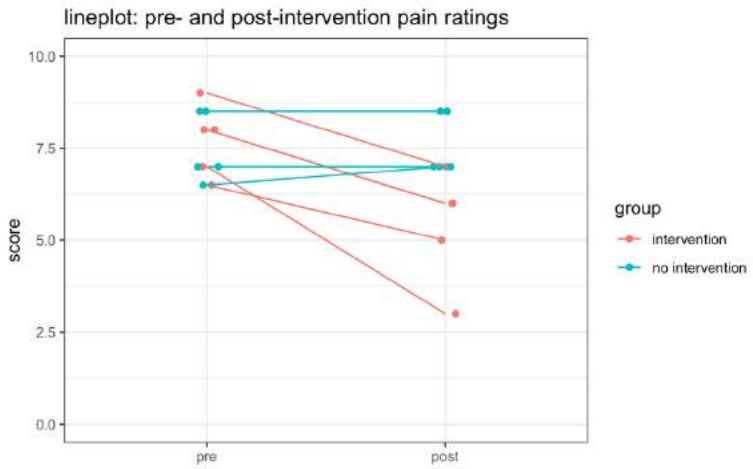
Table 2: *Pain levels based on the Algorithm Recommendation in the Pain Regimen.*

Pre-intervention	Post-intervention	Change
9	7	-2
8	6	-2
8	6	-2
6.5	5	-1.5
7	3	-4

Table 2: *Pain levels, No changes in the Pain Regimen based on the Doctors Decision*

pre-intervention	post-intervention	change
8.5	8.5	0
7	7	0
8.5	8.5	0
6.5	7	+0.5
7	7	0

Figure 2: *Pre-post Intervention Rating*



Summary

Given our assumptions, we have strong evidence that the workshop had a real effect on the difference in pretest and posttest scores for nurses. At the same time, it reveals that these nurses have knowledge deficits regarding pain management. In this project, even after the presentation, 6 out of 15 nurses scored below 80% on the post-test. The project also proved that educational reinforcements significantly impact nursing knowledge and attitude toward pain management.

Our outcome of interest was the causal effect of the pain management algorithm on patients' self-reported pain scores. However, one of the potential weaknesses of this project was related to the complexity of process implementation with multiple phases. First, the nurses were offered an educational presentation. Once they attended, they had to process the recommendations based on the pain algorithm, then get provider buy-in from the doctors to implement the algorithm. This type of intervention made it more challenging to evaluate the impact of the intervention on the outcome. With future research, we may investigate whether

nurses with a better mastery of the workshop material are more effective at persuading doctors to use the methods and therefore create greater doctor compliance. The implementation of the algorithm also displayed promising results. Of the 10 eligible patients for algorithm implementation, the 5 who benefited from their doctors following the pain algorithm recommendation all saw their pain scores improve. Conversely, in the 5 patients whose doctors did not follow the algorithm recommendation, all saw their pain scores either remain constant or worsen. Another weakness, however, is the small sample size of patients who actually received a new recommendation. Further, this did not represent a random sample (i.e., assignment to "treatment" vs "control"). In spite of the small sample size, the data does suggest that there may be a substantial effect on pain levels of intervention compared to no intervention. The use of pain measurement tools and documentation has shown significant improvement in assessing pain regimens and managing the patient's pain.

Interpretation of Results

According to Machira et al. 2013 study, nursing knowledge deficits related to pain management were prominent. The study revealed that nurses who received the educational pain management program scored significantly higher in caring for patients with chronic pain. The DNP project also confirms that nurses have deficits in pain-related knowledge. With future research, we may investigate whether nurses with a better mastery of the educational workshop are more effective at persuading doctors to use the methods and therefore build greater doctors' compliance.

The small sample size of the patient's data suggests that there may be a substantial effect on pain levels of intervention compared to no intervention using the algorithm. Objective pain assessment tools driven by detecting physiological data in patients provide

valuable information for hospital staff to manage better pain management (Aqajari et al., 202). In future studies, we may start with a larger sample of eligible patients for whom the doctors approve a regimen change based on algorithm recommendation and then randomly place them in treatment and control groups. We may also investigate whether nurses with better post-test scores saw better outcomes with patients. Establishing the tool in the EMR and its application in the clinical setting proves to be highly feasible and cost-effective for improving patient outcomes. This project confirmed that Positive project outcomes could encourage the development of embedded additional tools, such as the Suboxone management tool for nurses to manage patients considering suboxone is more commonly used inpatients.

Limitation of Findings

Project Design

One of the limitations of the DNP project design was the lack of research available on generalized pain regime algorithms developed by nurses. Most developed algorithms have been specific to patients' diagnoses, such as cancer or neuropathic pain. This meant that the development of the algorithm entailed moderate modification of national guidelines. The national guidelines for pain management had to be incorporated into the educational PowerPoint and the algorithm but required moderate modifications. Subsequently, approval of utilizing the algorithm in the facility was challenging. Developing an algorithm that fits the organization's needs requires more assessment and research and involving a multidisciplinary team for the desired outcome. Thus, working with several stakeholders, including the pain management CNS, the director of palliative care, and the unit director, had to be in place to minimize limitations.

Recruitment

One critical barrier that posed a challenge in recruitment was the COVID-19 pandemic. The nurses were reluctant to participate due to the unpredictable census due to Covid-19. It was challenging to minimize this limitation due to the unpredictability of patients' census and acuity admitted for COVID-19.

Data Collection

A limitation of the data collection phase was the timeline. Four weeks of the collection is not sufficient time to have the desired outcome, specifically the pain score changes after implementing the algorithm. The designated unit had to convert to covid unit 2 weeks in a row, which affected the targeted patient population criteria leading to smaller sample size than expected. It also made it harder for nurses to utilize the algorithm. This was due to a lack of staff during the pandemic and the acuity of their patients. Nurses also felt that using algorithms and adding to their charting was time-consuming. Once they attended, they had to approach providers to get buy-in changes in the regimen and the recommendations based on the pain algorithm recommendation. Therefore, It made it more challenging to evaluate the impact of the intervention on the outcome.

Data Analysis

The limitation of the data analysis is that it does not translate which nurses were non-compliant using the algorithm. This was most likely due to a lack of confidence in nurses approaching providers for recommendations in the pain regimen based on the algorithm. Consequently, the DNP project leader had to do continuous reinforcement and encouragement to be involved in this project to minimize this limitation. According to Topham & Drew 2017, A pain regimen evaluation involves interdisciplinary interaction with ongoing educational

strategies and opportunities. Inadequate communication between multidisciplinary teams has been conducted to be one of the barriers to pain control. The use of pain measurement tools and documentation has shown significant improvement in assessing pain and managing the patient's pain (Christie et al., 2018).

A recommendation to track nursing compliance is using an assigned number just for the algorithm. This project had assigned numbers for which nurses were assigned for the pre and post-tests. Additionally, a more extended data collection period would allow more nurses to use the algorithm with a larger sample size**.**

Conclusion

In conclusion, the contemporary healthcare setting emphasizes utmost care delivery and improvement of healthcare outcomes. According to Fischer 2016, the key hallmarks facilitating organizational changes are ensuring research, executing, and getting results. The results from the DNP project suggest that continued education on pain assessment is needed for all nurses to boost their confidence and enhance their communication with providers to be involved in the care, leading to better pain management of their patients.

According to Sharplin G. et al.,2019, evidence-based nursing practice identifies numerous barriers to reaching clinical standards. This includes a lack of full authority, failure to demand the best practice, failure to provide educational advancement, and a lack of support from the administration. Overcoming these barriers necessitates engagement from an appropriate stakeholder, involvement in policy-making decisions, and nurse involvement in implementing evidence-based practice strategies.

Despite its small sample size, this project showed promising results in decreasing pain scores in patients requiring pain regimens. The academic center's mission directly aligns with the DNP Scholarly Project, as it evaluates the effectiveness of using an evidence-based pain management algorithm, utilizing an evidence-based pain presentation, and furthering nurse education, all working towards the broader goal of improving the patient experience.
The introduction of algorithms developed by nurses can assist with improving gaps in education and communication between multidisciplinary teams, leading to higher-quality care.

At the project level, the DNP professional project must include a specific plan for sustainability. Most health organizations are moving toward Magnet status, which has become a gold standard for excellence in healthcare organizations. Excellence in leadership, scholarly evidence and policy, and multidisciplinary partnerships are deliverables for the DNP, facilitating improved patient outcomes and maintaining Magnet designation (Edwards, N. et al.,2018).

The DNP project aligns closely with the organization’s mission, which provides resources to promote sustainability and spread, including, but not limited to, incorporating the PowerPoint into the educational website to be disseminated to all nurses in the hospital, involving the pain management team including the MDs, NPs, CNs, and PAs to reinforce the incorporation of the modified tool in the EMR. This project will most successfully sustain changes by modifying the algorithm to a shortened version and providing educational material through the education department. Given that pain is one of the most reported symptoms in hospitalized patients, the next step to improve the dissemination and validation of the algorithm would be implementing it in all units, such as recovery, preop, and oncology units. Also, given the lack of research available on generalized pain regime algorithms developed by nurses,

publishing this algorithm could encourage nurses to participate in research-based evidence projects.

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Appendix A

FIRST AMENDMENT TO
AFFILIATION AGREEMENT

THIS FIRST AMENDMENT is made and entered into by and between The Regents of the University of California, on behalf of the UCLA Health System ("UCLA") and Touro University Nevada ("SCHOOL") with reference to the following:

A. The parties previously entered into an Affiliation Agreement ("Agreement") effective July 1, 2018, pursuant to which Touro University Nevada will send nursing students to UCLA facilities as approved by the Center for Nursing Excellence for clinical training.

B. The parties desire to modify the Agreement to extend the term of the Agreement for an additional three (3) years.

NOW, THEREFORE, it is mutually agreed to by and between the parties, as follows:

1. Section 4.1 of the Agreement is hereby amended to extend the term of the Agreement for three years through July 1, 2024.

2. Section 4.2 of the Agreement is hereby deleted in its entirety and replaced with the following:

> "4.2. Notwithstanding any other provisions to the contrary, this Agreement may be terminated without cause at any time by either party upon at least ninety (90) days' prior written notice to the other party. In the event of termination without cause by UCLA, UCLA may determine, in its sole discretion, whether to extend the effective date of termination to allow for completion of the current Students' rotation."

3. The following shall be added as a new Section 2.11 in the Agreement, immediately following Section 2.10:

> "2.11. Prior to placing Students at UCLA, the SCHOOL shall adhere to UCLA process and deadlines. All communications regarding student placement will be between SCHOOL and UCLA."

4. Exhibit A to the Agreement shall be deleted in its entirety and replaced with Exhibit A attached hereto.

5. All other terms and conditions of the Agreement shall remain unchanged, and except as expressly modified by this Amendment, the Agreement shall remain in full force and effect.

6. This Amendment may be executed by the parties in any number of separate counterparts, taken together which shall constitute one and the same instrument.

Affiliation Agreement

IN WITNESS WHEREOF, the parties have executed this First Amendment effective as of July 1, 2021.

TOURO UNIVERSITY NEVADA
("SCHOOL")

By: Andrew Priest
Name: Andrew Priest, Ed.D., PT

Title: Provost

Date: 7/19/2021

THE REGENTS OF THE UNIVERSITY CALIFORNIA, ON BEHALF OF ITS UCLA HEALTH SYSTEMS (UCLA)

By: Johnese Spisso
Name: Johnese Spisso, MPA

Title: President, UCLA Health
Chef Executive Officer, UCLA Health System Associate Vice Chancellor, Health Sciences

Date: 8/3/21

EXHIBIT A

1. **Type of Program(s) offered by SCHOOL covered under this Agreement:**
   A. Subject Area: MSN, Family Nurse Practitioner, DNP
   B. Degree Awarded:
      ___ Bachelor's Degree
      _X_ Master's Degree
      _X_ Doctorate Degree (doctorate of nursing practice)
      _X_ Advanced Practice: see above
      ___ Other: See above

2. **UCLA Health System facilities covered under this Agreement:**
      _X_ Ronald Reagan UCLA Medical Center
      _X_ Santa Monica UCLA Medical Center and Orthopedic Hospital
      _X_ Resnick Neuropsychiatric Hospital at UCLA
      _X_ Outpatient Clinics: Licensed Ambulatory Care Clinics

3. **Rotation Description:**
      _X_ Clinical care of patients - depending upon the type of student and training provided, the rotation may or may not involve clinical care
      _X_ Administrative rotation - depending upon the type of student and training provided, the rotation may or may not involve administrative functions

4. **Evaluations of Students by UCLA Health staff:**
      _X_ Yes
      ___ No

5. **SCHOOL Instructors:**
   A. SCHOOL Instructors present at UCLA:
      ___ Yes
      _X_ No

   B. Requirements for SCHOOL Instructors: Available by phone/email and every student needs to be cleared by the Center for Nursing Excellence department.

SCHOOL Representative:

Andrew Priest

Name: Andrew Priest, Ed.D., P.T.
Title: Provost

Date: 7/20/2021

UCLA Representative:

Lee Galuska Ph D, RN

Lee Galuska, PhD, RN, NE-
Title: Director Nursing Practice, Research, and Education, UCLA Health

Date: 08/03/21

Appendix B
Project Introduction to the Nursing Staff

My name is Sherri Salarkia. I am a 2nd year Doctor of Nursing Practice student at Touro University conducting a volunteer quality improvement project targeted toward nurses. I am an orthopedics NP at Santa Monica -UCLA, and a pain management NP at Northridge Hospital.

The focus of my project is:
Assisting Nurses Improve Pain Management in Hospitalized Patients
Utilizing An Evidence-based Pain Management algorithm
After a Pain Management educational presentation

Thank you and your leadership team for graciously allowing me to implement my project with you. I will be around during the next four weeks via email and phone for questions and in person during your Huddle for feedback. My institutional DNP mentor, Sue Kim-Saechao, from Interventional Radiology, will also be available.

Upon agreeing to participate in this project, I will ask you to please complete a quick baseline pre-test prior to study packets, including the PowerPoint presentation and the algorithm. You will have one week to review the PowerPoint after the live presentation. I will assist in utilizing the algorithm on a sample patient during the first week. Week 2-4 is the implementation period which means applying the algorithm to the eligible patients. I will collect the selected patient's information and monitor the pain scores in the EMR. Then the post-test will be provided on the 6TH day of week 4. They will be paired to test for changes in knowledge, but no provider identifiers will be recorded for confidentiality purposes.

I am honored to be with you guys. Thank you again for your kind support and generosity, and I hope you find this intervention helpful to your practice.

Sincerely,

Sherri Salarkia
818-687-1521 cell
Ssalarkia@mednet.ucla.edu

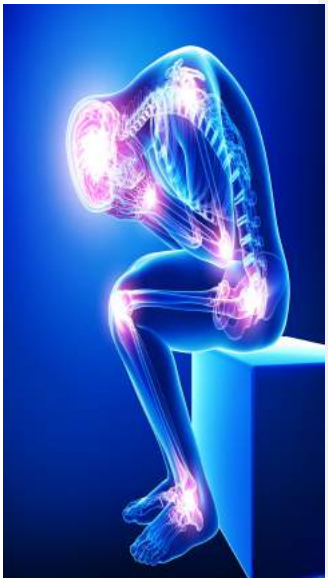
Sue Kim-Saechao
310-663-4414 cell
Suesaechao@yahoo.com

Appendix C
PowerPoint Education -presentation

Improving Nursing Pain Management in the Acute Care Setting

Sherri Salarkia, FNP-C, DNPc

Physiology



SOMATIC

- Well-localized
- Throbbing
- Aching
- Gnawing
- Soft tissue injury
- Bone Mets
- Headaches
- Pelvic pain

VISCERAL

- Aching
- Deep
- Pressure
- Poorly localized
- Bladder pain
- Endometriosis
- Prostate pain
- IBS

NEUROPATHIC

- Shooting
- Burning
- Stabbing
- Shingles
- Diabetes
- Cancer

(Pasero & McCaffery 2010)

Duration

ACUTE PAIN

- Time-limited response <3 months
- Obvious tissue damage
- Serves as a protective function
- Pain resolves upon healing

CHRONIC PAIN

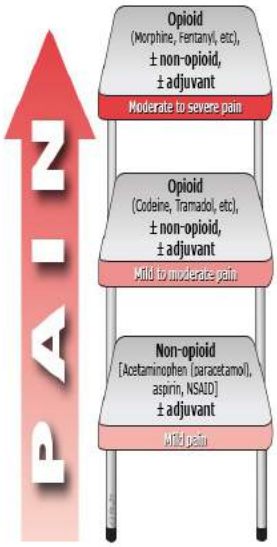
- Persisted beyond normal tissue healing >3 months
- Usually has no protective function
- Impaired health and function

ACUTE ON CHRONIC PAIN

- Acute pain flare is superimposed over the underlying chronic pain

(Pasero & McCaffery 2010)

Treatment Modalities



PHARMACOLOGICAL

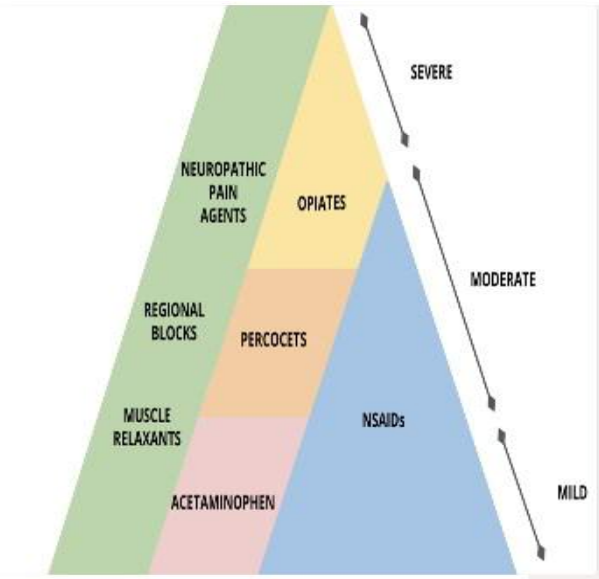
- Opioids (e.g., Norco, Percocet, Morphine, MS Contin, Methadone, Suboxone, Buprenorphine & OxyContin)
- Non-opioids (e.g. Tylenol & NSAIDs)
- Adjuvants (e.g., Muscle relaxants, Gabapentin, Lidoderm patches, Cymbalta, Lyrica & Amitriptyline)

NON-PHARMACOLOGICAL

- Massage, TENS unit, Heat & Cold pack
- Relaxation techniques, Distraction & Meditation

(Pasero &McCaffery, 2010 ; Anekar & Cascella, 2021)

Multimodal Pain Management



- Better pain relief
- Reduced doses of analgesics
- Opioid dose-reducing effects
- Fewer analgesic gaps
- Improved functional outcomes
- Less pain during rest & activity
- Reduced hospital length of stay
- Improved patient satisfaction

(Van et al., 2018)

Adjuvant in Multimodal Pain Management

Table 1. Multimodal Analgesia for Acute Pain Management

Drug Class	Drugs	Clinical Considerations
NSAIDs	Ibuprofen, naproxen, diclofenac, meloxicam, sulindac	Antiplatelet effects. GI bleeding risk; consider PPI use. CV risk; renal and hepatic considerations. Interactions with lithium. Available in topical, oral, and parenteral formulations
Acetaminophen		Maximum-dose considerations. Analgesic ceiling effects. Hepatic considerations. Available in oral and parenteral formulations
Opioids	Morphine, hydromorphone, oxycodone, hydrocodone, fentanyl, methadone	May be given as long-acting or short-acting formulation. Side effects and withdrawal symptoms. Assess renal and hepatic function. Available in topical, oral, and parenteral formulations
Mixed-acting analgesics	Tramadol, tapentadol	Low affinity for opioid receptors. Analgesic ceiling effect. Risk of lowering seizure threshold. May be considered adjuvant for neuropathic pain
NMDA receptor antagonists	Ketamine, methadone	May inhibit opioid tolerance. May be considered as adjuvant in opioid-tolerant patients. Ketamine shown to enhance morphine analgesic effects. Methadone administered as adjuvant to prevent opioid withdrawal
Anticonvulsants	Carbamazepine, gabapentin, pregabalin	Slow onset of pain relief. Gabapentin and pregabalin useful for neuropathic symptoms. Utility in opioid-tolerant patients not well established
Antidepressants	Venlafaxine, duloxetine, milnacipran, nortriptyline, amitriptyline	Greater evidence with neuropathic pain. Risk of serotonin syndrome with SNRIs. Risk of unpleasant side effects. Renal and hepatic considerations
Alpha$_2$ agonists	Dexmedetomidine, clonidine	Helps suppress opioid-withdrawal symptoms. Considered opioid-sparing and antihyperalgesic. Potentiates systemic analgesics
Corticosteroids	Dexamethasone	Possible analgesic adjuvant in opioid tolerance. Place in therapy unclear

CV: cardiovascular; GI: gastrointestinal; NMDA: N-methyl-D-aspartate; NSAID: nonsteroidal anti-inflammatory drug; PPI: proton pump inhibitor; SNRI: serotonin-norepinephrine reuptake inhibitor. Source: References 4, 5, 7, 8, 28-30, 32.

(Adesoye & Duncan, 2017)

Type of Analgesic

DOSAGE

- Pre-emptive analgesia (e.g., prior to physical therapy/MRI/CT)
- Around-the-clock (ATC)
- PRN (as needed)
- Patient Controlled Analgesia (PCA)

SHORT ACTING

- Morphine IV
- Hydromorphone
- Oxycodone
- Morphine sulfate Immediate release P.O.
- Meperidine

LONG ACTING

- MS Contin
- OxyContin
- Opana
- Methadone
- Suboxone
- Fentanyl patch

(Pasero & McCaffery, 2010)

Opioid Side Effects

SHORT TERM

- Feelings of euphoria
- Dry mouth
- Headache
- Flushing
- Mental fog
- Constipation
- Drowsiness
- Itching
- Respiratory depression
- Lethargy

LONG TERM

- Addiction
- Arrythmia
- Increased risk of heart attack
- Depression
- Constipation
- Severe abdominal pain
- Hormonal problems
- Weak bones
- Increased pain

(Peper & Harvey, 2018)

Chronic Pain Management in Acute Care

- Chronic pain may be nociceptive, neuropathic, or a combination
- For **patients with opioid dependency** (i.e., Methadone, MS Contin, and buprenorphine): the preadmitting dose must be RESUMED before any analgesic effect is realized with opioids used for ACUTE pain management, unless it's contraindicated
- The required pain dosage for chronic patients is often a higher dose than those without opiate dependency
- **Withdrawal**: Evaluate for withdrawal when the preadmitting dose is not resumed or if the patient is not on any opioid regimen
- Use **multimodal therapy** to achieve optimal pain relief

(Heyward et al., 2020)

Methadone

DOSAGE	SIDE EFFECTS	BENEFIT	NURSING
• 50-100mg daily • Lasts a long time in the body • The provider should be notified of the preadmitting dose • Resume preadmitting does if there is no contraindication	• Headache • Insomnia • Respiratory • Depression • Constipation • Nausea • Oral mucosal erythema • Vomiting	• Reduces cravings • Efficacy in opioid use disorder	• Baseline Assessment • Frequent monitoring to adjust the dose according to need • Monitor EKG for QT prolongation • Assess for side effect

(Substance Abuse and Mental Health Service Administration (SAMHSA),2021)

Buprenorphine/Naloxone (Suboxone)

ADMINISTRATION ROUTE	SIDE EFFECTS	CONTRAINDICATIONS	NURSING
Sublingual tablet Sublingual film Buccal film **MAINTENANCE** • Treatment of opioid dependence • Immediate-release opioids can be administered with buprenorphine	Headache Insomnia Respiratory depression Constipation Nausea Oral mucosal erythema Vomiting	Hepatitis B Chronic Hepatitis C Decreased function of the adrenal gland Psychosis Low seizure threshold	• Administer sublingually & watch it disappear to ensure ingestion • Dose q8, 12, or 24 • hours • May flush down feeding tubes • Adjust dose q 2–4 days (once steady-state reached)

(Substance Abuse and Mental Health Service Administration (SAMHSA), 2021)

Table 1

Summary of CDC Recommendations for Prescribing Opioids for Chronic Pain

Determining When to Initiate or Continue Opioids
Nonpharmacologic therapy and nonopioid pharmacologic therapy are preferred for pain conditions that typically last >3 months or past the time of normal tissue healing. Opioids should only be considered if benefits for both pain and function are expected to outweigh risks. If opioids are used, a combination of nonpharmacologic and nonopioid pharmacologic treatment options should be used along with opioids.
Before initiating treatment with opioids, providers should establish goals of treatment, including realistic goals for pain and function. Opioid therapy should be continued only if there are clinically significant benefits that outweighs risks to the patient.
Clinicians should discuss the known risks and realistic benefits of opioid therapy prior to starting opioids as well as throughout the duration of therapy. Responsibilities of the patient and the clinician in managing therapy should also be well established.

Sources: References 3, 4.

Table 2

Summary of CDC Recommendations for Prescribing Opioids for Chronic Pain

Selection, Dosage, Duration, Follow-up, and Discontinuation
Prescribers should initiate treatment with immediate-release opioids instead of extended-release/long-acting opioids when using opioids for treatment of pain.
Providers should prescribe the lowest effective dosage of opioids when needed. Clinicians should use caution when prescribing opioids at any dosage, should carefully reassess evidence of individual benefits and risks when increasing dosage to 50 MME or more per day, and should avoid increasing dosage to 90 MME or more per day or carefully justify a decision to titrate dosage to 90 MME or more per day.
Since long-term opioid use often begins with treatment of acute pain, clinicians should prescribe the lowest effective dose of opioids for the expected duration of pain only.
Clinicians should assess the benefits and harms within 1 to 4 weeks of starting or adjusting doses of opioids. Decision to continue therapy should be evaluated with patients at least every 3 months. If benefits do not outweigh risks of continued opioid therapy, then they should be tapered slowly to lower dosages or tapered and discontinued.

MME: morphine milligram equivalents.
Source: References 3, 4.

(Samuel, 2017)

Opioid Overdose vs. Opioid Withdrawal

WITHDRAWAL

- Watery eyes
- Runny nose
- Sneezing
- Yawning
- Sweating
- Chills
- Body aches
- Abdominal cramps
- Nausea & vomiting
- Diarrhea
- Loss of appetite
- Tachycardia
- Elevated blood pressure
- Tachypnea
- Insomnia

OVERDOSE

- Excessive sleepiness
- Breathing difficulty
- Respiratory depression
- Snoring or gurgling sounds
- Pinpoint pupils
- Cold, clammy skin
- Weak or limp muscles
- Blue or grayish skin
- Dark lips or fingernails
- Loss of consciousness
- Coma

(American Society of Addiction Medicine, 2011)

Respiratory Depression Monitoring

<u>All patients receiving opioid analgesia should have:</u>

1. Periodic assessment of level of consciousness
2. Continuous monitoring of oxygenation by pulse oximetry (SpO2)
3. High-risk patients should have constant monitoring of ventilation by capnography (etCO2)

(Monitoring (capnography) indications for nursing interventions (n.d.), Duckworth, 2017)

Nursing Interventions: EtCO2 Monitoring (Capnography)

Normal Values:
EtCO2 35-45 mm Hg

Abnormal Values:
EtCO2 < 35 mmHg = Hyperventilation/Hypocapnia
EtCO2 > 45 mmHg = Hypoventilation/Hypercapnia

I. **When EtCO2 is 45 to 50mmHg**:

a. Attempt to stimulate & arouse the patient
   - If the patient is immediately aroused & breathing normally, monitor every 15 minutes x 1 hour

b. Assess vital signs for decompensation (02 sat, BP, HR, RR, and LOC)
c. Check the patient for typical signs of ventilation & assess for hypoventilation via assessment of RR, quality, and depth
d. Assess pain, level of sedation, consider decreasing narcotic dose & frequency
e. Reposition the Smart CapnoLine if necessary
f. If EtC02 remains > 45 mmHg despite interventions, **contact the physician**

(Monitoring (capnography) indications for nursing interventions (n.d.), Duckworth, 2017)

Nursing Interventions: EtCO2 Monitoring (Capnography)

II. If ETC02 is >50 mmHg or greater:

a. If EtC02 does not return to normal within 5 minutes, call Rapid Response Team & notify MD immediately
b. Consider obtaining ABG (RT or RRT can also be consulted during this process)
c. If the patient does not immediately arouse, evaluate the appropriateness of administering **Narcan** to partially or completely reverse sedation
d. Patients may be referred to an ICU with concerns about possible respiratory compromise

III. If the Respiratory Rate falls <7 per minute (whether ETC02 is normal or not):

a. Evaluate the patient for sleep apnea
b. Sleep apnea patients are encouraged to remain non-supine
c. Patients can potentially have a normal EtC02 & low respiratory rate
d. In these instances, it is appropriate to monitor, contact respiratory therapy, or RRT

(Monitoring (capnography) indications for nursing interventions (n.d.), Duckworth, 2017)

(RASS) Scores

Richmond Agitation Sedation Scale (RASS)

Target RASS	RASS Description
+ 4	Combative, violent, danger to staff
+ 3	Pulls or removes tube(s) or catheters; aggressive
+ 2	Frequent nonpurposeful movement, fights ventilator
+ 1	Anxious, apprehensive , but not aggressive
0	Alert and calm
- 1	awakens to voice (eye opening/contact) >10 sec
- 2	light sedation, briefly awakens to voice (eye opening/contact) <10 sec
- 3	moderate sedation, movement or eye opening. No eye contact
- 4	deep sedation, no response to voice, but movement or eye opening to physical stimulation
- 5	Unarousable, no response to voice or physical stimulation

(John et al., 2021)

Nursing Interventions: RASS Assessment

- Patient is alert, restless, or agitated (score 0 to +4)
- If not alert, state patient's name & say to open eyes and look at speaker
- Patient awakens with sustained eye opening & eye contact (score –1)
- Patient awakens with eye opening & eye contact, but not sustained (score –2)
- Patient has any movement in response to voice but no eye contact (score –3)
- When no response to verbal stimulation, physically stimulate patient by shaking shoulder and/or rubbing sternum
- Patient has any movement to physical stimulation (score –4)
- Patient has no response to any stimulation (score –5)

(John et al., 2021)

Opioid Sedation Reversal

Mechanism of Action

- Naltrexone temporarily reverses respiratory & CNS depression
- May result in the sudden onset of opioid withdrawal symptoms

Routes of Administration of Naloxone

- Intramuscular
- Intranasal
- Intravenous
- Endotracheal

(Pasero & McCaffery, 2010)

Opioid Sedation Reversal

Dosage

- Initial dose: 0.1 to 0.2 mg IV at 2 to 3-minute intervals to the desired degree of reversal
- Supplemental doses administered IM have been shown to produce a longer-lasting effect

Indications for Naloxone Use

- Altered Level of Consciousness
- Respiratory depression or apnea
- Shallow, slow (<8 -10 breathes per minute)
- Unable to wake up with painful stimuli
- Constricted pupils (miosis)
- Profuse sweating (diaphoresis)
- Cardiac Arrest

(Pasero & McCaffery, 2010)

Naltrexone Safety Considerations

1. Avoid Naloxone with diseases that mimic opioid overdose (i.e., hypoglycemia, head injury, stroke, shock, hypoxia)
2. Naloxone has a **short duration of action** (half-life), so recurrent respiratory and/or CNS depression may result

Naloxone does not work for overdoses of non-opioid sedatives (i.e., Benzodiazepines such as Valium, Ativan, and Xanax)
Antidote for Benzodiazepine: Romazcon (Flumazenil)

(Pasero & McCaffery, 2010)

Paradigm for Assessment of Pain

Type of Pain

Location of Pain

Quality of Pain

Duration of Pain

Previous OR Current Use of Opioids

Rhythm/Variations in Pain

Intensity of Pain

Cultural/Ethnic

Religious factors

Patients Perception

Expression of Pain

Emotional vs. Physical Pain

Vital Signs

Previous experience w/ Pain

Respect and accept the self-report as the most reliable indicator of pain

(Van et al., 2018)

Untreated Pain Consequences

- Fatigue
- Anxiety
- Depression
- Confusion
- Increased falls
- Impaired sleep
- Decreased physical functioning/deconditioning

(Pasero & McCaffery, 2010)

Nursing Tips for Pain Management

- Be aware of all your patient's PRN pain medications
- IV pain medication should be transitioned to PO as soon as possible
- Always check the patient's allergy status
- Assess for addiction or opioid dependency
- Encourage multimodal therapy
- Don't wait for the pain to become severe before treating
- Make sure chronic pain patients have resumed their pre-admitting dose of medication if there are no contraindications
- Continues patient's education on the current regimen
- Continues pain assessment & documentation of pre- and post-intervention

(Baamer et al.,2022; Rahmawati, 2021)

Nursing Tips for Pain Management

Controlled Pain

- Pain controlled with multimodal therapy
- Reduced pain to an acceptable level with the use of less narcotic analgesic

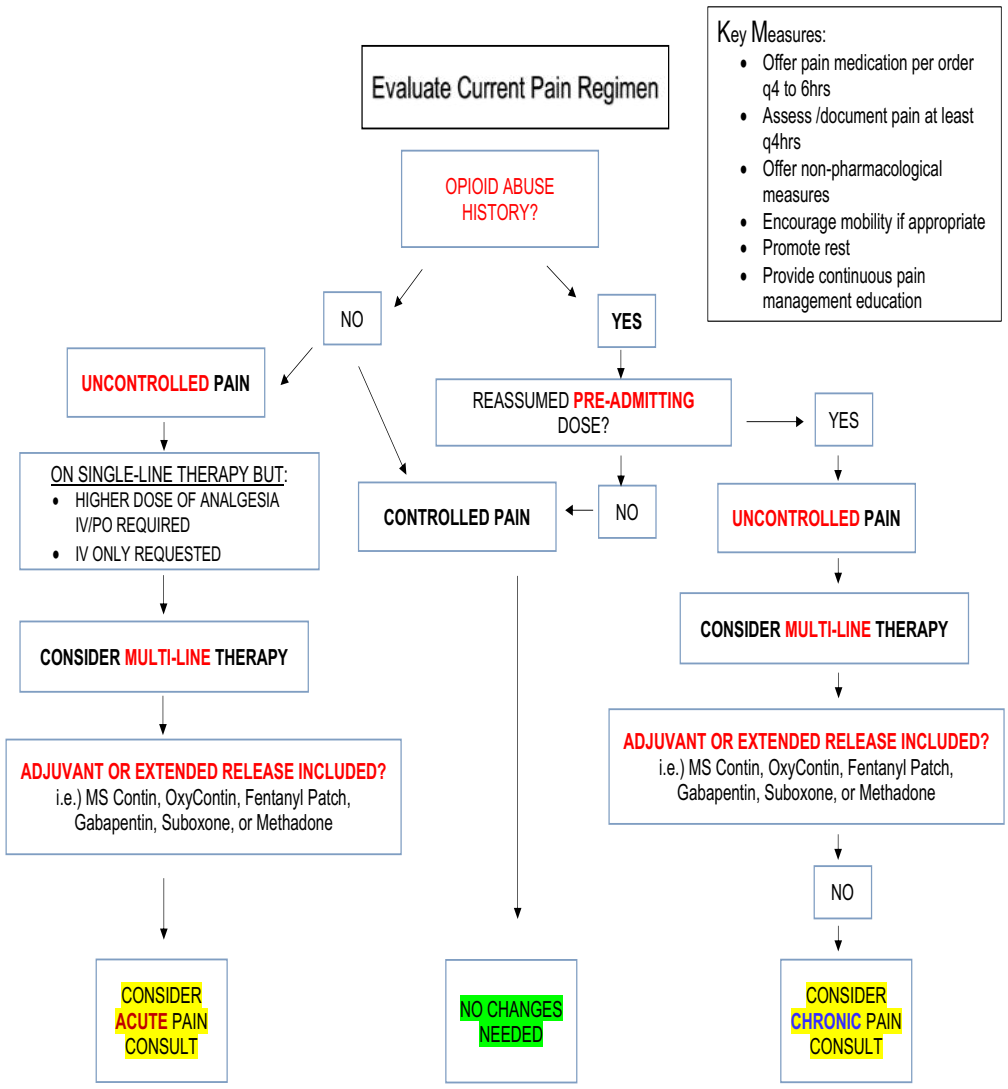
Uncontrolled Pain

- Requesting an increase in narcotic analgesic dosage
- Reports no pain control with non-narcotic analgesic
- Using IV opioids more than the PO regimen

Pain Assessment Scale In Adult

- Numerical Rating Scale (NRS)
- Visual Analog Scale (VAS)
- Defense and Veterans Pain Rating Scale (DVPRS)
- Adult Non-Verbal Pain Scale (NVPS)
- Pain Assessment in Advanced Dementia Scale (PAINAD)
- Behavioral Pain Scale (BPS)
- Critical-Care Observation Tool (CPOT)

(Pasero & McCaffery 2010)


Evaluate Current Pain Regimen
OPIOID ABUSE HISTORY?
NO
YES
UNCONTROLLED PAIN
ON SINGLE-LINE THERAPY BUT:
• HIGHER DOSE OF ANALGESIA IV/PO REQUIRED
• IV ONLY REQUESTED
CONSIDER MULTI-LINE THERAPY
ADJUVANT OR EXTENDED RELEASE INCLUDED?
i.e.) MS Contin, OxyContin, Fentanyl Patch, Gabapentin, Suboxone, or Methadone
CONSIDER ACUTE PAIN CONSULT
REASSUMED PRE-ADMITTING DOSE?
YES
NO
CONTROLLED PAIN
NO CHANGES NEEDED
UNCONTROLLED PAIN
CONSIDER MULTI-LINE THERAPY
ADJUVANT OR EXTENDED RELEASE INCLUDED?
i.e.) MS Contin, OxyContin, Fentanyl Patch, Gabapentin, Suboxone, or Methadone
NO
CONSIDER CHRONIC PAIN CONSULT
Key Measures:
• Offer pain medication per order q4 to 6hrs
• Assess /document pain at least q4hrs
• Offer non-pharmacological measures
• Encourage mobility if appropriate
• Promote rest
• Provide continuous pain management education

Pain Management Consult Considerations

- Uncontrolled pain despite multiple measures
- Chronic pain patients
- Trauma cases
- Cancer pain
- Patients with medication tolerance
- Suspected substance use disorder
- Suspected behavioral health disorder

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Appendix D

Pre-test and post-test

1. Following abrupt discontinuation of opioids, physical dependence is manifested by which of the following:

a) Sweating, yawning, diarrhea, and agitation
b) Excessive Sleeping
c) impaired control over drug use, compulsive use, and craving
d) The need for higher doses to achieve the same effect.
e) a and b

2. A patient with diabetic neuropathy currently on gabapentin 600 mg PO TID reports continuous burning, electrical-type pain in the lower extremities that is not responding to Norco. You anticipate that the physician will order adjuvant medication for this type of pain.

a) Ativan
b) Corticosteroid
c) Amitriptyline
d) Toradol

3. A patient has been injured in an accident and needs treatment for an arm fracture. The client has a history of substance abuse and reports unrelieved pain with the current regimen (Norco 10/325 one tab every 4 hours for moderate pain and IV Dilaudid every 4 hours for severe pain). The provider orders the nurse to administer Toradol for pain due to the fracture. The patient reports that the Toradol is not going to work, and he needs an increase in his Dilaudid IV dose. Which best describes the first step of the nurse in managing this situation? Select all that apply.

a) Educating the patient that NSAIDs can help with pain and inflammation
b) Contacting the hospital administrator to get the provider to change the order
c) Talking with the client about the outcomes of taking pain medication for an injury compared to using drugs inappropriately
d) Telling the client that the provider has ordered the medication whether the client wants it or not

4. An 81-year-old, 48kg lady with a history of HTN, diabetes, and CKD III with GFR 45, a left hip fracture, and severe anxiety, is in the general orthopaedic ward awaiting emergency hip surgery. She is currently on Norco 5/325 one-tab q 4 hours on a P.R.N basis. She reports no relive with the current regiment. She c/o a pain score of 8/10 on her

left hip. What analgesics would you recommend the doctor to prescribe? Select all that apply

a) Toradol 30 mg IV push q 6 hours P.R.N
b) Dilaudid .5 mg IV push Q 4 hours P.R.N
c) Ativan 1 mg IV push q 4 hours P.R.N
d) Gabapentin 100 mg po q 8 hours on a routine basis
e) Tylenol 500 mg PO q 8 hours on a routine basis
f) b, d& E
g) b,d,e,& a

5. A 50 y.o. A patient with a history of chronic abdominal pain is recovering from abdominal surgery. He complains of pain that has been continuously rated at a six on a 0-10 scale despite giving morphine 15 mg IR Q4H PRN. He takes MS Contin 15 mg PO Q12 and Norco 10/325 TID for pain. Which implication must the nurse consider when controlling this patient's pain?

a) Whether the patient would respond to a different type of medication
b) Whether the patient is becoming addicted to the medication
c) Whether the patient is experiencing an increased respiratory rate because of the medication
d) Consult with the physician if the patient needs to be resumed on his home medication

6. A patient receiving sustained-release morphine sulfate (MS Contin) every 12 hours for chronic pain experiences level 9 (0 to 10 scale) breakthrough pain and anxiety. Which of these prescribed medications will be best for the nurse to administer?

a) Immediate-release morphine 30 mg orally
b) Gabapentin 300 mg TID Orally
c) Amitriptyline (Elavil) 10 mg orally
d) Lorazepam (Ativan) 1 mg orally

7. A patient with a history of chronic pain and ETOH has been admitted for ETOH withdrawal. The patient's pre-admitting opioid med is resumed, plus the Ativan. The patient received Ativan 1 mg every 2 hours for withdrawal symptoms. The nurse notices the patient respiratory rate is four, and the patient is too lethargic. The nurse will administer it the right way.

a) Naloxone 0.4-2 mg IV; repeat q2-3min PRN; not to exceed 10 mg (0.01 mg/kg)
b) Naloxone 0.1-0.2 mg IV; q2-3min; not to exceed 10 mg (0.01 mg/kg)
c) Romazicon, 0.2 mg (2 mL) IV push once; not to exceed 3 mg

8. A patient with a history of chronic pain is admitted due to upper arm cellulitis and a secondary diagnosis of exacerbation of chronic pain. What are some common traits of patients who live with chronic pain?

a) They often have an increased tolerance to pain.
b) They can experience acute pain in addition to chronic pain
c) They often have a lower pain threshold than patients without chronic pain.

9. Regarding the treatment of neuropathic pain, the correct statement is

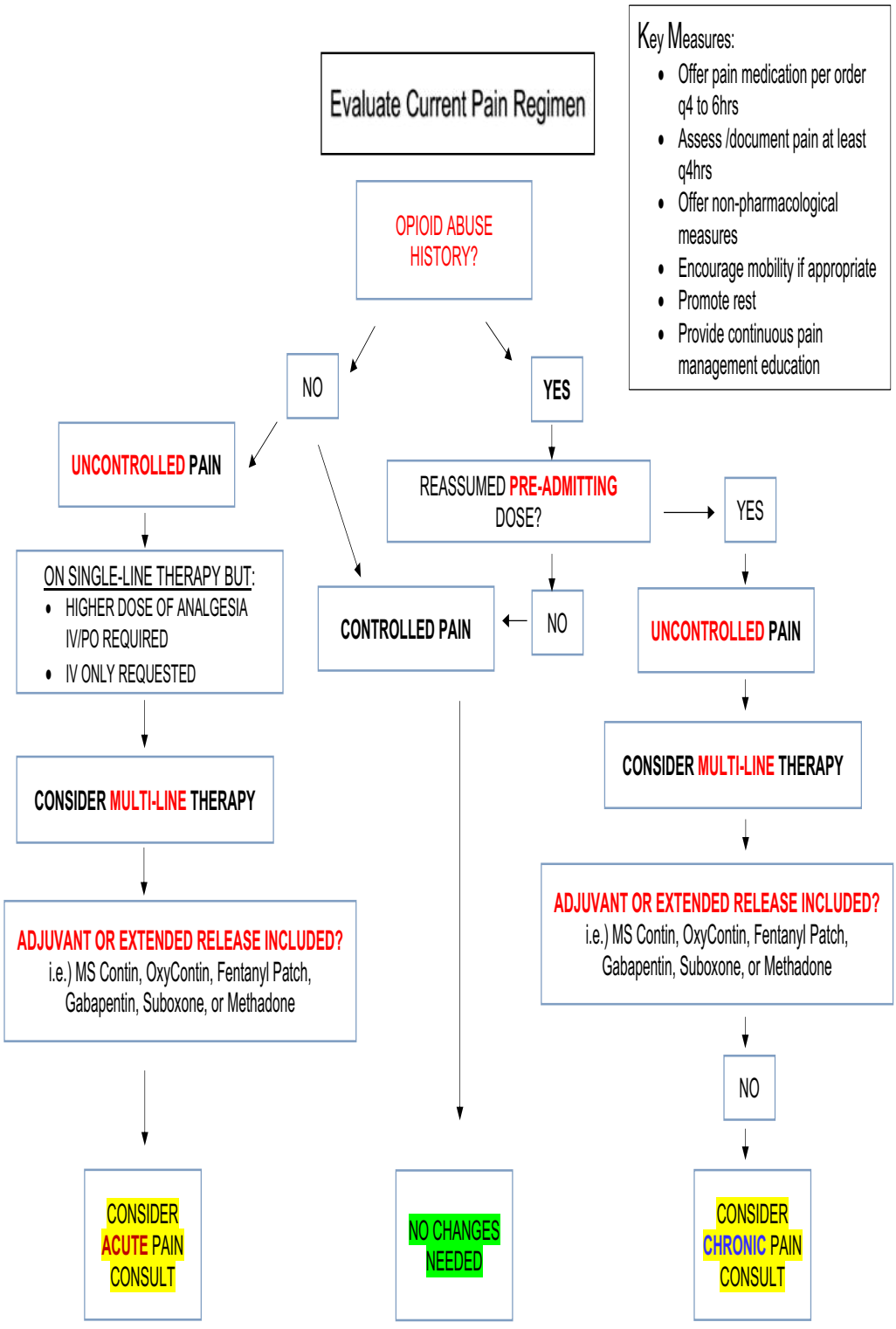
a) Narcotics should be the “first-line” treatment.
b) It is most optimally treated with multimodal therapies
c) In most cases, Gabapentin is an effective therapy

10. How should the nurse classify the pain that a patient with lung cancer is experiencing?

a) Radiating
b) Deep somatic
c) Visceral
d) Referred

Answers: 1. a, 2. c 3. a 4.f 5. a 6.a 7.c 8.b 9. b 10.c

Appendix E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ADJUVANT OR EXTENDED RELEASE INCLUDED?
i.e.) MS Contin, OxyContin, Fentanyl Patch, Gabapentin, Suboxone, or Methadone
NO
CONSIDER ACUTE PAIN CONSULT
NO CHANGES NEEDED
CONSIDER CHRONIC PAIN CONSULT

Appendix F

Nursing Compliance Checklist

Directions: Indicate the nurses' unique number and total compliance.

Nurse Number	Total # of eligible pts	Total # of eligible pts algorithm used

Appendix G

Nurse's knowledge score

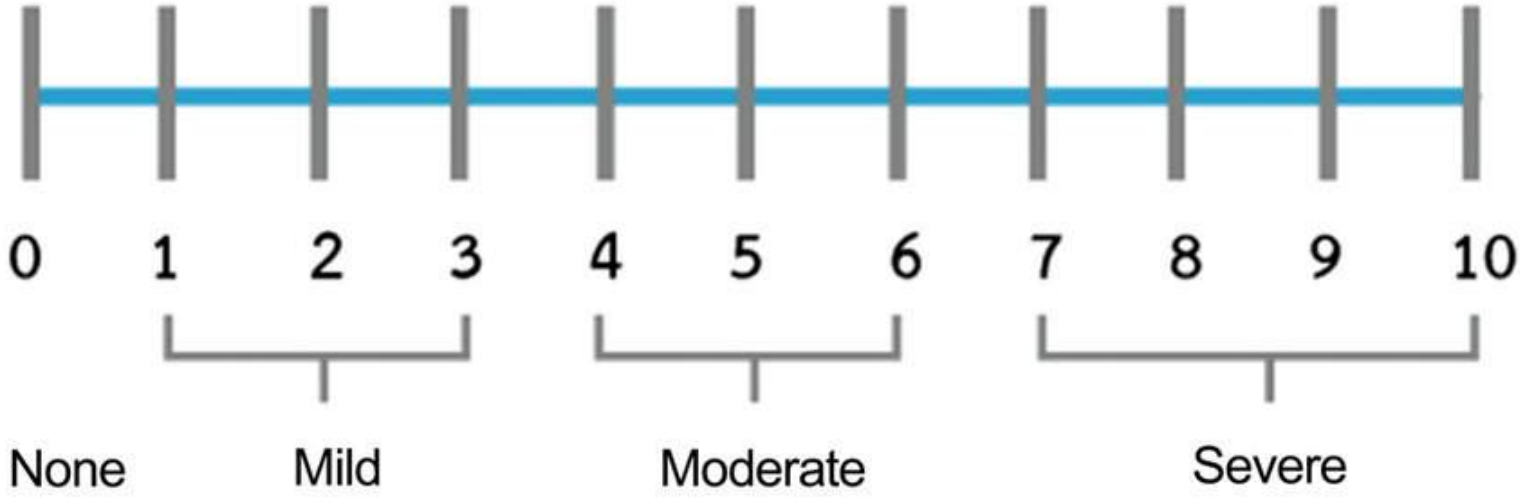
Nurse's ID #	Pre-test score	Post-test score

Appendix H

Pain score

Patient#	Pre- algorithm pain score	Post-algorithm pain score

Appendix I



Appendix J

CVI/CVR For Pre and Post-Test Questions

ITEM NUMBER	EXPERT 1 Dr. Hill	EXPERT 2 Dr. Tarrant	EXPERT 3 Dr. Kim-Saechao	MEAN
1			4	
2			4	
3			4	
4			4	
5			4	
6			3	
7			4	
8			4	
9			3	
10			4	