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## An Intervention to Increase Nurses' Knowledge of Non-Opioid Pain Management in Post-Operative Elective Knee and Hip Replacement Patients

Kristen K. Grunerud

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AN INTERVENTION TO INCREASE NURSES' KNOWLEDGE OF NON-OPIOID PAIN  
MANAGEMENT IN POST-OPERATIVE ELECTIVE KNEE AND HIP REPLACEMENT  
PATIENTS

By

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Bachelor of Science – Nursing  
University of Nevada, Las Vegas  
2014

A doctoral project submitted in partial fulfillment  
of the requirements for the

Doctor of Nursing Practice

School of Nursing  
The Graduate College

University of Nevada, Las Vegas  
August 2020



## **Doctoral Project Approval**

The Graduate College  
The University of Nevada, Las Vegas

July 17, 2020

This doctoral project prepared by

Kristen Kaye Grunerud

entitled

An Intervention to Increase Nurses' Knowledge of Non-Opioid Pain Management in Post-Operative Elective Knee and Hip Replacement Patients

is approved in partial fulfillment of the requirements for the degree of

Doctor of Nursing Practice  
School of Nursing

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## Abstract

Post-operative pain control is an enduring problem in health care. The extensive use of opioids since the 1980s has contributed to the current opioid crisis in the United States. In response, healthcare providers have begun to use a more biopsychosocial model to address pain control needs of patients. There is a demonstrated gap in knowledge for nurses in this area, and recent changes to hospital accreditation standards include a requirement to demonstrate both education provisions to staff and the use of non-opioid methods to control pain. The purpose of this Doctor of Nursing Practice (DNP) project was to assess, and increase if needed, nurses' knowledge of non-opioid methods of pain control in post-operative elective hip and knee replacement patients before and after an educational intervention. The project used an assess-teach-reassess approach to identify and improve nursing knowledge gaps regarding non-opioid methods of pain control in post-operative patients. This project was initially planned as an in-person educational presentation; however, in the setting of COVID19, an alternative delivery method was decided upon, and IRB approval was sought and obtained. An educational video on the topic was developed, and all data collection, assessments, education, and evaluation were carried out online via web links. The population of interest for this project was registered nurses over the age of 18, with a license to practice in Nevada; from this population, a convenience sample was sought. Nurses were invited to participate via email communications, social media, and word-of-mouth. Following one month of data collection, 103 nurses responded, but only 45 participants had complete data and were included in the final analysis. A paired *t*-test for matched samples was used to analyze pre- and post-knowledge assessment scores. A significant change in post-knowledge assessment scores ( $p \leq .001$ ) was achieved ( $N=45$ ). Though the mean difference in scores was statistically significant, it was small (1.1); however, percent change on

individual knowledge assessment items showed clinical significance. Data are available that support continuing nursing education online as effective. This project found consistent results as those in the literature regarding successful online delivery of continuing nursing education, as evidenced by this project's demonstration of increased knowledge assessment scores for this sample. Dissemination of these results in a manuscript is planned.

*Keywords: Opioid analgesics, Non-opioid pain control, Pain management, Orthopedic pain, and Nurses' knowledge of pain control.*

Dedicated to the memory of Dr. Christopher Pittman  
“Maximize your fun time.”

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## Chapter I

The question of how to appropriately manage pain is an enduring topic in health care. Before 1980 the medical view of pain was that it was a disease symptom and not a disease itself, which often led to suboptimal pain control. That viewpoint began to shift in the late 1980s and early 1990s when such institutions as the American Pain Society (APS), the Joint Commission (TJC), and the United States Veterans Administration (VA) began advocating for increases in pain assessment and treatment. Unfortunately, weak evidence for treating pain and aggressive marketing by pharmaceutical companies combined to create the current opioid crisis in the United States (Van Zee, 2009). While the medical community's efforts to recognize pain as a problem for patients and their desire to treat it to improve lives were laudable, it also led to some unfortunate consequences. For example, one study found that 59% of post-operative patients experienced high levels of pain, but 90% of all post-operative patients were satisfied with their pain control regimen; even though patients were satisfied, this was taken as a negative conclusion and evidence that pain was still being under-managed (Apfelbaum et al., 2003). In their history of pain standards, TJC noted that while increased use of opiates to treat acute pain did decrease patient discomfort, it also led to a substantial increase in over sedation and fatal respiratory depression (Baker, 2017).

Today, healthcare providers are in the midst of a pendulum swing back toward accepting pain as a biopsychosocial experience that is part of healing and life. While this effort is commendable, it leaves nurses playing catch-up. Researchers are finding compelling, non-opioid ways to manage pain. Still, the information is increasing so rapidly that there is often a gap between nurses' academic knowledge and techniques in daily practice. This project aimed to

close that gap in nurses' knowledge in general, and specifically for those caring for post-operative elective hip and knee replacement patients.

### **Problem and Significance**

There is a demonstrated gap in nurses' knowledge and the use of non-pharmacological and non-opioid methods of pain control (Lewis et al., 2018; Rejeh et al., 2009; Schafheutle, Cantrill, & Noyce, 2001). The Joint Commission ("New and Revised Pain Assessment and Management Standards," 2018) has tasked hospitals with utilizing non-opioid methods to enhance pain control, reduce side effects, and improve patient outcomes. Hospitals must now be able to demonstrate that they are providing education to nurses to address these requirements. In addition to a lack of awareness, nurses also report that they are uncomfortable using many methodologies, whether because of unfamiliarity with techniques or lack of knowledge about if procedures can be nurse-driven or require orders to implement (Schafheutle et al., 2001).

### **Purpose**

The purpose of this project was to assess, and increase if needed, nurses' knowledge of non-opioid methods of pain control in post-operative elective hip and knee replacement patients before and after an educational intervention. To accomplish this purpose, a presentation on non-opioid pain control methods in post-operative elective hip and knee replacement was developed along with a pre-and post-knowledge assessment; after that, this project was implemented and evaluated via an internet-based modality.

## Chapter II

### Review of the Literature

This chapter presents an extensive review of the literature. Databases searched include ScienceDirect, CINHALL, Medline, and ProQuest Central. Searches were limited to peer-reviewed journal articles and book chapters published after 2009. Keywords used in searching were *opioid analgesics, non-opioid pain control, pain management, and nurses' knowledge of pain control*. Definitions of pain, methods of pain control, and nurses' knowledge of pain are discussed in this chapter.

#### What is Acute Pain

For this paper, it is essential first to define acute pain. The American Pain Society (APS) describes acute pain as, "That which is usually associated with a degree of tissue damage that goes away when the injury is resolved" (Berry et al., 2015, p.10). The International Association for the Study of Pain (IASP) states that pain is "An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (Loeser & Treede, 2008, p. 474). This type of pain is often associated with protective reflex responses. Acute pain is usually attributed to processes like trauma, surgery, labor, and acute disease (Berry et al., 2015). In 2007, the World Health Organization (WHO) published its Delphi report (Geneva, 2007) that sought to define different pain types and establish guidelines for proper treatment and management. Some researchers and practitioners have been advocating for a revised definition of acute pain that recognizes the acute pain experience's cognitive and social aspects (Williams & Craig, 2016). In describing pain, revised definitions are critical as the

healthcare community continues to step away from strictly pharmaceutical pain management methods and toward a biopsychosocial model.

In the setting of an elective total knee or total hip arthroplasty, the absence of acute postoperative pain is not a realistic expectation. Instead, understanding expected discomfort and knowing countermeasures will permit patients to recover with minimal use of opioids (McAlister, 2018). In the case of an elective total knee and hip replacement patients, a cohesive and predictable pain management strategy can be important to allow patients to participate in rehabilitation activities to return to their best possible life. Nurses play a vital role in educating and encouraging patients under their care. If the nursing staff is well versed in pain management strategies, especially non-pharmaceutical but proven to deliver better outcomes, then patients' quality of life may be improved.

### **Methods Used to Control Pain**

According to the American Academy of Orthopedic Surgeons, the number of patients undergoing elective hip and knee replacements increases every year (American Academy of Orthopedic Surgeons, 2017). The majority of these patients have their pain controlled via inter-operative nerve blocks and local anesthetic applications, combined with intravenous and oral opioid medications while in the post-anesthesia unit and once they have been moved to the in-patient floor. Poor pain control, in the immediate days after surgery, has been shown to increase the length of stay in the hospital, slow healing, impair function long-term, and increase costs to patients and society (Gan, 2017). These adverse outcomes imply a critical need to look at evidence-based methods for effective pain control in the post-operative in-patient period for the elective total hip- and knee-replacement populations.

Studies have shown many effective, non-opioid methods to control pain in post-operative knee and hip replacement patients (Chou et al., 2016; Pellino et al., n.d.; Tedesco et al., 2017). Effective communication with patients is critical. One study found that responsive, caring nursing staff experienced in caring for surgical patients made the most substantial difference in patients' perception of pain (Joelsson, Olsson, & Jaksobsson, 2010). Therefore, enhancing the methods such a staff uses can have a significant impact on patient outcomes. Reducing anxiety has been shown to increase pain thresholds (Kumar, 2015); nurses can aid in this by teaching breathing methods, encouraging spiritual practice, or providing an empathetic listener. Early ambulation helps to reduce deep vein thrombosis (DVT) and myocardial infarction (MI), pneumonia, and poor wound healing incidence (Hutchison, 2007) and decreases the nociceptive perception of pain (Lunn, Kristensen, Gaarn-Larsen, & Kehlet, 2012). The use of ice can reduce pain and inflammation by slowing down blood flow to surgical areas (Fang, Hung, Wu, Fang, & Stocker, 2012) and allowing patients some control since they can apply or remove packs as needed. Distraction methods have been proven repeatedly to lower the use of pain medications (Bascour-Sandoval et al., 2019; Buhle, Stevens, Friedman, & Wager, 2012; Gezginci, Iyigun, Yalcin, Bedir, & Ozgok, 2018; Indovina et al., 2018). Lastly, having a multimodal analgesia regimen that includes non-opioid medications, like acetaminophen and tramadol, has been demonstrated to have positive effects on pain control (White, 2005). An additional advantage of this approach is that nurses are allowed to use appropriate clinical judgment to manage patient pain (Tomaszek & Dębska, 2018) while reducing opiate use and the adverse side effects such as nausea, vomiting, and constipation that can accompany these medications (McCartney & Nelligan, 2014).

## **Nurses' Knowledge of Non-Opioid Methods of Pain Control**

The Joint Commission updated its accreditation standards for hospitals in 2019 to reflect the current evolution in pain management (“New and Revised Pain Assessment and Management Standards,” 2018; “R3 Report: Pain assessment and management standards for hospitals,” 2017). Pertinent to this proposal are their requirements for healthcare organizations to, “Provide staff and licensed independent practitioners with educational resources and programs to improve pain assessment, pain management, and the safe use of opioid medications based on the identified needs of their patient populations,” and, “Ensure that the critical access hospital organized medical staff take an active part in pain assessment, pain management, and safe opioid prescribing through participating in the establishment of protocols, quality metrics, and reviewing performance improvement activities (*approved: New and Revised Pain Assessment and Management Standards*, 2018, p.2). The VA published a systematic review of pain assessment and management literature for hospital in-patients that found little to no strong evidence-based reasoning for how acute pain is addressed in hospitals (U. S. Department of Veterans Affairs & Service, 2013). The evidence from the VA suggests a gap in knowledge that needs to be addressed, especially among front-line nursing staff whose job is to control acute pain.

Multiple studies have assessed nurses' knowledge of post-operative pain evaluation and management (Lewis et al., 2018; Rejeh et al., 2009; Schafheutle et al., 2001). An exciting example evaluated in surgical patients' pain control day and night and compared the nurses' reported versus observed actions caring for them (Dihle, Bjolseth, & Helseth, 2006). Better control was achieved for patients with nurses who asked direct, instead of open-ended questions about pain experiences, those who used and *explained* pain control methods outside of opioid

analgesia, and those who coordinated pain relief strategies with mobilization and continually evaluated its effectiveness during activity. Another study found that one of the top reasons nurses didn't feel that they could help patients achieve optimal pain control was a lack of training and education (Rejeh et al., 2009). A recent study looking at non-pharmacological methods that nurses use to alleviate pain showed that while many nurses used simple techniques such as repositioning with the aid of pillows, others were aware of the effectiveness of TENS units but rarely used them (sometimes as a result of needing a provider's order to do so) (Lewis et al., 2018). A recent study on management of acute pain in older adults found that nurses' lack of knowledge of alternative methods of pain control and actual or perceived barriers to use of these methods greatly impacted practice (Fitzgerald, 2017). Misunderstanding of cultural differences in expressing signs of pain can also hinder nurses' ability to provide adequate relief (Chatchumni, Namvongprom, Eriksson, & Mazaheri, 2019).

Continuing education can thus be seen as a critical element of nursing care. Changes in practice brought about by research, and new requirements demand that nurses have access to the most up to date information. A Cochrane review (Forsetlund et al., 2009) focused on the effectiveness of educational workshops found that changes in practice, while incremental, can be achieved, especially if workshops combine interactive elements and are perceived as important to avoiding negative outcomes. A Swedish team found that non-pharmaceutical methods of pain control were perceived as being sometimes or never used 52% of the time, and cited nurses' lack of knowledge as the main contributing factor to this (Hartog, Rothaug, Goettermann, Zimmer, & Meissner, 2010). A recent study in Ireland (McNamara, Harmon, & Saunders, 2012) found an educational intervention to increase nurses' knowledge of methods to control post-operative pain effectively. Lastly, internet-based modalities for continuing education have shown equal

effectiveness to face-to-face delivery, while having a lower cost to healthcare providers and their employers (Maloney et al., 2012). Therefore, these studies suggest that offering internet-based information on acute post-operative pain management can be a cost-effective and efficient way to improve nurses' knowledge and decrease the pain experienced by post-operative patients.

## Chapter III

### Theoretical Underpinnings

This chapter describes the theoretical underpinnings used to guide this DNP project. The concept of diffusion of innovations (Rogers, 2003) is critical to this project's success. When implementing new ideas, care must be taken to recognize what Rogers called "adopter categories." His theory states that, among any organization, there is a spectrum of attitudes regarding the change that ranges from early, enthusiastic adopters to resistant, late adopters. The chances of a change being accepted and supported increase when early adopters can be recruited to help more resistant personalities adapt and adopt change, usually by finding ways of framing the change so that later adopters can buy into the change.

Keeping the diffusion of innovations theory in mind means being mindful of barriers to adoption and minimizing them as much as possible. For this project, buy-in from nurses is essential. Each caregiver has a set of values and methods that they bring to how their patients are managed. Therefore, it is of the utmost importance to have an informed discussion that can help nurses bring the latest research and guidelines to patients while being respectful of nurses' training and experience. Innovations need not be cumbersome to their practice while allowing them to have flexibility and choices within their practice scope.

It is also helpful to harness the enthusiasm of early adopters. Newer nurses joining the workforce have been educated in an environment where the crisis caused by overuse of opioid medications makes them amenable to using other techniques to manage pain. This current environment provides an opportunity for team building, mentorship, and knowledge distribution from newer staff to be incorporated. Supportive encouragement from nursing leadership will

also help later adopters become comfortable with alternative techniques. Lastly, embracing a patient-centered concept of care can help later adopters find these interventions to be meaningful. If the methods are efficient and prove to be effective in improving their patient's experience of pain and ability to participate in rehabilitation activities, the hope is that these methods will become second nature to all the nursing staff.

## **Chapter IV**

### **Project Methods**

The purpose of this project was to assess, and increase if needed, nurses' knowledge of non-opioid methods of pain control in post-operative elective hip and knee replacement patients before and after an educational intervention. To accomplish this purpose, a presentation on non-opioid methods of pain control in post-operative elective hip and knee replacement was developed; after that, this project was implemented and evaluated via an internet-based modality. This chapter describes the methods and plan for this Doctor of Nursing Practice (DNP) project, including the setting and design, population and sample, procedures, analysis, and presentation evaluation.

#### **Setting and Design**

Due to the social-distancing barriers imposed by Nevada governmental orders related to the COVID-19 pandemic, this project was implemented via an internet-based application called SurveyMonkey<sup>®</sup>. The design utilized was a pre-and post-assessment of an educational intervention (i.e., the video presentation). Subjects completed the project at their leisure at a location or setting of their choosing.

#### **Population and Sample**

The population for this study was registered nurses, over the age of eighteen, and licensed to practice in Nevada. A convenience sample was sought. Recruitment was conducted primarily via email invitations. Participants were voluntary responders to email invitations sent out from the University of Nevada Las Vegas (UNLV) School of Nursing's alumni list, an email list provided by the Nevada State Board of Nursing, an email sent to nurses at University Medical

Center of Southern Nevada (UMC), and an email invitation sent by the Nevada Nurses Association. Participants were also recruited using social media contacts and word-of-mouth.

## **Procedures**

After receiving IRB approval from UNLV (see Appendix A) and UMC, the sequential/simultaneous procedures below were included in this DNP project.

- Development and recording of an educational video
- Development of a SurveyMonkey® website (see Appendix B), including:
  - an informed consent page
  - a demographic collection page
  - a pre-knowledge assessment page
  - an inserted link to a video presentation and supplemental materials
  - a post-knowledge assessment page
  - a program evaluation page
  - an embedded link to download continuing education certificate
- Obtained email lists from various sources (and social media sites) for participant recruitment
- Analysis of data
- Presentation of results (Chapter V)
- Discussion and Conclusions (Chapter VI)

## **Data Analysis**

Descriptive statistics, including frequencies and percentages, were used to analyze and present demographic data and the individual item responses on the pre- and post-knowledge assessments. Percent change of pre- and post-knowledge assessment items were calculated using the formula of  $T2-T1/T1 \times 100$  (change in value divided by the absolute value of the original

value, multiplied by 100). Scores for knowledge assessments were calculated, and the number of correct responses out of 18 possible items. A paired *t*-test for match samples was used to analyze the pre-and post-knowledge assessment scores. Bivariate correlational statistics (Pearson *r*) were used to correlate age, years of practice, and pre- and post-knowledge assessment scores.

## **Resources**

Limited resources other than student time were needed for this project. The student's advisory Chair provided the use of the SurveyMonkey® application. Some assessment questions were taken from the Knowledge and Attitudes Survey Regarding Pain (Ferrell & McCaffery, 2012) provided as open-source material by the City of Hope.

## **Risks and Threats**

Risks to participants were considered to be minimal. As the project was voluntary and not connected to participants' employment, the minor anticipated risk was psychological discomfort if a participant felt unsure of their knowledge.

## **Project Evaluation**

The project's evaluation was done using the standard continuing education evaluation used by the UNLV School of Nursing, as an approved provider of continuing nursing education by the Nevada State Board of Nursing.

## **Chapter V**

### **Results**

This chapter describes the results for this Doctor of Nursing Practice (DNP) project, including the sample's demographic data, the comparison of individual and total scores on the pre- and post-knowledge assessments, and the correlations found.

#### **Sample**

A total of approximately 10,000 emails were sent out, with 103 nurses beginning the project. Of those 103 respondents, complete data were available from 45 respondents ( $N = 45$ ); only completed data were analyzed and are reported in this paper.

#### **Demographics**

The majority of respondents were female (86.7%), working full-time (95.6%) in an in-patient setting (44.4%). Most respondents had completed their nursing education in institutions in the United States (97.8%). The sample's educational levels were distributed relatively evenly among levels, with 35.6% holding a Bachelor of Science in Nursing, 28.9% having a Master of Science in Nursing, and 24.4% having a Doctor of Nursing Practice. Twelve respondents (26.6%) reported working on an orthopedic unit all or some of the time. Table 1 presents a full reporting of demographic results.

**Table 1*****Sample Demographics (N = 45)***

Sample Characteristics			
Age			
	Mean/SD	46.1±13.1	
	Median	46	
	Mode	54	
	Min	22	
	Max	74	
Years as a Nurses			
	Mean/SD	18.6±14.7	
	Median	17	
	Mode	32	
	Min	0	
	Max	53	
		Frequency	Percent
Gender			
	Female	39	86.7
	Male	6	13.3
Employment Status			
	Full-time	32	71.1
	Part-time	8	17.8
	Per-diem	2	4.4
	Other	2	4.4
Primary Workplace			
	In-patient (Hospital or Nursing Facility)	20	44.4
	Out-patient	10	22.2
	Academia	7	15.6
	Other	8	17.8
Country of Education			
	United States	44	97.8
	Other	1	2.2
Level of Education			
	Associates	1	2.2
	LPN	1	2.2
	BSN	16	35.6
	MSN	13	28.9
	DNP	11	24.4
	Other	3	6.7
Work on Orthopedic Floor			
	Yes	26	57.8
	No	10	22.2
	Sometimes	2	4.4
	New Graduate No Workplace	5	11.1
	Other		

### **Increase in Nurses Knowledge**

Pre- and post-knowledge assessment scores were compared using the paired *t*-test for matched samples. The mean pre-intervention score was 14.9 while mean post-intervention score rose to 16.0 ( $p \leq .001$ ).

Percent change in individual knowledge assessment responses pre- and post-knowledge assessment items demonstrated a reduction of “*I don’t know*” and “*Other*” responses. Percent changes in knowledge assessment item responses are illustrated in Table 2 (See Appendix C).

### **Correlations**

No significant correlations were found related to age or years as a nurse related to either the pre-or post-knowledge assessment scores.

## **Chapter VI**

### **Discussion and Conclusions**

The purpose of this project was to assess, and increase if needed, nurses' knowledge of non-opioid methods of pain control in post-operative elective hip and knee replacement patients before and after an educational intervention. To accomplish this purpose, a presentation on non-opioid methods of pain control in post-operative elective hip and knee replacement was developed with a pre-and post-knowledge assessment; after that, this project was implemented and evaluated via an internet-based modality. This chapter discusses the Doctor of Nursing Practice (DNP) project results, including main conclusions, limitations of the project, and long-term sustainability for the project.

#### **Main Conclusion**

This project's purpose was accomplished based on the significant difference in this project's pre- and post-knowledge assessment scores. Although the difference was statistically significant, closer examination indicated only a 1.1 difference in mean scores. However, from a clinical significance perspective, when the percent change of the individual knowledge assessment items was examined, it is clear that knowledge related to this project's subject matter was increased.

This knowledge improvement is important, as social distancing challenges imposed by the COVID-19 pandemic make successful employment of distance-learning techniques imperative. Since we do not know how long safety restrictions will be imposed, it is comforting to know that continuing education, to improve patient care and outcomes, can be implemented successfully by utilizing evidence-based online delivery strategies. In this project's case,

providing an alternative method to present an educational intervention related to non-opioid pain control was low cost. Additionally, it offered a perceived benefit to the participants and possibly to their patients.

Opportunities for improvement in the project were also shown in the results. While most questions showed a positive increase in the number of correct answers and subject confidence in their answers, a few results had increases in the number of wrong responses. These increases could be due to the wording of the questions or indicate a possible disconnect between the information presented and knowledge assessment. Further exploration of these questions could elicit an improved product for dissemination. Since no correlation was found between subjects' age and years of experience as a nurse and either pre- or post-knowledge assessment, it would be interesting further to explore the reasons for these changes in understanding.

### **Project Results and Previous Evidence**

In the literature reviewed for this project, there was a demonstrated need for increasing nurses' knowledge of non-opioid pain control methods. Additionally, new accreditation standards released by TJC in 2019 made reducing the use of opioid medications and educating nursing staff on alternate pain control methods a priority. Educational interventions are useful, especially when such interventions are shown to learners to be necessary. Internet-based platforms have been demonstrated to be cost-effective and efficient methods for the delivery of new information. This study indicates that clinically significant changes in knowledge regarding non-opioid methods of pain control can be delivered via an internet-based platform, thus meeting the needs of nurses and their institutions in a low-cost manner easy to use.

## **Issues with Online Continuing Education**

While online continuing education has been available for some time, some acknowledged problems are associated with it. These problems have been brought into stark relief since the outbreak of the Covid-19 pandemic and its associated social distancing guidelines. While the convenience of accessing classes online whenever and wherever one likes to make this delivery method appealing, individuals may not be able to access the internet due to financial hardships or location in rural areas; additionally, firewalls at some workplaces may make the development of workarounds necessary before an existing online intervention can be accessed by staff. Some learners report that they learn better with face-to-face access in a classroom setting. Lastly, this method requires learners to be self-motivated to complete the entire course; this can be an issue, as evidenced by the number of respondents to this project versus the amount that completed the entire survey.

## **Limitations**

Limitations of the study were primarily due to time and access constraints imposed by the government response to the Covid-19 pandemic. Larger sample sizes may have been achieved with in-person advocacy for participation by the investigator. While allowing enough responses to draw reasonable conclusions, a four-week sample period could have been improved upon by having the ability to send out reminder invitations to possible subjects.

## **Sustainability**

This project was intended to be accessible for nurses desiring continuing education credits even after completing the project. Desired indirect outcomes of improving patient care by continuing to enhance and reinforce current practice based on evidence-based methodology

may be achieved for some time to come due to the internet-based format of the project. Moreover, the relatively low cost for producers and consumers of an intervention, such as this project demonstrated, may add to the advantages and sustainability of targeted online continuing education.

## **Summary**

This project was intended to determine if a web-based educational intervention would be successful in assessing, and if necessary, increase nurses' knowledge of non-opioid pain control methods in the post-operative elective total knee and hip arthroplasty patient population. The opioid crisis in the United States, coupled with social distancing necessitated by the COVID-19 pandemic combined to make this project necessary and relevant. The project results show that this type of intervention can be developed and implemented quickly and at low cost to institutions and nurses while having a significant impact on clinical knowledge. This clinical knowledge can then be carried to patients and their caregivers and may reduce adverse outcomes associated with opioid use.

## Appendix A

### *IRB APPROVAL LETTER*

Please note that UNLV Biomedical IRB has taken the following action on IRBNet:

Project Title: [1564166-2] A Teaching Intervention to Increase Nurses' Knowledge of Non-Opioid Pain Management in Post-Operative Elective Knee and Hip Replacement Patients  
Principal Investigator: Patricia Gatlin

Submission Type: Revision  
Date Submitted: March 10, 2020

Action: EXEMPT  
Effective Date: March 19, 2020  
Review Type: Exempt Review

Should you have any questions you may contact Cindy Lee-Tataseo at [cindy.lee-tataseo@unlv.edu](mailto:cindy.lee-tataseo@unlv.edu).

Thank you,  
The IRBNet Support Team

[www.irbnet.org](http://www.irbnet.org)

## Appendix B

*Project's Components as it Appeared on Online*



CE Opportunity for Your Help With a DNP Project

An Invitation to Participate in a DNP Project

Dear Nursing Colleague:

**My name is Kristen Grunerud, I am a DNP candidate at the University of Nevada Las Vegas (UNLV) and I am asking for your help to complete my DNP project/research study (study). You are invited to participate because you meet the following criteria: you are a registered nurse, or a newly graduated nurse (NCLEX-RN pending), over the age of 18, with an active Nevada license, or license applied for, and practicing or plan to practice in Nevada. You would be excluded from this study if you do not meet inclusion criteria.**

**The purpose of my study is to develop, implement and evaluate an online presentation to increase nurses' knowledge of non-opioid methods of pain control in post-operative elective hip and knee replacement patients. To achieve this purpose, I have developed an online presentation, which translates the evidence of non-opioid pain control into practice, and I am asking for your participation in my study.**

**If you choose to participate, simply continue reading and proceed as directed below. This project has been approved by the UNLV Institutional Review Board (IRB) and was deemed as exempt[1564166-3]. Your consent is assumed if you continue participation. There is no cost or payment to you for your participation.**

**Participation is voluntary and anonymous and includes, in the following order, some general demographic information about you (results WILL NOT be reported as identifiable to you as an individual), a pre-knowledge assessment, a link to the educational presentation, a post-knowledge assessment, and a very brief evaluation of the presentation. I have also provided an additional article that might augment your learning. At any time, should you change your mind about participation, you can do so without penalty - that is, you can simply stop and exit the program; however if you want to receive the CE certificate, you must complete all components of the module.**

**Risk: It is anticipated that you might be exposed to some risk for participating in this project. It is truly believed that the risk is minimal and may only be an uneasy feeling or an uncomfortable feeling if you don't know answers to either the pre- or post-assessments.**

**If you choose to participate and complete all the components of the project, you will be awarded 1.5 hours of CE for your participation (you can download your certificate at the end of the project evaluation).**

**If you have any questions about the education or the process to receive your CE certificate, you may direct them to Kristen Grunerud at grunerud@unlv.nevada.edu or Mary Bondmass at mary.bondmass@unlv.edu (please put DNP PROJECT in the subject line of any emails). I greatly appreciate your time and willingness to help me complete my DNP!**

**For questions regarding the rights of research subjects, or any complaints or comments regarding the manner in which the study is being conducted you may contact the UNLV Office of Research Integrity – Human Subjects at 702-895-2794, toll free at 877-581-2794, or via email at IRB@unlv.edu.**

**Your participation in this project is voluntary. You may withdraw at any time. You are encouraged to ask questions about this project at the beginning or any time during your participation in this project.**

**If you would like a copy of the above, which is considered your consent to participate, please request from Kristen Grunerud using the above email.**

**Thank you in advance!**

**Kristen Grunerud, RN, BSN, DNP  
candidate University of Nevada Las  
Vegas**

**and**

**Mary Bondmass, PHD, RN,  
CNE UNLV Faculty Advisor  
for this project**

If you have read and understood the above, and would like to participate in this DNP Project, please select YES below and proceed to the next page.

If you do not want your data used in the analysis of data for this DNP project, but you want to receive the 1.5 CE, simply do not select YES and proceed to the next page. You may still proceed through

the module, but all other components must be completed to receive the 1.5 CE certificate.

If you select 'YES' or not, there is no way (nor is there any intent) to identify individuals who participate. All data will be blindly analyzed and there will be no way to identify any individual participant.

- Yes

## CE Opportunity for Your Help With a DNP Project

### 2. Demographic Information

**Please complete the following demographic data about yourself. I am asking that you use a unique ID number which will help me pair your pre and post assessment questions; however, it will not identify you as a specific participant.**

**Any 4 or 5 numbers will work for your unique ID, but I ask that you make them memorable to you so you start each component of this project with the same number. Suggestions include the last 4 of your phone number, the last 4 of your SS number, or your address number.**

UNIQUE ID NUMBER (only 4 or 5 numbers that you can easily remember)

I realize there are multiple genders, and I do not wish to exclude anyone. I have listed three options below for simplicity, and I did not want to leave any gender identification option out. Please feel free to indicate other (and describe) or feel free to choose not to answer.

- Male
- Female
- I choose not to answer
- Other (please specify)

What is your age (please provide a number only e.g. 35)

How many years have you been a nurse (please provide a number of years and/or months if applicable - If you are newly graduated, please put 0 for years and 0 for months.)

If you are not a nurse, please mark NA

Years

Months

NA

**Primary workplace**

In-patient (Hospital or Nursing facility)

Out-patient

Academia

Other (please specify)

Do you work on a floor where Ortho patients are cared for?

Yes

No

Sometimes

I am a new grad and have not start working anywhere yet

Other (please specify)

Orthopedic Experience: If you work on a unit that generally cares for Ortho patients, how many years of experience do you have on that unit? Mark NA if not applicable to you

Number of years of  
Orthopedic Experience

NA

Do you work full-time, part-time, per diem, or other?

- Full-time
- Part-time
- Per-Diem
- Other (please specify)

Was your original nursing program in the United States or from elsewhere in the world?

- Yes, my original nursing program was in the United States
- Other (please specify)

If you work for a hospital system, please indicate which. Select NA if you do not work for a hospital system.

- |   |   |
|---|---|
| <input type="radio"/> Dignity Health  | <input type="radio"/> Renown            |
| <input type="radio"/> HCA   | <input type="radio"/> Carson Tahoe      |
| <input type="radio"/> UMC (this includes the hospital and all out-patient facilities) | <input type="radio"/> Prime Health Care |
| <input type="radio"/> UHS   | <input type="radio"/> NA                |
| <input type="radio"/> Other (please specify)  |   |

What is your highest level of education in nursing?

- |  |  |
|--|--|
| <input type="radio"/> LPN              | <input type="radio"/> DNP                    |
| <input type="radio"/> Associate Degree | <input type="radio"/> PhD in nursing         |
| <input type="radio"/> BSN              | <input type="radio"/> Other (please specify) |
| <input type="radio"/> MSN              |  |

What is your highest level of education not in nursing (put NA if not applicable)?

What do you consider your specialty in nursing (A generalist is a specialty)

CE Opportunity for Your Help With a DNP Project

3. PRE-ASSESSMENT

Please complete the pre-assessment questions below.

UNIQUE ID NUMBER (same one from page 1)

I feel competent in my knowledge of non-opioid pain management techniques

- Yes
- Not at all
- Somewhat
- Other (please specify)

It is important to assess a patient's preoperative use of pain control methods to guide postoperative pain management.

- Yes
- No
- Sometime
- Other (please specify)

Nerve blocks prevent patients from participating in postoperative activity

- Yes
- No
- I don't know
- Other (please specify)

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

- Yes
- No
- I don't know
- Other (please specify)

Which of the following describes the best approach for cultural considerations in caring for patients in pain?

- There are no longer cultural influences in the U.S. due to the diversity of the population.
- Cultural influences can be determined by an individual's ethnicity (e.g., Asians are stoic, Italians are expressive, etc).
- Patients should be individually assessed to determine cultural influences.
- Cultural influences can be determined by an individual's socioeconomic status (e.g., blue collar workers report more pain than white collar workers).

Benzodiazepines are not effective pain relievers and are rarely recommended as part of an analgesic regimen.

- Yes
- No
- I don't know

Patients' spiritual beliefs may lead them to think pain and suffering are necessary.

- Yes
- No
- I don't know.

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

- Yes
- No
- I don't know

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

- Yes
- No
- I don't know

Acetaminophen and nonsteroidal anti-inflammatory agents are not effective analgesics for painful bone surgeries.

- Yes
- No
- I don't know

Patients who can be distracted from pain usually do not have severe pain

- Yes
- No
- I don't know

Patients may sleep in spite of severe pain.

- Yes
- No
- I don't know

The most accurate judge of the intensity of the patient's pain is:

- The treating physician
- The pharmacist
- The patient's primary nurse
- The patient's spouse or family
- The patient

The most likely reason a patient with pain would request increased doses of pain medication is:

- The patient is experiencing increased pain.
- The patient is experiencing increased anxiety or depression.
- The patient is requesting more staff attention.
- The patient's requests are related to addiction.

Which of the following is useful for treatment of postoperative pain

- Ibuprofen (Motrin)
- Acetaminophen (Tylenol)
- Gabapentin (Neurontin)
- All of the above

Analgesics for post-operative pain should initially be given

- Around the clock on a fixed schedule
- Only when the patient asks for medication
- Only when the nurse determines that the patient has moderate or greater discomfort

The recommended route administration of opioid analgesics for patients with brief, severe pain of sudden onset such as trauma or postoperative pain is

- intravenous
- intramuscular
- subcutaneous
- oral
- rectal

Effective non-pharmacological pain control methods for postoperative patients include:

- ice
- repositioning and/or mobilization distraction
- 
- 

CE Opportunity for Your Help With a DNP Project

#### 4. Presentation and supplemental reading

**Please view the presentation using the link below. After that, return to the SurveyMonkey page and download and read the supplemental article. Then move to the next page for the post-assessment and evaluation. You will be able to download your CE certificate at that time.**

**[CLICK HERE TO BEGIN THE PRESENTATION](#)**

**[Click here for the supplemental article](#)**

CE Opportunity for Your Help With a DNP Project

5. POST-ASSESSMENT

**Please complete the post-assessment below, then move to the next page, which will have the presentation evaluation and your link to download your CE certificate.**

UNIQUE ID NUMBER (same one from page 1)

I feel competent in my knowledge of non-opioid pain management techniques

- Yes
- Not at all
- Somewhat

It is important to assess a patient's preoperative use of pain control methods to guide postoperative pain management.

- Yes
- No

Nerve blocks prevent patients from participating in postoperative activity

- Yes
- No

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

- Yes
- No

Which of the following describes the best approach for cultural considerations in caring for patients in pain?

- There are no longer cultural influences in the U.S. due to the diversity of the population.
- Cultural influences can be determined by an individual's ethnicity (e.g., Asians are stoic, Italians are expressive, etc).
- Patients should be individually assessed to determine cultural influences.
- Cultural influences can be determined by an individual's socioeconomic status (e.g., blue collar workers report more pain than white collar workers).

Benzodiazepines are not effective pain relievers and are rarely recommended as part of an analgesic regimen.

Yes

No

Patients' spiritual beliefs may lead them to think pain and suffering are necessary.

Yes

No

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

Yes

No

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

Yes

No

Acetaminophen and nonsteroidal anti-inflammatory agents are not effective analgesics for painful bone surgeries.

Yes

No

Patients who can be distracted from pain usually do not have severe pain

Yes

No

Patients may sleep in spite of severe pain.

Yes

No

The most accurate judge of the intensity of the patient's pain is:

The treating physician

The patient's primary nurse The patient

The most likely reason a patient with pain would request increased doses of pain medication is:

- The patient is experiencing increased pain.
- The patient is experiencing increased anxiety or depression.
- The patient is requesting more staff attention.
- The patient's requests are related to addiction.

Which of the following is useful for treatment of postoperative pain

- Ibuprofen (Motrin)
- Acetaminophen (Tylenol)
- Gabapentin (Neurontin)
- All of the above

Analgesics for post-operative pain should initially be given

- Around the clock on a fixed schedule
- Only when the patient asks for medication
- Only when the nurse determines that the patient has moderate or greater discomfort

The recommended route administration of opioid analgesics for patients with brief, severe pain of sudden onset such as trauma or postoperative pain is

- intravenous
- intramuscular
- subcutaneous
- oral
- rectal

Effective non-pharmacological pain control methods for postoperative patients include:

- ice
- repositioning and/or mobilization distraction
- 

CE Opportunity for Your Help With a DNP Project

6. PRESENTATION EVALUATION

The objectives of this educational activity were for the participant to:  
 Increase knowledge of pain involved with ortho-procedures  
 Increase knowledge related to conventional drug options for ortho-procedures.  
 Increase knowledge related to non-drug options to relieve pain for ortho-procedures.

Your feedback is appreciate to the following evaluation questions One and one half (1.5) continuing nursing education contact hours is awarded for your participation in this educational activity. You will be able to download your continuing education (CE) certificate after completing this brief evaluation.

THANK YOU VERY MUCH FOR YOUR PARTICIPATION IN MY DNP PROJECT. At the end of the brief evaluation below, you will be directed to a link to download your CE certificate. If you forget to download your certificate please email me and I will send along.

UNIQUE ID NUMBER (same one from page 1)

Please rate the following items

	Strong Agree	Agree	Neutral	Disagree	Strongly Disagree	NA
Were the presentation objectives clear	<input type="radio"/>					
My personal learning objectives were met	<input type="radio"/>					
The content was appropriate for the intended audience	<input type="radio"/>					
The visual aids, handouts, and oral presentations clarified the content	<input type="radio"/>					
Teaching methods were appropriate for the subject matter	<input type="radio"/>					
The speaker, Kristen Grunerud, was knowledgeable in the content area	<input type="radio"/>					

Thank you again for completing this program's evaluation

NOTE: UMC's SECURITY MAY NOT ALLOW YOU TO DOWNLOAD THE CERTIFICATE FROM YOUR UMC COMPUTER - IF THAT IS THE CASE, PLEASE EMAIL [mary.bondmass@unlv.edu](mailto:mary.bondmass@unlv.edu) AND PUT **DNP PROJECT** IN THE SUBJECT LINE and YOU WILL BE SENT YOUR CERTIFICATE

[CLICK HERE FOR YOUR CE CERTIFICATE](#)

**Click the link above before you hit the 'Done' button (which submits your survey).**

If you exit before getting your certificate, please email [mary.bondmass@unlv.edu](mailto:mary.bondmass@unlv.edu) (put DNP CE in the subject line).

## Appendix C

**Table 2**

***Percent Change of Individual Item Responses on Pre- and Post-knowledge Assessment***

Item	Responses Options	Pre	Post	Percent Change
I feel competent in my knowledge of non-opioid pain management techniques				
	Yes	21	39	85.7
	Somewhat	22	6	72.7
	Not at all	2	0	100.0
It is important to assess a patient's preoperative use of pain control methods to guide postoperative pain management.				
	Yes	45	45	0
	No			
Nerve blocks prevent patients from participating in postoperative activity.				
	Yes	5	9	80.0
	No	30	36	20.0
	I don't know	8	0	100.0
	Other	2	0	100.0
Anticonvulsant drugs such as gabapentin (Neurontin) produce optimal pain relief after a single dose.				
	Yes	3	8	166.7
	No	33	37	12.1
	I don't know	6	0	100.0
	Other	3	0	100.0
Which of the following describes the best approach for cultural considerations in caring for patients in pain?				
	Cultural influences can be determined by an individual's ethnicity (e.g., Asians are stoic, Italians are expressive, etc.)	3	2	33.3
	Patients should be individually assessed to determine cultural influences	42	43	2.4
Benzodiazepines are not effective pain relievers and are rarely recommended as part of an analgesic regimen.				
	Yes	18	20	11.1
	No	20	25	25.0
	I don't know	7	0	100.0
Patients' spiritual beliefs may lead them to think pain and suffering are necessary.				
	Yes	42	41	2.4
	No	3	4	33.3

Item	Responses Options	Pre	Post	Percent Change
Patients should be encouraged to endure as much pain as possible before using an opioid.	Yes	2	2	0
	No	43	43	0
Combining analgesics that work by different mechanisms (e.g., combining an NSAID with an opioid) may result in better pain control with fewer side effects than using a single analgesic agent.	Yes	41	44	7.3
	No	2	1	50.0
	I don't know	2	0	100.0
Acetaminophen and nonsteroidal anti-inflammatory agents are not effective analgesics for painful bone surgeries.	Yes	5	1	80.0
	No	36	44	22.2
	I don't know	4	0	100.0
Patients who can be distracted from pain usually do not have severe pain.	Yes	9	14	55.5
	No	36	31	13.9
Patients may sleep in spite of severe pain.	Yes	37	40	8.1
	No	8	5	37.5
The most accurate judge of the intensity of the patient's pain is...	The patient	45	45	0
The most likely reason a patient with pain would request increased doses of pain medication is...	The patient is experiencing increased anxiety or depression	3	5	66.7
	The patient is experiencing increased pain	42	40	4.8
Which of the following is useful for treatment of postoperative pain?	Acetaminophen (Tylenol)	4	1	75.0
	Ibuprofen (Motrin)	4	0	100.0
	All of the above	37	44	19.0

Item	Responses Options	Pre	Post	Percent Change
Analgesics for post-operative pain should initially be given...	Around the clock on a fixed schedule	36	38	5.5
	Only when the nurse determines that the patient has moderate or greater discomfort	1	1	0
	Only when the patient asks for medication	7	5	28.5
The recommended route of administration of opioid analgesics for patients with brief severe pain of sudden onset such as trauma or surgery is...	Intramuscular	1	1	0
	Intravenous	34	38	11.7
	Oral	9	6	33.3
	Subcutaneous	1	0	100.0
Effective non-pharmacological pain control methods for postoperative patients include...	All of the above	45	45	0

## References

- American Academy of Orthopedic Surgeons. (2017). *Fourth Annual Report on Hip and Knee Arthroplasty Data*. Rosemont, IL. Retrieved from <https://www.ajrr.net/media-news/press-releases/500-ajrr-releases-2017-annual-report-on-hip-and-knee-arthroplasty-data>
- Apfelbaum, J. L., Chen, C., Mehta, S. S., & Gan, T. J. (2003). Postoperative pain experience: results from a national survey suggest postoperative pain continues to be undermanaged. *Anesthesia and Analgesia*, *97*(2), 534–540, table of contents. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/12873949>
- approved: New and Revised Pain Assessment and Management Standards*. (2018). Retrieved from <http://www.jointcommission.org>
- Baker, D. (2017). *The Joint Commission's Pain Standards: Origins and Evolution*. Oakbrook Terrace, IL. Retrieved from [https://www.jointcommission.org/assets/1/6/Pain\\_Std\\_History\\_Web\\_Version\\_05122017.pdf](https://www.jointcommission.org/assets/1/6/Pain_Std_History_Web_Version_05122017.pdf)
- Bascour-Sandoval, C., Salgado-Salgado, S., Gómez-Milán, E., Fernández-Gómez, J., Michael, G. A., & Gálvez-García, G. (2019). Pain and Distraction According to Sensory Modalities: Current Findings and Future Directions. *Pain Practice*, *19*(7), 686–702. <https://doi.org/10.1111/papr.12799>
- Berry, P. H., Dahl, J. L., Katz, J. A., & Miaskowski, C. (2015). *Pain: Current Understanding of Assessment, Management, and Treatment*. Glenview, IL. Retrieved from <http://americanpainsociety.org/uploads/education/npc.pdf>
- Buhle, J. T., Stevens, B. L., Friedman, J. J., & Wager, T. D. (2012). Distraction and placebo: two separate routes to pain control. *Psychological Science*, *23*(3), 246–253. <https://doi.org/10.1177/0956797611427919>
- Chatchumni, M., Namvongprom, A., Eriksson, H., & Mazaheri, M. (2019). Exploring the different management structures in nurses responses and treating of patients' postoperative pain: A qualitative triangulation study. *Electronic Physician*, *11*(2), 7536–7543. <https://doi.org/10.19082/7536>
- Chou, R., Gordon, D. B., de Leon-Casasola, O. A., Rosenberg, J. M., Bickler, S., Brennan, T., ... Wu, C. L. (2016). Management of Postoperative Pain: A Clinical Practice Guideline From the American Pain Society, the American Society of Regional Anesthesia and Pain Medicine, and the American Society of Anesthesiologists' Committee on Regional Anesthesia, Executive Committee, and Administrative Council. *The Journal of Pain : Official Journal of the American Pain Society*, *17*(2), 131–157. <https://doi.org/10.1016/j.jpain.2015.12.008>
- Dihle, A., Bjolseth, G., & Helseth, S. (2006). The gap between saying and doing in postoperative pain management. *Journal of Clinical Nursing*, *15*(4), 469–479. <https://doi.org/10.1111/j.1365-2702.2006.01272.x>
- Fang, L., Hung, C.-H., Wu, S.-L., Fang, S.-H., & Stocker, J. (2012). The effects of cryotherapy

- in relieving postarthroscopy pain. *Journal of Clinical Nursing*, 21(5–6), 636–643.  
<https://doi.org/10.1111/j.1365-2702.2010.03531.x>
- Ferrell, B., & McCaffery, M. (2012). The Knowledge and Attitudes Survey Regarding Pain (KASRP). Retrieved from <http://www.liebertpub.com/doi/10.1089/jpm.2007.9828>
- Fitzgerald, S. (2017). Assessment and management of acute pain in older people: barriers and facil...: EBSCOhost. *Australian Journal of Advanced Nursing*, 35(1), 48–57. Retrieved from <http://web.a.ebscohost.com.ezproxy.library.unlv.edu/ehost/detail/detail?vid=0&sid=e888d76f-afec-431c-8b80-69b51bcb2ef0%40sdc-v-sessmgr03&bdata=JnNpdGU9ZWwhvc3QtbG12ZQ%3D%3D#db=aph&AN=124995349>
- Gan, T. J. (2017). Poorly controlled postoperative pain: prevalence, consequences, and prevention. *Journal of Pain Research*, 10, 2287–2298. <https://doi.org/10.2147/JPR.S144066>
- Geneva. (2007). *WHO Normative Guidelines on Pain Management Report of a Delphi Study to determine the need for guidelines and to identify the number and topics of guidelines that should be developed by WHO*. Retrieved from [https://www.who.int/medicines/areas/quality\\_safety/delphi\\_study\\_pain\\_guidelines.pdf?ua=1](https://www.who.int/medicines/areas/quality_safety/delphi_study_pain_guidelines.pdf?ua=1)
- Gezginci, E., Iyigun, E., Yalcin, S., Bedir, S., & Ozgok, I. Y. (2018). Comparison of Two Different Distraction Methods Affecting the Level of Pain and Anxiety during Extracorporeal Shock Wave Lithotripsy: A Randomized Controlled Trial. *Pain Management Nursing*, 19(3), 295–302. <https://doi.org/10.1016/j.pmn.2017.09.005>
- HARTOG, C. S., ROTH AUG, J., GOETTERMANN, A., ZIMMER, A., & MEISSNER, W. (2010). Room for improvement: nurses' and physicians' views of a post-operative pain management program. *Acta Anaesthesiologica Scandinavica*, 54(3), 277–283. <https://doi.org/10.1111/j.1399-6576.2009.02161.x>
- Hutchison, R. (2007). Challenges in acute post-operative pain management. *American Journal of Health System Pharmacology*, 64, S1–S5. Retrieved from <http://web.b.ebscohost.com.ezproxy.library.unlv.edu/ehost/pdfviewer/pdfviewer?vid=1&sid=87fe2024-db14-4178-9c7e-7732274ad64b%40pdc-v-sessmgr03>
- Indovina, P., Barone, D., Gallo, L., Chirico, A., De Pietro, G., & Giordano, A. (2018, September 1). Virtual Reality as a Distraction Intervention to Relieve Pain and Distress during Medical Procedures. *Clinical Journal of Pain*. Lippincott Williams and Wilkins. <https://doi.org/10.1097/AJP.0000000000000599>
- Joelsson, M., Olsson, L.-E., & Jaksobsson, E. (2010). Patients' Experience of Pain and Pain Relief Following Hip Replacement Surgery. *Journal of Clinical Nursing*, 19(19–20), 2832–2838. Retrieved from [https://unlv-primo.hosted.exlibrisgroup.com/primo-explore/openurl?ID=doi:10.1111%2Fj.1365-2702.2010.03215.x&genre=article&atitle=Patients%5C%27%20experience%20of%20pain%20and%20pain%20relief%20following%20hip%20replacement%20surgery.&title=Journal of](https://unlv-primo.hosted.exlibrisgroup.com/primo-explore/openurl?ID=doi:10.1111%2Fj.1365-2702.2010.03215.x&genre=article&atitle=Patients%5C%27%20experience%20of%20pain%20and%20pain%20relief%20following%20hip%20replacement%20surgery.&title=Journal%20of%20Clinical%20Nursing)
- Kumar, S. (2015). The effect of preoperative anxiety on post operative pain.: EBSCOhost. *Indian Journal of Health and Wellbeing*, 6(6), 622–624. Retrieved from <http://web.b.ebscohost.com.ezproxy.library.unlv.edu/ehost/pdfviewer/pdfviewer?vid=1&sid>

=2ecf4fb0-23ed-44d8-a365-346ea5dce5b1%40sessionmgr103

- Lewis, M., Kohtz, C., Emmerling, S., Fisher, M., & McGarvey, J. (2018). Pain Control and Nonpharmacologic Interventions. *Nursing*, *48*(9), 65–68. Retrieved from <http://ovidsp.dc2.ovid.com.ezproxy.library.unlv.edu/sp-3.33.0b/ovidweb.cgi?WebLinkFrameset=1&S=LLGHFPCKPNEBENDGIPCKMHEHJBAOAA00&returnUrl=ovidweb.cgi%3F%26TOC%3DS.sh.22.23.27.31%257c19%257c50%26FORMAT%3Dtoc%26FIELDS%3DTOC%26S%3DLLGHFPCKPNEBENDGIPCKMHEHJBA>
- Loeser, J., & Treede, R.-D. (2008). The Kyoto Protocol of IASP Basic Pain Terminology. *Pain*, *137*(4), 473–477. Retrieved from <http://ovidsp.dc2.ovid.com.ezproxy.library.unlv.edu/sp-3.33.0b/ovidweb.cgi?WebLinkFrameset=1&S=KIGJFPGIOAEBHMCNJPCCKHHBFFKPOAA00&returnUrl=ovidweb.cgi%3F%26Full%2BText%3DL%257cjb.search.52.53%257c0%257c00006396-200807310-00005%26S%3DKIGJFPGIOAEBHMCNJPCCKHHB>
- Lunn, T., Kristensen, B., Gaarn-Larsen, L., & Kehlet, H. (2012). Possible effects of mobilisation on acute post-operative pain and nocicepti...: EBSCOhost. *Acta Anesthesiologica Scandinavica*, *56*, 1234–1240. Retrieved from <http://web.b.ebscohost.com.ezproxy.library.unlv.edu/ehost/pdfviewer/pdfviewer?vid=1&sid=3c4f033b-cc26-462a-a6e6-ae11cbe1788%40sessionmgr103>
- Maloney, S., Haas, R., Keating, J. L., Molloy, E., Jolly, B., Sims, J., ... Haines, T. (2012). Breakeven, cost benefit, cost effectiveness, and willingness to pay for web-based versus face-to-face education delivery for health professionals. *Journal of Medical Internet Research*, *14*(2), 222–237. <https://doi.org/10.2196/jmir.2040>
- McAlister, V. C. (2018). Tyranny of the pain score question after surgery. <https://doi.org/10.1503/cjs.017418>
- McCartney, C. J. L., & Nelligan, K. (2014). Postoperative Pain Management After Total Knee Arthroplasty in Elderly Patients: Treatment Options. *Drugs & Aging*, *31*(2), 83–91. <https://doi.org/10.1007/s40266-013-0148-y>
- McNamara, M. C., Harmon, D. C., & Saunders, J. (2012). Effect of education on knowledge, skills and attitudes around pain. *British Journal of Nursing*, *21*(16), 958–964. <https://doi.org/10.12968/bjon.2012.21.16.958>
- New and Revised Pain Assessment and Management Standards. (2018). Retrieved February 24, 2019, from <http://www.jointcommission.org>
- Pellino, T. A., Gordon, D. B., Engelke, Z. K., Busse, K. L., Collins, M. A., Silver, C. E., & Norcross, N. J. (n.d.). Use of nonpharmacologic interventions for pain and anxiety after total hip and total knee arthroplasty. *Orthopedic Nursing*, *24*(3), 182–190; quiz 191–192. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/15928526>
- R3 Report: Pain assessment and management standards for hospitals. (2017). Retrieved February 24, 2019, from [www.jointcommission.org](http://www.jointcommission.org)
- Rejeh, N., Ahmadi, F., Mohammadi, E., Kazemnejad, A., & Anoosheh, M. (2009). Nurses' experiences and perceptions of influencing barriers to postoperativ...: EBSCOhost.

- Scandinavian Journal of Caring Sciences*, 23(2), 274–281. Retrieved from <http://web.a.ebscohost.com.ezproxy.library.unlv.edu/ehost/pdfviewer/pdfviewer?vid=0&sid=260100eb-9555-4431-8e5a-135d714de975%40sessionmgr4007>
- Rogers, E. M. (2003). *Diffusion of innovations*. Free Press. Retrieved from [https://www.amazon.com/Diffusion-Innovations-5th-Everett-Rogers-ebook/dp/B000FC0NH8/ref=sr\\_1\\_1\\_tw\\_i\\_kin\\_2?ie=UTF8&qid=1551031090&sr=8-1&keywords=diffusion+of+innovations%2C+5th+edition+by+everett+m.+rogers](https://www.amazon.com/Diffusion-Innovations-5th-Everett-Rogers-ebook/dp/B000FC0NH8/ref=sr_1_1_tw_i_kin_2?ie=UTF8&qid=1551031090&sr=8-1&keywords=diffusion+of+innovations%2C+5th+edition+by+everett+m.+rogers)
- Schafheutle, E. I., Cantrill, J. A., & Noyce, P. R. (2001). Why is pain management suboptimal on surgical wards? *Journal of Advanced Nursing*, 33(6), 728–737. <https://doi.org/10.1046/j.1365-2648.2001.01714.x>
- Tedesco, D., Gori, D., Desai, K. R., Asch, S., Carroll, I. R., Curtin, C., ... Hernandez-Boussard, T. (2017). Drug-Free Interventions to Reduce Pain or Opioid Consumption After Total Knee Arthroplasty. *JAMA Surgery*, 152(10), e172872. <https://doi.org/10.1001/jamasurg.2017.2872>
- Tomaszek, L., & Dębska, G. (2018). Knowledge, compliance with good clinical practices and barriers to effective control of postoperative pain among nurses from hospitals with and without a “Hospital without Pain” certificate. *Journal of Clinical Nursing*, 27(7–8), 1641–1652. <https://doi.org/10.1111/jocn.14215>
- U. S. Department of Veterans Affairs, & Service, H. S. R. & D. (2013). *Assessment and Management of Acute Pain in Adult Medical Inpatients*. Retrieved from <http://web.b.ebscohost.com.ezproxy.library.unlv.edu/ehost/pdfviewer/pdfviewer?vid=1&sid=e6780047-4c16-4980-a3a3-aa8bc349416a%40pdc-v-sessmgr06>
- Van Zee, A. (2009). The promotion and marketing of oxycontin: commercial triumph, public health tragedy. *American Journal of Public Health*, 99(2), 221–227. <https://doi.org/10.2105/AJPH.2007.131714>
- White, P. F. (2005). The Changing Role of Non-Opioid Analgesic Techniques in the Management of Postoperative Pain. *Anesthesia & Analgesia*, 101(Supplement), S5–S22. <https://doi.org/10.1213/01.ANE.0000177099.28914.A7>
- Williams, A., & Craig, K. (2016). Updating the Definition of Pain. *Pain*, 157(11), 2420. Retrieved from <http://ovidsp.dc2.ovid.com.ezproxy.library.unlv.edu/sp-3.33.0b/ovidweb.cgi?WebLinkFrameset=1&S=KIGJFPGIOAEBHMCNJPCCKHHBFFKPOAA00&returnUrl=ovidweb.cgi%3F%26Full%2BText%3DL%257cS.sh.22.23.27.31.37%257c0%257c00006396-201611000-00006%26S%3DKIGJFPGIOAEBHMCNJPC>

## Curriculum Vitae

KRISTEN GRUNERUD, DNP, APRN, FNP-BC  
Las Vegas, Nevada | kkgrunerud@gmail.com

### Professional Summary

Dedicated and patient focused Family Nurse Practitioner with proven strengths in acute patient care, staff development and patient advocacy. Displays an exceptional aptitude to deliver positive patient outcomes in a fast-paced environment while simultaneously building productive relationships. Known for exceptional interpersonal and communication skills, the ability to manage competing priorities, as well as maintaining accurate and efficient documentation.

### Skills

- Advanced assessment skills and strong clinical judgment as a Nurse Practitioner
- Venipuncture, wound care management, nerve blocks, and EKG interpretation
- Computer proficiencies in MS Word, MS Excel, Outlook, and EMR

### Certifications

- American Nurses Credentialing Center, FNP-BC, issued 05/2020, current
- American Heart Association, BLS, PALS, and ACLS, all current

### Education

**Doctor of Nursing Practice**, anticipated 08/2020  
University of Nevada Las Vegas  
Las Vegas, Nevada

**Bachelor of Science in Nursing**, 08/2014  
University of Nevada Las Vegas  
Las Vegas, Nevada

### Licensure

- Advanced Practice Registered Nurse, State of Nevada, pending
- Advanced Practice Registered Nurse, State of Colorado, pending
- Registered Nurse, State of Nevada, issued 08/2014, current
- Registered Nurse, State of Colorado, issued 08/2014, reinstatement pending

## **Affiliations**

- American Nurses Association, ANA
- American Association of Nurse Practitioners, AANP
- Nevada Nurses Association, NNA

## **Clinical Practicums**

### **Pediatrics - Healthcare Partners Nevada Wigwam Pediatric Clinic**

- Conduct comprehensive wellness exams, developmental screenings, acute care, and follow-up visits for patients from birth to 18 years of age
- Conduct sports physicals and educate patients and parents on concussion care
- Confident in knowledge of growth and development, anticipatory guidance, and the child family interaction while working with parents to address their fears, concerns, and treatment options
- Recognition and management of acute and chronic pediatric diseases and the effect of childhood illness on growth and development
- Demonstrate safety in calculating pediatric dosages of medication

### **Adult and Women's Health - University of Nevada Las Vegas Student Wellness Center**

- Secure complete health histories including gynecologic, reproductive, contraceptive, medical, surgical, sexual, family health, and psychosocial systems
- Adept at performing basic physical exam components including breast exam, pelvic exam, pap smear, and cervical cultures
- Able to function autonomously from preceptor on routine care for GYN patients
- Knowledgeable in diagnostics and management of STDs

### **Obstetrics - Women's Health Associates of Southern Nevada**

- Follow ACOG DXII guidelines and protocols to deliver evidenced based treatment plans
- Secure complete health histories including gynecologic, reproductive, contraceptive, medical, surgical, sexual, family health, and psychosocial systems
- Create a birth plan and assist with ultrasounds, check-ups, and other tests to determine risk factors or other possible problems with the fetus or the childbirth
- Provide postpartum care, health education, counsel, and guidance regarding treatment provided, and communicate with patients and significant other

### **Adult Gerontology - Healthcare Partners My Generation Henderson Clinic**

- Provide compassionate primary care services including comprehensive and focused physical examinations, health assessments, diagnoses, and treatment of acute and chronic illnesses among the uninsured and homeless adult population
- Manage overall patient care, including acute illness such as upper respiratory infections, sinusitis, pharyngitis, allergies, pneumonia, acute otitis media, back pain, dermatitis, and cellulitis

- Manage chronic conditions such as diabetes, hypertension, arthritis, chronic obstructive pulmonary disease, and thyroid disorders
- Assess need for appropriate lab tests, order and interpret results under the supervision of preceptor
- Collaborate with medical specialties through appropriate referrals

## **Professional Experience**

### **Registered Nurse / Pre-op, Circulator, PACU**

Warm Springs Surgery Center, Las Vegas, Nevada, Present

- Promote evidence-based care for diverse patient populations and their families, during all surgical phases
- Assess and act in response to surgical patients' immediate health needs and conditions prior to surgery and hospital discharge, providing appropriate nursing interventions and medical management as needed
- Prepare surgical patients and their caregivers for EGD and laparoscopic surgery and after-care
- Function as circulating nurse in the OR, working with surgical team to provide care for patients under anesthesia

### **Registered Nurse / PACU**

Orthopedic Specialty Hospital of Nevada, Las Vegas, Nevada, 01/2020 to 6/2020

- Promote evidence-based care for diverse patient populations and their families, during the post-op surgical phase while maintaining open communication with the surgical team and numerous accessory departments
- Assess and act in response to surgical patients' immediate health needs and conditions prior to surgery and hospital discharge, providing appropriate nursing interventions and medical management as needed
- Prepare surgical patients and their caregivers for hospital discharge by delivering one to one post-operative education

### **Registered Nurse / Intermediate Care Unit**

Summerlin Hospital, Las Vegas, Nevada, 08/2019 to 01/2020

- Provide quality care to critically ill patients through the implementation of evidence-based nursing assessment, nursing diagnosis, interventions, and ongoing evaluation
- Collaborate with health professionals and interdisciplinary team members to ensure optimal patient outcomes
- Recognize clinical changes in patient status and implement appropriate interventions with concise communication of assessment and plan of care to physician

### **Registered Nurse / PACU**

Mountain View Hospital, Las Vegas, Nevada, 12/2018 to 06/2019

- Same skills and responsibilities as described above

### **Registered Nurse / Surgical Unit**

Mountain View Hospital, Las Vegas, Nevada, 11/2014 to 12/2018

- Provide highly skilled care grounded in evidence-based care guidelines and clinical knowledge to acutely ill medical inpatients
- Work closely with physicians and other interdisciplinary team members to deliver quality care and ensure optimal patient outcomes
- Skillfully respond in urgent situations with appropriate and timely nursing interventions to ensure patient safety and optimal patient outcomes
- Educate patients/families about medications, disease condition and health maintenance

### **Research Associate II**

Colorado State University, Fort Collins, Colorado, 01/2007 to 08/2011

- Performed bench research for cancer biology and drug development; utilized techniques such as cell culture, PCR, Western Blotting, confocal microscopy; participated in pharmacology journal clubs; preserved tissues for a national storage bank for research; published research

### **Interests**

- I enjoy rock climbing, canyoneering, hiking, backpacking, cycling, skiing, camping, golfing, swimming, and going to the gym and lifting weights
- When I am not being physically active, I love cooking and having friends over for dinner, gardening, and relaxing with my dog and a good book