Nursing Students' Beliefs and Attitudes Regarding Pain Management Knowledge Across Educational Levels

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DEDICATION

I dedicate this body of work to my family, who have made innumerable sacrifices that I may realize my academic aspirations. Heartfelt thanks and appreciation to my wonderful husband George, thank you for your constant encouragement and love. It seems my going back to school has turned you from a great cook to a gourmet chef. To my three beautiful daughters, Amanda, Alyssa and Rachel, I love you each more than you will ever know. It must have been difficult to understand why your Mom was always working on her computer, thank you for your patience and understanding.

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STUDENT NURSES' PAIN KNOWLEDGE AND ATTITUDES

ABSTRACT

Pain is a primary reason patients seek medical treatment. Nurses have been particularly overwhelmed with the task of effectively evaluating and treating patients' pain. Nursing educators and administrators go to great lengths to ensure nursing students are given pertinent and factual information regarding pain management. In spite of this, ineffective pain control continues to be a serious health condition. No studies to date have focused on the level of nursing education and the attitudes and knowledge nursing students possess regarding pain management. The aim of this study was to examine nursing students' knowledge and attitudes regarding pain management across the prelicensure registered nurse educational levels; diploma, associate degree and baccalaureate degree. Additionally, the effect prior pain experience, age, gender and ethnicity had on the nursing students' perception and knowledge of pain management was examined. A purposive sample of senior nursing students from different types of nursing educational programs located in Northeastern and Central Pennsylvania were queried using the Nurses' Knowledge and Attitude Survey Regarding Pain (NKASRP) and a Demographic Data Sheet developed by the researcher. The results of the one-way (between subjects) ANOVA were significant for type of nursing program ($p = <0.001$) and gender and nursing program ($p = 0.009$) but not significant for prior pain experience ($p = 0.135$), ethnicity ($p = 0.948$) and age (age was found to approach significance ($p = 0.050$). This study also found most students in all programs were satisfied with their nursing program abilities to educate them to assess, manage and treat their patients' pain.

Keywords: diploma, associate degree, bachelor degree, student nurses, NKASRP, pain management, pain knowledge and attitudes

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CHAPTER 1

Introduction to the Research Problem

Pain is a unique and individualized perception; therefore, quantifying and treating pain has long been a matter of consternation for healthcare practitioners. Nurses have been particularly overwhelmed with the task of effectively evaluating and treating patients' pain. It is nurses who spend the most time with patients and are the principal caregivers in the hospital, in the home and in outpatient settings. Nurses are responsible for every facet of patients' care including their physical, psychological, emotional, social, and spiritual wellbeing. One of the most frequent reasons patients seek medical treatment is pain. Unfortunately, that pain is woefully under-treated according to current literature. The aim of this study is to examine nursing students' knowledge and attitudes regarding pain management across the three basic registered nurse educational levels.

Pain is a very complex and individual response to illness or injury (Briggs, 2010; Quinlan-Colwell, 2009). Perhaps the most perplexing challenges facing nurses today is the effective management of patients' pain.

The International Association for the Study of Pain (IASP) defines pain as,

> An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. Note: The inability to communicate verbally does not negate the possibility that an individual is experiencing pain and is in need of appropriate pain-relieving treatment. Pain is always subjective. Each individual learns the

application of the word through experiences related to injury early in life (1994).

This definition demonstrates the intricacy of the concept of pain. Pain is a multifactorial dilemma. Teaching nursing students how to effectively identify and treat patients' pain is equally a challenge.

Many studies have been published demonstrating the effect untreated or inadequately treated pain has on patients. It is almost 40 years since Marks' and Sachar's sentinel research demonstrated that an overwhelming majority of medical inpatients, 73%, suffered moderate to severe pain (1973). These findings have been replicated time and time again. In addition to medical patients' unalleviated pain, studies have demonstrated that surgical patients, primarily those undergoing orthopedic procedures, have experienced insufficient postoperative pain management (Horlocker, 2010; Nett, 2010; and Pasero & McCaffery, 2007). Hutchison reported in 2007 that seventy-three million patients receive surgical procedures annually in the United States. An estimated 80% of these surgical patients will experience acute postoperative pain, and approximately one quarter will have severe, unrelieved pain. The author concludes that untreated surgical pain leads to clinical repercussions including physical and psychological damage. Unrelieved pain may lead to further hospitalization, readmission to the hospital and an increase in healthcare expenditures, felt by both the patient and the healthcare institution.

Roth et al. (2005) utilized a modified American Pain Society questionnaire and investigated the incidence of dissatisfaction with patients' postoperative pain course. The researchers chose two arms for this study. One arm ($n = 575$) would receive non-standardized pain management,

meaning no measurement of pain scores and no routine administration of analgesics. The second arm (*n = 496*) had regularly assessed pain levels and pain management in the form of patient controlled analgesia (PCA) or epidurals provided by an anesthesiologist based acute pain service (APS). The results supported the hypothesis that patients who are routinely queried about their pain and are given analgesics routinely fare better than their counterparts who receive no such care. Not surprisingly, the non-APS subjects stated increased dissatisfaction with their postoperative pain course.

Mertin, Sawatzky, Diehl-Jones and Lee (2007) outlined the detrimental effect surgical stress responses (SSR) have on homeostasis. The researchers proposed that inappropriately managed pain initiates continuous surgical stress responses, which in turn produce multi-organ damaging effects. The ineffectual response to acute surgical pain may interfere with the postoperative goals of ambulation and physical therapy, thereby prolonging healing and increasing the risk of postoperative complications such as infection, pulmonary embolism, deep vein thrombosis and pneumonia (Nett, 2010). In spite of improved surgical techniques, newer analgesics and opioids, and improved postoperative pain regimes, patients continue to describe unrelieved pain following surgery (Wu & Raja, 2011). Apfelbaum, Chen, Mehta, and Gan (2003) quote an alarming incidence of postoperative pain in patients ". . . 86% had moderate, severe, or extreme pain, with more patients experiencing pain after discharge than before discharge" (p. 534).

The adverse effects of analgesics and opioids utilized to treat postoperative pain include nausea, vomiting, respiratory depression, urinary retention and somnolence to name just a few. For the aforementioned reasons, some patients may forego requesting prescribed routine pain medication in hopes of being discharged to home. Other patients may wish to avoid some of the

untoward side-effects associated with the use of postoperative analgesics, specifically short-acting opioids (Lau & Brooks, 2001). Additionally, uncontrolled pain may lead to further hospitalization, or in the case of same day surgery, delayed discharge or admission to a hospital (Abarca, Saclarides, & Brand, 2011; Apfelbaum et al., 2003; McGrath et al., 2004; Shaikh, Chung, Imarengiaye, Yung & Bernstein, 2003). Unanticipated hospital admission, specifically after ambulatory surgery, has been examined by medical and nursing researchers (Lau & Brooks, 2001; Watt-Watson, Chung, Chan & McGillion, 2004). In this age of managed healthcare systems and limited medical resources and personnel, it is imperative that methods be developed to provide patients with adequate pain relief that does not require additional time spent in the hospital or added medical costs. A reduction in time to discharge could translate into significant savings in nursing care and healthcare dollar expenditures. Likewise, improved pain management outcomes may increase patient satisfaction with surgical outcomes and the healthcare experience. Patients whose pain has been adequately managed will experience a more timely recovery and an earlier return to activities of daily life.

Nurses' knowledge and understanding of pain and pain management have been brought into question for decades. The literature continues to support the hypotheses that student nurses need to receive additional education in pain theory and management (Arber, 2001; Briggs, 2010; Chiang, Chen, Huang, 2006; Chuck, 2002; Goodrich, 2006; Heye & Goodard, 1999; Huang, Cunningham, Laurito & Chen, 2001). Equally, registered nurses must receive continued education regarding effective pain management during the entire span of their careers. Horbury, Henderson, and Bromley (2005) reported a need for continuing education based on their alarming finding that more than 60% of nurses choose questionnaire answers that would result in

the persistence or exacerbation of patients' pain, given that patient's prior pharmacodynamics and behavioral response to an analgesic. The vast majority of research investigating pain management nursing has determined that accurate knowledge and informed attitudes are precursors for successfully treating patients' pain (Howell, Butler, Vincent, Watt-Watson & Stearns, 2000; Linkewich, Sevean, Habjan, Poling, Bailey & Kortes-Miller, 2007; Mackrodt & White, 2001; Simpson, Kautzman, & Dodd, 2002).

There may be other reasons for the disconnect between what the nursing student learns related to pain management theory and techniques and how the student utilizes those methods in his or her practice. Dimsdale (2000) cites one of the challenges he as a physician faces when dealing with his patients' pain is the ever changing ethnic diversity of the United States. The author outlines some of the obstacles associated with caring for an increasingly diverse population. The hindrances described in this research may be extrapolated to any healthcare provider, in particular nurses. Diverse cultures are affected by an array of disease processes. Specific populations of patients may respond differently to treatments and medications. It is essential for the practicing nurse professional to be fundamentally educated in pain management practices and beliefs of varying cultures. Within these, diverse cultures there are "ethnic nuances in communication" experienced between patient and the healthcare provider (p. 161). Such nuances may result in subtle differences in what is said by the healthcare practitioner and what is heard or interpreted by the patient. In 2000, Lasch cautioned the nurse to avoid "cultural stereotyping" when interacting with a patient in pain (p. 20). The researcher further encourages the nurse to read books and articles and interact within the community of the specific culture to increase understanding. Although culturally competent nursing has been promoted for more than

two decades, the tenets of transcultural nursing may not have been incorporated into the context of culturally competent pain management to the extent it is required.

Pain perception is greatly influenced by other elements including physiological state, psychological condition, age, gender and previous experience with pain and pain management outcomes. Age decreases the manner in which medications are metabolized and excreted; therefore, it is imperative for the nurse to be cognizant of dosage modifications in the elderly (Miaskowski, 2000). Equally, pediatric patients are a subset of the population that requires specialized knowledge concerning pain medication metabolism and excretion. Pediatric dosage alterations are based on physiological and pharmacokinetic differences such as body composition (greater water content at birth through the second year), immature immune and liver enzyme function and under-developed renal clearance capabilities (Ginsberg, Hattis, Miller & Sonawane, 2004; Prosad Paul, Whilbey & John, 2011). Nielsen, Staud and Price (2009) found a substantial difference in individuals' reported pain sensitivity. The authors suggest heredity and genetics, as well as environment, effect pain sensitivity. Nielsen et al. also propose that assessing pain sensitivity may prevent patients from developing clinical pain and identify those predisposed to postoperative pain and chronic pain conditions.

Gender related pain intensity and responses to analgesia research began to appear in the literature with more frequency beginning in the 1990s. Advances in biophysiology and genetics made it plausible for such inquiries to be deliberated. Miaskowski and Levine (1999) raised the question, is there a preference for opioid analgesia in females? The researchers stated that opioids are a better choice for pain relief in the female population. This research followed an earlier inquiry investigating the result pain had on women (Miaskowski, 1997). Fillingim, King,

Ribeiro-Dasilva, Rahim-Williams and Riley produced an extensive critical review of research articles addressing the topic of gender and pain (2009). While it was reported in this exhaustive review that the majority of studies found women reported more pain, other studies found women to be at greater risk for procedural and postoperative pain. Another issue brought to light by the authors was the fact that women experience gender bias in pain treatment. Calderone (1990) described this exact predicament when reporting that after cardiac surgery, women were more often prescribed sedatives whereas the men were more apt to receive analgesics. Fillingim et al., (2009) purported several probable explanations for the gender based pain sensitivity including hormonal influences, effects of sex hormones, endogenous opioids, and psychosocial variables to name a few. Clearly, there is much investigation to be carried out in the field of gender and pain.

Krueger and Stone (2008) contacted 10,700 prospective participants by random-digit telephone calling to determine what percentage of the population was experiencing pain and what type of pain they were experiencing. Response rate for this study was 37%. Information was collected in a 24 hour diary format; pain was measured by a 0-6 anchored scale, with zero meaning no pain. Three randomly selected 15 minute intervals were chosen and scored. The study generated results that were similar to some previous studies and some which challenged previous findings. Contrary to other studies, the statistics did not support prior findings that women report higher levels of pain over men. Results revealed that participants of lower socioeconomic means or with less education described more time in pain and increased levels of pain compared to those with higher income and educational levels.

In 1999, Congress directed the Institute of Medicine (IOM) to investigate the disparities experienced by many minorities in healthcare. The subsequent report entitled, *Unequal*

Treatment: Confronting Racial and Ethnic Disparities in Health Care, (Smedley, Stith & Nelson) was published in 2003 and has led to the passage of various federal laws aimed at reducing inequities in the medical treatment of marginalized, minority patients. Narayan (2010), a transcultural nurse consultant, asserts that minorities or cultural groups receive substandard pain management. This nurse researcher contends it is difficult for patients to translate feelings of pain into words. This problem is compounded when the patient and the nurse speak different languages. Even in the circumstance where the nurse and patient speak the same language, ineffective communication may lead to inadequate pain management or worse, no pain management. Further, Narayan proposes that by utilizing culturally aware assessments, nurses can improve minorities' pain care outcomes (2010).

"Pain is what the person says it is and exists whenever he or she says it does" (McCaffery, 1968, as cited in McCaffery & Beebe, 1994, p.15). Margo McCaffery, pain management advocate, is credited with providing nursing with that often referenced definition. Pasero reinforced the McCaffery definition of pain by stating, "The patient's self-report of pain is the gold standard of pain assessment" (2009, p.53). In spite of the familiarity of the nursing profession with that description of pain, as a whole, nurses continue to doubt patients' declarations of pain and its intensity. An alternative reason often referenced as to why nurses may discount or under value patients' reports of pain may be that nurses do not feel the patients' behavior corresponds to the self-reports of pain (McCaffery, Rolling Ferrell & Pasero, 2000). In studies, nurses have been found to dismiss patients' pain intensity if the patients' behavior appeared incongruent with what the nurse personally felt were expected pain gestures. For instance, if a patient were smiling or laughing, the nurse would dismiss the validity of his or her

reported pain (Katsma & Hamlow Souza, 2000; McCaffery, Ferrell & Pasero, 2000). Spencer and Burke (2011) identify cultural differences as a reason why some patients are able to project their pain by using outward mannerisms and verbalizations and some are not. Nurses unfamiliar with certain cultures may have difficulty in accepting patients' description of their pain. D'Arcy (2008) echoed this sentiment by reporting that some nurses, for mostly inexplicable reasons, experience difficulty in believing patients' pain accounts. The author received responses from 2,949 nurses and reported that some nurses determine that patients, in spite of stating they are experiencing pain, are labeled as "drug seeking" or "frequent flyers". Blondal and Halldorsdottir's phenomenological study described "reading the patient" or acknowledging the patient's verbal and nonverbal cues as the first challenge the nurse must face when caring for the patient in pain (2009). These instances indicate the need for increased pain management education, as it is acknowledged that for some individual patients, laughter is an effective coping mechanism for pain. Various studies have supported the position that forms of distraction, specifically humor, may provide substantial relief from pain though it is generally a short lived respite. (McCaffery & Robinson, 2002).

Pud (2004) noted that nurses' personal experience with opioids affects their attitudes and knowledge toward patients' pain management. The research supports the fact that the nurse who has had previous personal experience with opioids is more apt to conduct an effective pain assessment and more often able to choose the appropriate opioid therapy than the opioid naïve nurse. Similarly, McCaffery et al., (2000) found that beliefs and knowledge held by healthcare professionals influenced the amount of pain experienced by inpatients. Nurses, particularly graduate nurses, may not feel confident in administering opioids because of lack of education

regarding these medications, lack of clinical experience with the drugs or a combination of the two. Lastly, nurses may be fearful that administrating opioids may lead to side-effects such as a severe decrease in respiratory effort or patient addiction (Allock & Toft, 2003; Brennan, Carr & Cousins, 2007; Cordts, Grant, Brandt & Mears, 2011; Ferrell, McCaffery & Rhiner 1992). The notion of analgesics causing addiction and respiratory difficulties is not limited to healthcare professionals. In a study examining management of pain and nausea in the ambulatory care setting, researchers found that patients widely hold the misunderstanding that only the lowest dose of pain medication prescribed should be administered, even in the face of moderate pain, for fear of respiratory consequences (Juarez et al., 2005). Abdalrahim, Majali, Warrén Stomberg and Bergbom (2011) investigated nurses' knowledge and attitudes of postoperative pain management and suggest that nurses' lack of knowledge may be related to "negative attitudes in dealing with patients' complaints of pain" (p.250). The authors additionally propose the misconception that nurses may believe they are the prime authority on the patients' pain, not the patients themselves.

Gordon, Pellino, Higgins, Pasero and Murphy-Ende (2008) studied the administration of as needed or PRN range of opioids on acute pain. The researchers determined that as needed or PRN ranges are intended to provide latitude for variability in individual dosing requirements, however frequently these orders are misinterpreted and misunderstood. Nurses who attended pain management courses were found to answer more correctly to case vignettes than nurses who did not attend. The results demonstrated that one-half to one-third of the nurses answered on the conservative side of the dosing recommendations, choosing to undertreat the patients' pain by

answering to administer the lowest possible doses. This finding was in spite of the patient reporting severe pain.

Research published in 1997 cited reasons for nurses failing to use direct questioning as a method to determine patients' pain. Those reasons include reluctance to use new methods and limited or no support form nursing superiors and physicians (Franke, Luiken, de Schepper, Huijer Abu-Saad & Grypdonk). The preceding examples demonstrate that pain management misconceptions and perceptions have survived in nursing for decades and substantiate the necessity for further pain management education for nurses and student nurses alike.

The Agency for Health Care Policy and Research (AHCPR) in 1992, developed clinical guidelines for pain management in an effort to reduce patients' pain experience and decrease healthcare expenditures. The resulting document *Acute Pain Management: Operative or Medical Procedures and Trauma: Clinical Practice Guideline* was formulated by professionals considered experts in the field of pain. These federally established clinical practice pain management guidelines have not been revised since their inception (AHRQ, 2008). These recommendations were useful for organizations and institutions searching for methods to increase the efficacy of clinical pain outcomes while at the same time being conscious of fiscal responsibilities and nursing personnel time constraints.

The Veterans Administration (VA) has been at the forefront of developing standards for monitoring and treating patients' pain. In October of 2000 the VA published, Take *5, Pain: the 5th Vital Sign*, with permission from the American Pain Society to use the trademark, pain the 5th vital sign. It was the intent that this publication to be utilized by all healthcare professionals to,

"prevent pain and suffering in persons receiving care in the veterans healthcare system" (p.5). This work was a multidisciplinary collaboration of nurses, physicians and other healthcare professionals to accurately and continuously assess and treat patients' pain. A unique aim of this program was to include patients and families as active participants in the pain management process. This document also gives credit to the American Pain Society and specifically to James Campbell MD for the idea of promoting pain as the fifth vital sign. Campbell stated:

> Vital Signs are taken seriously. If pain were assessed with the same zeal as other vital signs are, it would have a much better chance of being treated properly. We need to train doctors and nurses to treat pain as a vital sign. Quality care means that pain is measured and treated. (James Campbell MD, Presidential Address, American Pain Society, November 11, 1996).

This was the first public suggestion that pain be assessed, measured and treated as are the other vital sign measurements including temperature, pulse, respirations and blood pressure. It was the impetus for other healthcare organizations to begin to seriously explore the patients' pain levels and what may be done to improve patients' pain management.

In 2001, The Joint Commission mandated that all patients of hospitals, nursing homes, convalescent homes and other healthcare agencies have their pain level assessed routinely. The required pain measurement became known as the fifth vital sign. This development occurred in response to a plethora of studies suggesting that under-managed pain contributes to physiological and psychological difficulties. The Joint Commission, along with assistance from other facilities including the University of Wisconsin-Madison School of Medicine, the Robert Wood Johnson Foundation and the Joint Commission's Department of Standards collaborated for two years to formulate standards for pain management. The standards are listed below:

1. Recognize the right of patients to appropriate assessment and management of their pain
2. Identify patients with pain in an initial screening assessment
3. Perform a more comprehensive pain assessment when pain is identified
4. Record the results of the assessment in a way that facilitates regular assessment and follow-up
5. Educate relevant providers in pain assessment and management
6. Determine and assure staff competency in pain assessment and management
7. Address pain assessment and management in the orientation of all new staff
8. Establish policies and procedures that support appropriate prescription or ordering effective pain medications
9. Ensure that pain does not interfere with participation in rehabilitation
10. Educate patients and their families about the importance of effective pain management
11. Address patient needs for symptom management in the discharge planning process
12. Collect data to monitor the appropriateness and effectiveness of pain management

(Berry & Dahl, p.8, 2000).

Subsequent literature continues to support the relationship between unrelieved pain and psychological, physical and social problems or complications (Dunwoody, Krenzischek, Pasero, Rathmall & Polomano, 2008; Thomas, 2003). Regardless of the institution of guidelines and standards to encourage proper management of patients' pain, there continues to be research evidence of unsuccessful pain management techniques.

Once the decision to require reporting of patients' pain levels was made, it was necessary to uniformly quantify patients' pain scores. The goal of any pain assessment tool is to transform

the largely subjective experience of pain into an objective, quantifiable score. The most popular and widely adopted pain reporting tools became the Numerical Rating Scale (NRS) and the Visual Analog Scale (VAS). The NRS is a scale employing numbers between 0 (no pain) and 10 (worst pain imaginable). The VAS similarly measures pain, however, uses a horizontal or vertical line measuring 10 centimeters to indicate the degree of pain the patient is experiencing. The patients were asked to draw a line, or point to the area on the continuum where their pain falls. The majority of clinical research studies use the Visual Analog Scale (VAS) to assess pain, chronic, acute and postoperative. The NRS and VAS are simple and usually easily understood scales. The reliability and validity of the VAS has been tested extensively (Bodian, Freedman, Hossain, Eisenkraft, & Beilin, 2001; Good, Stiller, Zauszniewski, Anderson, & Stanton-Hicks; 2001). DeLoach, Higgins, Caplan and Stiff (1998) found that the VAS correlates well with a verbal 11 point scale in the postoperative interval. The NRS instrument is valuable in assessing pain produced by surgery and injury. Though the tools are meant to help the healthcare practitioner to identify and treat patients' pain accordingly, it cannot be stressed enough that pain is subjective and therefore it is impossible for one tool to accurately measure pain conclusively. One patient's pain experience cannot be assumed to translate to another patient's pain experience, in spite of the fact that both report their pain at a level of 7 on a NRS. There are other pain scales in use for those unable to articulate or understand the VAS or NRS. These include primarily the very young, the very old, those with impaired senses and the cognitively diminished (Bulloch & Tenebein, 2002; Mawdsley, Moran & Conniff, 2002).

The initiation of pain management standards and pain scale tools assisted in bringing the problem of inadequate pain management to the healthcare forefront. Some pain management

research indicates that patients are experiencing a small improvement in pain levels. However, it is still reported that nurses are undermanaging patients' pain (Al-Shaer, Hill, & Anderson, 2011; Blondel & Halldorsdottir, 2009; Brantley Erkes, Parker, Carr & Mayo. 2001; Lewthwaite et al., 2011; McCaffery, Ferrell & Pasero, 2007).

Theoretical Framework

Knowles' Adult Learning Theory was utilized to devise the research inquiries for this research investigation. Knowles' Adult Learning Theory, the primary theory in the subcategory of education identified as andragogy, was introduced in the 1950s and developed further during the 1960s and 1970s. Andragogy differs extensively from the prevailing educational model until that time, pedagogy. Pedagogy was popular in most of Europe and North America in the 18th, 19th, and 20th centuries. Andragogy is defined by Knowles as, "The body and theory of practice on which self-directed learning is based has come to be labeled "andragogy", from the combining form *andr* of the Greek word *aner* (meaning "man")." (Knowles, 1975, p.19). Pedagogy had been the principal method of educating school aged children for centuries. Knowles' Andralogical theory was a response to the emerging thought that adult learners behave differently and, therefore, learn quite differently than their child counterparts.

Andralogical theory is primarily based on six central assumptions; the learners need to know, self-concept of the learner, prior experience of the learner, readiness to learn, orientation to learning and motivation to learn. All of these assumptions, specifically the role of experience, were investigated in this study to ascertain whether previous experience or didactic comprehension contributes to the student nurses' knowledge and attitudes regarding pain management. The research questions for this study were developed directly from Knowles'

assumptions. According to Knowles' learning principle, Learner's Need to Know, the student needs to be educated to the how, why and what of pain management. This principle was the basis for the research questions investigating the students' knowledge of pain management. The question to be answered is, "Are we teaching the nursing students what they need to learn regarding pain management to effectively identify and treat the patients' pain?" The instrument *Nurses' Knowledge and Attitude Survey Regarding Pain* (NKASRP) was utilized to assess the students' knowledge of pain theory and pain management principles.

The Self-Concept of the Learner deals directly with the goal of the student becoming autonomous. Although not all educational interactions may realize this objective, the student should be moving in the direction of becoming self-directed. Assessing the students' current pain knowledge may lead to further development of pain management standards which would ensure nursing students are being educated in a consistent manner. If all graduating nurses are taught sound pain management information, they will be better prepared to be effective nurses.

Prior Experience of the Learner is an integral focus of this study. The final research question, "What effect does prior pain experience (self or as caregiver) have on nursing students' pain knowledge and attitudes?" is directly related to Knowles' assumption regarding the students' life experiences. Knowles acknowledges that there are differences in both the quality and quantity in individuals' experiences. These individual, adult experiences may impact the students' learning encounter negatively or positively. It is not known how much influence prior pain management experience has on nursing students' knowledge and attitudes. Knowles' theory states that adults are best educated using a problem focused or task focused approach. All of the inquiries on the NKASRP dealt solely with pain management theory and techniques.

Questions concerning students' prior pain experience were asked on the students' Demographic Data Sheet.

The principle Orientation to Learning pertains to the education being applicable to life situations. Two of the items on the NKASRP deal with case studies, which the studenst may be able to relate to clinical experiences. Readiness to Learn, according to Knowles, is best accomplished when adult learners realize they need to know information to better manage situations effectively. This principle is particularly important to nursing because pain management is an ever-evolving discipline, and remaining current on new techniques and pharmaceuticals will improve patient outcomes. The necessity for continuing education in pain management needs to be instilled in the students, as they progress from nursing students to professional nurses. Another option available to nurse educators is to formulate teaching methods that couple theoretical lessons on pain management with clinical experiences when students are assigned patients with pain. The final principle, Motivation to Learn, relates to the student realizing that learning will benefit them in some capacity. At face value, that may mean that the student memorize the information presented in class to do well on a test. But moreover, it means understanding the principles of pain theory and management to better care for our patients.

Knowles' Theory was utilized to elucidate the findings generated by examining the three nursing programs students' knowledge and attitudes of pain management in this research study. The goal of this study was to begin a path of research regarding pain management education for all levels of nursing students. The findings of this investigation may lead to further research, which can lead to the development of a core curriculum for pain management nursing education.

This resource may allow nurse educators to more fully and effectively prepare future nursing students with the knowledge and skill sets to more adequately care for their patients.

Statement of the Problem

Nursing educators and administrators go to great lengths to ensure their nursing students are given pertinent and factual information regarding pain management. In spite of this, ineffective pain control continues to be a serious health condition. No studies have focused on the level of primary nursing education and the attitudes and knowledge nursing students possess regarding pain management. It stands to reason that if nursing students experience gaps in their pain management knowledge at graduation this deficiency may continue into their professional careers unless action is taken. Developing pain education programs for nurses is quite a challenge for educators, as nurses have differing levels of attitudes, expertise and knowledge (Heye & Goddard, 1999; Horbury, Henderson & Bromley, 2005; Hunter et al., 2008). This lack of knowledge can be translated into an increase in healthcare expenditures, an increase in nursing care requirements, an increase in time spent in the hospital or ambulatory surgery center and, most importantly, an increase in patients' pain and suffering.

Purpose of the Study

The purpose of this study was to ascertain whether the type of basic nursing education impacts the nursing students' pain knowledge and attitudes. Additionally, the effect that prior experience, age and gender have on the nursing students' perception and knowledge of pain management was examined. These objectives were addressed by comparing nursing students' knowledge and attitudes regarding pain management utilizing a questionnaire and information gathered from a demographic data instrument developed by this researcher. The research

subjects included willing participants in two diploma nursing programs, a two year associate degree nursing program and two 4 year baccalaureate nursing programs. The following research questions were developed for this study utilizing Knowles' Adult Learning Theory (1980):

Research Questions

1. What are the pain management knowledge and attitudes of senior nursing students in a diploma nursing program, an associate degree nursing program, and a baccalaureate degree nursing program?
2. What are senior nursing students' experiences and satisfaction regarding pain education in their nursing program?
3. What are the differences in pain management knowledge and attitudes of senior nursing students in the three pre-licensure nursing programs?
4. Are there differences in the pain management knowledge and attitudes of senior nursing students based on age (18-27 years, 28 years and older) in the three nursing programs?
5. Are there differences in the pain management knowledge and attitudes of senior nursing students based on gender in the three nursing programs?
6. Are there differences in the pain management knowledge and attitudes of senior nursing students based on race or ethnicity?
7. To what effect does prior pain experience (self or as caregiver) have on nursing students' pain knowledge and attitudes in the three nursing programs?

Significance of the Study

Nurses are charged with the well-being of their patients when they are providing care. This entails providing for their physical, emotional, psychosocial, and spiritual health; as well as providing for patients' safety and comfort. Responding to patients' pain cues, whether verbal or nonverbal, is a critical component of safe and effective nursing care. Nurses have a moral and ethical obligation to perform their nursing duties to the best of their ability. This requires having an astute working knowledge of the medications and therapies prescribed to alleviate their patients' pain. Nurses should also be instructed in the use of non-prescribed pain management techniques and comfort measures. These methods should employ alternative and complementary therapies when appropriate (Bruckenthal, 2010).

Ineffective pain management may be related to deficits in nurses' knowledge, attitudes or comprehension of pain. These insufficiencies can lead to patient suffering and further pain sequelae. To date there is no study investigating three levels of pre-licensure nursing education and its differences on student nurses' attitudes and knowledge regarding pain management. It may be reasoned that if nursing students lack a cursory knowledge of pain theory and management upon graduation this deficiency may follow them into their nursing careers.

According to the United States Department of Labor's (USDL) Bureau of Labor Statistics, there are 2.7 million registered nurses in the country Registered nurses account for the majority of all healthcare professionals (USDL, 2012). At the present time, there is no single entry level educational requirement for Registered Nurses. The three types of nursing pre-licensure educational programs currently available in the United States are as follows; a bachelor degree nursing program, an associate degree nursing program and a diploma nursing program.

Typically, the bachelors' degree in nursing is obtained by attending a four-year college or university. The associate degree in nursing program is often housed within a two-year junior or community college setting. The diploma of nursing program is most frequently located within or partnered with a hospital or healthcare system. This program of nursing education is generally between two to three years in length. At the successful completion of any of the three nursing programs, students are qualified for the National Council Licensure Examination for Registered Nurses (NCLEX-RN), the standardized test for licensure of Registered Nurses in the United States (National Council of State Boards of Nursing, April, 2010). Because of the differing program lengths and curricula variances within the three registered nursing educational options, the attention and focus given to pain theory and pain management instruction may vary greatly.

Shaw & Lee (2010) purported that nursing students had inappropriate knowledge and attitudes regarding patients with chronic pain. This study examined the misconceptions held by 430 student nurses in New Zealand. The researchers state that the New Zealand healthcare system is similar to that of many industrialized nations including the United States, Canada, the United Kingdom and Ireland; therefore, the results of this study are applicable to other countries. Several results of this study outlined the need for improvement in the area of pain management knowledge. The majority of student nurses (79.6%) answered erroneously that stress was a cause of pain in the chronic pain sufferer. Also, most students (64.3%) held the belief that depression is responsible for chronic pain. It was demonstrated that the majority of the sample hold true that using opioids would eventually lead to addiction (54.8%). Shaw & Lee offer suggestions to address the inaccurate information and misconceptions identified in this study.

Strategies include educational approaches to update curricula, dispel myths and misconceptions and providing a connection between pain theory and clinical practice.

Lieb Zalon (1995) produced one of the only studies investigating associate degree and bachelor degree nursing programs and pain management instruction by querying faculty. A random sample of associate degree and bachelor degree programs yielded 351 nursing faculty surveys. Results indicated both associate and baccalaureate programs committed a similar amount of time to pain management in the curricula. Associate degree programs (*n= 148*) stated an average total of 8.0 hours of pain management content over the curriculum; bachelor degree programs (*n = 156*) indicated 8.2 hours. The faculty of both types of nursing programs signified that time reserved for pain theory was somewhat less than satisfactory, but felt that adequate clinical preparation was offered to students.

Current literature continues to support that nursing faculty are lacking in knowledge pertaining to pain management. Voshall, Dunn and Shelestak (2012) studied nursing faculty in the United States Midwest. One hundred eighty-eight surveys were sent and 96 surveys were returned, yielding a response rate of 51%. The respondents were predominately white (92%), female (91%), and married (80%). Most of the educators' (61.5%) highest educational degree was a Master of Science in Nursing (MSN). The average age of the faculty was 53 years, average years as a Registered Nurse 27, and average years teaching 13. The majority of the nurse educators admitted to being taught pain management (72.9%) however, just 35 (36.5%) feel sufficiently prepared on the subject. Thirty-two (33.3%) subjects teach specific pain management guidelines to their students. The faculty was given the Knowledge and Attitudes Survey Regarding Pain (KASRP). The average score for the faculty members was 77.88%, not

achieving the predetermined passing score of >80%. Less than half of the respondents scored >80%. The researchers determined the areas in which the faculty showed knowledge were pain assessment, cultural and spiritual issues and pathophysiology. The areas that the faculty needs further education include pharmacology, interventions and addiction. This study pointed out the current state of pain management education. The limitations of the convenience sample in the U.S. Midwest, as well as the descriptive correlational design, prohibit generalizability of the findings. This study is an important step to future research investigating faculty preparedness in pain management. It is of vital importance that nurse educators, nursing program administrators and the profession of nursing itself, examine factors that may be contributing to the under management or mismanagement of patients' pain.

Delimitations of the Study

The study was conducted with the following delimitations:

1. This study used a convenience sample of senior nursing students in three types of pre-licensure nursing programs in Pennsylvania present the day the questionnaire was distributed.
2. Clinical experiences of the student nurses may vary greatly among the three nursing programs.
3. Didactic and theory experiences of the student nurses may vary greatly among the three nursing programs.

Assumptions

The following assumptions were utilized for this research:

1. The study participants responded truthfully and to the best of their ability.
2. The survey instrument precisely measured the nursing students' knowledge and attitudes regarding pain management.

Definitions

Margo McCaffery, nursing researcher, pain management pioneer and patient advocate, is credited with providing the first listed definition of pain used in this study. The International Association for the Study of Pain (IASP) has provided the second definition of pain. The Maryland State Board of Nursing's *Pain Management Nursing Role/Core Competency A Guide for Nurses,* was utilized as a resource for definitions.

Pain: pain is what the person says it is and exists whenever he or she says it does. (McCaffery, 1968). Pain is a disagreeable sensory and emotional experience combined with actual or potential damage to tissues, or described in terms of such damage. (IASP, 1994).

Pain Assessment: the comprehensive evaluation of the patient's pain including but not limited to: location, intensity, duration of the pain; aggravating and relieving factors; effects on activities of daily living, sleep pattern and psychosocial aspects of the patient's life, and effectiveness of current management strategies. Pain assessment includes the use of a standardized pain measurement tool. (MBON, 2002).

Pain Intensity Scales: Pain intensity scales are used by healthcare providers and researchers to measure how intensely individuals are feeling pain. These scales are also used as a monitor to gauge the effectiveness of treatments. There are different types of scales, some are appropriate for children, some for adults and others are for use with infants. (MBON, 2002).

Pain Management: The use of pharmacological and non-pharmacological interventions to control the patient's identified pain. Pain management extends beyond pain relief, encompassing the patient's quality of life, ability to work productively, to enjoy recreation, to function normally in the family and society, and to die with dignity. (MBON, 2002).

Diploma nursing student: A student in a basic educational program that is designed to prepare nursing students for entry into practice, usually within 2 or 3 years. The graduate diploma nurse is eligible to take the national licensing examination to become a registered nurse. In the United States, most diploma programs are affiliated with a hospital. (Mosby, 2009).

Associate degree nursing student: A student in a 2-year course of study, usually located in a community or junior college. The associate degree graduate nurse is eligible to take the national licensing examination to become a registered nurse. (Mosby, 2009).

Baccalaureate degree nursing student: A student in a 4-year course of study in a college or university. The baccalaureate graduate nurse is eligible to take the national licensing examination to become a registered nurse. (Mosby, 2009).

Pain Measurement Tool: The quantitative examination of the intensity of the pain as reported by the patient utilizing a standardized instrument which has demonstrated reliability and validity. (MBON, 2002).

Summary

Current literature supports the assumption that nurses' pain management knowledge may be improved. Nursing research has examined the knowledge and attitudes of nurses regarding pain and has compared the results of nurses and students. However, a review of nursing literature reveals research has not been conducted comparing different levels of nursing instruction to one other. It is not evident whether the type of pre-licensure nursing education affects nurses' knowledge and attitudes related to pain management.

Plaisance's and Logan's (2007) study found a significant statistical difference between baccalaureate degree nursing students' and associate degree nursing students' knowledge and attitudes regarding pain ($p = .001$). Both groups of students, nevertheless, demonstrated insufficient knowledge of pain management. The major purpose of this study was to identify attitudes and knowledge of nursing students regarding pain and pain management within the three types of pre-licensure nursing education. Further, the results may lead to the research necessary to develop a comprehensive pain theory and pain management curricula for basic nursing students.

Chapter 2 outlines the necessity for investigation and research into this topic. An exhaustive review of nursing research concerning the pain management knowledge deficits of nurses and students is presented.

CHAPTER 2

Review of Literature

Introduction

Nurses' pain management practices have come under scrutiny over the last few decades. A review of the literature demonstrates nursing, as a profession, has investigated its knowledge and attitudes regarding pain management. An overwhelming majority of the literature has validated the gaps in what nurses know and what nurses need to know to effectively achieve a decrease or elimination of patients' pain. This chapter discusses the past and present state of the science as it relates to the understanding and practice of nurses and student nurses regarding pain management. The studies presented add support for the need to assess pain management education in nursing programs by exposing the gaps in scholarly studies in this area. The vast majority of the literature involves research related to nurses' knowledge regarding pain management. Additionally, Knowles' Theory of Learning is examined as a theoretical framework for this study, as Knowles' Adult Learning Theory has identified core andralogical principles that support the research questions utilized in this research.

Nurses' knowledge and attitudes related to pain management

D'Arcy (2008) queried 2,949 nurses regarding pain management standards and practices. The findings revealed that while most nursing professionals had a working knowledge of pain management principles, nurses would benefit from more education in the areas of the use of opioids and pain assessment skills. Interestingly, 80% of the nurse respondents in this study believed, inaccurately, that an increase in vital signs is an indication that the patient is in pain. The other question to which a majority of the nurses answered incorrectly (58%) dealt with

increasing dosages of opioids. The nurses responded that there is an upper limit (ceiling effect) to how much opioids may be increased to improve patients' pain. Nurses also erroneously identified the percentage of chronic pain patients at risk for addiction to opioids after one-year. The correct response is 4% of patients with chronic pain who use opioids for one-year become addicted (Flemming, et al., 2007). Ninety-five percent of the nurses responded inaccurately, with the majority answering that the risk of addiction is much greater. These data indicate that accurate pain management information and continued education needs to be disseminated to practicing nurses. Nurses also identified an impediment to pain management plans in nursing practice being physicians prescribing the wrong medication or too little medication to effectively treat the patient. D'Arcy recommends using such an opportunity to educate the physicians or to use a formulary protocol for prescribing opioids (2008).

An early investigation by Hamilton and Edgar (1992) surveyed 318 nurses' knowledge of pain assessment and pathophysiology, pharmacologic and nonpharmacologic interventions. No statistical difference was identified in the scores based on nurses' level of education or years of experience as a nurse. The areas of pain theory and knowledge in most need of remediation, as outlined by this study, were equivalent dosing of analgesics and opioids, chemical properties of opioids, risk-ratio of addiction and contrasts between types of pain, specifically, chronic and acute pain. In contrast to the preceding research, Keene and Thompson's (2008) findings demonstrated that nurses with a higher level of nursing education self-reported they were less prepared to manage their patients' pain, enhance their end of life experience, and provide care for the dying patient. A post-hoc Tukey signified a statistical difference between nurses who routinely provided hands-on nursing care to the end of life patient including Licensed Practical

Nurses (LPNs) (p =.001), diploma nurses (p = .009), associate degree nurses (p = .002) and baccalaureate degree nurses (p = .008) and those with primary duties removed from patient care, labeled others in this study, including Master's prepared nurses, doctoral students and nursing students (p = .062). Researchers of this study outline the need for increased pain education in nursing curricula to include pain pathophysiology, accurate pain assessment, pharmacological and nonpharmacological strategies and evidence based protocols to name a few.

Infrequently, studies have included the two levels of nurses, Licensed Practical Nurses (LPNs) and Registered Nurses (RNs), in the sample. Coyne et al. (1999) examined contrasts in knowledge of pain assessment and pharmacologic and nonpharmacologic pain management techniques in LPNs and RNs with varying educational degrees. The 232 nurses included in the study were employed at three Mississippi hospitals. The setting for this study was 23 medical-surgical or specialty units in one of three hospitals. The hospital settings were defined as follows: Hospital A, was a private, for-profit facility, consisting of 160 inpatient beds, and six units; Hospital B, was a public, nonprofit facility, comprising 249 inpatient beds and nine patients units; and Hospital C, was a public, nonprofit facility, with 152 inpatient beds with eight inpatient units.

An analysis of variance (ANOVA) disclosed no significant differences among the nurses employed at the three hospitals in knowledge of pain assessment and knowledge of pharmacologic pain assessment scores. A significant difference was found in the nurses' knowledge of nonpharmacologic pain management amid the three hospitals (p =.000) and in the variable, overall knowledge of pain management (p =.000). No statistical difference was found between the LPNs' and the RNs' knowledge of pain assessment. Statistical differences were

noted between LPNs and RNs in the knowledge of pharmacologic pain management (*p = 0.030*) and overall pain management *(p = 0.040*), with the RNs scoring higher. No significant difference was seen in knowledge of pain assessment and knowledge of nonpharmacologic pain management scores among the levels of nursing education, LPNs, RNs with Associate Degrees (AD) or Associate in Applied Science (AAS), RNs with Bachelor Degrees (BS) or Master of Science Degrees (MS). Significant statistical differences were identified in pharmacologic scores between LPNs and AD /AA-RNs, and between BSN-RN and MS-RN; however no difference was found in scores between LPNs and diploma RNs. There was a statistical difference in overall knowledge of pain management scores with the BSN group outscoring the LPN group (*p =0.028*). Nonetheless, there was no significant difference observed in overall pain management knowledge when comparing the LPN group to all levels of the RNs. The findings indicate that there was a significant difference in scores of the nurses amongst the three hospitals, and between LPNs and RNs scores. The study's findings indicate the need for further investigation into the lack of knowledge or understanding of pain management techniques by both LPNs and RNs. The authors suggest that academia produce thorough pain management curricula for nursing students, which reflects the individuality of pain and the varied strategies available to treat and successfully manage pain.

Horbury, Henderson and Bromley (2005) cite meager attendance at pain management inservices as the motivation for the research investigating patients' behavior and nurses' pain assessment. The researchers used a questionnaire that originated from early publications of McCaffery and Ferrell (1997) to query the nurses regarding specific patient- nurse interactions. Horbury et al. adapted the original questionnaire to reflect the changing practice of pain

management by including answers regarding the use of epidural catheters for postoperative pain management. The researchers proposed eight separate vignettes utilizing four fictional patients: a grimacing 25 year old, a smiling 25 year old, a grimacing 75 year old, and a smiling 75 year old. The nurses were given information stating the patients were postoperative, though no identifiable procedure was mentioned, and that the patients had no significant medical history. Nurses were asked numerous multiple-choice questions corresponding to each of the four separate patient scenarios. Researchers detected behavioral biases in the nurses, which led to patients experiencing prolonged or untreated pain. Nurses were found to more often give a higher pain rating for the frowning patients than the smiling patients. In addition, nurses rated the smiling elderly patient's pain more believable than the smiling, younger patient's pain. The most reported factor influencing nurses' decision to treat reported pain was respiratory depression. This statement was evident in particular when the nurses were questioned regarding the patient with an indwelling epidural catheter. A significant finding of this study was that nurses were unwilling to accept patients' self-report of pain.

Educational programs have been created by nurse educators to enhance existing pain knowledge of nursing staff. De Rond, de Wit, Frits, van Dam and Muller (2000) developed and evaluated a Pain Monitoring Program (PMP) for nurses. Two phases are involved with the PMP. First, the nurses are educated concerning pain, pain assessment and pain management. Next, the RNs utilize a numeric rating scale to provide a daily value for the patients' pain. The researchers measured the effects of the PMP on communication, agreement in nurse-patient pain scale rating and nursing documentation about patients' pain. Results demonstrated that the PMP was effective in improving nurses' assessment of pain, documentation of pain, as well as patients'

pain intensity. Communication concerning pain between patients and nurses and between patients and physicians, unfortunately, did not show improvement.

Effects of hospital continuing education programs have been reported with varied results. Francke, Luiken, Schepper, Huijer Abu-Saad and Grypdonk (1997) conducted a controlled educational program with a pre- and post-test component. The educational program consisted of eight weekly three-hour sessions. The study focused on a student-directed education "of the head" and "of the heart" (p.92). Diverse educational activities were developed including audio-visual tactics; verbal demonstrations, large group and small group discussions, and other exercises aimed at increasing the nurses' ability to obtain a thorough pain history. Items for testing the sample were taken from Dalton's pain questionnaire (1989) as well as an investigator developed instrument. The intervention led to an increase in the quality of the nurses' pain history acquiring skills observed greatest at one-month though still present at six-months. The results support the assertion that the continuing education program did increase the quality of the activities related to acquiring pain histories. For instance, one nurse stated she now routinely asks the patients to describe, ". . . characteristics of their pain more extensively and thoroughly than before." (p.96). However, no statistical significance was observed regarding nurses' use of increased pain assessment practices (direct patient questioning, pain intensity assessments and pain scales).

Within the profession of nursing, there are specialty nurses concerned with the practitioners' level of pain management knowledge and a specific population including the geriatric patient, the oncology patient and the pediatric patient to name but a few. Wilson (2007) noted a difference between a specialist nurses' knowledge of pain as compared to a generalist nurse.

Oncology nurses have been active in studying the barriers to nurses' pain knowledge within their practice. In 1991, the City of Hope National Cancer Center developed an educational pain course entitled, "The Pain Resource Nurse Training Program". The first class of twenty-six Pain Resource Nurse (PRN) students was prepared utilizing didactic and clinical instruction. To date more than 2,100 nurses have participated in the PRN Training program. The educational course continues to prepare oncology nurses to return to individual institutions and act as the primary pain management resource. Ferrell, Grant, Ritchey, Ropchan and Rivera first described the PRN Training Program in an article outlining this inventive approach to cancer patients' pain (1993). The inaugural curriculum included pain assessment, nondrug interventions, pharmacology and ethical, cultural and psychosocial issues pertinent to pain. The current curriculum includes these tenets, as well as the inclusion of innovative pain management techniques, descriptions of at risk and minority groups, ethical and legal issues and the future role of nurses in pain management. Ferrell et al. (1993) stated that this educational endeavor has allowed the staff nurse to be accountable for patients' pain management. The three-month evaluation of the PRN Training program demonstrated high achievement in adherence to pain management standards and current knowledge. However, the researchers conceded that nurses continued to encounter operational barriers in instituting pain standards and practices in the clinical arena.

Howell, Butler, Vincent, Watt-Watson and Stearns (2000) examined oncology nurses' knowledge, attitudes and practices in pain assessment and management over a three-month period. Using a conceptual framework based on the theory of reeducation, an educational intervention was offered to all nurses on six inpatient oncology units. The educational inservice was attended by 101 nurses who completed a pre-test and post-test that day. At the three-month

mark, only 53 nurses completed the questionnaire and merely 33 nurses participated in the six-month questionnaire; therefore, the six-month findings were excluded from the study analysis. The initial improvement seen in the immediate post-intervention scores was reduced by the end of a three-month period. A decline that reached statistical significance was seen in most three-month scores and the downward trend in scores approached preintervention levels.

Puls-McColl, Holden and Tank Buschmann (2001) identified the demand placed on nurses' time as the leading factor in patients' inadequately managed pain. McCaughen & Parahoo examined medical and surgical nurses' level of competence when challenged with caring for patients with cancer (2000). Nurses in this study described a knowledge deficit when dealing with cancer patients' pain (65.3%). The researchers expressed surprise that while pain assessment and management has been a topic in the literature, nearly two-thirds of the nurses were identifying deficits in pain understanding. Richards and Hubbert produced a phenomenologic research investigation with expert nurses administering care to postoperative patients (2007). Four themes emerged including; considering the whole person, nursing as an independent art, agreeing to what the patient is saying and a commitment to surgical nursing. A glaring critique of this study is the miniscule sample. There were only three participants, ($n = 3$) therefore it is impossible to generalize these findings. However, the three nurses did verbalize the nuances between novice and expert nurses in terms of postoperative pain management. The researchers hope future educational programs incorporate expert nurses' clinical experiences and knowledge.

The Joint Commission began a pain management proposal in 1999. The Commission's goal was multifaceted. First, to make patients aware that pain management is a human/patient right,

which required training and education. Second, that pain needed to be evaluated and systematically assessed in order to be effectively treated. Third, that consistent pain instruments need to be utilized and lastly that pain management was required to be safe. Zichi Cohen et al. (2003) conducted a retrospective survey in five hospitals of 117 cancer patient charts, both inpatient and outpatient, to determine if Joint Commission standards were being documented regarding pain management practices. Joint Commission standards addressing pain assessment and management require all organizations to:

- Recognize patients' rights to assessment and management of pain
- Assess the nature and intensity of pain in all patients
- Establish safe medication prescription and ordering procedures
- Ensure staff competency and orient new staff in pain assessment and management
- Monitor patients after procedures and reassess patient problem appropriately
- Educate patients on the role of pain management in treatment
- Address patients' needs for symptom management in the discharge planning process
- Collect data to monitor performance (p.526).

Most of the patients' charts reviewed did not include a pain assessment or pain management entry. Slightly more than half of the inpatients' charts (53%) and outpatients' charts (57%) had mention of pain intensity. If pain was reported, only 86% of outpatient charts and 89% of inpatient charts documented the treatment. A minority of the inpatient charts (34%) and outpatient charts (44%) followed recommended policy and performed a pain reassessment. Surveyors examined the charts for evidence that support the practice of incorporating personal,

cultural, and/or spiritual beliefs when performing a pain assessment. Slightly more than a quarter of inpatient charts (28%) and 3% of outpatient charts addressed these concerns.

Huang, Cunningham, Laurite and Chen (2001) conducted a literature review supporting the assertion that patients' pain is woefully undertreated. However, Huang et al. further report that the Joint Commission's standards could reduce institutional obstacles to pain management thereby decreasing patients' experience of pain. Zichi Cohen et al. state that the Joint Commission standards are an opportunity for institutions and organizations to develop policies and procedures to achieve adequate patient pain assessment and management (2003). Earlier research reinforces nurses' documentation lapses (Clarke et al., 1996). Seventy-six percent of nurses reported using a patient pain rating score in practice, in spite of a chart audit revealing an overwhelming percentage of charts (76%, $n = 82$) deficient in documentation of patients' pain scores.

Medical and surgical critical care nurses were tested after participating in an educational exercise related to pain management. Brantley Erkes, Parker, Carr and Mayo (2001) collected data using the *Nurses' Knowledge and Attitude Survey Regarding Pain* (NKASRP). The researchers stated that many questions in the instrument concurrently measure knowledge and attitudes. Criteria for study eligibility include full or part-time RN in the medical/surgical Intensive Care Unit (ICU), and the RN must have had at least one-year experience in the profession of nursing. Thirty nurses completed a pre-test, attended an educational program and performed the post-test. A statistical analysis supported the finding that a significant increase in scores occurred following the educational intervention ($p = .0005$). A significant statistical correlation was identified between the change scores (change scores= post-test minus pre-test)

and years of nursing experience ($r_s = .37, p = .047$), although no statistical difference was noted related to nurses' educational degree and initial test or change scores ($r_{pb} = .11, p = .575, r_{pb} = .01, p = .955$). The socioeconomic characteristics demonstrated that 14 nurses were associate degree graduates and 16 were baccalaureate degree prepared. The majority of the nurses were female (80%), had less than 10 years of nursing experience and a mean age of 40.2 years. The critical care nurses scored poorly concerning the properties of non-opioid analgesics such as nonsteroidal anti-inflammatories and acetylsalicylic acid. Less than half of the nurses (46.6%) answered correctly that morphine has no ceiling effect. This finding echoes the results concerning ceiling effect in D'Arcy's research (2008). Overall the critical care nurses in this study exhibited low initial scores on the NKASRP instrument ($M = 72.9\%$). Eleven of the 30 nurses achieved a score of 75% or higher. A score of 85% or better was achieved by two nurses. Following the educational intervention, only one nurse scored less than 75%. Nineteen of the thirty nurses scored 85% or higher and twenty-nine participants improved performance on the post-test. The overall scores improved significantly ($M = 86.2\%, p = .0005$). The research supported previous conclusions concerning the insufficient pain management of hospitalized patients.

A study examining nursing staff members' pain assessments in nursing home residents with cognitive impairment was conducted by Cohen-Mansfield (2005). The goal of this investigation was to evaluate the pain assessment skills of nursing home staff on impaired residents. Fifty-seven nursing home residents of a large suburban nursing home were enlisted from six nursing units. The cognitive impairment of the residents was categorized according to degree of cognitive impairment and groups were formed related to patients who had cognitive impairment

and who have pain medication prescribed and those with cognitive impairment who are currently not prescribed pain medications. The categories were: residents with mild to moderate cognitive dysfunction and not taking pain medicine (*n =16*), residents with mild to moderate cognitive dysfunction and taking pain medication (*n = 12*), severely cognitively impaired residents and not taking pain medicine (*n = 17*) and severely cognitively impaired residents and taking pain medicine (*n = 12*). Consent was obtained from family members of the residents. The nursing staff was asked to use two instruments to rate their patients' pain; the Nurse Global Scale of Pain (NGS) and the Present Pain Inventory (PPI).

Two research assistants completed the questionnaire and one research assistant interviewed the nursing assistant charged with caring for the nursing home resident to establish inter-rater reliability. The questionnaire consisted of two questions, one from the NGS: "(1) "How much pain do you think the resident was in during the past 2 weeks?" and one from the Present Pain Inventory (PPI) (2) "Which word best describes the resident's physical pain the last 2 weeks?" (Melzack, 1975)." (p.70). Next, another nursing staff member, not as familiar with the resident, was asked to complete the questionnaire. This offered a second attempt at inter-rater reliability. Inter-rater reliability was found to be adequate. A week later, the original nursing staff member was given the same questionnaire, to determine test-retest reliability. Test-retest reliability was deemed adequate. Resident interviews were then conducted with the medical physicians, medical residents and an examination was conducted by an outside medical physician. All residents were asked if they experienced pain. Seventy-seven percent (*n = 44*) of the residents answered and of those, only 72% (*n = 41*) responded to "How much?" (p. 71). Interestingly, the results demonstrated that residents with higher cognitive function and a higher intake of pain

medication reported an increased perception of pain. Those residents with severe cognitive impairment were routinely assigned lower scores for their pain and those with moderate impairment who take pain medication were thought to have increased levels of pain. These findings warrant further study, as it may demonstrate that patients with severe cognitive deficiencies are under-valued on pain assessments. Further, the moderately impaired patients receiving pain medication are not experiencing relief from their pain medications. The researcher is forthcoming in citing the limitations of such a study including differing nursing staff, mostly nursing assistants, conducting the pain assessments. Other limitations include, conducting test-retest reliability data collection one week after the initial pain assessment, when the pain levels may not be dependable. In addition, not having the physician available to conduct the examination concurrent with the pain assessment could alter the test data.

Nurse researchers have investigated marginalized subsets of patients, specifically geriatric patients. The geriatric patient is at risk of not receiving an accurate pain assessment for various physical and psychosocial reasons. Katsma and Hamlow Souza (2000) studied long-term care nurses' pain assessment and management in the elderly. The researchers chose to study three topics: nurses' personal beliefs concerning patients' self-report of pain, documentation of patients' self-reports of pain and the pain medications and dose the nurse selected to administer to the patient. A total of 89 nurses participated in the study. Attrition rate was 0.3%. The sample was overwhelmingly female (*88.4%*, *n = 76*). The respondents included Licensed Vocational Nurses (LVN) and Registered Nurses (RN), 46% (*n = 40*) and 44% (*n =38*) respectively. Of the 38 RNs, 28% (*n = 24*) were Associate Degree nurses and 16% (*n = 14*) were bachelor's-prepared nurses. The mean age of the nurses was 46.8 years, mean years of

experience as a nurse was 17.7 years (range: less than 1 year to 38 years). Long-term care experience was calculated as 11.3 years (range: less than 1 year to 36 years). Most nurses worked in skilled nursing units (70.9%, *n = 61*). Forty-five percent self-identified as white (*n = 39*), 14% (*n = 12*) were Filipino , African-American 3.5%, American Indian 2%, Latino 1%, Southeast Asian 1% , Asian 5% and others 13%. The nurses were questioned regarding the last pain management classes attended: 2 years (*15%, n = 13*), 3years (*14%, n = 12*), 4 years (*10.5%, n = 9*), 5 years (*2%, n= 2*), and 6 years (*2%, n = 2*), never (*17%, n = 15)* and did not respond, (*32.6%, n = 28*). Three research questions were developed for this study. The first research question dealt with the issue of nurses' belief of patients' self-report of pain. The nurses were asked to assign a number to the patients' pain and the patients self-reported a number. The results demonstrated a significant, statistical differences in the personal opinion nurses had regarding patients' behavioral cues, such as smiling and grimacing (*p =.000*). Of interest was that the nurses answering appropriately to the grimacing patient were younger (*p = .02*) with fewer years of nursing experience (.049). Other variables such as gender, nursing education level and time since last pain class evidently had no bearing on the nurses' personal opinion of patients' pain.

The second research question examined whether the nurses charted the patients' self – reported number of pain in spite of either smiling or grimacing. A majority of the nurses, 65% *(n = 56*) did report the patients' stated pain score for the smiling patient. Thirty-five percent of nurses (*n = 30*) recorded less than the patients' reported score when the patient reported pain while smiling. When the patient reported pain with a grimace, the nurses recorded the correct score 70% of the time (*n = 60*) and 20% (*n = 17*) recorded less than the patients' self-reported

score. These findings were statistically significant between the grimacing (7.62) and smiling (6.2) patient,

(*p = .000*). Statistical significance was reached for the younger nurses choose acceptable answers for both the smiling and grimacing patients, (*p = .000, p = .003*) respectively and had fewer years as a nurse (*p =.003, p = .02*). As in the first research question, it was statistically determined that no other variables affected the results.

The final scenario in this study involved the nurse administering pain medication to the grimacing and smiling patient. The nurses were notified that one Vicodin tablet had been ineffectual in treating the patients' pain, with hourly pain scores ranging from 6-8 (0 to 10 scale). A total of 26 nurses (30%) opted to administer the correct dosage of Vicodin, two tablets to the smiling patient. Thirty-seven nurses' (43%) dispensed the appropriate dose, two Vicodin tablets, to the grimacing patient. Inferential statistical analysis, utilizing a X^2 comparison, determined that documenting the patients' reported pain scale accurately had a positive effect on administering the two Vicodin tablets for both the nurses' personal belief of the patients' pain and documentation (*p = .002, p =.000*). Only 36% (*n = 31*) of nurses in this study did believe the smiling patient's report of pain and just 56% (*n =48*) trusted the grimacing patient's self-report of pain. An explanation proposed by the researchers for the nurses not identifying the correct answers to the scenarios was identified by the characteristics of the sample. The average years of nursing experience in this sample was almost eighteen years (*mean = 17.69*) and most of the nurses had long term patient experience averaging more than 10 years (*mean = 11.3*). For this reason the researchers, suggested the nurses performed poorly because their nursing education took place long ago. Moreover, the authors state that nurses may lose some empathy

or become insensitive to patients' self-reports of pain over time. It was put forth again, by Katsma and Souza that the need for continued education for nurses and improved pain management education for student nurses must be a priority.

Elderly residents in Long-Term Care facilities (LTC) in the Midwest were the subjects of Morse and Steble Werner's study (2001). Nurses in 10 extended care facilities were questioned regarding attitudes with respect to pain, pain assessment and management in the elderly population (*n=27*). Dalton's (1989) pain questionnaire was employed. The results of this study support earlier research indicating that nurses' personal views of pain experience affect the way in which patients' pain are treated (McGuire, 1994). When asked if patients should be pain free, fourteen nurses responded affirmatively (*51.9%*), seven stated no (*25.9%*), one replied unsure and seven did not provide an answer (respondents were allowed to provide more than one answer). An open- ended question asked what the subjects' feelings about pain were. The majority (*n=20, 37%*) felt that pain is subjective. Other responses included a variety of answers, some commenting on the physical nature of pain. The nurses were then quizzed about personal pain experiences. Twenty-five of the nurses provided 58 responses including muscle, joint and tendon pain (*n=16, 27.6%*), visceral pain (*n=12, 20.7%*) followed by dental pain (*n=5, 8.6%*). An array of other conditions was stated by the nurses as being painful, including headache, emotional, accidental and surgical pain. The fourth question asked nurses if their personal feelings influence their patients' pain assessments. Almost half of the nurses (*n=13, 48.1%*) stated yes, six stated no (*22.2%*) and eight nurses did not provide an answer (*30%*). Nurses were also queried concerning self-help techniques for personal pain. Sixty-four responses were gathered from twenty-five nurses. The primary method the nurses cited to relieve personal pain

was medication (*n = 25, 39.1%*). Other techniques mentioned included distraction (*n = 9, 14.1%*), relaxation (*n = 7, 10.9%*) and heat (*n = 5, 7.8%*).

Mrozek and Stehle Werner (2001) investigated nurses' pain assessment behaviors in the LTC facilities by continuing with open-ended questions. When asked how the nurses determine if the geriatric patient is in pain, the majority answered by observing (*n = 23, 37.7%*), followed by the resident reporting the pain (*n = 15, 24.6%*), and direct questioning (*n = 11, 18.0%*). The remainder of the answers were divided between staff reports, family reports, no response and other (*n = 12, 19.6%*). Pain management practices were identified using open-ended questions and graphic rating scales. Long-term care nurses were requested to state what the first response is to a resident in pain. The largest percent of nurses responded that it is to ask the resident to describe the pain (*n =17, 30.4%*), ask the location (*n =12, 21.4%*), ask what worked in the past (*n =8, 14.3%*), ask if they want medication (*n = 5, 8.9%*), give emotional support (*n = 5, 8.9%*), assess the meaning to the patient (*n = 4, 7.1%*) change position (*n = 3, 5.4%*), other (n = *1, 1.8%*) and no response (*n = 1, 1.8%*). Nurses were asked to cite familiarity with various pain management practices. Massage, distraction, cold, and music ranked highest as pain coping strategies with 100% of the nurses (*n = 27*) expressing awareness of the techniques. Pertinent findings related to this study were that while the majority of nurses felt that LTC residents should be pain free (*n =14, 52%*) only five nurses defined pain free as having no pain. Results further signify that nurses' pain assessment and management of patients' pain is affected by personal pain experiences. Practitioners' responses in this study demonstrate that LTC nurses do not follow universal methods of pain assessment and management techniques. The researchers contend that these may be acceptable practices as this specific population may be confused,

disoriented, unable to effectively communicate and/or be cognitively impaired. Further study is warranted in the geriatric population regarding pain assessment and management.

Nurses caring for military veterans were examined for pain knowledge and attitudes by McMillan, Tittle, Hagan, Laughlin and Tabler (2000). The study was conducted in two large Veteran Administration (VA) hospitals in Florida. Seven medical-surgical wards were included in the study, as the researchers were investigating pain in the oncology patient. Patients with a diagnosis of cancer were admitted to general nursing units, no specific oncology units existed at this time. Knowledge of pain was determined to be lacking as evidenced by the raw scores (*n = 85*). Specifically, nurses in the study scored poorly on physiology (nerve fibers (*n = 13, 15%*), opiate receptors (*n = 20, 24%*), pain's effect on body (*n =35, 41%*)), Gate Control Theory (*n = 38, 45%*), pharmacology (opioid duration of action (*n = 14, 16%*), scheduling for steady-state analgesia (*n = 12, 14%*), preferred route of administration (*n = 35, 41%*) inability to judge patients' pain intensity (*n = 16, 19%*), and goals of therapy (*n = 24, 28%*). The nurses were found to possess negative attitudes related to pain management in the oncology patient, including the erroneous belief that nurses should control the analgesic schedule as opposed to patients and families, and that analgesics do not need to be maintained at a constant blood level. Results support the fact that nurses in government hospitals lack pain knowledge regardless of the fact that the government has produced cancer pain management guidelines (AHCPR, 1994).

The nurses' doubt of patients' pain is substantiated in multiple investigations. McCaffery (1972) has stated in multiple forums that, "Pain is whatever the experiencing person says it is, existing whenever he says it does" (p. 8). As evident in Katsma's and Hamlow Souza's (2000) research the nurses' opinions regarding the patients' self-report of pain are skeptical at best.

Evidence in this study demonstrates that older nurses with more years of nursing experience have a more difficult time believing patients' self-reports of pain. McCaffery and Ferrell (1997) described this phenomenon by proposing that nurses may experience immunity to patients' pain and suffering. This insensitivity may cause the nurse to dismiss patients' description of pain. The researcher proposes that lack of formal pain management education may be the cause of inadequate pain assessment and management.

An interesting phenomenon has been reported in the literature concerning patient satisfaction with the recommended course of pain management. Patients admit to experiencing some level of unrelieved pain and yet, report satisfaction with the prescribed pain management. Dawson et al. (2002) investigated this enigma and corroborated previous studies' findings. Two factors in this study were found to be significantly predictive of higher levels of patients' satisfaction with overall pain management: a nurse or primary care doctor telling the patient that treating the pain was an important goal ($p = 0.001$) and the patients' pain level over the last year "went down, stayed down" as compared to "no changes" ($p = 0.012$) (2000, p. 216). The study mirrored similar studies in the primary care setting asserting that patients described high levels of satisfaction with their pain management in spite of experiencing moderate to severe pain (Dawson, Spross, Jablonski, Hoyer, Sellers & Solomon, 2002; Miaskowski, Nichols, Brody, & Synold, 1994; Tang, S.T., Tang, W.R., Liu, Lin & Chen, 2010; Ward & Gordon, 1996). There appears to be a strong correlation between satisfaction of pain management or pain relief and confidence and trust in the healthcare provider. Patients who reported more willingness to take an opioid if told by the healthcare professional the medicine was not addicting, were more satisfied with their pain management ($p = 0.02$). The researchers noted limitations concerning

the population data (cross-sectional) and that no measures of interpersonal characteristics between provider and patient were obtained, such as trust, confidence, physician devotion, empathy and reassurance.

Aside from patients' satisfaction level with ineffective pain management, there may be serious physical and psychological effects to inadequate pain management. Dunwoody et al. (2008) reported untreated pain has the potential to produce chronic pain states. Acute pain that is not treated properly may lead to hemodynamic and metabolic alterations. Specifically, untreated operative pain may be particularly deleterious. Catecholamines such as, epinephrine and norepinephrine, released during surgery or during unrelieved pain states may cause tachycardia, tachypnea, elevated diastolic and systolic blood pressure and an increase in myocardial oxygen consumption without proper pain management techniques (Liu & Gropper, 2003). Ineffective pain management may also prolong patients' length of stay and increase health expenditures.

One unique approach to developing nurses' pain management knowledge is offered by Linkewich et al. (2007). The researchers developed and implemented a workshop featuring pain management experts from multiple disciplines. The target audience was front-line nurses in Ontario, Canada. The program tested pre-workshop knowledge then provided 4 two- hour educational activities (total pain, acute pain, chronic pain, and cancer pain) and a post-test at the end of each activity. The learning exercise demonstrated an increase in post-test scores and the nurses conveyed a high degree of satisfaction with the workshops.

Pain assessment and management in patients with terminal disease or at the end of life is prevalent in the literature. Pain management is of prime importance in order for patients to maintain quality of life while facing chronic, acute, incurable, and debilitating disease states.

Obstacles to effective pain management were identified in the patient, the nurse and the healthcare system. Patient barriers to pain relief was acknowledged as patients' reluctance to report pain to the nurse, fear that increasing pain means advancing disease process, wishes to be viewed as a well-behaved patient, fears about addiction, apprehension that concentrating on pain levels will divert the practitioners' attention away from the patients' disease, worries about the costs and side-effects of pain management, and a general reluctance to take medications. Nurses' barriers were those often cited in pain management writings including: inadequate knowledge regarding opioids, fear of addictions, and adverse effects of analgesics and opioids. The healthcare hindrances recognized in the study include the minimal priority placed on effective pain management, availability and access to skilled healthcare and affordable pain treatments (Witt Sherman, LaPorte Matzo, Panke, Grant, Rhome, 2003; Witt Sherman, LaPorte Matzo, Paice, McLaughlin & Virani, 2004).

Bell researched nursing literature to determine if the pain management postoperative orthopaedic patients received from Irish nurses was in line with international norms as compared to current nursing literature (2000). The findings support that nurses' ". . . attitudes, knowledge and beliefs are not conducive to optimal pain management" (p.68). The author suggests nurses must alter and foster their knowledge and attitudes concerning pain management on an ongoing basis. Bell's results supported findings published by Lewthwaite. Lewthwaite et al. (2011) investigated Canadian nurses and determined that there was a knowledge deficit specifically relating to pharmacological intervention.

Student nurses' knowledge and attitudes related to pain management

Graffam (1990) investigated pain content in baccalaureate degree nursing programs in the United States. A sample of 390 curriculum chairpersons was sent questionnaires; 305 responded for a response rate of 78%. The majority of programs reported designating time for formal instruction on pain (81%), and that the pain education was divided over several nursing courses (88%). Only 8% of the nursing programs identified a separate course offering for pain content. Interestingly the amount allotted for strictly pain education varies greatly between less than 2 hours (*6%*) to more than 15 hours (*4%*). The most frequent answer for time spent on pain education was 4 hours (*23%*). Fifty-seven programs admitted there was no formal instruction concerning pain content in their curriculum. The majority of the programs stated their program did not have a faculty member with expertise in pain management (82%). Graffam credited the high response rate for the collective interest educators have in the subject of pain education. The researcher suggests curriculum committees identify pain management theory by conducting literature reviews and consulting with pain experts. No other studies were found in the literature to replicate these findings.

Clinical vignettes have been used to assess student nurses' precision of pain assessments. An example of this is a study using two clinical vignettes and a survey with a convenience sample of senior nursing students in Hong Kong (Chuk, 2002). The sample was solicited from three hospital diploma programs (3 years) and one university nursing program (4 years). Diploma nursing school participants were the majority of the sample (*n = 141*, with a response rate, *n = 130, 92%*). The university nursing program sample was fifty-seven students (response rate, *n = 39, 68%*). Participants totaled 198 with a final combined response rate (*n = 169, 85%*).

Mean age of the students from the three hospital nursing programs was 22 years and mean age of the university students was 20 years. Gender of the subjects was unevenly distributed with 114 (87.8%) of hospital nursing program students being female and 16 (12.2%) males. Similarly, the majority of the university students were female (*n = 36*, 92.2%) with three males (*7.7%*). Interestingly, although both groups were in the final year of a nursing program only 92 (*70.2%*) of hospital nursing program students had attended a formal lecture on pain, while most of the university students reported having formal lectures on pain (*n = 36, 92.3%*). The final participant characteristic relates to mean hours of formal pain lecture; the hospital based nursing students reporting 1.5 hours and the university students, 2.3 hours.

A considerable portion (*35%*) of the senior students from both nursing programs did not accurately identify the pain rating as described in two vignettes. The first scenario required the students to rate the patients' pain based on "objective indicators" (p. 395). Chuk postulated that the university nursing students did score nominally better, perhaps owing to the fact that more lecture time was focused on pain in the university setting (p.396). The second research question asked students to differentiate between a patient in pain with a smile and a patient in pain grimacing. With respect to the smiling pain patient, the university students achieved a higher percentage of correct answers regarding a pain score (*61.5%, n = 24*) compared to the hospital-based nursing program (*45.4%, n = 59*). The grimacing pain patient had a correct pain score by the university students (*89.8%, n = 35*) more often than the hospital-based nursing program students (*81.5%, n = 106*).

The third research question presented a clinical situation in which the nursing student was asked to assign a pain score to a patient after receiving a set of vital signs for each patient.

Again, the university students provided correct answers more often than their three-year nursing program counterparts ($p = < 0.01$). The fourth and final research question requested all of the nursing students to state the "most reliable indicator for assessing the pain level of patients" (p.397). Only 40.8% ($n = 69$) of all senior students identified the patients' subjective report of pain as the correct answer. The majority of the senior students relied on outward, objective signs such as facial expressions and vital signs to determine patients' pain levels. Chuk describes the students' biases evident in this research. The researcher also suggests adding sound scientific pain information to nursing curricula, such as the Gate Control Theory.

Briggs (2010) attempted to replicate Chuk's 2002 study of nursing students' pain assessment skills with a sample of United States nursing students. This researcher, however, added qualitative data with the goal of sharing with nursing educators what the students had stated regarding their misconceptions and misinformation of pain. The sample included junior and senior nursing students ($n = 270$) at two nursing schools. Of note, both nursing programs utilized the same textbook for teaching pain concepts. The instrument was the Patient Behavior Case Vignette, alternatively referred to as the "Andrew-Robert Survey". Andrew is portrayed as laughing and talking when the nurse enters the room, yet reports a pain score of 8. Robert appears quiet and grimaces as he turns in bed while reporting a pain scale score of 8. Ferrell and McCaffery developed this tool and prior use has established validity and reliability of this vignette instrument. The vignette required the students to read two patient scenarios and answer questions accordingly. The nursing students were asked to rate the patient's pain on a scale and select an appropriate pain medication and dosage to correspond to the presented situation. The only identifiable difference in each case was the patient's name and reported behavior. Briggs

added two questions to the instrument requiring the students to state the rationale for their ratings and treatment decisions. Briggs (2010) outlined three research questions she attempted to answer:

1. To what extent do nursing students correctly rate their patients' verbal reports of pain intensity in two case vignettes?
2. To what extent do nursing students, who correctly rate a patient's stated pain intensity, also correctly administer the recommended dosage of analgesic under the conditions provided in the case vignette?
3. What rationales do students identify for their ratings of pain intensity and medication administration in the case vignette?

In answer to research question one, 87.41% (*n = 236*) of the nursing students correctly rated Robert's pain (quiet and grimacing), whereas 69.93% (*n = 189*) correctly rated Andrew's pain (laughing and talking). Both patients had stated their pain score was an 8; however, fewer nursing students believed Andrew who has laughing and talking during the nurse-patient interaction. Question two demonstrated that 236 of the 270 (*87.40%*) respondents correctly assessed the patients' pain as exemplified in the vignette and of that number, 50.42% (*n = 119*) correctly administered the accurate dose of morphine to Robert. One hundred eighty-eight students of the sample correctly rated Andrew's pain and of those only 38.83% (*n = 73*) administered the proper dose of morphine.

Briggs identified 10 themes for the students' pain assessment ratings and pain treatment choices. These themes include rationale for both correct and incorrect assessment and treatment of pain. The first theme was the ethical responsibility of the nurse. Many students commented

they have no ethical choice but to document what they are told by the patients. Some students also commented that in both vignettes visitors were at the bedside and that might have contributed to the distraction from the patients' pain. Reasons for incorrect pain assessment rating by the students included: stable vital signs, social stigma, and average of subjective and objective findings. Students cited the following reasons for incorrect dosage of pain medications; patients must ask for pain medicine, fear of addiction, patients' behavioral manifestations and misinterpretation of the case vignettes. Briggs (2010) quantitative data reinforces that numerous nursing students maintain erroneous pain management knowledge and attitudes. The researcher encourages future development of pain curricula within nursing schools.

Nurse educators have studied students' knowledge and attitudes regarding pediatric pain management. Chiang, Chen and Huang (2006) evaluated an education program on students' knowledge, attitudes and self-efficacy of children's pain management. Self- efficacy borrowing from Bandura's definition is "the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations" (1995, p.2). The convenience sample was comprised of 181 licensed nurse-students from four classes in a Taiwanese nursing program. All students had associate degrees in nursing, a nursing license and were attending a two-year baccalaureate degree nursing program. Nursing students attended a four-hour Pediatric Pain Education Program (PPEP). The educational program included video, lecture, and case situation dialogues. The RN students were evaluated by means of a 41 item questionnaire. Nurse-students' self-efficacy scores were measured with five-point Likert scale.

Statistical results demonstrated that nurses' knowledge and attitudes improved after the PPEP. Prior to the intervention 57% of the nurse-students answered the pre-test questions correctly. Following the PPEP, 91.4% of the nurse-students selected the appropriate answers. The scores of the post-test were statistically significant compared to the pre-tests ($p < 0.001$).

In 1992 Kopchak Sheehen, Webb, Bower and Einsporn identified a lack of student nurses' knowledge base in pain management. The researchers investigated baccalaureate degree student nurses' knowledge of cancer pain. The sample contained student nurses in the final course of their respective nursing programs randomized from seven National League for Nursing Accrediting Commission (NLNAC) accredited schools in northeastern Ohio. Of the 209 eligible students, only 82 completed the survey. Cancer pain knowledge was measured using the Cancer Pain Knowledge Questionnaire. Scores of cancer pain knowledge were reported from 24 % to 76%, mean 49%. The majority of students (*73%*) exhibited a knowledge deficit regarding the potential efficacy of pain treatment. The only significant influence associated with increased cancer knowledge was the students' age ($p = 0.001$). It may be inferred from this finding that prior personal experience may supplement pain management instruction during nursing education. This is one reason why age and personal knowledge of pain management were assessed in this dissertation.

Chiu, Trinca, Lim and Tuazon (2003) investigated the pain knowledge of senior nursing students in Australia and the Philippines. The researchers received 150 completed questionnaires from a total of 211 final year nursing students in the three nursing programs involved in the study. The exploratory study investigated one nursing program in Australia and two in the Philippines. The Australian program had 99 eligible students and the two Philippine

universities had 84 and 28 suitable nursing students. The final respondents included 81 (*54%*) from Australia, and 69 (*46%*) between the two Philippine universities. The questionnaire utilized by Chiu et al. was established and first employed by Trinca (1998). The thirty question survey contained 23 items based on pain knowledge and seven questions pertaining to demographics and pain management education. For the purposes of this study, the two Philippine schools had no significant differences in mean scores; therefore, the two programs were combined and reported as one. The Australian students answered more appropriately, questions concerning treatment of chronic back pain, symptomatic allodynia and phantom limb pain. Conversely, the Philippine students responded correctly to questions dealing with disability, complex regional pain syndrome definition and acute pain management. While there are differences between the knowledge of the Australian and Philippine students as it relates to specific pain topics, the entire sample demonstrated a generally poor understanding of pain management principles. The results support the opinion that final year nursing students lack knowledge related to pain management as measured by this instrument. These results have been echoed in similar studies evaluating student nurses' pain knowledge (Hamilton & Edgar, 1992; Clarke et al. 1996).

Interdisciplinary researchers conducted a qualitative study designed to ascertain themes regarding medical and nursing faculty and students' knowledge and attitudes regarding cancer pain management (Hunter, et al., 2008). The sample size was 72 and the total number of interviews conducted was 53. Three themes were identified in this study, the first being prioritization, with a subtheme of the relative importance of pain and cancer pain. The informants' knowledge of pain was the second emerging theme. Both faculty and medical

students acknowledged the severe angst experienced by medical students when they are expected to prescribe pain medications and to evaluate whether the analgesics are effective. Nursing students were also found to have similar concerns, however, nursing students tended to focus more on the patients' psychosocial factors. A subtheme of knowledge was found to be pain management incorporation in the curriculum. The final subtheme identified by both faculty and students was the role of knowledgeable faculty or clinical mentors. Faculty did admit that the extent to which pain is prominent in the curriculum is dependent upon the interests of the instructors. The final theme was the meaning of pain. Two central ideas involved the fear of administering too much analgesia, opioidphobia, and the providers' uneasiness with the subjectivity of patients' pain. The qualitative results from this study add to the depth of knowledge regarding the state of pain management education evident in quantitative research.

Shaw and Lee (2010) found that student nurses have misconceptions concerning chronic malignant pain. Previously identified misunderstandings of pain management knowledge and attitudes by student nurses were the basis for this research. The design was a cross-sectional study, spanning 3 years of an undergraduate nursing program (semesters one, four and six). The researchers designed the survey and approached 435 students to complete the study, 430 students returned the study questionnaires for a 99% response rate. Since the researchers had developed the tool specifically for this study, validity and reliability of the instrument needed to be determined before results could be reported. Validity of the tool was ascertained by requesting input from expert practitioners and educators not involved with the study. Reliability was established by calculating the Cronbach alpha (or coefficient alpha). The individual items scored between *0.7* and *0.8*, indicating the items had achieved statistically significance for reliability.

Eight misconceptions were identified by the researchers including that people with chronic pain become tolerant to pain. More than 38% of the students felt that chronic pain increases patients' tolerance to pain when in fact, chronic pain often lowers the pain threshold and makes the person more susceptible to pain triggers.

An overwhelming majority of the students, 59%, misidentified psychological impairment as expected sequelae of chronic pain. An alarming 79.6% of the 450 students believed that stress was a leading cause of chronic pain, while more than a third felt that chronic pain patients exhibit manipulative behaviors. Almost 50% of study participants held that chronic pain patients use compensation and exaggeration to advance their cause and 41.4% felt these patients were noncompliant and dependent. Finally, approximately one-half alleged that opioids were addictive in the chronic pain sufferers. This last misconception regarding addiction is similar to research reported by McCaffery and Ferrell (1997). The research stated that more than 75% of 2459 participants, mostly nurses, who attended pain programs answered incorrectly when questioned about the rate of addiction to prescribed opioids. It is unfortunate that misconceptions and misinformation continue to be so prevalent in pain management nursing.

Shaw and Lee (2010) acknowledge that whereas the data collection was conducted between the academic years of 2001-2003, there has been no literature to support the change in pain curricula since that time, specifically chronic pain management. This has also been the findings when conducting a literature review for the proposed dissertation.

Theoretical Framework

The theoretical framework utilized to guide the formulation of the research questions for this

Dissertation is Knowles' Theory of Learning. Malcolm S. Knowles is often regarded as a leading authority in the field of adult education. Knowles is credited with coining the educational term andragogy. Andragogy is the, "body and theory of practice on which self-directed learning is based. The art and science of helping adults (or, even better, maturing human beings) learn" (Knowles, 1975, p.19). This method of learning is in stark contrast to the conventional teaching methods employed prior to the twentieth century, this educational process is termed pedagogy.

Pedagogy, loosely translated, is the practice of teaching children. There are notable differences between the two methods of learning. In pedagogy, or teacher directed learning, the teacher solely determines what material will be taught and what methods will be employed to teach the students. Often, in this method, there is more value placed on the teachers' experience and less on the learners'. Additionally, external rewards (grades) are the sole motivator for the students doing well (Knowles, 1975).

Knowles' Theory of Learning lends itself to the fact that students often are capable of self-identifying knowledge deficits and then developing strategies to rectify those deficits. The "need to know" is identified by Knowles as a core andralogical principle. Nursing students often are able to define gaps in their nursing education and seek outside instruction or supplemental education to increase their knowledge. The following are the six core andralogical principles as outlined by Knowles, Holton & Swanson (2005):

1. The need to know
2. The learner self-concept (self-directed)
3. The learner's experience

4. The readiness to learn (life tasks)
5. The orientation to learning (problem centered)
6. The motivation to learn (internal)

The central theme of this theoretical framework is self-directed learning. Knowles proposed that individuals need to take initiative in determining their learning needs, should develop their personal educational goals, find the resources that will enable them to achieve their goals and then evaluate the process to see if the goals were met. By virtue of the student nurses being enrolled in a nursing educational program, it is assumed the students have both a need to know and a willingness to learn pain management concepts. The learner's experience to a vast extent is provided in the clinical setting. The motivation to learn may drive the student to perform well in the clinical setting or by scoring high on tests. Additionally, some students may feel motivated to learn to interact well with their patients. Orientation to learning may involve a student seeking information concerning specific pain medications or pain management treatments to care for a patient in the clinical setting. This theory lends itself to the research topic at hand, as pain management is a career long commitment to continued education. New pharmaceuticals as well as alternative and complementary therapies are continually being introduced to the nurse. For this reason it is imperative that as a profession we are able to evaluate our knowledge and self-direct our learning to specific needs that will ultimately benefit our patients. Knowles also was a strong proponent of empowering the student by ascribing credit to the students' prior experiences. This is evident in the tool utilized for this study; the NKASRP examines both pain knowledge and attitudes concerning pain, which may have been formed from life experiences. This instrument is examined closely in Chapter 3 for reliability

and validity. According to the literature, a majority of student nurses are not receiving an adequate education in pain management; therefore they must rely on their personal experience and instinct to direct patient management decisions. Practicing nurses also need to identify their knowledge deficits concerning their patients' pain and seek out educational programs and continuing education credits to increase their pain management skills. Knowles gives credit to the students' real life experiences, which in the case of second degree nursing students is respectful of their previous occupation or perhaps their roles as parents or caregivers.

The above principles are best accomplished when there is a climate of mutual respect and trust, conducive to dialogue in which all involved have clearly defined roles (Knowles, 1975). This theory of learning has gained wide usage and acceptance in adult business, government and continuing education programs. It has also been utilized effectively in nursing research.

Textor and Porock (2006) studied the pain management practice of nurses in a rural Midwest retirement community. The researchers used Knowles' Adult Learning Theory as the framework for their study. Using a one-group pretest and multiple posttest design, the researchers tested a convenience sample of RNs 78.3% (*n = 36*) and LPNs 21.7% s (*n = 10*). The nurses completed one 4 hour presentation of current pain management practices. The instrument used to evaluate the nurses' knowledge was the Nurses' Knowledge and Attitudes Survey Regarding Pain (NKASRP). The number of nurses participating in the pretest was 46; the mean score was *70.8*, with a range of *51.03-87.2*. Posttest 1 occurred immediately after the pain education intervention and the Posttest 2 took place at 4 weeks after the intervention. Posttest 1 had an *n = 46*, with a mean score of *87.3* and a range *69.2-100*. The final posttest 2 had 35 participants, who achieved a mean score of *84.1*, with a range from *61.5-97.4*. Final conclusions of this study

mirrored results of similar studies, revealing knowledge deficits in pharmacology, cancer pain management, addiction and unrelieved pain (Dalton et al., 1996; Howell et al., 2000; Keene & Thompson, 2008; Lewthwaite, et al., 2011; Linkewich et al., 2007; Mackrodt & White, 2001; McCaffery & Ferrell, 1997; McMillan et al., 2000). The researchers chose Knowles' Theory based on these six principles; adults learn better when they know the reason why they should learn something, are self- directed, can find a practical application for what they have learned, are motivated to learn, can recall prior experiences and can use a task, or life-centered focus for the educational interaction. The learning setting was one of acceptance and respect as suggested by Knowles and the learner was encouraged to share and interact to promote the idea of independence.

Knowles' Theory has been used with success in nursing education. McMillan et al. (2007) investigated the use of Knowles' learning characteristics to assist the graduate nursing students in bridging the gap between nursing theory and practice. The researchers used four of Knowles' six principles to teach the students that theory is an integral, practical and necessary part of nursing practice. The four principles utilized for this educational activity: adult learners are self-directed and want to be seen in that capacity, adult learners bring previous experiences with them into the learning environment, adults' readiness to learn is closely associated with societal competencies and adults choose a problem or situational approach to learning. The fundamentals of Knowles' theory were implemented by the research team, including providing an environment that was open and respectful. The student was also encouraged to link previous learning experience to new ones and to build on previous knowledge. Student learning was the focus and throughout the course the class became less teacher driven and more student driven. The last

component of the graduate course was the public display of the students' theory application posters. The posters contained a visual summation of a theory along with a thoughtful critique and a clinical application related to the theory. The facilitator guided discussions and encouraged thoughtful debate, while simultaneously promoting student autonomy. McMillan et al. stated that by the use of this theory the graduate students, ". . . developed the knowledge, skills and confidence to become a critical, informed and empowered theory consumer, contributor and advocate" (p.91).

Knowles' overriding theme of self-directed learning was investigated in a number of studies examining its application to undergraduate and graduate nursing education (Fisher, King & Tague, 2001; Levett-Jones, 2005; Sharples & Moseley, 2010). Pryce-Miller (2010) investigated the usefulness of self-directed learning in first-year baccalaureate degree nursing students. Four hundred fifty pre-registered nursing students were eligible for the study, 328 choose to complete and return the questionnaire. The items included questions related to the number of hours spent in independent studying, their self-reported method of learning and their knowledge of self-directed learning. Both quantitative and qualitative information was collected with the instrument. The study found that the majority of students (*n = 90) 27.4%* spent between 4-6 hours in independent study. The overwhelming number of students (*n = 253*) *77.1%* preferred direct teaching as their primary method of learning. The number of students aware of self-directed learning (*n = 245*) was calculated to be *74.69%, 21.95%* (*n = 72*) students were not aware of SDL and *3.35%* (*n = 11*) admitted some knowledge of SDL. The researchers asked the students to identify some beneficial and some detrimental aspects of SDL. Some of the nursing students' positive responses included, SDL will motivate students and encourage reflection, the

student becomes the focus of the learning, independent study will foster learning and SDL will encourage students to take the initiative in their learning. Negative characteristics identified by the students were anxiety related to the unknown, little to no previous experience with SDL, the nursing staff needs to enable SDL and fear that the students will not know what is expected of them.

Pryce-Miller determined that while most students identified direct teaching as their preferred method of instruction, some "mature" students thought an array of methods would foster learning. The study supported the use of SDL in nursing education. The researcher identified the need for students to be cognizant of what will be expected from them during the learning interaction. She encourages nurse educators to encourage their students to become self-directed learners, a skill which will encourage them to pursue, ". . . lifelong learning, increased interpersonal skills and increased lateral thinking ability" (p.23).

Montgomery (2009) selected Knowles' Theory to study students' attitudes, with its emphasis on self-directed learning, when choosing clinical assignments. The researcher cites the American Association of Colleges of Nursing's (AACN's) Essential Clinical Resource for Nursing's Academic Mission (2008) as challenging nurse educators to reassess traditional methods of nursing education. A benefit of this theory is that the student is able to utilize personal motivation to reach educational goals and to nurture skills needed to become a lifelong learner. The means by which the study was carried out included issuing students surveys over the four semesters of their educational program. Fifty-seven students received surveys, 6 males and 51 females. Forty-five students returned the completed survey, 6 males and 39 females. Seventeen of the 21 students registered for the third course of the four course nursing sequence

returned the survey, and 28 of the 36 (*77.78%*) nursing students enrolled in the fourth sequence completed and returned the forms. The range of the number of times the students choose their own clinical assignment was from 1 to 12. The majority of students, *55.6%* (*n = 25*) stated their learning needs were improved upon the days they choose their own clinical assignment. Eighteen students (*40%*) stated that "sometimes" their educational needs were improved, while only two students (*4.44%*) did not feel choosing their own assignment improved their educational needs. Qualitative data demonstrated the theme that the types of patients and clinical experiences the student believed they needed were chosen. "I got to focus on patients who had the needs with which I had not had experience with' (p. 49). The second theme that emerged from this study indicated that the students felt as though they had more accountability in their own learning: "The instructor really trusted me and that made me feel valuable" (p.49) was how one student described the experience. A surprising element found after analysis of the data was that the nursing students worried that their instructor or fellow students may think they were choosing patients deemed "too easy", or requiring little care. In spite of this perception, the researcher believes SDL is an invaluable tool in clinical nursing education and intends to continue to utilizing this method in her educational practice.

Summary

The extensive review of literature determined very few studies relating to the knowledge and attitudes regarding pain management of student nurses with differing educational backgrounds have been conducted. Reliable data concerning the deficits of nursing students' pain comprehension is mandatory to attain a consensus of what knowledge is necessary to graduate competent student nurses, proficient in assessment and treatment of their patients' pain. It is a

goal of this research study to add to the body of knowledge regarding the present state of nursing students' pain management knowledge. Identifying barriers and deficiencies in pain management instruction during primary nursing education may lead to the development of pain management core curricula for nursing students in all educational programs.

CHAPTER 3

Methods

This chapter provides a synopsis of the proposed research study including the purpose of the study, the research design, and the targeted sample population. A discussion of the ethical concerns, such as the protection of human subjects and refusal to participate in this investigation, is offered. The procedure for data collection was delineated and a summary of the study instruments will be presented. The research questions developed specifically for this investigation were derived from the works of Malcolm Knowles, and his Theory of Adult Learning. An outline of the data analysis techniques related to each research question is offered. Finally, an application of Knowles' theory to the research questions will offer an insight into its applicability to nursing education.

Purpose of the Study

The purpose of this study was to examine the pain management knowledge and attitudes of senior nursing students in three different educational types of basic nursing programs. A comprehensive review of the literature failed to produce research addressing all types of pre-licensure nursing education and pain management knowledge. The three types of registered nurses education tracks currently recognized in the United States are diploma nursing, associate degree nursing, and bachelor degree nursing. Generally, the diploma nursing program requires a three-year curriculum, the associate degree program, two years and the baccalaureate, four years or 8 semesters.

The study queried senior classes of nursing students, from each of the three different types of nursing programs. All nursing programs are located in Pennsylvania, the first diploma

program in Central Pennsylvania and the second in Eastern Pennsylvania. The remaining two-year associate degree program and both four-year baccalaureate programs are situated in Northeastern Pennsylvania. These programs were chosen, as representative of many diploma, associate degree and bachelor degree nursing programs found in Pennsylvania and across the country. The programs are a mix of public and private institutions. The initial research sample was to include students from six programs, two of each nursing program types: diploma, associate and bachelor nursing programs. One associate degree program defaulted after agreement to participate in the study. The study received the necessary Institutional Review Board (IRB) approval from Villanova University (see Appendix A) and from all but two of the nursing programs, the public bachelor degree program and the diploma program from Central Pennsylvania. The program directors from these nursing programs stated IRB approval was not needed since the study employed a survey instrument and demographic sheet with no identifiers and no follow up intervention was planned. This chapter describes the research study design, research sample, methods of data collection and data analysis techniques.

Research Design

A descriptive, correlational design was chosen for this study. In this design, there is no manipulation of study variables. All variables in this study were measured as they occurred in the sample population. The correlational design was useful to begin to establish what relationship existed between student nurses' knowledge and attitudes concerning pain management and the type of nursing education. Additional information regarding demographics was ascertained by data collected from the Demographic Data sheet. These data included age, gender, ethnicity, and other variables, which are described later in this chapter. Brink and Wood

(1998) cite the correlational design as appropriate for nursing research: "In nursing education, studies of student characteristics and progress through educational programs are suitable correlational studies" (p.169).

Research Sample

The sample size was calculated utilizing statistical power analysis. An a priori analysis employing a Cohen's effect size of .25, a power of .80 and a significance level of .05 determine the sample size total to be 159. Calculating the required sample size using power analysis is imperative to decrease the risk of incurring a Type II error (Brink & Wood, 1998; Huck, 2004).

A letter introducing the researcher, the purpose of the research and contact information for the researcher, dissertation chair and committee member was mailed to each nursing program director (Appendix E). After approval was received from each nursing program director, an appointment was made to visit each nursing program site and administer the instrument and demographic sheet. Twice, due to inclement weather, the faculty member teaching the senior class at the time the researcher was to be there administered the instrument and demographic data sheet. The faculty member was given explicit instructions via email correspondence and telephone conversations regarding the administration of the questionnaire and the demographic data sheet. Immediately after collecting all study materials, the faculty member placed the instruments and data collection sheets into a provided envelope and an international courier service delivered the contents to the researcher.

A purposive sample of senior nursing students from different types of pre-licensure nursing educational programs located in Northeastern and Central Pennsylvania present the day the instrument and demographic survey was distributed were queried. The subjects were required to

be fulltime enrolled day students. There are hybrids of the fulltime curriculum offered in the associate degree and bachelor degree programs. To decrease the risk of within class variation, that may affect statistical analysis, only fulltime, traditional day students were included in this sample.

The first three-year diploma registered nurse program is affiliated with a healthcare system and is located on one of the hospitals' sites. The diploma program shares an educational association with the local campus of a large state university. The students are enrolled in a fulltime curriculum attending classes or clinical rotations Monday through Friday during the three years. The students must first complete two semesters or one academic year of prerequisites at the university, followed by six semesters or two years of nursing course requirements. The second diploma program also is associated with a healthcare system in Eastern Pennsylvania. Twenty-eight credits of college prerequisites are required for admission to this nursing program. The nursing curriculum encompasses five semesters, each lasting approximately 14 weeks. Students are accepted on a rolling admission format.

The first associate degree-nursing program is primarily housed in a community college setting, although there are currently three distance-learning sites. An evening nursing program is offered at the main campus during odd calendar years. The cohort chosen for this study was the traditional fulltime day students, to homogenize the sample with the two other nursing programs, which was fulltime, day students. The students enrolled in the two-year associate degree of nursing program must take classes in a sequential order over the course of four semesters.

The following associate degree program was excluded from the study. The program director initially agreed to participate in the study but then did not return phone calls and emails

regarding the study. This associate degree program was located on a state university campus, which also offers a four-year baccalaureate program. This campus is part of a large state university system. The university also offers an R.N. to BSN option at this site. The associate degree candidates must complete 68 credits of study. The program offers both fulltime and part-time study, only fulltime students were asked to participate in this study.

The first four-year baccalaureate nursing degree program is located within a private university. The college of nursing has two different tracks for receiving a Bachelor of Science degree in nursing; the first is a traditional four year, day student program and the second is an accelerated Bachelor of Science degree for the candidate already possessing a baccalaureate degree. The accelerated BSN program consists of 48 credits and may be completed in 3 semesters of fulltime study. The group to be queried for this study was the fulltime, traditional day students.

The second baccalaureate nursing degree program asked to participate in the study was found within a Catholic, four year, liberal arts university. The traditional fulltime student is expected to complete 126 credits in eight semesters to be eligible for graduation. The university also offers part-time accelerated evening options, as well as second-degree options for those students already possessing a baccalaureate degree in another major. Again, only fulltime traditional nursing students were asked to take part in the proposed study.

Protection of Human Subjects

The nursing students were presented a Letter of Introduction/ Informed Consent form explaining that participation in the study is voluntary and maybe withdrawn at any time (see Appendix F). Additionally, the participants were assured that whether or not they chose to

participate would have no impact on their grades or standing within the nursing program. No identifiable characteristics were contained within the instrument or demographic data sheet. Contact information was listed in case a participant wishes to discuss concerns with the researcher, chair, or member of the dissertation committee. Students were advised that there was no benefit or risk involved with participating in this research study. However, the goal of the study was contained within the Letter of Introduction/Informed Consent, that is, ". . . results of this study may lead to find ways to better prepare nursing students to gain knowledge in the field of pain management" (Appendix F).

Data Collection

Students in class the day the research tool was distributed were asked to participate. The students received a Letter of Introduction/ Informed Consent (see Appendix F), the NKASRP instrument (Appendix D), and the Demographic Data Sheets at this time (see Appendix G). The students were instructed to return the answered NKASRP instrument and the Demographic Data Sheets, completed or left blank. Blank returns indicated a non-willingness to participate in the study and were discarded. Completed demographic sheets and the NKASRP instruments were locked in a secure container until data analysis was completed. Only the researcher had access to the key. Prior to data analysis, the paper forms were converted to an electronic file, with no discernible identifiers. The electronic file was stored in the researcher's hard drive and a portable data storage device. The electronic file was available to the chair and member of the dissertation committee upon request.

Survey Instruments

The *Nurses' Knowledge and Attitude Survey Regarding Pain* (NKASRP) was the instrument utilized in this study. The researcher was given permission to utilize the instrument by the originators of the tool (see Appendix B). Additionally, a list of references in which the tool was utilized accompanied the permission (see Appendix C). The NKASRP is a self-administered questionnaire containing 21 True/False statements, 18 multiple-choice questions, including questions related to two patient scenarios. The respondent is asked two questions regarding each scenario. The latest version of the NKASRP was administered to the sample in this study. Ferrell and McCaffery originally developed the instrument in 1987; further adaptations to the instrument have been made to bring it to its current form (Ferrell & McCaffery, 1992; 1998; 2008). According to Plaisance and Logan (2006), the instrument takes approximately 15 to 30 minutes to complete. A percentage score is computed by dividing the number of items answered correctly by the total number of items. Experts in the field of pain verified content validity for the NKASRP. Internal consistency reliability of the NKASRP was found to be adequate (*alpha r > 0.70*). Construct validity was ascertained by evaluating the scores of nurses at differing levels of education and skill. Test–retest reliability was measured at ($r > 0.80$) by repeated testing with a group of Registered Nurses ($n = 60$) (see Appendix B).

Much of the literature investigating nurses' state of knowledge regarding pain management knowledge utilizes the NKASRP or a modified version of the instrument (Al-Shaer, Hill & Anderson. 2011; Brown, Bowman & Eason, 1999; Brunier, Carson & Harrison, 1995; Clarke, French, Bilodeau, Capasso, Edwards & Empoliti, 1996; Goodrich, 2006; Lewthwaite, 2011; McCaffery & Robinson 2002; McCaffery, Ferrell & Pasero, 2000; McMillan, Tittle, Hagan,

Laughlin & Tabler, 2000; Simpson, Kautzman & Dodd, 2002). This instrument has been translated from English into Greek, Italian, Spanish, Turkish and several other languages. Two of these studies investigated the value of this instrument's efficacy in measuring foreign nurses' pain knowledge. The purpose of the Italian study was to test the construct validity, test-retest reliability and internal consistency of the NKASRP. The instrument was able to differentiate between the nursing education and experience of the nurses. The test retest reliability was measured at 14 days. The average score for all nurses was 52.7%; student nurses scored the lowest at 40.7% ($n = 29$), scoring slightly better was the generalist nurse at 46% ($n = 35$); oncology nurses scored 56.3% (n = 43) and hospice nurses ($n = 50$) scored the highest at 62% ($p = 0.001$). In this analysis Cronbach's alpha was determined to be *0.69* and test-retest reliability, $r = 0.97$ (Catania et.al, 2006).

Greek nurses were the focus of an investigation testing the construct validity, test-retest reliability, and internal consistency of the Nurses' Knowledge and Attitudes Survey Regarding Pain. The sample of 46 nurses was randomly assigned to one of two groups, expert and non-expert. The expert nurses were shown four pain management videos and the non-expert group received no intervention. All of the nurses completed a pre and post- test with a minimum of 8 days and a maximum of 12 days between testing. The expert nurses scored higher than the non-expert nurses on both the pretest 51.5% to 43.3% and the post-test 74.6% to 47.2%. The non-expert nurses test-retest reliability was valued as $r = 0.68, P < .001$ and Cronbach's alpha was *0.88* (Tafas, Patiraki, McDonald & Lemonidou, 2002).

The Demographic Data Sheets were developed for this study by the researcher. The 12-item survey asked the students to report age, gender, race, ethnicity, and type of nursing program

in which they were enrolled. Students were also asked questions pertaining to the quality of the pain management education they have received. A question related to whether they had ever cared for a patient with pain outside of their nursing education with pain was posed. Students were also asked to identify prior education or certification in other healthcare fields.

The students were given a stapled packet including the Letter of Introduction/Informed Consent Sheet, the Demographic Data Sheet, and the *Nurses' Knowledge and Attitude Survey Regarding Pain* (NKASRP). Completion and return of the survey and Demographic Data Sheets by the students will serve as informed consent. The students were asked to retain the Letter of Introduction/Informed Consent sheet for their records. Included on this sheet was the researcher's contact information as well as telephone and email contact information for the dissertation chair and a dissertation committee member. The respondents were instructed to complete the questionnaire to the best of their ability, answering all of the questions based on their knowledge and education received during the nursing program, both didactic and clinical instruction. The students were asked to return all forms, completed or not, to the front of the classroom. The documents were maintained in a locked receptacle until data analysis.

Research Questions

1. What are the pain management knowledge and attitudes of senior nursing students in a diploma nursing program, an associate degree-nursing program, and a baccalaureate degree-nursing program?
2. What are senior nursing students' experiences and satisfaction regarding pain education in their nursing programs?

3. What are the differences in pain management knowledge and attitudes of senior nursing students in the three types nursing programs?
4. Are there differences in the knowledge and attitudes of senior nursing students based on age (18-27 years, 28-37 years, 38-47 years, 48 years and older) in the three nursing programs?
5. Are there differences in the knowledge and attitudes of senior nursing students based on gender in the three nursing programs?
6. Are there differences in the knowledge and attitudes of senior nursing students based on race or ethnicity in the three nursing programs?
7. To what effect does prior pain experience (self or as caregiver) have on nursing students' pain knowledge and attitudes in the three nursing programs?

Data Analysis

The collected data was analyzed with the most recent Statistical Package for the Social Sciences (SPSS version 21.0.0; SPSS Inc., 2012). Pain management knowledge and attitudes was the dependent variable in this study. This variable was assessed by the *Nurses' Knowledge and Attitude Survey Regarding Pain* (NKASRP) percentage correct score.

The following statistical analyses were conducted to address the research questions:

1. What are the pain management knowledge and attitudes of senior nursing students in a diploma nursing program, an associate degree-nursing program, and a baccalaureate degree-nursing program?

Descriptive statistics of the NKASRP percentage correct score, including the mean, standard deviation, and range was used to report the pain management knowledge and attitudes of senior

nursing students in the three programs. Skewness and kurtosis values and graphical methods (e.g., histograms) were reported to exhibit the distribution of scores in the three programs.

2. What are senior nursing students' experiences and satisfaction regarding pain education in their nursing program?

Descriptive statistics was used to characterize the nursing students' experiences and satisfaction regarding their pain education in each of the three nursing programs, as reported by the items in the demographic questionnaire (see Appendix G). Descriptive statistics are employed to compute data on one single dependent variable (Huck, 2004). The frequencies and percentages of respondents answering *Yes/No* to each item were tabulated.

3. What are the differences in pain management knowledge and attitudes of senior nursing students in the three types of nursing programs?

This research question was addressed using one-way (between-subjects) Analysis of Variance (ANOVA). The ANOVA is a statistical method that allows the researcher to utilize the data to develop a single inferential account of the means of the study's population. A one-way ANOVA is performed when there are three or more groups of scores to be interpreted (Huck, 2004, p. 268). The percentage correct on the NKASRP was identified as the dependent variable, and the type of nursing program was the independent variable (factor). Post hoc-testing (Tukey HSD) was used to conduct pairwise comparisons to evaluate where the differences lie (Huck, 2004).

Assumptions of ANOVA

The assumptions of ANOVA were that the samples were independent, the dependent variable is normally distributed, and there is homogeneity of variance in the dependent variable between each of the cells.

This research study is a between-subjects design, with each of the data points representing independent observations. That is, each individual only contributes one observation and can only be represented in one cell of the design. It is also presumed that one individual's response will not affect another individual's response. Therefore, there is no issue with the independence assumption of ANOVA.

The normality assumption was verified by examining the descriptive distributional statistics (skewness and kurtosis) and graphical representations (histograms, boxplots, and probability plots) of the data. The Shapiro-Wilk statistic was calculated to provide a test of the null hypothesis that the data are normally distributed. Although ANOVA is generally robust to small departures in normality, data transformation was considered in the event of severely non-normally distributed values.

In addition, outliers (data points that are far outside the norm for a variable or population) can have deleterious effects on statistical analyses, by increasing error variance and decreasing normality. The data was screened for outliers, and those with standardized scores in excess of Z $\pm$ 3.29 ($p < .001$) were removed.

Levene's test was used to evaluate homogeneity of variance. This tests the null hypothesis that the variance is constant across the cells defined by the combination of factor levels. If the within treatment variances were different, then Welch's modified F-Test was used to test the

hypothesis that the means are equal between treatments. This statistic is preferable to the F statistic when the assumption of equal variances does not hold (SPSS Inc., 2012).

4. Are there differences in the knowledge and attitudes of senior nursing students based on age (18-27 years, 28 years and older) in the three nursing programs?

This research question was analyzed using two distinct, two-way factorial (between-subjects) ANOVA. One ANOVA measured gender as the second independent variable and one with race/ethnicity as the second independent variable. The assumptions related to two-way ANOVA are comparable to those of one-way ANOVA: independence, normality, randomness and homogeneity of variance (Huck, 2004, p.347). The NKASRP percentage correct score was used as the dependent variable, while age divided into categories, and type of nursing program, were the two factors. The main effects indicated whether there were mean differences in NKASRP scores according to either age or nursing program. The interaction term indicated whether any differences in NKASRP scores by age vary between nursing programs. In the event of a significant interaction term, the simple main effects of age within each nursing program were evaluated. This was followed up with post-hoc testing, when required. The assumptions of ANOVA were examined as described above.

5. Are there differences in the knowledge and attitudes of senior nursing students based on gender in the three nursing programs?
6. Are there differences in the knowledge and attitudes of senior nursing students based on race or ethnicity in the three nursing programs?

These research questions were analyzed using a two-way factorial (between-subjects) ANOVA. The NKASRP percentage correct score served as the dependent variable, while gender and type of nursing program were the two factors. The main effects indicated whether there were mean differences in NKASRP scores according to either gender or nursing program and race/ethnicity or nursing program. The interaction term indicated whether any differences in NKASRP scores by gender changed according to nursing program or if any differences in NKASRP scores by race/ethnicity changed according to type of nursing program. When the interaction term was significant, the simple main effects of gender and race/ethnicity within each nursing program were then evaluated. The assumptions of ANOVA were examined for as described above.

7. To what effect does prior pain experience (self or as caregiver) have on nursing students' pain knowledge and attitudes in the three nursing programs?

This research question was analyzed using a two-way factorial (between-subjects) ANOVA. The NKASRP percentage correct score was the dependent variable, while prior pain experience (yes/no) and type of nursing program was the two factors. The main effects indicated whether there were mean differences in NKASRP scores according to either prior pain experience or nursing program. The interaction term indicated whether any differences in scores by prior pain experience vary between nursing programs. When a significant interaction term occurred, the simple main effects of prior pain experience within each nursing program were evaluated. The assumptions of ANOVA were examined as described previously.

Application of Knowles' Theory of Learning

Knowles' Theory of Learning was the theoretical framework used to guide the formulation of the research questions proposed for this inquiry. The theory lends itself to this beginning investigation into the state of pain knowledge among nursing students enrolled in the three nursing educational tracks. It is imperative to gain knowledge related to the current pain knowledge base of nursing students to begin to identify the areas in need of improvement.

This educational theory is based on six andragogical principles. Andragogy is ". . . any intentional and professionally guided activity that aims at a change in adult persons" (Knowles, Holton & Swanson, 2005, p. 60). The model demonstrates the application of Knowles' Adult Learning Theory to this research study (Figure 1). The first principle, the learner's need to know, is based on the knowledge that learners perform better and learn better when they feel they are active participants in the educational exchange. Students perform at a higher level and retain more information when they are privy to how the learning will occur, what learning will occur, and why the information is important to learn (Knowles, Holton & Swanson, 2005). This principle will be achieved if nursing students from all nursing programs receive factual and current instruction in the science of pain theory and management.

Self-directed learning has been defined as "self-teaching", in other words, students are able to instruct themselves in a given subject. An example of this would be a student participating in an independent study course (Knowles, Holton & Swanson, 2005). A second definition of self-directed learning is offered by Candy (1990); this researcher describes self-directed learning as "autodidaxy". In a more familiar term, autodidaxy is simply, autonomy. It has been postulated by some educational theorists that not all students are capable of self- teaching and autonomy.

Some hold the belief that some learners have varying degrees of self-teaching and autonomy based on the situation. Grow (1991) suggests that it is the role of the teacher to determine what type of teaching style would benefit the student and apply it to the educational interaction. Grow outlined four stages to describe the process of learning autonomy. In a practical application of this theory to the research at hand, students would be active participants in their pain management education and would be able to assess their progress and ask for assistance from experienced or expert faculty members.

Prior experience of the learner has been a widely accepted focus in the education of adult learners recently. As many adults have for one reason or another chosen to start second or third career, previous knowledge and life experiences have been given recognition. According to this theory, prior experiences develop a broader range of individual variances, provide a valuable resource for learning, produce preconceptions that may hinder or develop future learning and provide a foundation for the learners' self-identity (Knowles, Holton & Swanson, 2005). Adapting this principle to the research would mean encouraging students to share their knowledge and experiences related to pain with their fellow students and faculty.

Learners, generally, seek knowledge when confronted with a situation that requires new knowledge. Readiness to learn is often related to life experiences or situational instances. The basis for this principle is that learners are ready to learn when they master one set of skills or retain certain knowledge before progressing to the next level. This standard is demonstrated by having the faculty teach educational activities which progress from basic concepts to complex.

The principle, orientation to learning, states that learners generally learn best when the education is centered on real life examples. Kolb (1984) echoes Knowles' assumption in his

experiential learning model. Kolb describes learning as imparting knowledge through the transmission of individual experiences. For this principle to be applicable to the research, the student should receive education to prepare to effectively assess and manage patients' pain. Methods that may be utilized to achieve this goal include case studies, patient scenarios, and role-playing.

The final assumption of this theory, motivation to learn, was not part of Knowles' initial theory in 1970. Motivation to learn, the final principle of this theory of learning, was introduced by Knowles in 1984. This value is useful to learners when they realize that what they will learn will be of benefit to them with specific problems or situations. This part of the theory describes a feeling of accomplishment or an internal sense of satisfaction when the learners master a new skill or learn new information vital to them. The internal satisfaction serves as a driving force for the learner to seek out further, new information. Examples of this assumption in this research proposal would be external motivators such as grades, test scores, or the faculty members' opinions. Internal motivators, what Knowles describes as the more important motivators, are the increased pain management knowledge and the ability of the students to make the correct decisions to alleviate their patients' pain.

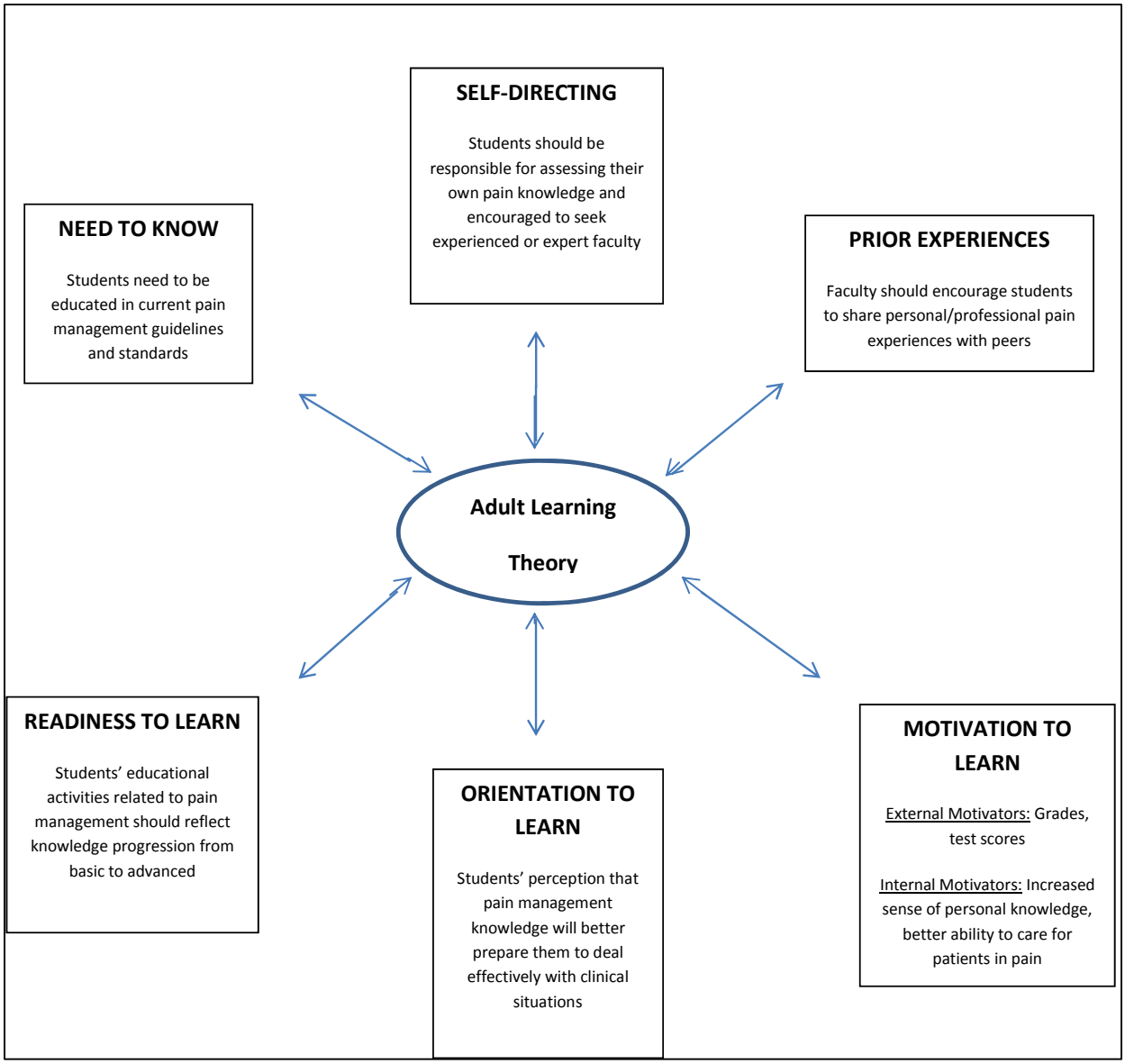

FIGURE 1. Application of Knowles' Learning Theory

Summary

This chapter evaluated the methods used to answer the research questions developed for this study. An examination of the conducted research sample and design were presented. Ethical considerations were outlined for this research as well as a description of how the data collection and data analysis were accomplished. A schematic of Knowles' Adult Learning Theory was provided to demonstrate the application of this theory and the six assumptions to the student nurses' pain management knowledge and attitudes.

Chapter 4

Results of Data

The purpose of this study was to investigate the relationship between type of nursing education and pain knowledge and attitudes of student nurses on the Nurses' Knowledge and Attitude Survey Regarding Pain instrument (NKASRP). This chapter will provide comparisons among the three types of nursing programs and responses to the NKASRP tool. Additionally, information collected from the Demographic Data Sheet including factors such age, gender, ethnicity, previous pain management experience, and prior education and certifications were examined to determine if there was an effect on individual item responses. The students were also asked to identify whether they felt adequately prepared to care for their patients' pain and if sufficient time was given to pain theory and management techniques during their nursing program. Each of the seven research questions are discussed with respect to the data analysis results.

Demographic Analysis

The following are results compiled from the Demographic Data Sheet each student was asked to complete. One hundred sixty- six senior nursing students participated in the study. Forty- six participants (27.7%) were senior nursing students in a diploma program. Forty-eight (28.9%) students were enrolled in an associate degree nursing program and the remaining participants seventy-two (43.4%) were students in a baccalaureate degree nursing program.

One hundred- fourteen (68.7%) of the nursing students were between the ages of 18-27 years old. Thirty-three (19.9%) listed their age as 28-37 years old. Seventeen (10.2%) respondents identified ages at or between 38-47 years of age and only two (1.2%) recorded age as 48 years or

older. Female gender accounted for the majority of the nursing students, 143 (86.1%), with males comprising 19 (11.4%) of the aggregate. Four respondents (2.4%) failed to list a gender.

The students were asked to identify their ethnicity. The majority of students (*n=156, 94.0%*) selected Caucasian as their race. Other students self-identified as Asian (*n=2, 1.2%*), Black or African American (*n=3, 1.8%*), Hispanic or Latino (*n=2, 1.2%*), Other (*n=1, 0.6%*) and No Response (*n=1, 0.6%*).

Student nurses in the study were queried as to whether they had earned a previous degree and if so, were asked to list that degree. Forty- three (25.9%) of the study population answered affirmatively and one hundred twenty- three (74.1%) stated having no previous degree. One (.6%) student did not respond to this question. Of the forty- three (25.9% of total participants) students who answered yes to prior education the majority, twenty- one (48.9%) listed a bachelor degree as the previous degree. The remaining students named preceding degrees as associate degree (*n=12, 27.9%*), business administration, with no level of degree noted (*n=1, 2.3%*), funeral director (*n=1, 2.3%*), high school (*n=1, 2.3%*), Licensed Practical Nurse (LPN) (*n=4, 9.3%*), no degree (*n=1, 2.3%*), psychology (*n=1, 2.3%*) and surgical tech (*n=1, 2.3%*).

The students were asked to list previous education or certification in the field of healthcare. Twenty- nine of the one hundred sixty-six respondents stated they had acquired prior instruction or certification. The majority (17.5% of the total sample) listed certification/education as Certified Nursing Assistants (*n=8, 27.6%* of this subpopulation), dental assistant (*n=1, 3.4%*), and Certified Surgical Tech (CST) (*n=1, 3.4%*). Further, students acknowledged earlier education as dental hygienist (*n=1, 3.4%*), dietary/life insurance (*n=1, 3.4%*), Emergency Medical Technician (EMT) (*n=3, 10.2%*), and EMT and CNA (*n=1, 3.4%*). The remaining

students listed previous experience as home health aide (*n = 1, 3.4%*), LPN (*n = 4, 13.6%*), LPN and CNA (*n = 1, 3.4%*), medical assistant and massage therapist (*n = 1, 3.4%*), nursing assistant (*n = 2, 6.8%*), nurses aide (*n = 1, 3.4%*), paramedic (*n = 1, 3.4%*), phlebotomist (*n = 1, 3.4%*) and one respondent failed to cite a certification (*n = 1, 3.4%*).

Just over half of the nursing students (*n = 84, 50.6%*) questioned identified that they had cared for a person with pain, acute or chronic, outside of the educational nursing program. Eighty- one students (48.8%) stated that they had not cared for patients in pain other than within their role as a student nurse. One student did not answer (.6%).

When the student nurses were asked if they had cared for patients with pain during their clinical rotations, one hundred sixty- three answered yes (98.2%). Interestingly, three students admitted they had not cared for patients with pain during their clinical rotations (1.8%). Table 1 outlines the characteristics of the sample including age, gender, ethnicity and previous education and certifications (*N=166*).

Table 1

Characteristics of the Sample

Students' Age (years)	**Diploma (n=46)**	**Associate (n=48)**	**Bachelor (n=72)**
18-27	25	20	69
28-37	11	19	3
38-47	9	8	0
48 and older	1	1	0
Students' Gender	Diploma (n=46)	Associate (n=48)	Bachelor (n=72)
Female	38	40	65
Male	8	4	7

No Response	0	4	0
Students' Ethnicity	Diploma (n=46)	Associate (n=48)	Bachelor (n=72)
Asian	0	0	2
Black/African American	1	1	1
Caucasian	45	45	66
Hispanic/Latino	0	2	0
Other	0	0	1
Previous Degree	Diploma (n=46)	Associate (n=48)	Bachelor (n=72)
Yes	18	21	3
No	28	27	69
Previous Certification	Diploma (n=46)	Associate (n=48)	Bachelor (n=72)
Yes	6	14	8
No	40	34	64

Research Instrument

The Nurses' Knowledge and Attitude Survey Regarding Pain (NKASRP) is a 39 item survey consisting of 21 True or False statements and 18 multiple-choice questions, two of the multiple-choice questions describe a scenario and ask the student to assign a value (0-10) to the patient's pain and administer the appropriate medication. According to the instrument's developers, Ferrell and McCaffery, it was first utilized in 1987 and evolved over numerous years to the tool used in this study. Content validity has been determined by leading pain experts and the

foundation for the items on the survey have been derived from standards of pain management practice from professional organizations such as the American Pain Society and the World Health Organization. Ferrell and McCaffery (2012) state that construct validity of the NKASRP has been established by equating scores from all levels of nurses, from students to expert pain nurses. According to the originators of the NKASRP, a score of 80% or higher was considered a passing score for this instrument. The researchers also report internal consistency reliability was established (*Cronbach's alpha r>.70*) with items replicating both knowledge and attitude. Test-retest reliability was recognized to be (*r>.80*) by repeat testing in a continuing education course for staff nurses. (http://prc.coh.org).

Data Analysis

The data were collected and analyzed utilizing the latest edition of the Statistical Package for the Social Sciences (SPSS, Version 21.0, 2012). Statistical analysis included descriptive techniques for identifying frequencies and percentages. Univariate analysis of variance (ANOVA), Shapiro-Wilk, Skewness and kurtosis values and graphical methods (e.g., histograms) were used to exhibit the distribution of scores in the three programs. The percentage correct on the NKASRP was the dependent variable, and the type of nursing program was the independent variable (factor). Post hoc-testing (Tukey HSD) was used to conduct pairwise comparisons to evaluate where the differences were located. Table 2 identifies the items on the NKASRP instrument and percentages of correct responses by nursing program and collectively. Pearson Chi-Square and significance are also indicated. An a priori analysis employing a Cohen's effect size of *.25*, a power of *.80* and a significance level of *.05* determined the sample size total to be 159. The total sample size for this study reached 166 participants. Additionally,

all items that attained statistical significance $p < 0.05$ are highlighted and followed by an asterisk (*).

Table 2

*Percentages of Correct Responses to the NKASRP by Program Type, Pearson Chi Square and Significance (Items with p <0.05 appear highlighted and marked with an *)*

NKASRP Questions	Diploma % Correct	Associate % Correct	Bachelor % Correct	All % Correct	Pearson X^2	p Value (<0.05)
1. Vital signs are always reliable indicators of the intensity of a pt's. pain. (FALSE)	95.7	91.7	93.1	93.4	.624	.732
2. Because their nervous system is underdeveloped, children under 2 years of age have decreased pain sensitivity and limited memory of painful experiences. (False)	80.4	64.6	54	73.5	3.178	.204
3. Patients who can be distracted from pain usually do not have severe pain. (False)	84.8	89.6	70.8	80.1	7.225	.027*
4. Patients may sleep in	78.3	93.8	73.6	80.7	7.754	.021*

spite of severe pain. (True)						
5. Aspirin and other nonsteroidal anti-inflammatory agents are NOT effective analgesics for painful bone metastasis. (False)	26.1	54.2	48.6	44.0	8.626	.013*
6. Respiratory depression rarely occurs in patients who have been receiving stable doses of opioids over a period of months. (True)	47.8	58.3	16.7	37.3	24.353	<.001*
7. Combining analgesics that work by different mechanisms (e.g., combining an NSAID with an opioid) may result in better control with fewer side effects than using a single analgesic agent. (True)	82.6	95.8	87.5	88.6	4.192	.123
8. The usual duration of analgesia of 1-2 mg morphine IV is 4-5 hours. (False)	43.5	41.7	27.8	36.1	3.890	.143

9. Research shows that promethazine (Phenergan) and hydroxyzine (Vistaril) are reliable potentiators of opioid analgesics. (False)	52.2	25.0	38.9	38.6	7.328	.026*
10. Opioids should not be used in patients with a history of substance abuse. (False)	45.7	58.3	52.8	52.4	1.521	.467
11. Elderly patients cannot tolerate opioids for pain relief. (False)	100.0	87.5	93.1	93.4	5.953	.051
12. Patients should be encouraged to endure as much pain as possible before using an opioid. (False)	100.0	97.9	97.2	98.2	1.249	.535
13. Children less than 11 years old cannot reliably report pain so clinicians should rely solely on the parent's assessment of the child's pain intensity. (False)	97.8	100.0	100.0	99.4	2.625	.269
14. Patients' spiritual beliefs may lead then to think pain	97.8	100.0	100.0	98.8	.969	.616

and suffering are necessary. (True)						
15. After an initial dose of opioid analgesic is given, subsequent doses should be adjusted in accordance to the individual patient's response. (True)	78.3	89.6	94.4	88.6	7.232	.026*
16. Given pts. sterile water by injection (placebo) is a useful test to determine if the pain is real. (False)	95.7	97.9	83.3	91.0	9.153	.010*
17. Vicodin (hydrocodone 5 mg + acetaminophen 500 mg) PO is approximately equal to 5-10 mg of morphine PO. (True)	19.6	37.5	34.7	31.3	4.194	.123
18. If the source of a pts. pain is unknown, opioids should not be used during the pain evaluation period, as this could mask the ability to correctly diagnose the cause of pain. (False)	41.3	35.4	45.8	41.6	1.288	.525

19. Anticonvulsants drugs such as gabapentin (Neurontin) produce optimal pain relief after a single dose. (False)	95.3	89.6	88.9	90.4	.726	.696
20. Benzodiazepines are not effective pain relievers unless the pain is due to muscle spasm. (True)	34.8	37.5	37.5	36.7	.106	.949
21. Narcotic/opioid addiction is defined as a chronic neurobiologic disease, characterized by behaviors that include one or more of the following: impaired control over drug use, compulsive use, continued use despite harm and craving. (True)	93.5	100.0	95.8	96.4	2.979	.225
22. The recommended route of administration of opioid analgesics for patients with persistent cancer-related pain is (oral).	30.4	12.5	25.0	22.9	4.601	.100
23. The recommended route of administration of opioid	91.3	83.3	76.4	82.5	4.361	.113

analgesics for patients with brief, severe pain of sudden onset, such as trauma or postoperative pain is (intravenous).						
24. Which of the following analgesic medications is considered the drug of choice for the treatment of prolonged moderate to severe pain for cancer patients? (morphine)	78.3	72.9	59.7	68.7	5.049	.080
25. Which of the following IV doses of morphine administered over a 4 hour period would be equivalent to 30 mg of oral morphine given q 4 hours? (Morphine 10 mg IV)	32.6	25.0	34.7	31.3	1.314	.518
26. Analgesics for post-operative pain should initially be given (around the clock on a fixed schedule).	80.4	87.5	79.2	81.9	1.447	.485
27. A patient with persistent cancer pain has been receiving daily opioid	17.4	20.8	5.6	13.3	6.795	.033*

analgesics for 2 months. Yesterday the patient was receiving morphine 200 mg/hour intravenously. Today he has been receiving 250 mg/hour intravenously. The likelihood of the patient developing clinically significant respiratory depression in the absence of new comorbidity is (less than 1%).						
28. The most likely reason a patient with pain would request increased doses of pain medication is (the pt. is experiencing increased pain).	91.3	100.0	100.0	94.6	4.039	.133
29. Which of the following is useful for treatment of cancer pain? (All of the above)	58.7	70.8	51.4	59.0	4.506	.105
30. Which of the following is useful for treatment of cancer pain? (the patient)	97.8	97.9	95.8	97.0	.581	.748

31. Which of the following describes the best approach for cultural considerations in caring for patients in pain (Patients should be individually assessed to determine cultural influences.)	93.5	85.4	80.6	85.5	3.791	.150
32. How likely is it that patients who develop pain already have an alcohol and/or drug abuse problem? (5-15%)	50.0	52.1	51.4	51.2	.043	.979
33. The time to peak effect for morphine given IV is (15 min.).	76.1	79.2	79.2	78.3	.186	.911
34. The time to peak effect for morphine given orally is (1-2 hrs).	54.3	47.9	37.5	45.2	3.421	.181
35. Following abrupt discontinuation of an opioid, physical dependence is manifested by the following: (sweating, yawning, diarrhea and agitation with patients when the opioid is abruptly	34.8	41.7	19.4	30.1	7.414	.025*

discontinued).						
36. A. Circle the number that represents your assessment of Andrew's pain. (8)	89.1	97.9	74.6	86.1	11.658	.003*
36. B. Check the action you will take at this time. (Administer morphine 3 mg IV now).	32.6	14.6	9.7	17.5	10.587	.005*
37. A. On the patient's record you must mark his pain on the scale below. Circle the number that represents your assessment of Robert's pain: (8).	93.5	93.8	87.5	91.0	1.858	.395
37.B. Check the action you will take at this time: (Administer morphine 3 mg IV now).	47.8	33.3	25.0	33.7	6.547	.038*

Significant results were tabulated for 12 of the thirty-nine NKASRP items (3, 4, 5, 6, 9, 15, 16, 27, 35, 36 A., 36 B. and 37 B) and two items approached significance (11 and 24). Item 3, a True/False statement, incorrectly indicated that a patient with severe pain could not be distracted. Most students answered correctly (80.1%), however, there was an important

difference in students' scores among the diploma, associate degree and bachelor degree programs, 84.8%, 89.6% and 70.8%, respectively ($x^2 = 7.23$, $df = 2$ and $p = 0.027$).

The associate degree students scored significantly higher (93.8%) than their diploma (78.3%) or bachelor degree (73.6%) peers on item 4 regarding sleep and patients with severe pain ($x^2 = 7.75$, $df = 2$ and $p = 0.021$). Most students answered this item correctly acknowledging that patients with serious pain levels may sleep in spite of it, but diploma and bachelor degree students scored appreciably lower.

The next item is the first of several testing pharmacological knowledge. Item 5 affirms that NSAIDs are effective in the relief of metastatic cancer pain ($x^2 = 8.63$, $df = 2$, $p = 0.013$), associate degree nursing students scored the highest on this item (54.2%) followed by bachelor degree students (48.6%) and then diploma students (26.1%) on this True/False statement.

The three groups differed significantly on item 6; the assertion was that respiratory depression is rare in patients who have been receiving constant doses of opioids for several months. Bachelor degree students earned a score of 16.7%, associate degree students agreed with this fact, correctly, with a result of 58.3% and diploma students achieved a score of 47.8% ($x^2 = 24.35$, $df = 3$, $p < .001$).

The next significant entry, item 9, involves another pharmacology-based question regarding promethazine (Phenergan) and hydroxyzine (Vistaril) as opioid analgesic potentiators. This false statement scored lowest with the associate degree group at 25%, followed by the bachelor degree group at 38.9%. The diploma group scored significantly higher at 52.2% ($x^2 = 7.33$, $df = 2$, $p = 0.26$). Item 15 deals with pharmacokinetics. It states that after the initial dose of opioids, subsequent dosing should rely on the patients' response. The bachelor degree students scored

94.4% followed by the students in the associate program with 89.6% and lastly by the diploma students at 78.3% ($x^2 = 7.232$, $df = 2$, $p = 0.26$).

Item 16 maintains that an appropriate method to determine if a patients' pain is real is to inject saline (placebo effect). Significance in this statement was calculated at $p = 0.010$, Pearson Chi-Square was calculated at 9.153, and degree of freedom, 2. This incorrect statement received the following scores from respondents; the diploma program 95.7%, the associate degree program 97.9% and the bachelor degree program 83.3%, with most students realizing this is not a suitable method for management patients' pain.

All three programs scored poorly on item 27. It relayed a situation in which a cancer patient who had been receiving scheduled hourly doses of morphine IV for 2 months had an escalation in dosage. The patient was prescribed an increase from 200 mg to 250 mg/hour. The students were asked to choose the likelihood that the patient would experience respiratory depression. The correct answer to this item is, less than 1%. Only 5.6% of the bachelor degree students answered correctly, 17.4% of diploma students and 20.8% of the associate degree students ($x^2 = 6.795$, $df = 2$, $p = 0.033$).

Item 35 incorrectly stated the physical symptoms involved with acute withdrawal of opioids. One of the answers identified symptoms associated with both opioid dependence as well as withdrawal, another stated the need for a higher dose to achieve the same effect. Bachelor degree students scored significantly lower than their diploma or associate degree counterparts, 19.4%, 34.8% and 41.7% .respectively ($x^2 = 7.41$, $df = 2$, $p = 0.025$).

The three remaining significant responses (items 36 A., 36 B., and 37 B.) dealt with two clinical scenarios. In each case a young, male surgical patient is asked to quantify his pain level

with a number between 0-10, however he exhibits different physical manifestations and mannerisms in each instance. Both young, male patients describe their pain level as an "8" on a 0-10 pain level scale. However, the patient in this first situation is smiling and joking with his visitor, the student was then asked to assign a number to this patient's pain (item 36 A.). The correct answer is an "8" as described by the patient. Associate nursing students chose this answer 97.9%, diploma nursing students 89.1% and bachelor degree students, 74.65% ($x^2 = 11.66, df = 2, p = 0.003$). The second part (item 36 B.) asks what action should be taken at this time, with the correct response to administer the full dose of morphine as ordered. The diploma group chose the proper response, 32.6%, the associate degree group, 14.6% while the bachelor degree group selected the correct action, 9.7%. Statistics for this item were calculated at $x^2 = 10.59, df = 2, p = 0.005$.

The last significant finding from the NKASRP instrument is item 37 B., which describes the same clinical situation with the same young, male surgical patient. Vital signs are identical and the patient reports a pain level of "8". However, this patient is lying quietly and grimaces when he turns in bed. The item asks the nurse which action should be taken with the correct response being, administer the prescribed opioid and dose now. The following were the responses from the diploma, associate degree and bachelor degree students, correspondingly 47.8%, 33.3% and 25.0% ($x^2 = 6.55$, $df = 2$, $p = 0.038$).

Two items on the NKASRP scored close to reaching statistical significance. Item 11, a True and False statement erroneously indicated that the elderly cannot tolerate opioids. Diploma students scored 100%, bachelor degree students 93.1% and associate degree students 87.5%. Pearson Chi- square value was $5.95, df = 2$ and $p = 0.051$. The other statement that approached

statistical significance was item 24. The students were asked which medication is preferred for prolonged moderate to severe cancer pain, the correct response is morphine. Members of the diploma group responded correctly 78.3%, associate degree group 72.9% and bachelor degree group 59.7% ($x^2 = 5.05$, df = 2, p = 0.080).

Research Questions Analysis

What are the pain management knowledge and attitudes of senior nursing students in a diploma-nursing program, an associate degree nursing program, and a baccalaureate degree nursing program?

The Nurses' Knowledge and Attitudes Survey Regarding Pain (NKASRP) was administered to 166 student nurses *(N = 166)* in three educational nursing programs: diploma (*n = 46, 27.7%*), associate degree (*n =48, 28.9%*) and bachelor degree (*n = 72, 43.4%*).

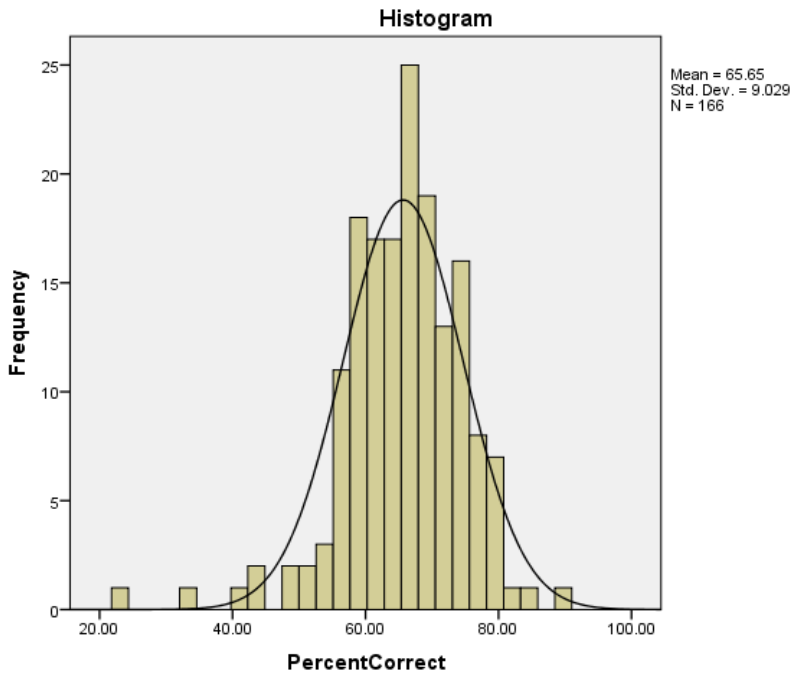

Figure 2. Frequency Distribution of Total Sample Scores

The student nurses in all three programs scored 65.65% collectively. Standard deviation was *9.03* for the combined groups and range was between 23.08% to 89.74% (total range of 66.67%). The skewness coefficient was reported as *-0.95*, however, this finding is generally considered acceptable as skewness within the range of *-1.00 to +1.00* is deemed not extreme. Kurtosis, calculated at *3.27*, is indicative of a more peaked distribution, referred to as leptokurtic. The excess kurtosis was corrected when two outliers were removed to meet the assumptions of normality for ANOVA. Figure 2 indicates the frequency distribution of all nursing programs on the NKASRP instrument.

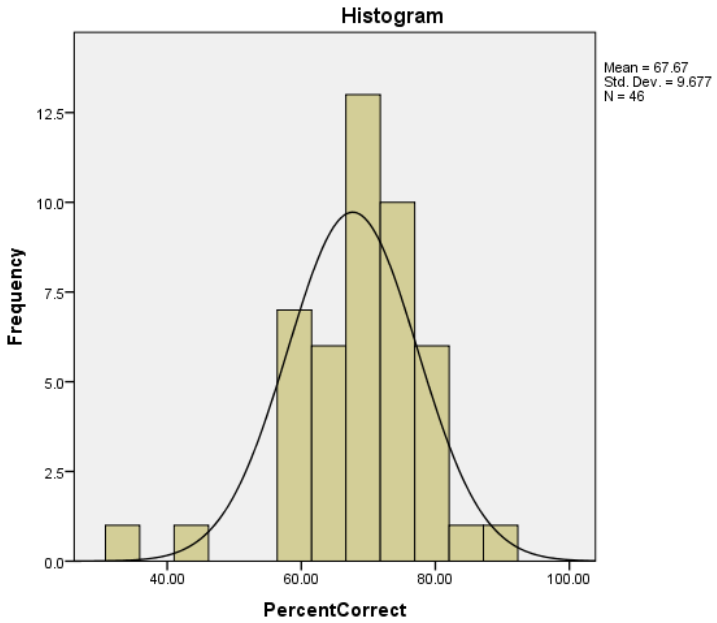

Figure 3. Frequency Distribution of Diploma Student Scores

Diploma student nurses (*n = 46*) scored a mean of *67.67%* correct on the survey. The students had a range of scores from 33.33% to 89.74% (*total range 56.41%*); median score was *67.95%* and a mode *of 66.67%*. Standard deviation was determined to be 9.68. The skewness

value was *-0.97*, this finding is similar to the reported skewness for all programs. Kurtosis at *3.03* is again reflective of a leptokurtic distribution. (See Figure 3)

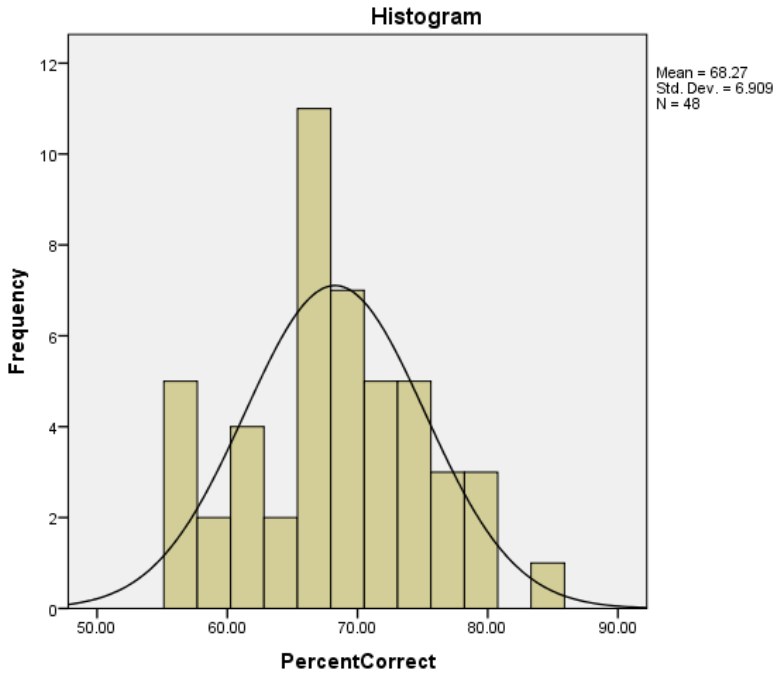

Figure 4. Frequency Distribution of Associate Degree Students' Score

Associate degree student nurses (*n = 48*) recorded a mean of *68.27%*. The associate degree students' scores ranged from 56.41% to 84.62% (*total range of 28.21%*). Median score was tabulated to be 67.95% and mode, 66.67%, standard deviation for the associate program nurses was *6.909*. Skewness for this group was higher than the diploma or the bachelor group and was found to be *0.04*. The kurtosis, *-0.38* also differed appreciably in the associate program. The kurtosis coefficient reflected a more mesokurtic distribution of scores. Figure 4 demonstrates associate degree students' performance on the NKASRP instrument.

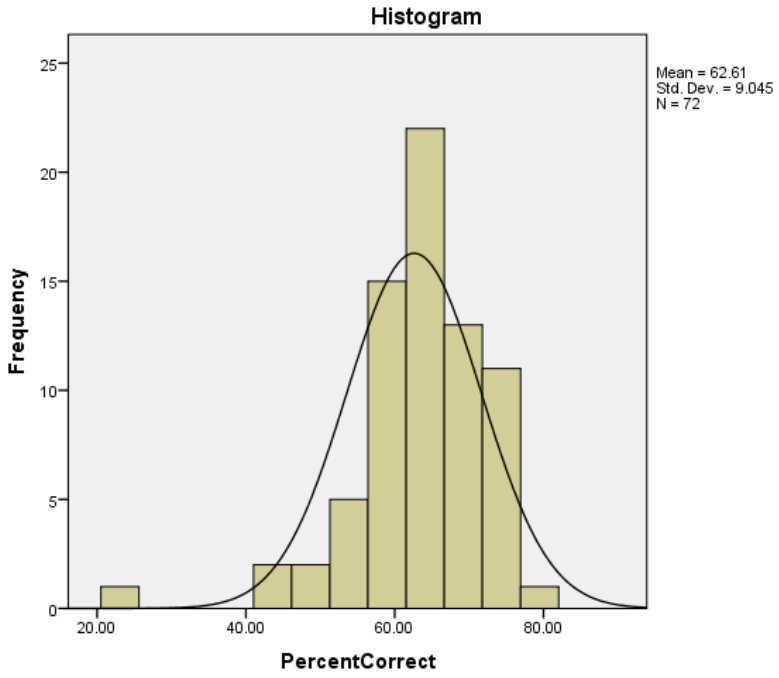

Figure 5. Frequency Distribution of Bachelor Degree Students' Scores

The students in the bachelor nursing program (*n=72*) achieved a score of 62.61%. The range was 23.08% to 79.49%, total range 56.41%. The mean and median were both recorded at *64.10*. Standard deviation for this group was 9.05. Skewness was determined to calculate at - *1.28*, just slightly lower than the range of -1.00 and +1.00, Huck (2004) states is "not to be too extreme" (p.29). The value for kurtosis was *4.29*; this is the highest kurtosis value in this study and indicates a leptokurtic distribution. The students' scores in the baccalaureate nursing program produced the histogram in Figure 5. As shown by the preceding analysis associate degree students (*68.27%*) scored higher than diploma students (*67.67%*) and bachelor degree students (*62.61%*) on the NKASRP.

2. *What are senior nursing students' experiences and satisfaction regarding pain education in their nursing program?*

The following responses were taken from the Demographic Data Sheet and deal with the students' perception of how prepared they feel to assess patients' pain, care for patients pain, as well as how they feel their individual program prepared them in pain management theory and pain management techniques including pharmacology and alternative and complimentary practices. Collective responses and individual nursing program responses are listed in table formats. Table 3 outlines the students' responses to the item addressing preparedness to assess the patients' pain sufficiently.

Table 3

Students' perception of ability to assess pain

I feel adequately prepared to assess patients' pain level.

Adequately Prepared to Assess Pain	All Programs (N=166)	Diploma (n=46)	Associate (n=48)	Bachelor (n=72)
Strongly Disagree	5 (3.0%)	2 (4.3%)	2 (4.2%)	1 (1.4%)
Disagree	2 (1.2%)	2 (4.3%)	0	0
Agree	61 (36.7%)	14 (30.4%)	19 (39.6%)	28 (38.9%)
Strongly Agree	98 (59.0%)	28 (60.9%)	27 (56.2%)	43 (59.7%)

Most students stated they felt adequately prepared to assess patients' pain levels. The group that most strongly agreed that their program prepared them for this task was the diploma students (*60.9%*). The diploma (*4.3%*) and associate degree (*4.2%*) groups were more likely to strongly disagree that they feel prepared to quantify their patients' pain.

Table 4

Students' perception of ability manage patients' pain

I feel adequately prepared to offer suggestions to manage my patients' pain.

Adequately Prepared to Offer Suggestions	All Programs (N=166)	Diploma (n=46)	Associate (n=48)	Bachelor (n=72)
Strongly Disagree	4 (2.4%)	2 (4.3%)	2 (4.2%)	0
Disagree	3 (1.85)	1 (2.2%)	1(2.1%)	1 (1.4%)
Agree	94 (56.6%)	28 (60.9%)	22 (45.8%)	44 (61.1%)
Strongly Agree	64 (38.6%)	15 (32.6%)	23 (47.9%)	26 (36.1%)
No Response	0	0	0	1 (1.4%)

Table 4 demonstrates that most participants stated they are in agreement, they are prepared to offer suggestions concerning their patients' pain. It is noteworthy that the bachelor degree program is the only program that did not have a student strongly disagree with the statement.

Table 5

Students' perceptions of time given to pain theory

I feel an adequate amount of time was given to pain theory in my nursing program.

Adequate Amount of Time to Pain	All Programs (N=166)	Diploma (n=46)	Associate (n=48)	Bachelor (n=72)
Strongly Disagree	3 (1.8%)	1 (2.1%)	2 (4.2%)	0
Disagree	19 (11.4%)	4 (8.7%)	4 (8.3%)	11 (15.3%)
Agree	102 (61.4%)	28 (60.9%)	30 (62.5%)	44 (61.1%)
Strongly Agree	41 (24.7%)	13(28.3%)	12 (25.0%)	16 (22.2%)
No Response	1 (0.6%)	0	0	1(1.4%)

Students overwhelmingly approved the statement that sufficient time was allotted for pain theory. Table 5 points out that the diploma program students either agreed or strongly agreed with the statement with a total of 89.2%, the associate degree program students, 87.5% and the bachelor's degree program students, 83.3%.

Table 6

Students' perceptions of pain management modalities

I feel an adequate amount of time was given to pain management techniques including pharmacology, alternative and complementary medicines etc., during my nursing educational program.

Adequate time to pain techniques, pharmacology etc.	All Programs (N=166)	Diploma (n=46)	Associate (n=48)	Bachelor (n=72)
Strongly Disagree	4 (2.4%)	1 (2.2%)	2 (4.2%)	1 (1.4%)
Disagree	13 (7.8%)	2 (4.3%)	6 (12.5%)	5 (6.9%)
Agree	90 (54.2%)	24 (52.2%)	27 (56.2%)	39 (54.2%)
Strongly Agree	58 (34.9%)	19 (41.3%)	13 (27.1%)	26 (36.1%)
No Response	0	0	0	1 (1.4%)

Associate degree students disagreed or strongly disagreed (16.7%) with the statement that sufficient time was allotted for pharmacology and alternative pain management therapies. Most students found their programs offered ample time to explore alternative pain management modalities and pharmacology instruction (see Table 6).

3. *What are the differences in pain management knowledge and attitudes of senior nursing students in the three primary nursing programs?*

This research question was addressed using one-way (between-subjects) Analysis of Variance (ANOVA). Tests of normality, Kolmogorov–Smirnov and Shapiro-Wilk, were performed and reveal significance. However, in order to meet the assumptions of normality for ANOVA, two outlying scores were removed from calculations. This, in turn, demonstrated that the Shapiro-Wilk was significant at *0.05*. Levene's test indicated that the homogeneity of variances assumptions was met. The ANOVA was then employed after removing the two extreme scores. The results demonstrated that the students in the bachelor degree nursing program did perform statistically differently from those students in the diploma and associate degree nursing program. The percentage correct on the NKASRP was used as the dependent variable, and the type of nursing program was the independent variable (factor). Post hoc-testing (Tukey HSD) was used to conduct pairwise comparisons. Group means for the three programs were as follows: diploma *68.43*, associate degree *68.27* and bachelor degree *63.16*. Because the three groups were not equally distributed in terms of number, a harmonic mean sample size of *52.50* was employed. Again, it was demonstrated that the bachelor nursing students' results were statistically different from the student of the other two nursing programs. The statistics depicting these results are listed in Table 7. Two outliers, one student's score from the diploma program and one student's score from the bachelor nursing program were removed from statistical analysis.

Table 7

Descriptive Statistics by Program (Minus outliers)

Program	Sample (n)	Mean	Standard Deviation	Standard Error
Diploma	45	68.43	8.26938	1.23273
Associate	48	68.27	6.90912	.99725
Bachelor	71	63.16	7.76812	.92191

Analysis was conducted using the score attained on the NKASRP and the type of nursing education program. Results of the ANOVA appear in Table 8.

Table 8

ANOVA Summary Table for Nursing Education Group by Percent Correct on NKASRP

	Sum of Squares	df	Mean Square	F Ratio	p value
Between Groups	1083.000	2	541.500	9.200	<0.001 *
Within Groups	9476..485	161	58.860		
Total	10559.484	163			

Note. An asterisk denotes statistical significance * $p < 0.05$

4. *Are there differences in the knowledge and attitudes of senior nursing students based on age (18-27 years, 28 years and older) in the three nursing programs?*

This research question was analyzed using a two-way factorial (between-subjects) ANOVA. The assumption of homogeneity was tested using Levene's Test of Equality of Error Variances. The ANOVA measured age as one independent variable and program as the second independent variable. The NKASRP percentage correct score was the dependent variable, while age was collapsed into two categories. For statistical purposes, the groups were divided into only two, 18-27 years old and 28 years old and older. The other factor was the type of nursing program. The age factor was found to approach significance ($p = 0.050$). Additionally, it was found that the educational group was significant ($p=0.005$). However, no interaction was seen between age and program. The younger group of students aged 18-27 years scored higher than the older (28 and older) students, *67.398* and *63.783* respectively. The interaction of age and type of nursing educational program was not significant ($p = 0.222$).

Table 9

ANOVA Tests of Between-Subjects Effects of Nursing Program and Age

Dependent Variable: Percent Correct on NKASRP

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Nursing Program	632.320	2	316.160	5.482	.005*
Age recoded	224.512	1	224.512	3.893	.050
Nursing Program + Age recoded	175.243	2	87.621	1.519	.222
Error	9111.904	158	57.670		
Total	10559.484	163			

Note. An asterisk denotes statistical significance * $p < 0.05$

5. *Are there differences in the knowledge and attitudes of senior nursing students based on gender in the three nursing programs?*

This research question was answered by employing a two-way analysis of variance. The assumption of homogeneity of variance was tested using Levene's Test of Equality of Variances. Tests of between subject effects demonstrated a statistically significant interaction ($p = 0.009$) between gender and nursing program. Males in both programs, with the exception of the diploma program, scored a higher mean on the NKASRP than their female classmates. Table 10 demonstrates descriptive statistics regarding the type of nursing program and gender.

Table 10

ANOVA Tests of Between- Subjects Effects of Nursing Program and Gender

Dependent Variable: Percent Correct on NKASRP

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Nursing Program	502.923	2	251.462	4.457	.013*
Gender	133.426	1	133.426	2.365	.126
Nursing Program + Gender	543.755	2	271.878	4.819	.009*
Error	8687.821	154	56.414		
Total	10364.522	159			

Note. An asterisk denotes statistical significance * $p < 0.05$

Additionally, Figure 6 offers a visual depiction that outlines the percent correct with respect to gender and type of nursing program.

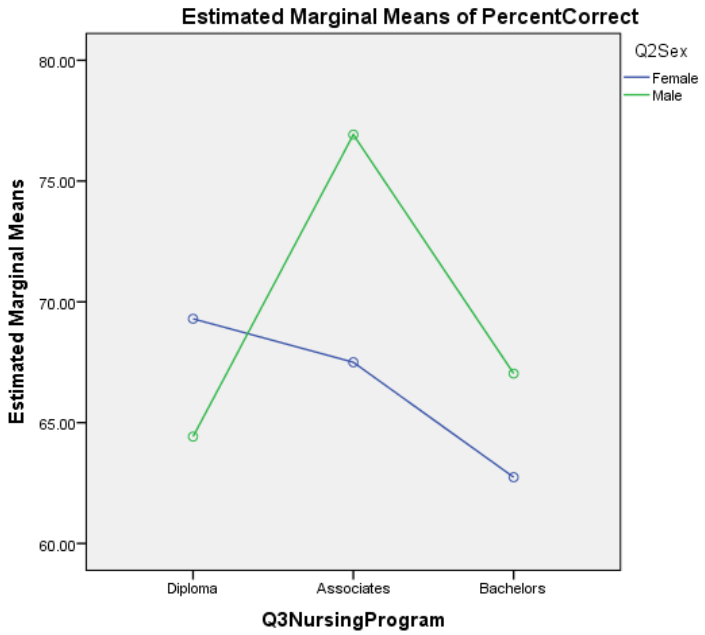

Figure 6. Mean on NKASRP based on Program and Gender

6. *Are there differences in the knowledge and attitudes of senior nursing students based on race or ethnicity in the three nursing programs?*

The number of minority students in this study population is extremely small. It is of note that there were no minorities identified in the diploma program, three in the associate program and only four in the bachelor program. For these reasons, the ethnicity groups were reclassified as Caucasian and Other. A two-way ANOVA was performed. Levene's Test of Equality of Error Variances was calculated and significance was determined to be *0.408*. The F test failed to demonstrate any significance among educational program, ethnicity and interaction of educational program and ethnicity. Table 12 shows the mean scores of the NKASRP between Caucasians and Others in the associate and the bachelor nursing programs.

Table 11

ANOVA Tests of Between- Subjects Effects of Nursing Program and Ethnicity

Dependent Variable: Percent Correct on NKASRP

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Nursing Program	125.246	1	125.246	2.217	.139
Ethnicity recoded	.240	1	.240	.004	.948
Nursing Program + Ethnicity recoded	6.321	1	6.321	.112	.739
Error	6384.823	113	56.503		
Total	7181.510	116			

Note. An asterisk denotes statistical significance * $p < 0.05$

Table 12

Mean Scores on the NKASRP based on Ethnicity

Program Type	Mean Score	Standard Error
Associate		
Caucasian	68.319	1.121
Other	67.521	4.340
Bachelor		
Caucasian	62.919	3.758
Other	64.103	.932

7. *To what effect does prior pain experience (self or as caregiver) have on nursing students' pain knowledge and attitudes in the three nursing programs?*

ANOVA was employed to analyze this research question using a two-way factorial analysis (between-subjects). The NKASRP percentage correct score was used as the dependent variable, while prior pain experience (yes/no) and type of nursing program were the two factors. Levene's test was used to evaluate homogeneity of variance ($p = 0.962$). Based on the statistical evidence there is no effect on prior pain experience and achievement on the NKASRP.

Table 13

ANOVA Tests of Between-Subjects Effects of Type of Program and Caring for Pain Patients. Dependent Variable: Percent Correct on NKASRP

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Type of Nursing Program	978.486	2	489.243	8.369	<.001*
Students who cared for Patients with Pain within their program	131.837	1	131.837	2.255	.135
Type of Nursing Program + Students who cared for Patients with Pain	70.709	2	35.354	.605	.547
Error	9178.002	157	58.459		
Total	10508.343	162			

Note. An asterisk denotes statistical significance * $p < 0.05$

Summary

The purpose of this study was to compare the knowledge and attitudes of pain management practices among nursing students with differing levels of nursing education. Demographic indicators and statistical analysis provided answers to the research questions that demonstrated significant results not published in current literature. In Chapter 5, the results of this study will be examined for each of the research questions formulated, and strengths and limitations of this study will be presented. Finally, implications for the practice of nursing and recommendations for future research will be offered.

Chapter 5

Conclusions

Discussion

The purpose of this study was to evaluate the current state of student nurses' knowledge and attitudes regarding pain management in all levels of prelicensure registered nursing programs. This descriptive, correlational inquiry utilized a convenience sample of students in class the day the NKASRP instrument and the Demographic Data Sheet were distributed. Six nursing programs were invited to participate. Responses were received from two diploma programs, one associate degree program, and two bachelor of nursing degree programs. A total sample of one hundred sixty- six students participated in the educational exercise. This chapter presents a discussion regarding the nursing implications of the results, strengths and limitations of the study, recommendations for future research and conclusions.

There is currently no research available regarding nursing students' level of nursing education and aptitude regarding pain management knowledge. There have been studies investigating students' knowledge of pain management, but not in connection with academic levels of preparation (Chiu, Trinca, Lim and Tuazon, 2003; Chuk, 2002; Clarke et al., 1996; Graffam, 1990; Hamilton & Edgar, 1992). Chiang, Chen and Huang (2006) explored Taiwanese nursing students' pain knowledge in the pediatric population. Briggs (2010) investigated student nurses' pain assessment skill in the United States utilizing vignettes and Shaw and Lee (2010) determined that student nurses held misconceptions regarding patients with chronic pain. No researchers, however, looked at the three different levels of nursing education as a way of investigating the preparation of nursing students regarding pain management fundamentals.

The research questions developed for this examination of student nurses' pain knowledge and attitudes will be presented with a discussion related to their results and the state of science as it relates to nursing education. Current literature will also be outlined detailing congruence with the findings of this examination and similar studies.

1. *What are the pain management knowledge and attitudes of senior nursing students in a diploma-nursing program, an associate degree-nursing program, and a baccalaureate degree-nursing program?*

The findings of this study demonstrated that senior students in the three programs lacked knowledge in pain management and attitudes regarding patients' pain. Associate degree nursing students scored higher (68.27%) on the NKASRP than their diploma (67.67%) or bachelor (62.61%) student counterparts, but all scored significantly lower than the recommended pass rate of 80% set forth by the developers of the NKASRP tool.

No study to date has been published looking at the three, nursing educational levels available in the United States. However, this finding of low scores regarding pain knowledge concurs with other research examining student nurses scores on the NKASRP in baccalaureate degree programs (Al-Khawaldeh, Al-Hussami & Darawad 2013; Duke, Haas, Yarbrough & Northam, 2010).

2. *What are senior nursing students' experiences and satisfaction regarding pain education in their nursing program?*

Students in all three types of nursing programs stated, overwhelmingly, that their

educational program had adequately prepared them to assess (95.7%), and manage (95.2%) patients with pain. The majority of all students felt that sufficient time was given to pain theory in their individual nursing programs (86.1%). Likewise, the aggregate affirmed that their programs allowed sufficient time for pain management techniques, including pharmacology and complementary and alternative methods (89.1%). In the literature reviewed, the investigators did not mention the students' satisfaction level with their programs pain management curricula. The high level of satisfaction students had with their programs seems incongruent with the low scores the students received on the NKASRP. This finding warrants further research in future studies.

3. *What are the differences in pain management knowledge and attitudes of senior nursing students in the three primary nursing programs?*

The differences in pain management knowledge and attitudes of senior nursing students in all three programs studied differed significantly. The bachelor degree students scored notably lower (62.61%) on the NKASRP than their student peers in the diploma (67.67%) or associate degree programs (68.27%). Senior nursing students in the bachelor degree nursing programs numbered seventy-two students. The bachelor degree student sample was comprised of students from two nursing programs. One program was a public university and the other a Catholic university, both located in Northeastern Pennsylvania. The administration of the NKASRP took place in the fall semester of their senior year, within the same week. Therefore, the students were, academically speaking, at comparable educational levels.

Duke et al. (2010) studied baccalaureate degree nursing students and faculty's pain knowledge using the NKASRP tool. These researchers also concluded that nursing students are lacking basic pain management education. The first semester senior students in the Duke et al.

research scored 68% (SD 6.8) on the NKASRP, higher than the bachelor degree students in this study. Yet, both the senior students in this study and in the study conducted by Duke et. al, scored lower than the anticipated pass rate, as suggested by the instrument's developers, of 80%. It is not known to this researcher which semesters the bachelor degree students were taught pain management theory and management , or whether or not it was taught as a separate course or integrated into other nursing courses. The bachelor degree nursing program typically consists of 8 semesters over four calendar years. A proposed reason why the bachelor degree students scored the lowest in this study may be they were presented this material early on in their academics and had not studied that material in some time. The pain management content may have been more recently presented to the diploma and associate degree nursing students as their programs are usually two years in length.

4. *Are there differences in the knowledge and attitudes of senior nursing students based on age (18-27 years, 28 years and older) in the three nursing programs?*

There were insufficient numbers of older students in all of the programs to reach significance and for this reason a choice was made to revise the age groups. For statistical purposes the age groups were recategorized into 18-27 years old ($n=113$) and 28 and older ($n=51$). The age factor approached statistical significance at $p= 0.05$. The younger group of students aged 18-27 years scored notably higher than the older (28 and older) students, 67.398% and 63.783% respectively. The group of students who attained the highest score on the instrument, with respect to age was the 18-27 year old diploma students, scoring 70.56%. Nonetheless, type of nursing program did reach significance at $p=0.005$, with the associate degree students scoring 68.26%, diploma students 68.17% and bachelor degree students 60.34%

(the means were calculated after eliminating the two outlying scores, one from the diploma program and one from the bachelor program). The interaction of age and type of nursing educational program failed to reach statistical significance ($p = 0.222$). Therefore, it may be stated, with regards to this study's findings, that age did not impact pain management knowledge to the degree that type of educational program did.

This finding varies from research conducted by Kopchak Sheehen, Webb, Bower and Einsporn (1992). These authors demonstrated that nursing students do lack knowledge regarding pain management, however when bachelor nursing students were queried about cancer pain the researchers found a significant interaction between age and cancer pain knowledge ($p=0.001$). However, Al-Khawaldeh, et al. (2013) found in their research conducted in Jordan no statistical difference on NKASRP scores and age. Duke et al. (2010) similarly found no relationship between age and percent correct on the NKASRP.

5. *Are there differences in the knowledge and attitudes of senior nursing students based on gender in the three nursing programs?*

The statistical data reflects a difference in the pain knowledge and attitudes of nursing students based on gender in the three nursing programs ($p = 0.009$). Male students in the associate degree and bachelor degree programs scored a higher mean on the NKASRP than their female classmates. Conversely, diploma males recorded a lower mean than the females. This finding differs from a study conducted in Africa. Machira, Kariuki and Martindale (2013) studied Kenyan nurses and their pain knowledge and attitudes before and after an educational pain program. The researchers utilized the NKASRP and determined in their study that gender had no effect on the scores the nurses received. Likewise, Al- Khawaldeh, Al-Hussami and

Darawad (2010) found no significant difference in scores on the NKASRP based on gender. Duke et al. (2010) likewise found no correlation between gender and scores on the NKASRP during research conducted on bachelor degree nursing students and faculty pain knowledge.

6. *Are there differences in the knowledge and attitudes of senior nursing students based on race or ethnicity in the three nursing programs?*

The students were asked to self-identify as one of seven ethnic groups for analysis: American Indian or Alaskan Native, Asian, Black or African American, Caucasian, Hispanic or Latino, Native Hawaiian or Other Pacific Islander or Other. Unfortunately, the number of minority students in this study population was exceptionally small. There were no minorities identified in the diploma program, three in the associate degree program and merely four in the bachelor degree program. For this reason, the diploma nursing program was removed from statistical analysis. There were two Asian students, one Black or African American and one student who reported as Other in the bachelor's degree nursing program. Two students left this question blank. In the associate nursing degree program there was one Black or African American and two Hispanic or Latino students. Because of the low numbers of minorities in this sample, the groups were reclassified as Caucasian and Other. The statistical analysis failed to demonstrate any effect on the NKASRP based on ethnicity in either the associate degree or bachelor's sample.

These findings are similar to those reported by Duke et al. (2010). That study saw no difference in scores on the NKASRP based on ethnicity.

7. *To what effect does prior pain experience (self or as caregiver) have on nursing students' pain knowledge and attitudes in the three nursing programs?*

In the diploma sample, seventeen students admitted to having experience with pain themselves or caring for someone with pain, twenty-seven students did not. While twenty-seven nursing students in the associate degree program stated they had pain at one time or were a caregiver to someone with pain, twenty-one of their classmates indicated they did not have that experience. Thirty-nine bachelor degree students had experience with pain personally or as someone rendering care and thirty-two fellow students replied, they had not. The statistical evidence does not support a relationship between having pain or caring for someone with pain and success on the NKASRP. Again, the type of program was significant regarding students' pain knowledge and attitudes but prior pain experience was not significant on the NKASRP scores.

Machira, Kariuki and Martindale (2013) study results confirm the finding that previous pain experience has no effect on scores on the NKASRP. The researchers tested nurses who had previous experience caring for family members with pain and found no significance between that and performance on the pain knowledge and attitude instrument. Duke et al. (2010) found, equally, that previous pain experiences had no statistical effect on scores achieved on the NKASRP.

Theoretical Framework

The theoretical framework that was used to develop the research questions for this inquiry was Knowles' Theory of Learning. A basic tenet of this theory is that students are able to identify knowledge deficits and then develop approaches to correct those shortcomings. Self-directed learning is an integral concept of the Theory of Learning. The majority of nursing students in all programs stated that they felt their nursing program prepared them to sufficiently

identify and treat patients' pain. However, the majority of students also produced low pain management knowledge and attitude scores. This leads to the presumption that the students in this study were not able to identify their pain knowledge deficits.

Additionally, Knowles promoted the concept of andragogy, the "body and theory of practice on which self-directed learning is based. The art and science of helping adults (or, even better, maturing human beings) learn" (Knowles, 1975, p.19). This method relies more on the students developing ideas as to what should be taught based on their "need to know", as opposed to the teacher telling the students what they must learn. An example of this "need to know" may be the students who seek out answers regarding a patient's unrelenting pain. Employing Knowles' Theory of Learning's (KTL) self-directed learning and orientation to learning (problem centered) principles may be one way of empowering students to seek knowledge, question nurses deemed experts in pain and seek unconventional therapies to relieve a patient's pain. The KTL principle of the learner's experience was the basis for the research question regarding caring for someone with pain previously. Although experiencing pain personally or caring for someone with pain did not have a significant interaction with scores on the NKASRP in this study, it may assist the student nurse in dealing with patients in pain in the clinical setting.

Nursing faculty employed Knowles' Theory of Learning in a graduate nursing science and theory course to demonstrate to the students how to critically assess nursing theory. The graduate students learned how nursing theory influences their practice and powers research by applying the principles developed by Knowles (McMillan et al. 2007).

Knowles' Theory of Learning was used by nursing faculty who researched the use of a CD-ROM to educate students about the regulations of the Health Insurance Portability and

Accountability Act (HIPAA). Feeg, Bashatah and Langley (2005) found Knowles' philosophy of self-directed learning, in particular, beneficial when instructing students to utilize a CD-ROM tutorial.

It has been demonstrated in the current literature that nursing faculty are lacking when questioned regarding their pain knowledge (Duke et al., 2010; Ferrell et al., 1993; Goodrich, 2006; Lasch et al., 2002; Voshall et al., 2012). This fact illuminates the position that there needs to be a change in the current way we are educating our nursing students to care for patients with pain. It is vital that faculty and students are able to identify deficiencies in nursing pain knowledge and then work together to minimize that gap. Knowles' Theory of Learning was found to be an acceptable ideology to promote self-directed learning in the pain management education of student nurses. Knowles' Theory of Learning has a place in nursing education research, specifically in the realm of student nurse, pain management education.

Strengths

This study was the first to examine the relationship between nursing educational level and pain management knowledge and attitudes. Exploring the performance of diploma educated, associate degree educated, and baccalaureate educated nursing students on the NKASRP will promote further analysis of the three-tiered prelicensure curricula in the United States.

An a priori analysis enlisting a Cohen's effect size of .25, a power of .80 and a significance level of .05 determined the sample size total to be 159, the subjects for this study numbered 166. Therefore, an adequate sample number was achieved. The instrument employed in this research, the NKASRP, has been found to be valid and reliable in multiple research studies (Al-Shaer, Hill & Anderson. 2011; Brown, Bowman & Eason, 1999; Brunier, Carson & Harrison, 1995; Clarke,

French, Bilodeau, Capasso, Edwards & Empoliti, 1996; Goodrich, 2006; Lewthwaite, 2011; McCaffery & Robinson 2002; McCaffery, Ferrell & Pasero, 2000; McMillan, Tittle, Hagan, Laughlin & Tabler, 2000; Machira, Kariuki & Martindale , 2013; Simpson, Kautzman & Dodd, 2002). This investigation adds to the current body of knowledge regarding nursing students' pain acumen nationally and throughout the world.

Limitations

An important limitation of this study was that the second associate degree program director agreed to participate in the study but did not commit to a date for the distribution of the NKASRP instrument and Demographic Data sheet. After repeated telephone calls and emails, the program director failed to return messages. The first associate degree program did have more students that qualified to be tested. The entire sample of associate degree students did belong to one school; however, the students were from different classes with different instructors.

Another limiting factor may be the homogenous sample in the study. Few males were enrolled in the three programs and even fewer minorities. For that reason, generalizability of these findings is strongly discouraged.

Implications for the Practice of Nursing

This research adds to the existing body of knowledge regarding student nurses' knowledge and attitudes regarding pain. After an exhaustive literature search, it was determined that no study involving diploma, associate degree and bachelor degree education and pain management comprehension exists. This study may stimulate further research regarding the different types of nursing education and students' pain knowledge. This investigation may also prompt research exploring how students view pain and their knowledge of pain management theory and pain

management techniques according to their age, gender, previous experience with pain or ethnicity.

It is imperative that nursing educators assess the current state of pain management education in their programs and find ways to improve students' knowledge base. A dialogue should take place in all nursing programs to determine to what degree effective pain management theory and techniques are being taught. Nurse educators should assess nursing curricula and determine if adjustments should be implemented (i.e. timing and content). Nursing faculty should be able to use the results of instruments such as the NKASRP to develop nursing courses addressing areas of low scores. If modifications are made to the curricula, reassessments should occur to determine if the changes have been effective.

Nursing faculty should be identified to teach pain theory and management who have specialized or who are willing to specialize in this area. These nursing education professionals should be encouraged to attend continuing education instruction specializing in pain. Nurse educators interested in serving in the role of pain management specialists within a nursing educational program should attain pain management nursing certification. Pain management expertise should be looked upon as a faculty specialization, just as pediatrics, critical care, and psychiatry.

Another objective of this study was to encourage nursing educators to include multiple teaching strategies to communicate effective pain identifying techniques and pain management approaches to students. This includes addressing the issues of age, gender, religion, and ethnicity in pain theory and pain management lessons. Nursing students may also benefit from collaborating with other medical and allied health professions in interdisciplinary seminars

including physical and occupational therapy, pharmacy, nutritional/dietary, and speech and hearing, concerning patients with pain.

Simulation labs would be an appropriate venue for developing clinical scenarios involving patients with pain. This hands-on, high fidelity simulation education will allow students to see firsthand what physiological changes occur in patients experiencing pain and make choices to relieve their pain in a nonthreatening, teaching environment.

A national consensus should be developed to outline the pain theory and pain management principles to be taught in all nursing programs, i.e., a core curriculum for pain management education. Nurse educators and experts in the field of pain management should be charged with developing educational objectives and formulate clear plans of care detailing what nursing students must be taught regarding pain management to be an effective healthcare professional to patients with pain.

Additionally, student nurses should be encouraged upon graduation to stay current on pain treatment modalities and pharmaceuticals, through continuing education, scholarly journals, and membership in professional organizations dedicated to pain management nursing. Nursing students should be taught the benefits of receiving professional certifications, including pain management. Nursing as a profession must strive to incorporate new pain relieving medications and techniques into their professional practice. It is the assertion of this researcher that if nursing would implement one of the above strategies, it would have a substantial effect on improving the pain knowledge deficiencies noted in current nursing education literature, including this study.

Increasing student nurses' pain knowledge will, in turn, increase patients' satisfaction with their care, improve health outcomes, and return patients to activities of daily life earlier. It will

further decrease length of hospitalizations and decrease healthcare expenditures. However, and most importantly, it may eliminate treatable pain and lessen intractable pain and human suffering.

Recommendations for Future Research

Studies replicating this investigation are strongly encouraged. Research needs to be conducted in other regions of the country on the three levels of nursing education to determine if the results found in this study are limited or more representative of a national problem.

Research studies utilizing pain knowledge instruments, other than the NKASRP, are encouraged to see if results are found to be similar to this study. It would be interesting to see if a study employing a more diverse sample of nursing students, more reflective of urban colleges and universities would produce comparable findings.

It is further recommended that potential, prospective studies focus on males and type of educational degree and pain management knowledge. In this study, bachelor degree students scored lower that associate degree and diploma students. Male students in the associate degree and bachelor degree programs scored a higher mean on the NKASRP than their female classmates. Males in those programs scored higher on the NKASRP for reasons unknown to this researcher. Conjecture is that in their previous occupations these male students dealt with patients in pain (Certified Nursing Assistant, paramedic and Emergency Medical Technician).

Summary

Pain is an all too human condition with which most people, at one time or another must deal. Nurses are often the ones a patient looks to help alleviate their pain. It is evident from the research that student nurses, practicing nurses and even nurse educators are lacking in their understanding of pain and pain treatment modalities. The relatively low score achieved on the NKASRP by students in all of the educational programs is evidence that senior student nurses are not being effectively educated regarding pain management.

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Appendix A

FW: HS 13-057 Approval

1 message

JoAnn Platko <jplatko@msn.com> Sun, Nov 17, 2013 at 2:35 PM
To: "george.platko@fairchildsemi.com" <george.platko@fairchildsemi.com>

From: kdodbi01@villanova.edu
To: jplatk01@villanova.edu; lesley.perry@villanova.edu
CC: mary.ann.cantrell@villanova.edu
Subject: HS 13-057 Approval
Date: Fri, 1 Mar 2013 17:28:43 +0000

Your application for a project involving human subjects research, HS 13-057 "Nursing Students' Beliefs and Attitudes Regarding Pain Management Knowledge Across Educational Levels" was approved as expedited by Dr. Mary Ann Cantrell, departmental reviewer for nursing, on 2/28/2013.

Please note that your approval period is for one year and will be up for renewal on 2/28/2014. If you plan on renewing your project's IRB approval please submit renewal paperwork, found on the ORSP website, two weeks before this date for processing.

Thank you and good luck with your research.

Kristi Dodbiba
Graduate Assistant
Office of Research and Sponsored Projects
Villanova University

Appendix B

October 2012

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

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

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

Enclosed for your use is a copy of our instrument and an answer key. You may use and duplicate the tool for any purpose you desire in whole or in part. References to some of our studies which have included this tool or similar versions are included below. We have received hundreds of requests for the tool and additional use of the tool can be found in other published literature. We also acknowledge the assistance of several of our pain colleagues including Pam Kedziera, Judy Paice, Deb Gordon, June Dahl, Hob Osterlund, Chris Pasero, Pat Coyne and Nessa Coyle in the revisions over the years. If using or publishing the tool results please cite the reference as **"Knowledge and Attitudes Survey Regarding Pain" developed by Betty Ferrell, RN, PhD, FAAN and Margo McCaffery, RN, MS, FAAN, (http://prc.coh.org), revised 2012.**

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

Sincerely,

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

Margo McCaffery, RN, MS, FAAN
Lecturer and Consultant

Appendix C

References:

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Appendix D

Knowledge and Attitudes Survey Regarding Pain

True/False – Circle the correct answer.

T	**F**	1. Vital signs are always reliable indicators of the intensity of a patient's pain.
T	**F**	2. Because their nervous system is underdeveloped, children under two years of age have decreased pain sensitivity and limited memory of painful experiences.
T	**F**	3. Patients who can be distracted from pain usually do not have severe pain.
T	**F**	4. Patients may sleep in spite of severe pain.
T	**F**	5. Aspirin and other nonsteroidal anti-inflammatory agents are NOT effective analgesics for painful bone metastases.
T	**F**	6. Respiratory depression rarely occurs in patients who have been receiving stable doses of opioids over a period of months.
T	**F**	7. Combining analgesics that work by different mechanisms (e.g., combining an NSAID with an opioid) may result in better pain control with fewer side effects than using a single analgesic agent.
T	**F**	8. The usual duration of analgesia of 1-2 mg morphine IV is 4-5 hours.
T	**F**	9. Research shows that promethazine (Phenergan) and hydroxyzine (Vistaril) are reliable potentiators of opioid analgesics.
T	**F**	10. Opioids should not be used in patients with a history of substance abuse.
T	**F**	11. Elderly patients cannot tolerate opioids for pain relief.
T	**F**	12. Patients should be encouraged to endure as much pain as possible before using an opioid.
T	**F**	13. Children less than 11 years old cannot reliably report pain so clinicians should rely solely on the parent's assessment of the child's pain intensity.
T	**F**	14. Patients' spiritual beliefs may lead them to think pain and suffering are necessary.
T	**F**	15. After an initial dose of opioid analgesic is given, subsequent doses should be adjusted in accordance with the individual patient's response.
T	**F**	16. Giving patients sterile water by injection (placebo) is a useful test to determine if the pain is real.
T	**F**	17. Vicodin (hydrocodone 5 mg + acetaminophen 500 mg) PO is approximately equal to 5-10 mg of morphine PO.
T	**F**	18. If the source of the patient's pain is unknown, opioids should not be used during the pain evaluation period, as this could mask the ability to correctly diagnose the cause of pain.
T	**F**	19. Anticonvulsant drugs such as gabapentin (Neurontin) produce optimal pain relief after a single dose.
T	**F**	20. Benzodiazepines are not effective pain relievers unless the pain is due to muscle spasm.
T	**F**	21. Narcotic/opioid addiction is defined as a chronic neurobiologic disease, characterized by behaviors that include one or more of the following: impaired control over drug use, compulsive use, continued use despite harm, and craving.

Multiple Choice – Place a check by the correct answer.

22. The recommended route of administration of opioid analgesics for patients with persistent cancer-related pain is
_____ a. intravenous
_____ b. intramuscular
_____ c. subcutaneous
_____ d. oral
_____ e. rectal

23. The recommended route administration of opioid analgesics for patients with brief, severe pain of sudden onset such as trauma or postoperative pain is
_____ a. intravenous
_____ b. intramuscular
_____ c. subcutaneous
_____ d. oral
_____ e. rectal

24. Which of the following analgesic medications is considered the drug of choice for the treatment of prolonged moderate to severe pain for cancer patients?
_____ a. codeine
_____ b. morphine
_____ c. meperidine
_____ d. tramadol

25. Which of the following IV doses of morphine administered over a 4 hour period would be equivalent to 30 mg of oral morphine given q 4 hours?
_____ a. Morphine 5 mg IV
_____ b. Morphine 10 mg IV
_____ c. Morphine 30 mg IV
_____ d. Morphine 60 mg IV

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

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

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

29. Which of the following is useful for treatment of cancer pain?
_____ a. Ibuprofen (Motrin)
_____ b. Hydromorphone (Dilaudid)
_____ c. Gabapentin (Neurontin)
_____ d. All of the above

30. The most accurate judge of the intensity of the patient's pain is
_____ a. the treating physician
_____ b. the patient's primary nurse
_____ c. the patient
_____ d. the pharmacist
_____ e. the patient's spouse or family

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

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

< 1% 5 – 15% 25 - 50% 75 - 100%

33. The time to peak effect for morphine given IV is
_____a. 15 min.
_____b. 45 min.
_____c. 1 hour
_____d. 2 hours

34. The time to peak effect for morphine given orally is
_____a. 5 min.
_____b. 30 min.
_____c. 1 – 2 hours
_____d. 3 hours

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

Case Studies

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

Directions: Please select one answer for each question.

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

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

0 1 2 3 4 5 6 7 8 9 10

No pain/discomfort Worst Pain/discomfort

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

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

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

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

0 1 2 3 4 5 6 7 8 9 10

No pain/discomfort Worst Pain/discomfort

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

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

Appendix E

Jo Ann Platko
49 Patrick Henry Drive
Hanover Township, PA 18706
August 11, 2012

Dr.
Nursing Program Director
[**Company Name**]
[**Street Address**]
[**City, ST ZIP Code**]

Dear Dr. :
My name is Jo Ann Platko. I am a doctoral nursing student at Villanova University. The focus of my research is student nurses knowledge and attitudes regarding pain management.

I am requesting permission to administer a questionnaire along with a demographic form to your senior nursing students. The surveys will take approximately 30 minutes to complete. The results will be analyzed along with the results of two other nursing programs. The programs will remain anonymous and no identifiable characteristics regarding the institution or students will be published.

If you have any questions or concerns regarding this research, please feel free to contact me at 570-829-4059 or joann.platko@villanova.edu , Dr. Lesley Perry, chairperson of my dissertation committee or Dr. Joyce Willens, committee member. Dr. Perry can be reached at lesley.perry@villanova.edu or at 610-519-4933, Dr. Willens is available at joyce.willens@villanova.edu or 610-519-6832.

Lastly, I would ask if you would share with me the number of semester hours dedicated to teaching pain management theory and management in your program. Attached you will find a form to complete providing this information, along with a stamped envelope addressed to me. I appreciate your commitment to nursing education and thank you for time and consideration in this matter. I look forward to hearing from you in the near future.

Sincerely,

Jo Ann Platko CRNA, BC, MSN

Appendix F

Office of Doctoral Student Research

INFORMED CONSENT

My name is Jo Ann Platko. I am a doctoral student at Villanova University. I am interested in the field of pain management. The focus of my study deals with nursing education and pain management knowledge and attitudes of students. The goal of this research is to obtain information that will assist nurse educators in identifying trends in pain education in different types of nursing educational programs.

The purpose of this form is to provide a clear explanation of the nature of this study. The necessary procedures are described below. Once you are completely satisfied with this explanation and freely choose to participate in the study, you may indicate your willingness to participate by completing the questionnaire and basic demographic sheets provided. By returning the completed questionnaire and demographic forms, it is presumed you are granting consent to participate in the study. You are free to end your participation in the study at any time.

I will answer any questions you may have before distributing the surveys. I ask that you complete the questionnaire provided and share some basic information regarding age, gender, previous education, and prior pain management experience. It will take about 30 minutes to complete the surveys.

Your participation in this research project is voluntary. Your specific responses will remain confidential and anonymous. There are no known benefits or risks to you as a participant in this study. However, results of this study may lead to find ways to better prepare nursing students to gain knowledge in the field of pain management.

I will distribute the questionnaires to everyone in class. Whether or not you choose to participate, I ask you to return the questionnaires to me (completed or blank). If you choose to participate, please complete all answers, leaving no blanks. Please use the knowledge you have gained during your nursing didactic and clinical instruction as well as any prior knowledge you may have. If you do not wish to participate, please return the handouts without completing them and they will be discarded.

If you have any questions or concerns regarding this research, please feel free to contact me at 570-829-4059 or joann.platko@villanova.edu If, after reading this form, you have any questions or concerns, please discuss these with Dr. Lesley Perry, chairperson of my dissertation committee. Dr. Perry can be reached at lesley.perry@villanova.edu or by telephone at 610-519-4933. Dr. Joyce Willens is my dissertation committee member and can be reached joyce.willens@villanova.edu or by telephone at 610-519-6832 any time prior to, during, or after your participation is completed. Thank you for your time. Best of luck as you progress in your nursing careers.

Jo Ann Platko, CRNA, BC, MSN

Appendix G

DEMOGRAPHIC SHEET

1. Age: **(1)____18-27 years (2)____ 28-37 years (3)____ 38-47 years (4)____ 48 years & older**

2. Gender: **(1)____Female (2)____Male**

3. What type of nursing program are you currently enrolled?

   (1) ____ Diploma (2) ____ Associates (3) ____ Bachelors

4. Have you completed a previous academic degree? **(1) ____ YES (2)____ NO**

   If so please list:

   _____

5. Have you completed previous education/certification in another field of healthcare? (Example: Emergency Medical Technician (EMT), paramedic, etc.)

   (1) ____ YES (2) ____ NO

   If so, please list:

   _____

6. Have you ever cared for a person with pain (chronic or acute) outside your nursing educational program? **(1) ____ YES (2)____ NO**

   If so, please describe in what capacity?

   _____

   _____

7. Have you cared for patients experiencing pain during your nursing clinical rotations?

(1) ____ YES (2) ____ NO

8. I feel adequately prepared to assess patients' pain levels.

(1) ____ Strongly Disagree (2) ____ Disagree (3) ____ Agree (4) ____Strongly Agree

9. I feel adequately prepared to offer suggestions to manage or treat patients' pain.

(1) ____ Strongly Disagree (2) ____ Disagree (3) ____ Agree (4) ____Strongly Agree

10. I feel an adequate amount of time was given to pain theory in my nursing educational program.

(1) ____ Strongly Disagree (2) ____ Disagree (3) ____ Agree (4) ____Strongly Agree

11. I feel an adequate amount of time was given to pain management techniques including pharmacology, alternative and complementary medicines, etc. during my nursing educational program.

(1) ____ Strongly Disagree (2) ____ Disagree (3) ____ Agree (4) ____Strongly Agree

12. What is your ethnicity?

American Indian or Alaska Native **(1) ____**

Asian **(2) ____**

Black or African American **(3)____**

Caucasian **(4) ____**

Hispanic or Latino **(5) ____**

Native Hawaiian or Other Pacific Islander **(6) ____**

Other (Please List) **(7)____**

THANK YOU AGAIN FOR YOUR PARTICIPATION. ALL INDIVIDUAL RESPONSES WILL REMAIN CONFIDENTIAL.