VARIATIONS IN PAIN MEDICATION ADMINISTRATION DUE TO PAIN MEASUREMENT IN INTENSIVE CARE UNIT PATIENTS UNABLE TO COMMUNICATE VERBATIM: AN EDUCATIONAL MODULE FOR NURSES

by

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STATEMENT BY AUTHOR

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Abstract

This paper explores the current literature available on pain measurement tools for non-verbal patients and factors that affect the amount and timing of pain management for these patients. The literature review assisted with the development of a teaching module for intensive care unit nurses in order to improve pain management in non-verbal patients with the use of two specific pain measurement tools. Pain is recognized as a sensory and emotional experience. The appropriate management of pain ultimately affects patient outcomes and thus, is important to the general population and to the nursing profession because it ultimately affects patient outcomes.

The literature review revealed two pain scales that are most effective for non-verbal patients. These two pain scales are the FACES pain scale and the Non-verbal Adult Pain Scale (NVPS). Both of these scales have been evaluated for reliability and validity and have positive results in non-verbal patients.

An educational module was developed in order to effectively evaluate nurses’ knowledge regarding pain and pain management. This module first focused on assessing nursing knowledge and then provides teaching on pain and use of the two pain scales. Finally, the module assesses learning through a post-test and long-term evaluation of pain management after the teaching module and use of the pain measurement tools was instituted.
Chapter 1

Introduction

This chapter will introduce the problem of variations in pain medication administration to non-verbal intensive care unit (ICU) patients due to pain measurement. Specifically in regards to this identified problem this chapter will discuss the purpose of the clinical project, the background information of the problem, the specific aims of the clinical project, the significance of the problem and project and specifically the significance to the profession of nursing.

Statement of the Problem

The problem identified for this clinical project is the variation in pain medication administration to non-verbal ICU patients due to the variety of pain measurement tools available for use by ICU nurses and factors that affect the timing and amount of pain medication administered by ICU nurses. There are a variety of pain measurement tools available for use by ICU nurses but none have been specifically identified or advocated for use in non-verbal ICU patients. There are also factors that exist that affect the timing and amount of pain medication administered by ICU nurses. These factors identified in the literature ultimately affect the pain management of non-verbal ICU patients.

Statement of the Purpose

The purpose of this project is to review and critique research-based knowledge of pain measurement leading to variations in pain medication administration in ICU patients who are unable to verbally communicate. This will be the basis for the development of an educational module for nurses.
Background

There is significant evidence available that indicates the problem of pain in all patient populations. In interviews conducted within five days after discharge from an intensive care unit (ICU) 63% of surgical patients rated their ICU pain as being moderate to severe in intensity (Puntillo, 1990). The Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatment (SUPPORT) study included 9,105 patients. This study focused on treatment preferences and patterns of decision making among critically ill patients. Interviews regarding pain were obtained from 5,176 patients and pain was reported to occur in almost 50% of seriously ill patients and was described as severe in 15% of patients (Desbians & Broste, 1996). This information indicates that pain is a serious issue that is not effectively managed or treated in sedated or mechanically ventilated patients in intensive care units.

Specific Aims

The specific aims of the clinical project are:

1) To review and critique existing pain management protocols for non-verbal patients in the ICU.

2) To assess factors identified in the literature that affect the timing and amount of pain medication administered by ICU nurses to non-verbal patients.

3) To develop an educational module for ICU nurses that teaches how to administer and interpret pain measures in non-verbal patients as a way to more effectively manage these patients’ pain.
General Significance

The significance of this problem is very important because pain management is a large area of concern among the general population during times of illness. Pain has become a major area of concern for patients admitted to the hospital. In the present time, patients and their families expect adequate pain management and control. These patients and their families expect to have their pain assessed adequately in all types of situations, to have nurses that are knowledgeable in pain assessment and management, and nurses that are sensitive to issues such as pain control. Pain has also been identified as a major area of concern because of the large number of patients that indicate that their pain was not well controlled while being admitted to a hospital.

Significance to Nursing

This problem is very specific to the nursing profession because nurses who care for ICU patients who are unable to verbally communicate need effective tools specific to this population of patients that adequately assess their pain and help the nurses to manage it effectively. Nurses need to know what type of instruments are available for use in pain assessment for this population of patients because at this point in time there is not a standard for ICU nurses to follow. ICU nurses also need to be aware of the factors identified in the literature that affect the timing and amount of pain medication administered to non-verbal ICU patients because this will help them to explore their own beliefs and practices in relation to pain management. In order to effectively manage patients’ pain, nurses need the best tools available. They also need additional education in order to learn about these tools and how to use them effectively.
Definitions

Pain: A personally defined unpleasant sensory and emotional experience often associated with tissue damage consisting of a physiological response to a noxious stimulus followed by an affective response to that event. The International Association for the Study of Pain defines pain as, “An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage,” (Merskey & Bogduk, 2004).

Intubated: The placement of a tube into the trachea in order to maintain an open airway in patients who are unconscious or unable to breathe on their own. Intubation limits the patient’s ability to verbally communicate.

Mechanical ventilation: The use of a mechanical device to inflate and deflate the lungs via a tube placed into the trachea.

Extubated: Removal of a tube from the trachea once a person is able to maintain an open airway and breathe on his or her own.

Non-verbal patients: A patient who is not able to communicate via verbal communication but may continue to communicate via gestures, pointing or other movements.

Pain measurement: The act of measuring pain someone is experiencing in order to quantify the pain.

FACES Pain Scale: A pain measurement scale that consists of seven oval shaped faces with varying degrees of “painfulness” expressed in their facial features. The “painfulness” of the faces increases from left to right.
NVPS Scale: A pain measurement scale that utilizes both behavioral as well as physiological indicators to assess pain intensity.

Summary

This first chapter introduced the problem of variations in pain medication administration based on pain measurement in non-verbal intensive care unit (ICU) patients. This chapter discussed the purpose of the clinical project, the background information of the problem, the specific aims of the clinical project, the significance of the problem and project and specifically the significance to the profession of nursing.

The next chapter will introduce the theoretical framework identified and used in the development of an educational program for ICU nurses that teaches how to administer and interpret pain measures in non-verbal patients. This succeeding chapter will also review and critique the literature currently available on existing pain measures for administration to non-verbal patients, existing pain measures for administration to non-verbal patients in the ICU, and factors that affect the timing and amount of pain medication administered by ICU nurses to non-verbal patients.
Chapter 2

Introduction

This chapter will discuss the theoretical framework used in the development of an educational program for ICU nurses that teaches how to administer and interpret pain measures in non-verbal patients. This chapter will also review and critique the literature currently available on: 1) existing pain measures for administration to non-verbal patients, 2) existing pain measures for administration to non-verbal patients in the ICU, and 3) factors that affect the timing and amount of pain medication administered by ICU nurses to non-verbal patients.

Theoretical Framework

The theoretical framework chosen for this project is Orlando’s Nursing Process Theory. Orlando’s theory is a reflective practice theory that focuses on the nursing process. Pain management for ICU patients unable to verbally communicate must involve a constant reflective process that incorporates the nursing process. The nurse must collect data from every dimension of the patient in order to make a correct determination of the pain needs of the patient. Incorrectly determining the needs of a patient in regards to pain can allow for continued unmet pain needs and incorrect interventions being used in an attempt to help the patient. Use of Orlando’s Nursing Process Theory will help nurses to use reflective and critical thinking in order to determine the best actions to care for ICU patients who are in pain but unable to communicate verbally.
Orlando (1961) stated, “A deliberative nursing process has elements of continuous reflections as the nurse tries to understand the meaning to the patient of the behavior she observes and what he needs from her in order to be helped. Responses comprising this process are stimulated by the nurse’s unfolding awareness of the particulars of the individual situation.” The theory contains five major interrelated concepts: 1) the professional nursing function-organizing principle, 2) the patient’s presenting behavior-problematic situation, 3) immediate reaction-internal response, 4) deliberative nursing process-reflective inquiry, 5) improvement-resolution (Schmieding, 2002).

The professional nursing function-organizing principle focuses on the nurse gathering information about the patient. The patient may display a sense of helplessness, stress, or need that originates from physical limitations, adverse reactions to the setting, and experiences that prevent communication of his or her needs. The nurse responds to the issue and attempts to solve the conflict based on the information that he or she gathers about the patient. Orlando (1961) describes that the nurse must take the initiative to correctly determine the immediate needs of the patient. Meeting the needs of the patient requires a full understanding of the patient’s presenting behavior (Schmieding, 2002). A complete understanding of the patient’s behavior comes from collecting data from every dimension of a patient including physical and behavioral.

The patient’s presenting behavior-problematic situation concept focuses on understanding the complex manifestations of a problematic situation (Schmieding, 2002). A patient may display verbal and non-verbal behaviors which are taken notice by the
nurse and determined to be a change in the normal behavior of the patient. Orlando (1961) believed that the nurse cannot act on an assumption based on the first presenting behaviors of the patient. Further exploration by the nurse and further validation by the patient would provide for a correct determination of what the problem really is. Without this exploration by the nurse, incorrect actions may take place leading to ineffective nursing care and a problem in the nurse-patient relationship.

Immediate reaction-internal response is the response by the nurse to the presenting behavior of the patient. The reaction according to Orlando (1972) is comprised of three sequential parts: 1) the nurse perceives the behavior through the five senses, 2) the perception leads to an automatic thought, 3) the thought process produces an automatic feeling. The nurse’s past experiences and knowledge combine with the nurse’s understanding of the immediate situation to produce the reaction that the he or she will have (Schmieding, 2002). After this thought process takes place, action occurs. The action can by automatic or deliberative (George, 2002). Automatic actions are those that are decided upon for reasons other than the patient’s immediate need (Orlando, 1961). These actions may be because of physician orders or underlying beliefs or morals of the nurse caring for the patient. Deliberative actions on the other hand, are those that meet the patient’s needs because they result from the correct identification of a patient’s needs through a thorough validation of the patient’s behavior (Orlando, 1961). These actions are not based on primarily following a physician’s order, prior experiences of the nurse, or because of convenience, but are based on data collection from the patient.
Deliberative nursing process-reflective inquiry is based on the dynamic relationship that exists between the nurse and the patient. The relationship is dynamic because the nurse’s behavior affects the patient, and the nurse is affected by the patient’s behavior (Schmieding, 2002). Orlando’s process requires a shared communication between the nurse and the patient. In order for nursing care to be successful and in the best interests of the patient’s needs, the nurse must focus on the patient and the underlying behavior of the patient rather than making assumptions about what the patient needs. Orlando (1961) believes that the nurse must explore the patient’s immediate need with the patient in order to better understand the patient’s need. If the nurse carries out actions automatically they can be ineffective in helping the patient because the patient was not involved in the process (Orlando, 1961). Past experiences are not acceptable reasons for making decisions about a patient’s care (Schmieding, 2002). Each nurse-patient interaction is independent and unique and must involve a deliberative nursing process in order for the best outcomes for the patient to occur. Automatic responses by the nurse will provide for ineffective and unfounded nursing actions leading to ineffective outcomes for the patient and continued problems for the patient.

Improvement-resolution involves the patient’s immediate needs being met by the nurse’s actions. The improvement is observable in the patient’s verbal and non-verbal behavior. Orlando (1961) states that if the patient’s behavior has not changed or improved then the function of nursing has not been met and the nurse must continue to explore the patient’s behaviors in order to act in the best interests of the patient. The deliberative nursing process involves continuous reflection and critical thinking
throughout the process in order to determine if the needs of the patient are being met by the nurse’s actions.

Literature Review

Existing pain measures for administration to non-verbal patients

A review of the literature for existing pain measures for administration to non-verbal ICU patients led to many existing pain measurement tools that were available for use with non-verbal patients but not specifically specified for use with intensive care unit patients. These measurement tools are important because they provide ICU nurses with valuable information to more adequately assess and manage their patients’ pain. The adequacy of these existing pain measurement tools on non-verbal ICU patients has not been established.

Stuppy (1998) used a descriptive correlational comparative design to study a convenience sample of 60 hospitalized mature adults experiencing pain. The study was limited to African-American or Caucasian patients, who could speak English, were able to follow directions, had experienced acute pain since hospitalization, and were willing to sign a consent form. Patients were excluded from the study if they were experiencing severe pain. The purpose of the study was to determine if the Faces Pain Scale developed by Bieri, Reeve, Champion, Addicoat, and Ziegler (1990) was a reliable, valid, discriminating, and acceptable measure of acute pain in mature hospitalized adults greater than 55 years of age (Stuppy, 1998). The Faces Pain Scale consisted of seven cartoon-like faces on a linear plane with each face having a different expression to reflect amount of pain. The faces changed from left to right to reflect increasing pain. The researcher
intended to determine: 1) If the Faces pain Scale was reliable and valid for measuring acute pain in African-American and Caucasian mature adults, 2) If subjects used different faces of the Faces Pain Scale to rate intensity of events that theoretically should represent different pain intensities, 3) Which scale for rating pain was preferred most by the subject group, and 4) Is preference ranking of scales different as a function of ethnic background or gender? (Stuppy, 1998).

The researcher collected data 2 to 3 days after admission. The patients were given four different scales to assess pain including the Pain Intensity Number Scale, Visual Analog Scale, and Verbal Descriptor Scale. The patients were asked to rate current level of pain, the worst pain since surgery or injury, and pain experienced “when getting a shot in the arm.” The patients were then given a paper with all four scales and asked to identify the scale they most preferred to use when telling a nurse how much pain they were having. In order to test the consistency and stability of the Faces Pain Scale test-retest reliability scores were determined. Test-retest reliability of the scale was determined by calculating the correlation between the initial and second rating of pain in the “getting a shot in the arm” question. A moderately strong, statistically significant positive correlation was found, \(n=19, r=.704, p<.001\). Descriptive analysis revealed 95% of the subjects agreed with or within one face of the initial response. Validity of the Faces Pain Scale was determined by determining the correlation with other scales. The Faces Pain Scale had a strong positive correlation with each of the other scales when rating current level of pain, \(r=.81\) to \(.95; p<.001\). This data indicates that the scale is clinically valid for use with mature adults (Stuppy, 1998). The strongest correlation was
with the number scale. Analysis using a paired t-test found a significant difference between the mean ratings of current and worst pain, (M “pain now”=1.67; M “worst pain”=5.28). This finding suggests that patients differentiate varying level of pain and that the Faces Pain Scale is able to effectively reflect these differences (Stuppy, 1998).

The majority of subjects preferred the Faces Pain Scale, (n=32, 53.3%) and no significant difference existed between preferences ranking either by gender or ethnic background.

The researcher was able to determine the reliability and validity of the Faces Pain Scale but the sample size was a small, convenience sample with several restrictions for inclusion in the study, this limits how the results can be generalized to the general population. The scale was not tested on patients experiencing “large amounts of pain”, therefore the results cannot be generalized to this population of patients and the exact quantity of “large amounts of pain” was not determined. Another limitation to the study was the way that patients were asked about their pain. The patients were approached 2 to 3 days after admission and were asked questions about pain that they may have not been experiencing at that particular time. Memory of pain may be difficult to recall and this could have affected the final results. Patients may have determined from previous experiences or simply common sense that some things hurt more than others and therefore, the scale’s ability to measure varying levels of pain may not be valid. Finally, the question of “getting a shot in the arm” was asked in the beginning of the study and then asked again 3 to 4 days later. Patients easily could have remembered what they said the first time and simply picked the same face the next time. The retest sample size was also small in comparison to the original sample size (original=60, retest=19). Test-retest
reliability may be incorrect due to high amounts of drop off of subjects from the first test point to the second.

In a study by Salmore (2002), a nonexperimental design was used to observe 30 uncommunicative, sedated patients during gastrointestinal (GI) procedures. The purpose of the study was to test the validity and reliability of a behavioral numerical pain scale that measures pain in the sedated adult patient undergoing GI procedures. The new pain scale was developed to measure pain in the sedated adult patient undergoing GI procedures. The Colorado Behavioral Numerical Pain Scale (CBNPS) lists behavioral observational descriptors on a 0 to 5 scale: 0 = Restful, no facial expression, 1 = Moaning, frowning, restless, 2 = Facial grimacing, protective body positioning, 3 = Resistive, crying out, 4 = Yelling, tossing, and 5 = Combative. Content validity of the scale was established by a panel of experts that included two doctoral prepared nurses with expertise in pain assessment and treatment and experienced nurses from the GI lab. Three documentations at occurrence of pain were completed, one by each of the two researchers and one by the nurse assisting with the procedure. Each time the patient exhibited a behavior indicating discomfort, each researcher would first independently document the rating according to the CBNPS and then the procedure nurse would give a numeric rating. Following the procedure, the nurse assisting with the GI procedure completed an evaluation tool that asked the nurse’s opinion of the descriptors on the scale.

In testing the reliability of the CBNPS, of the 117 data points collected, 82% were in complete agreement between the two observers and the nurse assisting with the
procedure. In 17% of the collection points, two of the three observers agreed, and in 1% there was no agreement. Of the observations that disagreed, there only was a one-point difference. The validity of the CBNPS was tested by the completion of the nurse evaluations. A total of 42 evaluations were returned with 95% indicating that the nurses preferred the CBNPS to currently used scales. Due to the data from the research conducted the researcher determined that the CBNPS was a pain tool that could capture frequently changing pain sensations during GI procedures and could be used easily with every vital sign reading (Salmore, 2002). Due to the reliability data the researcher determined that the CBNPS was learned easily and demonstrated accuracy among nurses caring for sedated patients (Salmore, 2002).

Limitations for the CBNPS are that it uses behavioral indicators only. Previous studies have advocated the use of behavioral as well as physiological indicators to infer the presence of pain for uncommunicative critical care patients (Christoph, 1991; Harrison, Cotanch, 1987; Les, 1990). The researchers concluded that the CBNPS was accurate among nurses caring for sedated patients but have not tested the scale in any other clinical situation other than GI procedures. The major strength of the CBNPS was the high percentage of agreement between observers. This indicates that the clinical reliability of the scale is well demonstrated. The scale may be used by different nurses on the same patient and the pain assessment would be very similar if not exactly the same during the same instance.

In a study by Odhner, Wegman, Freeland, Steinmetz, and Ingersoll (2003) a modified Faces, Legs, Activity, Cry, Consolability (FLACC) scale was developed for use
on non-verbal adults for pain assessment. The new scale was called the Adult Nonverbal Pain Scale (NVPS). The legs, cry and consolability components of the FLACC scale were eliminated and the face and activity components were revised to better reflect adult patients. Three new assessments were added: 1) guarding, 2) physiological aspects I (vital signs) and 3) physiological aspects II (skin, pupillary response, and perspiration). The study consisted of a convenience sample of 59 non-verbal patients ranging from 16-99 years of age. The admitting diagnoses for these patients were trauma, major abdominal surgery, or major burn injury. All patients were unable to speak and were unable to self-report level of pain through use of visual or pen and paper aids. Two nurses who used both the FLACC and NVPS scales during their assessments performed each bedside assessment. The nurse independently rated the patients’ pain level and recorded the assessment on the FLACC and NVPS tool.

Internal consistency reliability for each of the scales was similar. The coefficient alpha for the FLACC was 0.84 while the coefficient alpha for the NVPS was 0.78. When both scales were combined the coefficient alpha was 0.90. The individual items for each of the scales, individual items to total scale, and items and total score of one scale to items and total for the other scale was prepared to assess inter-item and scale and intra-item and scale relationships. All relationships were significant at <0.5. The strongest correlations were found between, 1) FLACC and NVPS face assessment components (0.78), 2) FLACC legs and NVPS activity components (0.72), 3) FLACC total score and NVPS face (0.71), activity (0.71), and guarding components (0.69), and 4) NVPS total
score and the FLACC consolability (0.75), legs (0.73), activity (0.71), and face components (0.65).

The researchers demonstrated that interrater reliability for both the FLACC and NVPS scales was good with nurses rating the individual components comparably (Odhner, et al., 2003). The assessment components of the newly designed adult pain assessment scale also correlated with those of the existing child-focused scale, suggesting reasonable evidence of criterion-related validity (Odhner, et al.) The range of responses for each of the assessment components of the FLACC and NVPS provide preliminary support for the discriminant validity of the scales (Odhner, et al.). Nurses frequently identified the cry and consolability components as not applicable and therefore this provides evidence that the FLACC has limited use for the adult non-verbal population (Odhner, et al.). Both physiological indicators on the NVPS influenced the total score significantly indicating that these indicators are important in adult pain assessment (Odhner, et al.).

A limitation of the study was that additional descriptive data about the participants was either not collected or not described in the research article. This makes it difficult to generalize the results to the general population. The limited diagnoses of the patients and the type of unit also limit the ability to generalize the results. The sample size was also small and a convenience sample. The usefulness of the NVPS is still very limited because the results are from a pilot test. Further testing on its usefulness is needed in order to better determine the applicability of the scale for the non-verbal ICU patient.
Existing pain measures for administration to non-verbal patients in ICU

The literature review also produced existing pain measurement tools that are available for use with non-verbal ICU patients. These pain measurement tools are specific to the non-verbal ICU population of patients and therefore, are important in understanding the best measurement tools in assessing pain for these patients.

Puntillo, Miaskowski, Kehrle, Stannard, Gleeson, & Nye (1997) conducted a study to: 1) describe the type and frequency of behavioral and physiological indicators that nurses selected from a pain assessment and intervention notation algorithm (PAIN) as indicative of pain, 2) determine the relationship between the number of nurse-selected behavioral and physiological indicators of pain and the nurses’ ratings of pain intensity, 3) determine whether there were differences between nurses’ and patients’ rating of pain intensity, and 4) determine the relationships between both patients’ and nurses’ ratings of pain intensity and the amount of intravenous opioid administered to the patient.

The descriptive, comparative analysis study was conducted in three intensive care units and three post anesthesia care units in two different hospitals (Puntillo et al., 1997). The study subjects were fourteen critical care nurses who conducted 114 pain assessments on 31 surgical patients. The nurses used a pain assessment and intervention notation algorithm designed by the researchers to conduct their pain assessment. The PAIN algorithm contained lists of behavioral and physiological indicators of pain, derived from the research literature, to make inferences about a patient’s pain intensity. The PAIN consisted of answering yes or no in regards to a patient’s movements, facial indicators, and posturing/guarding for the behavioral indicators and answering yes or no
in regards to heart rate, blood pressure, respiratory rate, perspiration and pallor for the physiological indicators. Following the use of the PAIN, the nurses then used a 0 to 10 numerical rating scale to rate a patient’s pain based on the previous assessment of behavioral and physiological indicators. After this rating by the nurses the patients were asked to rate pain on the same 0 to 10 numerical rating scale. Finally, after all three of these assessments were complete the nurses then decided whether or not to medicate the patients for pain and used a sliding scale opioid prescription to choose the dose of pain medication.

The 14 registered nurses who participated in the study had worked on their units for greater than or equal to 6 months. The 31 patients were greater than or equal to 18 years of age and had undergone abdominal or thoracic surgery within the past 48 hours. Patients were mechanically ventilated or had been extubated less than 4 hours before data was collected. All patients were required to understand English, were able to use a numeric rating scale of pain intensity, and had a physician’s order for postoperative opioid analgesics with a range of doses that the nurses could administer. Patients receiving patient-controlled analgesia were excluded from the study.

The behavioral indicators of pain most frequently reported by nurses were no movement (38%), grimacing, frowning and wincing (34%), vocalization (24%), and restlessness (19%). The most behavioral indicators chosen by the nurses occurred during the first assessment. Subsequent pain assessments demonstrated that the predominant behavioral indicator reported was no patient movement and other behavioral indicators decreased in frequency. The physiological indicators most frequently reported by nurses
were increased heart rate (HR) (30%) and increased blood pressure (BP) (26%). Nurses continued to notice increased HR and BP as physiological indicators after the first assessment. The researchers determined through statistical analysis that a moderate to strong correlation existed between nurse-selected behavioral and physiological indicators and nurses’ ratings of patients’ pain intensity based on these indicators. Correlations at each of the five assessment times between the nurses’ overall pain intensity and number of behavioral and physiological indicators were significant with one exception. The nurses’ overall pain ratings were consistently lower than patients’ rating at all of the five assessment times. However, no significant differences were found between the nurses’ overall ratings of pain intensity and the patients’ rating of pain intensity. Mean differences between scores ranged from 0.7 to 1.6 with the greatest difference occurring when the patient was having the most pain.

Because there was no significant difference in pain intensity scores between patients and nurses a secondary analysis was done to determine the degree of accuracy of nurses’ ratings of patients’ pain. Using a procedure modified by Iafrati (1986), who measured pain with a 10-centimeter visual analog scale, accuracy scores were calculated by measuring the difference between the nurses’ pain ratings and the patients’ pain ratings. A nurse’s numeric rating scale score was considered accurate if it was within 1 point of the patients’ numeric rating scale score. Nurses were accurate in their assessment of the severity of patients’ pain 60% of the time and inaccurate 40% of the time.
Through the research data the researchers determined that grimacing, frowning, and wincing were frequent signs of acute pain and therefore these facial expressions may represent involuntary responses to acute pain and therefore are valid indicators of acute pain in patients who are unable to provide verbal reports of pain (Puntillo, et al., 1997). The moderate to strong correlations between nurse-selected behavioral indicators and nurses’ rating of patients’ pain intensity support the use of a systematic method of observing signs of pain (Puntillo, et al.) The use of a systematic method may heighten awareness and increase the accuracy of nurses’ assessments of patients’ pain intensity (Puntillo, et al.). The researchers were able to find moderate to strong correlations between nurse-selected behavioral indicators and nurses’ rating of patients’ pain intensity. Despite this, the sample size was very small and the population criteria was limited leading to results that cannot be generalized to the general population. More importantly, due to the small sample size statistical significance was unobtainable at times leading to poor results. Even with the use a such a long, involved assessment which could deter nurses from it’s use, nurses’ overall pain ratings were still consistently lower than patients’ self report, especially with reports of large amounts of pain. Another limitation of the study was the heavy reliance of the PAIN on behavioral and physiological indicators to assess pain. Behaviors can be altered based on culture, nature of pain (chronic versus acute), and patients’ desire to report pain. Physiological indicators such as heart rate and blood pressure can be altered based on other physiological circumstances that are affecting the patient, especially those patients in a critical care environment.
Payen, Bru, Bosson, Lagrasta, Novel, Deschaux, Lavagne, and Jacquot (2001) used a prospective evaluation study design to study 30 mechanically ventilated patients who were receiving analgesia and sedation. These 30 patients were assessed a median of three times during their ICU stay for a total of 301 observations. The aim of the study was to establish the validity and reliability of a new objective pain scale called the Behavioral Pain Scale (BPS) in sedated adult patients undergoing mechanical ventilation. The study was conducted over a six month period and patients were included if they were greater than 15 years of age, were admitted to the ICU after trauma or thoracic or abdominal surgery, had undergone mechanical ventilation, were hemodynamically stabilized, and needed analgesia or sedation. Patients were excluded from the study if they were quadriplegic, were receiving neuromuscular blockade, or were allowed to be assessed by an autoevaluation pain scale, or if their sedative and analgesic regimen changed during the procedure.

The BPS was based on the sum of three behavioral indicators: facial expression (relaxed, partially tightened, fully tightened, grimacing), upper limbs (no movement, partially bent, fully bent with finger flexion, permanently retracted), and compliance with mechanical ventilation (tolerating movement, coughing but tolerating ventilation most of the time, fighting ventilator, unable to control ventilator). Each indicator was numbered 1 to 4 from the first to the last indicator. Each patient was assessed at three times during the day: morning, afternoon, and night. BPS scores were performed before any stimulation to establish baseline scores. Pairs of evaluators were established on a convenience basis to assess the patient at rest and then during one procedure in a
nonnociceptive and nociceptive group. In Group 1, the nonnociceptive group, compression stocking application and central venous catheter (CVC) changes were chosen as nonnociceptive procedures. In Group 2, the nociceptive group, endotracheal suctioning (ETS) and mobilization were chosen as nociceptive procedures. In order to test reliability of the BPS, two assigned evaluators, who did not perform the first assessments, performed another assessment independently during a nociceptive procedure. Comparing the BPS scores obtained during both nociceptive and nonnociceptive procedures tested the validity of the scale. The researchers hypothesized that a significant difference would occur between the two types of procedures.

Reliability of the BPS was assessed by measuring interrater agreement between independent observers during nociceptive procedures. Assessments completed at rest had a high percentage (Group 1-97% and Group 2-88%) of no response (score of 3) on the BPS. There was no significant difference found between the nociceptive and nonnociceptive groups during rest. Painless and painful procedures resulted in a significant change in the BPS with the percentage of no response dropping to 60% in Group 1 and 31% in Group 2, with a significant difference between the two groups (p<.01). The nociceptive procedure resulted in a four-fold increase in the BPS score compared with the nonnociceptive group. There was also a significant increase in the BPS scores during the painless procedures compared with the rest period. This increase was most attributable to the application of compression stockings required limited mobilization of limbs (Payen, et al., 2001). Significant results were found between the two groups of procedures and measurements of blood pressure (BP) and heart rate (HR).
There were significant increases in BP and HR during nociceptive procedures but no changes in BP and HR occurred during nonnociceptive procedures. Despite this the changes in hemodynamics were not related to changes in BPS. Among the thirty-paired assessments during a nociceptive procedure, 17 had similar BPS scores from the pair of raters, 12 differed by one mark, and two assessments disagreed by more than one mark. The correlation of the BPS values between the two groups was moderate to strong, with $r^2=.71$ at rest and $r^2=.50$ during procedure. Finally, there was a trend between the type of analgesia/sedation regimen (light, mild or heavy) given to the patient and the value of BPS as well as the BPS changes induced by nociceptive procedures. For example, the higher the dosage of midazolam and fentanyl, the lower the values of BPS.

The data found during research supports the use of facial expressions, movements during procedures and compliance with mechanical ventilation as indicators of pain (Payen, et al., 2001). The researchers were able to determine that significant increases in BPS scores were found to occur during two different painful procedures, this indicates that the BPS changes can be caused by painful procedures (Payen, et al.). BPS scores were also found to increase during painless procedures, but to a lesser extent than painful procedures. The painless procedure of compression stocking application brought about increases in the BPS scores from the resting state. No significant changes were found during central catheter changes from the resting state. The application of compression stockings does include some minor mobilization. This data indicates that the BPS is a sensitive scale because it can discriminate between different procedures according to their painfulness in sedated, mechanically ventilated patients (Payen, et al.). The BPS
was found to be a reliable indicator of pain because most paired evaluation were in agreement (Payen, et al.). Another indirect argument in favor of the validity of BPS in measuring pain is the trend found between the sedation/analgesia regimen and the BPS score. The higher the sedation/analgesia, the lower the BPS value was, as well as the BPS changes induced by painful procedures (Payen, et al.). The researchers concluded that responses to nonnoxious and noxious stimuli could be differentiated accurately in sedated, mechanically ventilated patients by using behavioral indicators (Payen, et al.). The BPS, developed by the researchers, could offer a sample, objective tool for ICU nurses to use to assess and medicated patients in pain (Payen, et al.).

Once again a limitation of the study is the ability to generalize it to all populations of sedated, mechanically ventilated patients because the sample size was so small. The scale was tested on sedated patients but was not tested on patients with a Ramsay score greater than 8. The validity for these patients has not been established for this scale. The difficulty with assessing patients receiving sedation is that results may be affected by the amount of sedative that the patient is receiving. The patients may have been unable to effectively communicate their pain needs by facial expressions or movements due to the sedative effects of the medications that they were receiving. Strengths of the BPS include the demonstration of discrimination between different procedures and ease of use. Data demonstrated that CVC changes were determined to be the least painful, followed by application of compression stockings, followed by turning or mobilization, and finally ETS as the most painful. The BPS scores changed comparably to the assumed painfulness of the procedure. The convenience of using the BPS could encourage nurses
Another pain assessment tool developed for use by nurses in an adult intensive care unit was called the Milne pain assessment tool. In an article by Blenkharn, Slobhan, and Morgan (2002) an audit of all nursing documentation at a hospital demonstrated that there was a need for a systematic and objective assessment and documentation tool for use with the unconscious critically ill patient. The authors designed an assessment tool that would objectively estimate the level of pain in this group of patients. The aim of the Milne pain assessment tool was to enable the intensive care nurse to articulate the level and nature of a patient’s pain to the multidisciplinary team. The goal was to improve pain management in the critically ill patient. The hospital utilized in the study already had a tool in place for use in the ICU that was in the form of a verbal numerical rating scale that only could be reliably used with patients who were conscious and able to communicate verbally. This instrument was inappropriate for patients with a reduced level of consciousness. Another tool available in the hospital was the pain assessment tool utilized in the recovery unit which consisted of a numerical rating scale from 0 to 10: 0=no pain, 1-2 = mild pain, 3-4 = moderate pain, 5-7 = severe pain, 8-10 = very severe pain. The tool used in the recovery unit had to be adapted to use for an unconscious, uncommunicative patient, therefore the behavioral and physiological indicators of pain identified by Puntillo et al. (1997) were incorporated into the recovery unit patient scale. The modified scale was; 0-2 = no pain to mild discomfort (no evidence of hypertension, tachycardia, or sweating that can be attributed to pain or distress), 3-5 = mild to moderate
discomfort (signs include slight sweating, tachycardia, moderate hypertension not attributable to other causes), 6-8 = moderate to severe pain (more pronounced sweating, hypertension or tachycardia with pupil dilatation and facial grimacing), 9-10 = severe pain (very pronounced sweating, hypertension or tachycardia, with facial grimacing associated with writhing or distressed movements). The conscious level was also determined to be of importance and therefore the Glasgow Coma Scoring and the Sedation Scoring System were reproduced into a single sheet for assessment of patients.

The population of patients was “mixed” although a “considerable proportion of admissions” were “postoperative surgical patients” (Blenkharn, Faughnan, & Morgan, 2002). An action research method was used. Action research is defined as a form of self-reflective enquiry undertaken by participants in social situations in order to improve the rationality and justice of their own practices, their understanding of their own practices and the situation in which they are carried out (Blenkharn, et al., 2002). Pain assessment by the nurses took place during two levels, at rest and during procedures such as suctioning and repositioning. The tool was utilized for 6 months and evaluated by looking at patient records. The researchers immediately identified two problems, one problem was the nurses having difficulty interpreting the numerical scoring of pain levels and the pain scores were not associated with any alteration in pain management. The tool was therefore modified to include only a single number to be given to pain intensity. A flow chart was also developed to help guide nursing actions in pain management and nursing actions. A number of teaching sessions and focus groups were held to heighten awareness of pain management before the modified tool and algorithm were introduced.
Pain scores were recorded in 80% of all documentation audited. There also appeared to be consistency in the individual nurses’ scores with different nurses recording the same score for the same patient at the same time. The nurses stated that they found the algorithm useful in guiding their assessment. Despite this there was no evidence that scoring had altered management of patients’ pain levels (Blenkharn, et al., 2002). Changes in pain scores in either direction did not appear to coincide with any change in medication although some increases in pain did reflect with some increases in pain medication administration. The authors identified that the tool may not accurately predict a patient’s pain, as pain is a subjective process that includes dimensions other than physiological (Blenkharn, et al.). The tool also did not distinguish between location of pain or consider co-morbidity. The authors also believed that the lack of specific parameters might affect the tool’s reliability, words like moderate and severe are subjective and may lead to variations in individual scoring (Blenkharn, et al.). The authors determined that the tool enabled nurses to articulate the nature of pain and identify need for intervention but that the management of pain in the critically ill had not been improved with the introduction of a more systematic assessment process (Blenkharn, et al.).

Further important limitations were identified for this study. Primarily was the lack of statistical results or specific results that were found during data collection. If these statistical results did exist, it is important to demonstrate these results in the research article to demonstrate the importance, reliability, and validity of the results. Another limitation was the pain tool utilized in the research. The pain tool primarily
focused on physiological parameters of pain and did not include any indication of behavioral parameters that were measured. The importance of using behavioral and physiological indicators to measure the presence of pain for uncommunicative critical care patients has been demonstrated (Puntillo, et al., 1997). Physiological indicators such as tachycardia, hypertension, and sweating can be indicative of other problems other than pain. The algorithm did not address these issues. Other important limitations to the scale were that it was not determined to be consistent among users and it did not improve pain management. The use of the scale must be consistent among users in order to provide continuity of care during pain management and pain management must be improved with the use of a pain scale for this population of patients.

Factors affecting the timing and amount of pain medication administered by ICU nurses to non-verbal ICU patients

The literature was also reviewed for factors that affect the timing and amount of pain medication administered by ICU nurses to non-verbal ICU patients. A review of the literature revealed many different factors that affect the timing and amount of pain medication administered to this population of patients. The measurement tool utilized during pain assessment greatly affects the pain management of non-verbal ICU patients. Once a determination of the best measurement tool for pain assessment in this population of patients is made, factors that affect the actual administration of pain medication is needed. A proper measurement tool will help to better assess the patients, but without determining the factors that affect the timing and amount of pain medication administered by the nurses the tool is ineffective. The measurement tool is the first step in better pain
management for this population but the factors that affect pain medication administration are also very important.

Erkes, Parker, Carr, and Mayo (2001) conducted a research study to determine the effectiveness of an educational intervention focused on pain management. The study participants consisted of 30 medical/surgical ICU nurses who were full or part time employees in a medical/surgical ICU. These nurses also had to have at least one-year experience in the profession of nursing.

The study was a quasi-experimental design. This type of design was used to compare pre and posttest scores to determine the effectiveness of an educational intervention on pain management (Erkes, et al., 2001). The nurses were given McCaffery and Ferrell’s Nurses’ Knowledge and Attitude Survey Regarding Pain during two different points in time. The survey was administered before a 1-hour videotape which focused on current best practice in managing pain in the inpatient population. The interventions also included a self-learning module focused on pain management. The survey was then given again within 2 weeks of watching the videotape. The Survey simultaneously assesses nurses’ knowledge and attitudes regarding pain management and had been tested for reliability and validity (Erkes, et al.). Specifically the instrument consisted of 22 true/false questions and 15 multiple-choice questions. The researchers determined that the scores on the survey less than 75% were considered low, 75-84% were considered to be moderate, and scores of 85% or greater were considered to be high (Erkes, et al.).
The mean pre-test score was 72.9% and the post-test score was 86.2%. Change scores, which represent the change in scores from the pretest to the posttest, increased 13.3%. The participants of the study showed lack of knowledge in several different areas including affects and use of NSAIDS for pain, and long-term use of opioids. A total of 19 of the 30 nurses (63.3%) scored below 75% on the pretest, of these 19 nurses 10 had at least 10 years of experience in nursing.

From the data collected, the researchers determined that on average the nurses in the study showed low baseline scores on the survey. This demonstrates that there are deficiencies and inconsistencies in nurses’ knowledge regarding pain management as well as inaccurate, negative attitudes about patients in pain (Erkes, et al., 2001). After the educational program only 1 of the 30 participants scored less than 75% on the survey and 29 of the nurses improved their scores after the intervention. This demonstrates that an educational intervention that includes viewing a video focused on pain management is effective in teaching nurses about pain control (Erkes, et al.). There were noticeably lower baseline scores shown by nurses with the greatest number of years experience. The nurses who improved their scores the most from pre to post test were those that had the most years of experience in nursing. The researchers determined that those nurses who have been out of school for a long period of time benefit greatly from educational programs regarding the best management of pain (Erkes, et al.).

In conclusion, Erkes, et al. (2001) believed that nurses’ knowledge and attitude levels regarding pain management are less than adequate which ultimately affects the amount of pain experienced by patients. The researchers also determined that nurses must be
responsive to and integrate current pain management techniques in an effort to decrease the suffering of hospitalized patients (Erkes, et al.).

The researchers were able to determine that an educational intervention focused on pain management is effective in improving knowledge in ICU nurses. The data demonstrates the effectiveness and importance of educational modules on altering the knowledge of ICU nurses’ regarding pain management. This increase in knowledge will help to improve pain management by affecting the timing and amount of pain medication that ICU nurses administer to their patients. There were two limitations identified for this study. One is the small sample size used during data collection making the data difficult to generalize. Also, the sample did not discriminate the nurses’ years of experience in an ICU. The study participants were ICU nurses and yet the experience was only limited to one year of experience in the profession of nursing. This affects the generalization of the results to ICU nurses.

Chuk (1999) studied 29 nurses from a cardio-thoracic intensive care unit (CTICU) to examine whether or not a patient’s vital signs would influence nurses’ choices of titrated dosages of morphine for relieving pain following coronary artery bypass graft surgery (CABGS). The purpose of the study was to explore the effect of a patient’s vital signs on nurses’ choices of titrated dosages of intravenous (IV) morphine to relieve the pain of the patient’s following CABGS (Chuk, 1999). The study participants were a convenience sample and consisted of both male and female nurses with most of the participants having greater than 3 years experience working in the CTICU.
The researcher noted that the opiate infusion protocol of the CTICU consisted of guidelines for the safe practice of morphine administration. However, the protocol did not provide guidelines for the account of the adequacy or the effectiveness of the given dosages in relieving patients’ pain (Chuk, 1999). Nurses used own discretion in the administration of morphine dosages. The researcher used a survey design to collect data. The conceptual framework of the study was based on McCaffery and Farrell’s studies regarding nurses’ attitudes towards pain assessment and administering intramuscular (IM) morphine for relieving postoperative pain. The framework for this study described the following factors as influencing nurses’ pain rating and therefore the choices of titrated dosages of IV morphine for relieving pain: 1) vital signs, 2) behavioral exhibitions, 3) demographic characteristics, 4) patient’s self-rating of pain (Chuk, 1999).

The study utilized a vignette and questionnaire based on two different patients. Both patients had undergone CABGS and were now on their first postoperative day. The first patient had slightly elevated vital signs compared to the stable range as determine by the researchers. The second patient had vital signs on the lower end of the stable range. Both patients scored their pain level as 4 on a 0 to 5 numerical scale. After the nurses assessed the patients they were asked to rate and document the pain level of the patient. The second part of the scenario related to medicating the patients with IV morphine. Both patients were described as already having received a loading dose of 1mg and then a maintenance dose of 1mg per hour on the day following the CABG. On post-op day 1, each patient received a bolus dose of 0.5 mg with a maintenance infusion rate of 1.5 mg per hour just 30 minutes prior to the evaluations by the nurses. Neither of the patients
displayed any type of side effects from the medication. The participants were then required to choose a bolus and maintenance dose of morphine for relieving the pain of the two patients. The nurses also chose concerns that might arise from their decision making process regarding the IV morphine dosages that they chose.

The results of the study demonstrated that 15% of the nurses documented the pain level of patient one as below 4 and 38% of the nurses documented the pain level of patient two as below 4. In regards to a choice for a bolus dose, 100% of the nurses chose a bolus dose of 0.5-2.5 mg for patient one. For patient two, 92% of the nurses chose a bolus dose of 0.5-2.5 mg and 8% chose no bolus dose. 85% of the nurses increased the maintenance dose rate to 1.5-2.5 mg per hour for patient one and 15% chose to keep the rate the same. For patient two, 77% of the nurses increased the rate of the maintenance dose to 1.5-2.5 mg per hour and 23% suggested to reduce the rate to 1.0 mg per hour. Important results demonstrated that some nurses suggested no bolus dose or no increase in the maintenance rate for patient two despite the fact that he had pain level of 4 and did not have adverse reactions from the previous bolus or maintenance dose (Chuk, 1999). Both patients reported the same pain intensity but the choice of the nurses was inconsistent with this report (Chuk, 1999). Chuk (1999) believed that the nurses may have been using vital signs as an indicator of the patients’ pain levels and therefore may not have medicated accordingly. The primary risk factor identified by the nurses in titrating the bolus or maintenance dosages of morphine was respiratory depression. Other risk factors identified as concerns of the nurses were body weight, demographic data of the patient, health history of the patient and behavioral exhibitions of the patient.
The researcher concluded that the protocol for the CTICU needed revision to emphasize pain assessment and titration method of IV morphine for relieving pain after cardiac surgery (Chuk, 1999). Chuk (1999) also emphasized the importance of nurses accepting a patient’s verbal report of pain during assessment. Chuk (1999) also determined that pain assessment with special techniques should be considered and used for special patient groups such as with critically ill patients that are unable to communicate their pain.

In critique of this study, the sample was small and a convenience selection which could ultimately affect the way that the results could be generalized to other populations. Most importantly was the use of a vignette to collect data. Use of vignette makes for unrealistic situations and could not demonstrate an actual patient situation. The patients in the vignettes may not have been described effectively and this could have also left the nurses with questions about the patient in the vignette. Uncertainty of the nurse participants about the patients in the vignette could have affected their responses and the results of the study.

Another study by Gujol (1994) used a vignette to explore the relationships between two variables, number of postoperative days and ventilator status, in pain assessment and medication decision made by critical care nurses and to identify nurses’ concerns about opioid use. The study was a survey type design that was based on McCaffery and Ferrell’s surveys exploring the influence of patient age, gender, behavior, lifestyle, and vital signs on nurses’ pain assessment and management (Gujol, 1994). A
convenience sample of 71 critical care nurses participated in the study. The participants ranged from 24 to 55 years and had critical care experience ranging from 3 to 30 years.

The research tool was presented in the form of a questionnaire and consisted of two vignettes. Two cases were presented in each vignette (Patients A and B in vignette 1, Patients C and D in vignette 2). Patient A was a 40 year old man on his second postoperative day after a lobectomy for lung cancer, he had a chest tube (CT), weighed 150 pounds, BP 140/80, HR 80, respiratory rate (RR) at 20. He had received 2 milligrams (mg) morphine IV push (IVP) 2 hours previously and was complaining of pain at 4 on a 0 to 5 scale. Patient B was also 40 year old man, had the same surgery on the same day, he also had a CT, weighed the same and had the same vital signs, he was also on a ventilator. He also had received 2 mg morphine IVP 2 hours previously and was also complaining of pain at 4 on 0 to 5 scale. Neither patient showed adverse effects to the morphine and both had an order for 1 to 3 mg morphine as needed for pain. Patient C was a 50-year-old man, admitted to ICU after 2-vessel coronary artery bypass grafting (CABG) performed 7 hours previously. The surgery was uneventful and he had been extubated 4 hours previous and had received 2 mg morphine after extubation. He rated his pain as 4 on 0 to 5 scale. His vital signs were BP 135/75, HR 80, and RR of 18. The patient had received 2 mg morphine IVP 3 hours previously. Patient D was also a 50-year-old man, admitted to ICU after 2 vessel CABG performed 36 hours previously. All other data is the same as Patient C, he had received 2mg morphine IVP 3 hours previously and rated his pain 4. Both patients had orders for 1 to 3 mg morphine IVP as needed for pain. Three multiple choice questions followed each case: 1) How would you
assess the patients pain on a scale of 0 to 5?, 2) Would you administer no medication or morphine 1-3 mg?, 3) What concerns would affect your choice of pain meds?

The results of the study demonstrated that 70% of the subjects believed that Patient A’s report of level 4 pain and 83% of the nurse believed Patient B’s report of level 4 pain. 23% of the nurses rated Patient A’s pain as 3 and 11% rated Patient B’s as 3. Some of the nurse even rated both patients’ pain at either a 2 or a 1. 41% of the nurses were willing to administer 3 mg morphine to Patient A and 60% were willing to administer 3 mg morphine to Patient B. Three nurses (4%) would not administer any morphine to Patient A. The most common concern for these patients was respiratory depression (46%) for Patient A and (11%) for patient B. Other concerns were addiction, tolerance, and physical dependence. 78% accepted Patient C’s report of level 4 pain and 72% believed Patient D’s report of level 4 pain. Slightly more than 40% of nurses were willing to administer 3 mg morphine to each patient. 3% would not medicate Patient C and 14% would not medicate Patient D. Respiratory depression was also believed to be a concern in these cases.

From the results of the study the researcher determined that each patient must be treated individually when being assessed for pain (Gujol, 1994). Concerns of respiratory depression, addiction, tolerance, and physical dependence affected the decisions of most of the nurses. Respiratory depression ranks highest among nurses’ concerns in administering narcotics to non-ventilated patients (Gujol, 1994). Among ventilated patients the same concern reflects fear of difficulty extubating the patient (Gujol, 1994). However, the incidence of respiratory depression is less than 1% (Gujol, 1994). A
considerable number of nurses questioned patients’ verbal report of pain despite the fact that pain has been found to be a subjective personal experience (Gujol, 1994). The skepticism of the nurses led to poor judgment decisions in the management of patients’ pain. The survey showed that patients would have been under-medicated (Gujol, 1994). Some patients in the results were not being medicated at all. Under-medication either by a low dose, low frequency, or no medication interferes with early ambulation and mobility (Gujol, 1994). Gujol (1994) determined that a complaint of pain from a mechanically ventilated patient was more likely to be believed by nurses than a similar complaint from a non-ventilated patient and were more likely to be treated with a larger dose. A patient’s pain was more likely to be believed by nurses in the early postoperative period than later, these patients were also more likely to receive larger doses of pain medication (Gujol, 1994). Nurses were also concerned with respiratory depression in the early postoperative period and more concerned with addiction, tolerance and physical dependence late in the postoperative period (Gujol, 1994).

Once again, a critique for this study is the use of a vignette for data collection. The use of a vignette is not a realistic situation and may ultimately affect the nurses’ choices during data collection. The sample was also a convenience sample affecting the way that the results may be able to be generalized to the general population of patients.

In a study by Stannard, Puntillo, Miaskowski, Gleeson, Kehrle, and Nye (1996) 14 volunteer nurses who had worked in one of three intensive care units (ICU) or two post anesthesia care units (PACU). The purpose of the study was to present qualitative research findings that described clinical judgment used by critical care nurses when
assessing and managing patients’ pain. The patients whom the nurses cared for were 18 years or older, had undergone abdominal or thoracic surgery and were within 48 hours of having had surgery. All patients included in the study were receiving mechanical ventilation or had been extubated within the last 4 hours. All participants understood English, were able to use a numeric scale to rate pain, had a prescription for postoperative pain medication with a sliding scale.

The nurses participating in the study were taped while “thinking aloud” during use of a pain algorithm while assessing pain. The nurses were prompted to describe any behaviors or physiological cues they observed from patients. The nurses were also prompted to describe their thoughts on pain assessment and their decisions about opioid administration. The audiotapes of the nurse participants were transcribed verbatim and the resulting text was analyzed using interpretive phenomenology. The aim of this type of analysis is to understand people, text, meaning and practices in their own terms (Stannard, et al., 1996). The data collected included 31 tape recordings ranging from 15 minutes to 1 hour in length. The 14 nurses cared for a total of 41 patients. Conceptual saturation was reached by the eighth nurse participant’s recordings.

The two domains of judgment found in the study were assessing the patient and balancing interventions (Stannard, et al., 1996). Within the domain of assessing the patient nearly every transcribed recording included descriptions of patients’ characteristics and behavioral and physiological indicators of pain that the nurses used in conjunction with other perceptual clues while assessing the patient. Assessing the patient was not always straightforward for some nurses because some patients gave deceiving
clues (Stannard, et al.). Other patients gave conflicting clues, especially challenging was differentiating indicators of pain from indicators of anxiety. Nurses would often medicate for pain and if this did not work they would turn to anti-anxiety medications (Stannard, et al.). Nurses would use anti-anxiety medications coupled with pain medication when nothing else seemed to relieve a patient’s pain (Stannard, et al.). Another issue found in the data analysis of assessing the patient was the nurses’ getting a sense of how the patients responded to treatment. Learning to assess the patients’ response to the pain medication was often preceded by the nurse initially administering a cautious dose of medications (Stannard, et al.).

Within the domain of balancing interventions the nurse understood the significance of the pain but had to balance the amount and kind of medications on the basis of physiological parameters, medical plan and prescriptions, and the desires of the patient and their families (Stannard, et al., 1996). Low BP and high carbon dioxide levels were common reasons that caused nurses to give pain medication carefully and slowly (Stannard, et al.). In regards to the medical plan and prescriptions, some nurses were more willing and able to discuss pain medication with physicians while other were not. According to Stannard, et al. (1996) some nurses’ reluctance to seek additional assistance by calling the attending physician may be due to lack of comfort in working the system, her therapeutic goal for the patient, or her confidence in assessing the patient in the situation. Finally, within the domain of balancing interventions, the nurses balanced the pain medications with the desires of the family and the patient. For instance, the patient may have wanted to interact with the family instead of being medicated for pain or the
family may have told the nurse what type of responses the patient would have to the medication. These factors could affect the nurse medicating the patient rather than performing her own assessment of the situation and the patient (Stannard, et al.).

The researchers concluded from the qualitative data that they collected that nurses used both physiological and behavioral cues as indicators of pain (Stannard, et al., 1996). Nurses often used both anti-anxiety and pain medications because at times they were unable to differentiate between anxiety and pain indicators (Stannard, et al.). The data also determined that the nurses in the study tested their patients’ response to pain medications by giving a mid-range dose when initially beginning to treat pain (Stannard, et al.). The study also demonstrated that nurses were able to initiate several simultaneous interventions enabling them to give their patients pain medications safely (Stannard, et al.). Ultimately, Stannard, et al. determined that skillful use of negotiation and collaboration with physicians, practical and theoretical knowledge of medications are essential in balancing clinical situations.

In critique of this study the use of a new pain algorithm for data collection could have affected the nurses’ responses because the use of the algorithm was not common practice. Another concern of the study could have been the nurses being affected by the audiotaping performed during the research. The taped comments may have not been reflective of common daily practices because the nurses knew that they were being recorded. There also seemed to be a poor differentiation of subcategories under the two domains identified by the researchers. The subcategories were not specifically highlighted and this made the results and conclusions difficult to interpret.
Summary

This preceding chapter discussed the theoretical framework of Orlando’s Nursing Process theory used in the development of an educational program for ICU nurses that teaches how to administer and interpret pain measures in non-verbal patients. The chapter also reviewed and critiqued the literature currently available on existing pain measures for administration to non-verbal patients, existing pain measures for administration to non-verbal patients in the ICU, and factors that affect the timing and amount of pain medication administered by ICU nurses to non-verbal patients. The purposes of this review and critique were to demonstrate the current information available for ICU nurses to administer and interpret pain measures in non-verbal patients and to identify areas of lacking information for pain measures and factors affecting the pain management in the non-verbal ICU patient population.

The next chapter will detail and describe the clinical project to develop an educational module for ICU nurses that teaches them how to administer pain measurement tools to non-verbal ICU patients and how to interpret these measures in order to more effectively manage their pain. The two pain measurement tools chosen from the literature review were the FACES pain scale and the Adult Nonverbal Pain Scale (NVPS). The chapter will discuss the elements included in this teaching module and the presentation of the module to ICU nurses. The chapter will also include a discussion of the methods used to discover learning from this module and a strategy in order to determine the long-term evaluation of the educational module.
Chapter 3

Introduction

This chapter introduces the clinical project that is an educational module for ICU nurses. The teaching module developed for presentation to the ICU nurse population is intended to provide awareness about pain management in non-verbal ICU patients. The module teaches how to administer pain measurement tools to non-verbal ICU patients and how to interpret these measures in order to more effectively manage pain. The presentation focuses on the pain measurement tools chosen as most effective for administering to the non-verbal population of ICU patients. The elements included in the educational module will then be discussed. These elements include: 1) a pre- and post-test to measure learning about pain management and use of the pain measurement tools, 2) a teaching module which will provide information on the importance of pain management of the ICU patient and how to utilize the pain measurement tools effectively, and 3) an evaluation of the nurses’ utilization of the pain measurement tools and learning by a simple nursing survey. The teaching module includes an overview of pain in the ICU patient, factors that affect timing and amount of pain medication administration by ICU nurses, and an overview of effective pain management tools for the non-verbal population of ICU patients. The pain management teaching will occur every year in the hospital with yearly nursing skills requirements to ensure continued education and knowledge of the nursing staff. Please see Appendix F for an outline of the educational module.
Clinical Project

Pre-test

A pre-test will be utilized to determine the ICU nurses’ knowledge prior to pain teaching and the introduction of the pain measurement tools for ICU patients. Pre-test data will be collected utilizing a self-report questionnaire entitled, *Nurses’ Knowledge and Attitude Survey Regarding Pain* (see Appendix D). This questionnaire was developed by Ferrell & McCaffery (1997) and assesses nurses’ knowledge and attitudes regarding pain management. The survey can be found in numerous pain studies and has been tested for reliability and validity by the authors. The tool was derived from current standards of pain management from the American Pain Society, the World Health Organization, and the Agency for Health Care Policy and Research (Ferrell & McCaffery, 1997). This pre-test will help to determine the nurses’ knowledge about pain and its management. Pre-test scores can then be compared to the post-test scores to measure learning.

Introduction to pain management in ICU patients

Pain is a common occurrence during a hospital stay due to invasive procedures, surgical procedures, disease processes, medical treatments, and most commonly due to everyday care and treatment by nurses. The focus of this presentation is on pain management in the intensive care unit patient, specifically the non-verbal patients. These patients include alert, responsive, intubated patients who are unable to verbally communicate due to an endotracheal tube and sedated, unconscious, completely uncommunicative patients either intubated or not. Pain screening is very individualized
to the nurse assessing the patient and can also depend on the tool being utilized to
determine the amount of pain a patient is experiencing. It is very important that pain
screening for this unique population of patients be standardized among ICU nurses due to
the inability of the population to verbally communicate their needs. Pain management is
extremely important due to the detrimental effects of pain on recovery, quality of life, and
general well being. It is important to screen non-verbal patients correctly so that
management of this pain is not ineffective or a cause of negative health consequences
related to medication administration. The aim of this presentation is to: 1) become
knowledgeable of the problem of pain management in ICU patients, 2) learn some of the
factors that affect timing and amount of pain medication given to these patients, 3) learn
to identify the two populations of non-verbal patients in ICU, and 4) learn to skillfully
utilize the pain management tools for the two populations of non-verbal patients in ICU.

Pain can occur at any time during an ICU stay. Patients in an intensive care
setting are generally very ill and require many invasive procedures, surgeries and
treatments which lead to pain. Therefore pain in an intensive care is a common
occurrence but often goes unnoticed due to the inability of critically ill patients to
communicate their needs. A study by Puntillo (1990) indicates that 63% of surgical
patients discharged from an ICU setting regarded their pain level as moderate to severe
during their inpatient stay. In a large study conducted by Desbians & Broste (1996), pain
was reported in almost 50% of patients and 15% of these patients rated their pain as
severe. It is very common for an ICU nurse to encounter a non-verbal patient in pain but
pain management of these types of patients is difficult due to the inability to have verbal
communication. Use of a pain management tools is easy, effective, and inexpensive and can provide concrete data to effectively medicate for pain and decrease its occurrence and severity.

Factors affecting pain management

Although pain management of the non-verbal ICU patient is very dependent on the type of pain measurement tool utilized to assess pain, there are other important factors that affect the management of pain. Specifically, there are many areas that ICU nurses are lacking in their knowledge about pain and its management. Many nurses have inconsistent and deficient knowledge regarding pain and often have a negative stigma about a patient in pain (Erkes, Parker, Carr, and Mayo, 2001). It has been demonstrated that education about pain and its management is effective in improving a nurse’s knowledge about pain.

Another very important factor is the time that a nurse has been out of an educational setting. Most nurses who have been out of school for a long period and practicing in the hospital have less knowledge about pain but do learn the most from an educational program than new nurses do. Many new pain techniques and important information about pain management are developed frequently; this information is often provided in an educational setting and often misses the nurses that are actively practicing in the hospital setting. Because these are the nurses that are at the bedside, caring for the patient, it is very important that they receive up to date information about pain and its management. Therefore frequent education and information about latest techniques are important in the management of pain.
Possibly one of the most important factors affecting the management of pain in the ICU setting is the nurses’ acceptance of a patient’s report of pain. Often a patient may complain of severe pain and request pain medication but the nurse will not medicate accordingly due to inconsistencies in vital signs or the patient’s behavior. As an example, a patient may be complaining of severe pain but be able to fall asleep during a conversation or have vital signs within his or her baseline limits. Nurses often look at the whole picture and tend to take other factors into consideration rather than taking the patient’s self report as an assessment of pain severity.

There are also concerns of respiratory depression, addiction, tolerance, and physical dependence affecting the decisions of most of the nurses to medicate a patient for pain. Respiratory depression ranks highest among nurses’ concerns in administering narcotics to non-ventilated patients and for ventilated patients the concern is difficulty with extubation (Gujol, 1994). Despite this concern respiratory depression occurs less than 1% of the time (Gujol, 1994). This results in under medication of the patient for pain and can ultimately affect recovery time and discharge time from the hospital ultimately leading to increased cost.

Two other important extenuating factors are the prescriptions provided by the physician and the pressure from the families of the patients. There are instances when the pain medication prescription is not effective and it becomes the nurse’s responsibility to contact the physician for further pain medication. At times there may be reluctance due to poor communication between the nurses and physicians or due to inexperience of the nurse engaging with the physicians. This ultimately affects the administration of pain
medication to the patient and may also result in ineffective pain control and undermedicating of the patient. Families also play a vital role in pain management. In the ICU setting families often attempt to become involved in pain management of their loved ones by requesting more pain medication when unnecessary or requesting less pain medication so that they may interact more with their ill loved ones. Balancing the needs of the patients with the demands and requests of the family can become overwhelming for some nurses and lead to ineffective control of a patient’s pain level. Once again an experienced nurse may have more knowledge and expertise in dealing with these types of situations and may be able to interact and communicate better with the family in order to provide the best pain management for the patient.

Non-verbal patients in the ICU setting

Through the previous review and critique of existing pain measures for administration to non-verbal patients in the ICU, two groups of patients were determined to exist: 1) Alert, responsive, intubated patients unable to verbally communicate, and 2) Sedated, unconscious, completely uncommunicative patients either intubated or not. These separate groups within the ICU population of patients are very different because they each require individual and unique types of pain measurement tools in order to effectively evaluate pain. The first population of patients can be recognized by their basic inability to verbally communicate. They are completely alert, oriented and easily responsive to assessment. These patients are also able to communicate by gestures or pointing using extremities and can use non-verbal cues to further communicate their needs, they may be intubated or not. The second group of patients are unconscious,
completely unresponsive, and unable to communicate in any way. This population may also be intubated or not but will not arouse enough to attempt any type of verbal or non-verbal communication. If any patient is assessed by the nurse and determined to be verbally communicative and cognitively able to use a verbal pain assessment tool, then they do not qualify for assessment with the preceding pain measurement tools.

Pain Measurement Tools- FACES Pain Scale

A patient’s self report of pain intensity is the most reliable and valid measurement of pain (Puntillo, et al., 1997). Patients that are restricted only in their ability to verbally communicate should therefore be given the opportunity to report their pain to their nurse through the use of an easy to use and effective pain measurement tool. This patient would be able to look at a pain measurement tool and communicate with the nurse through gestures, pointing, writing on paper or moving extremities in order to demonstrate pain intensity.

After reviewing and critiquing pain measurement tools for this population of patients the Faces pain scale (see Appendix A) developed by Bieri, Reeve, Champion, Addicote, & Ziegler (1990) was determined to be the most effective and easy to use pain measurement assessment tool for the ICU population of patients described above. The scale is based on the Wong-Baker FACES scale, widely used in the clinical pediatric setting. The Wong-Baker FACES scale is important because it provides the nurse with a way to also assess the emotional burden of pain. This is true because faces show and express emotion. The modified scale consists of seven oval shaped faces with varying degrees of “painfulness” expressed in their facial features (see Appendix A). The
“painfulness” of the faces increases from left to right. The first face is a very neutral face indicating “no pain”. The faces change in varying degrees to show amount of pain. The seventh, or last face shows a wrinkled forehead with closed eyes and an open mouth; this represents “worst pain”. To use the pain assessment tool the patient must simply point to or indicate with a gesture what face reflects the amount of pain that he or she is experiencing. The nurse is simply required to educate the patient by describing the scale and educating them that once he or she points to a face it will help to better determine how to medicate him or her for pain.

The FACES pain scale was found to be reliable for clinical use by mature adults (Stuppy, 1998). Test-retest reliability of the scale was determined by calculating correlation between the FACES pain scale scores of the same event at two different periods of time. The data indicates a significant positive relationship when calculating the correlation between the initial and second ratings of pain (n=19, r = .704, p < .001) (Stuppy, 1998). Correlations were found significant p < .001. Patients were able to rate varying levels of pain appropriately with the scale and preferred using it to other scales (Stuppy, 1998). Descriptive analysis revealed that retest responses of 18 subjects either agreed with or were within one face of the initial response (Stuppy, 1998). Validity of faces scales is supported by research determining that people from many cultures recognize and identify facial expressions in similar ways (Matsumoto, 1993). The FACES scale was also tested for correlation with four other pain assessment scales and was found to have a strong positive correlation (r= .81 to .95; p <.001) with each of the other scales (Stuppy, 1998). The FACES pain scale is easy to use and requires little
physical energy, the patient simply has to point to a face on the chart to communicate their pain intensity.

**Pain Measurement Tools-Adult Nonverbal Pain Scale (NVPS)**

Patients that are sedated by anxiolytic medications or who are unconscious due to a neurological condition and are unable to communicate verbally are a completely different group of ICU patients. These patients rely completely on the pain assessment completed by the nurse for their pain management. Previous studies have advocated the use of behavioral as well as physiological indicators to infer the presence of pain for uncommunicative critical care patients (Christoph, 1991; Harrison & Cotanch, 1987; Les, 1990). The Acute Pain Management Guidelines promote the use of both physiological and behavioral indicators for pain assessment when self-report is unavailable (Salmore, 2002). Ultimately, the pain assessment is the responsibility of the nurse and requires a much more involved assessment than with a patient who is responsive.

The pain assessment tool determined to be most effective for this population of ICU patients through a review and critique of existing pain measurement tools is the Adult Nonverbal Pain Scale (NVPS) (see Appendix B) developed by Odhner, Wegman, Freeland, Steinmetz, and Ingersoll (2003). The pain scale utilizes both behavioral as well as physiological indicators to assess pain intensity. This pain scale was modified from the FLACC scale to use on non-verbal adults for pain assessment.

The FLACC assessment tool (see Appendix C) was developed by Merkel, Voepel-Lewis, Shayevitz, and Malviya (1997) in order to provide a simple, consistent method for physicians and nurses to identify, document, and evaluate pain. The FLACC
tool incorporates five categories of behavior that measure pain. The acronym FLACC (face, legs, activity, cry, and consolability) assists with recall of the measuring behaviors in the tool (Merkel, et al., 1997). Each category is scored on a 0-2 scale resulting in a range of 0-10 for the final pain score. The nurse simply needs to evaluate the patient based on each of the categories and score the patient according to the description given for each score 0-2.

In the NVPS, the legs, cry, and consolability components of the FLACC scale were eliminated and three new assessments were added: 1) guarding, 2) physiological aspects I (vital signs), and 3) physiological aspects II (skin, papillary response, perspiration). The NVPS is quick and easy to use. Like the FLACC scale, the nurse is required to assess the patient based on the five categories and score the patient according to the description listed under the scores of 0-2. The patient will then receive a total score of 0-10 as his or her pain measurement and the nurse can then manage the pain accordingly. In the study by Odhner, et al. (2003) the NVPS was utilized with the FLACC scale to determine the reliability of the NVPS in comparison to the FLACC scale. Paired assessments by two different nurses were completed on each patient included in the study. Internal consistency reliability estimates for each of the scales was found to be similar with the coefficient alpha for the FLACC of 0.84 and for the NVPS of 0.78 (Odhner, et al.). Interrater reliability was good with nurses rating individual components comparably and no significant differences were seen between the nurses’ paired ratings for any of the assessments (Odhner, et al.).
Post-test

Finally a post-test will be utilized to determine the ICU nurses’ knowledge after the pain management teaching and the introduction of the pain measurement tools. The same self-report questionnaire, *Nurses’ Knowledge and Attitude Survey Regarding Pain* (see Appendix D) will be utilized to determine the effectiveness of general pain teaching information. In addition to the self-report questionnaire, nurses will be given a test to evaluate their knowledge in the use of the NVPS and FACES pain scale. Both of these post-tests will help to assess the effectiveness of the teaching module for future teaching and to establish where additional teaching is needed before implementation of the scales into nursing practice and patient care.

Long-term evaluation

It is important to assess the improvement or lack of improvement in the pain management of nonverbal ICU patients following the implementation of the new pain scales into practice. Three months after utilizing the two pain measurement tools the nurses will be given another test to evaluate their knowledge of the NVPS and FACES pain scales. The nurses will also be given a multiple-choice survey that evaluates any changes in their nursing practice with the implementation of the education and new pain scales. The multiple-choice survey will include questions such as: 1) Since the recent pain education have you changed your nursing practice?, 2) Since the pain education how have you changed your nursing practice?, 3) Do you find the pain measurement tools easy to use and effective?, 4) Do you use the pain measurement scales consistently?
If data indicates that pain management for this population of patients has not improved or is the same this may indicate that the NVPS and the FACES pain scale were not effective at measuring pain and providing nurses with the data that they required for effective pain management. If the multiple-choice survey indicates that the nurses are not using the pain measurement tools the education and tools may need to be re-evaluated.

**Summary**

The previous chapter discussed the development of the clinical project. The project is an educational module for ICU nurses. The module teaches pain assessment, interventions such as medications and adjunctive therapies, pharmacologic information, documentation, and management of patients’ pain. The primary focus of the teaching will be how to administer two pain measurement tools to non-verbal ICU patients and how to interpret these measures in order to more effectively manage pain. This chapter discussed the pain measurement tools chosen as most effective for administering to the non-verbal population of ICU patients: the NVPS and the FACES pain scale.

The following chapter will discuss Orlando’s Nursing Process Theory in relation to the educational module. The strengths and limitations of the educational module will also be discussed. Most importantly the chapter will discuss the significance of the educational module for patients and nurses. Specifically the discussion will focus on how the module will improve patient care and pain management as well as improving nursing care and nursing effectiveness.
Chapter 4

Introduction

This final chapter will discuss how the clinical project relates to Orlando’s Nursing Process Theory. The other purposes of this chapter are to discuss the strengths and limitations of the project and to discuss the significance of the clinical project for patients and nurses.

Discussion

The development of this clinical project, and more specifically the educational module, were based on Orlando’s Nursing Process Theory. Because Orlando’s theory is based on reflective practice it fits well with the development of the educational module. The educational module is based on reflective practice because it teaches nurses how to use reflection of their patients’ behaviors to effectively manage pain. The module specifically teaches nurses how to administer two different pain measurement tools to non-verbal ICU patients and based on the results from these tools how to interpret these measures in order to more effectively manage pain.

Nurses making decisions about pain measurement and how to care for verbally non-communicative ICU patients’ pain can easily use Orlando’s Nursing Process Theory. In this clinical project an educational model was developed in order to teach nurses a more efficient and effective way to administer and interpret pain measures to non-verbal ICU patients. This educational model provides nurses a more effective and universal way to manage non-verbal ICU patients’ pain. The educational model is based on Orlando’s Nursing Process Theory. It involves the nurse first recognizing from her patient’s
physical and behavioral responses that pain may exist. This is reflective of Orlando’s professional nursing function-organizing principle concept.

Next, the model provides a way for the nurse to correctly explore and interpret the complete data that he or she collects from their patient in regards to pain. The educational model provides ICU nurses with the skills that they need to correctly determine when a non-verbal patient is in pain and then to use a universal non-verbal pain scale to collect and interpret data about the patients’ level of pain and how to treat accordingly. This is based on Orlando’s patient’s presenting behavior-problematic situation concept.

Based on Orlando’s immediate reaction-internal response concept and the deliberative nursing proves-reflective inquiry concept, the nurse then acts and treats the patients’ pain based on the information that he or she has collected. The action of medicating or providing some other intervention to relieve the patients’ pain will be based on a deliberative action because it will meet the needs of the patient as determined by a thorough validation of the patients’ behavior by the nurse. Because the patients are non-verbal the nurse must rely on continued monitoring of physical and behavioral responses in order to validate that the interventions to treat the pain were effective and in the best interests of the patient.

If it is determined through continued physical and behavioral responses of the patient that the pain has not been improved by the intervention the nurse than evaluates and continues the reflective process in order to determine the next best intervention to improve the patients’ pain. This is based on Orlando’s improvement-resolution concept.
Strengths

This clinical project identified a discrepancy in pain management of ICU patients who are non-verbal, critiqued literature related to pain management of these patients, reviewed several different pain assessment tools, and proposed an educational module based on the two pain assessment tools determined to be most effective for this population of patients. The project first performed a thorough literature review related to this important topic for ICU populations. It is clearly evident in the review of literature that a problem exists in the management of pain in the non-verbal population of patients in general and more importantly in the ICU. As previously stated, there are a multitude of pain assessment tools available for use in the non-verbal population of patients but a standard of care does not exist. Blenkharn, et al. (2002) describe that there is a need for a systematic, objective pain assessment tool for use by nurses in an intensive care unit. The lack of a tool clearly makes pain management in this population unorganized, ineffective, and poorly controlled. The clear strength of this clinical project is that it has initiated a push for the standardization of a pain management tools to utilize in intensive care units for the non-verbal population of patients.

A review of the literature also indicated that ICU nurses are lacking in their knowledge of pain and its management. Another important strength of the clinical project is that it provides an educational module that is focused on educating all nurses about current evidence based pain knowledge. The educational module utilizes evaluation of the module by pre and posttests. This evaluation provides credibility to the project. Credibility can also be demonstrated in the data collection period following the
implementation of the educational module and the utilization of the two pain assessment tools within a population of nurses.

After a thorough demonstration of what constituted an effective pain management tool through the literature review, two pain assessment tools were determined as most suited for the non-verbal ICU population. The reliability and validity of these scales were thoroughly discussed. This also provides strength to the clinical project because it provides concrete data supporting the use of these tools in the educational module. Once again, standardization of an assessment tool is essential in the management of pain in the non-verbal ICU population of patients, therefore the reliability and validity of these scales is important to practice.

Limitations

One obvious limitation to the clinical project is the choice of the two pain assessment tools for use with the non-verbal ICU patient population. The primary reason for choosing these tools was because they seemed to be the best choice for the described population of patients. The other reason for choosing the two assessment tools was based on data collected from previous studies utilizing the tools. No other studies utilizing the tools were investigated and therefore reliability and validity data is described for only one study. The primary purpose of this clinical project was to set a care standard and to find tools that would be utilized by nurses to set this standard into clinical practice. Once this goal is achieved the effectiveness, reliability, and validity of the tools can be further tested.
Numerous searches were performed during the literature review to find pain assessment tools available for the described population of patients. Despite this, there may have been tools that were not investigated and therefore this is another limitation to the study. Colleagues may also believe that other pain measurement tools are useful with this population of patients and this reviewer may not have included them. The basis for inclusion in the literature review was on description of the population. If it was not believed that the scale was appropriate for this population than it was not included in the review.

Another important limitation to the study is the use of the self-report questionnaire entitled, *Nurses’ Knowledge and Attitude Survey Regarding Pain*. This questionnaire is limited because it is very general and does not focus primarily on intensive care unit patients. The questionnaire is also very dated and some of the information and data may need up to date information. A more extensive literature search did not reveal a more revised and updated questionnaire to be used for the teaching module. A recommendation for further research would be the development of a new questionnaire for this purpose. If one were published it would be used in this educational module.

**Significance of Clinical Project**

**Improving Patient Care**

The obvious significance of this clinical project to patient care is that it will improve pain management in the ICU and hopefully decrease the percentage of patients experiencing large amounts of unresolved pain. Pain is a factor in poor physiological
outcomes. Pain has been identified as a compounding factor to illness by many other authors investigating pain (Blenkharn, et al., 2002). The critically ill are also more vulnerable to the effects of unrelieved pain due to their critical condition, treatment and diagnostic interventions (Blenkharn, et al.). There is not a standard of care for use of a pain assessment tool in ICU populations. Because pain has been described as such an important factor in patient care here and in many other arenas standardization is obviously needed and has been lacking for some time. This clinical project was completed in the hopes that it would begin an initiative to standardize pain assessment in the ICU. Controlling pain in ICU patients can only improve their outcomes and also lead to improved patient satisfaction.

**Improving Nursing Care**

As described throughout this clinical project nurses need frequent and up to date information and education about pain management. Pain management criteria and evidence based practices are changing every day. For this reason alone, an educational module for ICU nurses caring for non-verbal patients is essential to bring about the best results for the patient. Nurses only can provide effective care if they have the best knowledge and the appropriate tools. Once again, the purpose of this clinical project was to initiate standardization for pain assessment tools in the ICU. With this standardization first comes proper education to the nursing population involved in the use of the pain assessment tools. The education will also focus on factors that affect the timing and amount of pain medication administered to non-verbal ICU patients because personal
beliefs and practices also affects how patients’ pain is managed. Pain education for nurses can only improve patient outcomes because it first improves nursing care.
Appendix A

Faces Pain Scale
## Adult Nonverbal Pain Scale

<table>
<thead>
<tr>
<th>Categories</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face</td>
<td>No particular expression or smile</td>
<td>Occasional grimace, tearing, frowning, wrinkled forehead</td>
<td>Frequent grimace, tearing, frowning, wrinkled forehead</td>
</tr>
<tr>
<td>Activity (Movement)</td>
<td>Lying quietly, normal position</td>
<td>Seeking attention through movement or slow, cautious movement</td>
<td>Restless, excessive activity and/or withdrawal reflexes</td>
</tr>
<tr>
<td>Guarding</td>
<td>Lying quietly, no positioning of hands over areas of body</td>
<td>Splinting areas of body, tense</td>
<td>Rigid, stiff</td>
</tr>
<tr>
<td>Physiologic I</td>
<td>Stable vital signs (no change in past 4 hours)</td>
<td>Change over past 4 hours in any of the following: SBP &gt; 20mmHg, HR &gt; 20/min, RR &gt; 10/min</td>
<td>Change over past 4 hours in any of the following: SBP &gt; 30mmHg, HR &gt; 25/min, RR &gt; 20/min</td>
</tr>
<tr>
<td>Physiologic II</td>
<td>Warm, dry skin</td>
<td>Dilated pupils, perspiring, flushing</td>
<td>Diaphoretic, pallor</td>
</tr>
</tbody>
</table>
### Appendix C

#### FLACC SCALE

*(FACE, LEGS, ACTIVITY, CRY, CONSOLABILITY)*

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FACE</strong></td>
<td><strong>FACE</strong></td>
<td>No particular expression or smile</td>
<td>Occasional’ grimace or frown, withdrawn, disinterested</td>
</tr>
<tr>
<td><strong>LEGs</strong></td>
<td>Normal position</td>
<td>Uneasy, Restless, Tense</td>
<td>Kicking, Or Legs drawn up</td>
</tr>
<tr>
<td><strong>ACTIVITY</strong></td>
<td>0</td>
<td>Lying quietly Normal position Moves easily</td>
<td>Squirming Shifting back/forth Tense</td>
</tr>
<tr>
<td><strong>CRY</strong></td>
<td>0</td>
<td>No Cry (Awake or Asleep)</td>
<td>Moans or Whimpers Occasional Complaint</td>
</tr>
<tr>
<td><strong>CONSOLABILITY</strong></td>
<td>0</td>
<td>Content Relaxed</td>
<td>Reassured by occasional touching, hugging, or talking to Distractible</td>
</tr>
</tbody>
</table>

The FLACC is a behavior pain assessment scale for use in non-verbal patients unable to provide reports of pain.

**Instructions:**
1. Rate patient in each of the five measurement categories
2. Add Together
3. Document total pain score
## Appendix D

### Nurses' Knowledge and Attitudes Survey Regarding Pain

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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>F</td>
<td>1. Observable changes in vital signs must be relied upon to verify a patient's statement that he has severe pain.</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>2. Because of an underdeveloped neurological system, children under 2 years of age have decreased pain sensitivity and limited memory of painful experiences.</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>3. If the patient can be distracted from his pain this usually means that he does NOT have high pain intensity.</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>4. Patients may sleep in spite of severe pain.</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>5. Comparable stimuli in different people produce the same intensity of pain.</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>6. Aspirin and other nonsteroidal anti-inflammatory agents are NOT effective analgesics for bone pain caused by metastases.</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>7. Non-drug interventions (e.g. heat, music, imagery, etc.) are very effective for mild-moderate pain control but are rarely, helpful for more severe pain.</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>8. Respiratory depression rarely occurs in patients who have been receiving opioids over a period of months.</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>9. Aspirin 650 mg PO is approximately equal in analgesic effect to meperidine (Demerol) 50 mg PO.</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>10. The World Health Organization (WHO) pain ladder suggests using single analgesic agents rather than combining classes of drugs (e.g. combining an opioid with a non-steroidal agent).</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>11. The usual duration of action of meperidine (Demerol) IM is 4-5 hours.</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>12. Research shows that promethazine (Phenergan) is a reliable potentiator of opioid analgesics.</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>13. Patients with a history of substance abuse should not be given opioids for pain because they are at high risk for repeated addiction.</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>14. Beyond a certain dosage of morphine increases in dosage will NOT increase pain relief.</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>15. Elderly patients cannot tolerate opioids for pain relief.</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>16. The patient with pain should be encouraged to endure as much pain as possible before resorting to a pain relief measure.</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>17. Children less than 11 years cannot report pain with reliability and therefore, the nurse should rely on the parents' assessment of the child's pain intensity.</td>
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<tr>
<td>T</td>
<td>F</td>
<td>18. Based on one's religious beliefs a patient may think that pain and suffering is necessary.</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>19. After the initial recommended dose of opioid analgesic, subsequent doses are adjusted in accordance with the individual patient's response.</td>
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<tr>
<td>T</td>
<td>F</td>
<td>20. The patient should be advised to use non-drug techniques alone rather than concurrently with pain medications.</td>
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<tr>
<td>T</td>
<td>F</td>
<td>21. Giving patients sterile water by injection (placebo) is often a useful test to determine if the pain is real.</td>
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<tr>
<td>T</td>
<td>F</td>
<td>22. In order to be effective, heat and cold should only be applied to the painful area.</td>
</tr>
</tbody>
</table>
23. The recommended route of administration of opioid analgesics to patients with prolonged cancer-related pain is
   a. intravenous
   b. intramuscular
   c. subcutaneous
   d. oral
   e. rectal
   f. I don’t know

24. The recommended route of administration of opioid analgesics to patients with brief, severe pain of sudden onset e.g. trauma or postoperative pain, is
   a. intravenous
   b. intramuscular
   c. subcutaneous
   d. oral
   e. rectal
   f. I don’t know

25. 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. Brompton’s cocktail
   b. codeine
   c. morphine
   d. meperidine (Demerol)
   e. methadone
   f. I don’t know

26. Which of the following IV doses of morphine administered over a 4 hour period would be equivalent to 30 mg of oral morphine given q4 hours
   a. Morphine 5 mg IV
   b. Morphine 10 mg IV
   c. Morphine 30 mg IV
   d. Morphine 60 mg IV

27. 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

28. A patient with chronic cancer pain has been receiving daily opioid analgesics for 2 months. The dose increased during this time period. Yesterday the patient was receiving morphine 200 mg/hour intravenously. Today he has been receiving 250 mg/hour intravenously for 3 hours. The likelihood of the patient developing clinically significant respiratory depression is
   a. less than 1
   b. 1-10%
   c. 11-20%
   d. 21-40%
   e. >41%

29. Analgesia for chronic cancer pain should 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

30. The most likely explanation for why 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.

31. Which of the following drugs are useful for treatment of cancer pain?
   a. Ibuprofen (Motrin)
   b. Hydromorphone (Dilaudid)
   c. Amitriptyline (Elavil)
   d. All of the above

32. 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

33. Which of the following describes the best approach for cultural considerations in caring for patients in pain:
   a. Because of the diverse and mixed cultures in the United States, there are no longer cultural influences on the pain experience.
   b. Nurses should use knowledge that has defined clearly the influence of pain on culture (e.g. Asian patients are generally stoic, Italians are expressive and exaggerate their pain, etc.)
   c. Patients should be individually assessed to determine cultural influences on pain.

34. What do you think is the percentage of patient who over report the amount of pain they have? Circle the correct answer.

   0   10  20  30  40  50  60  70  80  90  100%

35. Narcotic/opioid addiction is defined as psychological dependence accompanied by overwhelming concern with obtaining and using narcotics for psychic effect, not for medical reasons. It may occur with or without the physiological changes of tolerance to analgesia and physical dependence (withdrawal).

   Using this definition, how likely is it that opioid addiction will occur as a result if treating pain with opioid analgesics? Circle the number closest to what you consider the correct answer. < 1-5% 25% 50% 75% 100%
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.

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<tbody>
<tr>
<td>No pain/discomfort</td>
<td>Worst Pain/discomfort</td>
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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 as an acceptable level of pain relief. His physician's order for analgesia is "morphine IV 1-3 mg qlh 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.

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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 as an acceptable level of pain relief. His physician's order for analgesia is "morphine IV 1-3 mg qlh PRN pain relief." Check the action you will take at this time:

C. 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
Teaching Module Outline

I. Introduction and purpose of education

II. Pre-test (Nurses’ Knowledge and Attitude Survey Regarding Pain)

III. Introduction to pain management in ICU patients
   A. What is pain
   B. Aims of the presentation
   C. Pain data

IV. Factors affecting pain management
   A. Time out of school
   B. Accepting patient reports of pain
   C. Side effects of pain medications
   D. Physicians
      1. Orders
      2. Communication
   E. Families

V. Types of patients in ICU
   A. Non-verbal but alert
   B. Non-verbal comatose

VI. New Pain Measurement Tools
   A. FACES pain scale
   B. Adult Nonverbal Pain Scale (NVPS)

VII. Post-test
References


