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Neonatal Pain Management: the Evaluation of Two Methods on Educating Neonatal Nurses

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The Evaluation of Two Methods on Educating Neonatal Nurses

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Introduction

In January of 2001, the Joint Commission on Accreditation of Healthcare Organizations developed new "pain standards" which hospitals are required to meet. The following is a list of standards to be addressed at each healthcare institution:

- Should address pain at the end of life.
- Should provide each patient with an appropriate assessment and management of pain.
- Should provide effective pain management that is appropriate for all patients, not just for dying patients.
- Should provide appropriate policies and procedures to support safe medication prescription and administration.
- Should provide stringent monitoring of all patients during the post procedure period.
- Should accurately document the effectiveness of nonpharmocologic and pharmacologic interventions for each patient.
- Should provide each patient with appropriate education on managing pain.
- Should provide adequate discharge planning on appropriate pain management for each patient.
- Should collect data in order to monitor performance on pain management.

The clinical management of neonates' pain is a complex and challenging nursing responsibility. Before pain can be managed, knowledge of developmental principles, skills in neonatal pain assessment, and knowledge of intervention strategies are needed to prevent long-term complications related to emotional and physiological responses to pain.

Pain management in neonates is difficult to assess due to their inability to describe the subjective experience of pain (Anad, 1998). It was once thought that infants could not perceive pain. Ten years ago preterm neonates were routinely subjected to surgical procedures without the used of adequate anesthesia or postoperative analgesia (American Academy of Pediatrics, 2000). The discovery that extreme metabolic responses and clinical outcomes of neonates undergoing surgery can be improved by potent anesthesia led to the systematic changes in the clinical practice of neonatal anesthesia (Anad, 1998). These physiological responses were related to the developing pathways and mechanisms associated with pain perception during fetal and neonatal life.

Therefore, in order to meet the Joint Commission on Accreditation of Healthcare Organizations new "pain standards", Children's Hospital of New Jersey's Neonatal Intensive Care Unit, at Newark Beth Israel Medical Center developed an extensive education curriculum in order to educate the staff regarding neonatal pain and pain management. This was the first necessary step to take

before the initiation of policies, educational material, and competencies on pain management could be implemented.

Two educational programs were developed and presented to the staff. One lecture was on nonpharmocologic pain management and the other lecture was on pharmacologic pain management. Once the didactic was presented to the entire staff, the initiation of policies, competencies, and educational material began.

Educational programs on pain management have demonstrated some success in increasing nurses' knowledge, assessment, and management of pain. The purpose of this study was to evaluate whether or not the one –hour lecture, presented by this author, on Nonpharmacologic Pain Management in Neonates provided the nursing staff with an increase in knowledge regarding neonatal pain management and assessment.

LITERATURE REVIEW

The scholarly literature on two topics, neonatal pain management and nursing education, was reviewed. Research and clinical investigations on neonatal pain indicate that not only do preterm infants experience pain, but that they are hypersensitive and have a lower threshold for pain than the adult population (Corff, Seidman, Venkatarman, Lutes, Yates, 1995). As perinatal and neonatal knowledge and technology advance, smaller and less physiologically and neurologically mature infants are surviving. These infants are subjected to more than 300 painful procedures within the first few weeks of life (Stevens, 1996). The extrauterine environment bombards them with stressful stimuli to which their nervous systems are too immature to modulate effectively (Frank, 1998).

Studies of human fetuses indicate that the fetal nervous system is sufficiently mature by 20 weeks gestation to perceive nociception (Anad, 1998). Nociception is the perception of injury or painful stimuli by the body's nervous system and does not involve the affective or evaluative components of pain. Neurotransmitters that enhance nociception are functional earlier than the production of endogenous opiates, which when present, attenuate pain perception (Ruda, 2000).

Acute physiological changes caused by painful or stressful stimuli can be implicated in the causation or subsequent extension of early intraventricular

hemorrhage, or ischemic changes leading to periventricular leukomalacia (Anand, 1998). Even minor invasive techniques such as blood drawing by heel lancing or parental injections evoke distinct physiological responses when compared to non-painful stimuli. The repetitive character of these aversive routines potentially creates a burden of pain for the newborn infant, leading to late adverse consequences or immediate risk to hemodynamic instability, decreased oxygenation, or increased intracranial pressure (Whitfield, Grunau, 2000).

Severe or prolonged pain should be managed with pharmocologic agents. Certain opiates and narcotics have been used successfully in preterm infants. Minor pain or distress may be managed by nonpharmocologic comfort measures. Numerous nonpharmocologic measures such as nonnutritive sucking, swaddling, and facilitated tucking have shown to be quite effective in soothing preterm infants. Nursing care aimed at minimizing reactions in preterm infants resulted in shorter stays on the respirator, less oxygen requirements, reduced incidence of pnuemothorax, bronchopulmonary dysplasia, and intraventricular hemorrhage (Frank, 1998).

Effective pain management is a complex multidisciplinary treatment endeavor, and is plagued with many barriers including healthcare providers' attitudes and knowledge of pain (Cason, Jones, Brock, Maese, and Milligan, 1999). Given their integral role in pain management, nurses with knowledge, attitudes, and

beliefs about the experience of pain are essential in reducing the unnecessary high incidence of unrelieved pain. Despite nurses' crucial role in caring for patients with pain, studies of nurses' knowledge and attitudes about pain management are often inaccurate.

Therefore, education would be a key element in improving pain management (Hansen, 1997). In addition to building on a weak knowledge base, educators must realize that some nurses have negative attitudes and myths about pain management (Wallace, Graham, Ventura, and Burke, 1997). Instructors will also be confronted with rather strong beliefs that interfere with the objective use of newly acquired information.

Several published research studies reported clinical practice changes along with an increase in knowledge, as outcomes of continuing education programs.
A study conducted by (Czurylo, Gattuso, Epsom. Ryan, Stark, 1999) found that educational programs triggered practice changes in staff nurses. By using a written test and follow up evaluation, knowledge gain, and practice changes were documented on effective pain management. Positive patient outcomes include patient satisfaction with pain control.

Brazen (1995), studied the outcomes in practice in 171 nurses following a one day continuing education program. She determined that nursing practice did change because of attendance at a continuing education program. Factors that

appear to influence such outcomes are program content, clinical problem solving, complexity of the knowledge learned, a practice component as part of the educational presentation, and a practice environment to change. Participants identified their unit or department setting and people with whom they worked as the greatest obstacles to incorporating change into clinical practice.

Wallace et al (1997) reported that nurses need enough information to understand how attitudes could influence judgment in effective pain management. Using a theoretical base program can help determine the scope of the learning. The authors in this study used the physiological model, Gate Control Theory in developing their educational program on pain management.

Gate Control Theory postulates that painful signals are transmitted from the periphery to the central nervous system via ascending pathways. The modulation of painful signals occurs via descending pathways from the central nervous system that inhibit incoming pain signals from the periphery. However, neurotransmitters contained in descending pathways are not fully completed in the preterm infant. Hence, Gate Control Theory would suggest that nurses use both pharmocologic and nonpharmocologic strategies for pain control. Therefore, the educational effort would include classes in both of these skills.

Wallace et al (1997) also reported on the process for implementing a postoperative pain management protocol in the neonatal intensive care unit at

the Children's Hospital in Columbia Missouri. It involved three steps: 1. The identification of barriers to optimal pain management; 2. The formulation of a pain management team and 3. Utilization of a pain management tool. One of the most significant barriers that was identified was the lack of knowledge in neonatal pain by the nursing staff.

Similarly, heightened awareness of pain in neonates, the desire to improve outcomes for our most vulnerable patients and the publication of the Joint Commission on Accreditation of Healthcare Organizations, "pain standards" prompted the Neonatal Unit, at the Children's Hospital of New Jersey, to design and implement its pain protocol educational in-service program which was developed based on the theoretical model on Gate Control Theory.

Objectives of the one-hour in-service program presented for the nursing staff at the Neonatal Intensive Care Unit at Children's Hospital of New Jersey, Newark Beth Israel Medical Center, were to assist the participant in understanding myths and misconceptions regarding neonatal pain management, nonpharmocologic interventions, and techniques on providing parent involvement. The content of the in-service included history and research on neonatal pain management, myths and misconceptions on neonatal pain, assessment tools, nonpharmacologic interventions for procedural pain, benefits of pain relief, ethical considerations, and parent involvement.

METHODOLOGY

In order to meet the "pain standards" as addressed by the Joint Commission on Accreditation of Healthcare Organizations, the Neonatal Intensive Care Unit at Newark Beth Israel Medical Center began to tackle this task by implementing educational in-services for the staff, prior to the Implementation of policies and procedures in pain management. This author developed a Nonpharmacologic Pain Lecture in order to educate the staff regarding neonatal pain assessment.

In-services on nonpharmocologic pain management began in January 2001. Each nurse was required to attend one of the lectures presented on the following dates:

January	February	March	April	May
24,29,31	21,28	12, 14, 16, 18, 30	9,11,30,	1,14,16

Additionally, this author presented a statewide conference on Developmental Interventions and Nonpharmacologic Pain on February 13, 2001. Staff nurses

throughout the state, and from Newark Beth Israel Medical Center attended this one-day conference. For those nurses who could not attend any of the live lectures, a videotape of the lecture was recorded, and made available for the nurses to view at their convenience.

In total, over 200 individuals attended one of the Nonpharmocologic Pain Lectures that were presented to staff nurses as well as physicians, physician assistants, nurse practitioners, social workers, and nursing students. Of the 107 nurses on the staff of the Neonatal Unit at Newark Beth Israel Medical Center, 70 nurses attended the lecture, 20 viewed the tape, 7 nurses were out on a leave of absence, and 10 nurses did not attend any of the lectures as of August 1, 2001.

Finally, this author designed the attached questionnaire (appendix 1), which was distributed to the 107 staff nurses at Newark Beth Israel Medical Center's Neonatal Unit. The questionnaire was developed to determine the knowledge gained from the lecture or videotape. The 70 nurses who attended the live lecture received the questionnaire one to four months following their attendance at the lecture. Those 20 nurses who viewed the videotape on Nonpharmocologic Pain Management completed the questionnaire immediately following the viewing of the lecture. This was done in order to validate and assess the actual viewing of the tape.

This author evaluated the responses from those 20 nurses who viewed the videotape of the lecture, as well as those 70 nurses who attended the live lecture.

Results

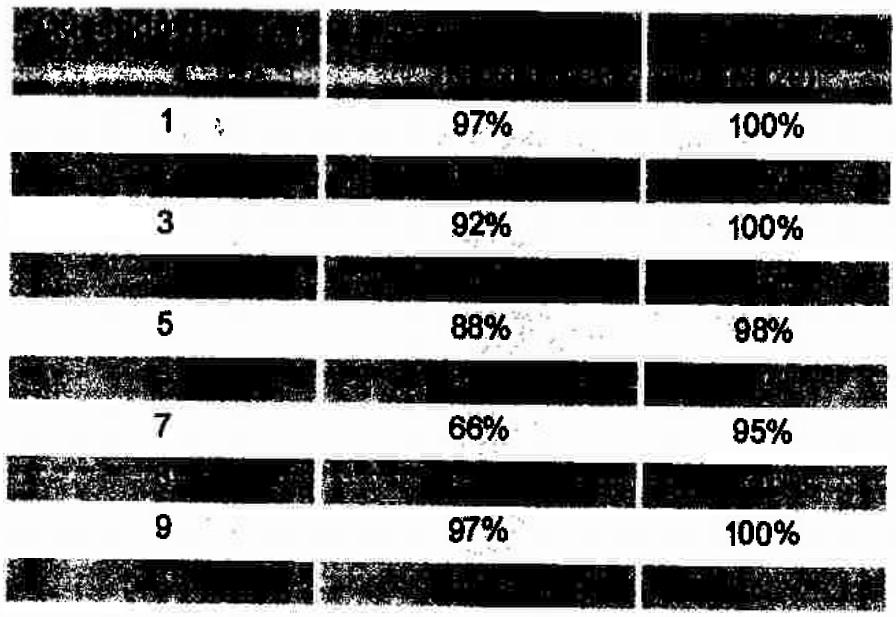
This author designed the attached questionnaire (appendix 1), to determine the knowledge gained from the lecture or videotape. The questionnaire was distributed to the 107 staff nurses at Newark Beth Israel Medical Center's Neonatal Unit. This author analyzed the responses from those 70 nurses who attended one of the live lecture sessions, as well as those 20 nurses who viewed the videotape of the lecture. Those nurses who attended the live lecture received the questionnaire one to four months following their attendance of the lecture. Those nurses who viewed the tape on Nonpharmacologic Pain Management in Neonates completed the questionnaire immediately following viewing the lecture. This was done in order to validate and assess the actual viewing the tape. (Explanation of results in Table 1.)

Explanation of Results

The nurses who viewed the videotape of the live lecture did better overall. More than 90% of them answered every question correctly. On the other hand, depending on the question, the percentage of correct responses varied from 52%-100% for those nurses who attended the lecture. The most difficult

questions were questions #4 and #7. Question 4 is "Identify one autonomic indicator of pain" and question 7 is "Neurotransmitters that decrease pain are present in ascending pathways" (true or false). Both of these questions dealt with neurotransmitters and their responses to painful stimuli and in each case less than 70% answered correctly. The difference in the group that attended the lecture and those who watched the videotape was not so great for questions #3, #5, and #10. Question 3 was, "What is a physiological indicator of pain", question 5 is" What are four behavioral indicators of pain?" and question 10 is, "What is a long term outcome of pain". All of these questions dealt with outcomes associated with pain. However, over 97% of all nurses in both groups answered questions# 6, # 8, # 9, correctly. Question 6 is "Which procedures can cause pain", question 8 is, "What conditions may result from pain", and question 9 is "When starting an IV, "What techniques could you use to reduce pain". Each of these questions dealt with nursing clinical practice. Both groups also showed proficiency in understanding changes in clinical practice that may reduce pain for infants.

Results Table 1-Responses to Questionnaire on Nonpharmacologic pain Management



Conclusions

The results seemed to indicate that the nurses who viewed the videotape retained more information from the lecture than did those who attended the lecture. However, one should not conclude that watching the videotape is a better way of teaching than is the classroom setting for the following reasons:

1. Those that viewed the videotape responded to the questionnaire immediately following viewing the lecture while those who attended the lecture were given the questionnaire one to four months later.
2. Those nurses who viewed the tape could replay any part of the videotape for clarification on the material that was presented, while those who attended the lecture could not do that.
3. Those nurses who viewed the videotape completed the questionnaire unsupervised; therefore, they may have collaborated with other staff members.
4. Those who viewed the videotape could view it at their convenience and therefore may have been able to focus more on the lecture.

However, both groups showed that they comprehended the concept that infants have a lower threshold for pain than adults.

Recommendations

1. To more accurately assess the material gained from the lecture, one should give the participants a pretest before they view or attend the lecture, and compare those results with the posttest. This author assumed that the knowledge base on neonatal pain management was minimal due to recent developments in neonatal pain and one should not make that assumption.
2. A questionnaire should be given out immediately following the lecture for both groups and then again 2 months later for both groups.
3. A continuation of educational programs on neonatal pain management is necessary in order to be up to date on the latest research and outcomes for neonates.
4. The use of videotapes that staff can view at home or at their own convenience may provide a more optimal experience for learning or may reinforce the classroom learning experience.

Appendix 1

Respondents
Nonpharmacologic Pain Management Test

1. At what age can infants perceive pain?

a. After 2 months post conception
b. At 20 weeks gestation
c. 40 weeks gestation
d. not well documented

Viewed tape 100 **% correct** **Attended lecture** 97 **% correct**

2. Preterm infants are less hypersensitive to pain than adults are.

True or False

Viewed tape 100 **% correct** **Attended lecture** 100 **%**

3. What is a physiological indicator of pain?

a. Decrease in heart rate
b. Increase in blood pressure
c. Increase in respiratory rate
d. All of the above

Viewed tape 100 **% correct** **Attended lecture** 92 **% correct**

4. Identify one autonomic indicator of pain. _____

Viewed tape 90 % **correct** **Attended lecture** 52 **% correct**

5. What are four behavioral indicators of pain?

a.
b.
c.
d.

Viewed tape 98 **% correct** **Attended lecture** 88 **% correct**

6. Which procedures can cause pain?

a. Ogt removal
b. IV insertion
c. Removal of leads
d. All of the above

Viewed tape 100 **% correct** **Attended lecture** 97 **%**

7. Neurotransmitters that decrease pain are present in ascending pathways.

True or False

Viewed tape 95 **% correct** **Attended lecture** 66 **% correct**

8. What conditions may result from pain?

a. IVH

b. PVL
c. Death
d. All of the above

Viewed tape 100 **% correct** **Attended lecture** 95 **% correct**

9. When starting an IV, what techniques could you use to reduce pain?

a. Pin infant's arms and legs down
b. Swaddle infant
c. Place infant on hard counter top
d. All of the above

Viewed tape 100 **% correct** **Attended lecture** 97 **% correct**

10. What is a long-term outcome of pain?

Viewed tape 100 **% correct** **Attended lecture** 92 **% correct**

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