

# Health Care Professional's Attitude Towards the Effective Management of Pain in the Critically Ill Neonate

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## ABSTRACT

**Introduction:** Over the past 25 years, caregiver's knowledge of pain in newborn infants has advanced from the beliefs that newborn infants do not feel pain, to the knowledge that preterm infants experience more pain compare to older children and adults. However, caregivers know that pain exists in this population and research has supported that pain continues to be untreated up to 65% of the time.

**Aim of the study:** The purpose of this study was to investigate the attitude and knowledge of health care professionals from the area of Neonatology in Romania regarding procedural pain management in newborn infants.

**Material and methods:** The sample consisted of 85 physicians and nurses (110 invited) working in five Neonatal Care Centres. Data were collected using a self-completion, 17 items questionnaire designed for this study.

**Results:** With a response rate of 77.27% which was similar in nurses and physicians, respondents in our study were aware about the pain experience during procedural interventions, recognized the items of pain scales assessment, and are not comfortable with the parental presence during painful procedures. Twenty-five percent of nurses versus 9% of physicians reported rushed care as an important barrier of adequate non-pharmacological pain management (95% IC, 0.319-0.003)

**Conclusions:** The use of pain protocols for an effective management of pain during neonatal period is required.

**Keywords:** pain management, health care professional's knowledge, neonates

Received: 10 March 2015 / Accepted: 25 June 2015

## INTRODUCTION

Neonatal pain management and pain assessment have been a focus of attention for more than twenty five years. The knowledge of both nurses and physicians, regarding pain in newborn infants, has increased considerable. Research has revealed that even infants born extremely prematurely have the ability to experience and feel pain [1]. Pain, as defined by the International Association for the Study of Pain (2001), is "an unpleasant sensory and emotional experience associated with

actual or potential tissue damage or described in terms of such damage". Pain assessment is a fundamental precursor to pain treatment [2]. Current recommendations indicate that multi-dimensional scales are preferable for pain assessment in the newborn infant because the pain is known to be relative to circumstance, with pain response in healthy newborns differing significantly from that in the critically ill or preterm infants [2,3].

Newborns routinely experience pain during first days of life associated with invasive procedures such

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as blood sampling for metabolic screening disease, immunization and vitamin K injection. Management of pain in the newborn period is hampered by the lack of awareness among health care professionals that the neonate is capable of experiencing pain, and by the concerns regarding side effects associated with analgesic use. Despite the current knowledge that newborn infants are able to experience pain, many daily procedures are still performed without pharmacological or non-pharmacologic analgesic therapy [4].

In a recent published study clinicians estimated that most neonatal intensive care unit procedures are painful, but only a third of the neonates received appropriate analgesic therapy [5]. Repetitive and prolonged pain during hospitalization interferes with normal growth and development and has implications for permanent alterations in long-term neurodevelopment [6]. Given that a neonate requiring intensive care may be exposed to as many as twelve to sixteen painful invasive procedures each day of hospitalization [7], the American Pain Society made pain the “fifth vital sign” and several psychometric tools are now available to assess pain in the neonate. Although clinically tested, most of these tools have not been integrated into the assessment of the well newborn [8].

Many analgesics and hypno-sedatives are available, but few of them have been studied in neonates. According to a work of a Cochrane group [9] doubts persist about the adverse effects of opioids, and choosing a suitable medication requires a delicate balance between benefits and risks. Non pharmacological techniques reduce neonatal pain directly by blocking nociceptive transduction or transmission or by activating descending inhibitory pathways, and indirectly by reducing the total amount of noxious stimuli to which infants are exposed [10].

The purposes of this study were to examine health care professional’s knowledge of pain controlling tools in critically ill neonates, pain intensity during procedural interventions and barriers to effective pain management.

## ■ METHODS

An exploratory descriptive study design was used. Responses to a 17 item questionnaire were collected during two months.

All the nurses and physicians (N=110) in five academic medical neonatal care centers were invited to

complete the questionnaire. These medical centers have an average yearly admissions of between 2000 and 5000 patients, and all of them have departments for neonatal intensive care and are referral units. Each of the five medical centres invited to participate in the study have existing written protocols addressing neonatal pain management for critically ill and healthy newborns. The questionnaire was developed specifically for this study and was trailed previous to its use in the study. Demographical data collected included age, qualification and years of experience of the medical personnel. The questionnaire contained ten true/false questions to assess health-care professionals’ knowledge of pain control in neonates. In the second part, six questions were designed to rate pain intensity from none to severe, for each of one routinely used procedure (n=8: heel lance, nasogastric tube insertion, upper airway suctioning, tape removal, endotracheal tube insertion, peripherally inserted catheter, diaper change, intramuscular injection). The questionnaires were completed anonymously and the average time for completion was less than 15 minutes. The study was approved by the sites institutional review board and respected the guiding principles of the Declaration of Helsinki.

Data were analyzed using IBM SPSS Statistics 17.0. Descriptive statistics were used to analyse data. The alpha value ( $\alpha$ ) was set at 0.05.

Independent T sample test and t-test equality of means between groups (nurses and physicians) was conducted to explore the difference in use of non-pharmacological technique during procedural pain.

## ■ RESULTS

One hundred and ten questionnaire were distributed. There was no significant difference in response rate between nurses and physicians. Forty nurse (47%) and forty five physicians (53%) responded, giving an overall response rate of 77%. Sixty percent of participants had 0 to 5 years’ experience, 18.8% had 6 to 10 years, 15.3% had 11 to 20 years and 5.9% had more than 20 years’ experience in neonatal care centres. Eighty three of eighty five (97.6%) respondents were aware of the fact that critically ill newborn infants experience more pain than older children and 84 of 85 (98.8%) responded that preterm born infants during hospitalization experience more pain than term born infants.

The T sample test and t-test equality of means between groups (nurses and physicians) to explore the

**Table 1. Participants’ responses to items regarding knowledge of pain management**

Items no	Items	Correct response	Nurses N=40	Physicians N=45
1	Critically preterm infants experience more pain than older children and adults	T	38	40
2	Healthy new born infants does not usually need pain relief during blood draw	F	39	40
3	Oral administration of glucose to neonates before painful procedure can reduce pain	T	30	38
4	Opioids use in neonates may lead to addiction	F	28	37
5	Only newborns critically ill admitted to Neonatal Intensive Care Units need pain control during blood draw	F	36	38
6	How many invasive procedures could be needed for a critically ill newborn admitted to Intensive Care Unit	12-16	24	20
7	A critically neonate admitted to Intensive Care Unit with ETT and respiratory support should not receive opioids due to high risk of toxicity	F	28	30
8	Opioids should not be administered for critically neonates pain relief due to high risk of respiratory depression	F	31	32
9	Critically affected neonates who need invasive procedures ie., ETT, and blood draw for blood gas analyses are too affected to cry and they should not receive sedatives and barbiturates due the overmedication	F	36	36
10	Swaddling the neonate during the painful procedures is effective	T	20	31

T= true F= false

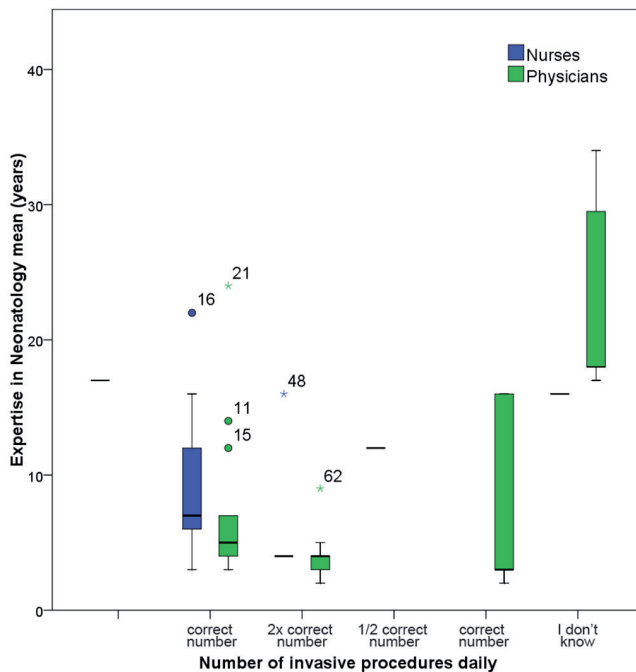
difference in use of non-pharmacological technique during procedural pain indicated that 70% of physicians and 49% of nurses use “swaddling” and 91% of physicians versus 70% of nurses place the infant in the mother arm after a painful procedure. The difference in procedures was statistically significant. (p=0.049 and 0.013 respectively). No differences were found between groups according the use of pacifiers (82% versus 80%: p=0.797) and sweet analgesia (85% versus 76%: p=0.283). Slightly less than half of the respondents (44% of physicians versus 48% of nurses, p=0.78) stated that physicians only order the analgesia during painful procedures in their departments. Twenty four % of physicians compare to 73% of nurses agreed that during painful procedures parents should not stay with

their child and this difference was statistical significant (95% CI: 0.672 to 0.289). Twenty five percent of nurses versus nine percent of physicians reported “rushed care” as an important, statistically significant barrier to adequate non-pharmacologic pain management (95% IC: 0.319 to 0.003). Seventy seven percent of the respondents reported the administration of “sweet analgesia” after a painful intervention. The most frequently reported painful procedure was heel lance, by thirty nine respondents (45.9%), followed by intramuscular injection by twenty two respondents (25.9%), and the least rated procedure was ETT and NG insertion by six respondents (7.0%).

Regarding the use of written hospital protocols for procedural pain, thirty one percent of respondents did

**Table 2. Participants’ responses to items rating the pain intensity for routinely used procedures in critically ill neonates**

Procedure (N=85)	No pain N, (%)	Mild pain N, (%)	Moderate pain N, (%)	Severe pain N, (%)
Heel lance	0	2 (2.4)	44 (51.8)	39 (45.9)
Nasogastric tube insertion	18 (21.2)	15 (17.6)	51 (60)	1 (1.2)
Upper airway suctioning	5 (5.9)	22 (25.9)	48 (56.57)	10 (11.8)
Tape removal	8 (9.4)	10 (11.7)	50 (58.8)	17 (20)
ETT insertion	4 (4.7)	11(12.9)	64 (75.3)	6 (7.1)
Peripherally catheter insertion	2 (2.4)	23 (27.1)	48 (56.5)	12 (14.11)
Diaper change for critically ill neonates	16 (18.9)	4 (4.7)	62 (72.9)	3 (3.5)
Intramuscular injection	0	0	63 (74.1)	22 (25.9)



**Figure 1. Association between expertise and knowledge about the number of invasive procedures needed daily when a critically ill newborn is admitted to a Neonatal Intensive Care Unit**

know of their existence, and thirty six percent did not know if there were written protocols addressing pain management in their departments.

Eighty seven percent of respondents reported that those critically ill infants admitted to Intensive care units required analgesics during procedural pain, and only thirty four percent operated on the assumption that healthy term neonates did not need analgesia during painful procedures. Fifty two percent of our respondents could not estimate the approximate number of painful procedures that a critically ill infant, admitted to neonatal intensive care unit, would require.

Regarding the use of pharmacological agents, seventy seven percent of respondents were aware of respiratory side effects, sixty nine percent of the effect of toxicity and overdose, and fifty six percent associated the use of analgesic agents with potential addiction. Only twenty percent of physicians and ten percent of nurses were willing to provide analgesia during procedural pain in an emergency situation and if the critically ill infant was admitted to neonatal intensive care unit. This difference was not statistically significant ( $p=0.206$ ).

Regarding knowledge of the neonatal pain scale items (PIPP scale), 96.5% recognize crying, 88.2% facial grimaces, 51.8% decrease in oxygen saturation, 63.5% squeezing eyes and 28.2% opening mouth.

## DISCUSSION

Respondents were aware of the fact that critically ill newborn infants experience more pain than older children or adult patients and about the fact that pre-term born infants experience more pain compare to term born infants, this result being consistent with results reported in prior studies [11,12]. Consistent with the literature, respondents recognized that heel lance procedures produces the most severe pain followed by the nasogastric tube insertion and endotracheal intubation [13]. Other studies reports moderate pain rating for NG tube placement and EET insertion [11].

Our results showed that compared to physicians, a significant percentage of nurses do not provide parents with the opportunity to be present during their child's painful procedure. This is contradiction to a recent review study which concluded that it was appropriate that parents be given the opportunity to stay with their child [14,15]. Some studies have revealed that parents desire more information and involvement in their infants' pain management and their presence during painful procedures would be helpful in developing coping strategies to reduce distress related to their infant's pain [16,17].

Nurses have a crucial role in the assessment and management of pain during invasive intervention for critically ill neonates. Most nurses had a good level of knowledge of pain management, but a few reported negative attitudes towards the use of pharmacological agents during painful procedures such blood sampling or EET for critically ill neonates admitted to intensive care units. Negative attitude have been reported in other studies as the main barriers in pain assessment and alleviation [18,19].

Two respondents were unaware of the existence of written protocols for pain management in their departments. Despite this, knowledge about ranking the intensity of pain and pharmacological and non pharmacological tools for managing pain were well known, and this result confirms this view as stated in another study [20]. Slightly more than half of the respondents would not provide pharmacological pain agents, citing the problem of potential addiction even though addiction cannot be generated in neonates [21].

The findings of this study suggest that the participants need further education regarding the pharmaco-

logical measures for pain management in neonates, a view described in previous studies [22,23].

The response rate was high in our study (almost 80%). However caution should be exercised in interpreting the results as these may show some overestimation due to the fact that the respondents had a heightened interest in neonatal pain.

## ■ CONCLUSIONS

In Romania each neonatal care centre has its own protocols addressing the neonatal pain management and neonatal pain assessment but unfortunately there are no approved national guidelines approved published by the Romanian Ministry of Health. The present study reports knowledge, practice and beliefs as well as barriers to efficient pain management during the neonatal period. We showed that health-care professionals were aware of the fact that most procedures performed on newborn infants are painful and that they have sufficient knowledge of pain control and that they have the desire to limit pain intensity in neonates. Increased care-giver education remain a necessity and strategies to implement new guidelines are mandatory.

## ■ ACKNOWLEDGEMENT

This paper is supported by the Sectorial Operational Programme Human Resources Development (SOP HRD), financed from the European Social Fund and by Romanian Government under the contract number POSDRU/159/1.5/S/133377/

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## ■ APPENDIX Questionnaire used to assess health-care professionals' knowledge of pain control - in neonates

1. Critically preterm infants experience more pain than older infants
  - True  False
2. Healthy new born infants does not usually need pain relief during blood draw
  - True  False
3. Oral administration of glucose to neonates before painful procedure can reduce pain
  - True  False
4. Opioids use in neonates may lead to addiction
  - True  False
5. Only newborns critically ill admitted to Neonatal Intensive Care Units need pain control during blood draw
  - True  False
6. How many invasive procedures could be needed for a critically ill newborn admitted to Intensive Care Unit
  - 12-16 painful procedures daily
  - 8-10 painful procedures daily
  - 18-20 painful procedures daily
  - 6-8 painful procedures daily
  - I don't know
7. A critically neonate admitted to Intensive Care Unit with ETT and respiratory support should not receive opioids due to high risk of toxicity
  - True  False
8. Opioids should not be administered for critically neonates pain relief due to high risk of respiratory depression
  - True  False
9. Critically affected neonates who need invasive procedures ie., ETT, and blood draw for blood gas analyses are too affected to cry and they should not receive sedatives and barbiturates due the overmedication
  - True  False
10. Swaddling the neonate during the painful procedures is effective
  - True  False
11. For the following routinely used procedures you have to rate the intensity of pain only in one of following variants from 0: no pain, 1: mild pain, 2: moderate pain, 3: severe pain
  - Heel lance for routinely diagnostic tests
  - Intramuscular injection
  - Nasogastric tube insertion
  - Upper airway suctioning
12. For the following routinely used procedures you have to rate the intensity of pain only in one of following variants from 0: no pain, 1: mild pain, 2: moderate pain, 3: severe pain
  - Tape removal
  - Endotracheal tube insertion
  - Peripherally catheter insertion
  - Diaper change for critically ill neonates
13. To comfort a crying newborn after pain caused by heel stick would you choose one of following non pharmacological interventions:
  - swaddling
  - place the infant in the mother arms
  - orally sweet analgesia
  - pacifiers
  - in my Department, the physicians are those who recommend analgesia during painful procedures, thus I will comfort a newborn according to their instructions
  - during painful procedures I will allow child parents to stay along with baby for comforting after the procedure was done
14. If a newborn baby is critically ill and will be admitted in Intensive Care Unit you consider that is a emergency situation and he didn't require analgesia during procedural pain?
  - Yes  No
15. From the following which one are side effects of administration of morphine?
  - Respiratory side effects
  - Toxicity
  - Overdose
  - Addiction
  - Hyperglycemia
16. Which of the following are associated with pain in newborns?
  - Squeeze eyes
  - Open mouth
  - Crying
  - Decrease in oxygen saturation
  - Facial grimacing
17. In your Department exists written protocols addressing Procedural Pain Management?
  - Yes  No  I don't know
18. Your professional grade is
  - Nurse  Physician
 and your expertise in Neonatology is
  - 1-5 years
  - 6-10 years
  - 11-20 years
  - 21-30 years
  - 31-40 years