

# Knowledge and Attitude of Personnel, Key Factors in Implementation of Neonatal Pain Management in NICU: A Qualitative Study

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## ABSTRACT

**Introduction:** Pain management is important, especially for neonates who are not able to verbally express their pain. Therefore, stress reduction and pain management are essential components of neonatal care.

**Aim:** The aim of this study was to explore the key factors in implementation of neonatal pain management in Neonatal Intensive Care Unit (NICU).

**Materials and Methods:** A qualitative study using conventional content analysis method was conducted with participation of nurses, physicians and nurse managers working in Alavi Educational Medical Center in Ardabil, Iran during July 2016 to October 2016. Twenty-five nurses took part in focus group discussions, five paediatrician and five nurse managers attended private interviews. Four focus group discussions

and ten interviews were performed until data saturation was ensured.

**Results:** Data analysis indicated two effective categories on implementation of infant's pain management which included "knowledge of the personnel" and "attitude and commitment of the personnel". The first category consisted of six subcategories "symptoms of pain", "outcomes of pain", "pain interventions", "side-effects of drugs", "parent's role", and "education of personnel." The second category consisted of three subcategories including "personnel's conscience", "personnel's emotions", and "personnel's belief."

**Conclusion:** According to the main findings of this study, there is a need for empowerment of the personnel about pain management and assessment.

**Keywords:** Content analysis study, Newborn, Pain control

## INTRODUCTION

Every year, around 15 million preterm infants are born in the world [1]. Along with advances of medical care, there is a great increase in survival rate of immature infants and infants with congenital disorders. These infants experience different stressors during their infancy [2]. However, high risk infants are frequently exposed to painful procedures during treatment that could impose different levels of pain or discomfort to the newborns [3]. The traditional view that neonates do not feel pain is now being challenged. Data now suggest that neonates also feel pain [4]. Neonates are more sensitive to the pain than infants, toddlers, and adults; this sensitivity is more prominent in preterm infants [3].

Studies have shown that infants who have born between 23 and 42 weeks of pregnancy need intensive care, which undergo 14 painful procedures every day during the first two weeks of hospitalization [1,5,6]. This means, more premature infants are at higher risks of unwanted outcomes [7].

Unfortunately, many procedures are still done without pain control measures and only 20.8% of the invasive procedures are controlled by pharmacological and non-pharmacological pain control procedures [5].

Infants are not able to express their pain and instead show the pain in the form of physiological and behavioural signs. The healthcare providers need to be familiar with these signs and in turn take proper measures [6].

Developmental disabilities and the brain behaviour, long-term cognitive, social, and emotional dysfunctions is related to frequent and long exposure to pain in infants. Especially, compared to healthy term infants, the brain is not fully developed in premature infants, so it likely reduces the pain threshold and increase their sensitivity to a level of pain [3]. Therefore, stress reduction and pain management are essential components of neonatal care [8].

In 2000, American Pain Association introduced pain assessment as the fifth vital sign for performing proper pain measurement and management by the healthcare provider for all patients in all age groups [6,9].

The recognition of situations that can be stressful for infants admitted to the neonatal intensive care unit is important, as they affect their normal growth. One of the basic methods is the adequate assessment of pain in infants since it depends on the therapeutic measures to control pain and minimizing suffering [10].

Although, nurses and physicians believe that most of the procedures performed in NICU are moderate to severe painful for the infants and despite the possibility to assess and measure pain using appropriate tools as well as non-pharmacological and pharmacological interventions to prevent and reduce pain but still the pain in high-risk infants admitted in neonatal intensive care units is not managed properly [7].

Scientific evidences indicate that in spite of two decades of medical advances in infant's pain management and increase of awareness among healthcare providers about the side-effects of pain in infants, nurses and physicians admit that pain still is an unsolved problem in this vulnerable population [11,12]. This shows that importance of infants' pain management is not recognized at clinical performance level and there is a gap between theory and practice. Filling in this gap is a good reason for further studies on pain management in infants [13]. The gaps between pain knowledge, evidence, and practice among neonatal nurses need to be addressed as well [14]. Therefore, the aim of this study was to explore key factors in implementation of neonatal pain management in NICU.

## MATERIALS AND METHODS

It is a qualitative study using conventional content analysis method. It is a research method to discover people's perception on the daily phenomena of life and interpretation of subjective data content in

textual form. The study was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences, Iran. The participants were first introduced to the objectives of the study and the method. Then, the participants were asked to sign a written letter of consent. The letter consisted of provisions about voluntary participation, the participant's right to leave the study whenever they would like, confidentiality of the information, and availability of the results for participants if needed.

Based on the descriptions provided by the participants, hidden and evident concepts are extracted, encoded, summarized, categorized, and finally themes are obtained. The codes are extracted based on units of meaning obtained from the descriptions provided by the participants, which are in turn, categorized based on similarities and differences [15].

The study was performed with participation of nurses, physicians, and nurse managers of NICU of Alavi Educational Medicine Center in Ardabil, Iran during July 2016 to October 2016. The NICU has 18 active neonatal beds. Twenty-five nurses, five paediatrician, and five nurse aide and a secretary work in this unit. This hospital is the largest maternity hospital in Ardabil province and provides health care for rural and urban patients. Most of the infants were hospitalized in this unit with diagnosis of prematurity and respiratory distress.

Twenty-five nurses participated in four focus group discussions (5-7 members in each group). Inclusion criteria for the nurses were at least having a Bachelor of Nursing, at least one year experience in NICU, and interest in participation. Five physicians and five nurse managers took part in private interviews. Focus group discussions and the interviews ended when the content of the discussions showed that no new information was being shared.

The sessions, which lasted for 50-60 minutes, were started and guided by the researcher. Focus group discussions in this study were based on following steps:

Before starting the discussion, the participants, were informed about the type of research, research purposes, and the conditions of discussions. Semi-structured in-depth interview started with the general questions such as: How do you evaluate infant's pain assessment and management in your ward? What are the health care services with regard to the infant's pain? And continued with these questions: What are the obstacles ahead of the nurses in managing the infant's pain in your ward? What are the solutions to improve awareness about effective management of the infant's pain in your ward? During the interviews the researcher asked for further explanation with explorative questions like: would you explain more? What do you mean? What was that? Finally, the discussions were ended with questions such as: Is there anything you would like to talk about? Private interviews with the physicians and the nurse managers were also based on prior arrangements in the place and time of their choice. All the interviews and focus group discussions were performed by the researcher and continued until achieving data saturation.

Data analysis was performed along with data gathering using conventional content analysis based on the steps proposed by Graneheim UH and Lundman B [15]. The method comprised of five stages for qualitative data analysis including: 1) Transcribing the interview word by word and reading it for several times until a general perception of the content is obtained; 2) Categorizing the text into short and summarized units; 3) Abstracting the summarized units and encoding; 4) Comparing the codes based on their similarities and differences and categorizing them based in categories and subcategories (based on evident content of the text); and 5) Determining the themes based on the categories (that represent hidden content of the text).

Lincoln and Guba's criteria was used to determine trustworthiness in qualitative studies including credibility, dependability, confirm ability,

and transferability [16]. Validity of the data was improved by checking the obtained codes (by other members of the research team and the participants). To this end, part of the interviews text and the primary codes was provided to the participants and they were asked to evaluate congruence of the extracted ideas by the researcher with the participants' ideas. To improve reliability and verifiability, audit technique was used in which the transcribed texts were reviewed by the observers and the extracted codes and categories were provided to two faculty board members for examination. They confirmed authenticity of the analysis. To ensure transferability of the data, the author needed to provide adequate explanations about the study and to this end; comprehensive description prepared the ground for implementation and assessment of the findings by others.

## RESULTS

The sample group consisted of 35 participants who were mostly women, below 40-year-old, and married. Most work experience in NICU was 1-5 years and the majority of the participating nurses had bachelors' degree [Table/Fig-1].

Data analysis indicated two categories which could be effective on implementation of infants' pain management, namely "Knowledge of the personnel" and "Attitude and commitment of the personnel" Each one of these categories is in turn comprised of subcategories [Table/Fig-2].

### 1. Knowledge of the Personnel

The first extracted category in this study consisted of subcategories "symptoms of pain", "outcomes of pain", "pain interventions", "side-effects of drugs", "parent's role", and "education of personnel".

Variables	Participants	n (%)
Age	< 30	7 (20)
	30-35	12 (34.3)
	36-40	10 (28.6)
	>40	6 (17.1)
Sex	Men	7 (20)
	Women	28 (80)
Work experience	1-5	16 (45.7)
	6-10	8 (22.9)
	11-15	8 (22.9)
	>15	3 (8.6)
Marital status	Married	28 (80)
	Single	7 (20)
Educational status	Bachelor	25 (71.4)
	Masters	5 (14.3)
	Paediatrician	5 (14.3)
Organisational position	Nurse	25 (71.4)
	Physician	5 (14.3)
	Nurse manager	5 (14.3)

[Table/Fig-1]: Demographic characteristics of the study participants (n=35).

Subcategories	Categories
Symptoms of pain Outcomes of pain Pain interventions Side-effects of drugs Parent's role Education of personnel	Knowledge of the personnel
Personnel's conscience Personnel's emotions Personnel's belief	Attitude and commitment of the personnel

[Table/Fig-2]: Categories, and subcategories based on focus group discussion and interviews with participants in NICU.

**1.1. Symptoms of pain:** Majority of the participants agreed about infants' ability to feel pain and some mentioned the symptoms of pain in the infants. In this regard, one participant said "well, they can feel the pain for sure; the infants start crying or show facial reaction whenever I try to find a vein or perform a procedure. This shows that they can feel the caused pain" (Nurse with 16 years of experience).

Another participant noted about the signs of pain in infants by saying that "well, you can find out how much pain the infant feels when you look at them; however, there are tool to measure this pain such as heart rate monitors or that breathing rate decreases when the saturation declines"(Nurse with 6 years of experience).

Even one of the participants named pain as the fifth vital sign: "As to the pain, well, we take pressure, pulse, respiration, and temperature as the four vital signs and the fifth one is the pain. It is essential to monitor pain as the fifth sign. Infants cannot complain when they feel pain, therefore, the nurse should be cautious about pain in the infant. The nurse should be an expert in this area and solve the problem". (Nurse Manager with 11 years of experience)

One of the physicians mentioned: "It is very important, since many think that infants cannot feel the pain; but the truth is that the stress caused by pain bothers the infant". (Physician with 10 years of experience).

**1.2. Outcomes of pain:** Majority of the participants believed that pain can have side-effects whether long-term or short-term. One said: "It might appear in different forms in the future; it might be effective, for instance, on child development or future encounter with pain, variety of diseases, and unwanted events" (Nurse with 10 years of experience).

Another participant said about long-term side effects of pain: "It might be even effective on their behaviour. The pain that the infant feels might influence on their behaviour in future" (Nurse with 9 years of experience).

Additionally, one of the managers believed that physicians are in charge of highlighting the side-effects of pain: "Or, the physician can note the side-effects of the pain when it is frequent"(Nurse Manager with 10 years of experience).

**1.3. Pain interventions:** One of the participants admitted that they do not have enough knowledge about pain interventions for infants. Some only knew about pharmacological intervention for some specific invasive procedures. One mentioned: "usually, chest tube placement is painful and they would order Fentanyl or Midazolam PRN. When Midazolam is ineffective, we would use Fentanyl to kill the pain. In most of the cases, pharmacological intervention is the only measure" (Nurse with 9 years of experience).

One of the top managers noted about failure to do non pharmacological intervention: "It is only pharmacological intervention here, but as far as I know, there are nonpharmacological interventions too"(Nurse Manager with 26 years of experience).

One of the physicians believed that they did not know about Fentanyl prescription in the ward and the medicine was rare: "I tried to promote the idea and now I order Fentanyl for chest tube placement. Now it is a routine procedure and they do not hesitate administering the medicine" (Physician with 18 years of experience).

As to non-pharmacological intervention, the majority of the participants believed that it was effective on reducing pain in infants. One mentioned: "Even massaging is very effective. It makes them feel secure and calm. I think, such measures are more effective. Alternative medicines are more efficient on infants."(Nurse with 4 years of experience)

**1.4. Side-effects of drugs:** With respect to side-effects of medicines and narcotics, some expressed their concerns. One noted: "For instance, Midazolam is used with cautious even for the adults. There

is a risk of apnoea at any moment. Many anaesthesiologists reject the idea at least during intubation; however, it is used as a routine drug" (Nurse with 5 years of experience).

Using narcotics creates anxiety in the nurses, and in this regard, one said: "the medicine is a stressor for the nurse and this is a more serious when narcotics are prescribed" (Nurse with 9 years of experience).

Some of the physicians tried not to use narcotics on infants due to the side-effects. One of the physicians said: "Some say Fentanyl and Midazolam must not be prescribed simultaneously, because of their side-effects; but the fact is, the right thing to do is to use both of them. Midazolam induces sedation effects and Fentanyl causes amnesia effects and together they act as a good painkiller. However, in many cases they are not used simultaneously because of the fears"(Physician with 15 years of experience).

**1.5. Parents' Role:** Most of the participants highlighted the parents' role and presence of the mother beside the infant. One mentioned: "Emotional supports, caressing, or the like are barely provided during the procedures. It is not possible to perform the procedure while the mother is holding the infant. However, the mothers' presence is very effective. Smelling the mother's scent is highly effective on calming down the infant. In mothers' presence, infants accept the procedure more easily" (Nurse with 4 years of experience).

One of the participant noted failure in performing Kangaroo Mother Care in the ward: "One interesting point is that Kangaroo mother care is barely performed here. I do not know why, while it is said that Kangaroo mother care is even good for premature infant"(Physician with 10 years of experience).

Absence of the mother was noted by one of the managers as the main problem: "one of the main problems is absence of the mother. We try to calm down the infants, but we would never be as good as the mothers are"(Nurse Manager with 10 years of experience).

**1.6. Education of personnel:** Some of the participants mentioned the personnel's lack of knowledge about the causes of crying. One said: "Many of the personnel do not know. Many of them have no idea why the infants cry. Probably they think that the infants should be fed or changed when they cry" (Nurse with 10 years of experience).

Another participant said: "In fact, the main issue in pain management is lack of knowledge in the physician and nurses"(Physician with 15 years of experience).

One of the managers said: "nurses do not know about the available strategies of pain management. For instance, they do not know how to soothe the pain during a puncture procedure. I remember they used to say that using serum was effective. At that time, this was the only measure"(Nurse Manager with 10 years of experience).

One of the managers noted about holding educational workshops: "informing is the first measure, which should be done by holding workshops. The workshops would be effective on increasing knowledge level of the personnel"(Nurse Manager with 18 years of experience).

## 2. Attitude and Commitment of the Personnel

The second abstracted category was featured three subcategories including "personnel's conscience", "personnel's emotions" and "personnel's belief".

**2.1. Personnel's Conscience:** Majority of the participants believed that the personnel's conscience was effective on infants' pain management. One noted: "It also has to be with the nurses' conscience. If they bother to check the infant when she/he is crying, they could find out what the problem is" (Nurse with 10 years of experience).

Another participant noted about conscience that: "They should have enough professional conscience to know that pain can cause

damages and side-effects in long-term" (Nurse Manager with 10 years of experience).

Pain control is a part of medical moralities and failure to control pain is a negligence of the patient's right. One participant noted: "Probably you cannot hear it or see it in any ward; however, it is a part of morality concern for human being. Physician and nurses' morality exists but there is no support for implementing it" (Nurse with 4 years of experience).

**2.2. Personnel's emotions:** Majority of the participants noted that the personnel's emotions are of the key factors effective on infant's pain management. One said: "I think not all nurses have the competence to work in NICU. To work here, you should have conscience and emotions; after all, they are infants and need special attention. You do not need to become so emotionally attached with the adults but, infants are very sensitive and NICU nurses need to have special characteristics"(Nurse with 6 years of experience).

Another participant mentioned: "NICU needs emotional nurses. Our instructor used to say that physicians who are also mothers or fathers are more successful in NICU. If you are a parent, you would be more sensitive to the feelings of infants"(Physician with 20 years of experience).

**2.3. Personnel's belief:** The participants mentioned that implementation of pain management in NICU entails changes in attitudes of the personnel. One highlighted: "above all, we need to change attitudes of the personnel" (Nurse with 5 years of experience).

Another participant said: "Changing attitudes of nurses needs going through pre-thinking stage, preparation-thinking stage, and practice stage"(Nurse Manager with 11 years of experience).

One of the managers noted: "It is the same about pain management. The personnel have the knowledge but lack the belief no matter if he/she is a specialist or a chief specialist. It would not happen, without culture promotion works" (Nurse Manager with 15 years of experience).

Another participant mentioned: "well, gravity of the issue is not known for many. What matters for them is keeping the patient alive" (Physician with 15 years of experience).

## DISCUSSION

The results showed that the personnel's knowledge and attitude are important in implementation of pain management program. The findings indicated that empowerment of the human resource in NICU is imperative in implementation of pain management program. Therefore, there is a need to design and hold training courses to inform the personnel.

The knowledge of personnel was the first extracted category with subcategories which include signs of pain, side-effects of pain, pain interventions, and side-effects of drugs, parents' role, and education of personnel. The results in this regard indicated lack of enough knowledge about pain management in the personnel. Although the participants were aware of pain in infants, they admitted failure in implementation of pain management in NICU, which is consistent with findings in studies [11,13,14], but other studies showed that the physicians and the nurses did not have adequate knowledge to assess and survey pain level and how to use pharmacological and non-pharmacological interventions for the infants [17,18]. However, a low proportion of respondents acknowledged the difference in long-term effects between neonates and older children. Less experienced doctors were especially unaware of this [18].

Lake SW reported that most of the nurses were not aware that infants feel more pain than the adults. However, the nurse's knowledge in the fields of pain perception and the side-effects of failure in implementation of pain management plan was acceptable. Only 28% of the nurses reported that pain management is implemented

properly in their ward [13]. Consistently, Byrd PJ et al., and Akuma AO and Jordan S reported that despite adequate knowledge about pain management, there was a wide gap between knowledge and practice so that pain management plan is not properly implemented in NICUs [7,12].

The results of present study showed that the majority of the participants were not aware of non-drug interventions. Lago P et al., showed that routine use of pharmacological and non-pharmacological intervention for painful procedures ranged from 13% for elective tracheal intubation to 68% for chest tube insertion [19].

Andersen R et al., showed that non-pharmacological methods were more common than pharmacological interventions. As only in painful and invasive procedures such as tracheal intubation and chest tube placement, pharmacological interventions were used [20]. Most of the participants mentioned the parent's role and presence of the mother beside the infant.

NICU environment is featured with many painful procedures and infants hospitalized for different reasons (immaturity, disease, etc.) show different responses to pain. All these procedures can be a source of stress for the parents. Therefore, health care providers should give a detailed explanation about the infant's condition to the parents and empower them to take part in pain management by giving the required educations to the parents.

Franck LS and Bruce E argued that; although, the parent's stress and anxiety were not decreased following pain management education, the parents were able to play more active role in providing health care to the infants. They also had more positive attitudes about their capabilities to take care of their infant after discharge [21]. Of the main barrier in personnel's education, from the participants viewpoint was lack of pain management education in NICU introduction courses. Ozawa M and Yokoo K named the obstacles in infant's pain management as personal factors and organizational factors [22]. The former consisted of lack of knowledge and education about infants' pain which was consistent with the present study. In addition, Cong X et al., reported that 50% of the nurses did not have adequate and routine education on pain [14].

Our findings highlighted the effects of personnel's attitude on implementation of pain management plan. Most of the participants argued that the personnel's beliefs and conscience were the main factors in implementation of pain control measures on infants. Although, they believed that pain management should be performed for infants, it was not implemented properly which is consistent with findings in studies [7,21].

De Aymar CL et al., showed that following education interventions, most of the participants reported changes in their attitudes about pain management and control for infants [23]. A study in Finland showed that even apparently knowledgeable nurses had no knowledge about higher pain sensitivity of the premature infants in comparison with term infants [24]. Nimbalkar et al (2014) showed that the nurses lack knowledge and their attitudes also were hindering pain management. So not only the nursing staff, but all of the caregivers involved in neonatal care may be lacking in knowledge and hold perceptions and attitudes that hamper neonatal pain management [25].

Also, Robins J showed that 20% of respondents still believe analgesia is not necessary prior to chest drain insertion, elective endotracheal intubation, or lumbar puncture. The results highlight the different standards and methods of pain control in the UK. It seems that pain relief is still regarded by many as an optional rather than an essential part of caring for a baby [26].

However, it appears that the mere knowledge is not enough for implementation of changes in clinical performance. Studies toward improvement of health personnel's knowledge level have found to be trivially effective on pain management in practice.

## LIMITATION

This study was conducted in a local area and thus, may not represent the general population. Moreover, we could not arrange the focus group discussions with all the nurses in NICU due to busy schedule and time constraint.

## CONCLUSION

In summary, according to the main findings of this study, there is a need to provide education services along with empowerment of the personnel from knowledge and emotional viewpoints with respect to pain management and assessment. These measures should be taken during the introduction training course for NICU and as routine courses for the health personnel of NICU.

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