



Factors Influencing Neonatal Pain Management from the Perspectives of Nurses and Physicians in a Neonatal Intensive Care Unit: A Qualitative Study

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Abstract

Background: Despite scientific advances on pain measurement and intervention, pain management for infants has remained a challenge for health teams. This is because infants are not able to talk and defend themselves when they are in pain. Prevention of pain is important, not only because it is an ethical expectation, but also because repeated painful exposures can have harmful consequences. The aim of this study was to explore factors influencing neonatal pain management from the perspectives of nurses and physicians in a neonatal intensive care unit (NICU).

Methods: A qualitative content analysis study was carried out. The participants were the nurses and physicians working in the NICU of Alavi medical training center in Ardabil, Iran. Twenty-five nurses took part in focus group discussions and five physicians attended private interviews. Four focus group discussions and five interviews were carried out until data saturation was ensured. Data analysis was performed using conventional content analysis. All the participants were provided with information about the purpose and the nature of the study, and provided informed consent.

Results: Data analyses indicated two effective themes about barriers of implementation of infant pain management, namely "Individual Factors" and "Organizational Factors". The first theme consisted of the categories "knowledge of the personnel" and "commitment of the personnel". The second theme included three categories namely "pain control policy", "work environment condition" and "management issues".

Conclusions: Our findings indicated that lack of educational courses, absence of an infant pain management policy, and management issues were the main obstacles in the way of implementation of infant pain management by nurses and physicians at the NICU. Therefore, strategies are required to reduce or remove these barriers.

Keywords: Pain Management, Neonate, NICU, Qualitative Study

1. Background

According to the international association for the study of pain (IASP), pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage. It is important to understand that the inability of neonatal patients to communicate verbally or nonverbally does not mean that they cannot feel pain. As the IASP states, inability to communicate verbally does not negate the possibility that an individual is experiencing pain; thus, there is a need for appropriate pain-relieving treatment (1, 2). It was believed in the past that infants could not feel pain, and based on this wrong assumption,

discussing pain management in infants was out of question. However, studies in the recent decade have shown that functional, autonomous, and neural-chemical systems of infants are developed enough to comprehend, experience, and memorize pain (3). Pain management for the infants who are not able to verbally describe their pain is imperative (4, 5).

Previous studies have shown that fetuses or premature infants have neural capabilities to feel pain. Not only they feel the pain, but they are very sensitive and their threshold to respond to painful stimuli is very low. Their reaction to painful stimuli is faster than that of adults. Thus,

infants can feel the pain and it may arouse physiological, hormonal, and behavioral reactions in infants (6). Although infants are not able to express their pain, they are able to demonstrate a set of visible and measurable behavioral and physiological reactions, such as facial expression (brows bulged, eye squeezed, and nasolabial furrowing), crying, increase of heart rate, and decrease of arterial O₂ saturation (AsO₂). Pain assessment tools are designed to measure pain in infants using physiological measures (heart rate and respiratory rate and behavioral measures (crying duration, facial expression, and body limb motions) (7).

Over the last decade, infant health care science has achieved great success in saving the lives of high risk infants, including premature infants. Vulnerable infants are usually kept in neonatal intensive care units (NICUs), and receive several invasive interventions as a part of their health care services. On average, they experience 10 to 16 painful interventions a day during hospitalization in NICUs (8, 9).

In addition, preterm infants are typically hospitalized in a comparatively hostile environment of the NICU, where they undergo numerous tissue-damaging procedures that are part of clinical care (10, 11), and each infant may receive 50 - 120 medical procedures in 24 hours, many of which are painful (12). Pain has been recognized as the “fifth vital sign” that should be monitored routinely in clinical practices (6).

Despite scientific advances in pain measurement and intervention, pain management for infants has remained a challenge for health teams. In comparison with other members of the health team, nurses spend more time with infants and their assessment of pain and pain-related performance is of great value (9, 13). Prevention of pain in neonates is an expectation of parents. However, there are major gaps in our knowledge regarding the most effective way to accomplish this. Although it may not be possible to completely eliminate pain in neonates, much can be done to reduce its amount and intensity. Prevention of pain is important not only because it is an ethical expectation but also because repeated painful exposures can have harmful consequences (14).

More than one half of the interviewed nurses in California felt that pain was not managed adequately in NICUs, and lack of evidence based pain management protocols/guidelines was one of the barriers (15). Another study showed that the majority of Australian NICUs had no articulated policy for pain management (16). Nurse-physician collaboration and nurses' work assignments may also predict evidence-based pain care in Canada (17). Less than one half of interviewed nurses in the USA reported that pain was well managed and that pain protocols

were evidence-based (13).

The first step to improve pain management is to detect the obstacles ahead of the nurses (15). Detecting the obstacles of pain management is a key point in dealing with and filling in the gap between clinical knowledge and performance (18). Therefore, the aim of this study was to explore factors influencing neonatal pain management from the perspectives of nurses and physicians in the NICU of Alavi medical training center in Ardabil, Iran.

2. Methods

2.1. Study Design

The study was carried out as a qualitative study using a content analysis method. Qualitative content analysis is a research method to discover people's perception of the daily phenomena of life and interpretation of subjective data content in textual form. 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 were in turn, categorized based on similarities and differences (19).

In studies using qualitative content analysis method, the characteristics of language are emphasized as communication with attention to the content or contextual meaning derived from the text. Text data may be in verbal, print or electronic, or can be obtained from narrative responses, open ended questions, interviews, focus groups, observations, or print media such as books, articles, or manuals (20).

2.2. Setting and Participants

The participants were the nurses and physicians working at the NICU of Alavi Medical Training Center in Ardabil, Iran. Our NICU has 18 active neonatal beds, and 25 nurses. Five pediatricians, 5 nurse-aids 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 infants are hospitalized in this unit with diagnosis of prematurity and respiratory distress.

All those involved in the process of assessment and management of neonatal pain in the neonatal intensive care unit were included in this study and were given an overview of all comments and views. Also, the researcher had more than 10 years of experience in clinical, educational and research activities of the center.

In total, 25 nurses took part in four focus group discussions (FGDs; n = 5 - 7) and five physicians undertook private interviews. All the physicians (pediatricians) took part in

the interviews. FGDs and the interviews were carried out until data saturation was ensured.

2.3. Data Collection

The data were collected using FGDs and interviews in order to allow some interaction among the participants. Also, to identify the factors affecting pain management from nurses' perspective, FGDs were held separately with five to seven participants.

To motivate the nurses to take part in the discussion, they were asked questions about their experiences with infants' pain management and assessment, to comment on their colleagues' experiences and to discuss different viewpoints. Through this, the authors found the opportunity to uncover what was valued more by the participants. Before initiating the discussions, the participants stated their consent for recording their voice during the discussion. Based on an agreement between the participants, the discussion sessions were held at the ward following the morning shift (1 pm - 2 pm). Timing of the discussion session allowed highest participation rate by the nurses of morning and afternoon shifts. The nurses were informed about the sessions by their head nurse and a note on the information board at the ward. The first author led the discussion using a questions guideline and the sessions were stopped when the first author was convinced that no new information would be obtained. Private interviews with the physicians were also based on prior arrangements in the place and time of their choice. All sessions, which lasted for 50 - 60 minutes, were started and guided by the researcher. Also field notes were made during the focus group discussions and interviews by the facilitator.

2.4. Focus Group Discussions

FGDs in this study were based on following steps:

Before starting the discussion, the participants were informed about the type of research and research purposes, and the conditions of discussion. Different opinions are all important and need not be in line with the views of others, but they are expected to respect those who are sharing information to avoid conflicts in the group, it was explained that there are no false or correct answers. Semi-structured pre-prepared questions were asked along with engagement questions such as: "How do you evaluate infant pain assessment and management in your ward?", "What are the health care services with regard to the infant pain?", "What are the obstacles ahead of the nurses in managing infant pain in your ward?", "What are the solutions to improve awareness about effective management of infant pain in your ward?". Then, the discussions continued with explorative questions such as: "Would you explain more?",

"What do you mean?", "What was that?" Finally, the discussions ended with questions, such as: "Is there anything you would like to talk about?". Group discussions ended when the content of the discussions showed that no new information was being shared.

2.5. Data Analysis

Data analysis was performed as data was gathered. To this end, Granhaim and Landman's (2004) method was followed (19).

This method is comprised of five stages for qualitative data analysis: 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 the data; 4, comparing the codes based on their similarities and differences and categorizing them based on 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).

After each group discussion and private interview, the recorded information was reviewed for several times as soon as possible and then the interviews were transcribed word by word. Afterward, the transcribed interviews were checked against the records to ensure accurate transfer of information. This process also enhanced the author's knowledge about the collected information. From this point forward, the transcribed information was the main source of raw data for content analyses. Data analysis method was based on conventional content analysis.

2.6. Authenticity of the Data

Authenticity of the qualitative findings was tested using four standards, including validity, confirmation, reliability, and transferability. To increase validity, the authors had adequate and close interaction with the participants. To improve confirmation of the data, the transcribed interviews were checked by the participants and the extracted codes were reviewed by independent supervisors. Comments and feedback by colleagues and experts of qualitative researcher were also taken into account. It is notable that the author observed all moral standards, including confidentiality of the information.

2.7. Ethical Statement

The study was approved by the ethics committee of Shahid Beheshti University of Medical Sciences, Tehran. Before starting the interviews, the participants were informed about the purpose and nature of the study, the voluntary nature of the participation, their right to withdraw

from the study any time, and the confidential and anonymous nature of the discussions. Written informed consent was obtained for voice recording and using the data.

3. Results

The sample group consisted of 30 participants who were mostly women, below 30 years old, married, and contractual employees. Most work experience in the NICU was 6-10 years and the majority of the participating nurses had bachelors' degrees (Table 1).

Table 1. Demographic Characteristics of the Study Participants (n = 30)

Variable	No. (%)
Age, years	
< 30	5 (16.7)
30 - 35	11 (36.6)
36 - 40	9 (30)
> 40	5 (16.7)
Gender	
Male	4 (13.3)
Female	26 (86.7)
Work experience, years	
1 - 5	10 (33.3)
6 - 10	6 (20)
11 - 15	5 (16.7)
> 15	9 (30)
Marital status	
Married	23 (76.7)
Single	7 (23.3)
Educational status	
Bachelor	25 (83.3)
Pediatrician	5 (16.7)
Organizational position	
Nurse	25 (83.3)
Physician	5 (16.7)

Initially, 530 codes were extracted and classified in 16 categories and 50 sub-categories. After removing and combining the codes, two themes, six categories, and 28 sub-categories were obtained. The themes included "Individual Factors" and "Organizational Factors" (Table 2).

3.1. Individual Factors

This theme covers the categories "knowledge of the personnel," and "commitment of the personnel".

3.1.1. Knowledge of the Personnel

The majority of the nurses and physicians agreed that the infants could feel pain and some of the nurses pointed out the signs. One of the participants said:

"They would shake their hands or pull back their legs or cry when they feel pain. In some cases, there is no expression but decrease of AsO_2 shows that the patient is in pain. For instance, bradycardia or tachycardia (and the latter in most of the cases) are the signs of pain" (Nurse with 16 years of experience).

Another participant commented on the signs of pain in the infant:

"...at any rate, there must be a sort of feeling that causes physiological changes. For instance, increase of heart rate or decrease of sO_2 are some of the signs of pain" (Physician with 10 years of experience).

With regard to short-term and long-term side effects of pain in the infants, some of the nurses believed that pain is not free of side-effects. One participant mentioned:

"Both of them [long and short term side effects] are expectable. Short-term effects might be observed in slower physical development. Long-term side-effects might appear in mental development; for instant frequent pain influences IQ of the patient" (Nurse with five years of experience).

The physicians believed that the side-effects of pain in the infant are more serious and they make the infant feel bad.

"Despite the general belief, premature infants are more vulnerable to the side effects of pain compared with term infants. Therefore, pain and the way it is felt create physiological changes in the infant. It even may create long-term effects in the infant." (Physician with 18 years of experience).

The participants acknowledged that they do not have thorough knowledge about pharmacological and non-pharmacological interventions to control pain in the infant. Most of them highlighted the necessity of additional education in this field. One mentioned:

"Another reason is lack of knowledge. We also know that we should give oral dextrose to the infant before doing vein puncturing. However, it is not easy to feed an NPO infant, even with suction, you cannot fix their head; we do not know how to deal with these cases." (Nurse with five years of experience)

One of the participants noted that they have received no special training about the infants.

"Well, we have had no training about pain control. During these nine months that I have been in the ward I have received no training about pain control. They would say that the infants do not feel pain or the procedures. It would

Table 2. Themes, Categories, and Subcategories Based on Focus Group Discussions with Nurses and Interviews with Physicians at a Neonatal Intensive Care Unit in Ardabil, Iran

Themes	Categories	Subcategories
Individual factors	Knowledge of the personnel	Symptoms of pain
		Outcomes of pain
		Pain interventions
		Side-effects of drugs
		Education of personnel
	Commitment of the personnel	Conscience
Feelings		
Beliefs		
Organizational factors	Pain control policy	Pain protocol
		Record pain control measures
		Monitor the implementation
		Pain assessment tools
	Work environment condition	Equipment and facilities
		Environmental factors
		Workload
		Sufficient time
	Management issues	Understaffed ward
		Emphasis on documentations
		Using experienced personal

be nice if there was a pamphlet, training course, or something.” (Nurse with three years of experience)

Some of the participants expressed their concerns about the narcotic medicines given to the infant:

“Giving the medicine with a pump is much better; however, intravenous administration is more stressful. It is very stressful for me to do intravenous administration. Add to this the fact that it is a narcotic medicine and might cause respiratory problems. You might be tempted to do the job as fast as possible or negate some tasks when the NICU is crowded and there are many premature infants. All these make me concerned.” (Nurse with three years of experience)

The participating physicians believed that educating the personnel is a critical requirement and the protocols should be taught to the nurses.

“You need to place the right personnel with adequate education in a ward in which the patients are not able to express their problem.” (Physician with 10 years of experience)

3.1.2. Commitment of the Personnel

The majority of the participants argued that nurses’ attitudes, work ethics, and feelings are the main factors affecting the implementation of infant pain control. They believed that failure to control pain in the infant is a negligence of the patient’s rights. One mentioned:

“...well, after learning about the effect of pain on the future of the infant, it would be a matter of work ethics to control pain in the infant. It is as important as giving the right medicine to the patient. Pain is a mental matter and medicine is a physiological matter. Only the nurse and God know what medicines are in the micro-set, and it is same regarding pain control.” (Nurse with nine 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.” (Nurse with five years of experience)

One of the physicians discussed the attitude of the personnel:

“Changing the attitudes is the first thing to do. As I

noted, it was not a common practice to prescribe morphine or phentanyl; at first, you need to convince them that the infant feels pain and they need painkillers.” (Physician with 18 years of experience)

3.2. Organizational Factors

The second theme found in the qualitative data was ‘organizational factors’ with three categories and 15 sub-categories. The categories included “pain control policy”, “work environment condition”, and “management issues”.

3.2.1. Pain Control Policy

The participating nurses stated that lack of a proper pain management protocol for the infant has allowed the nurses and physicians to follow different approaches. They acknowledged that there was no clear procedure to follow for the nurses and physicians with regard to pain control interventions. They believed that pain control is neglected during busy hours. One mentioned:

“Well, there is no standard to follow, so [someone] may make a decision quite different from mine about pain control.” (Nurse with 15 years of experience)

The majority of the participating physicians highlighted the necessity of a pain management protocol in NICU.

“It would be much better for the physicians from [a] legal point of view. What I mean [is] that it should [not] be an international guideline, but even a national guideline, like [the] CPR guideline, would be a great help when you enter NICU.” (Physician with 10 years of experience)

One of the participating physicians emphasized on the necessity of extending supervision on implementation of educations:

“...after education and implementation of the education, you need to have a supervising mechanism. Provision of adequate facilities is another matter; however, without supervision, nothing could be expected.” (Physician with 20 years of experience)

With regard to a recording system for infant pain control, some acknowledged the necessity of a checklist, such as the vital sign chart, to record the measures taken for pain management.

“There must be a checklist beside the infants’ bed to list all the measures and orders; like the vital sign worksheet. I don’t think that reading and filling a form would take much time. It would be like filling the report paper. After all, you should record all the measures and procedures somewhere; and this [is] a way to do this.” (Nurse with five years of experience)

3.2.2. Work Environment Condition

The majority of the participants noted work load and lack of time as a reason for neglecting pain control measures.

“There is a great work load on the nurses and in some cases, pain is not a priority.” (Nurse with nine years of experience)

The participating physicians also highlighted understaffed wards.

“The second thing is that sometimes workload cannot be handled by the staff. Infant and NICU [wards] are in one place and [the] number of patients is too high. After CPR, the nurse immediately goes to another bed to do vein puncture, and then is assigned with another task. ... There is no reasonable relevance between number of patients and personnel.” (Physician with 20 years of experience)

The majority of the participants highlighted lack of facilities and equipment; in particular for taking blood samples and performing vein puncture. They noted lack of the facilities, such as vein finder, and cannulation cut, as a reason for doing repetitious painful procedures. One noted:

“A special tool for cannulation cut or a vein puncture is the first thing you would expect in any hospital ward. At least they could provide us with a vein finding set or small catheter designed for premature infants with short veins. For instance, yesterday we wanted to vein puncture [on] an infant for two times. We punctured him several times to find a vein. All we could do was to grab his hand and caress his head. (Nurse with nine years of experience)

Some of the participants put emphasis on the importance of controlling environmental factors that are effective on controlling pain and stress in the infants. One noted:

“Noise stimuli are great disturbances for the infant and make them more vulnerable to pain. We need to control these noises and lower our voice at the ward.” (Nurse with nine years of experience)

3.2.3. Management Issues

Management issues were another reason noted for failure to carry out pain control intervention by the nurses. The majority of the participants mentioned over-emphasis on paper work and medical files as a time consuming process, so that no time remained to deal with pain control. One participant said:

“Well, given the lack of time and that paperwork is very time consuming, you can dedicate one hour to each infant and most of this time is spent with HIS and paperwork. The volume of paperwork has increased recently. Once there was only one VS sheet, but now we have infant assessment sheet, mother assessment sheet, mother education sheet, procedure report sheet, and nurse report about the infant.

Doing all these paper works leaves no time for taking care of the infant.” (Nurse with nine years of experience)

The majority of the nurses acknowledged that NICU is the place of experienced and capable personnel. One said:

“The fact that you are qualified as a nurse does not mean that you are ready to enter NICU. There are debates on preventing trainers to work in special care wards. I support that; it is not reasonable to allow an inexperienced nurse to work with infants while she/he has not mastered many procedures.” (Nurse with three years of experience)

The participating physicians argued that it is essential to use experienced nurses in the ward:

“[The] majority of the nurses in NICU must be well-trained and experienced. They should pass training courses before entering NICU. Sometimes you see a trainer in the ward who has no experience with the infant, they might even be good with the infant but it is more reasonable to only employ experienced nurses in the ward.” (Physician with 20 years of experience)

4. Discussion

The present study examined the obstacles to implementing pain management as described by NICU nurses and physicians at Alavi medical training center in Ardabil, Iran. The results showed several different obstacles including individual and organizational factors, affecting the control of pain in infants. According to the results, the factors pertinent to the personnel’s attitudes and beliefs, their lack of knowledge about the infants’ ability to feel pain, and the side-effects of pain on the infants were of great obstacles in the way of controlling pain in infants. There were also considerable problems with regard to nursing management. Lack of a specific policy was also noted by the physicians. In addition, the results showed that organizational factors play a key role in development of health care services for the infants, including pain management. It is necessary to provide the required training for all the personnel working with infants.

There are several studies on individual factors, which were the first extracted theme. The theme is comprised of categories “knowledge of the personnel” and “commitment of the personnel”.

The nurses and doctors in the present study were generally knowledgeable about and positive towards pain care, which is consistent with findings in other studies (9, 13). However, a study in Jamaica (21) and one in Australia (22) showed that physicians and nurses did not have adequate knowledge to assess and survey pain levels and how to use pharmacological and non-pharmacological interventions for the infants. A study in Finland showed

that even apparently knowledgeable nurses had no knowledge about higher pain sensitivity of premature infants in comparison with term infants (23). In addition, a study in Canada showed that less than 10% of the nurses used interventions to deal with pain management in the infants (17). A survey study on nurses and physicians in the USA showed that, although the personnel knew that infants can feel pain, the patients were rarely provided with pharmacological and non-pharmacological intervention while they were experiencing several painful procedures (8). A study in California reported that the nurses were informed about infants’ sensitivity to pain stimuli and the side-effects of frequent pain; however, less than one half of the nurses believed that infant pain in NICU was properly managed (15). Another study showed that nurses’ responses regarding neonatal pain reflected adequate knowledge in general, while knowledge deficits relating to several topics were found (e.g., preterm infants are more sensitive to pain and long-term consequences of pain) (9). Lago et al showed that routine use of preventative pharmacological and non-pharmacological measures for painful procedures ranged from 13% for elective tracheal intubation to 68% for chest tube insertion (24). Another study showed that medication was not usually prescribed for procedural pain (21).

The results of these previous studies have revealed that there was still a gap among academic knowledge about pain in infants, its side-effects, and methods to assess and manage pain in health services. The results have also indicated a lack of theoretical knowledge about physiopathology of pain, its assessment, and interventions (25).

The second theme found by the present study was organizational factors, with categories “pain control policy”, “work environment condition”, and “management issues”.

The majority of participants in this study reported that their pain protocols were not evidence-based, and the pain management guidelines/ protocols were not clear or comprehensive. Absence of evidence-based pain guidelines in NICUs has been found in previous studies (13, 15, 16, 26). A study in the United States and China showed that less than one half of participants felt that pain guidelines /protocols were research-based (9). Neonatal nurses need to effectively institutionalize evidence-based interventions in NICUs, especially to include parent involvement in the pain protocol. In this study, more than one half of the participants reported that parents should be involved with the care and comfort of their infant during painful procedures. A similar finding showed that most of the nurses agreed that parents should be involved with their infants’ pain care (9). However; another study showed that all units had written guidelines for prevention and treatment of pain. There was a higher tendency to document the use of drugs than behavioral treatments. A chief neonatologist

reported higher use of glucose compared with nurses' reports (27).

There are specific tools to assess pain in term and premature infants; however, these tools are not generally used, due to lack of knowledge, low priority of pain in the management's viewpoint, lack of time, and uncertainty about reliability of the scales (26). Our findings reflected a low rate of pain tool use in Ardabil, Iran. The results may be due to lack of clinically feasible pain tools and inadequate training. Absence of a systematic approach might be due to higher priority of survival of the infants compared with pain management and control.

The majority of the participants in other studies have noted that there is an absence of a pain management supervisor and lack of a systematic approach to assess and evaluate pain management (28). Cong et al (2013) in the US showed that most of the participants reported use of pain assessment tools on regular basis, while a smaller group agreed that the use of the tool was not appropriate or accurate (8).

In addition, it is important to integrate pain assessment tools with pain management strategies, which may be a contributing factor to the use of standardized pain assessment tools in routine clinical practice (29). In NICUs, this is generally accomplished using one of the numerous scaled infant pain instruments, which is commonly used alongside routine vital sign assessment (30).

Challenges to implementation of infant pain management as reported in the present study were a high workload, shortage of personnel, lack of knowledge, absence of pain protocols, lack of time, and lack of trust in the pain assessment tools, which is consistent with previous studies (9, 13, 15). This can be resolved by developing guidelines, supporting nurses, developing clinically feasible pain tools and providing adequate training and proper supervision. Other studies have also highlighted the need for neonatal clinician education about pain assessment and practice (15, 22), and promotion of nurse-physician collaboration (17).

4.1. Conclusions

Pain management training and empowerment of personnel before entering NICUs and routinely after entering the ward, are necessary steps. Our findings indicate that a lack of educational courses, absence of an infant's pain management policy, and managerial problems were the main obstacles for pain management for nurses and physicians in NICU. With regard to managerial problems in the NICU, managers need to provide more incentives for nurses in the NICU, remove human force problems, solve staffing problems, and remove background challenges,

such as developing clinically feasible pain tools, developing protocols and guidelines, supporting the nurses, providing proper education on infant pain management, and extending supervision.

The limitations of this study were the nurses' tight schedule at the NICU, which was a challenge for arranging implementation of FGDs.

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