

Views of nurses regarding pain control in neonatal intensive care units

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A – Study Design, **B** – Data Collection, **C** – Statistical Analysis, **D** – Data Interpretation, **E** – Manuscript Preparation, **F** – Literature Search, **G** – Funds Collection

Summary Background. Suboptimal pain control in neonatal intensive care units (NICUs) remains despite theoretical advances. Paying attention to the views and suggestions of those who directly face the challenges of neonatal pain control in NICUs can help the improvement processes. Nurses are continuously present at patients' bedsides and play a vital role in optimal pain management.

Objectives. This study aimed to study nurses' views of the quality of pain control in NICUs and the existing barriers.

Material and methods. The cross-sectional, descriptive method was utilised to study 140 nurses that worked in three NICUs in Iran. They were selected using convenience sampling and filled out a questionnaire. The information was analysed using descriptive statistical methods.

Results. The results showed that although most participants had good knowledge of the basic concepts of neonatal pain, some of them had problems in some areas, such as using neonatal pain assessment tools. 40% of them thought that pain was not managed properly in the NICU. The participants also mentioned barriers to proper neonatal pain management, including work overload, inappropriate professional knowledge, lack of organisational structure, poor collaboration of team members and low pain prevention.

Conclusions. It is necessary to improve the quality of caregiving with respect to pain management in the NICU. There were individual, inter-professional and organisational barriers that have to be sufficiently understood to allow for the taking of significant steps to improve pain control in NICUs.

Key word: pain, newborn infant, neonatal intensive care units.

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Background

Humans usually state their pain verbally and then try to relieve it. However, those who cannot speak cannot state their pain, and it is challenging to diagnose pain in such individuals [1]. As one of the most vulnerable human groups, neonates are unable to verbally communicate with their caregivers and cannot express their pain [2]. Although there were previous misunderstandings about neonates' sense of pain, scientists have accepted in recent decades that neonates perceive pain. Additionally, evidence suggests that tolerance of pain causes serious short-term and long-term problems in new-borns [3]. For this reason, it is now argued that pain control is not only ethically necessary in neonates [4] but can also prevent complications [5].

Since the neonate survival rate in NICUs has increased in recent years, optimisation of the care provided for neonates in NICUs and reduction in complications has become a priority. Although neonatal pain management is an important issue in this regard, literature reviews reveal that neonatal pain is not properly managed in NICUs [6–8] despite the considerable theoretical advances made in the control of neonates' pain [9].

Paying attention to the views and suggestions of those who directly face the challenges of neonate pain control in NICUs helps the improvement processes. They can help develop policies and programmes and improve effective management of vulnerable patients and their families [10]. As one of the main healthcare providers, nurses are continuously present at patients' bedsides and play a vital role in optimal pain management [11].

Objectives

Pain control and alleviation is one of the priorities in nursing [12], and few nursing measures are more important than pain relief [13]. Therefore, nurses' perception of pain management greatly influences their performance in relieving patients' pain [12]. This study aims to investigate nurses' views of pain control in NICUs and the existing barriers.

Material and methods

After obtaining the ethics code (IR.TBZMED.REC.1398.985), this cross-sectional, descriptive research was conducted on



nurses that worked in three NICUs at hospitals of the University of Medical Sciences from March to September 2021 in order to assess their perception of neonatal pain.

Measurement tool

A two-part questionnaire was used to collect the data. The first part consisted of items about demographic characteristics such as age, gender, educational level and work experience. The second part was a questionnaire developed by Cong et al. [14]. This questionnaire consists of 5 subscales: knowledge and beliefs, use of pain assessment, use of pharmacological and non-pharmacological relieving methods, guidelines/protocols and parental participation and barriers. The items related to the first 4 subscales were scored using a 5-point Likert scale. Open-ended question were developed to explore the potential barriers to pain control in NICUs.

The validity of the research questionnaire was examined by determining its face and content validity and using the views of 10 experts with a scientific and research background regarding the measured concept. For this purpose, the items in the questionnaire were studied with respect to levels of relevance, difficulty and ambiguity to confirm its face validity. The content validity index (CVI) was used to examine the content validity. The results showed that the CVI of this questionnaire was 0.96. The Cronbach's alpha obtained for this questionnaire (0.83) also confirmed its internal consistency and reliability.

Data collection and analysis

The nurses were selected using convenience sampling. For this purpose, the researcher visited the NICUs during the morning or evening shifts and explained to the nurses the research objectives and procedures. The questionnaires were then distributed among those who were willing to participate in the research, and the participants were asked to sign the consent form. The nurses could fill out the questionnaire right there or submit it to the researcher within one week.

The data was entered into SPSS 13.0 and was analysed by the first author. Descriptive statistics were used to analyse the

responses of participants. The first to fourth authors analysed the open-ended question responses using Graneheim and Lundman conventional content analysis method [15] and formed the categories. the frequency of each subcategories was also recorded, which will be mentioned in this manuscript.

Results

Demographic characteristics

140 nurses that worked in NICUs participated in this study. The data showed that 130 participants (92.59%) had a bachelor's degree, and 10 of them (7.41%) had a master's degree. All the participants were female, and their mean age and work experience were 33.41 ± 7.28 and 9.20 ± 9.02 years, respectively. 93 participants (66.42%) were married, and 69 of them (49.28%) had children.

Knowledge and beliefs

Most nurses believed that neonates were able to experience pain, which could cause long-term complications. About half of the participants argued that neonates could not recall their experience of pain in the future. Less than two-thirds of the participants had received adequate training in a new-borns' pain management when they began working in the NICUs, and about three quarters of them stated that they were continuously provided with training in neonatal pain management (Table 1).

Pain assessment tools

Most participants were able to identify pain symptoms in neonates, and about two-thirds stated that they could apply the pain assessment tools with sufficient self-confidence. Nevertheless, more than one-third were not confident of their ability to correctly interpret the pain scores. Some participants also said that the tool used in the NICUs for new-borns' pain assessment was not appropriate, and they believed it could not accurately measure new-borns' pain (Table 2).

Table 1. Knowledge and beliefs about neonatal pain

	Strongly agree/agree n (%)	Neutral n (%)	Strongly disagree/ disagree n (%)	No response n (%)
New-borns are able to experience pain	138 (98.6)	2 (14)	0 (0)	0 (0)
Minor procedures can be painful	130 (92.9)	4 (2.9)	3 (2.1)	3 (2.1)
Repeated painful procedures can cause neurodevelopmental complications in premature new-borns	125 (89.3)	11 (7.9)	2 (1.4)	2 (1.4)
New-borns, especially premature new-borns, are more sensitive to pain than others	115 (82.2)	14 (10.0)	10 (7.1)	1 (0.7)
Pain has long-term complications in new-borns	120 (85.7)	13 (9.3)	6 (4.3)	1 (0.7)
New-borns will remember painful experiences	72 (51.1)	37 (26.3)	27 (19.3)	4 (2.9)
When I started working at the NICU, I received enough education in neonatal pain assessment	86 (61.4)	18 (12.9)	36 (25.7)	0 (0)
In my unit, continuous training in new-borns' pain management is provided	104 (74.3)	14 (10)	22 (15.7)	0 (0)

Table 2. Pain assessment in the Neonatal Intensive Care Unit

	Strongly agree/ agree n (%)	Neutral n (%)	Strongly disagree/ disagree n (%)	No response n (%)
Newborn pain assessment tools are used regularly in my unit	92 (65.7)	21 (15.1)	25 (17.85)	1 (1.4)
I have sufficient skills to recognise the physiological/behavioural indicators of new-borns' pain	106 (75.8)	17 (12.1)	16 (11.4)	1 (0.7)

Table 2. Pain assessment in the Neonatal Intensive Care Unit

	Strongly agree/ agree <i>n</i> (%)	Neutral <i>n</i> (%)	Strongly disagree/ disagree <i>n</i> (%)	No response <i>n</i> (%)
I have sufficient ability when interpreting the scores of pain assessment tools	86 (61.5)	32 (22.9)	19 (13.5)	3 (2.1)
I feel confident in my use of new-borns' pain assessment tools	91 (65.0)	28 (20.0)	17 (12.1)	4 (2.9)
Pain assessment tools used in my unit are suitable for new-borns	90 (64.3)	29 (20.8)	18 (12.8)	3 (2.1)
Pain assessment tools used in my unit can accurately measure newborns' pain	92 (65.7)	26 (18.6)	20 (14.3)	2 (1.4)

Table 3. Pain interventions in the Neonatal Intensive Care Unit

	Strongly agree/ agree <i>n</i> (%)	Neutral <i>n</i> (%)	Strongly disagree/ disagree <i>n</i> (%)	No response <i>n</i> (%)
Pharmacological/non-pharmacological interventions must be performed even though invasive procedures are needed quickly	124 (88.6)	7 (5.0)	5 (3.6)	4 (2.8)
I am aware of pharmacological interventions for managing new-borns' pain	125 (89.3)	6 (4.3)	4 (2.8)	5 (3.6)
I have sufficient skills to use pharmacological interventions for managing new-borns' pain	103 (73.5)	20 (14.3)	12 (8.6)	5 (3.6)
Non-pharmacological interventions are effective for managing new-borns' pain	124 (88.6)	3 (2.1)	6 (4.3)	7 (5.0)
I have sufficient skills to use non-pharmacological interventions for managing new-borns' pain	109 (77.9)	21 (15.0)	8 (5.7)	2 (1.4)
I believe that new-borns' pain is well managed in my unit	84 (60.0)	28 (20.0)	27 (19.3)	1 (0.7)

Table 4. Guidelines/protocols and parental involvement in pain management

	Strongly agree/ agree <i>n</i> (%)	Neutral <i>n</i> (%)	Strongly disagree/ disagree <i>n</i> (%)	No response <i>n</i> (%)
I am aware of the pain control guidelines/protocols in my unit	117 (83.6)	13 (9.3)	7 (5.0)	3 (2.1)
The guidelines/protocols of pain control are clear and comprehensive in my unit	95 (67.9)	19 (13.5)	22 (15.8)	4 (2.8)
The guidelines/protocols of pain control are based on new research evidence in my unit	93 (66.5)	30 (21.4)	16 (11.4)	1 (0.7)
I believe that changes in pain control in my unit can easily begin	94 (67.2)	30 (21.4)	12 (8.6)	4 (2.8)
Parents are emotionally involved with the pain their new-born may experience	128 (91.5)	10 (7.1)	1 (0.7)	1 (0.7)
Parents expect their new-born's pain to be prevented	125 (89.3)	9 (6.4)	5 (3.6)	1 (0.7)
Parents should participate in their new-born's pain management during the procedures	126 (90.0)	8 (5.8)	2 (1.4)	4 (2.8)

Pharmacological and non-pharmacological interventions

Most participants believed that patient pain management was one of their tasks and stated that it was necessary to apply pharmacological or non-pharmacological interventions in newborns' pain management. About three-quarters of the participants also claimed that they had the necessary knowledge and skills to employ pharmacological or non-pharmacological interventions. However, 40% of them did not agree that newborns' pain control was properly managed in the NICUs (Table 3).

Guidelines/protocols and parental participation

Most participants knew about the pain management guidelines/protocols in the NICUs they worked in, and they also

stated that there was a comprehensive pain management protocol in the NICUs. They also knew that neonatal pain prevention was one of the expectations of the parents, and believed that the parents should participate in the management of their neonates' pain. Most nurses stated that it was possible to make some changes in their wards to improve the quality of neonatal pain control (Table 4).

Barriers to optimal neonatal pain management

81 participants answered the question within the fifth subscale. Data analysis identified 5 categories that mentioned the reasons for inadequate new-born pain control in NICUs (Table 5).

Table 5. Barriers to optimal neonatal pain management

Categories	Subcategories	n
Work overload	• lack of time	34
	• inadequate number of nurses	14
	• physical and emotional fatigue	6
	• accreditation processes and new nurses' tasks	4
Inappropriate professional knowledge	• lack of skills in using infant pain control methods	23
	• poor staff attitude on the need to manage infant pain	9
	• lack of awareness about the effects of pain tolerance in infants	6
	• insufficient pharmacological knowledge	6
	• lack of accurate neonatal assessment	5
	• insufficient knowledge about neonatal pain assessment tools	3
Lack of organisational structure	• insignificance of neonatal pain management in routine care	9
	• inadequate medicine and equipment	9
	• lack of protocol	6
	• poor supervision of care providers' performance	5
Poor collaboration of team members	• poor cooperation of physicians	7
	• inadequate parental involvement in managing infant pain	5
	• inconsistency in caring	4
Low pain prevention	• frequent uncomfortable and painful interventions	5
	• harmful environmental stimuli, such as light and sound	4
	• urgency of procedures	3

Discussion

The study findings showed that most participants had good knowledge and positive attitudes towards basic concepts of neonatal pain and complications of pain tolerance in neonates. These findings are consistent with those of some studies in Iran [16, 17] and other countries [7, 14, 18]. Therefore, it can be stated that nurses are now more knowledgeable and perceptive of pain management than previously. However, the participants stated that insufficient practical knowledge and skills were a barrier to optimal neonatal pain control. Other studies have reported low levels of nurses' skills in new-borns' pain management [7, 19]. According to international institutions and specialists, an important component of neonatal pain management in NICUs is to maintain caregivers' up-to-date knowledge by providing them with practical educational resources [20].

Guidelines indicate that appropriate pain control requires valid assessment. Pain assessment must be regularly performed, and if pain is diagnosed, the necessary interventions must be taken [21]. One-third of the participants in this study disagreed with statement that they used neonatal pain assessment tools and were sufficiently skilled in interpreting the pain scores. Some participants also stated that a barrier to proper new-born pain control was that the nurses did not routinely use pain assessment tools. There are contradictory results about the applications of pain assessment tools in NICUs in different medical settings. A review study showed that the rate of applying pain assessment tools in NICUs in different countries ranged from 6% to 88% [21]. A study conducted in the Netherlands indicated that pain assessment was performed at least once for most neonates admitted to NICUs [22]. In a study of nurses in the US, 81% of the participants stated that a pain assessment scale was regularly used in their NICU; they attributed this achievement to increased experience and nurses' self-confidence when using pain assessment tools [14]. By contrast, a prospective cohort study conducted in 243 NICUs in 18 European countries showed that pain assessment was performed for only 32% of neonates admitted to NICUs, and only 10% of them were assessed for pain every day [23]. A longitudinal study in Sweden also investigated the effects of length of stay on pain assessment tools use and reported that the rate had increased 80% from 1993 to 2008 [24]. This indicates that the development of programmes and plans to improve the quality of neonatal pain assessment and management can gradually promote the application of neonatal pain assessment tools used by nurses.

Another finding of this study was that most participants had a positive perception of their knowledge on non-pharmacological and pharmacological methods of neonatal pain management. Although most of them recognised support for patient pain management as one of their duties, about half stated that pain in new-borns was not properly controlled in their wards. Other studies have also pointed to the gap between nurses' knowledge and performance. Some of the participants in these studies reported that although the nurses were familiar with the issues related to neonatal pain management, they felt that pain in new-borns was not well controlled in their wards [7, 14]. This finding suggests that other factors, in addition to the positive attitudes and theoretical knowledge of nurses, can affect the quality of neonatal pain management in NICUs.

About one-third of the nurses mentioned that there was no neonatal pain management protocol in their wards. This, along with poor teamwork and lack of parental involvement, was among the organisational barriers to neonatal pain assessment mentioned by the participants. There is no coherent organisational structure, and pain management is based on the personal decision and opinion of health professionals, resulting in the poor quality of neonatal pain relief. This was reported by some other studies. They showed that a lack of protocols and organisational structure was among the reasons for inconsistent neonatal pain management [25, 26]. Studies have also shown that optimal neonatal pain management requires the promotion of communication channels between health professionals, free cooperation between all members of the team, respect for members' knowledge and group decision-making [27].

The major barrier to optimal neonatal pain management mentioned by the participants was their high workload, which was also reported in some other studies conducted in Iran [28] and in other countries such as the US, the UK and China [14, 29]. The high workload, along with lack of routine neonatal pain management, exacerbated the poor management of pain. In this situation, nurses usually focused on providing routine care and, considering their high workload, tried to do what they were expected to do, otherwise they could be reprimanded. Lago et al. also reported that non-routine analgesic practices in NICUs were a barrier to new-borns' pain control [30].

Another barrier to optimal neonatal pain control mentioned by the nurses was harmful environmental stimuli, such as noise and intense lighting, which could lead to the oversensitivity of neonates. Al-Braiki et al. also stated that noisy and crowded environments were a source of stress that could be a barrier to

optimal neonatal pain management [31]. In another study, noisy environments with intense lighting were mentioned as a hostile factor that could irritate neonates and exacerbate their pain [32].

Conclusions

The findings showed that although nurses had sufficient knowledge and positive attitudes towards basic concepts of neonatal pain management and family participation, some stat-

ed that a new-born's pain was not controlled well in the NICU. They also presented some existing barriers to optimal neonatal pain management in various personal, interprofessional and organisational areas. Gaining sufficient knowledge about these barriers and developing effective facilities would allow one to take firm steps to improving the quality of pain control in NICUs.

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