Original Article

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Barriers to Use of Non-pharmacological Pain Management Methods in Neonatal Intensive Care Unit

Y. Zahed Pasha (MD)[1], A. Arzani (PhD)[2], Z. Akbariyan (MD)[1], M. Haji Ahmadi (PhD)[1], M. Ahmadi (BSc)[*3]

1.Non-Communicable Pediatrics Disease Research Center, Health Research Center, Babol University of Medical Sciences, Babol, I.R.Iran
2.Department of Nursing, Faculty of Medicine, Babol University of Medical Sciences, Bobaol, I.R.Iran
3.Babol University of Medical Sciences, Babol, I.R.Iran

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ABSTRACT

BACKGROUND AND OBJECTIVE: Many activities and interventions performed in neonatal intensive care unit (NICU) cause pain. Recurrent and untreated pain can lead to severe and harmful complications for neonates. Provision of pain management solutions is one of the duties of nurses. This study aimed to evaluate the barriers to use of non-pharmacological pain management methods in NICU from perspective of nurses.

METHODS: This cross-sectional study was conducted on all nurses (N=57) working in NICU of hospital affiliated to Babol University of Medical Sciences, Babol, Iran selected by census method. Data were evaluated using a researcher-made questionnaire consisting of three parts and a three-point Likert scale. Barriers and suggested solutions were evaluated in the questionnaire, and the obtainable scores of the questionnaire related to the items of barriers and problems in application of non-pharmacological pain management methods and solutions were 17-51 and 12-36, respectively.

FINDINGS: According to the opinions of nurses, the most important barriers to the application of non-pharmacological pain management methods were shortage of personnel in each work shift (2.54±0.6), shortage of time and heavy workload (2.4±0.6), unawareness of pain complications (2.4±0.6) and long working hours and fatigue (2.35±0.6), respectively. Among the most important strategies mentioned by nurses were regularizing non-pharmacological pain management methods (2.63±0.6), regular holding of training classes (2.58±0.5), using matrons as tutors (2.53±0.6) and increasing the number of nurses in each shift or each ward (2.44±0.5).

CONCLUSION: According to the results of this study, inadequate nursing staff and insufficient knowledge about pain complications were the most important causes for lack of application of pain management methods for neonates.

KEY WORDS: *Neonatal Intensive Care Unit, Bloodletting, Venipuncture, Non-pharmacological Pain Management, Neonate.*

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*** Corresponding author: M. Ahmadi (BSc)**
Address: Faculty of Medicine, Babol University of Medical Sciences, Babol, I.R. Iran
Tel: +98 11 32199596
E-mail: mah2071@yahoo.com

Introduction

As defined by the international association for the study of pain (IASP), pain is an unpleasant feeling and a psychological experience caused by possible or actual injuries. Failure to manage pain in neonates may only indicate a deficiency in response ability and not a reduction in pain perception. Evaluation of pain is an essential prerequisite for optimal pain management (1). Neonates are able to show responses to painful stimuli by a series of visible and measurable physiological and behavioral reactions, such as changing facial expressions (raising eyebrows, squeezing the eyes, wrinkling nasolabial groove) and crying, increased heart rate and reduced arterial oxygen saturation, which are indicative of the definitive existence of pain in neonates. Pain can also lead to increased intracranial pressure, elevating the risk of intracranial hemorrhage in premature infants. Pain and stress can suppress the immune system and increase the susceptibility of infants to infection (1,2).

According to the literature, hospitalization during infancy, especially for premature infants, requires undergoing 16 painful treatments everyday day in NICU. This condition is frequently repeated in NICU, and pain relief in neonates is often neglected. In the past, it was believed that neonates feel no pain due to their immature central nervous system. In the early 1960s, it was observed that sheathing of the nervous system, which is essential for the transmission of painful stimuli to the cerebral cortex, exists in full-term and preterm infants (3). Studies have shown that neonates are more prone to the manifestation of negative side effects of pain, compared to adults and older children. In addition to short-term effects, untreated pain can have long-term impacts, including delay in neurodevelopment of pain and their subsequent responses to pain (4, 5).

According to the Children's Association and the American Pain society's statements in 2001, painful measures of children and infants should be appropriately predicted, prevented and treated (6). The most obvious and effective pain reduction strategy is limiting the number of painful practices and applying pharmacological and non-pharmacological methods for pain relief (7). Non-pharmacological interventions are nursing activities, relieving the pain of patients. These interventions are effective, simple, and low-risk and require no specific time and costly equipment. Given the fact that nurses spend the most time with patients, compared to other healthcare personnel, they play an essential role in evaluating and controlling pain during hospitalization (3,7). Hugging, non-nutritive sucking, shaking, changing the position of infants, swaddling, non-painful tactile stimulation and using solutions with different tastes are among non-pharmacological methods for relieving pain, performance mechanism of which is still unknown (8). According to the literature, there are many obstacles and problems in the field of pain measurement and control (3,6,7,9).

Results obtained by Finley et al. have indicated a gap between knowledge, attitude, and performance of nurses, demonstrating that the success of the implementation of pain control program required training, policy development and support of hospital management at all levels (10). Lack of using analgesics for neonates during initial painful procedures reduces the effects of analgesics in subsequent painful processes. Prevention of neonatal pain inhibits the emotional and mental complications caused by the first painful experiences in next periods. During infancy, analgesics are rarely used during painful processes due to harmful side effects of central analgesic medications in neonates, such as rashes, hives, and skin redness. Therefore, focusing on non-pharmacological methods, which effectively reduce pain, is of paramount importance. Non-pharmacological methods may change the sense of pain and pain responses by distracting attention and reducing pain perception (11,12).

With regard to the importance of pain control in neonates without imposing any side effects and creating a sense of tranquility and comfort, there seems to be some barriers to the application of non-pharmacological pain management methods by nurses, which led to limited use of these methods for infants. With this background in mind, this study aimed to determine the barriers to use of non-pharmacological pain management methods in NICU from the perspective of nurses.

Methods

This cross-sectional study was conducted on 57 nurses working in NICUs of hospitals affiliated to Babol University of Medical Sciences Babol, Iran after obtaining the approvals from the ethics committee of the mentioned university with the code MUBABOL.HRI.REC.1395.3. Nurses with a minimum of one-year work experience were included in this study. At first, objectives of the research and

content of the questionnaire were explained to the subjects, and they were asked to voluntarily participate in the research. Moreover, samples were required to answer the questionnaire honestly.

The researcher-made questionnaire consisted of three parts: the first part included demographic characteristics of the research units. According to the objectives, this section was used to determine the extent of use of pain management methods based on work experience and demographic characteristics. In this part, the alternative of "always" was interpreted as use of non-pharmaceutical pain management methods in 100% of the time, whereas the options of "often", "rarely", and "never" were interpreted as 50%-99%, 1-49%, and zero percent of the times, respectively. The second section contained a list of possible barriers to the use of non-pharmacological pain management methods in NICU from the point of view of nurses, which was assessed using a three-point Likert scale with the alternatives of low, medium, and high priority. This part was designed to determine the most common barriers to the application of non-pharmacological pain management methods.

The third part was a list of suggested strategies for removal of barriers to the use of non-pharmacological pain management methods, assessed using a three-point Likert scale with alternatives of low, medium and high priority. In this section of the article, face and content validity were used to confirm the scientific validity of the questionnaire. To this end, the preliminary questionnaire was completed by 10 faculty members, followed by necessary revisions in some parts of the scale. Reliability of the questionnaire was calculated at the Cronbach's alpha of 87% The necessary licenses were obtained from the related authorities after scientific approval of questionnaire.

Nurses were required to complete the questionnaire at an appropriate time with regard to their workload. The researcher was available to resolve the ambiguity or answer questions raised by the subjects. Data analysis was performed in SPSS version 19 using descriptive and inferential statistics, and P-value of less than 0.05 was considered significant.

Results

In this research, the age range of nurses was 27-34 years. However, it should be noted that this item was not answered by many of the participants. In terms of educational level, 83% and 7% of the subjects had BSc and MSc, respectively. Standard deviation of work experience of the subjects was 7.6±7.4, and range of work experience of nurses was 2-23 years.

While non-pharmacological pain management methods were never applied during bloodletting and venipuncture for neonates by 30% of the subjects these techniques, these techniques were applied by 61% of the nurses. In other words, only seven percent of nurses always used non-pharmacological pain management methods during bloodletting and venipuncture processes, and 30% of nurses never used these techniques. On the other hand, 18% of nurses preferred pharmacological pain management methods for bloodletting and venipuncture of neonates to non-pharmacological techniques, and 79% had no such preference. The most common non-pharmacological pain management method was use of sugar solution, which was the most common method with 46% of frequency followed by sterile water and breastmilk methods (table 1).

Table1. Distribution of absolute and relative frequency of the most common non-pharmacological pain management methods

Most common methods	Absolute frequency	Relative frequency(%)
Sugar solution	26	46
Sterile water	10	18
Breastmilk	10	18
Non-nutritive sucking	1	2%
Tactile stimulation	3	5%
Hugging	2	3%
Heat	5	8%
Total	57	100%

The most common barriers to the use of non-pharmacological pain management methods included shortage of personnel in working shifts (2.4±0.565), inadequate time and heavy workload (2.4±0.65), long working hours and fatigue (2.35±0.64), lack of awareness of pain complications (2.4±1.7), and lack of knowledge about the recent related research (1.88±0.69) (table 2). On the other hand, the most common practical solutions for removal of barriers to the use of non-pharmacological pain management methods were regularizing non-pharmacological pain management methods (2.63±0.61), holding continuous training classes (2.58±0.56), employing matrons as tutors (2.53±0.63), and increasing the number of nurses in each shift or in each hospital ward (2.44±0.56) (table 3).

Table 2. Most common barriers to the use of non-pharmacological pain management methods in NICU

Barriers	Mean±SD
Long working hours and fatigue	2.35±0.64
Inadequate time and heavy workload	2.40±0.65
Shortage of personnel in work shifts	2.54±0.65
Lack of knowledge about pain complications	2.40±0.7
Unwillingness of co-workers	1.42±0.59
Unwillingness of officials and managers	1.40±0.53
Uncommon applications of the proposed methods	1.61±0.64
Lack of sufficient motivation	1.79±0.81
Inadequate experience	1.88±0.7
Lack of awareness of recent studies	1.81±0.69
Inability to recognize pain behaviors in neonates	1.70±0.73
Inadequate training in educational periods	1.74±0/76
Negligence of relevant authorities	1.86±0.81
Insufficient facilities of the ward	1.75±0.66
Inability of nurses to assess pain	1.49±0.68
Unwillingness of physicians	1.49±0.65
Low salaries and financial incentives	1.54±0.68
believing in lack of feeling of pain in neonates	1.56±0.78

Table 3. Most common solutions provided by nurses to eliminate the barriers to use of non-pharmacological pain management methods

Solutions	Mean±SD
Preparing the necessary equipment for this method	2.32±0.65
Increasing the number of nurses in each shift or ward	2.44±0.56
Regularizing the use of non-pharmacological pain management methods	2.63±0.61
Holding continuous training classes	2.58±0.56
Using matrons as tutors for training and supervising	2.53±0.63
Using attached child pain control chart to control vital signs	2.51±0.68
Encouraging nurses who successfully use pain management methods	2.25±0.73
Establishing pain management committee in the hospital	2.37±0.72
Including pain management topic as a nursing lesson	2.37±0.72
Reducing resistance of physicians	2.19±0.71
Reducing resistance of nurses	1.89±0.79
Limiting painful practices	2.02±0.83

Discussion

According to the results of the present research, the most important barriers to the use of non-pharmacological pain management methods were shortage of personnel in each work shift, inadequate time, and heavy workload, lack of awareness of pain complications, and long working hours and fatigue. Among the most important strategies mentioned by nurses to overcome the obstacles were regularizing non-pharmacological pain management methods, holding continuous training classes, using matrons as tutors, and increasing the number of nurses in each shift or ward. In a research by Allahyari et al., one of the main problems was the incongruity between the number of nurses and the number of neonates, which resulted in a shortage of time for nurses to provide efficient healthcare services. In the mentioned study, the most prominent solution for elimination of barriers was the establishment of a nursing committee in the hospital for pain control (10).

Difference between the results of the aforementioned study and the current research was due to the assessment of barriers to use of non-pharmacological pain management from the perspective of nurses working in NICUs. Nevertheless, the main obstacle in both studies was lack of human resources. In line with our findings, Polliki et al. mentioned negligence of nurses and their beliefs about the role of parents, inability of neonates to express pain, heavy workload, inadequate time, and high rate of admission and discharge in the hospital (14). In a study by Parvizi et al., the problems mentioned by nurses included educational problems, nursing shortage, excessive work shifts, environmental problems, and insufficient equipment, which are incongruence with the results of the present research. The majority of nurses had no training regarding the use of non-pharmacological pain management methods and most of them learned through experience. Strategies presented by nurses to solve these problems are not completely consistent with our findings, which include considering a stronger monitoring system (pain committee) and revising university courses (7).

Namnabati et al. also stated that nurses were capable of identifying pain and this ability was not directly derived from theoretical lessons but was obtained using three areas of theoretical knowledge, emotions and feelings, and clinical performance (15). Consistent with our findings, Mohebi et al. marked the most important problems mentioned by nurses were long working hours, inadequate time, heavy workload and nursing shortage. In the aforementioned research, the most important strategies to eliminate these barriers were increasing the number of personnel, education of parents to recognize and apply these

methods and training the staff (8). However, sampling by census method was used in the mentioned study, which is not in line with the current research. Similar to our study, data collection tool was a researcher-made questionnaire, and results of the two studies are consistent in terms of the problems and some of the proposed strategies mentioned by nurses.

Incongruence with our findings, Malviya et al. affirmed that continuous training of personnel was the most efficient technique to improve and promote care (16). In a study by Parvizi et al., the results indicated that 99% of nurses received inadequate training during their education period. Moreover, it was demonstrated that nurses used no pain measurement tools, which may be due to shortage or unsuitability of pain assessment tools or inadequate knowledge of pain assessment tools and negligence of authorities (17). Dijk et al. marked the necessity of access to valid and reliable pain assessment tools, which can be easily used in daily care in NICUs (18).

According to the results of the current research, some of the prominent problems of nurses included lack of awareness of the complications of pain, insufficient knowledge of pain behaviors in neonates and lack of awareness recent studies. The most important factors for improving the use of non-pharmacological pain management strategies for pediatric surgeries included qualification and competence of nurses, application of multiple pain relief methods, and reduction of workload (14). In the present study, continuous training of personnel was one of the prominent solutions for implementation of non-pharmacological pain management methods. In a research by Farahani et al., establishment of a nursing pain committee was proposed, stating that nurses would become acquainted with pain assessment, which could result in early diagnosis and effective control of pain. In the mentioned study, another duty of the pain committee was changing the structure of hospital in line with the assessment of pain and establishment of policies for monitoring and evaluating pain assessment (19). Considering the barriers to the use of non-pharmacological pain management methods, strategies are required to reduce or eliminate these problems. In the current study, some of the proposed solutions included regularizing non-pharmacological pain management methods, holding continuous training classes, using matrons as tutors, increasing the number of nurses in each work shift and decreasing the work time of nurses. Other solutions were limiting painful practices, providing equipment for the implementation of related methods, presenting pain control sheet, encouraging successful nurses, establishing pain management committee in hospitals, including the topic of pain management in nursing lessons and reducing the resistance of colleagues.

According to the results of the present research, the main barrier to the use of non-pharmacological pain management methods was inadequate workforce and heavy workload, which could be resolved by increasing the number of personnel. Another notable solution was revising undergraduate courses and including the topic of non-pharmacological pain management methods to its content, which is a feasible strategy to reduce the problems of nurses in the future. Moreover, holding training classes, and controlling and evaluating nurses working at the NICU unit would be another effective measure in this regard.

With regard to the final results, it is suggested that providing necessary equipment, establishing a pain committee in the hospital (for providing necessary equipment, such as pain chart sheet, pain assessment tools, regularizing pain control methods, holding training classes, posters and pamphlets, and controlling and supervising) and reducing the work hours of nurses be considered by the related authorities in order to eliminate the barriers.

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