

BMJ Open Organisational challenges of pain management in neonatal intensive care unit: a qualitative study

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ABSTRACT

Objectives Despite credible evidence, optimal neonates' pain management in the neonatal intensive care unit (NICU) is a challenging issue. In this regard, the organisational context is an essential factor. The existing challenges vary depending on the context, and investigating them can help to improve the quality of care. The study aimed to explore organisational challenges to neonates' pain management in the NICU.

Methods This qualitative study included 31 nurses and physicians in the NICU of Children's Hospital, Tabriz, Iran. Data collection was done through individual and focus group interviews. For data analysis, we used conventional content analysis.

Results The identified challenges included organisational culture (poor interprofessional collaboration and low parental participation), organisational structure (lack of unified approach in relieving pain and limited supervision for pain management) and organisational resources (lack of time due to high workload and inadequate educational programmes).

Conclusions Many organisational factors consistently affect neonatal pain management. Adopting some approaches to enhance the cooperation of treatment team members, holding educational programmes, proper organisational supervision and implementing a unified neonatal-based pain management programme could improve neonatal pain management.

BACKGROUND

Nowadays, the survival rate of neonates admitted to the neonatal intensive care unit (NICU) has increased. Therefore, it is essential to optimise the NICU care and reduce the complications of survived cases. In this regard, proper neonates' pain control is a priority. Despite the misconceptions in the past, scientists have proved the neonates' perception of pain in recent decades.¹

Pain can increase the demand in the cardiovascular system and endanger the haemodynamic status of the neonate by increasing the heart rate and decreasing the arterial oxygen saturation. It also increases the risk of intraventricular haemorrhage by increasing blood pressure in the germinal matrix. The weak immune system and increased risk of

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The exclusive focus on the organisational challenges of neonatal pain management in the clinical setting of a developing country, which has been less addressed in other studies.
- ⇒ The inclusion of a range of health professionals across different caring situations, educational levels and work experiences.
- ⇒ Triangulation in data collection (individual interviews and focus groups) which increases the trustworthiness of the findings.
- ⇒ Sampling of single neonatal intensive care unit and lack of organisational diversity.
- ⇒ Potential for missing some information due to the hierarchical nature of the setting that discourages the voicing of opinions.

infections are other problems related to pain tolerance in neonates. Anxiety, abnormalities in processing pain (hyposensitivity or hypersensitivity to pain) and developmental problems are some long-term effects of inappropriate pain management in neonates.² Studies show that the prevention of pain in the neonates is not only ethically essential, but it is also necessary for preventing short-term and long-term complications and developmental disorders.^{3 4}

Although there have been theoretical advances and clinical guidelines related to pain management in the NICU, it is still a severe challenge in complex care conditions⁵ and needs further research.⁶ Evidence suggests that the rate of routine pain assessment in NICU can be as low as 6%–10%^{7 8} and only 7.1% of care providers always take interventions to reduce neonates' pain.⁹

Pain management of neonates is one of the most important tasks of care providers. Nurses in particular play a significant role in pain management due to spending more time at the patient's bedside.¹⁰ According to previous studies, the lack of knowledge in care providers is the significant barrier to optimal pain management.^{11 12} The evidence shows



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that care providers' knowledge of pain management and their perceived responsibility are significantly related to the organisation's policies.¹³ Nowadays, healthcare accreditation centres consider the optimal management of pain as one of the indicators for evaluating the quality of care. They extend patient pain management from an individual issue to an organisational issue and emphasise the importance of the organisation in providing safe care. Hence, the researchers are trying to understand the role of organisation in this area.¹⁴

Evidence suggests that differences in service quality may be due to organisational differences.¹⁵ In this regard, a study examined the role of organisational factors (culture, structure, resources, capabilities, skills and policies) in the NICU pain management of a developed country and discussed the existing challenges.¹⁶ However, there is a belief that the NICU context in developed countries may differ in developing countries, leading to different pain management challenges.¹⁷

Although some studies have evaluated pain management in the NICU, limited studies have focused on organisational challenges in developing countries. Accordingly, the present descriptive qualitative study was conducted with the aim of investigating the organisational challenges of NICU pain management in Tabriz, Iran.

METHODS

The interpretive descriptive method was used to evaluate the perceptions of health professionals on organisational pain management challenges in the NICU. Descriptive qualitative research helps to describe or discover a phenomenon or a problem, and the researcher can use it to examine a wide range of topics related to people's experiences, perceptions and perspectives.¹⁸

The study was conducted in a NICU (level III) in Tabriz, East Azerbaijan province in the northwest of Iran. The NICU was a referral centre for term and preterm neonates with various medical and surgical diseases. The physical space of the NICU included three large halls equipped with 27 warmers. The average ratio of nurse to patient was 1:3. In this ward, different types of painful interventions are performed according to the neonates' needs. The ward has an accommodation for mothers, which includes a kitchen, toilet, bathroom and a large hall with multiple

beds and wardrobes. Mothers can stay in the ward and with their infant 24 hours a day.

Participants and recruitment

Interviews were conducted with 26 nurses and 5 physicians who had at least 6 months of experience in the NICU. In order to make an informed decision of staff about whether to participate, the first author went to the NICU and explained the purpose of the research to them (potential participants). All were given the opportunity to ask questions. The first author also informed them about the voluntary nature of the participation, their right to privacy and confidentiality. All participants were assured that they could withdraw from the study at any time without giving any reason. Then, staff were offered an interview by the first author and no one declined to take part. Volunteered participants received and studied written information. They completed the consent form and expressed their willingness to participate in the individual or focus interviews. The purposive sampling was used to achieve the maximum variation. For this purpose, we selected the participants with various age ranges, educational levels, work experiences, organisational positions and professions for either individual or focus interviews (table 1).

Patient and public involvement

No patient involved.

Data collection

Data were collected from February 2021 to January 2022 through 11 individual interviews and 3 focus group discussions with 7, 8 and 5 participants, respectively. The place and time of the interview were chosen according to the participants' preference and their privacy were respected during the interview. The interviews were voice recorded after obtaining the participants' consent. The individual interviews lasted an average of 42 min (range: 23–65 min). All of them were performed in the coffee room, according to the preference of the participants. The first author, who had a clinical and research background in neonatal care, led the individual interviews. She used a semistructured interview guide that focused on participants' experiences of neonatal pain management in NICU (box 1).

Table 1 Demographic characteristics of participants

Participants (N=31)	Age (year)	Marital status married/single	Educational status	Organisational position	Work experience (year)
Nurse (n=26)	30–44	23/3	MSc=1 BSc=25	Clinical supervisor=1 Educational supervisor=1 Head nurse=2 Nurse=22	5–20
Physician (n=5)	35–48	5/0	Neonatologist=4 Fellowship of neonatology=1	Academic member=2 Clinical physician=2 Assistant=1	4–18

Box 1 Interview guide

Main questions:

- ⇒ It's very valuable for me to know about your experiences of managing infant pain in your NICU. Please talk about them if you wish.
- ⇒ What are healthcare services provided to manage the infant pain in your NICU?
- ⇒ What are the problems in managing infant pain in your NICU?
- ⇒ What organisational factors are effective in managing the neonatal pain?

Probing questions:

- ⇒ Could you explain more?
- ⇒ What do you mean?
- ⇒ Can you give an example to clarify further?

NICU, neonatal intensive care unit.

Box 2 The steps of data analysis

- ⇒ The first author transcribed each interview and read it several times to obtain a comprehensive view.
- ⇒ Meaning units within the text were extracted (which could be one or more sentences or a paragraph) and condensed based on their content.
- ⇒ The condensed meaning units were abstracted and labelled with codes (852 codes).
- ⇒ A group of four researchers (HN, HH, MJ and RN) reviewed and discussed condensed meaning units and codes once more to resolve any conflicts in the concept of one code or any possible similarities in several codes.
- ⇒ They sorted the codes based on their similarities and differences with subthemes.
- ⇒ Finally, themes were formulated from the classification of subthemes.

In order to achieve a broader and richer range of information when no new information emerged from the individual interviews, three focus groups were conducted by the first author in a conference hall of the centre. Integrating individual and focus interviews makes a productive process and enriches data to conceptualise the phenomenon.¹⁹ The focus group sessions began by providing information about the study, and the questions asked were similar to the individual interviews. The first author transferred the topics from one to another and, if necessary, extracted the meaning of the participants' answers and elicited more details.

Data analysis

We began coding before data collection had finished. This allowed us to reflect on how questions were asked during interviews and learn more about topics of relevance to the research aims. The audiorecorded interviews were transcribed verbatim and were double checked for anonymity and accuracy. Conventional content analysis was used to interpret the transcripts. In this approach, inductive codes, subthemes and themes emerged from the transcripts. We used Graneheim and Lundman algorithms to analyse the data.²⁰ MAXQDA10 software was used for data analysis. The data analysis steps were presented in [box 2](#).

Trustworthiness

We used Guba and Lincoln's criteria to assess trustworthiness.²¹ Credibility was enhanced through purposive sampling with the principle of maximum variation to select the participants. In addition to individual interviews, we used focus groups to collect data. Also, to verify the data and the extracted codes, the member check was used. The researchers were familiar with the NICU department, and they were experienced in qualitative research. For the study's dependability, we tried to clearly describe the research steps taken from the beginning of the research project to the development and reporting of findings. We also used probing questions to increase dependability. In addition, the process of data collection

and findings were audited by experts, which helped promote confirmability.

RESULTS

Three main themes and six subthemes that explained the organisational challenges to optimal neonates' pain management in the NICU were identified ([table 2](#)).

Organisational culture

Poor interprofessional collaboration

According to the participants, individual decision-making on doing tasks and poor coordination among team members led to such problems as repetitive manipulations of the neonates, disorganisation and limited opportunities to relieve the neonates' pain. Also, the staff did not talk to each other about the pain management of the neonates and no suggestions were exchanged between them. Although the nurses talked to physicians about the need to control neonates' pain and made suggestions in some cases, they were usually dismissed by the physicians because they had more decision-making power.

Staff just want to do their job. For example, the doctor comes and says: 'I want to do an LP on the infant.' Without coordinating the things related to managing the neonate's pain with the nurse! (Participant 3)

Table 2 Themes and subthemes

Themes	Subthemes
Organisational culture	Poor interprofessional collaboration
	Low parental participation
Organisational structure	Lack of unified approach to pain relief
	Limited supervision for pain management
Organisational resources	Lack of time due to high workload
	Inadequate educational programmes

Low parental participation

Although the parents were present in the ward, they were not considered members of the care team and were not often consulted. The participants believed that the staff usually controlled the parents, and the parents acted according to the staff's wishes. Usually, parents are given limited information about their neonate's pain and how to participate and relieve it. This led to a one-way and non-interactive relationship between family and the staff. As a result, they could not play a fully effective role in activities such as relieving their neonate's pain.

In our ward, usually we do not involve the parents in controlling the baby's pain. Most of the time, the staff asks the parents to go out and come back after managing the neonate's pain. This is quite acceptable behavior in the ward. (Participant 21)

Organisational structure

Lack of unified approach in relieving pain

According to the participants, there were no predefined and specific policy for pain control in the ward. As a result, no positive atmosphere and clear expectations in terms of pain-relieving actions were created. This caused a lack of strong support for the implementation of evidence in practice. Although several healthcare professionals working in the NICU did things to relieve the neonates' pain based on their personal preference, credible pain assessment tools and pain prevention and management policies were not used abundantly. Thus, there were disagreements and arbitrary pain management in the ward. The participants believed that specific protocols could help to improve outcomes and develop optimal pain management practices in the NICU, leading to the uniformity of performance among different professions and clinicians.

Currently, it is unclear what we should do to control the pain in different situations. For example, we don't know what exactly to do to control the pain of a neonate after surgery. The internal medicine and surgery team members have different opinions on this issue, and their lack of understanding sometimes causes the neonate not to be given painkillers at all. (Participant 1)

We have neonatologists with different methods of practicing; some of them prescribe painkillers more commonly than others. Perhaps we could have some predefined instructions for a variety of methods or painful pain management because some care-providers might think that a specific method is not very painful. (Participant 13)

Limited supervision for pain management

There is little demand from the organisation regarding the neonatal pain management. Also, the staff's performance regarding neonatal pain management is not supervised. The participants explained that the Hospital

Quality Assurance Committee had no policies on assessing the quality of neonatal pain management. Also, the patients' pain management was not explicitly mentioned in the job description of the staff, and the neonates' pain management was not examined in the monthly and annual performance evaluations of the staff. Thus, the performance of health professionals regarding the use of analgesics was not often questioned. However, in some cases, verbal warnings were delivered to some health professionals highly inattentive to the patients' pain. Furthermore, there were no clear policies to encourage health professionals who performed well in managing the neonates' pain. Accordingly, appropriately managing of the neonates' pain was not considered a professional value.

Nobody asks staff about the quality of their performance in relieving infant's pain. We feel we're not evaluated or monitored in this regard; and we are completely free to do it or not. (Participant 10)

Organisational resources

Lack of time due to high workload

According to the participants, a high workload was another challenge to appropriate pain management in the NICU. In most cases, the health professionals did not perform well in relieving the neonates' pain due to lack of time and work overload. Care providers mentioned the large number of patients as a challenge for pain management. They believed that the high workload resulted in limited attention to the neonates' pain and not using analgesics before the procedures. Also, some nurses believed that less pain during the procedure required two nurses, but the lack of time made it impossible for them to help their colleagues during the painful procedure.

A nurse with three patients may admit another one. This workload makes pain management difficult. She/he only thinks of doing their duties quickly and finishing the shift. (Participant 25)

Inadequate educational program

According to the participants, the lack of adequate training programmes and consequently insufficient knowledge caused the staff not to know the benefits and importance of controlling the neonates' pain. Some of the educational needs mentioned by the participants included gaining knowledge and skills in using pain assessment tools and pain management techniques appropriate for different situations and procedures, as well as using analgesics. From the participants' point of view, attending in-service training courses for managing the neonates' pain and participation in research projects or quality improvement activities could increase the health professionals' awareness of the neonates' pain and its treatment benefits.

There is no training program for the NICU staff about the importance and methods of relieving pain

in neonates. Since the treatment team members know little about this issue, we should not expect them to perform well. (Participant 24)

DISCUSSION

According to our results, organisational factors, including cultural, structural and resource issues, can affect the optimal control of neonates' pain in the NICU.

Organisational culture is the model of group's prevalent assumptions, which develops through a shared history, experiences and learning.¹⁶ The health professionals who participated in our study believed that the low participatory culture and poor collaboration of health team members threatened the optimal management of the neonates' pain. This issue has caused such problems as overstimulation of the neonates, inconsistencies in caring and losing opportunities to relieve the pain. Interprofessional collaboration is a way in which different healthcare professionals interact with each other to make clinical decisions after considering each other's knowledge. In this way, the specialists undertake complementary roles and get involved in problem-solving and decision-making processes to develop and implement patient care programmes.²² Participants in the study cited the hierarchical nature and clinical dominance of physicians over nurses as a barrier to appropriate collaboration. Power imbalances in clinical practice are a crucial barrier to joint decision-making, which can affect the quality of care.²³ The findings of our study are supported by the other literature. Mirlashari *et al* showed that the power imbalance between physicians and nurses in Iranian NICUs leads to insufficient team collaboration in providing care.²⁴ In studies conducted in developed countries, proper communication and interprofessional collaboration in complex care settings such as the NICU were considered the vital element of effective practice on pain.^{16 25 26} According to studies, finding communication channels between the healthcare members can reduce power imbalance and improve their ability to negotiate pain management approaches.²⁷ In contrast to our study finding, Tavernier *et al* identified team collaboration as a contextual factor in optimal pain management in US hospitals. They acknowledged that interprofessional educational programmes have improved communication between the disciplines and supported collaborative relationships.²⁸ This strategy can be used in countries such as Iran, where insufficient communication and collaboration among health professionals are considered a challenge in the quality of care. The users of educational programmes in Iranian health institutions are traditionally all from the same discipline. Also, evidence-based strategies, such as interprofessional practice teams, can improve interprofessional collaboration.²⁹

The findings of this study indicate insufficient parent-health professional collaboration in neonates' pain management. Organisational culture did not adequately

support parental involvement, and relationships between parents and professionals were affected by power imbalance. Parents often did not receive sufficient information and their participation in the decision-making and service providing was not considered in practice. Although few parental care involvement research is done in developing countries such as Iran, this finding is supported by other Iranian study.^{24 30 31} Khajeh *et al* found that families in Iranian medical fields are considered non-participating visitors.³² Other studies in Finland, Sweden, the USA and China showed that the level of parental involvement in the management of neonatal pain varies from parental absence to their full collaboration.^{33 34} However, the participation of the patients' family members and health-care professionals is essential to provide optimal care.³⁵ There are positive effects of parental involvement in the literature of developed countries, such as reducing parental stress,³⁶ facilitating parent/infant attachment³⁷ and more effectively managing neonatal pain.³⁸ Axelin *et al* pointed out that when the health professionals' relationship with the parents is paternalistic, parents were usually absent or passive in managing their neonate pain. They believed that the implication of the Family-Centred Care (FCC) approach had a positive effect on information sharing and parental involvement in neonatal pain management.³³ Mirlashari *et al* also acknowledged that the low parental involvement in Iranian NICUs is due to the marginalised FCC.²⁴ In the FCC model, the family is an essential member of the healthcare team and has a close relationship with staff. In this model, the parents are the most influential contributors to caring for their neonates in the NICU.³⁹ Some studies showed that the implementation of FCC model could increase the parents' participation in neonates' pain management.^{26 40} Evidence highlights the role of the organisation in creating instructions to change the context and provide the optimal parental involvement in neonatal care.²⁵

The lack of clear policy and supervising the health professionals' performance in relieving the neonates' pain are the main challenges related to organisational structure. This increases the evidence-practice gap and causes the staff to use analgesics based on their individual opinions and knowledge, which can lead to improper neonates' pain management. This finding is supported by some studies in Iran⁴¹ and other developing countries.⁴² Studies often conducted in developed countries emphasise the facilitation of optimal pain management with clear organisational protocols and quality improvement policies.^{16 28} A longitudinal study in Sweden showed that the development of the programme about neonatal pain management and staying on it increased the rate of the use of pain assessment tools by 80% from 1993 to 2008.⁴³ Nowadays, reputable institutions and neonatal pain specialists recommend that the NICUs should have evidence-based step-by-step protocol and continuous auditing programme for optimal neonates' pain management.⁴⁴ The American Academy of Pediatrics (AAP) listed the components of the neonates' pain

management protocol that include strategies to minimise the number of performed painful procedures, routine pain assessment programmes and pharmacological and non-pharmacological treatments for pain management during surgery and procedures.⁴⁵ Stevens *et al* used the evidence-based Practice for Improving Quality method. They implemented a multifaceted intervention to improve pain management in Canadian paediatric hospitals that can be used in other settings. After examining the unit's baseline pain practices and reviewing evidence of pain assessment and management in a participatory process, they identified their protocol. They improved the level of pain management with step-by-step interventions including educational sessions, reminders, audit and feedback.⁴⁶

Organisational resources include the supplies and time necessary to meet work demands. Achieving this organisational feature requires sufficient staff with the appropriate expertise to balance the job demands, workload and time. In our study, some nurses raised time management concerns more frequently than addressing their concerns about the neonates' pain management. High workload and lack of time cause accumulation of staff's duties. This issue, along with the non-supportive organisational structure and lack of care providers' knowledge about the importance of neonates' pain management, can cause priority of some care necessary for the newborn's survival and restrict the pain management. Rochefort *et al* suggest that staffing constraints and non-supportive work environments result in the rationing of nursing interventions in NICU.⁴⁷ Moreover, a high workload can cause physical and mental fatigue in staff and negatively affect their performance. Work overload and lack of time are the international challenge in health institutions that affect in quality of care. Similar to our finding, the studies conducted in Iran⁴⁸ and other countries^{28 34} mentioned high workload as a barrier to optimal management of patient pain. Although part of the high workload is due to the nurse shortage, which requires interventions at the international and national levels, nevertheless, some solutions such as reducing indirect care time by supplies availability, providing enough off-duty hours and more payments for extra work hours can motivate nurses and improve the quality of neonatal pain management in busy settings.

Inadequate training programmes on the neonates' pain management were another problem related to organisational resources. According to the participants, the knowledge about various areas of pain management was at a low level due to inadequate training. Although Cong *et al* concluded that care providers' knowledge of neonatal pain has changed dramatically in recent decades,³⁴ there is still a need to improve it. Studies in developed and developing countries have reported insufficient knowledge of health professionals in patient pain management.^{27 28 41 49} In this regard, international organisations and specialists stated that improvement, the knowledge of the health professionals by providing educational resources is an

important factor for appropriate pain management in the NICU.⁴⁵ Nowadays, pain management is one of the topics of continuing education programmes in developed settings. A study cited numerous training forums and seminars as a factor in promoting pain management in US hospitals.²⁸ In addition, other educational methods have been mentioned in studies that can be used based on the facilities and conditions of each setting. For example, Rajasoorya acknowledges that clinical rounds are a great opportunity to gain knowledge. If performed well, they can create unique learning opportunities and improve the quality of patient care.⁵⁰ However, knowledge–practice gap is a global issue. Sometimes there is knowledge about protocols, standard procedures or guidelines, but they are ignored in practice.⁵¹ It is necessary to facilitate the use of knowledge along with its promotion. Some facilities can include respect for teamwork and coordination in providing care which was discussed previously. Also, reducing work overload can provide the time needed to use knowledge to relieve the neonate's pain. It seems, there are some interactions between the study findings that emphasise the complexity of making change and can be a basis for further studies.

Limitation

Our study was conducted in the NICU of a government teaching hospital, which may have a different environment from other clinical settings and limit the representativeness of the findings. Although qualitative research is usually not generalisable and its emphasis is the in-depth exploration of an issue. Another limitation is related to the hierarchical nature of the medical environment, which although widespread internationally, is exacerbated in developing countries. Medical hierarchical power structures have been linked to negative impacts by creating environments that discourage the voicing of opinions and sharing information freely. To deal with this issue, we emphasised maintaining the confidentiality of the participants at different stages of the study. Also, in order to control the effect of the nurse/physician power imbalance, which increased the possibility of marginalisation of nurses, the focus groups of the nurses and physicians were held separately.

Conclusion

This study showed the organisational factors affecting the gap between the level of expected neonatal pain management in the NICU and the care provided. The non-encouraging organisational culture and its hierarchical nature caused the loss of communication channels between health team members and their insufficient interaction. The poor interprofessional collaboration led to inconsistent care, missed opportunities to relieve the neonate's pain and repeated painful procedures. The weakness of the FCC principles and the power imbalance between care providers and parents caused the low participation of parents in the management of their neonate's pain. An unresponsive organisational structure and lack

of a clear policy on the quality of neonatal pain management were associated with care provider discretion and, in some cases, suboptimal pain management. Work overload caused care providers to prioritise tasks that seemed more necessary in the setting. In addition, insufficient educational resources caused a lack of knowledge and further marginalisation of infant pain management.

How might this information affect in practice?

It seems that new strategies are needed to improve NICU pain management. Promoting interprofessional collaboration and parent–care providers’ interactions can increase neonatal pain management. Moreover, developing and implementing an evidence-based pain management protocol is necessary to achieve optimal pain management. An integrated clinical performance can be achieved through administrative supervision and frequent auditing. Due to the inadequate knowledge in the healthcare team, practical training is essential in such areas as control of environmental stimuli, pharmacological and non-pharmacological pain-relieving methods and using pain assessment tools. Also, a heavy workload can decrease the quality of staff performance in managing of neonatal pain. Reducing the workload in healthcare organisations is complex and multifaceted, but fulfilling the physical and emotional needs of the care team can improve their performance.

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