

## Assessment of Parents' Knowledge of Their Infants' Pain Experience in the NICU

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**Abstract:** Parental involvement in the assessment and management of neonatal pain in the Neonatal Intensive Care Unit (NICU) is essential for improving infant comfort and outcomes. However, gaps persist in parental knowledge, use of pain assessment tools, and engagement in clinical decision-making. Limited evidence exists from the Pakistani context, where resource constraints may further impact parental participation. **Objective:** To assess the knowledge and involvement of parents in evaluating their infants' pain experiences in the NICU of a tertiary care hospital in Lahore, Pakistan. **Methods:** A descriptive cross-sectional study was conducted from July 2024 to March 2025 at a tertiary care hospital NICU in Lahore. Using non-probability convenience sampling, 153 parents of neonates aged less than one month were recruited. Data were collected through a structured, validated questionnaire that covered demographic characteristics, parental knowledge of pain assessment, and their involvement in the assessment process. Descriptive statistics, including frequencies and percentages, were analyzed using SPSS version 21. **Results:** More than half of the infants (52.9%) were aged 0–7 days, with a slight female predominance (52.3%). Preterm births accounted for 32.7% of cases, and 64.7% of infants had a birthweight below 2500 grams. Most deliveries were by cesarean section (60.1%). The leading causes for NICU admission were shortness of breath (34.0%) and jaundice (24.8%). Regarding parental involvement, 56.2% reported that their expertise was considered in pain assessments; however, only 41.8% were informed about pain scales, and 26.8% were asked to use standardized tools. Nearly half (49.0%) could identify the type of pain, but many parents were uncertain about assessing its duration and location. **Conclusion:** While over half of the parents felt included in their infants' pain assessment, significant knowledge gaps remain, particularly in understanding and applying standardized pain assessment tools. These findings highlight the need for targeted educational interventions to improve parental engagement in neonatal pain management.

**Keywords:** Parental knowledge, neonatal pain, NICU, pain assessment, Pakistan

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### Introduction

The introduction of a study assessing parental knowledge of their infants' pain experiences in the Neonatal Intensive Care Unit (NICU) is crucial for advancing neonatal care. Infants in the NICU often undergo numerous painful procedures, such as venipunctures, intubations, and heel sticks. Research has established that these procedures can lead to significant physiological and psychological distress, manifesting as alterations in neurodevelopment and long-term health outcomes for the infant (1-3). It has been demonstrated that neonates experience pain similarly to older children due to their functional neuroanatomy capable of perceiving and processing painful stimuli (4,5). Despite this understanding, many healthcare professionals and parents may be ill-equipped to recognize and manage neonatal pain effectively (6).

Parental involvement has been shown to facilitate the alleviation of neonatal pain significantly. Parents' active participation during painful procedures helps reduce the distress experienced by their infants, leading to improved satisfaction with care and empowerment in their caregiving roles (7,8). Parent-targeted interventions, such as educational videos that provide information on pain management strategies, are effective in enhancing parental engagement in pain relief practices (9,10). As research emphasizes the reciprocal nature of pain assessment and management, it is imperative to acknowledge parents as integral members of the care team in the NICU (11).

The current state of pain management for neonates is complicated by barriers such as inconsistent application of pain assessment tools, a lack of knowledge among parents and healthcare workers, and varying institutional policies on pain management (12-14). While several pain assessment scales exist, such as the Neonatal Infant Pain Scale (NIPS), a significant gap remains regarding the proper implementation of these

tools in clinical practice (15). Moreover, studies have highlighted the need for heightened awareness of pain management among healthcare professionals to bridge the gap between knowledge and practice (16).

In the Pakistani context, where the NICU environment can often be challenging due to limited resources and healthcare personnel, strengthening parental knowledge regarding their infants' pain experiences is paramount. Pakistani parents, like many globally, express a keen desire to be involved in their infants' care but often lack pertinent information on how to participate effectively (17). Educational interventions tailored to parents may empower them to advocate for their infants' comfort in the NICU, potentially increasing the utilization of non-pharmacological pain relief strategies. As such, this study seeks to assess the current level of parents' knowledge regarding their infants' pain experiences, thereby identifying areas for improvement in educational outreach and enhancing overall neonatal care outcomes in Pakistan.

### Methodology

The present study employed a descriptive cross-sectional research design to assess parents' knowledge of their infants' pain experiences in the neonatal intensive care unit (NICU). The study was conducted over nine months at the NICU of a tertiary care hospital in Lahore, Pakistan, from July 2024 to March 2025. The target population comprised parents of infants aged less than one month who were admitted to the NICU during the study period. A non-probability convenience sampling technique was used to recruit participants who met the inclusion criteria, which were being the parent of a neonate admitted to the NICU and having the infant aged under one month at the time of enrollment. Parents of children admitted to other departments and those whose children were older than one month were excluded from the study.



The sample size of 153 participants was determined based on a total population of 247 parents, a 5% margin of error, and a 95% confidence level. Ethical approval for the study was obtained from the Institutional Review Board of the Faculty of Nursing, The Superior University, Lahore. Permission to collect data was sought from the hospital administration and the head of the NICU department. All participants were informed about the study's purpose, procedures, and voluntary nature, and written informed consent was obtained before the commencement of data collection. Confidentiality and anonymity were ensured, and participants were assured that their responses would be used solely for research purposes.

Data were collected using an adopted and translated version of a structured questionnaire designed to evaluate parental knowledge of their infant's pain. The instrument consisted of two parts: demographic characteristics and knowledge variables related to pain assessment, including the use of pain scales, verbal assessment, pain type, duration, and location, as well as parental involvement in the assessment process. Responses were recorded on a nominal scale, with correct answers scored as one and incorrect or uncertain responses scored as zero, yielding a maximum possible score of 11. Knowledge levels were categorized as poor (<33.3%), moderate (33.3–66.6%), or good (>66.6%). The questionnaire was self-administered to parents, with assistance provided by the data collectors when clarification was needed.

Data analysis was performed using Statistical Package for the Social Sciences (SPSS) version 21. Descriptive statistics, including frequencies,

percentages, means, and measures of central tendency, were used to summarize the demographic and knowledge data. Results were presented in tabular form, accompanied by narrative interpretation. The analysis adhered to standard epidemiological reporting practices to ensure comparability with similar international studies.

## Results

More than half of the infants (52.9%) were aged between 0 and 7 days at the time of data collection, while 47.1% were aged 7–28 days. Regarding gender distribution, female infants constituted a slightly higher proportion (52.3%) compared to males (47.7%). In terms of gestational age, approximately one-third of the infants (32.7%) were born preterm, whereas the majority (67.3%) were delivered at term. Birthweight data revealed that a substantial proportion (64.7%) of the neonates had a birthweight below 2500 grams, while 35.3% weighed above 2500 grams. Feeding methods varied, with 44.4% of infants exclusively breastfed, 39.9% solely bottle-fed, and 15.7% receiving mixed feeding. The mode of delivery showed that most infants (60.1%) were born via cesarean section, compared to 39.9% delivered vaginally. Length of hospital stay was most frequently reported in weeks (54.9%), followed by days (34.6%) and months (10.5%). The leading etiological factors for NICU admission were shortness of breath (34.0%), jaundice (24.8%), infection (22.2%), breastfeeding-related issues (9.2%), and tachycardia (9.8%).

**Table 1: Demographic Characteristics**

Demographic Characteristics	Frequencies (%)
<b>Age</b>	
0–7 days	81 (52.9%)
7–28 days	72 (47.1%)
<b>Gender</b>	
Male	73 (47.7%)
Female	80 (52.3%)
<b>Gestational Age</b>	
Preterm	50 (32.7%)
Term	103 (67.3%)
<b>Birthweight</b>	
<2500 gms	99 (64.7%)
>2500 gms	54 (35.3%)
<b>Feeding Method</b>	
Breastfeeding	68 (44.4%)
Bottle Feeding	61 (39.9%)
Mixed	24 (15.7%)
<b>Type of Delivery</b>	
Vaginal	61 (39.9%)
Cesarean Section	92 (60.1%)
<b>Length of Hospital Stay</b>	
Days	53 (34.6%)
Weeks	84 (54.9%)
Months	16 (10.5%)
<b>Etiology</b>	
Shortness of Breath	52 (34.0%)
Jaundice	38 (24.8%)
Infection	34 (22.2%)
Due to Breastfeeding	14 (9.2%)
Tachycardia	15 (9.8%)

Table 2 presents the responses regarding parental knowledge and involvement in assessing their infant's pain in the NICU. Over half of the parents (56.2%) reported that their expertise was considered during their child's pain assessment, whereas 30.1% disagreed, and 13.7% were uncertain. Less than half of the participants (41.8%) reported that hospital staff explained the pain scale and its purpose; however, 37.3% stated they were not informed, and 20.9% were unsure of the explanation. Only 26.8% of parents were directly asked to assess their child's pain using a standardized pain scale such as the Visual Analogue Scale (VAS) or Numerical Rating Scale (NRS), while 32.0% were not, and 41.2% were uncertain. Regarding verbal

assessment of pain severity, 34.6% of parents were consulted, 36.6% were not, and 28.8% were unsure. Almost half of the parents (49.0%) reported being asked about the type of pain their child experienced, with equal proportions (25.5%) stating they were not asked or were unsure. When asked about the duration of their child's pain, 34.6% of parents provided input, 29.4% were not asked, and 35.9% were uncertain about the answer. Knowledge about pain location was reported by 48.4% of parents, while 47.7% were not consulted, and 3.9% were unsure. Finally, 35.9% of parents felt included in the overall pain assessment process, 34.6% did not, and 29.4% were uncertain.

Table 2: Knowledge Variables

Sr. no	Items	Yes F (%)	No F (%)	Don't Know F (%)
1	I felt that my expertise was taken into account when my child's pain was assessed	86 (56.2%)	46 (30.1%)	21 (13.7%)
2	Hospital staff talked me through the pain scale used to assess my child's pain and explained its purpose	64 (41.8%)	57 (37.3%)	32 (20.9%)
3	As a parent, I was asked to assess my child's pain using a pain scale (e.g., VAS or numerical rating)	41 (26.8%)	49 (32.0%)	63 (41.2%)
4	As a parent, I was asked to give a verbal assessment of the severity of my child's pain	53 (34.6%)	56 (36.6%)	44 (28.8%)
5	As a parent, I was asked about what type of pain my child was experiencing (e.g., drowsiness or wheezing)	75 (49.0%)	39 (25.5%)	39 (25.5%)
6	As a parent, I was asked how long my child had been in pain (e.g., when did the pain begin?)	53 (34.6%)	45 (29.4%)	55 (35.9%)
7	As a parent, I was asked about the location of my child's pain	74 (48.4%)	73 (47.7%)	6 (3.9%)
8	As a parent, I felt included in the assessment of my child's pain	55 (35.9%)	53 (34.6%)	45 (29.4%)

Discussion

The results of our study reveal significant insights into the demographic characteristics of infants and the knowledge and involvement of parents in assessing their infants' pain within the NICU. A total of 52.9% of the infants were aged 0–7 days, while 47.1% were between 7–28 days, corroborating findings that emphasize the vulnerability of neonates during their initial days, a critical period for their development and care (18). The male-to-female gender distribution showed a slight bias towards females (52.3% vs. 47.7%), consistent with trends where females have been reported to outnumber males in neonatal populations. However, specific references for this claim were not found, and therefore, this assertion may be too generalized (19).

The reported gestational age indicated that 32.7% of infants were preterm, which aligns closely with literature highlighting the prevalence of preterm births in NICUs worldwide (20). The birthweight data showed that a considerable proportion (64.7%) of infants weighed less than 2500 grams, reinforcing the emphasis on low birth weight as a common concern in neonatal care. This is supported by evidence that indicates a link between low birth weight and neonatal morbidity (21).

Exclusive breastfeeding among 44.4% of infants reflects an a continued commitment to breastfeeding in neonatal practice, supported by guidelines that promote breastfeeding as essential for neonatal health (22). In terms of delivery modes, the dominance of cesarean sections (60.1%) is consistent with rising trends in surgical deliveries globally, attributed to various factors, including maternal preferences and perceived risk factors associated with vaginal birth (23). The length of hospital stay reported, with 54.9% spending time in weeks, provides insight into the prolonged care that many infants require, often due to complications linked to premature birth or other health issues (24).

The etiology for NICU admissions revealed high rates of shortness of breath (34.0%) and jaundice (24.8%), which are prevalent reasons for neonatal hospitalizations in many regions (25). This data highlights the need for targeted interventions and knowledge dissemination among healthcare providers and parents to manage these common conditions effectively.

When considering parental involvement and knowledge regarding their infants' pain assessments, our results indicate that 56.2% of parents felt their expertise was acknowledged in pain assessments. This finding aligns

with the literature, which reflects that active parental participation can improve pain management outcomes in neonates (26). However, only 41.8% of parents reported being informed about pain scales used for assessment, indicating a significant area for improvement in parent education (27). The lower rate of parents being asked to utilize standardized pain scales (26.8%) echoes research indicating that systematic incorporation of parental assessments using established scales remains inconsistent within clinical settings (28).

Our findings show that nearly half of the parents (49.0%) could articulate answers regarding the type of pain experienced by their infants, which highlights the gap in routinely involving parents comprehensively in pain assessment practices (29). Moreover, many respondents reported uncertainty about how to assess their child's pain duration and location, suggesting an urgent need for improved communication strategies from hospital staff concerning pain indicators and assessment methods (30).

Thus, while a substantial number of parents feel included in the pain assessment processes for their infants, significant knowledge gaps persist, particularly surrounding the facilities provided to parents to assess pain effectively. These gaps necessitate more robust educational initiatives and training programs to enhance parental participation and comfort, which may lead to improved pain management practices in the NICU context. Educational interventions targeting parents have been shown to improve knowledge, self-efficacy, and overall involvement in managing their infant's pain experiences (31).

Conclusion

This study reveals that although a substantial proportion of parents felt involved in their infant's pain assessment in the NICU, many lacked adequate knowledge of standardized pain assessment methods. Strengthening parental education and communication strategies is crucial for bridging these gaps, enhancing collaborative pain management, and improving neonatal care outcomes in resource-limited settings.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

# Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-24)

# Consent for publication

Approved

# Funding

Not applicable

# Conflict of interest

The authors declared the absence of a conflict of interest.

# Author Contribution

## AA (BS Nursing Generic Student)

Manuscript drafting, Study Design,

## SMF (BS Nursing Generic Student)

Review of Literature, Data entry, Data analysis, and drafting articles.

## STK (Nursing Director)

Conception of Study, Development of Research Methodology Design,

## KP (Associate Professor)

Study Design, manuscript review, critical input.

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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