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Nurses' Knowledge And Practices On Neonatal Pain Management

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ABSTRACT

Neonates frequently experience pain due to medical interventions such as venipunctures, mechanical ventilation, and surgical procedures. Nurses in Neonatal Intensive Care Units (NICUs) play a crucial role in neonatal pain management, yet gaps in knowledge, inconsistent pain assessment practices, and poor adherence to standardized protocols persist. This study aimed to evaluate NICU nurse's knowledge and practices regarding neonatal pain management, assess the utilization of validated pain assessment tools, and identify barriers that hinder effective pain relief measures. A descriptive cross-sectional study was conducted in selected tertiary care hospitals with 150 NICU nurses using a validated structured questionnaire and a researcher-designed observational checklist. Data were analyzed using IBM SPSS (Version 22), employing descriptive statistics, Chi-square tests, independent t-tests, and ANOVA to examine differences across multiple groups. The findings revealed moderate awareness among nurses (mean knowledge score: 7.26 ± 1.99, 95% CI: 7.1–7.9), yet 60% relied on personal judgment rather than validated pain assessment tools. Non-pharmacological pain relief strategies were utilized by 58% of nurses, while 60% employed pharmacological interventions, with only 48% adhering to hospital protocols. The study identified three primary barriers: insufficient training (40%), time constraints (35%), and lack of standardized pain assessment tools (25%). These findings emphasize the urgent need for structured training programs, standardized pain assessment tools, and policy improvements in NICUs. Future research should explore intervention-based studies, technological advancements in pain assessment, and comparative analyses across diverse healthcare settings to further improve neonatal pain management strategies.

Keywords: *Neonatal pain, pain management, NICU, pain assessment, nursing practices*

1. INTRODUCTION

The management of pain in newborns represents a vital yet frequently disregarded healthcare matter within Neonatal Intensive Care Units (NICUs) because premature infants and those with medical conditions experience multiple painful medical procedures. The developing nervous systems of neonates make them highly susceptible to pain because their ability to process and respond to pain differs from adults. The growing evidence about negative pain outcomes in neonates does not resolve the ongoing difficulties in delivering optimal pain treatments (1). The obstacles to optimal care mainly result from healthcare professionals' knowledge deficits and inconsistent implementation as well as institutional barriers that exist throughout medical institutions. NICU nurses stand as essential figures in neonatal care because they directly evaluate and manage pain while monitoring its effects which makes them crucial for effective pain control. Research indicates that NICU nurses demonstrate inconsistent knowledge about neonatal pain and their actual clinical practices while failing to use evidence-based protocols for optimal pain relief (2). The definition of neonatal pain includes all unpleasant sensory and emotional responses that stem from actual or potential tissue damage that occurs through physical or procedural interventions in newborns. Medical procedures including venipunctures and heel pricks as well as intubation and routine care such as diaper changes lead to substantial pain experiences in newborns. The immature neonatal nervous system can sense pain and experience enduring neurological modifications when early-life pain management remains inadequate. Neonatal exposure to persistent or recurrent pain leads to negative results that affect brain development modify pain processing and stress reactions and might trigger enduring emotional and behavioral problems. The research demonstrates that appropriate pain management for newborns remains essential because it reduces potential risks and leads to improved short-term along long-term results for these at-risk infants (3).

The practice of ignoring neonatal pain management occurred because medical professionals believed newborns could not feel pain because of their age and developmental stage. Scientific studies have proven that newborns can process pain which affects their health development in substantial ways. The healthcare industry now places greater emphasis on neonatal pain management because pain recognition has become a fundamental medical issue that requires appropriate treatment (4). Well-designed pain assessment instruments that measure both neurological signs and observable symptoms like emotional

expressions heart rate and oxygen saturation have become vital for improving both diagnosis and the management of newborn pain. Healthcare providers now use these assessment tools to measure neonatal pain accurately which leads them to create targeted pain management approaches. NICU nursing staff carries out pain management procedures and evaluates their results as part of their standard duties. As neonates spend most of their time with nurses these healthcare professionals become the primary identifiers of pain symptoms while administering suitable pain management techniques and promoting infant health (5). The knowledge and practice of NICU nurses regarding neonatal pain management remain inadequately supported by research-based guidelines despite recent advancements. The gap between what nurses know about pain treatment and how they practice leads to insufficient pain management for newborns which allows unnecessary suffering to continue. The inconsistent nature of training along with inconsistent standardized protocols among NICUs accounts for most gaps in care delivery. Assessment tools validated for medical use instead of healthcare provider experience or personal judgment produce inconsistent pain management practices (6). Healthcare organizations combined with time limitations and resource shortages and insufficient organizational backing create barriers that prevent best practice implementation in neonatal pain management.

The current literature demonstrates critical problems in the way NICUs manage pain for newborns. Nurses' understanding of neonatal pain varies widely because their education level interacts with their clinical experience and continuing education (7). Specialized NICU training combined with experience leads nurses to develop a better understanding of neonatal pain and enhances their ability to deliver proper pain management solutions (8). The majority of NICUs struggle to deliver adequate professional development and ongoing education to their nursing staff members. The lack of recent research knowledge among nurses about neonatal pain management guidelines leads to suboptimal care delivery (9). The inconsistent implementation of validated pain assessment tools in NICUs creates a major obstacle to delivering effective pain management according to research. The assessment tools for neonatal pain including the Neonatal Pain Agitation Sedation Scale (N-PASS) and Premature Infant Pain Profile (PIPP) show inconsistent use between different institutions and within the same unit according to research (10). Inadequate knowledge about assessment tools and unclear understanding of their use among nurses results in insufficient pain evaluations and inadequate pain control (11). The management of neonatal pain requires healthcare providers to find the proper combination of drug-based and non-drug-based treatments. Medical professionals use opioids and local anesthetics as primary treatments to control intense pain that occurs during invasive procedures for neonates. These medications present two main risks to patients: respiratory depression and possible negative impacts on neurodevelopment that healthcare providers need to monitor closely (12). The healthcare field recognizes non-pharmacological approaches including sucrose administration together with swaddling skin-to-skin contact and environmental changes that reduce light and noise as beneficial supplemental or alternative practices to pharmacological strategies (13). These pain reduction methods demonstrate effectiveness for minor procedures according to research findings (14). Research shows that non-pharmacological pain relief methods provide valuable benefits yet their implementation remains inconsistent because many nurses primarily use pharmacological approaches. Multiple barriers prevent effective neonatal pain management because they originate from individual staff members and from the institutions where they work (15). Nurses frequently mention inadequate training in pain evaluation and treatment methods as their main professional difficulty. The absence of structured educational programs about neonatal pain in most NICUs results in nursing staff lacking confidence when assessing and managing pain effectively (16). The heavy workload in NICUs causes nurses to face time limitations that prevent them from delivering personalized care to patients. Standardized pain assessment methods alongside protocols are missing which creates challenges for nurses to follow a clear consistent approach when managing pain. Organizational support for pain management initiatives along with insufficient resources play a role in maintaining these barriers (17).

Healthcare professionals now acknowledge the necessity of treating newborn infant pain while enhancing pain management strategies in NICUs. Effective neonatal pain relief requires healthcare providers to receive proper education and training while NICUs need to adopt standardized pain assessment protocols and organizational policies supporting evidence-based pain management strategies (18). The field of neonatal care research needs to maintain its focus on studying non-pharmacological interventions along with creating new pain assessment techniques. Ongoing assessments of pain management practices and continuous identification of improvement opportunities will guarantee neonates receive top-quality care with effective pain control (19). This study examines NICU nurse competence in neonatal pain treatment approaches while investigating how valid pain assessment instruments get implemented and what obstacles prevent successful pain mitigation methods. The study aims to create strategies for better neonatal pain management through its identification of gaps and barriers that will enhance care quality for neonates during their most fragile developmental period. Neonatal pain management stands as a vital concern within neonatal care which needs thorough evidence-based strategies for protecting neonates from avoidable pain. The delivery of effective pain management in medical settings heavily depends on nurses' work yet knowledge shortcomings inconsistent approaches and organizational obstacles often limit their ability to provide proper pain relief (20). The research aims to discover pain management problems in NICUs and develop recommendations for better neonatal care to achieve improved quality of care and health outcomes for neonates.

2. METHODOLOGY

2.1 Study Design and Setting

The research followed a descriptive cross-sectional study design and took place in selected tertiary care hospitals. NICUs were selected as the research setting because they serve as specialized units that care for neonates who need medical attention or intensive care due to birth complications. This study evaluated NICU nurses' understanding and procedures for treating pain in newborns. The research took place in multiple hospitals with qualified NICU nurses who actively cared for neonates. This study collected information about present neonatal pain management strategies and staff understanding in multiple healthcare facilities.

2.2 Participants

A total of 150 NICU nurses participated in the study from the selected tertiary care hospitals. Participating nurses needed to actively provide care to neonates in the NICU as part of their direct responsibilities. The research included nurses from various experience levels who had practiced for different durations to achieve representative participation from the NICU staff. Every nurse involved in the research project gave their permission before participation. The participants who took part in the study were directly involved in neonatal pain management activities throughout their regular shifts so they served as essential study respondents. The research evaluated both neonatal pain assessment understanding and management intervention comprehension among nurses alongside their protocol adherence in pain management.

2.3 Data Collection

Two main data collection instruments included a validated structured questionnaire and an observational checklist designed for the study.

The validated structured questionnaire served to evaluate the knowledge of neonatal pain management among the 150 NICU nurses. The survey contained multiple questions about pain assessment instrumentation together with medication-based and non-medication-based pain treatments and hospital neonatal pain protocol compliance. The tool underwent validation procedures to guarantee accurate collection of data about nurses' neonatal pain management understanding and practice application.

The observational checklist designed by researcher served as an additional tool to monitor NICU nurses' actual practices in addition to the questionnaire. The checklist functioned as a tracking tool to record nurses' instant pain management practices through pharmacological and non-pharmacological methods and institutional pain management procedures. The observational checklist allowed researcher to monitor pain management strategy implementation during standard neonatal care procedures thus providing evidence of both theoretical understanding and practical implementation.

2.4 Data Analysis

IBM SPSS (Version 22) served as the tool for analyzing data obtained from the questionnaire and observational checklist. The study used these statistical methods during the analysis phase: The study used descriptive statistics to present NICU nurses' knowledge scores and document the observed pain management practices. The researcher computed mean and standard deviation from knowledge score data to understand the general nursing comprehension of neonatal pain management. Chi-square tests analyzed the connections between demographic factors similar to the experience level and educational history with neonatal pain management knowledge and practice. The test results indicated whether knowledge and practice variations existed between different groups. Further independent t-tests and ANOVA to evaluate knowledge scores and practices between different NICU nurse groups. The researcher used independent t-tests to analyze differences between two groups and ANOVA to evaluate differences among three or more groups. The research design enabled investigators to examine if nurse experience level together with training and demographic characteristics affected their knowledge and practices regarding neonatal pain management.

3. RESULTS

The research evaluated NICU nurses' understanding and clinical practices for neonatal pain treatment to reveal important deficiencies and obstacles in pain management. The research showed that nurses showed an average level of understanding about neonatal pain assessment with a score of 7.26 ± 1.99. Personal judgment served as the primary method for pain assessment among 60% of nurses even though validated pain assessment tools were used by only 40% of the nursing staff. The inconsistent use of evidence-based tools by healthcare staff results in fluctuating accuracy levels during pain assessments. Non-pharmacological pain relief methods like swaddling and sucrose were used by 58% of nurses alongside pharmacological pain relief methods including opioids and local anesthetics which were used by 60% of nurses. The hospital protocols for pain management received adherence from 48% of nurses despite showing a major discrepancy with established guidelines that could result in inconsistent pain relief for neonates. The research discovered that limited education restricted time availability and inadequate assessment equipment stood as the most important obstacles to optimal pain care implementation. The observed barriers negatively affected proper pain management practices and demonstrated the necessary development of standardized training methods and tools with improved hospital policies.

3.1 Knowledge of Neonatal Pain Management

A research evaluation examined NICU nurses' understanding of neonatal pain treatment methods. The research results showed nurses possessed a moderate level of knowledge which averaged at 7.26 ± 1.99. Participants demonstrated a similar level of knowledge understanding since their 95% confidence interval for the mean score fell between 7.1 to 7.9.

Table 1. Distribution of NICU Nurses' Knowledge Scores on Neonatal Pain Management

Measure	Value	95% Confidence Interval
Mean Knowledge Score	7.26 ± 1.99	7.1 – 7.9
Standard Deviation	1.99	-
Confidence Interval (95%)	-	7.1 – 7.9

3.2 Utilization of Pain Assessment Tools

The study revealed that personal judgment dominated NICU nurses' pain assessment practices since 60% of them did not use validated assessment tools. Standardized assessment tools like the Neonatal Pain, Agitation, and Sedation Scale (N-PASS) and the Premature Infant Pain Profile (PIPP) were used by just 40% of the nurses who participated in the study.

Table 2. Usage of Pain Assessment Tools by NICU Nurses

Assessment Method	Percentage (%)
Personal Judgment	60%
Validated Pain Assessment Tools	40%

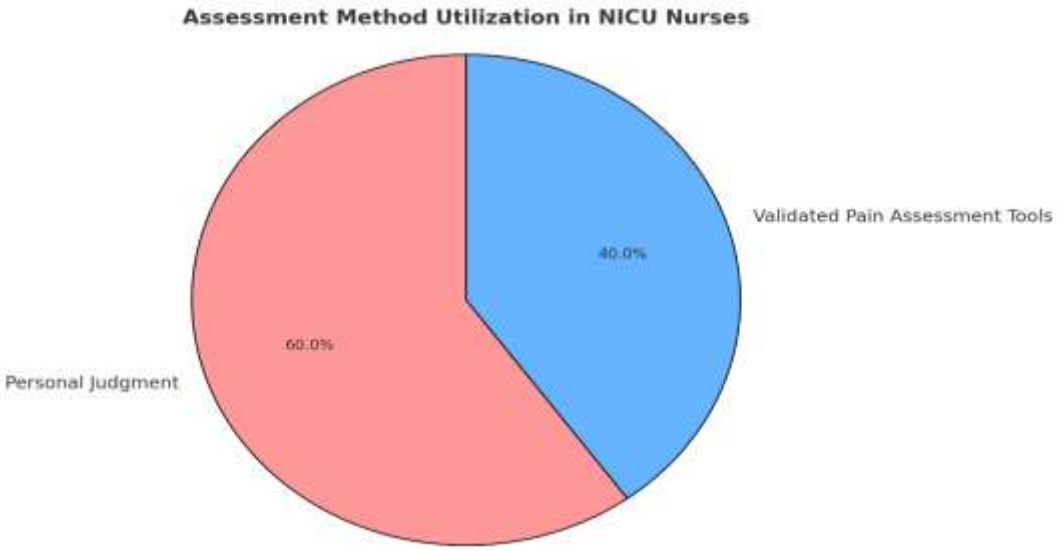

Fig 1. Assessment Method Utilization in NICU Nurses

3.3 Pain Relief Strategies Employed

The research investigated the pain relief approaches NICU nurses utilized where non-pharmacological methods such as swaddling skin-to-skin contact and sucrose administration were employed by 58% of nurses. A total of 60% of nurses employed pharmacological pain relief methods which included opioids and local anesthetics. The study revealed that 48%

of nurses failed to follow established hospital protocols for neonatal pain management even though only 48% of nurses adhered to established hospital protocols for neonatal pain management.

Table 3. Pain Relief Methods Used by NICU Nurses and Adherence to Protocols

Pain Relief Method	Percentage (%)
Non-Pharmacological Strategies	58%
Pharmacological Interventions	60%
Adherence to Hospital Protocols	48%

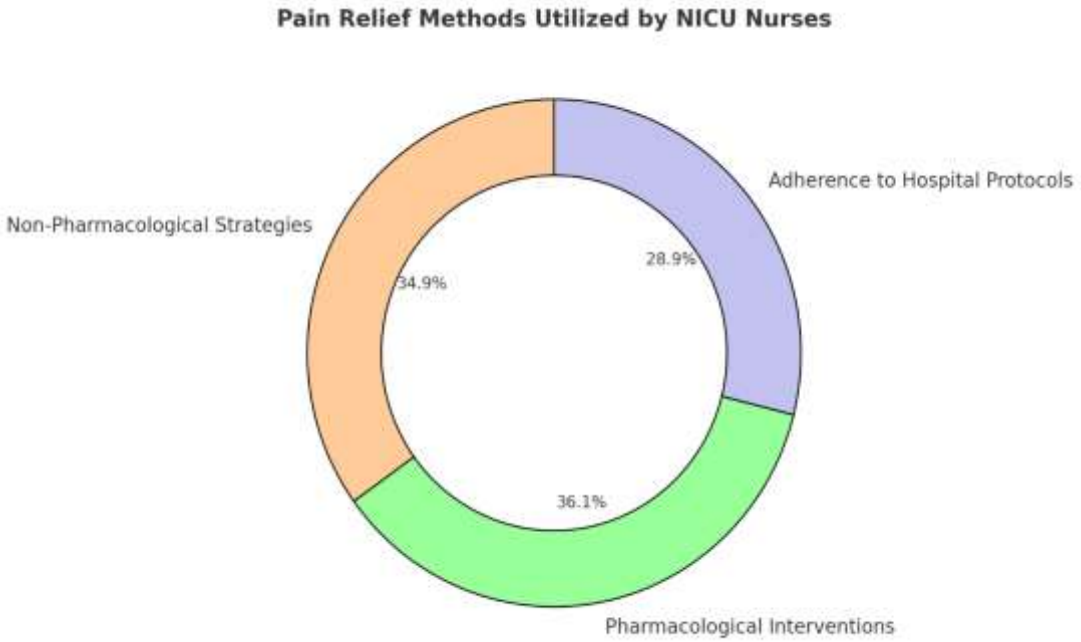

Fig 2. Pain Relief Methods Utilized by NICU Nurses

3.4 Barriers to Effective Pain Management

The research found insufficient training and time constraints to be primary barriers to effective pain management of newborns. The implementation of effective pain management practices faced difficulties because 25% of nurses reported inadequate standardized pain assessment tools.

Table 4. Barriers to Effective Neonatal Pain Management in NICUs

Barriers to Pain Management	Percentage (%)
Insufficient Training	40%
Time Constraints	35%
Lack of Standardized Pain Assessment Tools	25%

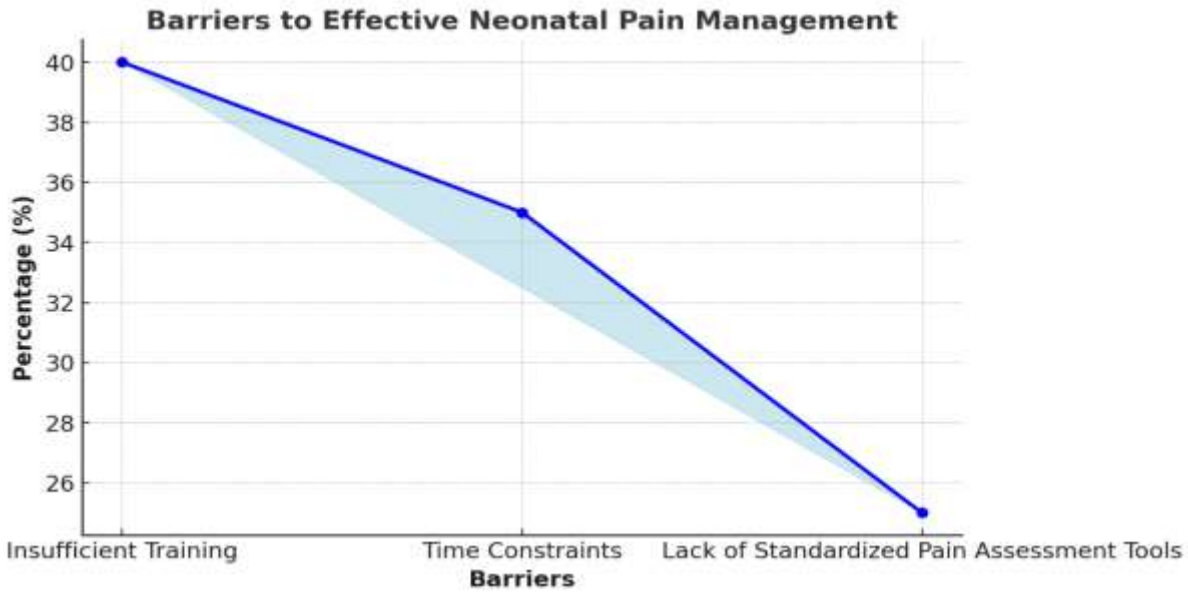

Fig 3. Barriers to Effective Neonatal Pain Management

4. DISCUSSION

The research evaluated NICU nurses' understanding of neonatal pain management approaches while exploring obstacles that prevent effective pain relief methods. The research showed that nurses displayed an average understanding of neonatal pain assessment based on their mean score of 7.26 ± 1.99 and the 95% confidence interval of 7.1–7.9. The obtained score demonstrates adequate awareness but shows significant knowledge gaps in neonatal pain management. Research has demonstrated that nurses display diverse levels of knowledge regarding pain management especially when caring for patients in NICUs which require specialized complex care.

The research revealed a major concern when 60% of nurses chose to use their personal assessment methods instead of recognized pain assessment tools including the Neonatal Pain, Agitation, and Sedation Scale (N-PASS) and Premature Infant Pain Profile (PIPP). A standardized assessment tool for pain is crucial because it enables consistent and precise assessment of pain currently remains a major challenge. Using unvalidated assessment tools leads to both inadequate pain evaluation and insufficient pain management which creates negative health effects for newborns. Research evidence supports the observation that nurses tend to use subjective pain assessments instead of evidence-based tools despite previous studies showing this inconsistency.

Nurses primarily used a mix of non-pharmacological methods including swaddling and sucrose administration and skin-to-skin contact (58%) and pharmacological approaches with opioids and local anesthetics (60%) for pain relief. Non-pharmacological treatment methods demonstrate clear effectiveness at treating minor pain yet the substantial dependency on drugs creates issues since these medications can generate undesirable side effects including respiratory depression. The low rate of 48% demonstrates that nurses failed to follow hospital protocols which indicates poor adherence to established guidelines for neonatal pain management. The failure of nurses to follow established protocols results in variable care delivery practices that potentially harm patient results.

This study discovered that insufficient training was reported by 40% of participants while time constraints reached 35% and 25% of healthcare professionals lacked standardized pain assessment tools. The research findings match previous studies which demonstrated insufficient training and heavy workloads as major obstacles for nurses who manage neonatal pain. The improvement of neonatal pain management practices demands structured training programs better time management and standardized pain assessment tools to overcome existing barriers.

5. CONCLUSION

NICU nurses stand as vital figures in neonatal pain control but researcher discovered substantial knowledge gaps and behavior shortcomings in nursing staff. Nurses demonstrate a basic understanding of neonatal pain management according to their moderate knowledge score of 7.26 ± 1.99 yet further improvement is needed. The study revealed a major concern because sixty percent of nurses assessed pain through personal judgment instead of using established assessment tools like the Neonatal Pain Agitation and Sedation Scale (N-PASS) or Premature Infant Pain Profile (PIPP). Standardized pain

assessment tools should be consistently used because their absence leads to inaccurate pain management which affects the well-being of neonates. The research showed that nurses applied non-pharmacological approaches in 58% of cases and pharmacological methods including opioids and local anesthetics in 60% of cases. The evidence shows that hospital protocols were followed by 48% of nurses highlighting a need for better implementation of proven practices. The data indicates pharmacological approaches dominate treatments but healthcare providers need to incorporate non-drug pain management approaches as a better practice strategy. The study found three main obstacles that prevent effective pain management in NICUs: nurses received inadequate training (40%), they faced time limitations (35%) and they lacked standardized pain assessment tools (25%). The barriers identified in this study restrict nurses from delivering their best care thus requiring better training resource distribution and standardized pain assessment tools. Research should direct its efforts toward developing intervention programs that enhance NICU nurses' understanding and delivery of neonatal pain management strategies. Organized medical education should deliver training for nurses to use proven pain assessment instruments and proven-based clinical approaches. Nursing practice will likely benefit from future technology advances including digital pain assessment tools combined with machine learning algorithms that provide immediate precise assessments. Research that compares different healthcare environments will help us understand neonatal pain management better and show how universal protocol standards should be established. Future research must prioritize the assessment of how improved pain management techniques affect neurodevelopment in neonates alongside their overall health development pattern. Research studies should develop a complete framework to enhance neonatal pain management which will result in improved outcomes for newborns during their short and extended periods of development.

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