

Effectiveness of Involving Parents During Minor Invasive Procedures of the Neonates Admitted in Neonatal Intensive Care Unit (NICU): A Review based on Available Literature

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Abstract:-

➤ Introduction:

Painful procedures are unavoidable in neonatal care in the Neonatal Intensive Care Unit (NICU). The involvement of parents during these procedures has gained increasing recognition as an important component of providing holistic care for neonates. This abstract explores the importance of involving parents during painful procedures in the NICU and its potential benefits for newborns.

➤ Objectives: 1.

To identify the various methods of parents' involvement during the minor invasive procedures of their neonates in the NICU. 2. To explore the benefits of involving the parents during the minor invasive procedures of their neonates in the NICU.

➤ Methods:

An extensive review of existing literature and scholarly articles available on Pub Med CINHL, Science Direct, Cochrane, and Google Scholar databases was done using a specific search approach for each database, covering the period from 2020 to 2023. Initially, relevant article titles were collected, and through a screening process, a subset of articles was chosen for further evaluation. Ultimately, based on predefined inclusion criteria, 10 articles were selected for in-depth analysis.

➤ Results:

Parents' involvement during minor invasive procedures like venipuncture, heel prick, phlebotomy, etc. in the form of skin-to-skin contact, facilitated tucking, mother's lullaby, and breastfeeding revealed significantly low pain scores and reduced discomfort in neonates.

➤ Conclusion:

In conclusion, involving parents in simple procedures in the NICU offers considerable benefits for both the parents and the infant. By recognizing the importance of parental involvement and providing

appropriate support, healthcare facilities may establish an atmosphere that optimizes infant care and outcomes in the NICU.

Keywords:- Minor Invasive Procedures, Neonates, NICU, Parents.

I. INTRODUCTION

Parents are an invaluable yet overlooked asset when it comes to managing procedural pain in neonates. The impacts of parents become especially significant during the early stages of infancy and in highly distressing situations such as painful procedures. This is due to the fact that infants do not possess the developmental capacity to effectively manage their own pain. Consequently, it is crucial for infants to have emotionally available and stable parents who can adequately recognize their distress cues, offer comfort, and regulate their emotions. As part of routine neonatal care, infants undergo regular painful procedures during their early stages of life. However, neonates in the Neonatal Intensive Care Unit (NICU) experience the highest level of pain exposure, with an average of 7 to 17 painful procedures per day. [1].

Parental involvement in the care of neonates has been recognized as crucial for the well-being of children. It promotes bonding, reduces stress, and improves development outcomes. The effectiveness of parental involvement can vary depending on specific painful procedures, and infants' gestational age and ability to provide comfort. In addition, neonates' ability to perceive and respond to parental presence and touch may vary due to their stage of neurological development. Several studies have explored parental presence like skin-to-skin contact, facilitated tucking, mothers' voices and touch, and breastfeeding as potential interventions to reduce pain in neonates. However, the extent to which parental involvement can effectively mitigate pain in neonates during pain procedures is not well-established. Studies have shown some positive effects including decreased pain scores and reduced physiological responses to pain. However, the evidence is limited.

Parental involvement in the NICU, including parent attendance and newborn holding, can increase emotions of usefulness and strengthen the connection. Parents can also assist the infant cope with NICU challenges by providing appropriate, relevant sensory stimuli and human contact [2-5]. Therefore, comprehending the engagement of parents in the NICU during minor invasive procedures is vital to enhance emotional well-being, fortify the bond between parents and infants, alleviate stress for the infants, foster effective communication and collaboration, and adequately prepare parents for their ongoing care responsibilities. This approach establishes a nurturing and family-oriented atmosphere that positively impacts outcomes for both parents and infants.

II. METHODOLOGY

➤ *Search Strategy Methods:*

A comprehensive examination was conducted on various electronic sources to investigate the topic at hand. The purpose of this review was to identify studies that

examined parental involvement within NICU settings during minor invasive procedures. Electronic databases such as PubMed, CINHL Plus, Science Direct, Cochrane, and Google Scholar databases were thoroughly reviewed to gather relevant articles in the field of healthcare sciences. The search parameters included MeSH terms to identify studies published between 2016 and 2023 with full access to article content while adhering to predetermined inclusion and exclusion criteria. The focus of the literature review was on studies that explored parental involvement in the Neonatal Intensive Care Unit (NICU).

➤ *Types of Studies*

True experimental, quasi-experimental studies.

➤ *Types of Participants*

Parents having neonates admitted to NICU and undergoing minor invasive procedures.

➤ *Setting*

Hospitals, Tertiary Care Centers.

III. RESULTS

➤ *Prisma Flow Chart*

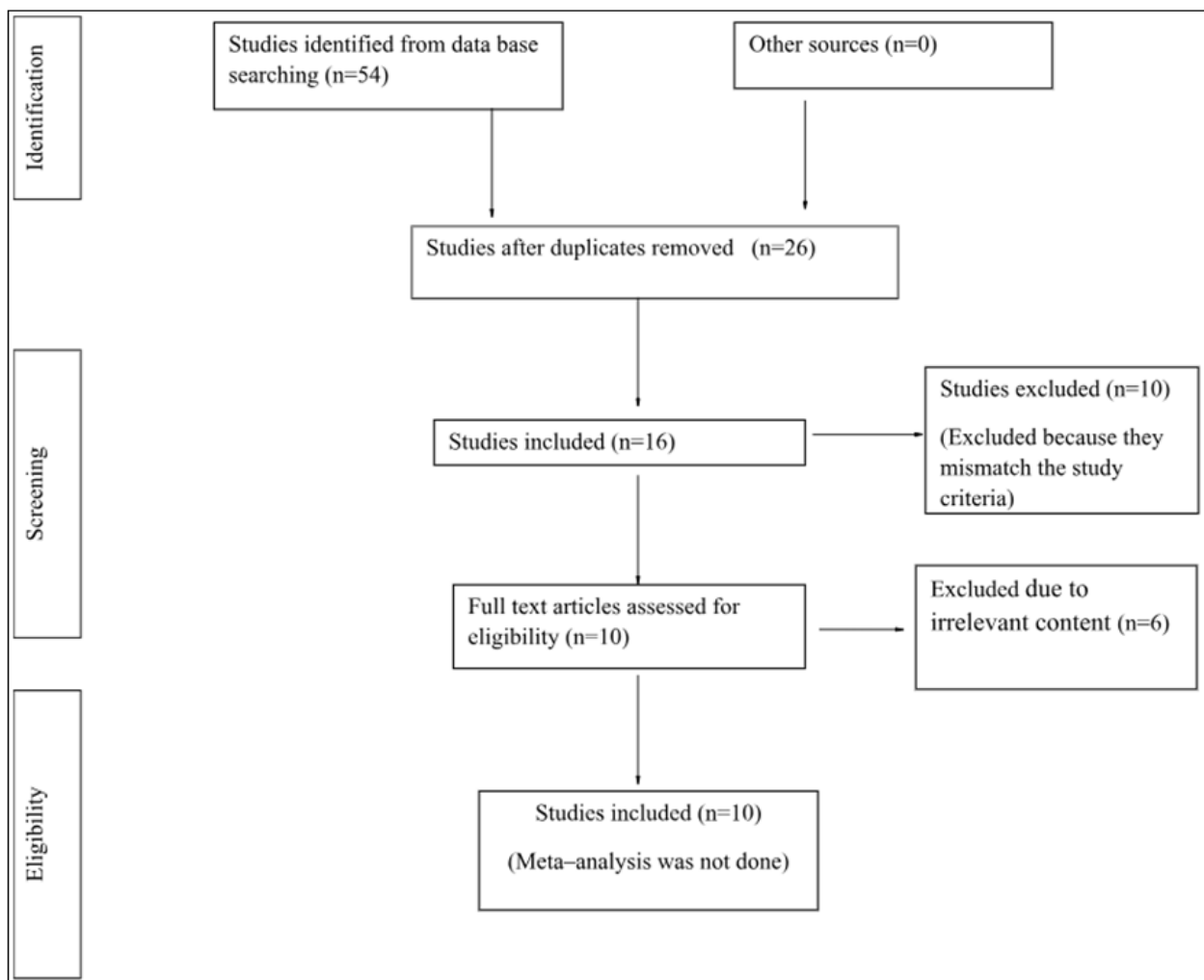


Fig 1 Prisma Flow Chart

➤ *Data Extraction Tables*

Based on the inclusion criteria, 10 articles published which were closely relevant were included in the present review. Details of the studies are given below; a total of 10 true experimental and quasi-experimental research studies were included.

Table 1 Data Extraction

S.N. and Author	Objectives	Country	Variables	Instruments	Sample and Sampling Technique	Design	Duration	Findings	Conclusion
Bhandekar & Malik (2018)	To assess the efficacy of Kangaroo Mother Care in mitigating pain during minor procedures in preterm neonates.	India	Kangaroo mother care, pain	Premature Infant Pain Profile Scale	80, purposive sampling	Pre-experimental	Eighteen months	The statistical analysis revealed a significant disparity ($p < 0.001$) in the mean PIPP scores between the study group (Kangaroo Mother Care) and the control groups at 1, 3, and 5 minutes following the procedure.	KMC is a non-pharmacological strategy that is safer and more successful than standard care at reducing discomfort in premature newborns during minor painful procedures such as venipuncture.
Shukla et al., (2021)	To assess the effect of skin-to-skin contact by mother vs. father for preterm neonatal pain	India	Skin-to-skin care, pain	Premature Infant Pain Profile Scale	64, Random sampling	Randomized controlled trial	Six months	No component of the PIPP score showed a statistically significant difference between the groups. In both groups, the PIPP score at 5 minutes was approximately equal to the level at 0 minutes.	In delivering skin-to-skin care for preterm newborn pain control, the father is just as beneficial as the mother.

Lund, Noergaard & Kofoed (2023)	To evaluate the effectiveness of skin-to-skin contact as a pain-relieving intervention for infants undergoing heel lances	Denmark	Skin-to-skin contact, pain	COMFORTneo scale	84, Random sampling	Experimental research design	2 months	Skin-to-skin contact did not significantly affect changes in heart rate, oxygen saturation, or comfort level from baseline to during the procedure.	Despite the many positive advantages of skin-to-skin contact, there may be practical reasons to avoid utilizing it when the baby is receiving other pain-relieving treatments.
Samudre & Bale (2020)	To evaluate the effect of assisted tucking on pain during Venipuncture among neonates	India	Facilitated tucking, pain	Neonatal Infant Pain Scale	70, Purposive sampling	Quasi-experimental	-	The average pain score for the control group was higher than the experimental group. The experimental group's mean pain score is lower than the control groups, and the p-value is 0.001, which is less than 0.05.	Facilitated tucking proved successful in lessening pain during painful procedures. It enhances psychological safety and lessens pain perception. Therefore, it can be applied in therapeutic settings.
Sankpal et al., (2017)	To assess the efficacy of assisted tucking in minimizing the pain response during venipuncture in preterm neonates.	India	Facilitated Tucking, venipuncture	Neonatal Infant Pain Scale	60, Purposive sampling	Post-test only control group	-	The mean pain score for the intervention group and other group was 2.47 and 6.17 respectively. The result indicates a	Facilitated tucking is a non-pharmacological, efficient, affordable, and safe pain control approach during painful procedures in neonates.

								significant difference in the mean level of pain experienced by neonates in the experimental and control groups, with a p-value of 0.05.	
Diab (2023)	To evaluate the effect of positioning on prematurity and pain intensity induced by the minor procedures in the NICU	India	Facilitated Tucking, Invasive procedure	Premature Infant Pain Profile Scale and Neonatal behavioral scale	68, Purposive sampling	Quasi-experimental study	Three months	Based on the findings of the study, it was observed that following an invasive procedure, 64.4% of the study group experienced mild to moderate pain, while 35.6% experienced moderate pain. In contrast, among the control group, 48.9% reported moderate to severe pain, while 8.9% experienced severe pain.	Assisted tucking is considered the standard component of care for all prematurely born infants admitted to NICUs is recommended.

Ullesten (2017)	To evaluate the effect of live singing by mother during minor procedures	Sweden	Live lullaby, painful procedure	Premature Infant Pain Profile-Revised and Behavioral Indicators of Infant Pain	38, Random sampling	Cross-over design	-	The act of live lullaby singing did not demonstrate a statistically significant effect on the infants' pain scores	The study concluded that additional research is necessary to investigate how lullaby singing can be tailored to empower newborn infants during painful procedures
Filippa et al., (2021)	To assess the effect of mothers' voices among infants during painful procedures	Italy	Maternal speech, heel prick	Premature Infant Pain Profile-Revised	20, random sampling technique	True Experimental Research Design	1 year 5 months	The PIPP scores in the experimental group (mother speech) were significantly lower compared to the control group (p = 0.006).	The study concluded that more research is required to fully explore the significance of mothers' voices as a defense mechanism for preterm newborns against the consequences of pain in the NICU.
Singh, Simalti & Singh (2016)	To evaluate the effectiveness of breastfeeding as analgesia in neonates: A randomized controlled trial	India	Breastfeeding, a heel prick		60, Random sampling technique	Randomized controlled trial	8 months	The babies that were breastfed had shorter crying duration (40.04 seconds vs. 69.09 seconds and less heart rate increase (21.78 vs. 34.46 bpm than the control group. Although not statistically significant, the	Breastfeeding is a simple and efficient way to ease a newborn's discomfort during normal neonatal treatments.

								breastfed group showed a trend toward lessening blood pressure and oxygen saturation declines.	
Gupta et al., (2022)	To assess the efficacy of breast milk to relieve pain during skin and venipuncture	India	Painful procedures, breastfeeding	Neonatal Infant Pain Scale	167, Random Sampling	Randomized Controlled Trial		NIPS score in the breastfeeding group is considerably lower than in the control group (p-value 0.000).	Breastfeeding has a superior analgesic effect to reduce pain during heel prick and phlebotomy.

IV. SUMMARY OF THE FINDINGS

The available literature was refined to get 10 quantitative approaches.

Three research findings emphasized the necessity of parental skin-to-skin contact during painful procedures in neonates admitted to the NICU. According to the findings, both father and mother are equally successful at delivering skin-to-skin care for neonatal pain control.

The other three publications emphasized the significance of assisted tucking in infants during painful operations. According to the findings, it improves psychological safety and reduces pain perception. As a result, it is beneficial in therapeutic settings.

The two articles demonstrated that mothers' vocalization for pain relief during difficult operations is debatable. As a result, more research is needed to investigate how live singing might be customized to empower the newborn infant during painful procedures.

The remaining two RCTs on breastfeeding showed that breastfeeding during pain procedures lowers noxious stimuli and provides a relaxing impact for pain alleviation in newborns.

➤ *Future Significance:*

The future significance of parental involvement in the NICU during painful procedures lies in the continued recognition of parents as vital partners in the baby's care. By fostering collaboration, individualized approaches, technological advancements, and comprehensive support, healthcare systems can ensure that parents have an active role in providing comfort and support to their infants leading to improved outcomes and enhanced family-centered care in the NICU.

V. LIMITATIONS

Data search was limited. The search strategy was refined to parents' involvement during minor invasive painful procedures in NICU only.

VI. CONCLUSION

Active involvement of the parents during the painful procedures helps to develop a stronger connection which is particularly important in NICU settings where separation and medical interventions disrupt the natural bonding process. Studies have shown that infants whose parents are actively involved in the care have indicated improved psychological safety, lower pain scores, better neurodevelopmental outcomes, improved weight gain, and reduced discomfort as well as length of hospital stay. Therefore, recognizing the importance of parental

involvement and actively involving parents in infant care should be a priority in NICU settings.

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