护理杂志
Journal of Nursing
Volume 70 Number 10
ISSN: 0047-262X
DOI: 10.5281/zenodo.10029185

Efficacy of 25% Dextrose versus Breast Milk on Pain, Duration of Cry, and Comfort Level during Heel Prick in Neonates: A Protocol for a Systematic Review and Meta-Analysis

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Abstract

Introduction: *Neonates, particularly preterm infants, often require various medical procedures during their early days of life. One such procedure is the heel prick, commonly performed for blood sampling. While essential for diagnostic purposes, these procedures can be distressing for neonates, resulting in pain, prolonged crying, and discomfort. Minimizing neonatal distress during such procedures is crucial for both the well-being of the infant and the satisfaction of caregivers and healthcare providers.* ***Aim:*** *The main goal of the review is to evaluate how effective 25% dextrose and breast milk is in reducing pain, duration of crying and discomfort related to heel prick.* ***Methods:*** *A systematic review encompassing both randomized controlled trials and non-randomized controlled trials will be done. This review will adhere to the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines (Prospero Registration No- CRD42023444089). The literature search will encompass PubMed-Medline, CINHAL, and Science Direct databases. We will focus on studies published between 2008 and 2023. To assess the study quality, the JBI clinical appraisal checklist for both RCTs and Non-RCTs will be used. Inclusion criteria will encompass studies published in the English language, with specific keywords including Neonates OR Infants AND "Non-Pharmacological" AND Pain AND Comfort.* ***Results:*** *A descriptive synthesis of the chosen study outcomes will be portrayed in a narrative summary, including the integration of statistical results.* ***Conclusion:*** *This review will offer current evidence for practicing 25% dextrose and breast milk in reducing pain, cry duration, and discomfort experienced by neonates undergoing heel pricks in the NICU.*

Keywords: *Comfort, Neonates, Non-pharmacological, Pain.*

INTRODUCTION

Hospitalization is a high-risk factor for a child's development, especially in the early years, and it is stressful for primary family careers, particularly for the interactions between mothers and children. While hospitalization presents an essential opportunity to fulfill clinical requirements for treating diseases or addressing prenatal and neonatal concerns like prematurity, extremely low birth weight, and congenital issues, it also hinders the child's exposure to vital environmental cues crucial

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for growth and learning. Additionally, it exposes them to distressing and traumatic experiences. Furthermore, mothers also experience adverse effects from hospitalization, such as increased stress and anxiety. [1]

The World Health Organization (WHO) and the International Association for the Study of Pain (IASP) recognize pain as a significant global concern within the healthcare sector. Despite substantial investments and research efforts dedicated to addressing this issue, clinical practices in hospitals still fall short of the ideal "best practices." Both in industrialized and developing nations, pain tends to be underreported, not consistently evaluated with validated tools, inadequately documented in medical records, and often not adequately treated. [2, 3]

During the initial two weeks after birth, newborns who are admitted to a Neonatal Intensive Care Unit (NICU) go through an average of 134 demanding medical procedures [4]. Even more concerning is that certain infants might experience more than 3000 unpleasant treatments during their entire NICU stay [5]. These procedures, which include actions like heel pricks for blood samples or endotracheal suctioning, are necessary for providing the best possible care. However, it is important to note that some of these procedures are repeated on the same infant, leading to negative long-term physiological effects. [4]

Systematic reviews (SRs) have been increasingly conducted to evaluate the effectiveness and safety of various non-pharmacological therapies for alleviating pain in newborns. These reviews are considered to provide high-quality evidence. However, due to the vast amount of information available, doctors working in Neonatal Intensive Care Units (NICUs) may find it challenging to make rapid decisions when choosing between different analgesic therapies. [6] It is therefore necessary to compare the efficacy of two specific non-pharmacological methods (25% dextrose and breast milk) for dealing with different painful stimuli in a single systematic review.

RATIONALE

Various studies indicated that non-pharmacological pain management techniques are beneficial and successful in reducing pain and duration of cry in neonates during minor invasive procedures. However, the specific benefits of 25% glucose versus breast milk are contradictory. Therefore, the purpose of this review is to ascertain the most effective non-pharmacological approach by making a comparison between glucose and breast milk for achieving optimal pain relief in newborn infants during minor invasive procedures. This analysis aims to determine the efficacy of glucose versus breast milk and assist in implementation to relieve pain and maintain comfort in newborns.

OBJECTIVES

To identify the comparative efficacy of 25% dextrose versus breast milk on vital parameters, pain level, duration of cry, and comfort level during heel prick in neonates.

METHODS

We will adhere to the PRISMA guidelines for this review. [7] The study has been registered in the International Prospective Register for Systematic Reviews under registration number CRD42023444089.

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Eligibility Criteria

The literature search for this systematic review will involve a three-step process, focusing exclusively on articles published in the English language from 2008 to 2023.

P- Neonates (28+ weeks of gestation)

I-25% dextrose

C- Breast milk or Routine care or No specific intervention

O- Pain level, vital parameters, duration of cry, and comfort level

The selection of studies for this review will be based on the following criteria:

a) Studies available in electronic databases that have been published in peer-reviewed journals.

b) This review will include randomized controlled trials and non-randomized controlled trials exclusively in its study design.

Intervention: Studies consisting of 25% dextrose and breast milk as the main variable will be included in the study.

a) **Population**: Neonates with 28+ weeks of gestation irrespective of gender, region, race, and country.

b) **Settings:** Conducted in clinical settings

c) Regarding outcomes, articles will be considered suitable if they discuss some or all of the health advantages, such as pain reduction, shorter crying duration, and enhancements in vital signs and the overall comfort of newborns.

d) Excluded from consideration will be books, unpublished materials, and databases that only contain brief abstracts.

Sources of Information

Databases like Science Direct and PubMed will be utilized using the keywords as per PICO, after that titles and abstracts will be searched with the help of alternative keywords.

A comprehensive investigation will be done by using a clear search approach for science direct databases, CINAHL plus databases, PubMed-Medline, and Cochrane Library. In addition to this Citation pearl searching will, be done for relevant studies.

Search Strategy

Science Direct Databases

25% dextrose OR Glucose AND Breast-milk OR Breast-feeding AND Neonates OR Newborns AND Heel-prick OR Heel-lance AND {Randomized Control Trials} Filters: Research article, Year: 2008-23.

Study Records

Data handling will involve the utilization of Zotero software for uploading research papers, with the removal of duplicate entries. The software will retain the article details within the reference manager throughout the review.

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Selection Process

Two authors will initially evaluate the titles and abstracts of the research articles, considering their relevance to the review topic. Subsequently, a comprehensive examination of the entire content will be conducted to ensure compliance with eligibility criteria. Both authors will independently conduct the assessment at both the abstract and full-text levels. Any disagreements that arise during the screening process will be resolved through consultation with a third author if necessary, followed by discussion.

Data Collection Procedure

To assess the quality of the selected publications, the clinical assessment criteria for randomized controlled trials (RCTs) outlined in the Joanna Briggs Institute Manual (JBI) will be applied [8]. Two reviewers will conduct a thorough examination of article quality, and in the event of any discrepancies, a third reviewer will be consulted for discussion. The data extraction process from the chosen studies will be conducted using the Cochrane data extraction form.

Data Items

This assessment encompasses research involving variables such as the health advantages associated with both 25% dextrose and breast milk. These advantages comprise the reduction of pain, duration of crying, the preservation of comfort levels, and the monitoring of vital parameters in a population consisting of neonates with a gestational age of 28 weeks or more. The primary variables under scrutiny are 25% dextrose and breast milk.

Outcomes and Prioritization

This review will evaluate the effectiveness of 25% dextrose compared to breast milk in terms of health benefits, specifically focusing on the reduction of pain, duration of crying, maintenance of comfort, and monitoring of vital parameters in newborns as a whole. As such, the primary outcome of interest in this review will be the decrease in pain levels, duration of crying, and the comfort level of newborns following a heel prick procedure.

Assessment of Individual Bias Risk

To evaluate individual studies, this review will employ the Cochrane risk bias assessment for randomized controlled trials (RCTs) [9]

Data Integration

The study results will align with the research objectives. This will involve the creation and presentation of a descriptive synthesis in the form of a narrative summary presented in a tabular format. This summary will encompass both qualitative accounts and statistical findings from the study. In the meta-analysis for the knowledge variable, we will employ the Standardized Mean Difference (SMD), and the assessment of heterogeneity will be conducted using I2 statistics.

Assessment of Publication Bias: The studies included in this review will be evaluated for potential publication bias.

Certainty of Cumulative Evidence: To assess the level of confidence in the evidence, we will utilize the GRADEpro approach. [10]

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CONCLUSION

This review aims to provide healthcare practitioners with insights into the significance of employing non-pharmacological pain management strategies during minor invasive procedures such as heel pricks. In addition, it will help to relieve the pain and maintain the comfort of hospitalized newborns. It will help identify the gap in the existing literature and suggest areas for future research.

References

1) Matsuda-Castro AC, Linhares MB. Pain and distress in inpatient children according to child and mother perceptions. Paidéia (Ribeirão Preto). 2014; 24:351-9.

2) Stevens BJ, Abbott LK, Yamada J, Harrison D, Stinson J, Taddio A, Barwick M, Latimer M, Scott SD, Rashotte J, Campbell F. Epidemiology and management of painful procedures in children in Canadian hospitals. Cmaj. 2011 Apr 19; 183(7):E403-10.

3) Bucsea O, Riddell RP. Non-pharmacological pain management in the neonatal intensive care unit: Managing neonatal pain without drugs. InSeminars in Fetal and Neonatal Medicine 2019 Aug 1 (Vol. 24, No. 4, p. 101017). WB Saunders.

4) Cignacco E, Hamers JP, Stoffel L, Van Lingen RA, Gessler P, McDougall J, Nelle M. The efficacy of non-pharmacological interventions in the management of procedural pain in preterm and term neonates: A systematic literature review. European Journal of Pain. 2007 Feb 1; 11(2):139-52.

5) Perry M, Tan Z, Chen J, *et al*. Neonatal pain: perceptions and current practice. Crit Care Nurs Clin North Am 2018;30:549–61

6) Shen Q, Huang Z, Leng H, Luo X, Zheng X. Efficacy and safety of non-pharmacological interventions for neonatal pain: An overview of systematic reviews. BMJ open. 2022 Sep 1; 12(9):e062296.

7) Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ. 2021; 372:n71. doi:10.1136/bmj.n71

8) Tufanaru C, Munn Z, Aromataris E, and Campbell J, Hopp L. Chapert 3: Systematic Review of Effectiveness. In: Aromataris E, Munn Z, editors. JBI Manual for Evidence Synthesis [Internet]. JBI; 2020 [Cited 2020 Nov 9]. Available from: http://wiki.jbi.global/display/MANUAL/Chapter+3%A+Systematic+reviews+of+effectiveness.

9) RevMan. Version 5.3. Cochrane Training. Accessed November 12, 2022. https://training.cochrane.org/ online-learning/core-software/revman

10) GRADEpro GDT, GRADEpro Guideline Development Tool [software]. McMaster University: 2015 (developed by Evidence Prime Inc.) Available from gradepro.org