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A study to assess the effectiveness of pain management strategies among neonates admitted in NICU

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Abstract
Introduction: A neonate is also called a newborn. The neonatal period is the first 4 weeks of a child's life. It is a time when changes are very rapid. Many critical events can occur in this period. Neonates admitted to neonatal intensive care units (NICU) are exposed to a high number of painful procedures. Medical professional team members are the responsible for pain management among the neonates. Breastfeeding, also known as nursing, is the feeding of babies and young children with milk from a woman's breast. Breastfeeding has a number benefits to both mother and baby. It is one of the pain management for the neonates and tucking also.
Objectives: The aim of this study was to assess the effectiveness of pain management strategies among neonates admitted in NICU.
Method: A prospective analytical study was used selected to assess the effectiveness of pain management strategies among neonates admitted in NICU at Thiruvallur GH conducted among 80 samples in one group pre intervention and post intervention research design who met the inclusion criteria. A convenient sampling technique was used to select the samples. Data were collected by using Neonatal Infant Pain Scale among each samples from pre intervention and post intervention. Interventions were given to the neonates were breastfeeding and tucking before the time of procedure.
Results: The finding revealed that mean value of pre intervention was 6.33 and standard deviation was 0.71 and mean value of post intervention was 3.56 and standard deviation was 0.39. The post intervention "t" value was 8.95 which is found to significant at $P<0.05$. So the breastfeeding and tucking was effective on pain among neonates.
Conclusion: Breastfeeding and tucking was effective non-pharmacological interventional among neonates pain during painful procedures.

Keywords: breastfeeding, tucking, pain, neonates, NICU

Introduction

A neonate is also called a newborn. The neonatal period is the first 4 weeks of a child's life. It is a time when changes are very rapid. Many critical events can occur in this period.
Several factors may be responsible for pain in the neonatal population, including mechanical ventilation, invasive procedures, repeated heel sticks for blood draws, postoperative issues, and acute medical illnesses, including necrotizing enterocolitis. The past 2-3 decades have seen many changes in the management of acute pain in the neonatal population. These changes began with the rejection of previously held misconceptions that neonates, infants, and children do not feel, experience, or react to pain such as adults because of the immaturity of their peripheral and central nervous system (CNS). These tenets, compounded by fears of addiction, concerns regarding the potential adverse effects of opioids, and the lack of effective pharmacokinetic data led to the under-treatment of pain in the operating room and during the peri-operative period. However, such practices began to change after the publication of studies demonstrating that infants, children and adults experience similar levels of postoperative pain. These studies showed that measurable alterations in physiologic and biochemical markers of stress existed following painful stimuli even in preterm infants. In fact, when compared with the adult population, the changes in stress markers such as endogenous catecholamines and adrenocortical hormones were several-fold higher in neonates compared to their adult counterparts.
Almost all neonates have blood work for newborn screening in their first days of life, and preterm or sick hospitalized infants may require repeated invasive needle-related procedures for medical monitoring over the course of their hospitalization. Painful experiences in the neonatal period may results in physiological and behavioural alterations, as well as changes in the development of the nervous system, which can provoke considerable damage in the future. The publication of an increasing number of studies in recent years linking repeated neonatal pain exposure with poor neurological outcomes is concerning, and highlights the urgent need for health care professionals and parents of healthy, preterm and sick neonates, to reduce pain exposure and to advocate for consistent use of effective pain management strategies. - Denise Harrison *et al* (2016)
The encouraging news is that health care providers now have well validated means of assessing pain and simple, feasible, and effective ways to reduce pain during needle related painful procedures. Breastfeeding, skin to skin care also referred to as kangaroo mother care and sweet solutions; either sucrose or glucose, reduce pain during commonly performed painful procedures compared to no treatment, water, breast milk, or positioning, swaddling, holding or cuddling health care professionals and parents now have effective pain-reducing strategies available to use for neonatal pain- the next step is to ensure that these strategies are consistently used during necessary painful

procedures.

Breastfeeding, also known as nursing, is the feeding of babies and young children with milk from a woman's breast. Breastfeeding has a number benefits to both mother and baby.

The prevention of pain in neonates is an expectation of parents. However, there are major gaps in our knowledge regarding the most effective way to accomplish this. Although it may not be possible to completely eliminate pain in neonates, much can be done to reduce the amount and intensity of pain. The prevention of pain is important not only because it is an ethical expectation but also because repeated painful exposures can have deleterious consequences. These consequences include altered pain sensitivity and permanent neuroanatomic and behavioural abnormalities, as found in animal studies.-American Academy of Pediatrics Neonates at greatest risk of neurodevelopmental impairment as a result of preterm birth are also those most likely to be exposed to the greatest number of painful stimuli in the NICU, creating a "double-hit" phenomenon. Although effective pain relief is now usually provided for neonates during and after a major surgical procedure, pain-reducing therapies are often underused for the numerous minor procedures that are a part of routine medical and nursing care for neonates. - Pia Lundqvist (2014) More over studies still show gaps in the knowledge of nursing professionals regarding assessment and management of pain. This paper will present an overview of indicators to assess pain in the neonate, a review of evidence supporting breast feeding, skin to skin contact and sweet solution for procedural pain reduction and recommendation including in neonatal pain in management guidelines. -Natália Pinheiro Braga Sposito *et al*. (2014)

Objectives

- To assess the pre interventional pain score during a procedure without any pain management strategies among neonates.
- To assess the post interventional pain score in neonates who had pain management strategy.
- To assess the effectiveness of pain management strategies among neonates.

Material and Methods

A sample of 80 neonates who admitted in NICU. Sample are selected by convenient sampling technique. The experimental study was conducted during one week period. Data collected was conducted in Thiruvallur GH after getting permission from the Hospital. Demographic variables consists of sex and age of the newborn, gestational age, parity of the mother, birth weight, age of mother, education, occupation, type of family are the questionnaire.

The investigator had obtained formal permission from the mothers. Pre intervention was done by using Neonatal infant pain scale after that pain management strategies was given. After that post intervention assessment of Neonatal infant pain score was done. The data were analysed by using one group pre intervention post intervention method. Descriptive statistics and inferential statistics were used to analyses the data and to test the hypothesis.

Chi-square test was used to test the association between categorical variables $P<0.05$ was taken as stastifically significant.

Result

Out of 80 samples the finding revealed regarding pre intervention level of pain 03(3.75%) Newborns had mild pain, 36(45%) Newborns had moderate pain and 41(51.05%) had severe pain and regarding the post intervention 38(47.5%) Newborns had mild pain, 42(52.5%) Newborns had moderate pain and no one had severe pain. The mean value of pre intervention was 6.33 and standard deviation was 0.71 and mean value of post intervention was 3.56 and standard deviation was 0.39. The post intervention "t" value was 8.95 which is found to significant at $P<0.05$. So the breastfeeding and tucking was effective on pain among neonates.

Table 1: Frequency and distribution of Demographic variables of newborns

S.NO	Demographic variables	Frequency	Percentage
1.	Sex of the Baby		
	a) Male	37	46.25%
	b) Female	43	53.75%
2.	Age of Newborn		
	a) Early newborn (0-7 days)	41	51.25%
	b) Late newborn (8-28days)	39	48.75%
3.	Parity of the Mother		
	a) Primipara	38	47.5%
	b) Multipara	42	52.5%
4.	Type of Delivery		
	a) Normal vaginal delivery	32	40%
	b) Caesarean section	48	60%
5.	Gestational Age		
	a) Below 37 weeks	45	56.25%
	b) Above 37 weeks	35	43.75%
6.	Birth Weight		
	a) Below 2500g	43	53.75%
	b) Above 2500g	37	46.25%
7.	Age Of Mother		
	a) Below 19years	22	27.5%
	b) 20-29years	20	25%
	c) Above 30years	38	47.5%
8.	Education of Mother		

	a) No formal education	2	2.5%
	b) Primary school(1-8)	19	23.75%
	c) Secondary school (9-12)	38	47.5%
	d) College and above	21	26.25%
9.	Occupation		
	a) House wife	44	55%
	b) Government employee	2	2.5%
	c) Private employee	26	32.5%
	d) Others	8	10%
10.	Religion		
	a) Hindu	25	31.25%
	b) Muslim	27	33.75%
	c) Christian	28	35%
11.	Type of Family		
	a) Joint family	37	46.25%
	b) Nuclear family	43	53.75%

Above the table reveals that out of 80 samples (37) 46.25% belongs to the male sex, (43) 53.75% belongs to the female sex, regarding age (41) 51.25% belongs to early newborn, (39) 48.75% belongs to late newborn, regarding parity of the mother (38) 47.5% belongs to primipara, (42) 52.5% belongs to multipara, (32) 40% belongs to normal vaginal delivery, (48) 60% belongs to caesarean section, (45) 56.25% belongs to below 37 weeks of gestational age,(35) 43.75% belongs to above 37 weeks of gestational age,(43) 53.75% belongs to below 2500g of birth weight,(37) 46.25% belongs to above 2500g of birth weight, regarding the mother (22) 27.5% belongs to age below 19 years, (20) 25% belongs to age of 20-29 years, (38) 47.5% belongs to age of above 30years, regarding the education of mother (2) 2.5% belongs to no formal education,(19) 23.75% belongs to primary school(1-8), (38) 47.5% belongs to secondary school (9-12),(21) 26.25% belongs to college and above, regarding the occupation of mother (44) 55% belongs to house wife, (2) 2.5% belongs to government employee,(26) 32.5% belongs to private employee,(8) 10% belongs to others, regarding religion(25) 31.25% belongs to Hindu,(27) 33.75% belongs to Muslim,(28) 35% belongs to Christian and regarding the type of family(37) 46.25% belongs to joint family and (43) 53.75% belongs to nuclear family.

Table 2 Frequency and percentage distribution of the pre intervention and post intervention level of pain in study participants.

S.No	Level of pain	Pre intervention		Post intervention	
		Frequency	Percentage	Frequency	Percentage
1	Mild Pain	03	3.75%	38	47.5%
2	Moderate Pain	36	45%	42	52.5%
3	Severe Pain	41	51.05%	0	0

The above table shows that out of 80 samples regarding pre intervention level of pain 03(3.75%) Newborns had mild pain, 36(45%) Newborns had moderate pain and 41(51.05%) had severe pain and regarding the post intervention 38(47.5%) Newborns had mild pain, 42(52.5%) Newborns had moderate pain and no one had severe pain.

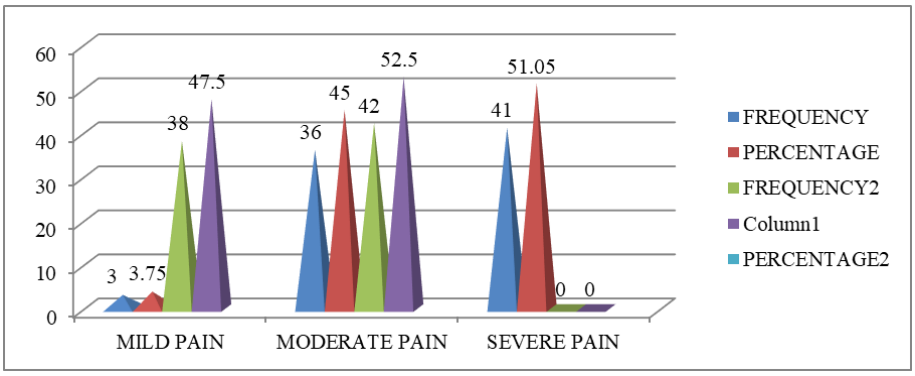

Fig 1: frequency and percentage of distribution of pre intervention and post intervention level of pain in study participants.

Figure 1 shows that out of 80 samples regarding pre intervention level of pain 03(3.75%) Newborns had mild pain, 36(45%) Newborns had moderate pain and 41(51.05%) had severe pain and regarding the post intervention 38(47.5%) Newborns had mild pain, 42(52.5%) Newborns had moderate pain and no one had severe pain.

Table 3: Statistical analysis of the level of pain on Newborn in NICU

Assessment	Mean	Standard Deviation	Paired t
Pre intervention	6.33	0.71	**8.95**
Post intervention	3.56	0.39	**S**

P<0.05, S- Significant

The above table shows that the pain management strategies among the newborns admitted in NICU was significant paired t value was 8.95. It shows that pain management strategy was reduces their pain and effective in newborns.

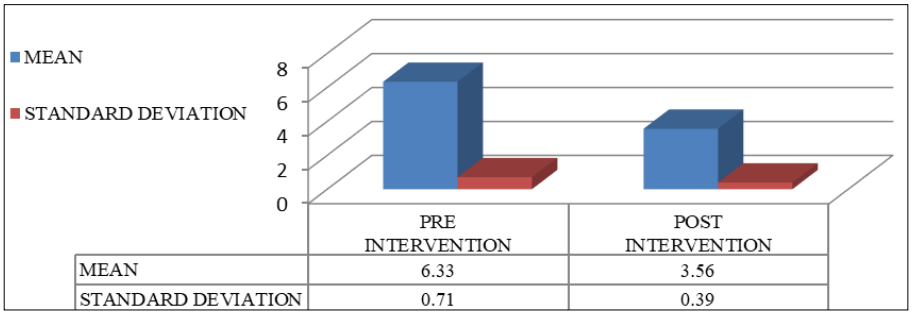

Fig 2: Mean and standard deviation of pre and post intervention

Figure 3 shows that the pain management strategies among the newborns admitted in NICU was significant paired t value was 8.95. It shows that pain management strategy was reduces their pain and effective in newborns.

Discussion

The first objective of the study was to assess the demographic variables of neonates admitted in NICU.

Table 1 shows the frequency and percentage distribution of demographic variables of neonates admitted in NICU.

Above the table reveals that out of 80 samples (37) 46.25% belongs to the male sex, (43) 53.75% belongs to the female sex, regarding age (41) 51.25% belongs to early newborn, (39) 48.75% belongs to late newborn, regarding parity of the mother (38) 47.5% belongs to primipara, (42) 52.5% belongs to multipara, (32) 40% belongs to normal vaginal delivery, (48) 60% belongs to caesarean section, (45) 56.25% belongs to below 37 weeks of gestational age,(35) 43.75% belongs to above 37 weeks of gestational age,(43) 53.75% belongs to below 2500g of birth weight,(37) 46.25% belongs to above 2500g of birth weight, regarding the mother (22) 27.5% belongs to age below 19 years, (20) 25% belongs to age of 20-29 years, (38) 47.5% belongs to age of above 30years, regarding the education of mother (2) 2.5% belongs to no formal education,(19) 23.75% belongs to primary school(1-8), (38) 47.5% belongs to secondary school (9-12),(21) 26.25% belongs to college and above, regarding the occupation of mother (44) 55% belongs to house wife, (2) 2.5% belongs to government employee,(26) 32.5% belongs to private employee, (8) 10% belongs to others, regarding religion(25) 31.25% belongs to Hindu,(27) 33.75% belongs to Muslim,(28) 35% belongs to Christian and regarding the type of family(37) 46.25% belongs to joint family and (43) 53.75% belongs to nuclear family.

The second objective of this study was to assess the frequency and percentage distribution of the pre-test and post-test level of pain in study participants.

Table 2 shows that out of 80 samples regarding pre intervention level of pain 03(3.75%) Newborns had mild pain, 36(45%) Newborns had moderate pain and 41(51.05%) had severe pain and regarding the post intervention 38(47.5%) Newborns had mild pain, 42(52.5%) Newborns had moderate pain and no one had severe pain.

The third objective of this study was to determine the effectiveness of pain management strategies among neonates in NICU.

Table 3 shows that the pain management strategies among the newborns admitted in NICU was significant paired t value was 8.95. It shows that pain management strategy was reduces their pain and effective in newborns.

The fourth objective of this study was to find out the association.

Table 4 shows that association between the demographic variables and post interventional level of pain among neonates in NICU. It shows that there is significant variables between the demographic variables such as sex of the newborn, age of the newborn, parity of the mother, occupation of the mother, religion and type of family and non-significant variables between demographic variables such as type of delivery, gestational age, birth weight and age of mother.

The study findings were supported by Munevvar Erkur and Emine Efe (2017) conducted a study on efficacy of breastfeeding on babies' pain during vaccination. The aim of this randomized controlled experimental study was to evaluate the effect of breastfeeding on the pain of babies during vaccination. The sample of the study consisted of 100 babies who compiled with the sampling criteria. The babies in the control group experienced severe pain and the babies in the control group felt severe pain and the babies in the breastfeeding group felt moderate pain during the injection. Breastfeeding prevented increased heart rate, duration of crying, falling of oxygen saturation and reduced pain during the invasive procedures in newborns more than control group.

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