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Effect of kangaroo mother care in reducing pain due to heel prick among preterm neonates: A randomised controlled study

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Abstract
Objective: To Study The Effect Of Kangaroo Mother Care In Reducing Pain Due To Heel Prick Among Preterm Neonates At Nicu Of K.T. Children Hospital, Rajkot.
Design: Randomised Controlled Study.
Setting: Tretiary Care Level.
Method: Comparision between preterm neonates undergoing KMC (study group) and preterm babies without KMC (control group) according to premature infant pain profile (PIPP) related to heel prick is proposed. Study participants will be premature neonates (32-36 weeks) admitted to the tertiary care NICU in whom heel prick is to be done for glucose monitoring. Preterm neonates (32-36 weeks) whose general condition is stable, not on oxygen or any IV fluids and on breast-feeding, cup feeding or RT feeding and Preterm neonates in whom glucose estimation is needed for routine monitoring of hypoglycemia are included with prior consent.
Result: statistically significant ($p<0.05$) difference is noted among mean PIPP score of immediately after heel prick and 5 minutes after hell prick among study and control group. No any such difference ($p>0.05$) is there among mean PIPP score of before the heel prick.
Conclusion: This study concludes that kangaroo mother care is an effective way in reducing pain due to heel prick among preterm neonates. Difference in mean PIPP score is more significant among 32-36 weeks of newborns.

Keywords: kangaroo mother care, premature infant pain profile (PIPP), preterm neonates

1. Introduction

Out of the estimated four million neonatal deaths worldwide, preterm and low birth weight babies account for more than a fifth. Kangaroo Mother Care (KMC) is care of infants carried in direct skin-to-skin contact with the mother over the mother's chest between the breasts (Kangaroo Position). KMC is an effective way to meet baby's needs for warmth, breastfeeding, protection from infection, stimulation, safety and love [1]. Rey and Martinez, in Bogotá, Colombia, developed KMC as an alternative to inadequate and insufficient incubator care for preterm newborn infants [2]. Neonates born prematurely who spend the initial weeks of their lives in NICUs, undergo many invasive procedures (anaverage of 2–3/d, up to 8–10/d) without benefit of analgesia of which heel pricking is one of the most common procedure [3]. There is increasing evidence to suggest that these repeated invasive procedures have long-term consequences [4].

International Association for the Study of Pain defines pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage [5]. Sucrose has been shown to be effective but frequently repeated doses of sucrose in the neonate may not be safe especially in preterm [6] and may put infants at risk for poorer neurobehavioral and physiologic outcomes [7, 8]. There is also inconsistency in the dose of sucrose that would be effective [6]. Parenteral analgesics either have side effects or are not very effective in newborns [9]. Breast feeding is effective, but has only been reported to be used for pain control in full-term neonates. Premature infants are not being breast fed during the days when most invasive procedures are carried out as they may not have the developmental maturity [10]. It is proposed that it may be the contact of breast feeding, and not the breast milk per se, which is efficacious in decreasing pain [10, 11]. Thus for the preterm group, KMC would be a cost effective analgesic and provide mothers a greater sense of responsibility for their sick babies. Studies have compared the effect of KMC and oral glucose on pain response in neonates and show that KMC acts synergistically with other non-pharmacological modalities in reducing pain [12, 13].

This study was conducted to find out the effect of KMC in reducing pain among preterm neonates by comparing mean PIPP score of both study and control group before the heel prick, immediately and 5 minutes after the heel prick.

2. Material and Methods

This prospective randomized controlled study is proposed at a tertiary care NICU of K.T. Children hospital, Rajkot. Comparision between preterm neonates undergoing KMC and preterm babies without KMC according to premature infant pain profile (PIPP) related to heel prick is proposed.

Study participants will be premature neonates (32-36 weeks) admitted to the tertiary care NICU in whom heel prick is to be done for glucose monitoring Before doing heel prick for blood glucose estimation, premature neonates will be accessed for the eligibility criteria

Eligibility criteria

i) Inclusion criteria

- Preterm neonates (32-36 weeks) whose general condition is stable, not on oxygen or any IV fluids and on breast-feeding, cup feeding or RT feeding.
- Preterm neonates in whom glucose estimation is needed for routine monitoring of hypoglycemia.

ii) Exclusion criteria

- Preterm neonates in whom any invasive or painful procedure is done before 1 hour will be excluded.
- Preterm neonates to whom breast-feeding, cup feeding or RT feeding was given in less than 30 minutes before heel prick will be excluded.

After identifying eligible participants, Parents of all eligible participants will be asked about their willingness to participate in the study with detailed information and those consented will be randomized using FLIP COIN method.

Test group a participants will be given kangaroo mother care at least 15 minutes before doing heel prick. Control group B will not be given kangaroo mother care before heel prick.

Both these group A & B will be evaluated for PIPP (premature infant pain profile) score 1 minute before, immediately and 5 minutes after heel prick.

Total Sample size will be 100 according to recommended minimum sample size criteria for validity of the study. (Recommended minimum sample size=30).

Difference of mean of PIPP score will be calculated using CHI-SQUARE test for statistical significance.

To analyze the data software SPSS version 18 is used.

3. Results

Table 1: Comparison of PIPP score in Study group and Control group

Particulars	Study group mean (SD)	Control group mean (SD)	Mean difference	P value
Total PIPP score	4.92 (2.54)	6.08 (3.54)	1.16(0.53,1.79)	<0.05
Before 1 minute	3.38 (1.36)	3.36 (1.39)	0.02(0.0,0.6)	>0.05
Immediately after	7.47(2.17)	9.91 (2.76)	2.44(1.47,3.63)	<0.05
After 5mins	3.91 (1.73)	4.96 (2.17)	1.05(0.023, 1.073)	<0.05

Table 2: comparison of mean PIPP score among study group according to weight pattern

Average Pipp score				
Weight band		Before heel prick	Immediately after heel prick	5mins after heel prick
1-1.2 kg		4.6666	10.6666	7
	Male	0	0	0
	Female	4.6666	10.6666	7
1.2-1.4 kg		3.875	8.0625	4.375
	Male	3.7777	7.8888	4.4444
	Female	4	8.2857	4.2857
1.4-1.6 kg		3.3888	7.5555	3.7777
	Male	2.7142	8	3.5714
	Female	3.8181	7.2727	3.9040
1.6-1.8 kg		2.2857	5.4285	2.2857
	Male	2	5	2.6666
	Female	4	8	5
1.8-2 kg		1	3	2
	Male	1	3	2
	Female	0	0	0
2-2.2 kg		2.5	6.5	3.5
	Male	2	7	3
	Female	3	6	4

Table 3: comparison of mean PIPP score among study group according to weight pattern

Average Pipp score				
Maturity band		Before heel prick	Immediately after heel prick	5mins after heel prick
28-30 wks		5	12	7
	Male	00	00	00
	Female	5	12	7
30-32 wks		4.125	9	5.125
	Male	4	8	4.66
	Female	4.2	9.6	5.4
32-34 wks		3.7142	7.5714	4.2857
	Male	3.5	7.25	4.125
	Female	4	8.1666	4.5
34-36 wks		2.875	6.6666	3.1666
	Male	2.1538	6.5384	2.6153
	Female	3.7272	8.2727	4.1818

4. Discussion

- ✓ Table-1 shows statistically significant ($p<0.05$) difference is noted among mean PIPP score of immediately after heel prick and 5 minutes after hell prick among study and control group. No any such difference ($p>0.05$) is there among mean PIPP score of before the heel prick.
- ✓ Table-2 shows Statistically significant difference observed between 1-1.6 kg vs 1.6-1.8 kg weight band before & immediately after heel prick [p=<0.01] Difference is not significant in 1.8-2 vs 2-2.2kg weight band among study group.
- ✓ Table-3 shows Significant difference observed between 32-34 vs 34-36 wks in before & immediately after heel prick [p=<0.05] Difference is not significant in 28-30 wks vs 30-32 wks [p=0.189] among study group.

5. Conclusion

This study concludes that kangaroo mother care is an effective way in reducing pain due to heel prick among preterm neonates. Difference in mean PIPP score is more significant among 32-36 weeks of newborns.

6. References

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