

EFFECT OF FACILITATED TUCKING IN REDUCING THE PAIN RESPONSE DURING VENIPUNCTURE AMONG PRETERM NEONATE ADMITTED IN NEONATAL INTENSIVE CARE UNIT (NICU) IN A SELECTED HOSPITALS, BENGALURU

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ABSTRACT

This study was aimed to assess the effect of facilitated tucking in reducing the pain response during venipuncture among preterm neonate admitted in neonatal intensive care unit (NICU) in a selected hospital, Bengaluru. Methodology: True experimental posttest only control design was used. Non-probability purposive sampling technique to select 100 in each experimental and control group who met the inclusion and exclusion criteria. The tool used were demographic proforma and Preterm infant pain profile (PIPP) was used to collect the required data from subjects. The experimental group was subjected to facilitate tucking whereas control group was give routine hospital care before, during and after venipuncture.

Results: Regarding level of pain response in experimental group and control group, before the procedure all 50 (100%) of the preterm had mild or no pain. In experimental group during procedure with facilitated tucking 40 (80%) had slight to moderate level of pain, 10 (26%) had no whereas in control group during procedure with routine care 29 (58%) had slight to moderate level of pain, 21 (42%) had severe pain. After the procedure in experimental group, 33 (66%) had no pain or mild pain, 17 (34%) had slight to moderate level of pain and none had severe pain, whereas in control group after procedure majority 41 (82%) had slight to moderate level of pain and 9 (18%) had severe pain. The calculated F value, between experimental group and control group was 111.09 greater than the table values at 0.05 level of significance. The mean difference of PIPP scores in experimental group was low compared to that of control group. This showed that facilitated tucking was effective in reducing the pain response in experimental group. Unpaired t test showed significant difference between experimental and control group during and after the venipuncture. The results prove that facilitated tucking was effective in reducing pain among preterm babies.

Key words: effect, facilitated tucking, pain response, preterm neonates, NICU.

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INTRODUCTION

Neonates at greatest risk of neurodevelopmental impairment as a result of preterm birth (i.e., the smallest and sickest) are also those most likely to be exposed to the greatest number of painful stimuli in the NICU (Barrington et al., 2007). Preterm infants receiving intensive care are subjected to frequent invasive and stressful procedures as well as more chronic environmental influences. Acute episodic pain may cause early neurologic injury. (Bouza, 2009)

Since the rapidly developing nervous system of immature preterm neonates differs from term infants, preterm infants are particularly vulnerable to the effects of pain and stress. In the neonatal period they are at risk of enhanced pain sensitivity. (Beggs et al., 2007). For these infants, poorly managed pain and stress may have important consequences. Continual adaptation to repeated pain appears to induce functional changes in stress and pain processing systems. (Hohmeister et al., 2010). Furthermore, repeated neonatal pain may contribute to long-term changes in generalized stress systems (Holsti et al., 2007). Preterm newborns shift abruptly from the protective intrauterine environment to the neonatal intensive care unit (NICU), where they undergo essential life-saving, invasive care-related procedures. (Grunau et al., 2007)

To protect the brain, and to promote optimal long-term development, using accurate pain assessment tools is essential for mitigating pain. Given the vulnerabilities of tiny babies, pain assessment must be as accurate as possible to ensure that there are no 'unintended negative consequences' of pharmacologic pain management or other forms of humane care (Mellon et al., 2007). Facilitated Tucking is the simplest non-pharmacological and cost-effective technique simulating the condition of being in uterus. This helps the preterm infant comfortable, more secure with controlled response. It facilitates self-regulation by decreasing the physiologic response like prolonged heart rate elevation that contributes to the disequilibrium associated with pain and stress (Cignacco et al., 2007). So the researcher is interested to assess the effect of facilitated tucking in reducing the pain response during venipuncture among preterm neonate admitted in neonatal intensive care unit (NICU) in a selected hospital, Bengaluru.

OBJECTIVES OF THE STUDY:

1. To assess the pain response during venipuncture among preterm neonate in experimental and control group.
2. To evaluate the effect of facilitated tucking during venipuncture on pain response among preterm neonate in experimental and control group admitted in Neonatal Intensive Care Unit.
3. To find an association between pain response during venipuncture among preterm neonate and their selected demographic variables.

HYPOTHESIS:

All Hypotheses will be tested at 0.05 level of significance.

H₁: There will be no significant difference in the pain response score between experimental and control group.

H₂: There will be no significant association between the selected demographic variables and pain responses among preterm neonates in experimental group.

H₃: There will be no significant association between the selected demographic variables and pain responses among preterm neonates in control group.

METHODOLOGY

An experimental approach is used based on the nature of the problem in order to accomplish the objectives and to test hypotheses of the study. True experimental posttest only control design is used to assess the effect of facilitated tucking in reducing the pain response during venipuncture among preterm neonate admitted in neonatal intensive care unit (NICU) in a selected hospital, Bengaluru. Probability simple random sampling technique to select the preterm neonates admitted in neonatal intensive care unit (NICU) to experimental and control group. The samples consisted of 50 preterm neonates undergoing venipuncture and admitted in NICU of selected hospitals, Bengaluru each experimental and control group who met the inclusion and exclusion criteria. Based on the objectives of the study, demographic proforma prepared by the researcher and standardized Preterm infant pain profile was used to collect the required data from subjects.

The Pilot study was conducted and was found to be feasible and practical No further changes were done in the tool after the pilot study. Ethical clearance was obtained from ethical committee.

Prior to data collection permission was obtained from the concerned authority of the hospitals for conducting study. The investigator introduced herself to the parents, the purpose of the study was explained and a written consent was obtained from the parents after assuring confidentiality. The sample size was 50 in each experimental and control group. Sample who fulfilled the sampling criteria were assigned randomly to experimental group and control group. Baseline data was collected and pain response was recorded 2 minutes prior to the venipuncture procedure. Heart rate and oxygen saturation was monitored by pulse oxymeter and

other parameters through video recordings in both the groups. The experimental group was provided with facilitated tucking during and after venipuncture. The control group received routine care (verbal pampering and touch). Sample of both groups was assessed with Preterm infant pain profile before, during and after the venipuncture. The investigator expressed her sincere gratitude for their co-operation.

RESULTS

The results revealed the following findings

Table 1: Frequency and percentage distribution of level of pain response before, during and after venipuncture among preterm neonates.

Level of pain	Experimental group (n=50)						Control group (n=50)					
	Before		During		After		Before		During		After	
	f	%	f	%	f	%	f	%	f	%	f	%
No pain/ Mild pain	50	100	10	20	33	66	50	100	0	0	0	0
Slight to Moderate pain	0	0	40	80	17	34	0	0	29	58	41	82
Severe pain	0	0	0	0	0	0	0	0	21	42	9	18

Table 1 regarding level of pain response in experimental group and control group, before the procedure all 50 (100%) of the preterm had mild or no pain. In experimental group during procedure with facilitated tucking 40 (80%) had slight to moderate level of pain, 10 (26%) had no pain or mild pain and none had severe pain, whereas in control group during procedure with routine care 29 (58%) had slight to moderate level of pain, 21 (42%) had severe pain and none had pain or mild pain. After the procedure in experimental group, 33 (66%) had no pain or mild pain, 17 (34%) had slight to moderate level of pain and none had severe pain, whereas in control group after procedure majority 41 (82%) had slight to moderate level of pain and 9 (18%) had severe pain.

Table 2: Repeated measures ANOVA showing sum of squares, mean square, F value and p value of scores of pain response scores between experimental and control group among preterm babies undergoing venipuncture.

Source		Sum of squares	df	Mean squares	F value	p value	Inference
Experimental group and control group	Between treatments	1174.29	3	391.43	111.09	<0.00001	Significant
	Within treatments	7119.9	196	3.63			

Table 2 reveals that the calculated F value, between experimental group and control group was 111.09 greater than the table values at 0.05 level of significance. The table also shows that the p value obtained is less than 0.00001. Hence the null hypothesis H_{01} was rejected and research hypothesis was accepted. Therefore facilitated tucking was effective in reducing pain scores among preterm babies during venipuncture between experimental group and control group.

Table 3: Unpaired t test showing the pain scores across before, during and after venipuncture between experimental and control group

Time	Group	Mean difference	t value	p Value	Inference
Before	Experimental group	0.08	0.409	0.68	Not Significant
	Control group				
During	Experimental group	-4.30	10.99	<0.0001	Significant
	Control group				
After	Experimental group	-4.84	13.04	<0.0001	Significant
	Control group				

Table 3 reveals that before procedure there was no significant difference between experimental and control group with t value 0.409 ($p=0.68$), whereas during and after procedure there was significant difference between the experimental group and control group where t value was 10.99 ($p<0.0001$) and 13.04 ($p<0.0001$). Thus it proves that facilitated tucking was effective in reducing the pain scores.

Table 4: Indicator of PIPP Mean, SD, mean percentage and F value of during and after venipuncture among preterm neonates. n=100

Sl.no	Area	Time of intervention	Experimental group		Control group		F value
			Mean±SD	Mean %	Mean±SD	Mean %	
1.	Gestational age	During	1.66±0.63	55.33	1.58±0.609	52.66	0.395
		After	1.66±0.63	55.33	1.58±0.609	52.66	
2.	Behavioural state	During	1.1±0.64	36.67	1.98±0.86	66	18.112*
		After	1.18±0.63	39.33	1.72±0.83	57.33	
3.	Heart rate	During	0.82±0.44	27.33	1.78±0.54	59.33	66.23*
		After	0.6±0.53	20	1.5±0.614	50	
4.	Oxygen saturation	During	0.88±0.59	29.33	1.44±0.50	48	66.124*
		After	0.22±0.42	7.33	1.38±0.53	46	
5.	Brow bulge	During	1.14±0.54	38	1.78±0.616	59.33	42.93*
		After	0.54±0.58	18	1.5±0.62	50	
6.	Eye squeeze	During	1.22±0.51	40.67	1.74±0.57	58	26.01*
		After	0.86±0.57	28.67	1.5±0.54	50	
7	Naso – labial furrow	During	0.98±0.59	32.67	1.8±0.57	60	24.47*
		After	0.88±0.77	29.33	1.6±0.67	53.33	

In table 4, calculated F value in gestational age was 0.395 less than the tabled value whereas other areas like behavioral state calculated F value was 18.112, Heart rate was 66.23, Oxygen saturation was 66.124, Brow bulge was 42.93, Eye squeeze was 26.01 and Naso – labial furrow was 24.47 which was greater than the table value. Therefore research hypothesis was accepted in all the areas of pain score except in gestational age. i.e., there was significant difference in the pain response score of experimental and control group.

Regarding association in experimental group reveals that there was association between pain scores and demographic variables like Apgar score at 5 min, ($\chi^2= 5.325$; $p<0.05$) birth weight in kg ($\chi^2= 4.75$; $p<0.05$) and order of birth ($\chi^2= 4.77$; $p<0.05$). In control group reveals that there was association between pain scores and demographic variables like gender ($\chi^2= 5.88$; $p<0.05$) and mode of feed ($\chi^2= 13.28$; $p<0.05$).

DISCUSSION

In the present study investigator found that Calculated F value was greater than the tabled value between experimental and control group. The mean difference of PIPP scores in experimental group was low compared to that of control group. This showed that facilitated tucking was effective in reducing the pain response in experimental group. Unpaired t test showed significant difference between experimental and control group during and after the venipuncture. The results prove that facilitated tucking was effective in reducing pain among preterm babies.

The findings were consistent with the study conducted by Alinejad-Naeini et al., 2014 38.2% of infants experienced severe pain during suctioning without intervention, only 8.8% of them experienced severe pain during suctioning with intervention. The results of the paired t-test show that there is a statistically significant difference in the mean scores of pain between non-intervention and intervention cases ($p < 0.001$), and the mean pain score substantially reduced in cases with intervention.

The findings were consistent with the study conducted by Kucukoglu et al., 2015 the mean pain scores of infants in facilitated tucking position (2.83 ± 1.18) were significantly lower than the scores of infants in the classical holding position (6.47 ± 1.07) ($p < 0.05$). The study was concluded that facilitated tucking is a non-pharmacological, effective and useful method for reducing pain during the procedure.

CONCLUSION

Preterm babies are greater risk of neurodevelopmental impairment. These babies are more exposed to painful stimuli in NICU. Even preterm babies experience pain to same as that of the older children or adults Evidences for the studies showed that an adverse impact of neonatal pain/stress in infants due to physiological immaturity, rapidly developing brain microstructure and networks, as well as programming of the hypothalamic-pituitary-adrenal axis. It appears that early pain/stress may influence the developing brain and

thereby neurodevelopment and stress-sensitive behaviors, particularly in the most immature neonates. The study proved that facilitated tucking is effective in reducing the pain in preterm neonates.

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