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Research Article

EFFECT OF FACILITATED TUCKING ON PAIN DURING HEPATITIS B VACCINATION AMONG NEWBORNS-RANDOMISED CONTROLLEDTRIAL

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ABSTRACT

Background and objective: Pain may also cause detrimental effects on child's future abilities to learn and remember new information. The most common painful procedures performed during infancy are routine injections without pain management. Non pharmacological and pharmacological methods should be considered for pain relief by health staffs. So the current study was carried out to assess the effect of facilitated tucking on pain during Hepatitis B vaccination among newborns. **Methodology:** A randomized controlled trail was used. The target population were the term neonates who underwent hepatitis B vaccination. Facilitated tucking position was provided prior to vaccination (n=21) were compared with those of non-tucking (n=21).The outcome measured were the pain score using Neonatal Infant Pain Scale (NIPS) and physiological parameters. **Result:** There was no significant difference in the pain level between control (4.47 1.16) and treatment group (3.76 0.94) during vaccination, whereas there was a significant difference in the level of pain 3 minutes after vaccination ($p<0.05$) and also there was a significant difference in respiratory rate between the group during vaccination ($p<0.05$). **Conclusion:** Facilitated tucking is found effective in reducing the pain during Hepatitis B vaccination among the term newborns. Hence facilitated tucking position can be used as a non-pharmacological method during painful procedure, as this position make the infant comfortable, more secure with controlled response and it is a simple, inexpensive and non-invasiveintervention.

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INTRODUCTION

Alleviation of pain is a basic right for every individual irrespective of age or size. The pain is defined as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" by International Association For the study of Pain (IASP).[1] Assessment of pain in a preverbal child is difficult, especially in the neonate. The most reliable way of assessing pain is self- report by the individual. Even though infants are not able to verbalize, they do feel pain and express in various ways. From the 24 weeks of post-conceptional age, all the neurotransmitters and pain modulation receptors are present and responsive to painful stimuli. Thus, fetus and newborns feel pain. Pain in the newborns cause changes in the behavior and physiological parameters. So, the evaluation of pain must be based on physiologic changes and behavioral observations. Although behaviors such as vocalization, facial expression, and body movement are common to all infants, Crying associated with pain is more intense and sustained. Most infants respond with increased body movement, alteration in physiologicalparameters.[2]

If the pain is not managed properly in the early neonatal period it may result in impairment in the neuro-developmental outcomes and also alter the pain threshold and stress related behavior when exposed to painful stimuli in the later life.[3,4,5,6] The pharmacological interventions are considered only for severe pain because of many side effects associated with the medications.[7] Various non-pharmacological methods like skin to skin contact, kangaroo care, breastfeeding, swaddling, are proven effective in relieving pain during invasive procedures like venipuncture and endotracheal suctioning. These techniques makes the newborns more comfortable and thereby able to avoid the period of irritation. Facilitated tucking is where a nurse or a parent holds the infant in a lateral position with flexed extremities towards the trunk.It is one of the non pharmacological methods which is convenient,cost-effectiveandrequireslesstimeandskill.Itmakesthenewbornsfeel more comfortable and able to control painful stimuli. Hence the study was conducted to assess the effect of facilitated tucking on pain during HepatitisB vaccination among newborns.

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MATERIAL AND METHODS

A randomized controlled trial was carried out in the post-natal ward of Women and Children Hospital, JIPMER, Puducherry. The total sample was forty two newborns. After getting permission from the Institute ethical committee, human studies. Informed consent was obtained from mother of each neonates after a brief explanation regarding the study. Confidentiality was maintained and participants were given freedom to leave the study at any time. The neonates who fulfilled inclusion criteria (newborn babies receiving Hepatitis B vaccination and have not received any intramuscular injection for last 1 hour) were selected. Babies crying continuously before vaccination, who were sick, who had congenital anomalies and birth asphyxia were excluded.

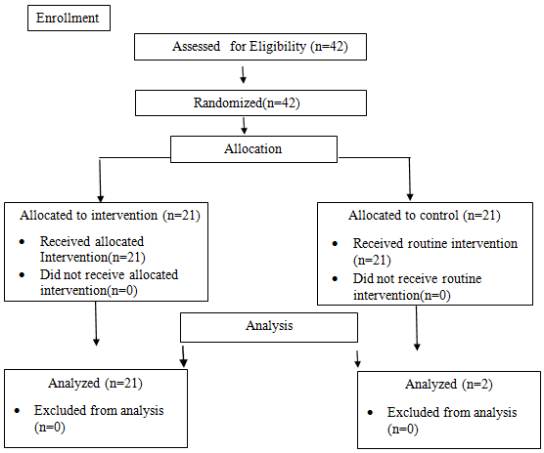

Figure 1 CONSORT Flow Diagram of participants

The data collection profoma which was prepared by the researcher was used to collect the clinical characteristics of the baby such as gender, gestational age and birth weight from the case sheet of the mothers. The neonatal infant pain scale (NIPS) was used to measure the level of pain among the newborns. The NIPS was developed by Lawranceet. al. in 1993 to evaluate the behavioral and physiological pain responses of preterm and terms infants. The scale consist of six indicators i.e facial expression, cry, breathing patterns, arms, legs position and state of arousal. The total score vary from 0-7 which was interpreted as score of 0-2 mild to no pain, 3-4 mild to moderate pain and >4 severe pain. The physiological parameters such as heart rate and oxygen saturation was monitored by using pulse oximeter and respiratory rate was assessed clinically.

For the newborns in the experimental group, before the intervention the baseline physiological parameters and pain was assessed. After 2 minutes of facilitated tucking , again the physiological parameters and pain was assessed. Then the newborn was vaccinated with hepatitis B vaccine by the public health nurse and the physiological parameters and pain was assessed during and 3 minutes after vaccination. In control group, vaccination was performed by the same public health nurse and the physiological parameters (heart rate, oxygen saturation and respiratory rate) and pain was assessed before, during and 3 minutes after the vaccination.

Both descriptive and inferential statistics were used to analyse the data. The data collected from the subjects were transferred into excel sheet and analysed using Statistical Package for Social Science (SPSS) - version 22. The distribution of data on categorical variables such as gender, gestational age and birth weight were expressed as frequency and percentage. The distribution of continuous variables such as physiological parameters and pain were expressed in terms of mean and standard deviation. The comparison of the physiological parameters and pain level between the groups was carried out by using independent student t-test. All the statistical analysis had been carried out at 5% level of significance.

RESULTS

- ✓ In this study, the proportion of female were high 13 (61.9%) compare to male 8 (38.1%) in control group. Whereas in the experimental group, 10 (47.6%) were female and 11(52.4%) were male.
- ✓ Concerning the gestational age in the control group, 14 (66.7%) were 37-38 weeks of gestation and 7 (33.3%) were 39-40 weeks of gestation. Whereas in the experimental group, 13 (61.9%) were 37-38 weeks of gestation, 7 (33.3%) were 39-40 weeks of gestation and 1 (4.8%) was more than 40 weeks of gestation.
- ✓ Comparing the birth weight between the group, 19 (90.5%) newborns had birth weight ≥ 2.5Kg and 2 (9.5%) newborns had ≤ 2.5 Kg in control whereas in the experimental group, 15(71.4%) newborns had birth weight ≥ 2.5Kg and 6 (28.6%) newborns had birth weight ≤ 2.5Kg.
- ✓ In control group 1 (4.8%) newborn had no pain to mild, 8 (38.1%) had mild to moderate pain and 12 (57.1%) had experienced severe pain during vaccination.
- ✓ In the experimental group: 1 (4.8%) newborn had no pain to mild, 16 (76.2%) had mild to moderate pain and 4 (19.0%) had experienced severe pain during vaccination.
- ✓ Tab.1.showed the comparison of mean pain scores of experimental and control groups. During vaccination mean pain score in experimental group was less than that of control group, but it was not statistically significant, but after 3 minutes of vaccination it was significant at0.05level.
- ✓ Comparison of the physiological parameters between control and experimental groups before vaccination showed no statistically significant difference, but an improvement in oxygen saturation and reduction in heart rate and respiratory rate were identified in the experimental group.[Tab.2]
- ✓ During vaccination there was a statistically significant difference in respiratory rate at0.05 level. Though improvement in oxygen saturation was elicited, it was not statistically significant.[Tab.3]
- ✓ Three minutes after vaccination though the oxygen saturation improved and respiratory rate reduced in experimental group, it was not statistically significant.[Tab.4].

Table 1 Comparison of mean pain score between control group and experimental group

N=42

Procedure	Groups	Mean	Standard deviation	't' test	'p' value
Before vaccination	Control	0.19	0.67	0.73	0.36
	Experimental	0.33	0.57		
During vaccination	Control	4.47	1.16	-2.18	0.19
	Experimental	3.76	0.94		
3 minutes after vaccination	Control	2.85	1.52	-4.225	0.03*
	Experimental	1.14	1.06		

p< 0.05 significant

Table 2 Comparison of mean physiological parameters between control and experimental groups before vaccination

N=21

Physiological parameters (before vaccination)	Groups	Means	Standard deviation	't' test	'p' value
Heart rate	Control	124.9	12.2	-1.00	.225
	Experimental	121.3	10.8		
Oxygen saturation	Control	93.6	3.82	3.04	.058
	Experimental	96.7	2.53		
Respiratory rate	Control	40.14	2.53	0.09	0.084
	Experimental	40.05	3.69		

Table 3 Comparison of mean physiological parameters between control and experimental groups during vaccination

N=21

Physiological parameters (During vaccination)	Groups	Mean	Standard deviation	't' test	'p' value
Heart rate	Control	123.6	12.0	.677	.532
	Experimental	126.6	16.3		
Oxygen saturation	Control	93.67	3.82	1.97	.145
	Experimental	95.7	2.83		
Respiratory rate	Control	45.90	4.07	-4.75	0.04*
	Experimental	40.95	2.47		

*-$p < 0.05$ significant

Table 4 Comparison of mean physiological parameters between control and experimental groups at 3 minutes after vaccination

N=42

Physiological parameters (3 min after vaccination)	Groups	Mean	Standard deviation	't' test	'p' value
Heart rate	Control	122.3	16.3	.553	.540
	Experimental	125.0	14.9		
Oxygen saturation	Control	93.6	3.17	2.59	.334
	Experimental	96.0	2.75		
Respiratory rate	Control	41.24	3.68	-2.47	0.47
	Experimental	38.24	3.68		

DISCUSSION

The quantification of newborn pain still remains a challenge among the health care personnel.There is raise in need on concentration about neonatal pain,its assessment and management of acute pain produced due to painful procedures in clinical settings. A variety pain assessment approaches namely behavior observation, physiological technique have been used to accurately quantify neonates pain perception[8].

Acute episodic pain may lead to early neurologic injury while repeated and prolonged exposure to pain may alter of pain and routine assessment of pain and the use of specific non pharmacological and pharmacological interventions. NIPS is a behavioural measure of pain for neonates and the score may range from0 to 7.A higher score indicates grater pain behavior in the newborns[11]. The present study findings revealed that facilitated tucking position reduced the level of pain during and after vaccination among newborns. Other studies also reported similar results. Axelinetal reported that facilitated tucking during end tracheal suctioning markedly reduced pain among neonates. [12]Liawetalfound that facilitated tucking among neonates during heel stick procedure significantly lower the pain when compared to non-nutritive sucking and routine care.[13]Taye beetal reported that facilitated tucking during blood sample collection among neonates showed markedly less duration of cry and it was statistically significant[14]. Lopez etalrevealed that among a cohort of preterm infants with facilitated tucking facilitated tucking during venepuncture, the mean pain score [6.62+_2.60] was significantly lower than controlgroup[8.52+-2.99][15].

The present study adds one more piece of evidence that facilitated tucking is effective in reducing pain during hepatitis B vaccination among newborns. Hence this cost effective strategy should be included in the vaccination protocol to ensure pain reduction among newborns during hepatitis B vaccination.

Limitations

The limitation of the present study was that it was conducted only in one healthcare organization. Therefore, this study should be repeated in other healthcare settings with other samples.

Implications of the findings

This study helped to create an awareness among health care professionals to incorporate non- pharmacological methods to comfort newborns during painful procedures.

CONCLUSION: Providing tucking position to newborn prior to invasive procedure helps in managing pain. It can be used as a non-pharmacological method during a painful procedure as it is a simple, non-invasive and inexpensive intervention which makes the infant comfortable, more secure with the controlled response.

Conflict of Interest

None declared.

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