

A QUASI EXPERIMENTAL STUDY TO ASSESS THE EFFECT OF SWADDLING ON MANAGEMENT OF PAIN DURING HEEL PRICK AMONG NEONATES ADMITTED IN NICU AT G.G.S MEDICAL HOSPITAL, FARIDKOT.

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ABSTRACT

A quasi experimental study to assess the effect of swaddling on management of pain during heel prick among neonates. Study design used is quasi-experimental research design. Study setting includes NICU of G.G.S. Medical Hospital, Faridkot. Study population is 70 neonates who are delivered by lower segment cesarean section or normal vaginal delivery after 32 weeks of gestational age. Convenient sampling technique was used. PIPP-R pain scale was used to assess level of pain and Socio demographic data sheet to collect baseline information. Majority 20% of the neonates in the experimental group perceived mild-moderate pain and only 1.4% had moderate-severe pain during heel prick using swaddling at 30 seconds. 45.5% of neonates perceived no pain and 4.28% had minimum pain during heel prick using swaddling at 60 seconds. 30% of the neonates in the Conventional care group had mild-moderate pain, only 2.85% had minimum pain and no pain during heel prick using Conventional care at 30 seconds. 25.7% of neonates had mild-moderate pain and 12.8% had no pain during heel prick using Conventional care at 60 seconds. There is significant decrease in pain score in swaddling group as compared to Conventional care group with $p < 0.05$. There is significant difference in the pain score during heel prick with swaddling. This reduction in the pain results in judicious application of this intervention, backed by awareness and sensitivity to pain perception, on part of caregivers is likely to yield the best results.

KEY WORDS: Swaddling, Heel prick, Neonates.

INTRODUCTION

Pain is defined as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage”.¹ Neonates experience pain at least as similar as older children and has increased sensitivity with subsequent painful stimuli.

Pain is the physiological mechanism that protects the individual from a harmful stimulus and serves as a warning to tissue damage. Keeping the importance of pain assessment in mind, many health care institutions have even adopted pain as a “**fifth vital sign**”.²

The combined use of multiple interventions (non-pharmacological) may have additive or synergistic clinical effects in heel lance.

Non-pharmacological intervention to manage pain:-

- Use a pacifier with sucrose (concentration 12%-24%) given 2 minutes before the procedure to see the analgesic effect of sucrose in infants.³⁻⁵
- Use swaddling, containment or facilitated tucking.⁶⁻⁷
- Consider skin-to-skin contact with the mother.⁸

OBJECTIVES OF THE STUDY

1. To assess the level of pain during heel prick with swaddling in experimental group.
2. To assess the level of pain during heel prick in conventional care group.
3. To compare the level of pain during heel prick between experimental (swaddling) and conventional care group (control).

MATERIALS AND METHODS

Research approach & research design

A Quantitative research approach

Research setting

The study was conducted in NICU of Guru Gobind Singh Medical Hospital, Faridkot.

Study population

The target population for conducting research study consisted of all the newborn babies delivered by lower segment cesarean section or normal vaginal delivery after 32 weeks of gestational age admitted in NICU at G.G.S. Medical Hospital, Faridkot.

Sample & sampling technique

The study carried out on 70 newborns admitted in NICU at G.G.S Medical Hospital, Faridkot. Convenient Sampling Technique was used.

Research Tool

Research tool used for the study consists of 2 sections. Part A the socio-demographic profile of neonates. Part B consists of standardized tool PIPP-Revised scale to assess the level of pain.

INCLUSION CRITERIA FOR SAMPLING

1. Neonates undergoing a heel prick (blood sugar monitoring)
2. Neonates who are present at the time of study.
3. Neonates who's parent are willing to participate & have given written informed consent for the same.
4. Neonates born by lower segment cesarean section or normal vaginal delivery after 32 weeks of gestational age.

EXCLUSION CRITERIA FOR SAMPLING

1. Neonates who are critically ill not maintaining oxygen saturation, sedated, congenital anomaly grade, III or IV intra-ventricular hemorrhage, history of surgery and any tissue breakdown or inflammation of either heel.
2. Neonate who require more than one prick during one heel prick procedure
3. Neonate in whom the heel-prick procedure or any other painful procedure is repeated within 4hrs.

DATA ANALYSIS

Data analysis was done as per the objectives of the study. Statistical analysis was performed using SSP version 2.80 and SPSS version 20.0 software.

TABLE 4
Socio Demographic Characteristics of study subjects

Characteristic/ variable	Group I (Swaddling Technique) n=35	Group II (Conventional Care) n=35	Chi- square value (χ^2)	Df	p value
	Frequency (percentage) f (%)	Frequency (percentage) f (%)			
Age (in hours) <ul style="list-style-type: none"> • < 48 hours • 48- 96 hours • 97- 144 hours • 145- 192 hours • > 192 hours 	6 (17.1%) 9 (25.7%) 7 (20%) 3 (8.57%) 10 (28.5%)	8 (22.8%) 12 (34.2%) 5 (14.2%) 5 (14.2%) 5 (14.2%)	3.214	4	0.522
Gestational Age (in completed weeks) <ul style="list-style-type: none"> • 32-34 • 35-37 • >37 	8 (22.8%) 18 (51.4%) 9 (25.7%)	9 (25.7%) 16 (45.7%) 10 (28.5%)	0.2291	2	0.891
Gender <ul style="list-style-type: none"> • Male • Female 	19 (54.2%) 16 (45.7%)	25 (71.4%) 10 (28.5%)	2.202	1	0.137
Weight in grams <ul style="list-style-type: none"> • 1500-1999 • 2000-2499 • 2500-2999 • 3000 and above 	17 (48.5%) 9 (25.7%) 7 (20%) 2 (5.71%)	10(28.5%) 8 (22.8%) 13 (37.1%) 4 (11.4%)	4.340	3	0.226
Status of neonates before heel prick <ul style="list-style-type: none"> • Quiet sleep • Light sleep • Active 	23 (65.7%) 7 (20%) 5 (14.28%)	21 (60%) 5 (14.28%) 9 (25.7%)	1.567	2	0.456
Mother's education <ul style="list-style-type: none"> • Illiterate • Up-to primary • Up-to middle 	8 (22.8%) 6 (17.1%) 8 (22.8%)	11 (31.4%) 8 (22.8%) 4 (11.4%)	3.335	5	0.648

<ul style="list-style-type: none"> • Secondary • Senior secondary • Graduation and above 	<p>7 (20%)</p> <p>5 (14.2%)</p> <p>1 (2.85%)</p>	<p>4 (11.4%)</p> <p>6 (17.1%)</p> <p>2 (5.71%)</p>			
<p>Father's education</p> <ul style="list-style-type: none"> • Illiterate • Up-to primary • Up-to middle • Secondary • Senior secondary • Graduation and above 	<p>4 (11.4%)</p> <p>2 (5.71%)</p> <p>5 (14.2%)</p> <p>8 (22.8%)</p> <p>10 (28.5%)</p> <p>6 (17.1%)</p>	<p>2 (5.71%)</p> <p>1 (2.85%)</p> <p>6 (17.1%)</p> <p>8 (22.8%)</p> <p>14 (40%)</p> <p>4 (11.4%)</p>	2.157	5	0.826
<p>Mother's occupation</p> <ul style="list-style-type: none"> • Government service • Private service • Self employed/business • Laborer • Housewife 	<p>0 (0%)</p> <p>3 (8.57%)</p> <p>0 (0%)</p> <p>0 (0%)</p> <p>32 (91.4%)</p>	<p>1 (2.85%)</p> <p>5 (14.2%)</p> <p>0 (0%)</p> <p>0 (0%)</p> <p>29(82.8%)</p>	1.647	2	0.438
<p>Father's occupation</p> <ul style="list-style-type: none"> • Government service • Private service • Self employed/business • Laborer • Unemployed 	<p>3 (8.57%)</p> <p>14 (40%)</p> <p>3 (8.57%)</p> <p>15 (42.8%)</p> <p>0 (0%)</p>	<p>4 (11.4%)</p> <p>17 (48.5%)</p> <p>3 (8.57%)</p> <p>11 (31.4%)</p> <p>0 (0%)</p>	1.048	3	0.789

(Significant at $p < 0.05$)

Findings related to perceived level of pain in swaddling Technique group and Conventional care group

TABLE 2(a)

Distribution of study subjects according to the perceived level of pain in Swaddling group at 30 seconds

Pain Score (PIPP -R)	f (%)	Mean (SD)
0 (No pain)	7 (10%)	0(0)
<6(Minimum pain)	13 (18.5%)	4.92 (0.2774)
6-12 (Mild - Moderate pain)	14 (20 %)	8.14 (1.9945)
>12 (Moderate - Severe pain)	1 (1.4 %)	14 (0.000)

TABLE 2(b)

Distribution of study subjects according to the perceived level of pain in Swaddling Technique group at 60 seconds:-

N=35

Pain Score (PIPP -R)	f (%)	Mean (SD)
0 (No pain)	32 (45.5%)	0(0)
<6(Minimum pain)	3 (4.28%)	4.33 (1.1547)
6-12 (Mild - Moderate pain)	0	0(0)
>12 (Moderate - Severe pain)	0	0(0)

TABLE 2(c)

Distribution of study subjects according to the perceived level of pain in control group at 30 seconds:-

Pain Score (PIPP -R)	f (%)	Mean (SD)
0 (No pain)	2 (2.85%)	0(0)
<6(Minimum pain)	2 (2.85%)	4.5 (0.7071)
6-12 (Mild - Moderate pain)	21 (30%)	9.38 (2.0851)
>12 (Moderate - Severe pain)	10 (14.2%)	14.1 (0.5676)

TABLE 2(d)

Distribution of study subjects according to the perceived level of pain in control group at 60 seconds:-

Pain Score (PIPP -R)	f (%)	Mean (SD)
0 (No pain)	9 (12.8%)	0(0)
<6(Minimum pain)	6 (8.57%)	4.33 (1.2111)
6-12 (Mild - Moderate pain)	18 (25.7%)	8.33 (1.970)
>12 (Moderate - Severe pain)	2 (2.85%)	13.5 (0.7071)

Findings related to comparison of swaddling and Conventional care on perceived level of pain during heel prick.

TABLE 3(a)

Comparison of Swaddling group and Conventional Care group on the perceived level of pain during Heel prick at 30 seconds:-

Attribute under study	n	Mean ± SD	t value	df	p value
PAIN MEASURED BY PIPP-R SCALE					
• Swaddling Technique group	35	5.4857 ± 3.5922	4.9167	68	0.000006*
	35	9.9143 ± 3.9360			
• Conventional care group					

*Independent t-test is significant at p value < 0.05

TABLE 3(b)

Comparison of Swaddling Technique group and Conventional Care group on the perceived level of pain during Heel prick at 60 seconds

Attribute under study	n	Mean ± SD	t value	df	p value
PAIN MEASURED BY PIPP-R SCALE					
• Swaddling Technique group	35	0.3714 ± 1.2623	7.3303	68	0.0000000004*
• Conventional care group	35	5.8571 ± 4.2436			

*Independent t-test is significant at p value < 0.05

TABLE 3(c)

Comparison of Swaddling Technique group on the perceived level of pain during Heel prick at 30 and 60 seconds

Attribute under study	n	Mean \pm SD	Mean difference	SD difference	t value	df	p value
PAIN MEASURED BY PIPP-R SCALE							
• At 30 seconds	35	5.4857 \pm 3.5922	5.1142	3.2518	9.304	34	0.000 *
• At 60 seconds	35	0.3714 \pm 1.2623					

*Dependent t-test (2-tailed) is significant at p value < 0.05

TABLE 3(d)

Comparison of Conventional care group on the perceived level of pain during Heel prick at 30 and 60 seconds

N=70

Attribute under study	n	Mean \pm SD	Mean difference	SD difference	t value	df	p value
PAIN MEASURED BY PIPP-R SCALE							
• At 30 seconds	35	9.9143 \pm 3.9360	4.05714	2.62278	9.151	34	0.000*
• At 60 seconds	35	5.8571 \pm 4.2436					

*Dependent t-test (2-tailed) is significant at p value < 0.05

DISCUSSION

Discussion related to effectiveness of swaddling technique on perceived level of pain:- The present study depicts that there is less perception of pain during heel prick among neonates who were receiving swaddling as compared to who were receiving conventional or routine care. This might be due to the stimulation of larger sensory fibers from touch receptors in areas of pain leads to pain signals weakening, therefore, it can be suggested

that swaddling reduces pain by stimulating touch. One of the other effects of swaddling is warming the neonate. Heat increases blood flow and may reduce pain through excretion of metabolic materials which cause pain. Another way to reduce pain is muscle relaxation, and reduction of respiratory and heart rates. Swaddling may reduce pain by reducing the respiratory and heart rates. This finding is supported by a study conducted by **Shahin Dezhdar et al (2016)**⁹. This Study concluded that swaddling effectively reduces pain and improved pain management by stimulating touch through swaddling during heel prick.

According to the study conducted by **Ho LP et al (2016)**¹⁰ the mean Premature Infant Pain Profile (PIPP) scores were significantly reduced in the intervention group compared to the control group during, immediate, two, four, and six minutes after the heel stick procedure. The mean changes of heart rate and oxygen saturation in the intervention group were significantly lower than that of the control group at all measured time points. Their findings showed that swaddling was feasible and efficacious in controlling pain for heel stick procedure among preterm infants (30-37weeks). Findings of this study are consistent with the findings of present study among preterm infants (32-37 weeks). The mean pain intensity by PIPP-R scale was less in case of interventional group as compared to conventional care group. Thus, statistically significant differences came out between both groups.

Similarly, **Thakur Shivani et al (2015)**¹¹ investigated the effect of swaddling on pain and physiological parameters and there was significant difference found in pain and heart rate of the neonates with or without swaddling. Moderate correlation was found between pain and heart rate during heel lance. Findings of their study also support the findings revealed by the present study as there was significant difference found in pain of neonates with or without swaddling.

CONCLUSIONS

On the basis of the findings of the study, majority of the neonates perceived mild-moderate level of pain in swaddling as well as in conventional care group at 30 seconds.

On the other side, most of the neonates had no pain in swaddling group and only 9 of the study subjects had no pain during heel prick in conventional care group at 60 seconds.

There is significant reduction in the level of pain when swaddling was done during heel prick as compared to Conventional care or routine procedure at 30seconds as well as 60 seconds.

There was non-significant association on level of pain with any demographic variables of neonates. Hence, it is concluded that Swaddling was effective as a non pharmacological method of reduction/management of pain during heel prick. Hence, strategies should be planned so as to implement it in the clinical setting which leads to painless heel prick and a better and secured future for neonates. So there should be some more specific pain management strategies which effectively reduce heel prick associated pain in pre term and term infants in order to reduce the anxiety and distress of parents associated with procedural pain like heel prick.

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