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Effectiveness of Nesting on Posture, Movements and Physiological parameters among Preterm Babies in selected hospital, Cuddalore

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ABSTRACT
Preterm babies are considered to be the most vulnerable group for getting adjusted to the extra uterine environment. In the initial period of birth, transition phase exists during which the baby adjusts from the aquatic life to the external environment. As a result, the way in which the preterm baby is positioned during this period is very important and posture dictates the level of the child's wellbeing. Promoting good positioning and encouraging opportunities for flexion can prevent the problems like motor coordination, balance and posture difficulties. The correct positioning will help the baby to develop good posture and improve muscle control. A quantitative study was carried out in Selected Hospital Cuddalore, to assess the effectiveness of nesting on posture, movements and physiological parameters among preterm babies. Posttest with control group design was adopted for the study. Nesting procedure was done for seven days for four hours per day for experimental group babies. Routine care was received by the control group. Posttest was done for both groups on 3rd day and 7th day using IPAT tool, assessment of premature infant's behaviour scale and structured physiological parameters scale. The calculated student independent 't' test values for posture (t = 16.312), movements (t = 20.137), temperature (t = 8.956), respiratory rate (t = 2.835), heart rate (9.774) and SPO_2 (t= 8.585) on 7th day between experimental and control group showed that nesting was found to be effective in maintaining the normal posture, healthy movement and stable physiological parameters in the experimental group. There was a significant association found between posture and demographic variables of mothers with area of residence (χ^2=4.751, p=0.029), family history of preterm labour (χ^2=4.337, p=0.037) in experimental group and also between movements and demographic variables of mothers with family history of preterm labour (χ^2=4.337, p=0.037).There found to be a significant association between physiological parameters and demographic variables of babies like breast feeding practices (χ^2=16.966, p=0.009)in experimental group. Hence the study results concluded that nesting is an effective intervention to improve posture, movements and physiological parameters among preterm babies.
Keywords: *Nesting, Posture, Movements, Physiological Parameters, Preterm Babies.*

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INTRODUCTION

A newborn is a child below 28 days of age. Preterm birth is defined as all births before 37 completed weeks of pregnancy or lesser than 259 days. WHO classified preterm births into extreme preterm less than 28 completed weeks, very preterm 28 to less than 32 completed weeks, and moderate to late preterm 32 to less than 37 completed weeks [1].

The common risk factors for preterm birth are early pregnancy, low socio-economic status, multiple pregnancies, smoking, obesity and bad obstetrical history. In addition to this, maternal factors like nutritional level, psychological feature, sepsis, uterine shrinkage, cervix length and genetic factors are related to the risk of preterm deliveries. Preterm labor is contemplated as an intricate syndrome which is induced by various mechanisms such as infection, utero-placental ischemia, uterine over expansion, stress, and immunological reactions [2].

Prematurity has been identified as a major cause of under five deaths. Worldwide, 2.5 million children die each year. In India (2019) 15 million babies are born preterm every year. Many survivors of preterm face a lifetime disability, including learning disabilities and visual and hearing problems, neurodevelopmental

damage, gastrointestinal difficulty, cerebral palsy, sensory deficiency, learning disorder and respiratory disease.

Preterm neonates must undergo many adaptations after delivery to adjust to extra uterine life. One of the important adjustments is the need to rapidly increase body temperature and strive to accommodate to an environment colder than that of the prenatal environment. Keeping newborns warm, especially preterm infants, can be challenging [3]**.** Nesting procedure is a nursing expertise used frequently in the care of early neonates. Nesting is a method to help the newborn to maintain a position that promotes comfort, sleep and stable physiological parameters by minimizing the effect of environmental stimuli of Neonatal Intensive Care Unit [4]**.** Developmental supportive Positioning includes midline orientation, hand-to-mouth activity and fetal flexor patterns. All these principles are achieved through 'Nesting' [5].

A flexed, midline position without overextending the baby's head and neck is the recommended position for the newborn. Good posture, muscle control and stable physiological parameters of newborn babies can be achieved through correct positioning. Use of nesting will make the newborn feel secure and the physiological parameters of the newborn also will be stable. They are able to grasp their hands together and suck their fingers during nesting, and this makes them more comfortable. Newborn always need help to find a position in which they are able to be comfortable [6]**.** As nurses, we have the responsibility to maintain as much posture and movement as possible to maximize comfort for the baby and reduce further complications. Therefore, researchers feel it is necessary to provide new practices for premature infants, and improve their posture, movements and physiological parameters, and prevent greater hidden dangers. Therefore this study aims to evaluate the effectiveness of nesting on posture, movement, and physiological parameters

MATERIAL AND METHODS

Quantitative research approach was adopted for the present study in order to achieve the objectives of the study.The research design selected for the present study was quasi experimental posttest with control group design with the selected hospitals, Cuddalore.In this study, population includes all preterm babies (32-36.6 weeks).Sample for the present study are preterm babies at the gestational weeks between (32-36.6).The sample size of the study was 60 preterm babies of gestational weeks (32-36.6 weeks) and they divided into two groups (experimental and control group).Purposive sampling technique was used to select the samples for the present study.

The purpose and duration of study was explained to the parents. After obtaining the informed written consent, the baseline variables were collected.The study was conducted for a period of one month. Nesting was provided for four hours per day for seven days for each preterm in experimental group and no intervention, only routine care was given for control group. The post test 1 was done on third day and post test 2 was done on seventh day to assess the effectiveness of nesting by using IPAT tool, assessment of premature infant's behaviour scale and structured physiological parameters scale. Privacy during data collection procedure was maintained and also assured confidentiality regarding the information received. The collected data was compiled for data analysis.

RESULTS

Mean difference between experimental and control group (3rd day&7th day)

In post test 1(3rd day) the mean difference of posture was 2.77, movement was 4.1, and physiological parameters for temperature was 0.75, respiratory rate was 0.41, heart rate was 7.34 and SPO_2 was 1.41.In post test 2(7th day) the mean difference of posture was 5.06, movement was 5.94, and physiological parameters for temperature was 1.94,respiratory rate was 6,heart rate was 16.12 and spo2 was 2.71.

Table 1: Frequency and percentage distribution of demographic variables of preterm mothers in the experimental and control group. [N = 60(30+30)]

Demographic Variables	Experimental Group		Control Group		Chi-Square
	No.	%	No.	%	
Age of the mother					0.550 d.f=3 p=0.908 N.S
<20 years	3	10.0	3	10.0	
20 – 30 years	15	50.0	14	46.7	
31 – 40 years	10	33.3	12	40.0	
>40 years	2	6.7	1	3.3	
Family monthly income in (Rs.)					4.400 d.f=2 p=0.111 N.S
Below 5000	5	16.7	10	33.3	
5001 to 10000	19	63.3	11	36.7	
>10001	6	20.0	9	30.0	

Demographic Variables	Experimental Group		Control Group		Chi-Square
	No.	%	No.	%	
Religion					3.318 d.f=2 p=0.190 N.S
Hindu	25	83.3	19	63.3	
Muslim	3	10.0	5	16.7	
Christian	2	6.7	6	20.0	
Others	-	-	-	-	
Area of residence					0.000 d.f=1 p=1.000;N.S
Urban	11	36.7	11	36.7	
Rural	19	63.3	19	63.3	
Educational status of mother					1.167 d.f=3 p=0.761 N.S
Illiterate	11	36.7	13	43.4	
Primary level	10	33.3	10	33.3	
Secondary level	6	20.0	6	20.0	
Intermediate level	3	10.0	1	3.3	
Graduate and above	-	-	-	-	
Occupational status of mother					0.325 d.f=2 p=0.850 N.S
Government employee	-	-	-	-	
Private employee	-	-	-	-	
Daily wages	11	36.7	9	30.0	
Housewife	15	50.0	17	56.7	
Self employee	4	13.3	4	13.3	
Family history of preterm labour					0.317 d.f=1 p=0.573;N.S
Yes	8	26.7	10	33.3	
No	22	73.3	20	66.7	
Mode of delivery					0.000 d.f=1 p=1.000;N.S
Vaginal delivery	19	63.3	19	63.3	
Instrumental delivery	-	-	-	-	
Caesarean delivery	11	36.7	11	36.7	
Breast feeding initiationwithin anhour					**10.000 d.f=1 p=0.002;S****
Yes	24	80.0	12	40.0	
No	6	20.0	18	60.0	
Previous history of pregnancy					0.067 d.f=1 p=0.795;N.S
Primi mother	16	53.3	17	56.7	
Multi gravida	14	46.7	13	43.3	

The table 1 shows that in the experimental group, most of them 15(50%) were aged between 20 – 30 years, 19(63.3%) had family monthly income of Rs.5001 to 10000, 25(83.3%) were Hindus, 19(63.3%) were residing in rural area, 11(36.7%) were illiterates, 15(50%) were housewives, 22(73.3%) had no family history of preterm labour, 19(63.3%) had vaginal delivery, 24(80%) had initiated breast feeding within an hour, 16(53.3%) were primi mothers and in control group, most of them 14(46.7%) were aged between 20 – 30 years, 11(36.7%) had family monthly income of Rs.5001 to 10000, 19(33.3%) were Hindus, 19(63.3%) were residing in rural area, 13(43.4%) were illiterates, 17(56.7%) were housewives, 20(66.7%) had no family history of preterm labour, 19(63.3%) had vaginal delivery, 18(60%) had not initiated breast feeding within an hour, 17(56.7%) were primi mothers.

Table 2: Frequency and percentage distribution of demographic variables of preterm babies in the experimental and control group. N = 60(30+30)

Demographic Variables	Experimental Group		Control Group		Chi-Square
	No.	%	No.	%	
Age of baby					5.526 d.f=5 p=0.355 N.S
Day 1	6	20.0	7	23.3	
Day 2	6	20.0	8	26.7	
Day 3	10	33.3	9	30.0	
Day 4	5	16.7	4	13.3	
Day 5	3	10.0	0	0	
Day 6	0	0	2	6.7	
Day 7	-	-	-	-	
Sex of the baby					0.617 d.f=1
Male	16	53.3	19	63.3	

Demographic Variables	Experimental Group		Control Group		Chi-Square
	No.	%	No.	%	
Female	14	46.7	11	36.7	p=0.432;N.S
Birth weight of baby					4.148 d.f=2 p=0.126 N.S
<1 kg	6	20.0	1	3.3	
1 – 1.5 kg	11	36.7	12	40.0	
1.5 – 2.5 kg	13	43.3	17	56.7	
>2.5 kg	-	-	-	-	
Birth order of baby					**8.364 d.f=2 p=0.015 S***
First	16	53.3	17	56.7	
Second	14	46.7	7	23.3	
Third and above	0	0	6	20.0	
Gestational age of baby					0.606 d.f=1 p=0.436;N.S
32 – 34 weeks	18	60.0	15	50.0	
35 – 36.6 weeks	12	40.0	15	50.0	
Current breast feeding practices					0.887 d.f=3 p=0.829 N.S
Direct breast milk	7	23.3	9	30.0	
Expressed breast milk	9	30.0	6	20.0	
Spoon feeding	13	43.3	14	46.7	
Paladai feeding	-	-	-	-	
Nasogastric tube feeding	1	3.3	1	3.3	

**p<0.01, *p<0.05, S – Significant, N.S – Not Significant

In experimental group,10(33.3%) of babies were aged 3 days, 16(53.3%) babies were male, 13(43.3%) babies were weighing >2.5kg, 16(53.3%) were first born baby, 18(60%) babies had gestational age of 32 – 34 weeks, 13(43.3%) babies had spoon feeding.
In control group 9(30%) of babies were aged 3 days, 19(63.3%) babies were male, 17(56.7%) babies were weighing >2.5kg, 17(56.7%) were first born baby, 15(50%) babies had gestational age of 32 – 34, and 14(46.7%) babies had spoon feeding.

Table 3: Comparison of mean, standard deviation of posture, movements and physiological parameters among preterm babies in the experimental group.

Group	Variables	Post Test	Mean	S.D	Paired 't' Test	P value
Experimental Group	Infant posture	(3rd)	8.20	1.03	7.215	**0.0001*** S**
		(7th)	10.03	0.81		
	Movement	(3rd)	8.30	1.15	6.424	**0.0001*** S**
		(7th)	10.17	1.02		

Further with reference to table 3 on infant posture in the experimental group, the mean score on 3rd day was 8.20±1.03 and the mean score on 7th day was 10.03±0.81. The calculated paired't' test value of t = 7.215 was found to be statistically significant at p<0.001 level.
With respect to movement of the babies, the mean score on 3rd day was 8.30±1.15 and the mean score on 7th day was 10.17±1.02. The calculated paired't' test value of t = 6.424 was found to be statistically significant at p<0.001 level. The findings of the study was supported by study on the effectiveness of nesting on posture and movement in healthy preterm in Pravara Rural Hospital, Loni (Bk). There was a significant difference in the paired test between pre and post-test of posture and movement in t=4.87, p 0.001 and t=4.93, p 0.001 respectively.

Table 4: Comparison of mean, standard deviation of physiological parameters among preterm babies in the experimental group. N=30

Group	Variables	Post Test	Mean	S.D	Paired 't' Test	P value
Experimental group	Temperature	(3rd)	93.72	1.36	8.697	**0.0001***S**
		(7th)	96.43	1.04		
	Respiratory Rate	(3rd)	41.17	2.75	7.906	**0.0001***S**
		(7th)	48.82	5.34		
	Heart Rate	(3rd)	121.27	7.08	3.915	**0.0001***S**
		(7th)	130.15	8.17		
	SPO_2	(3rd)	93.12	1.42	11.885	**0.0001***S**
		(7th)	97.27	1.40		

***p≤0.001, S – Significant**

With reference to table 4, regarding physiological parameters, the mean value of temperature on 3rd day, was 93.72 with a standard deviation of 1.36 as compared to a mean value 96.43 with a standard deviation of 1.04 on 7th day. With respect to mean value of respiratory rate on 3rd day, was 41.17 with a standard deviation of 2.75 as compared to a mean value 48.82 with a standard deviation of 5.34 on 7th day. Considering the mean value of heart rate on 3rd day, was 121.27 with a standard deviation of 7.08 as compared to a mean value 130.15 with a standard deviation of 8.17 on 7th day. With regard to mean value of SPO_2 on 3rd day, was 93.12 with a standard deviation of 1.42 as compared to a mean value 97.27 with a standard deviation of 1.40 on 7th day. The calculated paired ''t test value for temperature (t = 5.737, p = 0.0001), respiratory rate (t = 7.906, p = 0.0001), heart rate (t = 3.915, p = 0.0001) and SPO_2 (t = 5.577, p=0.0001) was found to be statistically significant at p<0.001 level.

Table 5: Effectiveness of intervention on post test of posture, movements among preterm babies between experimental and control group. N = 60(30+30)

Variables	Post Test	Experimental		Control		Independent 't' Test	P value
		Mean	S.D	Mean	S.D		
Infant posture	(3rd)	8.20	1.03	5.43	1.19	9.606	**0.0001*** **
	(7th)	10.03	0.81	4.97	1.49	16.312	**0.0001*** **
Movement	(3rd)	8.30	1.15	4.20	1.13	13.955	**0.0001*** **
	(7th)	10.17	1.02	4.23	1.25	20.137	**0.0001*** **

*****p≤0.001, S – Significant**

Table 5 shows that the calculated student independent't' test values for infant posture, movement on 3rd and 7th day between experimental and control group was found to be effective in maintaining the normal posture, movement in the experimental group than the preterm babies in the control group.The findings of the study was supported on the effect of applying the nesting technique as a developmental care on physiological functioning and neurobehavioral organization of premature infants in Egypt[8]. There was a significant difference between the study and control group in sleeping, temperature, oxygen saturation, motor activity, infant crying, and primitive reflexes. The study concluded that the nesting method had a potential outcome among premature infants on physiological performance and neurobehavioral structures.

Table 6: Effectiveness of intervention on posttest of physiological parameters among preterm babies between experimental and control group.N=60 (30+30)

Variables	Post Test	Experimental		Control		Independent 't' Test	P value
		Mean	S.D	Mean	S.D		
Temperature	(3rd)	93.72	1.36	94.47	0.58	2.751	**0.009**S**
	(7th)	96.43	1.04	94.49	0.57	8.956	**0.0001 *** S**
Respiratory Rate	(3rd)	41.17	2.75	41.58	10.85	0.204	0.840 NS
	(7th)	48.82	5.34	42.82	10.29	2.835	**0.007**S**
Heart Rate	(3rd)	121.27	7.08	113.93	3.90	4.971	**0.004**S**
	(7th)	130.15	8.17	114.03	3.85	9.774	**0.0001*** S**
SPO_2	(3rd)	93.12	1.42	94.53	1.06	4.339	**0.0001*** S**
	(7th)	97.27	1.40	94.56	1.01	8.585	**0.0001*** S**

****p≤0.01, ***p≤0.001, S – Significant, NS – Not Significant**

Table 6 shows that the calculated student independent't' test values for physiological parameters on 3rd and 7th day between experimental and control group was found to be effective in maintaining the stable physiological parameters than the preterm babies in the control group.

Experimental group:

Area of residence (χ^2=4.751, p=0.029), Family history of preterm labour (χ^2=4.337, p=0.037) and current breastfeeding practice (χ^2=8.008, p=0.046) had shown statistically significant association with level of posttest (7th day) posture scores among preterm infants in the experimental group at p<0.05 level.The demographic variable of family history of preterm labour(χ^2=4.337, p=0.037) had shown statistically significant association with level of posttest (7th day) movement scores among preterm infants in the experimental group at p<0.05 level. The present study findings is contradicted in their study found that posture of preterm babies was not associated with their selected personal variable viz age, gender, mode of delivery, weight of baby[9].

Demographic variable of mother's educational status (χ^2=9.310, p=0.025) current breastfeeding practice (χ^2=16.966, p=0.009) had shown statistically significant association on 7th day with heart rate at p<0.01 level.

Control group:
Statistically significant association was established with level of post test (7th day) physiological parameters scores with family monthly income (χ^2=6.111, p=0.047) family history of preterm labour (χ^2=6.992, p=0.030) and respiratory status at p<0.05 level**.**

DISCUSSION

Nesting positioning plays a major role in maintaining a beneficial position where the babies feel more secure and are more physiologically stable [7].The aim of the study was to assess the effectiveness of nesting technique on posture, movements and physiological parameters among the preterm babies. The study findings indicate that nesting is effective in improving the body posture, movements and physiological parameters of preterm babies in NICU.

Ponnambalam Sumathy [8] conducted a quasi-experimental one-group pre-and post-test design study on the Effectiveness of the Nesting Technique on Posture and Physiological Parameters among preterm and low birth weight babies in Puducherry. The study concluded that nesting technique aids maintain important parameters and posture continuance among preterm and low birth weight babies.

Jagadeeswari and Swathi [9] performed a quantitative quasi-experimental research design study on the Effectiveness of Nesting on Posture Comfort among Low Birth Weight Babies (LBWB) in Neonatal Intensive Care Unit in Chennai, Tamil Nadu. The study concluded that nesting is an efficacious and stable technique to ameliorate posture comfort sustains important signs and aids in the growth of LBWB .

Maher and Elarousy [10] conducted an Experimental design study on the Effect of Nested and Swaddled Prone Positioning on Sleep and Physiological Parameters of Low Birth Weight Neonates in Alexandria. The study concluded that nested positions ameliorate the sleep and physiological parameters.

SavitaIngale., *et al*.[11]conducted an experimental study on the effectiveness of nesting on posture and movement in healthy preterm in Pravara Rural Hospital, Loni (Bk)(11).The study concluded that intervention is efficacious to ameliorate posture and movements.

Prasanna and Radhika [12] examined a quasi-experimental-nonequivalent control group design on Effectiveness of Nesting on Posture and Motor Performance among Newborn babies in Nellore, Andra Pradesh. The study concluded that nesting is an efficient intervention in conserving good posture and motor activity among newborn babies.

Neethu C Joseph [13] studied A quasi experimental study was done to assess the effectiveness of nesting on posture and movement among preterm babies in selected hospitals, Mysore. Therefore, the study concluded that the nesting was an effective method to maintain posture and movement in preterm babies.

Poulose., *et al* [14] conducted an experimental study on the Effectiveness of Nesting on Posture Discomfort and Physiological Parameters of Low Birth Weight Infants in Delhi. The study concluded that nesting is effective in improving posture, reduce discomfort and stabilize physiological parameters.

CONCLUSION

Nesting is one of the measures to keep the babies comfortable. Therefore, from the data analysis and the results, it can be concluded that nesting is an effective intervention to improve posture, movements and physiological parameters of premature babies.

CONFLICT OF INTEREST

No conflict of interest.

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