Effect of Nesting on Posture Discomfort and Physiological Parameters of Low Birth Weight Infants

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Abstract: *A study was conducted to determine the effectiveness of "nesting" among low birth weight infants in NICU of selected government hospital of Delhi. An experimental study was conducted in which low birth weight infants (birth weight 1.00-2.5kg) were stratified into three groups based on their birth weight (1.0-1.5kg, 1.5-2.0kg, 2.0-2.5kg). The samples consisted of 60 low birth weight infants; 30 in experimental group and 30 in control group. Pre-test Post-test control group design was used in which nesting was provided in experimental group 9 hours per day for 5 days. Posture, comfort and physiological parameters were assessed before and during administration of nesting. A significant improvement in posture (t=12.64) was observed in experimental group during application of nesting. A significant reduction in the discomfort was observed in experimental group as compared to control group (t=10.65).Low birth weight infants exhibit comparatively stable physiological parameters during the period of nesting.*

Keywords:
Discomfort: *It refers to the discomfort of low birth weight infants as evident from neonatal comfort scale,*
Low Birth Weight Infants: *Infants who are admitted in NICU of selected hospital in Delhi with a birth weight between 1.0 kg and 2.5 kg.*
Nesting: *is an intervention which is aimed at ensuring comfortable flexed position to the new-borns by providing an oval shaped boundary or an enclosure using a rolled bed sheet, around the immediate physical environment of the neonate,*
Physiological Parameters: *Axillary temperature, heart rate, and respiration of the LBW infants,*
Posture: *a position or alignment of various parts of the body in relation to one another for minimum of 10 seconds of LBW infants.*

I. Introduction

Due to the developments in medical technology, the survival rate of premature and low birth weight infants has been markedly improved, an increased risk for later poor developmental outcomes remains. Nursing and medical research have raised the public's awareness of the extreme physiological and neurobehavioral stress experienced by premature infants. This research based knowledge has initiated changes in caregiving and the rudimentary life support environments created for these Extreme Low Birth Weight infants. Intuitively and conceptually, caregivers now strive to achieve stress reduction through minimal intervention, and provision of a protective environment that will promote physiological stability.

Objectives
The objectives of the study were
1. Assess and evaluate the posture of low birth weight infants before and during administration of nesting.
2. Assess and evaluate the discomfort level of low birth weight infants before and during administration of nesting.
3. Assess and evaluate the physiological parameters of low birth weight infants before and during administration of nesting in terms of Heart rate, Respiratory rate and Temperature.

Conceptual Framework
The conceptual frame work adopted for the study was based on Katherine Kolkaba's Nursing Theory of Comfort (2002).

II. Review Of Literature

Ferrari, F. (2007)[1] conducted an experimental study to evaluate the Posture and movement in healthy preterm infants in supine position in and outside the nest. 10 healthy preterm infants underwent serial video recording each lasting an hour, in the supine position, when lying in a nest and outside it.The effect in the nest or outside

the nest—was evaluated using the non-parametric Wilcoxon's signed rank test and p value <0.05 was considered to be statistically significant. The findings show that nest promotes a flexed posture of the limbs with adduction of shoulders, facilitates elegant wrist movements and movements towards and across the midline and reduces abrupt movements and frozen postures of the arms and legs.

Comaru, T.(2009)[2]conducted a study to determine the effects of a postural support protocol on the physiological and behavioural stability of preterm infants while undergoing a diaper change. All babies displayed increased distress and pain scores during diaper changes. This was significantly less for babies nested compared with non-nested babies (P<0.0001).I was concluded that Diaper change is a distressing procedure for preterm infants. Providing postural support during diaper changes reduces the signs of distress and pain.

Slevin , M.(1997)[3] Conducted a prospective study to evaluate the degree of distress caused by retinopathy of prematurity (ROP) screening in a cohort of preterm infants was assessed and the modifying effects of nesting in reducing their discomfort was evaluated. The distress caused by ROP screening was significantly less for the nested group compared with the non-nested group for both movement activity (p<0.01) and crying (p<0.01). ROP screening is distressing for preterm infants. Nesting can significantly reduce this discomfort.

Kihara, H.et al.(2013)[4] observed the effect of nested and swaddled positioning support in the prone position on heart rate, sleep distribution, and behavior state of very low birth weight infants (VLBWI). A total of 20 VLBWI who were born at a gestational age of 26.5 ± 4 weeks with a birth weight of 709 ± 207 g were studied at an average gestational age of 37.4 ± 0.6 weeks and a weight of 1590 ± 337 g. The study concluded that a prone position with nested and swaddled positioning support might facilitate sleep and heart rate stability compared to prone positioning alone in VLBWI.

III. Methodology

Research Design
True Experimental design was chosen consisting of Pre-test Post- test control group with repeated follow ups.

Setting
The research setting selected for the study was NICU of Safdarjung Hospital ,New Delhi.

Population
The population comprised of the low birth weight infants who are admitted in NICU of government hospitals in Delhi

Sample Size
A total number of 60 Low birth weight infants (30 in experimental & 30 in control group) were selected.

Sampling Technique
In the present study **stratified random sampling** was used for selecting the subjects
Criteria for Sample Selection
1) Low birth weight infants who are admitted in NICU of the selected hospital of Delhi.
2) Neonates whose birth weight is between 1.0 kg and 2.5 kg
3) Neonates who are not diagnosed with any medical or surgical illness.
4) Neonates whose age is <7days
5) LBW infants whose parents/guardians are willing to include their baby in the study.

Description of the Tool:
Part I: Structured Interview Schedule for demographic data
Part-II: Observation Checklist to assess posture of low birth weight infants
Part-III: Neonatal Comfort Scale to assess Discomfort level of low birth weight infants
Part –IV: Structured Observation Schedule for physiological parameters.

IV. Data Collection

Data collection was done from 13th December 2013 to 4th January 2014 at NICU of Safdarjunghospital,Newdelhi. The samples were selected by stratified random sampling. The low birth weight infants who met the sampling criteria were divided into three strata based on their birth weight. The three strata based on birth weight were 1.0-1.5kg,1.6-2.0kg and 2.1-2.5kg.The low birth weight infants in each strata were randomly selected by lottery method and were assigned to experimental and control group by odd even method.

Pre-test was conducted for both experimental and control group. Demographic data was collected using structured interview schedule. Posture, discomfort and physiological parameters were assessed using the respective tools. Nesting was done for the subjects in the experimental group. Post-test was done after 3 hours of intervention. This was repeated for 5 consecutive days and the scores were recorded.

V. Findings of the study

Low birth weight infants under study were more (61.7%) in the age group of < 1 day of life (63.3% in experimental group, and 60 % in the control group).Majority of low birth weight infants (80%) belongs to low income group families. Low birth weight infants under study were more in the gestational age group of 34-36 weeks .i.e.40 %. The birth weight infants under study were more in the group of 2-2.5kg .i.e.40 %, (40% both in experimental and control group). More than half of low birth weight infants (63.3%) received formula feed(70% in experimental group and 56.7% in control group) . More ore than half of low birth weight infants had maternal haemoglobin 8-10 gm/dl at the time of delivery (56.7% in experimental and 66.7% in control group).

Table-1 Mean, mean difference, standard deviation, standard error of mean difference and "t" value of pre-test and post-test posture scores of low birth weight infants in experimental group

N=60

Group	Posture	Mean	M_d	$S.D_D$	SE_{MD}	't'value
Experimental group	Pre-test	15.93	4.59	1.97	0.36	12.64*
	Post test	20.52				

't'(29)=2.04,p<0.05,significant at 0.05 level of significance

The data presented in the Table 1, shows that mean post-test posture score of low birth weight infants in the experimental group (20.52) is significantly higher than the mean pre-test posture scores (15.93) with "t" value 12.64 at 0.05level of significance. Thus there was significant difference in posture scores of low birth weight infants in the experimental group before and during administration of nesting.

Table-2 Mean, Mean Difference, Standard Deviation, Standard Error of Mean Difference and "t" Value of Post-Test Posture Scores of Low Birth Weight Infants in Experimental and Control Group

N=60

Group	Mean	M_d	S.D	SE_{MD}	't'value
Experimental group	20.52	3.77	1.62	0.42	8.54*
Control group	16.75				

't'(58)=2,p>0.05;Not Significant; at 0.05 level of significance.

The data presented in the Table-2 shows that mean post-test posture scores of experimental group (20.52) is significantly higher than the mean post-test scores of control group (16.75) with the 't' value 8.54 at 0.05 level of significance. This shows that the experimental and control group differed markedly in terms of their posture before and during the administration of nesting.

Table-3 Mean, Mean Difference, Standard Deviation, Standard Error of Mean Difference And "t" Value of Pre-Test And Post-Test Discomfort Scores of Low Birth Weight Infants In Experimental Group.

N=60

Group	Discomfort	Mean	M_d	$S.D_D$	SE_{MD}	't'value
Experimental group	Pre-test	15.9	3.43	2.13	0.39	8.76*
	Post test	12.47				

't'(29)=2.04,p<0.05,significant at 0.05 level of significance

The data presented in the Table 3, shows that mean post-test discomfort score of low birth weight infants in the experimental group (12.47) is significantly lower than the mean pre-test discomfort scores (15.9) with the "t" value 8.76 at 0.05level of significance. Thus there was significant difference in discomfort scores of low birth weight infants in the experimental group before and during administration of nesting.

Table-4 Mean, Mean Difference, Standard Deviation, Standard Error of Mean Difference and "t" Value of Post-Test Discomfort Scores of Low Birth Weight Infants in Experimental and Control Group

N=60

Group	Mean	M_d	S.D	SE_{MD}	't'value
POST TEST Experimental group Control group	12.47	3.0	1.18	0.28	10.65*

	15.47				

t'(58)=2,p>0.05;NS at 0.05 level of significance.

The data presented in the Table-4 shows that mean post-test discomfort scores of experimental group (12.47) is significantly lower than the mean post-test scores of control group (15.47) with the 't' value 10.65 at 0.05 level of significance. This shows that the experimental and control group differed markedly in terms of their discomfort before and during the administration of nesting.

Table-5 A Repeated Measure analysis of Variance (ANOVA) on Mean , SD of changes in Heart Rate and Respiratory rate of low birth weight infants at different time points in experimental group.

N=30

Physiological parameters	Post test Day 1 Mean ±SD	Post test Day 2 Mean ±SD	Post test Day 3 Mean ±SD	Post test Day 4 Mean ±SD	Post test Day 5 Mean ±SD	Df	F	P
Heart rate	140 ± 12.86	140.67 ±12.56	141.8 ± 12.41	141.67 ± 12.69	140.07 ± 12.63	4	1.70	0.16 [NS]
Respiratory rate	53.47 ±8.66	53.73 ± 8.32	52.67 ±6.74	52.93± 7.93	52.66 ±8.28	4	1.25	.29 [NS]

*P Value significant at 0.05 level

The data presented in Table 5 shows that low birth weight infants experienced stable physiological parameters during the period of nesting in experimental group in terms of heart rate and respiratory rate. The temperatures of low birth weight infants were found to be stable both in experimental and control group irrespective of intervention.

VI. Discussion

The study shows that Nesting was effective in improving the posture of low birth weight infants in early neonatal period. This finding of the study was consistent with the study conducted by **F Ferrari (2007)**[1] aimed to evaluate the Posture and movement in healthy preterm infants in supine position in and outside the nest. The researcher reported that a nest promotes a flexed posture of the limbs with adduction of shoulders, facilitates elegant wrist movements and movements towards and across the midline and reduces abrupt movements and frozen postures of the arms and legs.

Findings of the present study revealed thatNesting was effective in reducing the discomfort of low birth weight infants during their stay in NICU. This finding was consistent with findings of the study conducted by **Comaru, T**. (2008)[2],to determine the effectiveness of Postural support on distress and pain during diaper change in preterm infants. It was found that all babies displayed increased distress and pain scores during diaper change and this was significantly less for babies nested compared with non-nested babies.

Findings of the present study revealed that low birth weight infants in experimental group experience stable Physiological parameters in terms of heart rate and respiration during the stay in NICU. This was consistent with the findings of the study conducted by **Kihara H, Nakamura T(2013)**[4]**,** in which they observed the effect of nested and swaddled positioning support in the prone position on heart rate, sleep distribution, and behaviour state in very low birth weight infants (VLBWI).The study concluded that, a prone position with nested and swaddled positioning support might facilitate sleep and heart rate stability compared to prone positioning alone in VLBWI.

VII. Conclusion

This is a true experimental study, conducted among 60 low birth weight infants in NICU of selected government hospital in Delhi. The study proved that Nesting is effective in improving the posture, comfort and stable physiological parameters of low birth weight infants during their stay in NICU. Some of the limitations identified in the study were as follows;the intervention of Nesting was given for a small time period due to time boundaries of the study. The sample size was limited. There could be no blinding because the infants when in the intervention group had nesting that was evident to the evaluator.

Nurses are central in hospital efforts to improve quality care. Comforting interventions in the field of nursing care will contribute to high patient satisfaction and eventually will lead to institutional development.Nursing curriculum also should be equipped with the recent advances in new born care and students should also be trained to provide developmental care in an NICU setting.Nurse administrators should provide and recommend the interventions like Nesting in the setting like NICU of the hospital.

References

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