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A pre-experimental study to assess the effectiveness of nesting on physiological parameters and posture of preterm babies in selected hospital Bilaspur (C.G.)

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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, physiological parameter 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 muscles control. "A pre-experimental study to assess the effectiveness of nesting on physiological parameters and posture of preterm babies in selected hospital Bilaspur (C.G.)." "study was undertaken as a partial fulfillment of requirement for the degree of master of science in Child Health Nursing. It was done by Miss Roshani Sahu from Pt. Deendayal Upadhyay memorial health science and Ayush university of Chhattisgarh, Raipur Chhattisgarh.

Keywords: Nesting technique, posture, physiological parameter, low birth weight babies

Introduction

According to the World Health Organization (WHO), every year about 15 million babies are born prematurely globally, which is more than one in ten of all babies. Due to complications of preterm birth, approximately 1 million children die annually. Preterm birth is the leading cause of newborn deaths all over the world. In 2013, as many as 22 million newborns an estimated 16% of babies born globally were low. Birth weight (LBW), according to UNICEF South Asia had the highest incidence, with 28% newborns weighing less than 2.5 kilograms India had the third-highest percentage of LBW newborns [2]. Preterm babies are the most vulnerable group. After birth, the first few months, act as a transitory period during which baby has no adjust to the new environment. Hence the position of the babies

throughout this time is very important.

Krishnaja M Unnikrishnan, Aneesha VB (2024) – "A study to determine the effect of nesting on physiological parameters among preterm babies admitted to Neonatal intensive care unit (NICU) of Amala Institute of Medical Sciences, Thrissur, Kerala."

Objectives: are to analyze the physiological parameters among preterm babies, determine the effect of nesting on physiological parameters among preterm babies, and also to find the association between physiological parameters with baseline variables.

Method: The research approach is quantitative approach and the research design is crossover design. The study is

based on Ludwig Von Bertalanffy, general system model. Twenty preterm babies were selected by purposive sampling technique. Samples were randomly allocated for nesting and routine care. Tools used were a structured questionnaire to determine the baseline variables and a physiological parameter datasheet to record physiological parameters after nesting and routine care.

Result: The calculated t-value and p-value of heart rate are 0.26 and 0.797 respectively, respiratory rate is 0.163 and 0.109, temperature is 0.113 and 0.910 and oxygen saturation is 2.74 and 0.009 respectively after nesting and routine care. Hence there-value of oxygen saturation is statistically highly significant at 0.05 level irrespective of other physiological parameters that are maintained stable and showed differences but statistically not significant after nesting and routine care. The heart rate and respiratory rate were decreased, mean body temperature was increased but statistically not significant after nesting as compared to routine care. The study findings reveal that nesting is beneficial in sustaining stable physiological parameters among preterm babies.

Background

Preterm babies, born before 37 weeks of gestation, often experience challenges in maintaining physiological stability and adopting a flexed posture due to immature neuromuscular and physiological systems. In the Neonatal Intensive Care Unit (NICU), these infants are exposed to bright lights, noise, and frequent handling, which can disturb sleep, cause stress, and lead to instability in vital parameters such as heart rate, respiration, and oxygen saturation. Hence, providing a developmentally supportive environment is crucial to promote physiological and postural stability.

Nesting is a simple, non-pharmacological intervention designed to simulate the intrauterine environment by providing soft boundaries around the infant using rolled towels or cloths. This creates a "nestlike" space that supports flexed and midline posture, self-regulation, and comfort.

Nesting positions are supporting techniques that help preterm neonates in the NICU to correct their posture, which may have an impact on their general health.

Preterm babies have poor muscle tone leading to abnormal tone and consequent delay in motor development. The flexed posture reduces the surface area exposed to the environment, minimizing heat loss which prevents enormous weight loss. It also affects neuro-behavioral development. Stable physiological parameters such as heart rate, respiratory rate and oxygen saturation are the indicators of good health and reflect the maturation of the central nervous system.

Good posture can help to improve the circulation and digestion, enhance sleep and prevent cramping. It also enhances the quality of life and muscle control, physiological functioning and reduces stress. Many factors may combine to cause early birth. The causes of preterm babies are associated with maternal factors malnutrition, hypertension, multiple pregnancies, polyhydramnios, placenta previa or, diabetes, with behavioral and environmental factors smoking, alcohol, domestic violence,

stress, lack of social support. Fetal factors associated with prematurity are chromosomal abnormality, fetoplacental unit dysfunction, congenital anomalies and unknown factors. Due to immaturity, they often lack adequate muscle tone and are at the risk of developing an abnormal posture.

A posture or alignment of various body parts in relation to one another as midline head position, neck slightly flexed forward, hands flexed and able to touch the face, rounded shoulders, hips, knees, ankle and feet aligned and softly flexed. Nesting is one of the methods that help maintain position, promote comfort and provide physiological, behavioral and postural stability to the premature babies.

During clinical exposure, the investigator observed that many preterm babies experienced difficulty in maintaining posture and physiological parameters. Since early intervention can improve posture and physiological parameters, the investigator felt the need to assess the effectiveness of nesting on physiological parameters and posture of preterm babies in selected hospital Bilaspur (C.G.).

Ethical considerations

Ethical clearance was obtained from the institutional ethical committee of Government College of Nursing Bilaspur (C. G.). Each individual was informed about the purpose of the study and confidentiality was promised and ensured. The client has the freedom to leave the study at their wish without assigning any reason. Thus, the ethical issues were ensured in this study.

Specific Objective

1. To assess the physiological parameters and posture of preterm babies before giving nesting.
2. To apply nesting on preterm babies.
3. To determine the effectiveness of nesting technique on preterm babies.
4. To find out the association between post-test score the physiological parameter and posture with their selected sociodemographic variables of preterm babies.

Hypothesis

H₁: There will be significant difference between the pre-test and post-test score of physiological parameter and posture of preterm babies.

H₂: There will be significant association between the physiological parameter and posture of babies with demographic variables.

Methodology

Research Approach: A Quantitative research approach was adopted for the present study.

Research Design: A quantitative pre-experimental pre-test and post-test control group design was adopted to evaluate the posture and physiological parameter of preterm babies. Setting of the study a study was conducted in the Chhattisgarh institute of medical science (CIMS) Bilaspur (C.G.).

Population

The target population considered of pre-term babies admitted to Chhattisgarh institute of medical science (CIMS) Bilaspur (C.G.).

Sample and sampling technique

A total 60 pre-term babies selected using Non - probability purposive sampling technique.

Inclusion Criteria

- New born baby below 2.5 kg (low birth weight).
- Neonates whose APGAR score is not less than 7.
- Neonates who were not on CPAP or ventilator and not diagnosed with severe medical and surgical conditions.

Exclusion Criteria

- New born baby above 2.5 kg.
- Neonates whose APGAR score is more than 7.

Variable of the study: Dependent variable Nesting technique.

Independent Variable

Posture and physiological parameters of pre-term babies.

Extraneous variables

It includes age in days, gender, gestation age in week, weight at birth, family history of pre-term labour, primipara of mother parity, method of delivery, breast feeding initiation, bad habit of mother, birth order of baby, current breast - feeding practice, feeding pattern, hospitalization in days.

Tool for data collection Section A: Demographic variables

It includes age in days, gender, gestation age in week,

weight at birth, family history of pre-term labour, primipara of mother parity, method of delivery, breast feeding initiation, bad habit of mother, birth order of baby, current breast - feeding practice, feeding pattern, hospitalization in days.

Section B: (a) Infant positioning assessment tool

The infant positioning assessment tool used to assess the positioning of the pre-term babies each condition scored as:

Table 1: Infant positioning assessment tool

Response	Score
Ideal cumulative score	12
Acceptable cumulative score	9 - 11
Need for reposition	≤ 8

Indicator	0	1	2	Score
Head	Head rotated laterally (L or R) > 45° from midline	Head rotated laterally (L or R) 30° - 45° from midline	Head aligned (L or R) 0° - 30° from midline	
Neck	Neck in hyperextension or hyperflexion	Neck neutral	Neck neutral, aligned, head slightly flexed forward 10°	
Shoulders	Shoulders retracted	Shoulders aligned, flat to surface	Shoulders rounded forward towards midline	
Hands	Hands away from body	Hands touching torso	Hands touching face	
Hips/pelvis	Hips/pelvis abducted, externally rotated	Hips/pelvis aligned but extended	Hips/pelvis aligned and softly flexed	
Knees/ankles/feet	Knees extended, ankles and feet externally rotated	Knees, ankles, feet aligned but extended	Knees, ankles, feet aligned and softly flexed	
12 = Ideal cumulative score, 9 - 11 = acceptable cumulative score, ≤ 8 = need for repositioning. Total cumulative score				

Table 2: Modified sick neonatal score

Parameter	(0) Normal	(1) Monitor	(2) Alert	(3) Emergency	Total
Heart rate	120 – 160 Beat/min	100 - 119 Beat/min	80 - 99 Beat/min	< 80 Beat/min	
Respiration rate	30 – 60 Breath/min	20 – 29 Breath/min	35 – 35.9 Breath/min	< 10 Breath/min	
Temperature	36.5 – 37.5 Degree/Celsius	36 – 36.4 Degree/Celsius	35 – 35.9 Degree/Celsius	< 35 Degree/Celsius	
SPO2	>94	90 - 94	85 - 89	< 85	
BP	60 – 80 mm/hg	50 – 59 mm/hg	40 -49 mm/hg	< 80 mm/hg	

A 6 items rating scale was used to assess the physiological parameters of pre – term babies each items was scored as:

Table 3: Items rating scale was used to assess the physiological parameters

Response	Score
Normal / stable	0 – 5
Monitor	6 – 10
Alert	11 – 15
Emergency	>15

Data Collection Procedure

Formal administrative permission was obtained from the hospital authorized prior to data collection. Pre – test assessment of posture and physiological parameters using infant positioning assessment tool and modified sick neonatal score scale. After pre-test provide intervention. Post – test was conducted after completion of the intervention.

Plan for data analysis

The demographic data were analyzed by using descriptive measures (Frequency and percentage). Reduce the instability of physiological parameter and posture was analyze by using descriptive measures (Mean and SD). Effectiveness of nesting was analyzed by using paired "t" test. The association between nesting with their selective demographic variables among pre-term babies was analyzed by using inferential statistics (chi square- F2 test)

Report writing

The finding of the study were organized, analyzed, interpreted, and presented in the form of the table, figures, graphs, followed by discussion, conclusion and recommendations.

Ponnambalam Sumathy (2020) [2] – “Effectiveness of nesting technique on posture and physiological parameter.” According to World Health Organization (WHO), every year about 15 million babies are born prematurely around

the world and that is more than 1 in 10 of all babies born worldwide. The NICU environment may interfere with the maturation and organization of preterm of the study was to determine the effectiveness of Nesting Technique on Posture and Physiological Parameters among preterm and low birth weight babies. Materials and methods: The study was quasi experimental one group pre- and posttest design: A total of 40 preterm and low birth weight babies were selected by purposive sampling technique. The tool comprised demographic data observation checklist for posture and structured observational checklist for physiological parameter. The babies were placed in the nest for 6 hours dally for 5 days. Data analysts Was done using mean, percentage, standard deviation and ANOVA. Results: Most of the mothers [22 (55%)] were in the age group between 25 years and 30 years. With regard to the age of the baby, 11 (27.5%) were 4 days old. With regard to the weight, 37 (92.5%) of the babies had their w eight between 1.5 kg and 2.0 kg. The mean score of pasture and physiological parameters that is temperature, heart rate, respiratory rate, and oxygen saturation revealed that the low birth weight and preterm babies experienced stable posture and physiological parameters during the period of nesting, which was highly statistically significant at the $p < 0.001$ level.

Discussion

Comparison of pre-test and post-test score through mean, mean % and SD.

The study that the posture and physiological parameters score were improved after implementation of nesting technique among pre-term babies.

The nesting technique activities helped pre-term babies to improve their posture and physiological parameter during hospitalization. Overall findings revealed that nesting techniques were effective in improving posture and physiological parameters among pre-term babies.

Results: Depicts that nesting techniques had significant effectiveness in improving posture and physiological parameters among pre-term babies. The intervention was found to be simple, cost-effective, and beneficial for improving condition among pre-term babies in selected hospital Bilaspur, Chhattisgarh.

Conclusion

Paired 't' test was used for assessing the significant difference between pre-test and post-test scores of posture and physiological parameter among pre-term babies. Chi-square test was used to find the association between pre-test level of posture and physiological parameter with selected socio demographic variables.

The findings of the paired t-test revealed that the experimental group showed highly significant improvement in posture and physiological parameter after the intervention. The calculated t-value was higher than the table value at 0.05 level of significance, indicating a significant difference between pre-test and post-test scores. Therefore, the null hypothesis (H_0) was rejected, and it was concluded that nesting technique were effective in improving posture and physiological parameter among pre-term babies.

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