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Effectiveness of nesting practice on posture and movements among preterm babies in NICU of a tertiary care hospital at Bhubaneswar

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Abstract
Background: The effectiveness of nesting practice on posture and movements among preterm babies in the NICU of a tertiary care hospital in Bhubaneswar is an important topic to investigate. Nesting practice has been shown to provide support and a secure environment for preterm babies, which can aid in the development of postural control and motor control.
Methods: This study utilized a quantitative research approach with a quasi-experimental pre-test and post-test non-randomized control group design. The sample consisted of preterm babies from the NICU of KIMS Hospital, with a total of 30 participants selected using a non-probability convenience sampling technique. The collected data was analysed using descriptive and inferential statistics. The sample was divided equally into two groups, with 15 participants in each group: the experimental group and the control group. Baseline data was collected using a self-structured interview schedule to gather socio-demographic information. Additionally, the standardized observational Albert scale was employed to assess the posture and movements of the preterm babies.
Result: Nesting practice is effective on posture and movements with t value 17.13 and 2.44 of preterm babies and obtained difference between experimental and control group.
Conclusion: Nesting practice was significantly effective on posture and movements which was highly statistically significance at p value ≤0.05.

Keywords: Effectiveness, nesting, posture, movements, preterm babies

Introduction

Proper posture is crucial for newborns as they transition from the aquatic to the aerial environment. It affects their overall well-being and development. Good posture ensures proper alignment of body parts, improves circulation and digestion, enhances sleep, and prevents internal organ cramping. By promoting proper posture, we can improve the quality of life for newborns during this critical period of adjustment.

Danielle Salducci, a pediatric physiotherapist, recognized the importance of creating a nurturing environment for newborns that mimics the sensations they experienced in the womb. She designed and made a "nest" that allows newborns to make movements similar to those made in their mother's womb. This approach addresses concerns about the newborn lying flat on a firm mattress, which can lead to a feeling of insecurity and potential physical ailments. Developmental care, introduced in the 1980s, focuses on modifying the extra uterine environment to provide a more optimal setting for preterm infants. This includes controlling external stimuli, clustering care activities, and positioning or nesting the infant to mimic the intrauterine environment. These strategies aim to provide containment and longer rest periods. When a newborn lies on a firm mattress in a batrachian posture with arms folded back and upwards on either side of the body, they may stare at the ceiling or consistently turn their head to the same side they adopted in the womb. This can lead to non-symmetrical lateralization, potential delays in psychomotor development, and an increased risk of plagiocephaly (a flattened head), which is observed in a growing number of young children today [1].

In the article published in the Neonatal units in Trent Perinatal Network, it highlights the importance of positioning for preterm and sick neonates. The aim of positioning is to provide a safe, comfortable, and appropriate care environment for these infants as they transition from the womb to the outside world. By ensuring proper positioning, healthcare providers

can help these infants cope with their new environment and promote their overall well-being [2].

The fetus in-utero experiences consistent and dynamic boundaries that encourage a flexed midline position. However, infants in the neonatal intensive care unit (NICU) are exposed to the effects of gravity and often assume flattened postures, especially if they are preterm or sick. This can have short and long-term effects on their posture and movement patterns. Proper positioning can help promote normal structural alignment and neuromotor control, which are essential for optimal development of posture and motor skills. Using specially designed "bumpers" to contain and support the baby in a midline flexed position can also promote calming behaviours and sucking [3].

The use of a "nest" or nesting with soft sheets can provide a sense of security and containment for preterm and sick infants. This positioning technique helps mimic the feeling of being in the womb and promotes a sense of safety and comfort. By creating a supportive environment, the baby can develop good posture and improve muscle control. It is important to ensure that the materials used are soft and gentle to avoid any discomfort or harm to the baby. This approach not only helps with positioning but also encourages healthy movement and provides comfort for the infant [4].

Objectives

1. To assess the posture and movements of preterm babies among experimental group and control group.
2. To determine the effectiveness of nesting on posture and movement of preterm babies.
3. To determine the effectiveness of nesting on posture and movement of preterm babies in experimental group and control group.
4. To find-out the correlation between posture and movement among preterm babies of experimental and control group.
5. To find-out association between the posture and movement of preterm babies with selected demographic variables.

Hypothesis

$H0_1$: There will be significant difference between the pre-test and post test score of posture and movements of preterm babies in both experimental and control group at 0.05 level of significant.

$H0_2$: There will be significant association between the posture and movement of preterm babies with selected demographic variables in both experimental and control group at 0.05 level of significant.

Methods and Materials

The study conducted at KIMS hospitals in Bhubaneswar, Odisha aimed to assess the effectiveness of nesting on the posture and movement of preterm babies. A total of 30 preterm babies, born between 28th-36th weeks of gestation and hemodynamically stable in the NICU, were included in the study using convenience sampling. The babies were divided into an experimental group (15 babies) and a control group (15 babies). The study utilized a pre-test post-test only control group design. Socio-demographic data of the babies and mothers were collected using a questionnaire. The standardized observational checklist called "Albert's scale for assessment of posture and movement of preterm babies" was used to assess the posture and movement of the babies. Before the intervention, the posture and movements of the preterm babies in both the experimental and control groups were assessed for 30 minutes, which served as the pretest score (1st observation). Fold a blanket diagonally and make a couple of folds to join. Place the folded blanket upright across both sides. Lay a wrap cloth over the blanket and tuck it in. Position the baby with their hands to midline and legs flexed. The intervention involved positioning the preterm babies in a prone or side-lying position with flexed extremities using a rolled blanket as a nest. The upper part of the baby's body was slightly raised, resembling a position as if they were "cradled in the arm". After the nesting intervention, two additional observations of posture and movements were conducted. The second (2^{nd}) observation was done at 1 hour after the baby was placed in the nest, and the third (3^{rd}) observation was done at 3 hours. The purpose of this study was to evaluate the impact of nesting on the posture and movement of preterm babies, and the observations were made to assess any changes in these parameters following the intervention.

Results

Findings related to demographic characteristics of mother and baby

The descriptive statistics of the study subjects show that in the experimental group, the highest percentage (53.33%) of mothers were in the age group of 18-23 years. Similarly, in the control group, the highest percentage (56.66%) of mothers were also in the age group of 18-23 years. Regarding the mode of delivery, the experimental group had the highest percentage (40%) of babies delivered through normal vaginal delivery. In the control group, the highest percentage (53.33%) of babies were also delivered through normal vaginal delivery. In terms of the mother's gravida (number of pregnancies), the highest percentage (50%) in the experimental group were primigravida (first pregnancy), while in the control group, 46.66% were primigravida. When it comes to the educational status of the mothers, 30% in the control group had secondary education, and 36.66% had higher secondary education. In terms of the area of residence, the majority of the subjects belonged to urban areas, with 80% in the experimental group and 86.6% in the control group. Interestingly, both in the experimental and control groups, 100% of the mothers did not have any knowledge about nesting practices. These descriptive statistics provide an overview of the characteristics of the study subjects in terms of age, mode of delivery, gravida, educational status, area of residence, and knowledge about nesting practices.

The descriptive statistics of the study subjects reveal that in the experimental group, 66.66% of the families did not have any siblings, while in the control group, 80% of the families did not have any siblings. Regarding the gestational age of the babies, in the experimental group, the highest percentage (66.66%) of babies were born between 34-36 weeks of gestation. In the control group, the highest percentage (43.33%) of babies were born between 31-33 weeks of gestation. In terms of the sex of the babies, in the experimental group, the highest percentage (56.66%) were female, while in the control group, the highest percentage (63.33%) were male. When it comes to the birth weight of

the babies, the highest percentage (66.66%) in the experimental group had a birth weight between 1001-1500 grams. In the control group, the highest percentage (63.33%) had a birth weight between 1501-2000 grams. These descriptive statistics provide information about the number of siblings in the family, gestational age of the babies, sex of the babies, and birth weight of the babies in both the experimental and control groups.

Findings related to assess the posture of preterm babies in experimental and control group without nesting practice

In the experimental group, it was observed that the nesting intervention had a positive effect on the posture and movement of preterm babies. At the first observation, a majority of preterm babies had neutral alignment of the left shoulder (63.33%), semi-flexed left elbow (66.66%), neutral alignment of the right shoulder (63.33%), semi-flexed right elbow (73.33%), semi-flexed left hip (66.66%), semi-flexed left knee (56.66%), semi-flexed right hip (56.66%), semi-flexed right knee (60%), asymmetric tonic neck reflex (63.32%), and head towards the side (100%). However, with subsequent observations, improvements were seen in various aspects of posture and movement. For example, at the second and third observations, a higher percentage of preterm babies in the experimental group showed an adducted posture of the left shoulder (83.33% and 100%), flexed left elbow (56.66% and 100%), adducted posture of the right shoulder (90% and 96.66%), flexed posture of the left hip (63.32% and 100%), flexed posture of the left knee (76.66% and 100%), flexed posture of the right hip (80% and 93.33%), and flexed posture of the right knee (70% and 100%). The proportion of preterm babies with an asymmetric tonic neck reflex remained unchanged throughout the observations.

In the control group, there were minimal changes in the posture and movement of preterm babies. The percentages of preterm babies with neutral alignment of the left shoulder, semi-flexed left elbow, neutral alignment of the right shoulder, semi-flexed right elbow, semi-flexed left hip, semi-flexed left knee, semi-flexed right hip, semi-flexed right knee, asymmetric tonic neck reflex, and head towards the side remained relatively stable across all three observations. These findings suggest that the nesting intervention had a positive impact on the posture and movement of preterm babies in the experimental group compared to the control group.

Findings related to assess the movements of preterm babies in experimental and control group without nesting practice

It can be observed that the nesting intervention had a positive impact on various aspects of movement and posture in preterm babies compared to the control group. In the experimental group, improvements were seen in movements towards and across the midline, with a significant increase from 6.66-23.33% at the first observation to 83.33-100% at the third observation. In contrast, the control group showed minimal changes, with only 20-36.66% of preterm babies exhibiting these movements at the first observation and 6.66-26.66% at the third observation. Gentle striking with open hands was present in 68.66% of preterm babies at the first observation in the experimental group, but it reduced to none at the third observation. In the control group, it was present in 70% of preterm babies at the first observation and 56.66% at the third observation. Wrist movements with superimposed rotations showed significant improvement in the experimental group, with only 23.3% of preterm babies exhibiting these movements at the first observation, increasing to 100% at the third observation. In the control group, it was present in 10 preterm babies at the first observation but dropped to 0% at the third observation. Abrupt hand or limb movements and rolling to the side were observed in 43.33-100% of preterm babies at the first observation in the experimental group, but decreased to 0-6.66% at the third observation. In the control group, these movements were present in 90-96.66% of preterm babies at both the first and third observations. Frozen posture of arms and legs was observed in 43.33-100% of preterm babies at the first observation in the experimental group, but reduced to 0-30% at the third observation. In the control group, it was present in 56.66-100% of preterm babies at the first observation and 70-100% at the third observation. Overall, these findings suggest that the nesting intervention had a positive effect on the movement patterns and postural control of preterm babies, leading to improvements in their motor development.

Findings related to effectiveness of nesting on posture of preterm babies in experimental and control group by using pair t test

Table 1: Effectiveness of nesting on posture of preterm babies in experimental and control group by using pair t test.

Item	1ST and 2ND Observation t Value	Inference	1ST and 3RD Observation t Value	Inference
Left shoulder	8.11	Highly significant	9	Highly significant
Left elbow	4.78	Highly significant	11.3	Highly significant
Right shoulder	5.53	Highly significant	8	Highly significant
Right Elbow	6.63	Highly significant	14.12	Highly significant
Left hip	6.36	Highly significant	8.3	Highly significant
Left knee	8.45	Highly significant	16.57	Highly significant
Right hip	5.09	Highly significant	5.83	Highly significant
Right knee	8.18	Highly significant	12	Highly significant
Symmetrical tonic neck posture	0	Not significant	0	Not significant
Head position	8.75	Highly significant	23.25	Highly significant

The table 1 shows the effectiveness of nesting on the posture of various body parts of preterm babies. The obtained t-values for left shoulder, left elbow, right shoulder, right elbow, left hip, left knee, right hip, right knee, and head position are all greater than the table value of 2.76 at a significance level of 0.01. This indicates that the

nesting has a highly significant effect on improving the posture of preterm babies in all these body parts. In the 2nd observation, the obtained t-values for all body parts except for the right hip and head position are greater than the table value of 2.76 at a significance level of 0.01. This again shows that nesting has a significant effect on improving the posture of preterm babies. In the 3rd observation, the degree of freedom is 29, and the obtained t-value is greater than the table value of 2.76 at a significance level of 0.01. This indicates that nesting has a highly significant effect on improving the posture of preterm babies. However, the obtained t-value for asymmetric tonic neck posture is 0, which is less than the table value of 2.76 at a significance level of 0.01. This indicates that nesting does not have a significant effect on improving the posture of preterm babies in this body part. Overall, the data suggests that nesting is an effective intervention for improving the posture of preterm babies, except for asymmetric tonic neck posture.

Findings related to effectiveness of nesting on movement of preterm babies in experimental and control group by using pair t test

Table 2: Effectiveness of nesting on movement of preterm babies in experimental and control group by using pair t test.

Item	1ST and 2nd observation t value	inference	1st and 3rd observation t value	Inference
Movement towards and accross the midline	1.5	Not significant	2.64	significant
Elegant wrist movement	1.80	Not significant	2.71	Significant
Abrupt hand/ limb movement and rolling to side	11	significant	25.07	Significant
Frozen posture of arms and legs	16.69	significant	17.16	Significant

The above table 2 represents the effectiveness of nesting on abrupt hand/limb movements and frozen posture of arms and legs and it was found to be significant as the obtained t value is 11 and 16.09 in 2nd observation and 25.07 and 17.16 in 3rd observation at degree of freedom 29 at p<0.05 level of significance which is greater than the table value 2.05. Movements towards and across the midline and elegant wrist movements was found to be not significant in 2nd observation but was found to be significant in 3rd observation as the obtained t value is 2.64 and 2.71 at degree of 29 at P<0.5 level of significance which is greater than the table value 2.05. The data represents that nesting has an improvement on movements of preterm babies.

Findings related to the effectiveness of nesting on posture of preterm babies in experimental and control group by using unpair t test

Table 3: Effectiveness of nesting on posture of preterm babies in experimental and control group by using unpair t test.

	Mean	Mean%	S.D	t Value	Level of Significant	Inference
Experimental Group	0.76	4.22	0.66	17.13	0.01	Highly Significant
Control Group	9.5	52.7	2.74			

The table 3 shows the mean score percentages for the posture of the experimental and control groups of preterm babies. The mean score percentage for the control group is 52.7, which is higher compared to the mean score percentage of 4.22 for the experimental group. The standard deviation (SD) of the experimental group is 0.66, while the SD of the control group is 2.74. The obtained t-value is 17.13, which is statistically highly significant for the degrees of freedom (df) of 58 at a significance level of 0.01. The obtained t-value is greater than the table value, indicating a significant difference in posture between the preterm babies in the experimental and control groups. This suggests that the nesting intervention has a positive impact on the posture of preterm babies, as evidenced by the significantly lower mean score percentage in the experimental group compared to the control group

Findings related to the effectiveness of nesting on movement of preterm babies in experimental and control group by using unpair t test.

Table 4: Effectiveness of nesting on posture of preterm babies in experimental and control group by using unpair t test.

	Mean	Mean%	S.D	t Valuue	Level of Significant	Infernce
Experimental Group	6.83	40.17	1.52	2.44	0.05	Significant
Contro Group	7.83	46.05	2.29			

The table 4 shows the mean score percentages for the movements of the experimental and control groups of preterm babies. The mean score percentage for the control group is 2.29, which is higher compared to the mean score percentage of 1.52 for the experimental group. The standard deviation (SD) of the experimental group is 1.52, while the SD of the control group is 2.29. The obtained t-value is 2.44, which is statistically highly significant for the degrees of freedom (df) of 58 at a significance level of 0.05. The obtained t-value is greater than the table value, indicating a significant difference in movements among preterm babies in the experimental and control groups. This suggests that the nesting intervention has a positive impact on the movements of preterm babies, as evidenced by the significantly lower mean score percentage in the experimental group compared to the control group.

Table 5: Findings related to correlation between posture and movement among preterm babies of experimental and control group

Group		Mean score%±SD	r	Inference
Experimental and control group	Posture	51.48±1.96	0.001	No correlation
	Movement	46.96±2.53		

The table 5 shows the mean score and standard deviation (SD) for posture and movement in both the experimental and control groups of preterm babies. The mean score for posture is 51.48 with an SD of 1.96, while the mean score for movement is 46.96 with an SD of 2.53. The statistical analysis indicates that the calculated correlation coefficient (r) for both the experimental and control groups is 0.001, which is lower than the table value of 0.250 at a significance level of 0.05. This suggests that there is no significant correlation between posture and movements among preterm babies. This indicates that there is no significant correlation between posture and movements of preterm babies in both the experimental and control group.

Findings related to association between the posture and movement of preterm babies with selected demographic variables.

It was found that there was no significant association between the posture and movement of preterm babies with demographic variables. For the association between posture and demographic variables, the chi-square value was 1.87 with a p-value of 0.5. Since the p-value is greater than the significance level of 0.05, there is no significant association between posture and demographic variables. Similarly, for the association between movement and demographic variables, the chi-square value was 1.22 with a p-value of 0.05. Since the p-value is greater than the significance level of 0.05, there is no significant association between movement and demographic variables. In conclusion, the chi-square test results indicate that there is no significant association between the posture and movement of preterm babies with demographic variables

Discussion

The demographic characteristics of the participants in the study. Based on the updated data, the age of the mothers in the experimental group ranged between 19-23 years, with 53.33% falling within this age group. In the control group, the majority (56.66%) of mothers were also in the 18-23 years age group. Regarding the mode of delivery, 40% of mothers in the experimental group had a normal vaginal delivery, while in the control group, the percentage was slightly higher at 53.33%. In terms of primigravida mothers, 50% of mothers in the experimental group were primigravida, while in the control group, 46.66% fell into this category. The gestational age of the babies varied, with 66.66% of babies in the experimental group born between 34-36 weeks, and in the control group, 43.33% were born between 31-33 weeks. Gender distribution differed between the two groups, with 56.66% of babies in the experimental group being female and 63.33% being male in the control group. Additionally, the majority (66.66%) of babies in the experimental group had a birth weight between 1001-1500gm, while in the control group, 63.33% had a birth weight between 1501-2000gm.

A study was conducted by Jagadeeswari J Among 30 samples, 15 samples belong to the experimental group, where most of the low birth weight babies 6(40%) were 4 to 7 days and 8 to 11 days old respectively, 10(66.7%) were born of vaginal delivery, 8(53.3%) were weighing 2 to 2.5 kg at the time of birth, 7(46.7%) had a gestational age of >37, 8(53.3%) were preterm, and 10(66.7%) had direct breastfeeding. Whereas in the control group, most of the low birth weight babies 5(33.3%) were 4 to 7 days old, 9(60%) were born of vaginal delivery, 7(46.7%) were weighing 2 to 2.5 kg at the time of birth, 8(53.3%) had a gestational age of 28 to 33 weeks, 9(60%) were preterm, and 8(53.3%) had direct breastfeeding [6].

Shivani Thakur, 2022 The study aimed to evaluate the effectiveness of nesting on posture and physiological parameters among premature babies in the NICU. A quasi-experimental research methodology was used with a sample of 30 premature babies. The results showed that nesting improved posture and physiological parameters, with all babies in the experimental group having acceptable posture, and higher percentages of excellent temperature, respiration, heart rate, and oxygen saturation compared to the control group. The study concluded that nesting is effective in maintaining posture and improving physiological parameters in premature babies [7].

A study evaluated the effects of lying in a nest on the posture and spontaneous movement of healthy preterm infants. The study included 10 healthy preterm infants in three age groups. Video monitoring was used to observe the infants inside and outside the nest in the supine posture before and after general activity. The study found that the nest promoted flexed alignment of the limbs, graceful gestures of the wrist towards and across the midline, and reduced sudden movements and frozen positions of the arms and legs [8].

The results of the study indicate that nesting had a significant impact on the posture of preterm babies. Before nesting, the majority (63.33%) of preterm babies had a left shoulder in a neutral alignment, while 23.33% had an adducted posture and 13.33% had an abducted posture. After nesting, at 1 hour, the majority (83.33%) of preterm babies had a left shoulder in an adducted posture, and only 16.66% had a neutral alignment. By the 3rd hourly observation, all preterm babies (100%) had a left shoulder in an adducted posture. In terms of the elbow posture, before nesting, the majority (66.66%) of preterm babies had a semi-flexed posture, while 23.33% had an extended posture and 10% had a flexed posture. After nesting, at 1 hour, the majority (56.66%) of preterm babies had an extended posture, 40% had a semi-flexed posture, and only 3.33% had an extended posture. By the 3rd hourly observation, all preterm babies (100%) had a flexed posture.

These findings suggest that nesting practices have a positive impact on the shoulder and elbow posture of preterm babies. The majority of babies showed improvements in shoulder alignment, transitioning from a neutral or abducted posture to an adducted posture. Similarly, there was a shift towards a more flexed posture in the elbow. These results highlight the importance of implementing nesting practices in neonatal care to promote optimal posture development in preterm.

In regards to posture, nesting practice has a positive impact on the posture of preterm babies in various aspects: Right

shoulder alignment: Before nesting, 63.33% of preterm babies had their right shoulder in a neutral alignment, 26.66% had an adducted posture, and 10% had an abducted posture. After nesting, at 1 hour, the majority (90%) of preterm babies had their right shoulder in an adducted posture, and 10% had a neutral alignment. By the 4th hourly observation, the majority (96.66%) of preterm babies had their right shoulder in an adducted posture, and only 3.33% had a neutral alignment. Left hip posture: Before nesting, the majority (66.66%) of preterm babies had a semi-flexed posture in the left hip. After nesting, the majority (96.66%) of preterm babies had a flexed posture in the left hip. Asymmetrical tonic neck reflex: Before nesting, 63.33% of preterm babies had the asymmetrical tonic neck reflex present, while 36.66% had an absent reflex. After nesting, the presence or absence of the reflex remained the same at 1 hour and 3rd hourly. The data provided indicates that nesting has a positive impact on various aspects of posture, including the alignment of the right shoulder, the flexion of the left hip, and the presence of the asymmetrical tonic neck reflex. Additionally, it suggests that nesting also has positive effects on other aspects of posture, such as adducted shoulder, flexed elbow, flexed hip, flexed knee, and head position in the midline among preterm babies in the experimental groups. These improvements in posture can contribute to better development and overall well-being in preterm infants.

The study's results are consistent with previous research that also found nesting to be beneficial for preterm babies. Another study evaluating movement and posture among preterm babies in a supine position before and after nesting showed similar findings. It demonstrated that nesting facilitated a flexed posture of the limbs with adduction of shoulders and reduced extended postures of the legs and arms [9].

The study observed head-placement choice in 20 awake newborns with varying ages and sexes. The newborns were secured on a custom frame to minimize the impact of gravity and asymmetry on their trunk position and skull stability. The study found that maintaining the head at midline was comparable in duration to that observed in babies aged 2 to 3 months, as recorded by the global score system. This suggests that the neural mechanisms responsible for achieving and maintaining a midline position are present at birth, but are not clinically expressed due to insufficient strength in the neck's antigravity muscles [10].

The present study shows that nesting practice has a positive impact on movement towards and across the midline, as well as other movements, among preterm babies in the experimental group. Here is a summary of the findings: Head rotation from side to midline and back: Before nesting, this movement was present in 6.665% of preterm babies. After nesting, the movement increased to 43.33% at 1 hour and further increased to 86.66% at the 3rd hourly observation. Head rotation from side to side: Before nesting, this movement was present in 20% of preterm babies. After nesting, the movement increased to 226.66% at 1 hour and decreased to 16.66% at the 3rd hourly observation. Hand-head contact: Before nesting, this movement was present in only 20% of preterm babies. After nesting, the movement increased to 60% at 1 hour and further increased to 83.33% at the 3rd hourly observation. Gently striking the head with open hands: Before nesting, this movement was observed in 66.665% of preterm babies. After nesting, the movement decreased to 3.33% at 1 hour and was absent at the 3rd hourly observation. Hand to hand contact: Before nesting, this movement was present in 10% of preterm babies. After nesting, the movement increased to 73.33% at 1 hour and further increased to 96.66% at the 3rd hourly observation. Wrist movement with superimposed rotations: Before nesting, this movement was observed in 23.335% of preterm babies. After nesting, the movement increased to 40% at 1 hour and reached 100% at the 3rd hourly observation. Abrupt abduction-extension of the four limbs: Before nesting, this movement was observed in 96.66% of preterm babies. After nesting, the movement decreased to 50% at 1 hour and further decreased to 66.66% at the 3rd hourly observation. Abrupt rolling to the side: Before nesting, this movement was present in 43.33% of preterm babies. After nesting, the movement was present in only 10% at 1 hour and none rolled to the side at the 3rd hourly observation. Frozen posture of arms and legs: Before nesting, this posture was observed in 100% of preterm babies. After nesting, the posture decreased to 3.33% at 1 hour and none had a frozen posture of arms and legs at the 3rd hourly observation. In the control group, all the movements were observed before nesting at the 1st observation and after nesting at 1 hour and 3rd hour. These findings reveal the positive impact of nesting movement among preterm babies in the experimental group, including increased movement towards and across the midline, improved wrist movements, and reduced abrupt hand/limb movements and frozen posture of arms and legs.

The findings from K Thompson's article suggest that positioning via nesting has several benefits for preterm babies. Nesting promotes physiological stability, aids in flexion, prevents postural deformity, and facilitates self-regulation. It allows for important contact between the baby's hands, mouth, and feet [11, 12]. The study examined the effectiveness of nesting on posture and movement in preterm babies. The results showed a significant difference in posture between the experimental and control groups. The estimated t-value was 17.13, which was highly significant at a significance level of 0.001 with degrees of freedom (df) equal to 58. This indicates that nesting was effective in promoting good posture for preterm babies. Similarly, the study found that there was a significant difference in movements between the two groups. The estimated t-value was 2.44, which was greater than the table value of 2.00 at a significance level of 0.05 with df=58. This indicates that nesting was effective in facilitating good movements for preterm babies. These findings suggest that appropriate support and positioning through nesting can have positive effects on the posture and movements of preterm babies, potentially improving their overall development and well-being

The study evaluated the impact of supportive pillows on the motor behavior of infants with and without minor neurological dysfunction (MND). The researchers found that the use of pillows did not affect the time spent in general movements or specific movements, nor did it impact the quality of general movements in either group. However, in neurologically normal infants, the shoulder pillow with or without pelvic pillow increased the diversity of specific movements, while in infants with MND, all pillow conditions led to a substantial increase in movement variety. This suggests that specific postural support can promote variation in motor behavior, particularly in infants with

MND [13].

A study was conducted that the findings indicated that infants sleeping in the prone position demonstrated higher motor development compared to those sleeping in the supine position. Additionally, infants who played in both the prone and supine positions exhibited greater motor development than those who played exclusively in the supine position. This suggests a potential association between sleeping and playing positions and motor development in infants.[14] The study conducted a randomized, observer-blind controlled trial involving 123 very preterm infants in the neonatal intensive care unit of the sole tertiary referral center in Western Australia. The infants were stratified by gestational age (<29 weeks or 29-30 weeks) and then randomized into one of three intervention groups: postural support nappy, postural support nappy and postural support roll, or disposable nappy and postural support roll. The interventions began when the infants were stable and ended when routine side-lying commenced. Measurements of shoulder and hip posture were taken pre-intervention, 5 weeks post-intervention, and at term postmenstrual age [15].

The study found that six-month-old infants who slept supine and were placed in the prone position when awake showed more advanced gross motor development compared to those who had limited or no experience in the prone position while awake. This suggests that awake positioning plays a significant role in interpreting infants' developmental motor performance [16]. The study compared motor performance in infants sleeping in prone versus supine positions. At 4 months, the supine group had lower motor scores and were less likely to achieve prone extension. By 6 months, there were significant differences in motor scores between the supine and prone groups. Motor delays were observed in 22% of infants sleeping supine, while prone-sleeping infants were more likely to sit and roll. Daily exposure to awake prone positioning predicted motor performance in infants sleeping supine, and at 15 months, sleep position continued to predict motor performance [17, 18].

To describe sleep positions among low birth weight infants, variations in sleep position according to birth weight, and changes in sleep position over time. To analyze risk factors and influences associated with prone sleep. Prone sleep decreased among low birth weight infants from 1995 to 1998. However, VLBW infants, who are at very high risk for sudden infant death syndrome, are more likely to sleep prone than larger low birth weight infants [19, 20].

Conclusion

Nesting" is a comforting practice that simulates the feeling of lack of space experienced in utero, reducing jitteriness and startle responses in babies. It helps establish more peaceful sleep patterns, conserving energy and minimizing weight loss. The flexed posture reduces surface area exposed to the environment, preventing heat loss and excessive weight loss. Research indicates that nesting is a safe and beneficial practice for promoting the comfort of newborn babies. Studies, including present research, suggest that nesting has a significant positive effect on posture and movement among preterm babies.

The correlation coefficient between posture and movements among preterm babies was not significant. The calculated (r=value was 0.001), which is less than the table value of r=0.250 at a significance level of 0.05. Therefore, the hypothesis of a positive correlation between posture and movements among preterm babies was rejected. This suggests that there is no significant relationship between posture and movements in this particular study.

Recommendation on the study

1. An experimental study with one group pretest and posttest can be conducted to compare the effectiveness of nursing interventions for maintaining good posture and motor performance among preterm babies.
2. A comparative study can be undertaken to evaluate the impact of nesting on posture and motor performance among preterm babies, comparing outcomes for babies who receive nesting care and those who do not.
3. A study can be conducted to investigate the role of nurses' practice of nesting in the Neonatal Intensive Care Unit (NICU) and its impact on the comfort, posture, and motor performance of preterm babies.

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