



## Effectiveness of Nesting on Posture and Movement of Upper Extremities in Healthy Preterm Infants

### KEYWORDS

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**ABSTRACT** *Background & Aim: Preterm babies are the delicate lives to be taken care of very intelligently as well as delicately, a helpful step for the preterm to maintain his posture and smooth movement and that is "Nesting". It is necessary to maintain proper anatomical alignment to avoid any type of contractures or potential complications related to abnormal position so purpose of the study is to see effectiveness of nesting on posture and movement of upper extremities in healthy preterm infants. Method : This study is adopted for assessing the posture and movements for healthy preterm infants in and outside the nest. It is a non-randomised control study design the assessment of & observation and measurements are taken of the best possible posture and best possible movements in these preterm infants, and the same assessment in non-nested preterm infants. Result : There is no significant difference of gestational age, sex & birth weight between nested and non-nested group means both group having same gestational age, sex & birth weight. There is no significant difference of shoulder position on day1 morning in nested and non-nested group and highly significant difference of shoulder position on day2, day3 morning in nested and non-nested group means that best possible shoulder movement on day2, day3 are significantly more in nested group. There is significant difference of shoulder position on day1 evening in nested and non-nested group and highly significant difference of shoulder position on day2, day3 evening in nested and non-nested group means that best possible shoulder movement on day1, day2, day3 are significantly more in nested group. Conclusion: Nesting is convenient, cost effective, requires less time and skills, hence it is easy for the nurse to practice and in turn be beneficial for pre term babies, starts with simple intervention by making nest for the preterm.*

### INTRODUCTION

Preterm babies are the delicate lives to be taken care of very intelligently as well as delicately; love, touch, care, support in NICU is required. Along with the emergency care, medical care, physical care, nursing care many small, simple interventions to bear in mind regarding care of the preterm; may be not much known or practiced regularly in Indian nursing scenario, but a helpful step for the preterm to maintain his posture and smooth movement and that is "Nesting"<sup>1</sup>

All preterm infants need intensive care from the moment of birth to give their best chance of survival without neuro logic after-effects.

Despite the marvels of modern neonatal intensive care practices, however, premature births, their care and complications still remain a long way to be a success in child care.<sup>2</sup>

The major causes of neonatal mortality are sepsis, birth asphyxia, and prematurity and/or low birth weight.<sup>3</sup> The current status of neonatal health in India is indeed dismal to state the least 3 neonates are dying every minute in India and every 4<sup>th</sup> baby born is low birth weight.<sup>4</sup> For a nation to grow and progress, the well being and health of the children is of crucial importance.<sup>5</sup> In preterm babies, about 50% death occur in the first week of life. The risk of death is higher in 24-48 hours of life. WHO has defined Low birth weight "One whose birth weight is less than 2500 grams irrespective of the gestational age."<sup>6</sup>

The last trimester is from 32 weeks of gestation in which the baby in utero, weighs 1800 grams, and pulmonary sur-

factant appear. In preterm CNS the baby is inactive and lethargy, cry is weak, reflexes are poorly developed.[7]

Preterm birth is a significant cost factor in healthcare. A 2003 study in the US determined neonatal costs to be increasing exponentially with the decreasing gestational age and weight.<sup>8</sup>

Neonatal period is characterized by transition to extra-uterine life and exquisitely rapid growth and development. This is the phase in life with the greatest risk of mortality as well as the maximum potential for long term physical and neurocognitive development.<sup>9</sup>

Infant should be provided with midline orientation to facilitate hand-to-mouth activities which are self-soothing. The hands of the baby should be left free so that he can get them to his face to suck his fingers or just touch his face. When hands of the caretaker are busy in doing the procedure, the flexed legs of the infant can be enclosed in a blanket making it a NEST, to provide containment<sup>10</sup>

Preterm infants are usually characterised as hypotonic, their thighs, arms extended, hypotonia is due to prematurity.<sup>11</sup> Limbs are extended due to hypotonia with poor recoil of flexed forearm when it is extended, reduced muscle power and bulk, with flaccid muscle tone; therefore their movements are erratic, weak or flailing.<sup>12</sup> They exert energy to maintain their body position against the pull of gravity. Without support they may, to differing degrees, develop head, shoulder and hip flattening which in turn can lead to poor mobility.<sup>11</sup>

Baby should be placed on a soft comfortable "Nestled"

and cushion bed.

As there is hypotonia in these preterm babies, it is necessary to maintain proper anatomical alignment to avoid any type of contractures or potential complications related to abnormal position. Thus it is a felt need to maintain proper anatomical alignment with the use of nursing intervention like "Nesting".<sup>13</sup> As pregnancy approaches its end, body size of the fetus increases and room for movement inside the womb decreases; the head of the fetus is predominantly flexed or semi-flexed, the shoulders and the hips are flexed and adducted, and the limbs are close to trunk. Hence infants prefer to assume this position in early extra uterine life.

The NICU exposes the preterm infant to a non-optimal physiological environment and to invasive procedures and handling. These may induce pain and stress, along with the frequent manipulations by medical and nursing staff that disrupt rest activity cycles and sleep, which may lead to chronic and prolonged stress in the preterm infant.

Acute stress may induce abrupt movements and startles; motor behavior of the preterm infant is also affected. As a result, startles, rolling to the side, abrupt movements of the limbs, frozen postures of arms and legs, either spontaneous or induced by handling, are commonly observed behaviors in preterm infants, in particular when the clinical condition is not yet stable, in turn, the abrupt movements and adducted postures may add stress to stress.

Also, nesting is convenient, cost effective, requires less time and skills, hence it is easy for the nurse to practice and in turn be beneficial for preterm babies, starts with simple intervention by making nest for the preterm<sup>14</sup>

**Method :** This study is adopted for assessing the posture and movements for healthy preterm infants in and outside the nest. It is a non-randomised control study design the assessment of & observation and measurements are taken of the best possible posture and best possible movements in these preterm infants, and the same assessment in non-nested preterm infants.

The sample selected were preterm babies, admitted in NICU of selected hospitals of Pune City. Purposive Non Probability Sampling Technique is used for the present study. 60 preterm infants were included in this study .Group I – 30 Experimental, nested preterm babies. Group II – 30 Control group, non-nested preterm babies.

Preterm infants lying in supine position with gestational age between 33-36 weeks whose parents are willing to give consent for the study included in this study.

Preterm infants on ventilators , with neurological dysfunction ,congenital anomalies. cerebral palsy were excluded from the study.

The tool was taken from Modified Ferrari et al consisted of observation and measurement charts consisted of demographic data , best possible posture in preterm infants, best possible movements in preterm infants.

Assessment of best possible posture in /out nest, which includes angles to be measured in: Shoulder, both right and left side whether Adduction, Neutral, Abduction. Elbow, both right and left side whether Flexion, Semiflexion,- Extension.Hip, both right and left side whether Flexion, Semi

flexion, Extension.Knee, both right and left side whether Flexion, Semiflexion, Extension. Head position whether in midline or sidelying. Asymmetric Tonic Neck posture whether present or absent

Assessment of best possible movements in/out of nest, which includes: Movements towards and across the midline Elegant wrist movements, Abrupt limb movements . Rolling to the sides .Frozen Postures of arms and legs.

The details of the angles ( ° ) are as follows:

Sr No.	Item	Description	Angles	Picture	Scores
1	Left Shoulder	Adduction	0-20°		2
		Neutral	21-90°		1
		Abduction	>90°		0
2	Right Shoulder	Adduction	0-20°		2
		Neutral	21-90°		1
		Abduction	>90°		0

Details of Movements: Healthy Movements towards and across the midline: Head rotation from side to midline and back, head rotation from side to side, hand-mouth contact, hand-head contact, gently striking head with open hands, hand-hand contact, hands touching contralateral shoulder and trunk, hand-leg contact, foot-foot contact. Elegant wrist movements: Wrist movements with superimposed rotations.

Unhealthy Movements consisted of Abrupt hand and/or limb movements: Abrupt opening of hands and fingers, abrupt abduction-extension of the limbs. Rolling to the sides: Abrupt rolling to the sides. Frozen postures of arms and legs: Arms in frozen extension, Arms in frozen flexion and fisting, legs in frozen extension.

The healthy and unhealthy movements are placed in order/ grouped in tool II b

Scores for movements: For positive healthy movement present, score is 1 For negative unhealthy movement present, score is 0 Measurements and interpretation of angles was done as per the tool. The instrument used for assessing the angles was Goniometer.

Tool was tested on 10 subjects that were eligible for the study and the investigator found that tool was feasible. These subjects were exclusively excluded in the main study.

Subjects were selected from NICU of selected hospital, Pune. Five subjects each from both the groups were studied, using non-probability purposive sampling technique. Written informed consent was also obtained from the in

fants' parents. The subjects included in this pilot study are marked for exclusion in the final study. The interpretation was carried out at the end of the pilot study, the findings were reliable, main study was found to be feasible for conduct, based on the findings of pilot study.

The content validity of tool enclosed, demographic data, assessment of best possible posture in preterm infants, as sessment of best possible movements in preterm infants.

The data collection was done strictly under the standard and same laid down conditions and NICU environment. It was planned to start the observation of the nested babies after 24 hours of admission, nest to be applied immediately after admission. Observation and measurements of the nested babies to be done under the same NICU environmental conditions these are: standard warmer temperature, same environment throughout the treatment, cared by trained registered staff nurses only, post feeding, absolute no disturbance specially during the 2 hours after which the observation to be started, no any noise pollution so as to prevent any abrupt actions or irritability in the babies. Observation in the same timing of the day 2 hours in the morning and 2 hours in the evening, by the same standard instrument, The same technique to be applied to the non-nested babies.

The investigator would continually keep watch for admission to NICU and applied florescent labels to file for identification and so the staff nurses who were very cooperative, as per instructions would keep the baby undisturbed for the timing as instructed. Once it was made sure about the feasible state, observation and measurements were taken.

Written informed consent taken from the parents of the babies, in the morning from 10am to 12noon the baby was absolutely not disturbed, all the routine care was carried out before these timings, similarly in the evening from 6pm to 8 pm, recording for last 10 seconds done for observation of movements, the measurements as per the tool IIA were taken by the same Goniometer cleaned with sterilium before applying to the preterm baby, the measurements were taken by qualified therapist. All the recording was done at that instant itself. The observation and measurements were taken for three alternate days, same time of the day, same procedure by same investigator and same staff nurses who assisted in the process. Same procedure was applied for the group two that is non-nested babies.

Out of the subjects taken, 6 subjects of first group were cancelled due to their deteriorated condition on next day and other physical problems; a few needed repeated measurements due to errors, some babies' parents did not give consent for the same

Mann Whitney test will be used to analyse, and compare the posture and movements of the two groups, nested and non-nested.

**Result :**

**Table 1: Comparison of gestational age, sex & birth weight in study groups**

Parameter	Group A (Nested)	Group B (Non-nested)	Z Value	P Value
	Mean ± SD (n=30)	Mean ± SD (n=30)		
GA (Wks)	34 ± 0.79	34.28 ± 0.78	1.4	>0.05
Sex (Male/ Female)	16/14	19/11	0.62	>0.05
Birth Weight (Gms)	1468.87 ± 257.32	1456.47 ± 147.10	0.23	>0.05

Chi-square

**There is no significant difference of gestational age, sex & birth weight between nested and non-nested group means both group having same gestational age, sex & birth weight.**

**Table 3: Day wise comparison of morning and evening shoulder position in study groups**

Shoulder position on		Group A (Nested)	Group B (Non-nested)	Z Value	P Value
		Mean ± SD (n=30)	Mean ± SD (n=30)		
Morn- ing	Day 1	1.23 ± 0.89	0.8 ± 0.8	1.96	>0.05
	Day 2	2.57 ± 0.77	1.73 ± 0.64	4.55	<0.0001
	Day 3	3.53 ± 0.51	2 ± 0.45	12.32	<0.0001
Even- ing	Day 1	1.57 ± 0.82	1 ± 0.87	2.60	<0.05
	Day 2	2.87 ± 0.82	1.87 ± 0.57	5.48	<0.0001
	Day 3	3.97 ± 0.18	2.07 ± 0.36	25.49	<0.0001

**There is no significant difference of shoulder position on day1 morning in nested and non-nested group and highly significant difference of shoulder position on day2, day3 morning in nested and non-nested group means that best possible shoulder movement on day2, day3 are significantly more in nested group.**

**There is significant difference of shoulder position on day1 evening in nested and non-nested group and highly significant difference of shoulder position on day2, day3 evening in nested and non-nested group means that best possible shoulder movement on day1, day2, day3 are significantly more in nested group.**

**Discussion :**

**Both group having same gestational age, sex & birth weight. Best possible shoulder movement on day2, day3 morning and day1, day2, day3 evening are significantly more in nested group.**

Despite the marvels of modern neonatal intensive care practices, however, premature births, their care and complications still remain a long way to be a success in child care.[2]

The major causes of neonatal mortality are sepsis, birth

asphyxia, and prematurity and/or low birth weight.[3] The current status of neonatal health in India is indeed dismal to state the least. 3 neonates are dying every minute in India and every 4<sup>th</sup> baby born is low birth weight. [4]

In the mother's womb, which is a natural environment, the baby is comfortably "nested" in a flexed posture with hands in the midline close to his mouth. The physiological needs of oxygenation, nutrition and excretion are admirably met by the utero-placental unit. [10]

The preemies have poor muscle tone and they lie with their arms and legs straight or extended. The extended posture for a long period of time may lead to abnormal tone with consequent delay in motor development. Body position affects gastric emptying and neurobehavioral development. The infant should be positioned properly with flexed extremities by providing a "nest" with a rolled blanket. Swaddling simulates in-utero feeling of lack of space and it makes the baby less jittery or prone to startle.[10]

Infant should be provided with midline orientation to facilitate hand-to-mouth activities which are self-soothing. The hands of the baby should be left free so that he can get them to his face to suck his fingers or just touch his face. When hands of the caretaker are busy in doing the procedure, the flexed legs of the infant can be enclosed in a blanket making it a NEST, to provide containment

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Appreciation of muscle tone is a fundamental feature of the examination, which includes the study of the resting posture, active tone and passive tone. One evaluates spontaneous posture by inspection when the infant is lying supine. Baby should be placed on a soft comfortable "Nestled" and cushion bed. [12]

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