IJN
Iranian Journal of Neonatology
http://ijn.mums.ac.ir

Open Access
Original Article

Clinical Outcomes of Snuggle up Position Using Positioning Aids for Preterm (27-32 Weeks) Infants

Yashoda Sathish[1], Leslie Edward Lewis[2], Judith Angelitta Noronha[*3], Anice George[3], Baby Snayak[3], Mamatha S Pai[3], Ramesh Bhat[2], Jayashree Purkayastha[2]

1. Assistant Professor Manipal College of Nursing Manipal University, Manipal, India
2. Professor, Department of Paediatrics, Kasturbha Hospital and Kasturbha Medical College, , Manipal, India
3. Professor, Manipal College of Nursing Manipal University, Manipal, India

ABSTRACT

***Background*:** Preterm birth, if not actively managed with developmental supportive care, can significantly contribute to neurodevelopmental compromise. Use of appropriate positioning aids helps with mimicking the intrauterine environment and facilitating neuromuscular development. Herein, we aimed to determine the effectiveness of snuggle up positioning aids on clinical outcomes of preterm (<32weeks) infants.

***Methods*:** This randomized controlled trial was performed at a tertiary neonatal intensive care unit (NICU) to investigate the effect of snuggle up position using positioning aids (vs. standard care) on heart rate, respiratory rate, oxygen saturation, duration of ventilation, weight gain, and duration of NICU stay.

***Results*:** There was a significant difference in respiratory rate, oxygen saturation, stability of the cardiorespiratory system in preterm infants (SCRIP) score, and weight gain between the intervention and control groups (P<0.05). However, there was no significant difference in temperature, heart rate, and duration of ventilation between the two groups (P>0.05).

Conclusion: Use of snuggle up position with positioning aids increased stability of physiological parameters and weight gain and reduced duration of NICU stay. Thus, the use of positioning aids for preterm infants is recommended to facilitate their growth and clinical outcomes.

Keywords: Clinical outcomes, Physiological parameters, Preterm infants, Snuggle up positioning

Introduction

Prematurity accounts for 35% of neonatal mortalities and it is a major contributor to child and adult morbidities (1). Globally, every 10th infant is born preterm and India constitutes a quarter of all preterm births. Those who survive without receiving proper interventions end up having long-term disabilities. According to the World Health Organization (WHO), the incidence rate of disability is approximately 15-25% (2). However, neurodevelopmental outcomes and pulmonary morbidity remain two major issues of concern.

The intrauterine environment provides a variety of vestibular, auditory, chemical, hormonal, tactile, visual, and sensory stimuli in an integrated, multimodal fashion, and thus, protecting the developing fetus against harsh outside (3, 4). Being born prematurely, the infant loses the well-defined boundaries of the intrauterine space. The intrauterine environment facilitates neural development. However, preterm birth places the infant in high-tech environment of Neonatal Intensive Care Unit (NICU), posing considerable stress.

Mimicking fetal position in utero using snuggle up positioning aids ensures optimal growth and normalises the neuro-behavioural parameters (5). Fetal and neonatal postures and movements contribute to shaping the skull, joints, and spinal curvatures in infants. It also conserves the required calorie for the brain development (6). A functional posture in these infants can enhance psychomotor and neural development (7).

Prone positioning increases thoracoabdominal synchrony and rib cage motion. Pressure from the

* *Corresponding author*: Judith Angelitta Noronha, Manipal college of Nursing, Manipal University, Karnataka, India. Tel: 082029223123; Email:juval12@gmail.com.

Please cite this paper as:
Sathish Y, Edward Lewis L, Angelitta Noronha J, George A, Snayak B, S Pai M, et al. Clinical Outcomes of Snuggle up Position Using Positioning Aids for Preterm (27-32 Weeks) Infants. Iranian Journal of Neonatology. 2017 Mar: 8(1). DOI: 10.22038/ijn.2016.7709

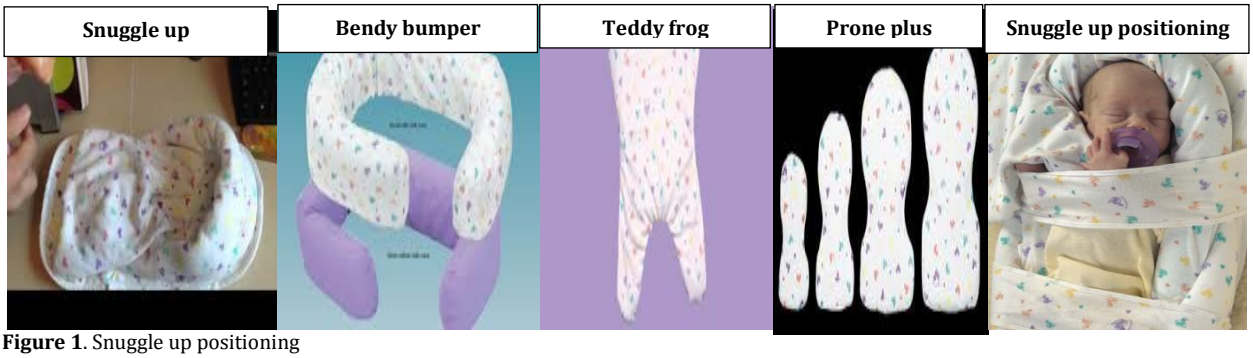

Figure 1. Snuggle up positioning

infant's weight against the supporting surface is believed to enhance the stability of the chest wall, allows for greater diaphragm excursion, and ultimately, results in a mechanical advantage for breathing (8). Appropriate positioning can promote neuro-behavioral parameters, help with keeping the infant calmer, and lower the energy requirement of an infant (9).

Adopting developmental care principles in providing the snuggle up position and caring for preterm neonates is the sole responsibility of neonatal nurses. The current state of positioning practices in the NICU lacks consistency in adoption, application, and use of effective therapeutic supportive positioning practices. There is a shortage of positioning aids despite the available and expanding body of research regarding gravity, posture, and motor development (10).

Developmental supportive care with appropriate positioning is applied to mimic the intrauterine environment. The uterus provides a feedback mechanism by allowing extension and flexion within the dynamic circumferential boundaries of the uterine environment, proprioceptive exploration, and stimulation.

When an infant is born prematurely, it is quickly taken from an environment of supportive boundaries and constant temperature and is placed into a loud, comparatively cold, and unsupportive environment (11). Positioning system, designed in collaboration with clinicians, enables caregivers to provide premature infants with the flexion, containment, and midline orientation necessary to meet their individualized developmental requirements (12).

The unique design of the Snuggle Up (Figure 1) and Bendy Bumpers mimic the elasticity and resistance of the uterine wall, allowing the infant to extend the legs, foot brace, and come back into a flexed position. T Frog is placed under the shoulders to facilitate and maintain rounded shoulder, preventing shoulder retraction. When placed in prone position, Prone Plus positioning aid utilizes the natural force of gravity to promote rounding of the hips and shoulders and facilitates hand-to-mouth coordination without placing excessive pressure on the knees and elbows.

Recommendations for use of positioning aids are still debated despite more than two decades of its practice. There is a scarcity of well-conducted trials on snuggle up positioning aids, which limits the provision of evidence. The findings of this study will definitely add to the body of knowledge to use positioning aids in preterm neonates to facilitate their growth and development.

Methods

This randomized controlled trial with repeated measures design was used to assess the effectiveness of snuggle up positioning. The sample size was calculated based on two-group comparison with effect size of 1.0, an a of 0.05, and power of 0.80 [11], the sample size required in each group was 24. The study was carried out during September 2013-July 2014; there were 72 preterm (27-32 weeks) infants admitted during this period. Infants admitted after six hours of birth (extramural), APGAR <7 at 5 min, born after > 32 weeks of gestation, and those required inotropes or arterial line were excluded from the study.

A total of 56 preterm infants (27-32 weeks) were enrolled in the study. Block randomization with concealed opaque envelop with block size of 4 was performed. The snuggle up positioning aids were used for the intervention group and the control group received the routine care (the preterm infants were placed in ordinary boundaries prepared by cotton cloth roll). The study design is presented in a CONSORT diagram (Figure 2).

Baseline demographic proforma, weight, length, head circumference, and stability of the cardio-respiratory system in preterm infants (SCRIP) score

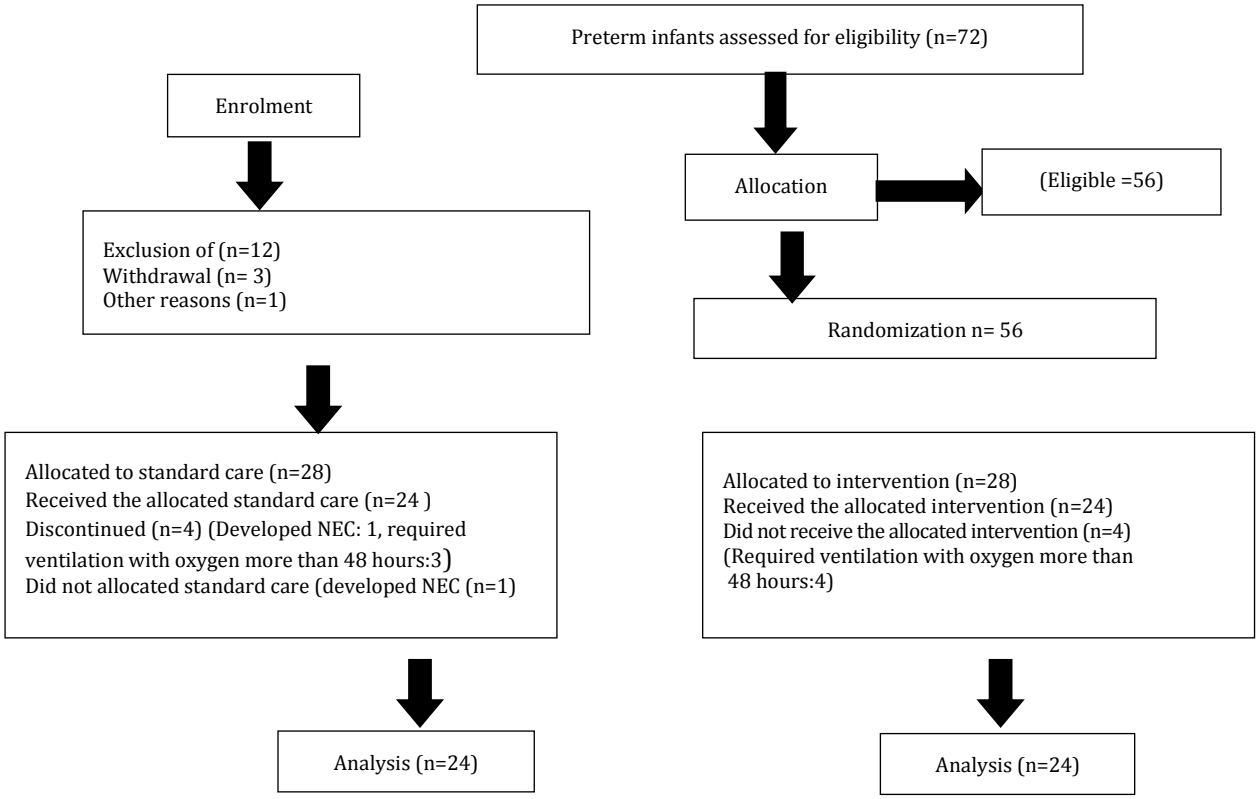

Figure 2. CONSORT diagram of the study population

were recorded at enrollment.

Clinical outcomes including body temperature, heart rate, respiration rate, oxygen saturation, SCRIP score, and duration of ventilation and hospital stay were recorded for each infant. The SCRIP score is a reliable instrument for determining the level of cardiorespiratory stability, which helps with identifying the subnormal range (i.e., periodic breathing, apnea, and deceleration of the heart rate); for every single parameter, it has three grades of severe instability (0 points), minor instability (1 point), and perfect stability (2 points). Temperature and SCRIP score were recorded at 8, 16, 24, 48, and 72 hours; positioning continued for four weeks.

Weight (using electronic weighing machine on adaily basis) and follow-up of weight, as well as duration of ventilation and NICU stay were recorded. The primary outcome of the study was clinical outcome it include, SCRIP score duration of ventilation and hospitalization. The data were analyzed performing t-test, using SPSS version 16. P-value less than 0.05 was considered statistically significant.

Results

In the 48 infants, means of gestational age in the intervention and control groups were 29.56±1.822 weeks and 29.88±1.536 weeks, respectively. In both groups, the majority of the preterm infants were male. The mean weight, length, and head circumference at birth did not differ significantly between the groups (Table 1).

Table 1. Baseline characteristics of the study population

Characteristics	Intervention (n=24) mean±SD	Control (n=24) mean±SD
Gender		
Male	14(58.33%)	13(54.16%)
Female	10(41.66%)	11(45.84%)
Type of delivery		
Normal delivery	8(33.5%)	13(54.16%)
C–section	16(66.5%)	11(45.84%)
Birth weight (g)	1141.04±255.917	1118.96±271.789
Length at birth	37.71±2.177	37.96±2.349
Head circumference at birth	27.152±2.103	27.60±2.027
Gestational age (weeks)	29.56±1.822	29.88±1.536

Table 2. Clinical outcomes in terms of weight, days of hospital stay, and ventilation in the preterm infants

Variables	Time interval	Intervention Mean±SD	Routine care Mean±SD	F value	P-value
Weight gain/loss per week	At the end of the 1st week	-60.75±15.25	-100.00± 20.05	1.172	<.001
	At the end of the 2nd week	70.69±19.50	30.16 ±8.0		
	At the end of the 3rd week	136.13±23.18	102.50 ±17.23		
	At the end of the 4th week	165.42±26.17	113.21±16.95		
Duration of hospital stay (days)		37.04±11.13	41.75±15.61	1.446	0.235
Mean days of ventilation		0.79±0.721	0.71± .624	0.183	0.671

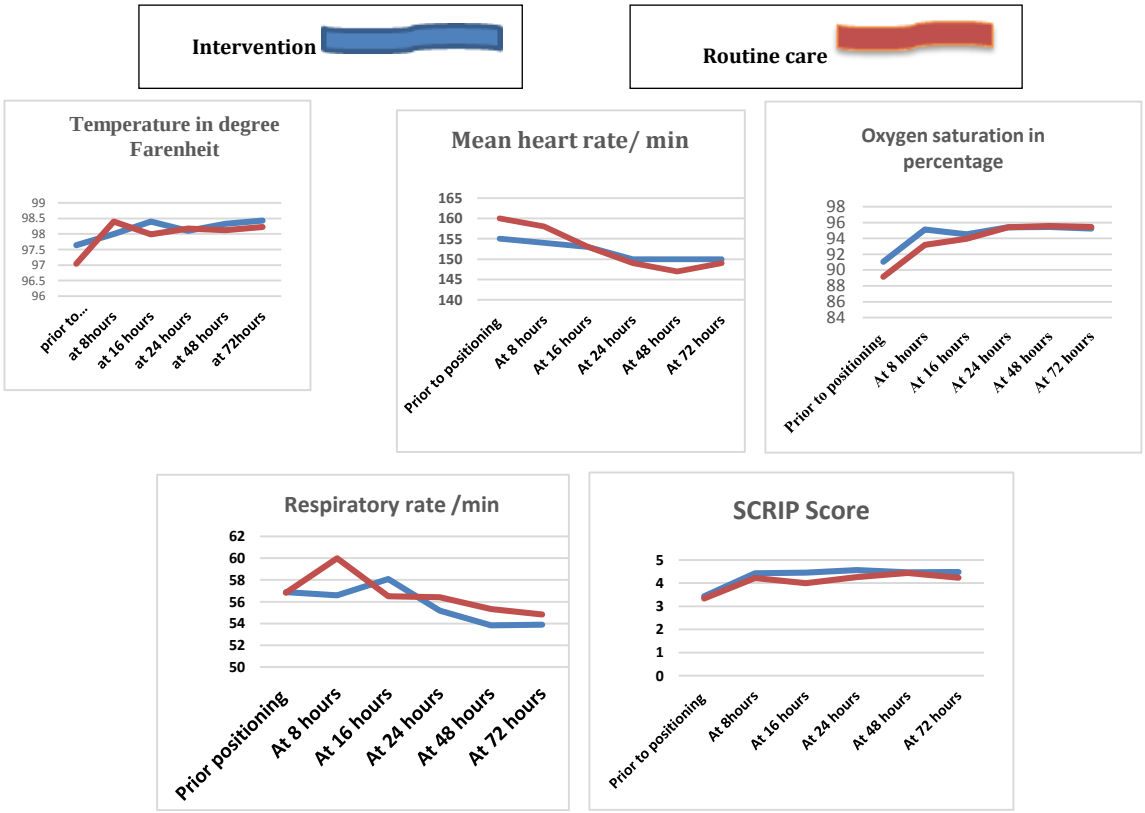

Figure 3. Physiological stability of premature infants in the intervention and routine care groups

With regard to physiological stability (Figure 3), there were significant differences between the groups in respiratory rate (F=3.264, P<0.001), peripheral capillary oxygen saturation (F= 4.122, P<0.001), and SCRIP score (F=10.769, P<0.001). There was no significant difference intemperature (F=0.146, P=0.423) and heart rate (F=0.168, P=0.684) between the intervention and control groups.

The data presented in Table 2 shows the clinical outcomes of preterm infants. With regard to duration of ventilation (F=0.183, P=0.671), there was no significant difference between the groups. The duration of hospital stay was less in the intervention group as compared to the control group; however, the difference was not statistically significant. The weight changes were statistically significant indicating improvement in the intervention group (F=1.172, P<0.001).

Discussion

Preterm birth places infants in the high-tech environment of NICU, posing considerable stress to them. Mimicking the position in utero (i.e., snuggle up positioning) supports the infant in a flexed, contained, and midline-oriented position as it is in utero.

A study conducted in New Delhi investigated the effect of nesting on posture discomfort and physiological parameters of low-birth-weight infants. There was a significant reduction in the discomfort in experimental group compared to the control group (t=10.65) (13).

A study conducted in Japan on very low birth weight infants demonstrated that prone position with nested and swaddled positioning facilitates sleep and heart rate stability compared to prone

positioning alone (14); findings of these studies are congruent with those of the present study. This study, comparing the snuggle up positioning to the routine care, showed a significant difference between the two groups in terms of cardiorespiratory stability, as documented by SCRIP score. A study conducted in the USA on preterm infants (age range: 26-32 weeks, till 1.8 kilograms weight) revealed that nesting (vs. non-nesting) prolonged hospital stay; however, no difference was noted in weight between the groups (15), which is contradictory to our findings.

The present study exhibited reduced length of hospital stay (4.71 days), which was not statistically significant (F=1.446, P=0.225). With regard to weight gain, a significant difference was noted (F=1.172, P<0.001) between the snuggle up positioning group and the routine care group.

Conclusion

Proper supported snuggle up positioning is recommended for very-low-birth-weight or premature infants as it promotes warmth, comfort, and development of pulmonary and cardiovascular systems. Furthermore, it facilitates the recovery of preterm infants from the respiratory complications associated with immaturity. Its other benefits include weight gain and reducing the duration of hospital stay. Further rigorous comfort positioning studies are required with large sample sizes and randomized, systematic methodological designs to determine its short- and long-term effects.

WHAT IS ALREADY KNOWN?

Intrauterine environment enables the neuromuscular development of the fetus. Very preterm neonates are at risk for compromise in the neuromuscular development due to lack of developmental supportive care in the Indian NICUs.

WHAT THIS STUDY ADDS?

Mimicking the intrauterine environment by using snuggle up position using positioning aids helps with maintaining the optimal environment for promoting physiological and neuromuscular stability.

Acknowledgments

No.

Conflicts of interests

No.

References

1. Liu L, Johnson HL, Cousens S, Perin J, Scott S, Lawn JE, et al. Global, regional, and national causes of child mortality: an updated systematic analysis for 2010 with time trends since 2000. The Lancet; 2012; 379(9832):2151-2161.
2. Bylund B., Cervin T, Finnström O, Gäddlin P, Kernell A, Leijon I, et al. Morbidity and neurological function of very low birthweight infants from the newborn period to 4y of age. A prospective study from the south-east region of Sweden. Acta Paediatrica;. 1998; 87(7): 758–763. doi: 10.1111/j.1651-2227. .tb01743.x
3. Vaucher YE. Bronchopulmonary dysplasia: an enduring challenge. Paediatric reviews Rev. 2002; 23(10):349-358.
4. Bregman J. Developmental outcome in very low birth weight infants. Current status and future trends. Pediatr Clin North Am. 1998; 45(3): 673-690.
5. Altimier, L, Philips RM. The neonatal integrative developmental care model: seven neuro protective core measures for family-centered developmental care. Newborn & Infant Nursing Reviews. 2013; 13(1): 9-22.
6. Beck S, Daniel W, Say Lale S, Betran AP, Mario M, Jennifer HR, et al. The worldwide incidence of preterm birth: a systematic review of maternal mortality and morbidity. Bulletin World Health Organization. 2010; 88(1):31-38.
7. Halverson, Kristia. "The effects of positioning on premature infant development". Michigan: (2010). Pediatrics CATs. 2010. Paper 5. http://commons .pacificu.edu/otpeds/5,
8. Fox RE, Viscardi RM, Taciak VL, Niknafs H, Cinoman MI.Viscardi RM, Taciak VL, Niknafs H, Cinoman MI. Effect of position on pulmonary mechanics in healthy preterm newborn infants. J Perinatol. 1993; 13(3):205–211.
9. Waitzman, KA. The importance of positioning the near-term infant for sleep, play, and development. Newborn& Infant Nursing Reviews. 2007; 7(2): 76-81.
10. Coughlin M, Gibbins S, Hoath S. Core measures for developmentally supportive care in neonatal intensive care units: theory, precedence and practice. . Journal of Advanced Nursing. 2009; 65(10):2239-2248. doi:10.1111/j.1365-2648.2009.05052.x.
11. Faul F, Edgar E, Buchner, A, Georg Lang, AG. Statistical power analyses using G*Power 3.1: Tests tests for correlation and regression analyses. Behavior Research Methods. 2009; 41(4): 1149-1160.
12. Jenni OG, von Siebenthal K, Wolf M, Keel M, Duc G, Bucher HUOskar J, Kurt S, Martin W, Matthias K, Gabriel D, Hans B. Effect of nursing in the head elevated tilt position (15 degrees) on the incidence of bradycardia and hypoxemic episodes in preterm infants. PedriatricsPediatrics. 1997; 100 (4):622-5.
13. Joana brigs Institute. Positioning of preterm infants for optimal physiological development. Best Pract. 2010; ice 14(18) 2010;:1-4. available at: www joannabriggs. edu.au

14. Kihara H, Nakamura T. Nested and swaddled positioning support in the prone position facilitates sleep and heart rate stability in very low birth weight infants. Research and Reports in Neonatol.ogy 2013; 3:11-14.
15. Beckmann CA. Use of neonatal boundaries to improve outcomes. Journal of Holistic Nursing;. 1997; 15(1):54–67.