ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF RESEARCH IN PHARMACEUTICAL SCIENCES

Published by JK Welfare & Pharmascope Foundation Journal Home Page: www.pharmascope.org/ijrps

Effect of positioning on physiological parameters on low birth weight preterm babies in neonatal intensive care unit

Alice Jeba J[*1], Senthil Kumar S[2], Shivaprakash sosale[3]

[1]Department of Pediatric Physiotherapy, NRR Hospital, Chikkabanavara, Bangalore-560090, Karnataka, India
[2]Saveetha college of Physiotherapy, Saveetha University, Thandalam, Chennai , Tamil Nadu, India
[3]Department of Pediatrics, NRR Hospital, Chikkabanavara, Bangalore -560090, Karnataka , India

Article History:

Received on: 05.03.2019
Revised on: 18.06.2019
Accepted on: 23.06.2019

Keywords:

Neonatal intensive care unit,
Nesting,
physiological parameters,
prematurity,
neonate

ABSTRACT

Preterm infants are babies who are delivered before the completion of 37 weeks gestation period. They are born with immature functioning of the brain. In Neonatal Intensive Care Unit (NICU), these infants receives many environmental stimuli, and their comfort will be disturbed. These various sensory stimulus received in NICU influence the functional and neurodevelopmental outcome of these infants and also their quality of life. So this study was intended to evaluate the axillary temperature, heart rate, respiratory rate and oxygen saturation level of these infants prior to nesting and after nesting at the 60^{th} minute. Forty preterm infants who fulfilled the criteria of selection were included in the study by simple random sampling and segregated into case and control groups by blocked randomization. Data was collected and recorded. The temperature was recorded by a digital thermometer, respiratory rate was counted by the number of times the infants' chest rises, heart rate and oxygen saturation readings from the pulse oximeter. The result of the study showed that there was statistically significant effect of nesting at 60^{th} minute, temperature ($t=5.03966, p<0.05$), respiratory rate($t= -2.13, p<0.05$) and heart rate ($t=-2.59766, p<0.05$). But the effect was not significant on oxygen saturation level ($t=1.2, p=0.238$). Hence this study result supports the use of nesting in NICU.

*Corresponding Author

Name: Alice Jeba J
Phone: 7204143730
Email: dralicejeba@yahoo.co.in

ISSN: 0975-7538

DOI: https://doi.org/10.26452/ijrps.v10i4.1550

Production and Hosted by

Pharmascope.org

INTRODUCTION

Neonates who are born prior to the term gestational age and with the immature neurological function will be in Neonatal Intensive Care Unit (NICU) for a long time. These infants are exposed to a lot of challenges from birth, in most of the areas of development. The major challenge in the first month of their life is state organisation and the development of coordinated patterns of sleep-wake cycle (Nakamura and Kihara, 2013) . Maturation of the Central Nervous System (CNS) will be reflected in a stable sleep-wake organization (Anders *et al.*, 1995) .

The NICU environment can affect the maturation and functioning of preterm infant's CNS. Changes in parameters such as heart rate (HR), respiratory rate (RR), colour, blood pressure and oxygen saturation (SaO_2) shows whether there is any physiological instability (Gill *et al.*, 2015) . Incorrect positioning in NICU leads to postural abnormalities such as abduction and externally rotated hip, everted ankles, neck hyperextension, shoulder retraction

and abduction (Symington *et al.*, 2001) .

A method which helps to maintain the baby's position & reduces the effect of external stimuli in NICU and also gives comfort to the baby and regulates sleep is nesting. It also facilitates the sleep pattern of the babies from erratic disturbed spells to deep sleep and thus helps in energy conservation and minimizes weight loss (Sheldon, 2002) .

The positioning which supports the development of the baby includes midline orientation, hand to mouth activity and fetal flexor pattern (Hennessy *et al.*, 2007) . This kind of positioning will be achieved through nesting. Keeping all this in view, this study intended to determine the changes in parameters of preterm infants in terms of heart rate, respiratory rate, temperature & oxygen saturation before and after the nesting.

MATERIALS AND METHODS

Research Design

The experimental design was chosen, consisting of pre-test and post-test control group.

Setting

The research was conducted in the NICU of NRR hospital, Bangalore.

Sample size

A total number of 40 preterm infants (20 in experimental & 20 in the control group) were selected.

Sampling technique

Simple Random sampling with blocked randomization.

Criteria for sample selection

Preterm infants who were admitted in NICU of NRR hospital.

Neonates who breathe spontaneously and do not require resuscitation.

Neonates with gestational age between 32- 36 weeks.

Neonates with no medical or surgical illness, congenital defects or IVH.

Neonates who were not treated with sedatives, 24hours prior to intervention.

Neonates whose age was less than 7 days.

Neonates who were allowed to participate in the study by parents/ guardians.

Description of the tool

Structured physiological parameters assessment sheet was used.

Method

An official permission was taken from the chairman of the hospital, and ethical approval was taken from the institutional ethical committee to conduct this study. The informed consent was obtained from all the parents/guardians. This study was done in neonatal intensive care unit of NRR hospital, Bangalore. Forty preterm babies were selected by simple random sampling and then divided into experimental (nesting) and control (routine procedure of wrapping) groups by blocked randomization. Physiological parameter assessment sheet was used. It consisted of two sections. Section one to record the demographic characteristics of preterm infants & section two included the physiological parameters values recording sheet. Axillary temperature was recorded through the digital thermometer. Respiratory rate was counted by number of times the infants' chest rises, for one full minute. Heart rate & oxygen saturation was monitored and recorded from a pulse oximeter.

The observations of HR, SaO_2, RR and Temperature were made and recorded before the nesting and simultaneously documented. Once again, the observations were recorded at 60^{th} minute & simultaneously recorded for the experimental group infants. Similarly, the same parameters were observed and recorded before the routine positioning of infants & once again at 60^{th} minute & simultaneously recorded for the control group infants. The same procedure was continued for five consecutive days, and the readings were recorded.

Data analysis

Data were analysed using SPSS version 16 software. The value of P if less than 0.05 was considered statistically significant.

RESULTS AND DISCUSSION

Out of forty subjects in the study, seven subjects were excluded due to illness, seventeen subjects were male, and sixteen were female participants. The subjects were 3-12 days old when nesting was implemented. 30.3% of subjects belonging to the gestational age between 28.0 and 32.6 weeks and 69.7% had gestational age between 33 and 36.6 weeks. Most of the subjects (97%) weighed between 1500- 2499 grams. All the participants had scored 7 and above in Apgar scoring at the 1^{st} minute and 5^{th} minute respectively. Preterm infant characteristics are shown in Table 1 .

The present study found that mean temperature, heart rate, respiratory rate and oxygen saturation

Table 1: Preterm Infant Characteristics in Experimental and Control groups

S.No	Variables	Experimental Group	Control Group
1	Age (days)	3-12 days	3-12 days
2	Gestational Age	33.3±1.46	33.31±1.49
	28.0-32.6 weeks	31.30%	29.40%
	33.0-36.6 weeks	68.80%	70.60%
3	Birth Weight (1500-2499 gms)	87.50%	100%
		1950.2±423.9	1905.9±282.81
4	Gender		
	Male	50%	53%
	Female	50%	47%
5	Apgar at 1st Min	7±0	7±0
	Apgar at 5th Min	7.93±0.44	7.88±0.60

Table 2: Physiological parameters of experimental & control groups before & after nesting

S.N	Parameters		Experimental group				Control Group			
			Mean	SD	t- value	p-value	Mean	SD	t-value	p-value
1	Tempe	Before nesting	98.06	0.2	<0.00001	<0.00001	98.08	0.1	3.77	<0.002
	rature	After Nesting	98.36	0.2			98.12	0.1		
2	HR	Before nesting	149.1	3.1	-22.03	<0.00001	149.4	4.2	-12.93	<0.00001
		After Nesting	144.3	3			147.5	4.1		
3	RR	Before nesting	56.5	2.5	-18.82	<0.00001	56.18	2.3	-5.99	1.9E-05
		After Nesting	53.18	2.3			54.82	2.1		
4	SaO2	Before nesting	94.25	1	11.18	<0.00001	95.29	1.2	4.2	0.00068
		After Nesting	95.5	0.8			95.12	1		

Table 3: Post test comparison between experimental & control groups

S.No	Parameters	t-value	p-value	Significance
1	Temperature	5.03966	0.000019	p<0.05
2	HR	-2.59766	0.014	p<0.05
3	RR	-2.13	0.041318	p<0.05
4	SaO2	1.2	0.238	not significant at p<0.05

of the babies before nesting and after nesting in the experimental & control group were significant at 0.05 significance level**.** Physiological parameters of both experimental & control groups before & after nesting is shown in Table 2 .

The result of the study further revealed that in the t-test comparison between both the groups after nesting, the statistically significant values were achieved in mean temperature, heart rate and respiratory rate but the oxygen saturation level was not significant at 0.05 level of significance. Post-test comparison between both the groups is shown in Table 3 .

The results of the present study revealed that nesting is very effective to raise and stabilize the temperature of preterm babies significantly. It is also effective to lower and stabilize the mean heart rate, mean respiratory rate of preterm infants. This result was consistent with the previous study done by Kihara H, Nakamura T. They found the effect of nested and swaddled positioning support compared with prone positioning alone in the very low birth weight babies and concluded that the nested and swaddled positioning facilitates sleep and heart rate stability (Anders *et al.*, 1995) .

Halverson had found that developmental care positioning promotes normal postural development and musculoskeletal development, maintains a patent airway and promotes thermal regulation. Premature infants who were developmentally positioned, cry less, have less flailing of their extremities and fewer behavioural indicators of pain, have improved physiologic outcomes and sleep states (Halverson, 2010) .

The present study further found that the nesting did not affect the mean oxygen saturation level of preterm babies. This was consistent with the result found by Halverson.,2010. The study conducted by Yogesh Kumar also determined that nesting helped to improve and stabilize physiological parameters (Gill *et al.*, 2015) . This study result is consistent with one of the previous study, which also found that preterm babies with low birth weight had stable physiological parameters in NICU (Mony *et al.*, 2018) .

Also, Comaru and Miura had done a study to assess the behavioural and physiological stability of preterm babies due to postural support and found that the stress was significantly reduced for babies who were nested compared with non- nested babies ($p<0.0001$) (Comaru and Miura, 2009) . It was also concluded that nesting is very beneficial in improving sleep patterns in NICU (Poulose *et al.*, 2015) .

Limitations

The sample size of this study is very small, as well as the intervention duration is very short. Preterm infants whose postmenstrual age between 32- 36 weeks only were included in the study.

CONCLUSIONS

This study was done among forty preterm babies and proved that Nesting is effective to improve and stabilize the physiological parameters of preterm babies who also weighed less during their stay in NICU. Nesting intervention improves the developmental care in NICU setting. This study results can be utilized in NICU to care the preterm babies, where there is a lack in parental care to prevent crippling complications like abnormal psychomotor and neurological sequelae. Further studies are recommended in this aspect with a larger sample size.

Acknowledgement

We thank all the study participants, their parents and all the members of NICU for their cooperation in completing this study.

REFERENCES

Anders, T., Sadeh, A., Appareddy, V. 1995. *Normal sleep in neonates and children. Principles and practice of sleep medicine in the child*. Philadelphia.

Comaru, T., Miura, E. 2009. Postural support improves distress and pain during diaper change in preterm infants. Journal of Perinatology, 29(7):504–507.

Gill, S. K., Kumar, Y., *et al.* 2015. A study to assess and evaluate the effects of Nesting on physiological parameters and comfort behaviour of preterm infants admitted in NICU of selected hospitals in Punjab and Haryana. . Journal of nursing science and practise, 5(2):2249–4758.

Halverson, K. 2010. the Effects of Positioning on Premature Infant Development. Pediatrics Critically Appraised Topics. CATs)2010. Retrievd at http://commons.pacifiu.edu/otpeds/5.

Hennessy, A., Maree, C., Becker, P. 2007. The effect of developmentally supportive positioning (DSP) on preterm infants' stress levels. Health SA Gesondheid, 12(1).

Mony, K., Selvam, V., Diwakar, K., Raghavan, R. V. 2018. Effect of nesting on sleep pattern among preterm infants admitted in NICU. Biomedical Research (India), 29(10):1994–1997.

Nakamura, T., Kihara 2013. 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 Neonatology.

Poulose, R., Babu, M., Shardarastogi, S. 2015. Effect of Nesting on Posture Discomfort and Physiological Parameters of Low Birth Weight Infants. IOSR Journal of Nursing and Health Science (IOSR-JNHS) e-ISSN, pages 2320–1959.

Sheldon, S. 2002. Sleep in infants and children. Sleep Med Philadelphia PA: Hanley and Belfus Inc.

Symington, A., J, P., *et al.* 2001. Developmental care for promoting development and morbidity in preterm infants. . Evidence based Nursing Journal., 4:75.