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Effect of Selected Position on Physiological Parameters of Neonates Admitted with Respiratory Problems in Neonatal Intensive Care Unit in a Selected Tertiary Care Hospital

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Abstract: Correct body positioning is a major nursing intervention to prevent respiratory problem and reduce complication. The important causes of neonatal deaths is birth asphyxia and along with serious infections results in more than 50% of all neonatal deaths.The study was conducted to assess the effect of positioning on physiological parameters of neonates admitted with respiratory problem and find out the difference among positions. The conceptual frame work of the study was based on Stuffle Beams evaluation model provides a framework for evaluation of an innovative intervention .The research design adopted was quasi experimental with one group post test design. The experiment was done by taking 60 neonates admitted for respiratory problem. The level of significance was found using "Z'' test & ANOVA.The mean heart rate in prone position is 132.4 ± 15.26 less than mean heart rate in lateral position is 137.8 ± 9.82 and in supine position is 141.6 ± 9.75. The mean oxygen saturation in prone position is 95.9 ± 2.87 is higher than the mean oxygen saturation in lateral position is 88.9 ± 2.49 and in supine position is 91.2 ± 2.54. The mean respiration rate in prone position is 43.8 ± 3.18 is less than in lateral position 51.4 ± 4.33 and supine position is 52.2 ± 1.9. The mean arterial pressure in supine position is 49.1 ± 8.27 is same as in prone position is 49.1 ± 8.12 and in lateral position is 48.56 ± 7.57.The mean of oxygen saturation, respiration rate, heart rate in prone position is clinically effective. Prone position improves oxygen saturation and decrease respiratory distress in compared to supine and lateral position in neonates having respiratory problems.

Keywords: Neonates, Supine, Prone, Lateral, oxygen saturation, respiration, mean arterial pressure, Heart rate.

INTRODUCTION

Neonates constitute the foundation of nation as the healthy babies can evolve strong adults. New born period is the most crucial period in a child's life. The most profound physiologic change required of the neonate is transition from fetal or placental circulation to independent respiration. The immediate adjustments include respiratory system, circulatory system thermoregulation and fluid and electrolyte balance etc. All the systems are trying to adjust to extra uterine life. Body alignment is known to affect many physiological and neural behavioural parameters the positioning of neonates is significant prolonged supine positioning for neonates is not desirable, since they appear to lose their sense of equilibrium when supine and use vital energy in attempts to recover balance by postural changes. In addition prolonged supine positioning is associated with long-term problems such as decreased flexion of the limbs, pelvis and trunk; widely abducted hips etc. The physical and mental well being of an individual depends on the correct management of events in perinatal period. Newborn who lack appropriate care at high risk for poor Health and reduced productivity in childhood and later. It has been observed that respiratory problems accounts for the most of the mortality in neonatal period. Respiratory disorders are the most frequent cause of admission for special care in both term and preterm Infants [1]. Body positioning is used an intervention in various situation.Correct body positioning is a major nursing concern to prevent problem and reduce complication. Since body alignment is known to affect many physiologic and neural behavioural parameters the positioning of neonates is significant [2].

A prospective study was conducted to find out the incidence, etiology and outcome of respiratory problems in newborns. All newborns (n = 4505), delivered at this hospital over a period of 13 months, were observed for respiratory problems. Relevant

antenatal, intranatal and neonatal information was noted. Cases were investigated for the cause of respiratory problems and found that the overall incidence of respiratory problems was 6.7%. Preterm babies had the highest incidence (30.0%) followed by post-term (20.9%) and term babies (4.2%). Transient tachypnea of newborn(TTN) was found to be the commonest in term and preterm babies(42.7%) cause of respiratory problems followed by infection (17.0%), meconium aspiration syndrome (10.7%), hyaline membrane disease (9.3%) and birth asphyxia (3.3%) among term and post-term babies. Overall case fatality ration for respiratory problems was found to be 19%, being highest for HMD (57.1%), followed by MAS (21.8%) and infection (15.6%). The results indicate that respiratory problem is a common neonatal problem in which TTN accounts for a large proportion of these cases [3].

Highly skilled care is necessary for early recovery of sick neonates. Many of the newborn care interventions are easy to implement and affordable in settings with poor resources as well [4].

Body positioning is used an intervention in various situation. Correct body positioning is a major nursing concern to prevent problem and reduce complication .Since body align ment is known to affect many physiologic and neural behavioural parameters the positioning of neonates is significant [5]

OBJECTIVES

- To assess the effect of positioning on selected physiological parameters of neonates in NICU, in a tertiary care hospital with respiratory problems.
- To compare the effect of selected positioning with the physiological parameters.

METHODOLOGY

The data collection method was observational method and sampling technique was non probability purposive sampling. The independent variables were positioning and dependent variables were Physiological parameters. The investigator provide the supine ,prone and lateral position and after 30 mins she assessed the mean value of 31st min 32ndmin and 33rdmin reading of each parameters such as Oxygen saturation, heart rate, respiration rate, mean arterial pressure respectively and put the mean value. The 60 neonates admitted in neonatal intensive care unit and the physiological parameters like oxygen saturation, respiration, mean arterial pressure and heart rate were assessed.The research design selected for study was quasi experimental with one group post-test design.The exclusion criteria were surgical cases and those who were in mechanical support. The data collection tool designed for the study was questionaires and observational check list.

DATA ANALYSIS AND INTERPRETATION

The age during admissionof samples 88.3% werein between 0-7 days of age, 70% babies were male ,60% were term, 50% AGA, 50% were having normal weight , 40% of study samples were 0-7 days,65% (39) of were having mild depression..

The mean heart rate in supine position is 141.6 $\pm$ 9.75 and the mean heart rate in lateral position is 137.8 $\pm$ 9.82 The obtained z value (2.127) was found to be statistically significant at P value (0.0334).The mean heart rate in prone position is 132.4 $\pm$15.26 and the mean heart rate in lateral position is 137.8 $\pm$ 9.82 The obtained z value (3.023) was found to be very statistically significant at P value (0.0025) .The mean heart rate in supine position is 141.6 $\pm$ 9.75 and the mean heart rate in prone position is 132.4 $\pm$ 15.26 The obtained z value(5.1) was found to be statistically significant at P (<0.001).The mean oxygen saturation in supine position is 91.2 $\pm$ 2.54 and the mean oxygen saturation in prone position is 95.9 $\pm$ 2.87 The obtained z value(9.497) was found to be extremely statistically significant at P (<0.0001). The mean oxygen saturation in supine position is 91.2 $\pm$ 2.54 and the mean oxygen saturation in lateral position is 88.9 $\pm$ 2.49. The obtained z value (5.003) was found to be extremely statistically significant at P (<0.0001).The mean oxygen saturation in prone position is 95.9 $\pm$ 2.87 and the mean oxygen saturation in lateral position is 88.9 $\pm$ 2.49. The obtained z value(14.27) was found to be extremely statistically significant at P (<0.0001) .The mean respiration rate in supine position is 52.2 $\pm$ 1.9 and the mean respiration rate in prone position is 43.8 $\pm$ 3.18 The obtained z value(17.567) was found to be extremely statistically significant at P (<0.0001). The mean respiration rate in supine position is 52.2 $\pm$ 1.9 and the mean respiration rate in lateral position is 51.4 $\pm$ 4.33. The obtained z value (1.65) was found to be not statistically significant at P value (0.988) The mean respiration rate in prone position is 43.8 $\pm$ 3.18 and the mean respiration rate in lateral position is 51.4 $\pm$ 4.33. The obtained z value (10.954) was found to be extremely statistically significant at P value (<0.0001). The mean arterial pressure in mean supine position is 49.1 $\pm$ 8.27 and the mean arterial pressure in prone position is 49.1 $\pm$ 8.12. The obtained z value (0) was found not to be statistically significant at P = (1). The mean arterial pressure in mean supine position is 49.1 $\pm$ 8.27 and the mean arterial pressure in lateral position is 48.56 $\pm$ 7.57. The obtained z value (0.374) was not statistically significant at P value is (0.7082).The mean arterial pressure in prone position is 49.1$\pm$ 8.12 and the mean arterial pressure in lateral position is 48.56 $\pm$7.57. The obtained z value (0.378) was not statistically significant at P value is (0.7).

Table-1: Mean of all parameters in selected positions

Parameters	Supine Position	Prone position	Lateral Position
Oxygen saturation	91.1	95.9	88.9
Respiration	52.2	43.8	51.4
Heart rate	141.6	132.4	137.8
Mean arterial pressure	48.37	49.1	49.7

The mean of oxygen saturation in prone position is 95.9 which is clinically significant than supine and lateral position. The mean of respiration rate in prone position 43.8 is clinically effective than the mean respiration rate in supine and lateral position. The mean heart rate in prone position 132.4 is clinically effective than the mean heart rate in supine and lateral position. There is no difference between the mean arterial pressure in supine prone and lateral position and hence there is no effect of positions upon the mean arterial pressure.

Table -2: Difference of physiological parameters between selected positions by ANOVA

	SS (Sum of squares)	Degree Of Freedom	Mean of sum of squares	F value	P value	F CRIT	Inferences
Variation between positions	18.25407	9	9.127037	0.005117	0.994899	4.25	Statistically not significant
Variation within positions	16051.63	2	1783.514				
Total	16069.88	11					

The sum of squares between the positions is 18.25407 and the sum of squares within the positions is 16069.88 and total sum of squares is 16069.88.The mean sum of squares between positions is 9.127037 and mean sum of squares within positions is 1783.514. The calculated f value is 0.005117 and the F value tabulated for horizontal *df =2* and vertical *df = 9* at 0.05 level of significance is 4.256495 and P value 0.994899.Hence the calculated F value 0.005117 is less than tabulated F value 4.256495, P value is calculated equals to 1.00000 which is not to be statistically significant.

DISCUSSION

The mean of oxygen saturation in prone position was 95.9± 2.87, respiration rate in prone position 43.8 ± 3.18, mean heart rate in prone position 132.4 ± 15.26 was clinically effective comparing with the lateral and supine positions and there was no effect of positions upon mean arterial pressure.

The sum of squares between the positions (supine, prone, lateral) was 18.25407 and the sum of squares within the positions (parameters) was 16069.88 and total sum of squares was 16069.88.The mean sum of squares between positions was 9.127037 and within positions was 1783.514. The calculated f value was 0.005117 at P value 0.99489. P value was calculated equals to 1.00000 which was not to be statistically significant.

This study was supported to the similar study conducted where he reported oxygen saturation in supine position was 84.84 ± 4.20,in prone position 91.05 ± 3.29 , after 4 hour 91.62 + 3.89 and after 6 hours it was 92.63 + 3.02 respectively with p value of < 0.001 which is statistically highly significant. It shows that oxygen saturation is increased by about 7%, and maximum oxygen saturation increases in first 2 hours. Similar trend was seen in respiratory rate with reduction of respiratory rate by 6 breaths / min in first two hours. Prone position improves oxygenation saturation and decreases respiratory distress as compared to supine position in neonates with respiratory distress [6].

A study was conducted to determine the effect of selected positions on the physiological parameters of neonates admitted with respiratory problems in NICU, Institute of child health, Kottayam (2008),found that the mean heart rate was no difference in supine and right lateral position, the mean respiratory rate in right lateral position and supine with 30°head end elevation positions are less than mean respiratory rate in supine position which was clinically significant not statistically significant. There was statistically significant difference in oxygen saturation level in right lateral position and supine with 30° head end elevated position at 30 min than in supine position at p{=0.05}[7]

CONCLUSION

The mean of oxygen saturation, respiration rate, heart rate in prone position was clinically effective. Prone position improves oxygen saturation and decrease respiratory distress in compared to supine and lateral position in neonates having respiratory problems. Three studies indicated that the supine positioning in healthy preterm infants was associated with higher respiratory rate than the prone position but the other study demonstrated that there were no

significant differences in the incidence of clinically significant apnea, bradycardia, or desaturation between supine and prone positions.

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