IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

EFFECT OF SELECTED BODY POSITIONS ON PHYSIOLOGICAL PARAMETERS OF PRETERM BABIES RECEIVING NASAL CONTINUOUS POSITIVE AIRWAY PRESSURE (NCPAP) IN NEONATAL ICU AT KMCH, COIMBATORE.

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ABSTRACT

Introduction:High prevalence of preterm infants' birth is considered a serious problem in health system in recent decades. Positions of the body in preterm neonates who receive respiratory support are accounted an important factor for ventilation and tissue oxygenation. **Method**: Quasi experimental multiple intervention posttest time series design was adopted for this study. Sixty preterm neonates were recruited using purposive sampling technique. Each preterm baby was placed in supine, prone, right lateral poistion.to assess the physiological parameters of heart rate, respiratory rate, SPO2, gastric residual value. **Result and discussion**: The comparison between the observation one and two in Heart Rate using paired 't' test show significant difference ($p<0.05$) for supine and prone position. There is no significant difference in right lateral position. The comparison between the observation one and two in Spo2 using paired 't' test show highly significant different ($p<0.001$) in prone positionThe 't' value for the gastric residual volume of comparison between the selected body position is 36.71 which is significant at $p<0.001$.It indicates the gastric residual volume low in right lateral position.

1. INTRODUCTION

Worldwide 15 million babies are born prematurely due to complication of premature birth, one million babies tragically lose their life and fight for life. In United States, one in every 10 babies are born prematurely and 12 out of 100 live births in preterm infants. In U.K 85% infants are born prematurely at a VLBW (very low birth weight) of 1000grams and 94% are born 24 weeks of gestation.

Premature babies with respiratory problems (dyspnea, respiratory distress,

Broncho pulmonary dysplasia and apnea), Cardiac problems (patent ductus arteriosus,hypotension), brain problems (intra ventricular haemorrhage, hydrocephalus, cerebral palsy, impaired cognitive skills,) temperature control problems (hypothermia produced hypoglycaemia). Preterm infants also suffer from digestive, metabolic, blood, immune, vision, hearing, dental, behavioural and psychological disorders, as well as various other medical complications and intermittent hospitalization during the neonatal period. Premature infants are at risk for developmental delay due to immaturity and lack of adequate muscle tone. Some delay are related to improper body mechanics rather than neurological impairment. So proper body alignment to promote normal motor development is essential This study revealed that positioning the preterm infants improve the physiological effect include respiratory function (oxygen saturation, tidal volume, respiratory rate), hemodynamic (heart rate , blood pressure), neuro motor development (motor activity) and gastric function (gastric esophageal reflux, gastric residual).

1.1 Objectives

- Determine the effect of different positions on physiological parameters of premature babies receiving the NCPAP.
- Associate between the selected background and clinical variables of preterm with the physiological parameters of the premature babies.

2. METHODOLOGY

2.1 Research design

Quasi experimental multiple intervention posttest time series design was adopted for this study.

2.2 Setting of the study

The study was conducted in Neonatal Intensive Care unit of Kovai Medical Center and Hospital, Coimbatore.

2.3 Population and sampling

all preterm babies who are receiving the NCPAP.

2.4 Sample size.

The sample size comprised of 60 preterm neonates.

2.5 Criteria for sample selection

Inclusion criteria

- Gestational age between 30 to 34 weeks
- Preterm babies belong to both sexes
- Age group of 2 to 7 days
- Birth weight of 1000 to 2,500 grams.
- A preterm baby who has spontaneous respiration receiving CPAP of flow 6 liters and PEEP 6cm.

Exclusion criteria

- Preterm babies with congenital anomalies
- Preterm babies with inotropic support
- Preterm babies with umbilical catheter in situ.

2.6 Sample technique

Samples were selected by Purposive sampling technique.

2.7 Description of the tool:

Development of the tool

The background variables, clinical profile and physiological parameters checklist prepared by the researcher.

Section A: Background data of preterm babies

The background variables of neonates include gender, birth weight, gestational age, mode of delivery, order of birth

Section B: Clinical profile of preterm babies

The clinical profile of the neonates include present diagnosis, FiO_2requirement, surfactant therapy, amount of milk per feeding, APGAR score, indication for NCPAP, obstetrical indication of preterm labor.

Section C: Observational Performa physiological parameters

The physiological parameters of the neonates includes Heart Rate, Respiratory Rate, Oxygen Saturation and Gastric Residual Volume.

2.8 Description of intervention

- ✓ **Supine position**: refers to babies on NCPAP lying horizontally with the head turned to side and roll will be placed under shoulders is the conventional body position of preterm.
- ✓ **Prone position**: refers babies on NCPAP whose position of the body lying facedown elbows will bent and arms will be placed at the sides and head turned toone sides.
- ✓ **Right side lying position**: refers to babies on NCPAP body lying right side withbody straight or forward.

2.9 Data Collection Procedure

The data collection was done for a period of 6 weeks. Ethical clearance obtained from ethical committee and chairman and managing director of Kovai Medical Center and hospital to conduct the study. The same information was communicated to the consultant neonatology, the study was explained to parents and their consent was obtained. Study participants were selected, according to the inclusion and exclusion criteria. Data collection procedure was explained to nurse in-charge in Neonatal Intensive Care Unit. The preterm baby was placed in supine, prone, right lateral position. In each position, the preterm babies left for half an hour to stabilize and then the physiological parameters like heart rate, oxygen saturation were recorded by using Maxima pulse oximeter, the respiratory rate was counted by the researcher and the nurses, gastric residual volume was observed after aspirate the stomach content before each feed during selected body positions. The interval between observation one and two was one hour (60 min) each preterm was observed two times in each positions. The whole process of data collection was 6 hours (360 min) for each preterm baby.

3. **RESULTS**

3.1 background characteristics

The background characteristics of preterm baby under the NCPAP as follows regarding sex male 61.67% dominates than the female. Based on birth weight 41.67% preterm belongs to 1000- 1500

grams and 58.33% preterm belongs to 1500-2500 grams. Majority of the preterm babies were born between 30-32 weeks 53.33%. According to mode of delivery 11.67% of Normal vaginal delivery (NVD) and 83.33% of LSCS. Regarding order of birth 61.67% first and 38.33% second born babies.

3.2 Clinical Characteristics

The clinical characteristic of preterm baby under NCPAP, the present diagnosis 51.67 % of preterm babies with RDS. FiO_2requirement of preterm babies is less than 30% is 66.67% and more than 30% is 33.33%. Regarding surfactant therapy only 31.67% received surfactant. The amount of milk 5 to 10ml received by 40% of preterm babies. The One minute of Apgar score was 7-10 for 36.67% and five minute of Apgar score was 8-10 for 61.67%. Regarding the indication of NCPAP 38.33% of preterm with RDS. The indication of preterm labor was PIH 35%.

3.3. Comparison between selected body positions with the physiological parameters of preterm babies during observation one and two**.**

	Positions	**n**	**Mean**	**Std. Deviation**	**Mean**	**Std. Deviation**	**Mean difference**	**'t' value**
HR	Supine	60	141.38	20.53	145.56	18.56	4.18	**2.86***
	Prone	60	144.85	18.56	147.73	19.00	2.88	**2.24 ***
	Right lateral	60	141.21	19.13	142.55	19.29	1.34	1.52
RR	Supine	60	63.13	11.11	64.60	10.99	4.17	1.84
	Prone	60	60.47	9.47	63.20	11.36	1.73	1.56
	Right lateral	60	61.93	10.43	62.70	10.56	0.77	0.90
SpO_2	Supine	60	93.38	3.50	95.00	3.61	1.62	**2.33 ***
	Prone	60	93.30	3.64	96.25	2.21	2.95	**3.94 *****
	Right lateral	60	92.65	2.00	94.10	2.25	1.45	**2.25 ***

*significant at $p < 0.05$, *** $p<0.001$, NS Non significant

3.4.Comparison of selected body positions with the Gastric residual volume of preterm babies

	N	Mean	Std. Deviation	't' value
Supine position	60	6.38	3.28	36.71***
Prone position	54	4.05	1.91	
Right lateral position	38	2.11	1.24	
Total	152	4.49	2.96	

***significant at p<0.001

3.5. Association between selected background and clinical profile of preterm with their physiological parameters in each position.

- Association between both birth weight and Mode of delivery with the Respiratory Rate during supine position was significant χ^2= 1.97, 2.04 at p<0.05.
- Association between both birth weight and gestational age with the Heart Rate during prone position was significant χ^2=2.01, 1.97 at p<0.05.
- Chi square test used to association between both birth weight and gestational age with the Respiratory Rate for prone position was significant χ^2= 1.98, 2.00 at p<0.05.
- Association between both birth weight, gestational age with the SpO_2 during prone position was χ^2=2.01, 2.12 which was significant at p<0.05.
- The association between the surfactant therapy with the SpO_2 during supine position was significant χ^2=1.99 at p<0.05.
- Chi square test to associate between FiO_2 requirement with the SpO_2 during right lateral position was significant χ^2= 2.49 at p<0.05

4. DISCUSSION

- The mean SpO_2 for supine position, prone position and right lateral at 60 minute were 93.38%, 93.30% and 92.65% respectively. The SpO_2 was increased in observation two taken at 120 minute. The corresponding SpO_2 for supine position, prone position and right lateral position were 95%, 96.25% and 94.10%.The comparison between the observation one and two in SpO_2 using paired 't' test show highly significant different in prone position.
- The mean gastric residual volume of newborns babies in selected body positions as follows, for mean volume for supine 6.38ml, for prone 4.05ml, for right lateral 2.11ml. There was a significant difference in gastric residual volume for right lateral't'36.71 significant at p<0.001.

5. CONCLUSION:

- Statistically proved that the Prone position was superior in maintaining SpO_2 than other two positions, for preterm babies under NCPAP.

- The Heart rate was slightly increase in supine and prone position.
- The gastric residual volume was lower right lateral position than other two positions.

6 . LIMITATION

The study sample was 60, could not include 76 because of want of time.

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