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## A comparative study to evaluate the effectiveness of lateral position versus supine position on respiratory parameters among infants with respiratory problems

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### Abstract

**Introduction:** Neonatal respiratory dysfunction is common because the process of lung development is protracted and differentiation of anatomic structures for gas exchanging and surface and surfactant production begins there after survival increases markedly. The risk of an Indian child dying of respiratory problems is 30-75 times more than that of its counterpart in the developed world. In India they account for 14.3% of deaths during infancy. Positions are important to reduce the breathing difficulties by improving lung ventilation because of gravity action in different positions.

**Methods:** A True- Experimental pretest posttest design was adopted for the study. The study was conducted in selected Hospital, Nellore District. 60 infants with respiratory problems were selected by simple random technique. Observational check list was used to assess the respiratory parameters.

**Results:** The study shows that in supine position among 30 infants in pretest, 17 (57%) children had mild, 11 (37%) had moderate and 2 (6%) had severe respiratory difficulty whereas in posttest 24 (80%) had mild, 5 (17%) had moderate and 1 (3%) had severe respiratory difficulty. In lateral position group among 30 samples in pretest, 23 (77%) infants had mild, 7 (23%) had moderate respiratory difficulty whereas in posttest, 20 (67%) infants had mild, 8 (27%) had moderate and 2 (6%) had severe respiratory difficulty.

**Conclusion:** The study reveals that there is no significant difference with supine or lateral position on respiratory parameters in both group-I and group-II among infants with respiratory problems.

**Keywords:** Lateral position, Supine position, Respiratory parameters, Infants.

### Introduction

Infants are the most vulnerable group for infections. Even though there are several diseases which are affecting the infants among those respiratory problems place first. Neonatal respiratory dysfunction is common because the process of lung development is protracted at Children need special attention and protection towards the quality of care when compared to adults<sup>[1]</sup>.

Prevalence of respiratory infections possess a major challenge to the health system in developing countries because of high morbidity and mortality. It is estimated that Bangladesh, India, Indonesia, and Nepal together account for 40% of the global respiratory infections mortality. Interestingly infants living in overcrowded surroundings and sub optimally breast-fed are more likely to suffer respiratory infections-related illnesses<sup>[2]</sup>.

Patient positioning can markedly improve physiological lung function. The use of judicious positioning can also enhance the cardiopulmonary response.

### 2. Objectives

1. To assess the respiratory parameters of infants with respiratory problems.
2. To assess the effectiveness of lateral position on respiratory parameters among infants with respiratory problems.
3. To assess the effectiveness of supine position on respiratory parameters among infants with respiratory problems.
4. To compare the effectiveness of lateral position and supine position among infants with respiratory problems.

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5. To associate effectiveness of lateral position on respiratory parameters among infants with respiratory problems with the sociodemographic variables.
6. To associate effectiveness of supine position on respiratory parameters among infants with respiratory problems with the sociodemographic variables.

**3. Materials and Methods:** A True –Experimental study was conducted in Narayana Medical College Hospital, at Nellore District. Sample sizes of 60 infants with respiratory problems were selected by probability simple random technique by means of lottery method. Observational check list was used to assess the respiratory parameters.

**3.1 Sample Size:** 60 infants with respiratory problems were selected by using probability simple random technique by means of lottery method. Data were obtained by the following methods:

- A. Through questionnaire method by interviewing the mothers for assessing their sociodemographic variables
- B. Observational check list to assess the respiratory parameters. The study period was one month, February, 2015. The data entry & analysis was done, using the Microsoft excel. Results were presented as percentage with correct responses.

**2.2 Ethical Clearance:** There was no drug administration or invasive procedure involved in the study. A written permission was obtained from the institutional authority and ethical committee. Written informed consent was obtained from mothers of infants who participated in the study and Confidentiality and anonymity of the subjects was maintained throughout the study.

**4. Results**

**Table 1:** Distribution of Demographic Variables of the infants with respiratory problems (N=60)

| S. No | Demographic Variables  | Group-I                |    | Group-II                |    |
|-------|--|------------------------|----|-------------------------|----|
|       |  | Supine position (n=30) |    | Lateral position (n=30) |    |
|       |  | f                      | %  | f                       | %  |
| 1.    | <b>Age:</b>  | 2                      | 7  | 2                       | 7  |
|       | a) Neonate   | 11                     | 37 | 15                      | 50 |
|       | b) 1-6 months  | 7                      | 23 | 7                       | 23 |
|       | c) 6-9 months  | 10                     | 33 | 6                       | 20 |
|       | d) 9-12 months   |                        |    |                         |    |
| 2.    | <b>Gender:</b>   | 17                     | 57 | 20                      | 67 |
|       | a) Boy baby  | 13                     | 43 | 10                      | 33 |
|       | b) Girl baby   |                        |    |                         |    |
| 3.    | <b>Birth weight:</b>   | 5                      | 17 | -                       | -  |
|       | a) 1500-2001 grams   | 11                     | 36 | 12                      | 40 |
|       | b) 2001-2500 grams   | 14                     | 47 | 16                      | 53 |
|       | c) 2501-3000 grams   | -                      | -  | 2                       | 7  |
|       | d) More than 3000 grams  |                        |    |                         |    |
| 4.    | <b>APGAR Score</b>   | 9                      | 30 | 8                       | 26 |
|       | a) 8-10  | 14                     | 47 | 17                      | 57 |
|       | b) 6-8   | 7                      | 23 | 5                       | 17 |
|       | c) 4-6   |                        |    |                         |    |
| 5.    | <b>Maturity at birth</b>   | 23                     | 77 | 25                      | 83 |
|       | a) Term  | 6                      | 20 | 5                       | 17 |
|       | b) Pre term  | 1                      | 3  | -                       | -  |
|       | c) Post term   |                        |    |                         |    |
| 6.    | <b>Mode of delivery</b>  | 15                     | 50 | 15                      | 50 |
|       | a) Normal delivery   | 15                     | 50 | 15                      | 50 |
|       | b) Caesarian section   |                        |    |                         |    |
| 7.    | <b>Birth order of baby</b>   | 15                     | 50 | 11                      | 37 |
|       | a) First child   | 12                     | 40 | 14                      | 46 |
|       | b) Second child  | 3                      | 10 | 5                       | 17 |
|       | c) Third child   |                        |    |                         |    |
| 8.    | <b>History of respiratory distress at birth</b>                        | 8                      | 27 | 8                       | 27 |
|       | a) Yes   | 22                     | 73 | 22                      | 73 |
|       | b) No  |                        |    |                         |    |
| 9.    | <b>Type of respiratory problem</b>                                     | 1                      | 3  | 2                       | 7  |
|       | a) ARI   | 8                      | 27 | 7                       | 23 |
|       | b) Bronchiolitis   | 2                      | 7  | 9                       | 30 |
|       | c) Bronchitis  | 10                     | 33 | 7                       | 23 |
|       | d) Pneumonia   | 9                      | 30 | 5                       | 17 |
|       | e) Others like Asthma, rhinitis, wheeze associated respiratory disease |                        |    |                         |    |
| 10.   | <b>History of hospitalization during neonatal period</b>               | 9                      | 30 | 8                       | 27 |
|       | a) Yes   | 21                     | 70 | 22                      | 73 |
|       | b) No  |                        |    |                         |    |

**Table 2:** Frequency and percentage distribution of Respiratory Parameters among infants with Respiratory problems of Group –I and group-II

| S.NO | Respiratory Parameters   | GROUP-I(n=30) |    | GROUP-II(n=30) |    |
|------|--|---------------|----|----------------|----|
|      |  | f             | %  | f              | %  |
| 1    | <b>Temperature</b>   |               |    |                |    |
|      | a)98.6F  | 19            | 67 | 13             | 44 |
|      | b)<98.6F   | 1             | 3  | 1              | 3  |
| 2    | c)>98.6F   | 10            | 30 | 16             | 53 |
|      | <b>Pulse rate</b>  |               |    |                |    |
|      | a)120-140/mt   | 16            | 53 | 14             | 47 |
| 3    | b)<120/mt  | 8             | 27 | 6              | 20 |
|      | c)>140/mt  | 6             | 20 | 10             | 33 |
| 3    | <b>Blood pressure</b>  |               |    |                |    |
|      | Pulse rate   |               |    |                |    |
|      | a)80/60+/- 20/10 mm of Hg  | 19            | 63 | 20             | 67 |
| 4    | b)>100/70 mm of Hg   | 11            | 37 | 10             | 33 |
|      | <b>Respiratory rate</b>  |               |    |                |    |
|      | a)30-60 breaths/mt   | 28            | 93 | 28             | 93 |
| 5    | b)61-70 breaths/mt   | 2             | 7  | 2              | 7  |
|      | <b>Depth</b>   |               |    |                |    |
|      | a)Normal   | 1             | 3  | 2              | 7  |
| 6    | b)Shallow  | 20            | 67 | 20             | 67 |
|      | c)Deep   | 9             | 30 | 8              | 26 |
| 6.   | <b>Retractions</b>   |               |    |                |    |
|      | a)Absent   | 3             | 10 | 2              | 7  |
|      | b)Minimal  | 15            | 50 | 20             | 67 |
|      | c)Moderate   | 10            | 33 | 7              | 23 |
| 7.   | d)Marked   | 2             | 7  | 1              | 3  |
|      | Nasal flaring  |               |    |                |    |
|      | a)Absent   | 10            | 33 | 9              | 30 |
|      | b)Minimal  | 7             | 23 | 13             | 44 |
| 8    | c)Moderate   | 11            | 37 | 8              | 26 |
|      | d)Marked   | 2             | 7  | -              | -  |
|      | Chest in drawing   |               |    |                |    |
|      | a)Mild supraclavicular intercostals, sub costal in drawing of the chest      | 18            | 60 | 24             | 80 |
| 9    | b)Moderate supra clavicular intercostals, sub costal in drawing of the chest | 11            | 37 | 5              | 17 |
|      | c)Marked supraclavicular intercostals, sub costal in drawing of the chest    | 1             | 3  | 1              | 3  |
|      | <b>Wheezing</b>  |               |    |                |    |
| 9    | a)Absent   | 11            | 36 | 7              | 23 |
|      | b)Minimal audible with stethoscope   | 16            | 54 | 16             | 54 |
|      | c)Marked audible with stethoscope  | 3             | 10 | 7              | 23 |
| 10   | <b>Auscultation (Ronchi/Crackles)</b>  |               |    |                |    |
|      | a)Absent   | 14            | 47 | 10             | 33 |
|      | b)Minimal  | 10            | 33 | 16             | 54 |
|      | c)Moderate   | 6             | 20 | 3              | 10 |
| 11   | d)Marked   | -             | -  | 1              | 3  |
|      | <b>Oxygen saturation</b>   |               |    |                |    |
|      | a)Without oxygen 90-100  | 18            | 60 | 24             | 80 |
|      | b) Without oxygen 90-80  | 11            | 37 | 6              | 20 |
|      | c)Without oxygen 80-70   | 1             | 3  | -              | -  |

**Table 3:** Effectiveness of supine position on respiratory parameters among infants with Respiratory problems in Group-I (n=30)

| Stages                          | Group –I(Supine position) |     |              |     |
|---------------------------------|---------------------------|-----|--------------|-----|
|                                 | Pretest (f)               | %   | Posttest (f) | %   |
| Mild respiratory difficulty     | 17                        | 57  | 24           | 80  |
| Moderate respiratory difficulty | 11                        | 37  | 5            | 17  |
| Severe respiratory difficulty   | 2                         | 6   | 1            | 3   |
| Total                           | 30                        | 100 | 30           | 100 |

Table.No.3reveals that among 30 samples in pretest, 17 (57%) children had mild respiratory difficulty, 11 (37%) had moderate respiratory difficulty and 2 (6%) had severe

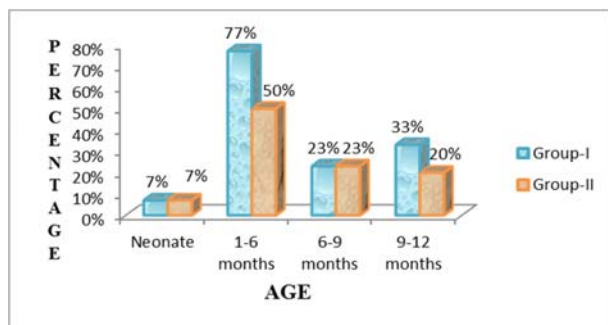
respiratory difficulty whereas in posttest 24 (80%) had mild respiratory difficulty, 5 (17%) had moderate respiratory difficulty and 1 (3%) had severe respiratory difficulty.

**Table 4:** Effectiveness of lateral position on respiratory parameters among infants with Respiratory problems in Group-II (n=30)

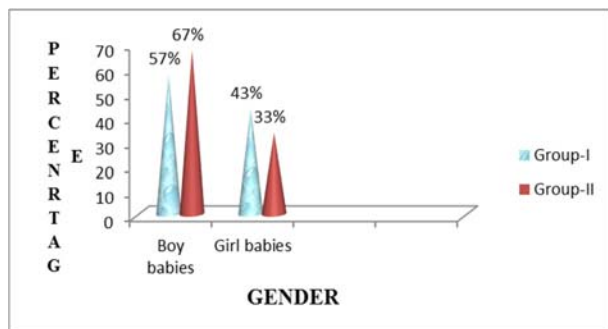
| Stages                          | Group -II (Lateral position) |     |              |     |
|---------------------------------|------------------------------|-----|--------------|-----|
|                                 | Pretest (f)                  | %   | Posttest (f) | %   |
| Mild respiratory difficulty     | 23                           | 77  | 20           | 67  |
| Moderate respiratory difficulty | 7                            | 23  | 8            | 27  |
| Severe respiratory difficulty   | -                            | -   | 2            | 6   |
| Total                           | 30                           | 100 | 30           | 100 |

Table.No-4 reveals that among 30 samples in pretest, 23 (77%) infants had mild respiratory difficulty, 7 (23%) had moderate respiratory difficulty whereas in posttest, 20 (67%) infants had mild respiratory difficulty, 8 (27%) had moderate respiratory difficulty and 2 (6%) had severe respiratory difficulty.

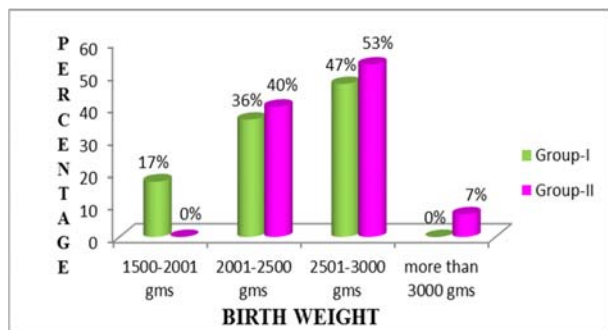
**Frequency and percentage distributions of socio demographic variables**



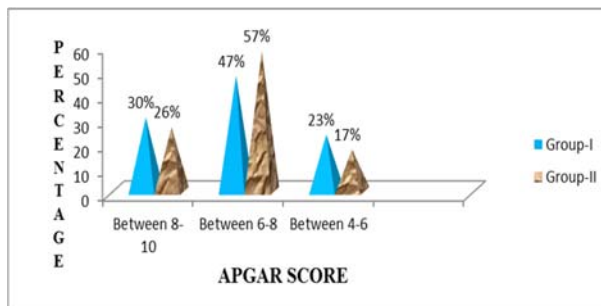
**Fig 1:** Percentage distribution of infants in both group-I and group-II based on age



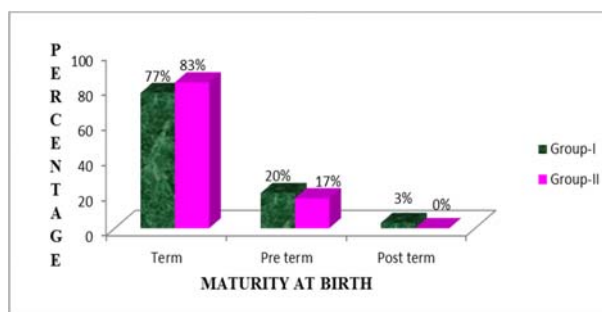
**Fig 2:** Percentage distribution of infants in both group-I and group-II based on gender



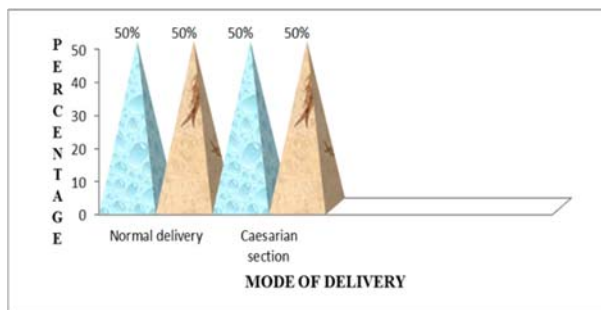
**Fig 3:** Percentage distribution of infants in both groups based on Birth weight



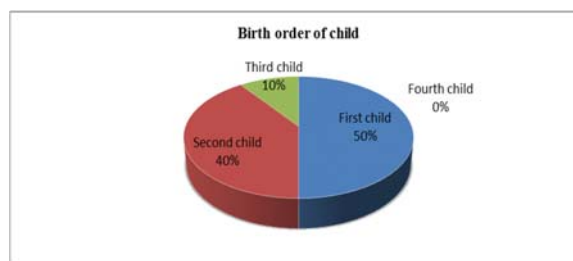
**Fig 4:** Percentage distribution of infants in both groups based on Apgar score



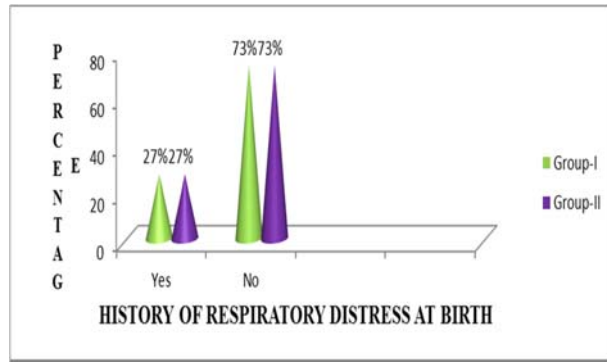
**Fig 5:** Percentage distribution of infants in both groups based on Maturity at birth



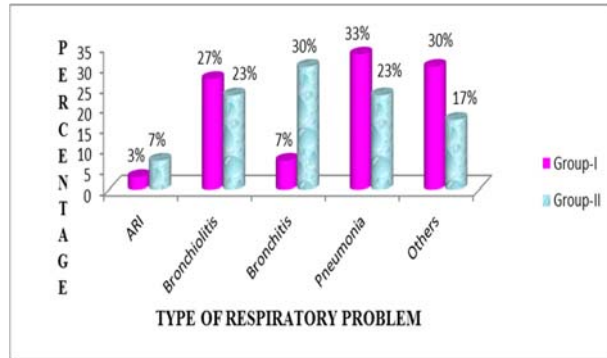
**Fig 6:** Percentage distribution of infants in both group-I and group-II based on Mode of delivery



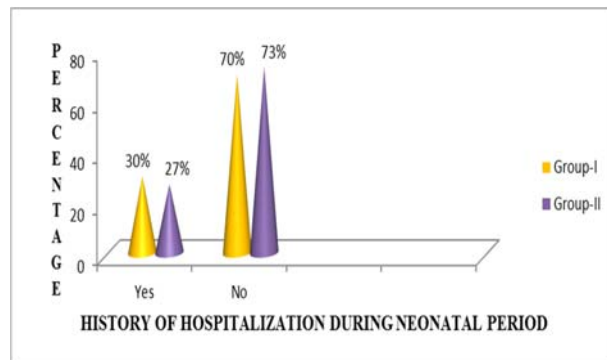
**Fig 7:** Percentage distribution of infants in both groups based on Birth order of child.



**Fig 8:** Percentage distribution of infants in both groups based on History of respiratory distress at birth



**Fig 9:** Percentage distribution of infants in both group-I and group-II based on Type of respiratory problem



**Fig 10:** Percentage distribution of infants in both group-I and group-II based on History of hospitalization during neonatal period

#### 4. Discussion

##### Characteristics of Back Ground Variables.

**Table.No.1** shows that Among the 60 infants, with regard to the age group, 15 (50%) infants were between 1-6 months, regard to gender 20 (67%) infants boy babies, regarding to birth weight 16 (53%) were 2001-2500 grams, regard to APGAR score 17 (57%) infants had 6-8 score, regard to maturity at birth 25 (83%) were term babies, regard to mode of delivery 15 (50%) were born by normal vaginal and caesarian section delivery, regard to birth order of baby, 15 (50%) were first born babies, regard to history of respiratory distress at birth, 22 (73%) child had no history of distress at birth, regard to type of respiratory problem, 10 (33%) infants had Pneumonia, regard to hospitalization during neonatal period, 21 (70%) did not had history of hospitalization in neonatal period.

A community-based cross-sectional study was conducted in urban and rural areas of Puducherry, India to estimate the

prevalence of ARI and selected associated factors among under-five children. Data were collected from 509 parents of under-five children regarding ARI incidence along with socio-demographic and selected associated factors. Results showed that overall prevalence of ARI was observed to be 59.1%, with prevalence in urban and rural areas being 63.7% and 53.7%, respectively. Bivariate analysis indicated that overcrowding, place of residence, and mother's education was significantly associated with ARI. Multiple logistic regression analysis suggested that presence of overcrowding (adjusted odds ratio [AOR] = 1.492), urban residence (AOR = 2.329), and second birth order (AOR = 0.371) were significant predictors of ARI [3].

Findings related to effectiveness of supine position and lateral positions on respiratory parameters among infants with Respiratory problems based on pretest and post test scores

Table.No-3 reveals that among 30 samples in pretest, 17 (57%) children had mild respiratory difficulty, 11 (37%) had moderate respiratory difficulty and 2 (6%) had severe respiratory difficulty whereas in posttest 24 (80%) had mild respiratory difficulty, 5 (17%) had moderate respiratory difficulty and 1 (3%) had severe respiratory difficulty.

A Retrospective study was conducted to determine the effectiveness of prone, supine, and side position on oxygen saturation, temperature, respiratory rate, and heart rate in IFBA Hospital at Saudi Arabia. 117 healthy term and preterm infants with median birth weight of 2580grams were selected. Data was collected through medical records. Results showed that in prone position infants had higher oxygen saturation (p=0.02) compared to side and supine position. Side positioning was associated with significantly higher body temperature and lower respiratory rate (p less than 0.0001 and 0.004 respectively). No significant difference in heart rate. Respiratory rate was lower in supine and side position (p=0.005 and p=0.004 respectively) [4].

Table.No-4 reveals that among 30 samples in pretest, 23 (77%) infants had mild respiratory difficulty, 7 (23%) had moderate respiratory difficulty whereas in posttest, 20 (67%) infants had mild respiratory difficulty, 8 (27%) had moderate respiratory difficulty and 2 (6%) had severe respiratory difficulty.

A study was conducted on Body positioning for spontaneously breathing preterm infants with apnea to determine the effect of body positioning on cardio respiratory functioning in spontaneously breathing preterm infants with clinically significant apnea. 114 samples were selected by random sampling method. Data was analyzed performed assessment of trial quality, data extraction and synthesis of data using standard methods of the Cochrane Neonatal Review Group. Results showed that bradycardia, oxygen desaturation or oxygen saturation with body positioning like supine versus prone; prone versus right lateral; prone versus left lateral; right lateral versus left lateral; prone horizontal versus prone head elevated; right lateral horizontal versus right lateral head elevated and left lateral horizontal versus left lateral head elevated were not shown any effect on reduction of apnea [5].

#### 5. Conclusion

The study reveals that there is no significant difference with supine or lateral position on respiratory parameters in both group-I and group-II among infants with respiratory problems.

## 6. Recommendations

Based on the findings the following recommendations are suggested for future research.

1. Similar study can be conducted with large samples in different settings.
2. A cross sectional study can be conducted to refine the respiratory status of children
3. A comparative study can be conducted between the effect of lateral versus prone position on sleep among infants
4. A comparative study can be conducted between supine and prone position among infants on physiological parameters.
5. A study can be conducted to assess the relationship between respiratory status and health outcome among pre term infants.

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