

# Effectiveness of Respiratory Therapy on Respiratory Parameters and Behavioural Response of children with Lower Respiratory Tract Infection

Anjali K V<sup>1</sup>, Dr. Sreedevi T R<sup>2</sup>

<sup>1</sup>Junior Lecturer, Govt. College of Nursing, Thiruvananthapuram, India

<sup>2</sup>M. Sc (N), Ph.D, Professor, Govt. College of Nursing, Alappuzha, India

**Abstract:** *The present study investigated the effectiveness of respiratory therapy on respiratory parameters and behavioural response of children with lower respiratory tract infections. The conceptual framework for the study was based on Betty Neuman's system model. The research design selected for this study was quasi experimental pre test post test control group research design. Seventy children with LRTI were selected by purposive sampling. Results of the study revealed that respiratory therapy had a statistically significant effect in improving respiratory parameters such as respiratory rate, oxygen saturation, breathing pattern, air entry and abnormal breath sounds at 0.05 level. There was a statistically significant difference in the behavioural response in terms of cry, activity, comfort, social interaction, facial expression and feeding of children with lower respiratory tract infection between control and experimental group at 0.05 level.*

**Keywords:** Respiratory therapy, respiratory parameters, behavioural response, children with lower respiratory tract infection

## 1. Introduction

Acute respiratory infections are the main cause of utilization of health services by under five children in many countries. Every year ARI in young children is responsible for an estimated 3.9 million deaths worldwide. It is estimated that Bangladesh, India, Indonesia and Nepal together account for 40% of the global ARI mortality. About 90% of the ARI deaths are due to pneumonia which is usually bacterial in origin<sup>1</sup>

In the developed world, the annual incidence of pneumonia case is estimated to be 33 per 10000 among children younger than five years and 14.5 per 10000 in children 0-16 years.<sup>2</sup>

Severity of respiratory tract infection is mainly due to the presence of thick secretion in the airway and usually it can lead to death of children. If the respiratory function is not maintained that may lead to respiratory insufficiency and finally lead to respiratory failure. Respiratory therapy is essential to improve and maintain the well being of the patients with airway obstruction. The respiratory therapy management will include aerosol therapy (humidification and nebulization), postural drainage with percussion and vibration autogenic drainage, breathing exercises, diaphragmatic breathing, sustained maximal inspiration and segmental breathing exercises. Early chest physiotherapy can prevent several complications and also help the patients to gain independence and return to an active life style. Respiratory therapy plays a significant role in parenchymal expansion by improving the efficiency of respiratory muscles<sup>-3</sup>

Percussion and vibration helps in evacuating inflammatory exudates and tracheobronchial secretions, removing airway obstruction, decreasing airway resistance, improving gas exchange and diminishing the work of breathing. This

ensures every cell in the body receives adequate supply of oxygen. This oxygen enters the blood stream in the lungs, through the alveolar sacs and attaches to hemoglobin of red blood cells, which is carried to the whole body.<sup>4</sup>Effect of vibration and percussion of chest wall is having wonderful advantage for the children with respiratory infection to relieve symptoms. Breathing exercise as an integral part plays a significant role in airway clearance and parenchymal expansion by improving the efficiency of respiratory muscles. Thus it increases oxygen consumption. Breathing exercises helps to strengthen the children's lungs and control their breathing thus it help to reduce the severity of respiratory signs and symptoms Modified breathing exercise is mandatory in children because they might not cooperate like adults. The principle is to attract children and not to create boredom. It can be accompanied by musical tone that would evince interest in child

Various modified forms of breathing exercises like balloon blowing, blowing air into the water with a straw, blowing a trumpet, flute and mouth organ playing are found effective in children.<sup>5</sup>Chest physiotherapy with the standard treatment plays a significant role in improving the health of children with lower respiratory tract infection.<sup>3</sup>

## Objectives

- 1) To assess the respiratory parameters of children with lower respiratory tract infection.
- 2) To assess the behavioural response of children with lower respiratory tract infection
- 3) To find out the effectiveness of respiratory therapy on respiratory parameters of children with lower respiratory tract infection.
- 4) To determine the effectiveness of respiratory therapy on the behavioural response of children with lower respiratory tract infection.

Volume 9 Issue 5, May 2020

[www.ijsr.net](http://www.ijsr.net)

Licensed Under Creative Commons Attribution CC BY

## 2. Materials and methods

A quantitative approach was used for the study. The study design selected was Quasi experimental Pretest post test control group design. Non probability sampling technique was employed to select 70 children between 2-4 years of age admitted with lower respiratory tract infection admitted in medical wards of a tertiary care hospital according to inclusion criteria. The subjects were grouped into control and experimental groups consisting of 35 subjects each. The purpose of the study was explained and informed consent was obtained from the mothers of the participants in the prescribed format prior to data collection. The confidentiality of the data collected was assured. Basic information of children with lower respiratory tract infection was collected using demographic data sheet and clinical data sheet which was filled by the investigator.

Initial assessment of demographic data, clinical data, respiratory parameters and behavioural response were done in control group and experimental group. No intervention was given to the control group other than routine care and post test was conducted to measure the respiratory parameters and behavioural response on 5th day using the same scales. After initial assessment, respiratory therapy including percussion and vibration of child's anterior and posterior chest followed by blowing exercise was given to experimental group. Percussion of anterior and posterior chest was done by using manual percussor for 2 minutes, chest vibration by hands for 5 breaths and blowing exercise for 5 minutes two times daily for 5 days. In blowing exercise, child was allowed to blow to the bottle containing coloured thermocol balls through a straw. Post test was conducted on the 5th day using the same scales.

## 3. Results of the Study

### Sample characteristics

In this study more than half of the population, 71.4% in control group and 65.7% in experimental group belonged to age of more than 3 years. Majority of children in control group (68.6%) and in experimental group (65.7%) were males. Regarding birth order, 20% in control group and 40% in experimental group were with birth order one. In the study, 51.4% of children in control group and 65.7% in experimental group lives in rural area. Majority of children (71.4%) in control group and experimental group belongs to nuclear family.

In this study children with pneumonia are equally distributed in both control and experimental group (100%). Regarding the frequency of LRTI in last 6 months, 40% of children in control group and 25.7% in experimental group had one episode of LRTI. In this study, 25.7% of children in control group and 20% in experimental group had hospitalization once within one year. In the present study, 29% in control group and 23% experimental group had history of use of nebulization. Majority of children in control group (48.6%) and in experimental group (62.9%) had use of MDI.

### Respiratory parameters of children with lower respiratory tract infection

Majority of children in control group (60%) and in experimental group (42.9%) had a respiratory rate at a range of 40-50 breaths/minute. In this study, 25.7% both in control group and experimental group were having oxygen saturation within 95-97%. While considering breathing pattern of children with lower respiratory tract infection, 42.9% in control group and 31.4% in experimental group had inter costal retractions only, whereas 57.1% in control group and 68.6% in experimental group had both intercostals and subcostal retractions.

In the present study, more than half of children with lower respiratory tract infection, 71.4% in control group and 65.7% in experimental group had air entry decreased at lung field. The remaining 28.6% in control group and 31.4% in experimental group had air entry good at lung field.

With regard to abnormal breath sounds, majority of children with lower respiratory tract infection in control group (62.9%) and in experimental group (57.1%) had extensive abnormal breath sounds. Remaining 37.1% in control group and 42.9% in experimental group had scattered abnormal breath sounds.

### Behavioural response of children with lower respiratory tract infection

Majority of children in control group (60%) and in experimental group (48.6%) were with moderate behavioural response. In this study, 40% of children in control group and 51.4% of children in experimental group were with poor behavioural response.

### Effectiveness of respiratory therapy on respiratory parameters of children with lower respiratory tract infection

Respiratory parameters includes respiratory rate, SpO<sub>2</sub>, breathing pattern, abnormal breath sounds and air entry and were assessed using respiratory parameter assessment scale. Effectiveness of respiratory therapy on respiratory parameters of children in the control and the experimental group were analyzed using Mann Whitney U test.

**Table 1:** Mean rank, sum of ranks and Mann Whitney U value of post test score of respiratory parameters of children with lower respiratory tract infection, (n=70)

Respiratory parameters	Control group (n=35)		Experimental group (n=35)		U
	Mean rank	Sum of rank	Mean rank	Sum of rank	
Respiratory rate	53	1855	18	630	10.6*
Oxygen saturation	18.44	645	52.56	1839.5	15.5*
Breathing pattern	51.07	1787.5	19.93	687.5	67.5*
Air entry	47	1645	24	840	210*
Abnormal breath sounds	52.53	1838.5	18.47	646.5	16.5*

\*Significant at 0.05 level

Mann Whitney U test value for respiratory rate and oxygen saturation for children with lower respiratory tract infection between control and experimental group were 10.6 and 15.5 respectively which were found to be significant at 0.05 level. This reveals that respiratory therapy has influence on respiratory rate of children with lower respiratory tract

infection. The obtained U value for score of breathing pattern, air entry, abnormal breath sounds among the children with lower respiratory tract infection in both control and experimental group were 67.5, 210 and 16.5 respectively which were significant at 0.05 level. This reveals that respiratory therapy has influence on breathing pattern, air entry and abnormal breath sounds of children with lower respiratory tract infection.

#### Effectiveness of respiratory therapy on behavioural response of children with lower respiratory tract infection in the control and the experimental group

Effectiveness of respiratory therapy on behavioural response of children with lower respiratory tract infection in the control and the experimental group was analyzed using Mann Whitney U test. Behavioural response includes cry, activity, comfort, social interaction, facial expression and feeding and are measured using behavioral assessment scale.

**Table 2:** Mean rank, sum of ranks, and U value of post test score of behavioural response of children with lower respiratory tract infection (n=70)

Group	Behavioural response		U value
	Mean rank	Sum of rank	
Control group (n=35)	46.06	1612	243*
Experimental group (n=35)	24.94	873	

\*Significant at 0.05 level

The obtained U value for the behavior response assessment score among children with lower respiratory tract infection in both control and experimental group was 243 which was significant at 0.05 level. Hence null hypotheses is rejected. This reveals that respiratory therapy has influence on behavioural response of children with lower respiratory tract infection.

#### 4. Discussion

The present study evaluated the effectiveness of respiratory therapy on respiratory parameters of children with lower respiratory tract infections. The study findings revealed that there was statistically significant difference in the respiratory parameters score among children in the control and experimental group. Hence there was significant change in the respiratory parameters of children with LRI through respiratory therapy

It is in close conformity with another study done on combination of nebulization and chest physiotherapy which improved respiratory status in children with pneumonia on 34 samples with the age younger than five. Results concluded that the combination of nebulization and chest physiotherapy was more effective than nebulization only. It is important to reconsider the combination of nebulization and chest physiotherapy to overcome airway obstruction problems.<sup>6</sup>

In agreement with the present study findings, another study done to evaluate the effect of chest physiotherapy on 50 hospitalized children with pneumonia concluded that the chest physiotherapy showed significant improvement in terms of median time to clinical resolution and arterial oxygen saturation in pediatric hospitalized with pneumonia.<sup>7</sup>

Present study results are in congruent with a study done by Shally and Kaur on effectiveness of breathing exercises as therapeutic play on respiratory status among children undergoing nebulization therapy with lower respiratory tract disorders at Haryana. Study was conducted with 60 samples, with age of 5 to 18 years showed that the breathing exercise as therapeutic play was effective in improving the respiratory status among children undergoing nebulization therapy with lower respiratory tract disorders<sup>8</sup>

The present study findings revealed that there was statistically significant difference in the post test scores of behavioural response of children in the control and experimental group. This made it clear that the respiratory therapy have improved the behavioural response of children with lower respiratory tract infection.

This is in conformity with a study conducted to assess the effect of relaxation breathing training on anxiety of children with lower respiratory tract infection on 48 children. Children in the experimental group were given 30 minutes of training in a relaxation-breathing technique and a CD for home practice. It concluded that a combination of self-management and relaxation-breathing training can reduce anxiety thus improving children's health.<sup>9</sup>

Findings of another study to evaluate the effectiveness of combined self-management and relaxation-breathing training for children with moderate to severe asthma compared to self-management only supported the present study findings. Children in the experimental group were given 30 minutes training in a relaxation breathing technique and a CD for home practice. Data on anxiety levels, self-perceived health status, asthma signs/symptoms, peak expiratory flow rate and medication use were collected at base line and at the end of the 12 week intervention. The study concluded that the combination of self-management and relaxation breathing training can reduce anxiety.<sup>10</sup>

#### 5. Conclusion

It is very evident from the above reviews that respiratory tract infections are common among children of underfive age group. It is the main cause of mortality and morbidity rate among children in both developing and developed countries. The respiratory parameters and behavioural response of children with lower respiratory tract infection is significantly different from healthy children. Along with medical management, administration of respiratory therapy can have significant improvements in respiratory parameters and behavioural response of children.

#### References

- [1] Rudan, I., Boschi-Pinto, C., Biloglav, Z., Mulholland, K., & Campbell, H. (2008). Epidemiology and etiology of childhood pneumonia. Bulletin of the world health organization, 86, 408-416B.
- [2] Anderson, E. J., & Tan, T. Q. (2008). Severe pneumonia in children: Causes, diagnosis, and treatment. Journal Of Respiratory Diseases, 29.
- [3] Arif, M., Bashir, M. S., & Noor, R. (2014). Effectiveness of chest physiotherapy in the management

- of bronchiectasis. *Annals of King Edward Medical University*, 20(3), 205-205.
- [4] Britton, S., Bejstedt, M., & Vedin, L. (1985). Chest physiotherapy in primary pneumonia. *Br Med J (Clin Res Ed)*, 290(6483), 1703-1704.
- [5] Balachandran, A., Shivbalan, S., & Thangavelu, S. (2005). Chest physiotherapy in pediatric practice. *Indian pediatrics*, 42(6), 559.(24)
- [6] Lestari, N. E., Nurhaeni, N., & Chodidjah, S. (2018). The combination of nebulization and chest physiotherapy improved respiratory status in children with pneumonia. *Enfermeria clinica*, 28, 19-22.
- [7] Abdelbasset, W. K. M., & Elnegamy, T. E. H. (2015). Effect of chest physical therapy on pediatrics hospitalized with pneumonia. *International Journal of Health and Rehabilitation Science*, 4(4), 219-226.
- [8] Shally, Y. K., & Kaur, P. (2017). Effectiveness of breathing exercises as therapeutic play on respiratory status among children undergoing nebulization therapy with lower respiratory tract disorders. *IJAR*, 3(11), 101-107.
- [9] Chiang, L. C., Ma, W. F., Huang, J. L., Tseng, L. F., & Hsueh, K. C. (2009). Effect of relaxation-breathing training on anxiety and asthma signs/symptoms of children with moderate-to-severe asthma: a randomized controlled trial. *International Journal of Nursing Studies*, 46(8), 1061-1070.
- [10] George, M., & Topaz, M. (2013). A systematic review of complementary and alternative medicine for asthma self-management. *Nursing Clinics*, 48(1), 53-149.