



RESEARCH ARTICLE

A STUDY TO ASSESS THE EFFECTIVENESS OF STRELNICOVA BREATHING EXERCISE ON PULMONARY FUNCTION AMONG CHILDREN WITH LOWER RESPIRATORY TRACT INFECTION IN SELECTED HOSPITALS , COIMBATORE

^{1,*}Dr. Vijayalakshmi, N. and ²Mrs. Karthika, A.V, MSc.(N)

¹Principal, Kumaran College Of Nursing, Coimbatore
²Dr. MGR Medial University, Chennai, Tamil Nadu, India

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*Corresponding author:
Dr. Vijayalakshmi, N.

ABSTRACT

"Children are the precious pearls" who need protection from all harm and problems which includes health issues Now a day's children are prone to get some life threatening conditions such as diarrhea, anemia, and some respiratory diseases. Acute respiratory infections are not only limited to the respiratory tract but also affect other systems of the body as there is a probability of spread of infection and microbial toxins. Respiratory tract infections in children are often reported by physicians in developed countries. Breathing exercises are essential part and plays an important role in clearing the airway and making parenchyma to expand. They help in improving the efficiency of respiratory muscles. Breathing exercises need to be modified for children as they might not cooperate like adults. So the researcher is planned to implement Strelnikova breathing exercise to the children with lower respiratory tract infection. Therefore the present study is aimed to assess the effectiveness of strelnicova breathing exercise on pulmonary function among children with lower respiratory tract infection in a selected hospital. Quasi experimental research design was adopted for this study. Based on the inclusion and exclusion criteria by using purposive sampling technique, 60 samples were selected and assigned in both experimental group and control group. The demographic variables and clinical variables were collected by structured interview schedule. The Clinical respiratory score with 8 parameters were assessed by history collection, physical examination, stethoscope and pulseoxymeter. Pulmonary function was assessed by using a spirometer. The result of the study revealed that there is a significant difference between pretest and post test scores of clinical respiratory scores and pulmonary function parameters like FEV1, FVC, PEFR among children with lower respiratory tract infection. at 5% level of significance in experimental group and there is a significant association between the pulmonary function parameter and residential area, frequent history of respiratory infection. Therefore the study concluded that strelnikova breathing exercise is an effective intervention to improve pulmonary function among children who were admitted with lower respiratory tract infection.

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INTRODUCTION

Children constitute principal assets of any country. Childrens' Development is as important as the development of material resources and the best way to develop national human resources is to take care of children. India has the largest child population in the world. All efforts are being made by India for the development and welfare of children.¹ "Children are the precious pearls" who need protection from all harm and problems which includes health issues Now a day's children are prone to get some life-threatening conditions such as diarrhoea, anaemia, and some respiratory diseases due to child poverty, lack of education and family dysfunction. The author states that Strengthening health status of childhood is strengthening of our society² Acute respiratory infections are the most common cause of death in children. Acute respiratory infections are not only limited to the respiratory tract but also affect other systems of the body as there is a probability of spread of infection and microbial toxins. Respiratory tract infections in children are often reported by physicians in developed countries. About 30-50% of the children visit to the hospital and 20-40% of admissions to hospitals are due to respiratory tract infections.³ According to Om PrakashGhai (2012), lower respiratory infections cause broncho-spasm of respiratory pathway in children. Wheezing can occur due to hyper sensitivity of respiratory tract. Attacks of wheezing triggered when the child exposed to cold or acute respiratory diseases. The pulmonary function in children gets affected with continuous respiratory infections and inflammation of airways. Increased mucous secretion and its accumulation in airways make mucociliary function changes which are reversible through airway remodelling measures and supportive therapies. When the condition worsens, it is difficult to reverse the pulmonary function. (TERRY KYLE, 2010)⁴. There are various methods to treat respiratory tract infections like deep

breathing, relaxation sessions and other exercises like balloon blowing, abduction, adduction and forward movement of upper limbs, blowing air into the water with straw, blowing a trumpet, flute, mouth organ etc. In lower respiratory tract infection, breathing pattern of children need to be manipulated with these exercises. These techniques will help to strengthen the respiratory muscles and thereby improves the respiratory pattern. The play way method is a more spontaneous one, which demands creativity in which it may not be a structured and documented system but more an adaptation of best practices from across the world, with a greater emphasis on physical activities such as role-play, music and movement, art and crafts, stories. Although a child is born breathing deeply abdominal, they will usually become a chest breather by 6 years. Breathing with the chest restrains the amount of oxygen that enters the body. Therefore, it is important to teach a child how to breathe properly. The technique of A.N. Strelnikova has hyperventilation and hypercapnic nature, exercises performed with active inhale, without breath-holding, in a combination with dynamic physical exercises⁵. Strelnikova breathing exercises can restore voice, eliminate symptoms of chronic diseases, such as asthma and bronchitis, and even create a voice for those people who could not sing⁶. Strelnikova exercise is a very effective breathing exercise with simple physical movements. It consists of 12 steps of different body movements and nasal sniffs. This exercise is widely used in respiratory conditions as a supportive method. The combination of powerful breath and compression of the chest is allowing the oxygen to enter additionally to the lung tissue which helps to improve the respiratory pattern.⁷ Respiratory tract infections are the major issues during childhood, it affects not only the health of a child but also the academic performance. It also affects financial background of the family and familial harmony. So, childhood RTI's are considered as an important aspect to be considered in health care planning. Breathing exercises are essential part and plays an important role in clearing the airway and making parenchyma to expand. They help in improving the efficiency of respiratory muscles. Breathing exercises need to be modified for children as they might not cooperate like adults. Modified breathing exercises may be helpful in catching the attention of children.⁸ Based on various statistical reports and literature, the researcher felt that it is the responsibility of the nurse to improve the pulmonary function of the children with lower respiratory tract infection. So, the researcher is planned to implement Strelnikova breathing exercise to the children with lower respiratory tract infection. Therefore, the present study is aimed to assess the effectiveness of strelnikova breathing exercise on pulmonary function among children with lower respiratory tract infection in a selected hospital, Coimbatore.

STATEMENT OF THE PROBLEM

A Study To Assess The Effectiveness Of Strelnikova Breathing Exercise On Pulmonary Function Among Children With Lower Respiratory Tract Infection In Selected Hosiptals, Coimbatore.

OBJECTIVES

- To assess the pulmonary function among children with lower respiratory tract infection in experimental and control group.
- To evaluate the effectiveness of strelnikova breathing exercise on pulmonary function among children with lower respiratory tract infection in experimental group.
- To compare the level of pulmonary function between experimental and control group children with lower respiratory tract infection.
- To associate the findings with selected demographic variables and clinical variables.

MATERIALS AND METHODS:

RESEARCH APPROACH: Quantitative Research Approach.

RESEARCH DESIGN: Quasi Experimental Research Design (Non randomized control group design)

VARIABLES

Independent variable

Independent variable: Strelnikova Breathing Exercise for children with lower respiratory tract infection.

Dependent variable: Pulmonary Function among Children with Lower Respiratory Tract Infection.

Extraneous variables: Medication, Climate changes, Anxiety and Residential area

Influencing variables: Age of the child, Gender of the child, Height of the child, Residential area, Location of house, Type of house, Type of ventilation, Location of school, Play area, Birth history, Birth weight of the child, History of breastfeeding, Immunization history, Frequent history of respiratory infection and its frequency per year, History of allergy, History of hospitalization with LRTI, History of continuous exposure to irritants.

SAMPLE SIZE: 60

SAMPLING TECHNIQUE: Purposive sampling technique

CRITERIA FOR SAMPLE SELECTION

Inclusion criteria

The children,

- who are between the age group of 6 and 12years.
- who are willing to participate.
- who can understand Tamil and English.
- who are hospitalized for more than 5 days.

Exclusion criteria

The children,

- who are under continuous oxygen therapy.
- with developmental problems.
- who had any co morbid illness.
- who are blind and deaf (who cannot follow the instructions).
- who are critically ill.
- who are practicing breathing exercises and yoga.

DESCRIPTION OF THE TOOL

The tool consists of three sections

Section A:

Part 1 - Demographic variables of children: Age of the child, Gender, Height of the child, Birth order, Number of siblings, Education of father, Education of mother, Occupation of father, Occupation of mother, monthly income of the family, Type of the family, Residential area, Location of house, Type of house, Type of ventilation, Location of school and play area.

Part 2 - Clinical variables: Birth history, Birth weight of the child, History of breast feeding, Immunization history, Frequent history of respiratory tract infection, If yes number of frequencies per year, History of allergy, History of hospitalization with respiratory illness, History of continuous exposure to irritants like dust and pollens, family history of allergy.

Section B

Part 1 - Modified Clinical Respiratory Score: The level of respiratory illness were measured by modified Clinical Respiratory Score with 8 parameters such as auscultation, mental status, use of accessory muscles, feeding difficulties, wheeze, respiratory rate, pulse rate and room air SPO₂. The respiratory rate measured by manual counts, SPO₂ and heart rate with pulse oxymeter and the other scores like auscultation, use of accessory muscles, mental status, feeding difficulty and wheeze by using a stethoscope, through history collection and physical examination. The modified respiratory score categorized as mild respiratory illness (<8), moderate respiratory illness (9-16) and severe respiratory illness (17-24).

Part 2 - Pulmonary function parameters: Pulmonary function is measured by peak expiratory flow rate (PEFR), forced vital capacity (FVC) and forced expiratory volume in one second (FEV₁). The scores of peak forced expiratory volume in 1 second (FEV₁), forced vital capacity (FVC), forced expiratory ratio (FER) were interpreted according to global lung initiative (GLI) predicted values which is based on age, sex and height, the scores of peak expiratory flow rate (lit/min) is calculated by using the formula (height-80)⁵.

METHOD OF DATA COLLECTION

Data collection was done for a period of 4 weeks. The researcher introduced herself and explained about the purpose of the research and assured confidentiality and anonymity. The consent was obtained from the parents. Based on the inclusion and exclusion criteria by using purposive sampling technique, 60 samples were selected and assigned in both experimental group and control group. The demographic variables and clinical variables were collected by structured interview schedule. The Clinical respiratory score with 8 parameters were assessed by history collection, physical examination, stethoscope and pulseoxymeter. Pulmonary function was assessed by using a spirometer. On the same day, strelnikova breathing exercise was performed for 20 minutes in the morning and 20 minutes in the evening for 5 consecutive days. Control group undergone routine care. Posttest was done for both control and experimental group after a period of 5 days with the same tool. After posttest, control group taught with strelnikova breathing exercise as ethical consideration.

MAJOR FINDINGS

The data collected were analyzed by using descriptive and inferential statistics.

Distribution of demographic variables: In Experimental and control group most of the children were between the age group of 6 and 8 years (47% & 57%). Regarding the gender of children, in experimental group, most of them were males (57%) and in control group, most of them of them were females (60%). In Experimental and control group most of the children were between the height of 120 to 130 cm (50% & 66.5%). Regarding the birth order of children, in experimental group and control group, most of the them were first born (46.6% & 50%). In Experimental and control group most of them had only one sibling (63.3% & 63.3%). In Experimental and control group most of the children's father were graduates (47% & 57%). In Experimental and control group most of the children's mother were graduates (43% & 57%). In Experimental and control group most of the children's father were private employees (70% & 77%).

In Experimental and control group most of the children's mother were home makers (47% & 60%). In Experimental group 40% of the children family income is above Rs 20000. In Control group 60% of the children family income is above Rs 20000. In Experimental and control group majority of the children belongs to Nuclear family (70% & 50%). In Experimental and control group many of the children are residing in Semi-Urban Area (53% & 43.3%). In Experimental and control group many of the children are residing in Non- industrial Area (67% & 60%). In Experimental and control group most of the children are living in Pucca house (63% & 60%). In Experimental and control group most of the children's house have open type of ventilation. (70% & 70%). Regarding the location of school, in experimental group, most of them goes to school in low traffic area (63%). In control group, most of them goes to school in heavy traffic area (53%). In Experimental and control group most of the children are playing in outside (57% & 57%).

Distribution of clinical variables

Table 1. Distribution of clinical variables among children with lower respiratory tract infectionn=60

S.No	Clinical variables	Experimental Group		Control Group	
		No	%	No	%
1.	Birth History				
	a)Normal VaginalDelivery	16	53.3	11	37
	b)Forceps	1	3.3	3	10
	c)LSCS	13	43.3	16	53
2.	Birth weight of the child a) 3.5-4 kg	5	17	4	13
	b) 3-3.4 kg	8	27	5	17
	c) 2.5-2.9 kg	6	53	15	50
	d) Below 2.5 kg	1	3	6	20
3.	History of breast feeding				
	a)fed up to 6months	3	10	3	10
	b)fed up to 1year	15	50	13	43
	c)fed up to 2years	12	40	14	47
4.	Immunization history				
	a)Immunized	25	83	20	67
	b)Notimmunized	5	17	10	33
5.	Frequent history of respiratory infection				
	a)Yes	18	60	17	57
	b)No	12	40	13	43
6.	If yes number of frequencies / year				
	a)< 4times	15	50	12	40
	b)5-7times	10	33	14	47
	c)8-10ties	5	17	4	13
7.	History of allergy				
	a)Yes	15	50	14	47
	b)No	15	50	16	53
8.	History of hospitalization with lower respiratory tractinfection				
	a)Yes	10	33	12	40
	b)No	20	67	18	60
9.	History of continuous exposure to irritants				
	a)Yes	7	23	11	37
	b)No	23	77	19	63
10.	Family history of allergy				
	a)Yes	16	53	13	43
	b)No	14	47	17	57

Distribution of modified clinical respiratory score among children with lower respiratory tract infection in experimental and controlgroup.

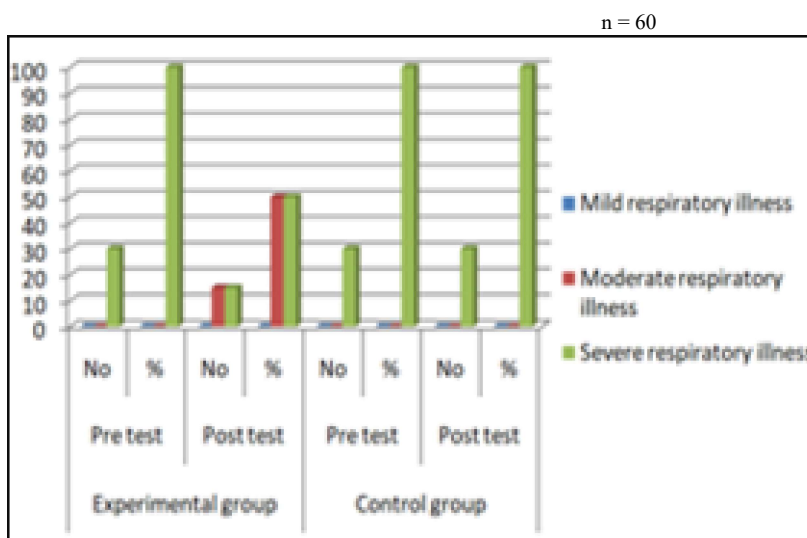


Fig. 1. Distribution of modified clinical respiratory score

It reveals that in post test 15 of them had severe respiratory illness in experimental group and 30 of them had severe respiratory illness in control group.

Comparison of pretest and posttest clinical respiratory score among children with lower respiratory tract infection in experimental and control group.

Table 2. Comparison of pretest and posttest clinical respiratory score among children in experimental and control group

GROUP	Pre test		Post test		Calculated value of 't'	Table value of 't' at 5% level of significance
	Mean	SD	Mean	SD		
Experimental Group	13.1	1.37	8.9	0.9	17.2	2.05
Control group.	12.2	1.5	10.7	1.5	6.8	2.05

The table shows that the calculated value of "t" is greater than the tabulated value at 5% level of significance in Experimental and Control Group. Therefore, there is a significant difference between pretest and post test scores of clinical respiratory scores among children with lower respiratory tract infection. Hence it is proven that, strelnicova breathing exercise is effective in improving pulmonary function among children with lower respiratory tractinfection in Experimental group and there is a minimal improvement in pulmonary function among children with lower respiratory tract infection due to routinecare in Control group.

Comparison of posttest clinical respiratory score among children with lower respiratory tract infection between experimental and control group.

Table 3. Comparison of posttest clinical respiratory score among children with lower respiratory tract infection between experimental and control group

GROUP	Mean	SD	Calculated value of 't'	Table value of 't' at 5% level of significance
Experimental Group	8.9	0.9		
Control Group	10.7	1.5		

The table shows that, the calculated value of "t" is greater than the tabulated value at 5% level of significance. Hence, it is evident that strelnikova breathing exercise with routine care is more effective than routine care alone, for improving pulmonary function among children with lower respiratory tractinfection.

Comparison of pretest and post test scores of pulmonary function parameters among children with lower respiratory tract infection

Table 4. Comparison of pretest and post test scores of pulmonary function parameters among children with lower respiratory tract infection in experimental and control groupn=60

Group	pulmonary function Parameters	Pretest		Post test		Calculated value of 't'	Table value of 't' at5% levelof significance
		Mean	SD	Mean	SD		
Experimental Group	FEV 1	0.7	0.009	1.03	8.91	8.25	2.05
	FVC	0.70	0.05	1.05	0.09	9.5	
	PEFR	122.9	38	158	47.03	8.5	
Control Group	FEV 1	0.54	0.316	0.58	0.173	2.01	2.05
	FVC	0.55	0.184	0.59	0.18	0.9	
	PEFR	105.13	21.37	113.6	34.95	1.30	

The table reveals that, there is a significant difference between pretest and post test scores of pulmonary function parameter among children with lower respiratory tract infection in experimental group. Hence it is proven that, strelnikova breathing exercise is effective in improving pulmonary function among children with lower respiratory tract infection.

Comparison of post test scores of pulmonary function parameters among children with lower respiratory tract infection between experimental and control group

Table 5. Comparison of post test scores of pulmonary function parameters among children with lower respiratory tract infection between experimental and control group.n=60

Pulmonary function parameters	Experimental Group		Control Group		Calculated value of 't'	Table value of 't' at5% level of significance
	Mean	SD	Mean	SD		
FEV 1	1.03	8.91	0.58	0.173	7.0	2.05
FVC	1.05	0.09	0.59	0.18	5.68	
PEFR	158	47.03	113.6	34.95	4.187	

The table shows that, strelnikova breathing exercise with routine care is more effective than routine care alone, for improving pulmonary function among children with lower respiratory tract infection.

Association between posttest pulmonary function parameter and demographic variables of children with lower respiratory tract infection in experimental and control group.

The results shows that there is an significant association between the pulmonary function parameter (FVC) and residential area. There is no significant association between other demographic variables and pulmonary function parameter (FVC,FEV1 and PEFR) in both groups.

Association between posttest pulmonary function parameter and clinical variables of children with lower respiratory tract infection in experimental and control group

The results shows that there is an significant association between the pulmonary function parameter (FVC) and frequent history of respiratory infection and there is no association between the pulmonary function parameter (FVC,FEV1 and PEFR) and other clinical variables among children with lower respiratory tract infection.

RESULTS AND DISCUSSION

This study aims to assess the effectiveness of strelnicova breathing exercise on pulmonary function among children with lower respiratory tract infection. The result of the study revealed that there is a significant difference between pretest and post test scores of clinical respiratory scores and pulmonary function among children with lower respiratory tract infection. at 5% level of significance and there is an significant association between the pulmonary function parameter and residential area, frequent history of respiratory infection. Therefore, the study concluded that strelnikova breathing exercise is an effective intervention to improve pulmonary function among children who were admitted with lower respiratory tract infection. These findings are supported by Ranjita Jena who conducted a study on the Effect Of Strelnikova Exercise On Respiratory Parameters Among Children With LRTI In Selected Hospital. The findings shown that post-test was obtained in experimental & control group were respiratory rate ($t=9.50$, $p0.23$), breath sounds ($t=2.21$, $p0.23$), & oxygen saturations ($t=5.99$, $p<0.0001$) respectively which was statistically significant in respiratory parameters. The study determined that the effect of " strelnikova breathing exercise" on respiratory parameters among children with LRTI has a good impact on respiration patterns.⁹ Rakini Motcha C. Beulah Hepzibahetal also found that a randomized controlled trial was conducted to assess the effectiveness of blow bottle exercise on respiratory status among children with lower respiratory tract infection. The study concluded that there was a significant difference in the respiratory parameters in the study group than the control group which was attributed to the use of respiratory exercise and shows that blow bottle exercise is one of the effective non-pharmacological method in treating the children with lower respiratory tract disorders.¹⁰ The findings of study are similar to Arul Vimala Mary who conducted a quasi-experimental study to assess the effectiveness of strelnikova breathing exercises on respiratory signs and parameters among children with Lower respiratory tract infections the result shows that there is significant difference in independent 't' test regarding respiratory signs ('t' value =5.2), peak flow rate ('t' value=16) and oxygen saturation level ('t' value=5.27) at $P< 0.05$ level of significance between experimental group and control group. The study concluded that Strelnikova breathing exercises was beneficial and there was a significant reduction in respiratory signs and improvement in respiratory parameters in experimental group among child with LRT.¹¹

Pundir N., et al conducted a study to evaluate the effectiveness of breathing exercises as play method on cardiopulmonary parameters among children with acute respiratory tract infections The mean posttest heart rate 96.47, respiration rate 25.47, and SpO2 95.2 of the experimental group was significantly near to normal as compared to control group. The mean posttest cough score 1.62, breath sound score 2.18, chest expansion score 2.16, and dyspnea score 3.74 of experimental group was significantly lower than the control group. There was significant association between cardiopulmonary parameters and selected demographic variables. Breathing exercises have advantageous effects on cardiopulmonary parameters among children with acute respiratory infections¹²

CONCLUSION

Today's children are the citizens of tomorrow and they considered as the integral part of national development. Healthy society is essential for healthy development of our nation. Nurses also play an extended role in supporting parents who may be worried and anxious about their child's symptoms, by ensuring appropriate follow-up arrangements are provided, and that written and verbal safety net explanations are given and understood with regard to what should be done if the child deteriorates at home. Strelnikova breathing exercise is one of the easy and interesting measures to keep the children comfortable and joyful during hospital stay and further. This study implies health care providers can use these adjuvants as therapeutic play in the day to day practice so that it helps the child to recover from the respiratory illness. The present study has been supported by various studies of different publishers. Hence from the analyzed data, it was concluded that strelnikova breathing exercise is an effective intervention to stabilize pulmonary functions and to improve respiratory health among children with lower respiratory tract infection The findings of the study serve as a basis for further studies on different breathing exercise in children. The study will motivate the beginning researchers to conduct the same study with different variables at a large scale

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