Assess the effectiveness of balloon blowing exercise on respiratory parameters among school age children with lower respiratory tract infection at Sri Muthukumaran Medical College Hospital& Research Institute,Chennai.

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Abstract: Children who are in good health mature into adults who are robust in body and mind. one's greatest asset and source of pride of every country are its healthy children. However, millions of youngsters suffer from both acute and chronic illnesses, which has an influence on their quality of life and range of possibilities, including educational chances.**Methods:**A study was adopted by quantitative evaluative approach. A sample size was 60 school age children with LRTI, at Sri MuthuKumaran Medical College Hospital &Research Institute, Chennai. Sampling technique was adopted by this study was Non probability Purposive sampling technique. The tools consist of demographic variables, clinical variables, and respiratory parameters on lower respiratory tract infection. **Results:**The study found that the effectiveness of balloon blowing exercise on respiratory parameters among school age children with LRTI.t=13.68 which shows significant at the level of $p<0.001$ **Conclusion:**The study revealed that the effectiveness of balloon blowing exercise on respiratory parameters among school age children with LRTI between study and control group showed that, There is a statistically significant difference found at $p<0.001$ level of significance.

Keywords: lower respiratory tract infection, balloon blowing exercise, children

Introduction: In impoverished nations, a child dies from an acute respiratory infection (ARI), typically pneumonia, every 7 seconds. Four and a half million children every year die from lower respiratory tract infections, which account for 30% of all pediatrics fatalities. In India, the majority of pediatrics admissions and outpatient visits are caused by diseases of the respiratory system, Worldwide, respiratory diseases are one of the primary reasons of illness and death. Infection in

the lower respiratory tract is the fourth most common cause of death. Thankfully, Between 2000 and 2019, there were 460,000 fewer fatalities than there were in 2019. Pneumonia is the most common infectious cause of death in children worldwide. It killed roughly 808,694 young children under the age of five in 2017 all across the world. [2]. Disease burden worldwide in 2016. The sixth largest cause of death among children under the age of 8 is COPD (chronic obstructive pulmonary disorders), which accounts for about 2.38 million deaths from LRTI. Among the most frequent global causes of severe disease and mortality are lung cancer, acute lower respiratory tract infection, asthma and tuberculosis. [3] For kids with lower respiratory tract infections, blowing balloons is the simplest and most effective exercise for bettering lung function. Exercises that include inflating a balloon help a number of muscles work together to adjust the thoracic proportions to different breathing stages. Basic breathing muscles consist of the diaphragm, internal intercostal, and external intercostal muscles. During strenuous physical activity like weight lifting, stressful conditions or when someone is having an asthma attack, accessory muscles that help lift the ribcage so that the lungs can expand and take in air are regularly engaged. In addition to strengthening these muscles, steadily inflating numerous balloons one at a time also increases lung capacity and stamina [4]. According to the Indian Academy of Paediatrics (2013), 95% of the world's reported cases of paediatric pneumonia 150 million episodes each year come from underdeveloped nations.15 nations make up about 75% of the total, while 6 nations, including India, make up 50%. Over 16%, or 12 million deaths, of the 7.6 million under-5 youth deaths worldwide are pneumonia-related. More than 3 90% of pneumonia-related deaths take place in 68 underdeveloped countries, primarily in Africa and Asia.India has a significant disease load.Annually, it is projected that 45 million events and 6.6 million hospitalization result in a 24% national disease burden and 0.37 million fatalities. [5]. According to a research from the American Academy of Allergy Asthma & Immunology (AAAAI), (2016), asthma is the third most common reason for hospitalization worldwide, accounting for close to 500,000 hospitalizations each year. youngsters under the age of 15. The total crude incidence of asthma among kids is 8.2%. The prevalence of crude asthma was 14.0% among Latinos, as opposed to 6% among African Americans and 6.7% among Caucasians. Children in India between the ages of 5 and 14 make up around one-fourth of the country's overall population. According to reports from different regions, bronchial asthma affects 4 to 20% of school-aged children. [6] Except during the early neonatal period, when it is very uncommon, wheezing is frequent throughout infancy. Wheeze incidence

among schoolchildren in the UK ranges from 25 to 38 percent in 2011. [7] According to the United Nations Children's Fund (UNICEF), pneumonia killed more than 800,000 children under the age of 12 in the world every year, or one kid every 39 seconds. [8]. Pulmonary fibrosis (2021) Blowing up balloons exercises works your respiratory muscles, a set of muscles that help the chest to expand and contract during inhalation and expiration.[9] Patients with COPD will be able to walk better, cough more productively, and engage in everyday activities (WHO, 2017). [10]

Aim of the study was to determine the effectiveness of balloon blowing exercise on respiratory parameters among children with lower respiratory tract infection in study group

To associate the mean difference score of respiratory parameters with sociodemographic variables and clinical variables among children with lower respiratory tract infection in study group & control group

Methodology

A quasi experimental one group pretest posttest design was adopted and conducted in, Sri Muthu Kumaran Medical College Hospital& Research Institute Mangadu. 60 school children who fulfilled the inclusion criteria were selected using purposive sampling technique and allotted 30 for study and control group. A systematic questionnaire that was created based on prior reviews was given out by the researcher. The program was translated into the regional tongue. Experts validated the instrument. The tool's first section included clinical and demographic variables. The physiological measures in Part II included heart rate, respiration rate, and oxygen saturation, Use of accessory muscles, Chest retractions Breath sounds, Nasal flaring**,** Dyspnea, Cough**,** Air entry. The researcher collected data in four phases. In phase I, permission was secured from the parents, the children's cooperation was gained, and background information was gathered from the mother. The assessment of respiratory parameters for both the study and the control groups was done on Day I of phase II in the morning After the pretest, the study group's children were made to sit in a comfortable position for phase III's balloon-blowing exercise, which required them to hold a

balloon in one hand, take a breath through their nose while placing their tongue on the roof of their mouth, and then exhale into the balloon. The task was repeated.

Ethical considerations; Formal approval was obtained from the institutional review board and institutional ethical committee of MAHER University.Mangadu, Chennai. Tamil made permission obtained from the Sri Muthu Kumaran Medical College &Hospital and Research Institute Dean after explaining about the study and benefits of the study to family members and obtained written consent from family members before data collection. Assurance was given to the family members that confidentially will be maintained.

Table1 Frequency and percentage distribution of demographic variables of the study and control group

(N=60)

Demographic Variables	**Study group (n=30)**		**Control group (n=30)**	
	F	%	F	%
1.**Age of The Child**				
a) 6-9 years	18	60.0	15	50.0
b) 10-12 years	12	40.0	15	50.0
2.Gender				
a) male	14	46.6	17	56.6
b) female	16	53.3	13	43.3
3.Educational Status of the children				
a) Primary	20	66.6	18	60.0

b) Secondary	10	33.3	12	40.0
4.Type of family				
a) nuclear	14	46.6	19	63.3
b) joint	10	33.3	7	23.3
c) extended	6	20.0	4	13.3
5.Birth order of the child				
a) 1	16	53.3	13	43.3
b) 2	8	26.6	7	23.3
c) More than 3	6	20.0	10	33.3
6.Religion				
a) Hindu	19	63.3	18	60.0
b) Christian	7	23.3	8	26.6
c) Muslim	4	13.3	4	13.3
d) others	-	-		
7. Residence				
a) Rural	7	23.3	12	40.0
b) urban	10	33.3	7	23.3
c) semi urban	13	43.3	11	36.6
8. Occupation of father				
a) unemployed	9	30.0	4	13.3
b) coolie	1	3.33	3	10,0
c) private	13	43.3	10	3.0
d) government	5	16.6	7	23.3
e) business	2	6.6	6	20.0

9. Occupation of mother				
a) House wife	12	40.0	18	60.0
b) Coolie	7	23.3	4	13.3
c) Private	8	26.6	5	16.6
d) Government	3	10.0	3	10.0
10. Monthly Income of the Family (In Rupees)				
a) < 5000	5	16.6	3	10.0
b) 5000-10000	5	16.6	4	13.3
c) 10000-20000 d) > 20000	9 11	30.0 36.6	13 10	43.3 33.3
11.AnyFamily History of Allergies (if any specify)				
a) yes	10	33.3	8	26.6
b) No	20	66.6	22	73.3

Regarding the demographic variables and clinical variables of study group In study group age demographic variables 18 (60%) were 6-9 years , 16(53.3%) were females, 20(66.6%) primary.14(46.6%)belongs to nuclear family, 16(53.3%) were first child ,19(63.3%) belongs to Hindu, religion, 13(43.3%) were from semi urban area, 13 (43.3%) were private employees.12 (40%) were housewife 11 (36.6%) had income of > Rs 20000 ,20 (66.6%) has no dust allergen, **Table 2; Frequency and percentage distribution of socio background(clinical) variables of the study and control group**

(N=60)

Clinical variables	**Study group n=30**		**Control group n=30**	
	F	**%**	**F**	**%**
1. Mode of delivery				
a) Normal vaginal delivery	13	43.3	11	36.6
b) Caesarean Section	11	36.6	15	50.0
c) AVD (Assisted Vaginal delivery)	6	20.0	4	13.3
2. Birth Weight of the Baby				
a) >2.5 kg	14	46.6	16	53.3
b) 2.5-3.5 kg	9	30.0	7	23.3
c)>3.5 kg	7	23.3	7	23.3
3.Current Weight of the Child				
a) up to 15 kg	2	6.66	3	10.0
b)16-25 kg	16	53.3	15	50.0
c)25-35 kg	10	33.3	8	26.6
d)Above 35 kg	2	6.66	4	20.0
4.Provisional Diagnosis				
a) Pneumonia	4	13.3	5	16.6.
b) Bronchitis	13	43.3	17	56.6
c) Bronchiolitis	9	30.0	5	16.6
d) Others	4	13.3	3	10.0
5.Duration of stay of hospitalization				
a) <3 days	19	63.3	20	66.6

b) 4-6 days	8	26.6	5	16.6
c) .6 days	3	10.0	5	16.6
6. Frequency of respiratory tract infection occurs in last year				
a) No infection	2	6.60	3	10.0
b) 1-2times	6	20.0	9	30.0
c) 3- 4 times	10	33.3	8	26.6
d) above 4 times	12	40.0	10	33.3
7. Co morbid illness				
a) Anemia	9	30	7	23.3
b) IHD	2	6.60	1	3.33
c) thyroid disorder	3	10.0	2	6.66
d) seizure disorder	7	23.3	10	33.3
e) none	9	30.0	10	33.3
8.Did you use any alternative therapies				
a) yes	10	33.3	13	43.3
b) No	20	66.6	17	56.6

In study group clinical variables 13(43.3%)had normal vaginal delivery 14(46.6%) had weight of less than 2.5 kg ,16(53.3%) having 16-25 kg and13(43.3%) having bronchitis, 19(63.3%) had a duration of hospitalization of less than 3 days, 12(40%) had above 4 times of respiratory tract infection, 9(30%) had anemia,20(66.6%) have not using alternate therapies.

Table 3; Frequency and percentage distribution of pretest level of respiratory parameters among children with lower respiratory tract infection in study group and control group

(N=60)

S.no	Level of respiratory distress	Study group (n=30)		Control group (n=30)	
		Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
1.	No distress	0	0.00	0	0.00
2	Mild distress	11	36.6%	12	40%
3	Moderate distress	19	63.3%	18	60%
4	Severe distress	0	0.00	0	0.00

The above table describes that pretest level of respiratory parameters among school age children with lower respiratory tract infection 19(63.3%) had moderate distress ,11(36.6%) had mild distress and none of them had no distress and severe distress in study group and In control group 18(60%) had moderate distress and 12(40%) had mild distress and none of them had no distress and severe distress.

Table4 Frequency and percentage distribution of posttest level of respiratory parameters among school age children with lower respiratory tract infection in study group and control group

(N=60)

S. No	Level of respiratory distress	Study group (n=30)		Control group (n=30)	
		Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
1.	No distress	20	66.6%	4	13.3%
2	Mild distress	6	20%	9	30%
3	Moderate distress	4	13.3%	17	56.6%
4	Severe distress	0	0.00	0	0.00

Table 4 Represents posttest level respiratory parameters in study group 6(20%%) had mild distress ,4(13.3%)had moderate and 20(66.6) had no distress and none of them had severe distress. In control group 17(56.6%) had moderate distress and 9(30%) had mild distress and 4(13.3 had) no distress none of them had severe distress.

Table 5; comparison of posttest level of respiratory parameters of children with lower respiratory tract infection

Group	Mean	Standard deviation	Unpaired "t" value
Study group	30.3	5.43	t=13.68
Control group	24.4	6.81	

Table 5 represents that the mean value of 30.3 with standard deviation 5.43 in study group compared with mean value 24.4 with standard deviation 6.81 of control group projects "t" value 13.68 which was statistically significant at p =0.001 level.

Table 6 Comparison of pretest and posttest mean and standard deviation of respiratory parameters among school age children with lower respiratory tract infection in study group and in control group

N= (60)

Group	**Pretest**		**Posttest**		**Paired "t" test**
	Mean	**SD**	**Mean**	**SD**	
Study group (n=30)	19.96	5.03	30.3	6.58	t=15.03 p=0.001 S*** (*df*=29)
Control group (n=30)	19.73	5.42	24.4	6.81	t= 1.78 p=0.09 (*df*=29) NS

Table6 shows In study group, the analysis show that the mean value of 19.96 with standard deviation 5.03 in pretest when compare with the mean value of 30.3 with standard deviation 6.58 in post test with respect to respiratory parameters projects "t" value 15.03 which was statistically significant at p=0.001 level.

Considering the control group the analysis depicted that the mean value of 19.73 with standard deviation 5.42 in pretest when compare with the mean value of 24. 4 with standard deviation

6.81in posttest with respect to respiratory parameters projects "t" value 1.78 which was statistically not significant

DICUSSION

Respiratory parameters to evaluate quality of breathing ,rate, rhythm, regularity.Comparison of post test level of respiratory parameters of children with LRTI between study and control group showed that that the mean value of 30.3 with standard deviation 5.43 in study group compared with mean value 24.4 with standard deviation 6.81 of control group Considering the control group, the analysis showed that the mean value of 19.73 with standard deviation 5.42 in pretest when compare with the mean value of 24. 4 with standard deviation 6.81in posttest with respect to respiratory parameters projects "t" value 1.78 which was statistically not significant.Hence there was a significant change in the respiratory parameters of children with LRTI through balloon blowing exercise.

The study findings consistent with another study.The estimated paired t value of respiratory distress among children (10.5*) which is significant at $p<0.005$. It shows balloon blowing exercise was effective in reducing respiratory distress.

There was significant association found between level of respiratory parameters to the children with clinical variables. level duration of stay of hospitalization, frequency of respiratory tract infection of significance at $p<0.05$ level. And other clinical variables were not associated with respiratory parameters of children with lower respiratory tract infection in study group.There was no significant association found between control group.

Conclusion

The reviews above make it abundantly clear that respiratory tract infections are widespread in children under the age of five. It is the primary contributor to child mortality and morbidity rates in both developing and industrialised nations. The present study was to conducted to

assess the effectiveness of balloon blowing exercise on respiratory parameters among school age children with lower respiratory tract infection. The comparison of level of respiratory parameters among school age children between study group and control group showed that, there is a statistically significant difference found at $p< 0.001$ level of significance. So, the study findings concluded that there is a significant difference in the respiratory parameters among school age children with lower respiratory tract infection. Balloon blowing exercise is a cost effective, non-invasive, no pharmacological alternative method of respiratory parameters that a nurse can implement independently

RECOMMENDATIONS

- Similar study can be done in different settings (rural and urban).
- Similar study can be replicated on larger samples there by findings can be generalized.
- A comparative study can also be done between the effectiveness of various non-pharmacological measures for improving lung function among children.

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