

Balloon-Blowing Exercises: Best Remedies for Lower Respiratory Tract Infections in Children

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Abstract

Background: Due to their rapid, children's growth and development more exposed to the acute and long-term health consequences of pollutants in their surroundings, which can result in illnesses including diarrhea and respiratory tract infections.

Objectives: The study's objectives were to determine if balloon-blowing exercise has an impact on the lower respiratory tract characteristics in children aged 6–12 infections. Need: This study was to determine if balloon-blowing exercise has an impact on the lower respiratory tract characteristics in children aged 6–12. Nearly 1.0% of children had respiratory illness in 2019–2020 in Gujarat.

Methods: The study used a quasi-experimental research design. Sample size: The sample comprises 60 kids who were hospitalized in a pediatric unit. They were diagnosed between the ages of 6 and 12 with lower respiratory tract infections. The research group received 30 of them, while the control group received 30. Sampling technique: For individuals who met the inclusion requirements for the study, the researcher chose a purposeful non-randomized sampling approach.

Results: Pre-test and post-test mean values for the study group were 20.63 and 34.43, respectively. At $P = 0.05$, the paired t value of 15.76 is significant. It demonstrates that balloon-blowing activity was successful in easing respiratory discomfort. Hence, H1 was approved. While in the control group, children's pre-test and post-test mean values for respiratory distress were 21 and 32.13, respectively. At the significance level of 0.05, the paired t value was 12.77 and was significant.

Conclusion: According to the findings of the study, it was concluded that engaging in balloon blowing activities could have a positive impact on the respiratory parameters of children with lower respiratory tract infections.

Keywords: Evaluate, lower respiratory infection, respiratory parameters, scholar children, workout with a balloon

INTRODUCTION

Children who grow being brought up in healthy circumstances not only make everyone happier but it will also be India's

greatest resource in the future. They are going through a dynamic process of development and growth, making them more susceptible to the acute and long-term health consequences of pollutants in their surroundings, which can result in illnesses including diarrhea and respiratory tract infections.^[1]

Children's respiratory systems are frequently the location of the disease. Together, allergies and respiratory infections cause numerous family disturbances and make children skip schoolwork. Children react to respiratory illnesses differently than do grown ups. The developmental changes in a child's respiratory system as the form and function of the current structure change and

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new lung tissue continues to develop. The majority of respiratory issues, however, are more distressing for kids than for adults, and they more frequently result in airway blockage or breathing difficulties. An infection of the lower part of the respiratory system is one among the most prevalent disorders that affect children when it comes to the respiratory system.^[2]

Children of all ages can be diagnosed with acute infections of the lower respiratory tract, although little ones who have not yet established immunity to infectious diseases tend to experience them the most frequently. Childhood diseases such as bronchitis and pneumonia are common. When a kid coughs and breathes quickly, a good clinical indicator of determining an acute infection of the lower respiratory system is the respiratory rate. More serious disorders are indicated in drawings by the existence of the lower chest wall.^[3]

Although it happens more commonly pneumonia, an inflammation of the lung parenchyma is most common in infancy and the early years of childhood. Clinically, pneumonia can appear on its own or as a complication of another illness. Pathophysiology of bacterial pneumonia in young children has been identified as being caused by organisms colonizing the upper respiratory system and aspirating contaminated excretions. Hospitalizations for pneumonia in children in impoverished nations are caused by viruses 40–50% of the time. Respiratory syncytial virus, parainfluenza viruses, adenoviruses, parainfluenza viruses, and influenza type A virus are the main factors that induce viral pneumonia.^[4]

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.^[5]

Objectives

The objectives of this study were as follows:

1. To assess the pre-test level of primary children with the lower respiratory tract infection in the study group and control group.
2. To evaluate the effectiveness of balloon therapy on respiratory parameters among primary children with lower respiratory tract infection in the study group.
3. To associate pre-test level of respiratory parameters among primary children with lower respiratory tract infection with their selected demographic variables.

METHODS

Research approach

The study utilized a quantitative approach.

Research design

The research design selected for this study was quasi-experimental, non-equivalent control group pre-test, and post-test design.

Group	Pre-test	Intervention	Post-test
Study group	O ₁	X	O ₂
Control	O ₁	-	O ₂

The symbols used are as follows:

O₁ – Pre-test to assess the level of respiratory parameters in the study group and control group.

X – The intervention (balloon-blowing breathing exercise) in the study group.

O₂ – Post-test to assess the level of respiratory parameters in the study group and control group.

Research setting

The study was conducted in Urban Hospital, Raliyati, Dahod Managed by Health Foundation and Research center, Dahod It is a pediatric hospital with a well-equipped pediatric critical care unit, with 500 kids on average each month in outpatient and inpatient counts. Many of the kids there are between the ages of 6 and 12 years old.

Population

Target population

Children with lower respiratory infection (LRTI).

Accessible population

The population included in this study was children with lower.

Respiratory tract infection from Urban Hospital, Raliyati, Dahod, Managed by Health Foundation and Research Center, Dahod.

Sample

Children diagnosed with lower respiratory tract infections, asthma, bronchitis, and pneumonia who are hospitalized in a pediatric ward and are between the ages of 6 and 12 make up the sample.

Sample size

The sample consisted of 60 kids who had lower respiratory tract infections according to their diagnosis. Thirty of those were chosen for the study group and 30 for the control group.

Sampling technique

For individuals who met the inclusion requirements for the study, the researcher chose a purposeful non-randomized sampling approach.

Over the first 15 days, the researcher chose 30 kids for the study group, and over the next 15 days, she chose 30 kids for the control group.

Plan of data analysis

Descriptive statistics

- To assess the demographic factors of children with lower respiratory tract infections, frequency, and percentage distribution were utilized.
- The pre-test and post-test respiratory parameter scores among kids with lower respiratory tract infections were evaluated using the mean and standard deviation.

Inferential statistics

- The level of respiratory parameters in the study group and control group was compared before and after the test using a paired *t*-test.
- The post-test level of respiratory parameters in the study and control groups was compared using an unpaired “*t*” test.
- The post-test level of respiratory parameters in the study and control groups and their chosen demographic characteristics were compared using the Chi-square test.

RESULTS

Table 1 represents the distribution of kids based on demographic factors. According to the age distribution of the children in this case, 11 (36.7%) of the study group’s children were between the ages of 10 and 12 years, while 19 (63.3%) of the group’s children were between the ages of 6 and 9. In the control group,

21 people (70%) were between the ages of 6 and 9 and 43.3% were between the ages of 10 and 12. The gender distribution of the research group’s offspring reveals that there were 23 (76.7%) boys and 7 (23.3%) girls. In the control group, there were eight females and 22 (73.33%) males. Children in the research group were distributed according to where they lived; 3 (or 10%) were from rural areas, while 27 (or 90%) were from metropolitan areas. Four (13.3%) of the control group’s members belonged to the rural sector, while 26 (86.7%) did. Children’s distribution throughout the research group according to how often they have respiratory infections 3 (10%) people had no respiratory infections, 15 (50%) had respiratory infections one to 2 times, 11 (36.7%) had respiratory infections 3–4 times, and 1 (3.3%) had respiratory infections more than 4 times. In the control group, there were two cases of no respiratory infection, 18 cases of respiratory infection that occurred between one and 2 times, eight cases of respiratory infection that occurred between 3 and 4 times, and 2 cases of respiratory infection that occurred more than 4 times. Assignment of kids to study groups based on their propensity for blowing balloons: 29 (96.7%) had no balloon-blowing tendencies, compared to 01 (3.3%) who did. In the control group, 0 people (0.0%) and 30 people (100%) had no balloon-blowing tendencies. The research group’s distribution of children’s incomes reveals that 01 (3.3%) had less than Rs. 5000, 4 (13.3%) had between Rs. 5001 and Rs. 10,000, and 25 (83.3%) had more than Rs. 10,000. 0 (0.0%) of the control group’s members had <Rs. 5,000, 3 (10%) had between Rs. 5001 and 10,000, and 27 (90%) had more than Rs. 10,000.

Table 2 represents the study group that reported mild respiratory discomfort in 14.7%, moderate respiratory distress in 16.3%, and severe respiratory distress in none of them before the intervention. Fourteen (46.7%) of the participants in the control group had mild respiratory discomfort, 16 (53.3%) had moderate respiratory distress, and none had neither no difficulty nor severe distress.

Table 3 represents 26 (86.7%) members following the intervention, none of the study group’s members encountered respiratory distress, just four (13.3%) had mild distress, and none had moderate or severe distress. There was no respiratory distress in 18 (or 60%) of the control group participants, mild respiratory distress in 12 (or 40%), and neither moderate nor severe distress.

Table 4 represents the average rating for children’s respiratory parameters. Pre-test and post-test mean values for the study group were 20.63 and 34.43, respectively. At *p*0.05, the paired *t* value of 15.76 is significant. It demonstrates that balloon-blowing activity was successful in easing respiratory discomfort. Hence, H1 was approved.

While in the control group, children’s pre-test and post-test mean values for respiratory distress were 21 and 32.13, respectively. At the 0.05 level, the paired *t* value of 12.77 was significant.

Table 5 represents children in the study respiratory parameters, compared to 32.13 in the control group, with a mean score of 34.43. Children in the study group and control group

Table 1: Frequency and percentage distribution of children according to demographic variables and clinical variables in the study group and control group (n=60)

S. No.	Demographic variables	Study group (n=30)		Control group (n=30)	
		F	%	f	%
1	Age of the child				
	6–9 years	19	63.3	21	70
	10–12 years	11	36.7	09	30
2	Gender				
	Male	23	76.7	22	73.33
	Female	07	23.3	08	26.66
3	Area				
	Rural	03	10	04	13.3
	Urban	27	90	26	86.7
4	Frequency of respiratory infection in last year				
	No infection	03	10	02	6.7
	1–2 times	15	50	18	60
	3–4 times	11	36.7	08	26.7
	>4 times	01	3.3	02	6.7
5	Previous habit of balloon-blowing during hospitalization				
	Yes	01	3.3	00	00
	No	29	96.7	30	100
6	Income				
	Rs. <5,000	01	3.3	00	00
	Rs. 5001–10,000	04	13.3	03	10
	Rs. >10,000	25	83.3	27	90

S. No.	Demographic variables	Study group (n=30)			Control group (n=30)		
		Df	χ^2 value	Table value	Df	χ^2 value	Table value
1	Age	1	0.01	3.84	1	1.01	3.84
2	Gender	1	4.99* ^s	3.84	1	4.04* ^s	3.84
3	Area	1	3.73	3.84	1	1.57	3.84
4	Frequency of respiratory infection	3	1.99	7.82	3	4.11	7.82
5	Previous habit of balloon-blowing during hospitalization	1	1.19	3.84	1	1.98	3.84
6	Income	2	1.92	5.99	2	0.23	5.99

Table 2: Frequency and percentage of children according to their level of respiratory parameters in the study group and control group before intervention (n=60)

S. No.	Level of respiratory distress	Study group (n=30)		Control group (n=30)	
		Frequency	Percentage	Frequency	Percentage
1	No distress	00	0	00	0
2	Mild distress	14	46.7	14	46.7
3	Moderate distress	16	53.3	16	53.3
4	Severe distress	00	0	00	0

Table 3: Distribution of children in the study group and control group according to the level of respiratory distress after intervention (n=60)

S. No.	Level of respiratory distress	Study group (n=30)		Control group (n=30)	
		Frequency	Percentage	Frequency	Percentage
1	No distress	26	86.7	18	60
2	Mild distress	04	13.3	12	40
3	Moderate distress	00	0	00	0
4	Severe distress	00	0	00	0

Table 4: Mean and standard deviation and paired “t” value on pre and post-test level of respiratory parameters among children in the study group and control group (n=60)

S. No.	Group	Mean	Standard deviation	Paired “t” value
1	Study group (n=30)			
	Pre-test	20.63	4.57	15.76
	Post-test	34.43	2.72	
2	Control group (n=30)			
	Pre-test	21	4.41	12.77
	Post-test	32.13	4.09	

Table value $t=2.05$, significant at $P<0.05$ level

had significantly different post-test values of respiratory parameters, as shown by the unpaired “t” value of 2.9, which is significant at $P = 0.05$.

Table 6 shows that the chi-square value for the research group’s respiratory parameters after taking age into account was 0.010, and 3.84 in the table at degree 1 of freedom. The chi-square value when gender was taken into consideration was 4.99, and the table value at degree 1 of freedom was 3.84. When the area was considered, the chi-square value was 3.73, and the table value at the degree of freedom 1 was 3.84. The frequency of respiratory illnesses had a chi-square value of 1.99, and the value of the table at the degree of freedom 3 was 7.82. The balloon-blowing behaviors’ chi-square value was 1.198, and the table value for the degree of freedom 1 was 3.84. The chi-

square value for income was 1.92, and the table value for the degree of freedom 1 was 3.84.

This table shows that the respiratory parameters in the control group had a Chi-square value of 0.010 and a table value at the degree of freedom 1 of 3.84. When gender was taken into consideration, the chi-square value was 4.04, and the table value at degree 1 of freedom was 3.84. The area’s Chi-square value was 1.57, and the degree of freedom 1’s table value was 3.84. The frequency of respiratory infections had a Chi-square value of 4.11, while the value for the table with a degree of freedom 3 was 7.82. The balloon-blowing behaviors’ chi-square value was 1.92, and the table value for the degree of freedom 1 was 3.84. The Chi-square value for income was 0.23, and the table value for the degree of freedom 1 was 3.84.

The pre-test level of respiratory parameters among children in the study group and control group is significantly correlated ($P = 0.05$) with their chosen demographic characteristics, such as gender alone, according to this table.

In addition, there is no correlation between the pre-test level of respiratory parameters in the study group and control group and the demographic factors they chose, such as age, region, frequency of respiratory illness, prior balloon-blowing habit, and income.

DISCUSSION

Beulah *et al.*, (2014) did research in Chennai to assess the impact of blow bottle exercise on children with lower

Table 5: Mean, standard deviation and unpaired t value of the post-test level of respiratory parameters among children in the study group and control group after intervention L (n=60)

S. No.	Group	Mean	Standard deviation	Mean D	Unpaired t value	Table value
1	Study group (n=30)	34.43	2.72	2.3	2.9	2.02
2	Control group (n=30)	32.13	4.09			

Table value $t=2.02$, *significant at $P<0.05$ level

respiratory tract infections' respiratory condition. It made use of a quantitative research design. Thirty members of the study group and the control group contained 30 participants who were affected by lower respiratory tract infections for the sample. For 10 days, the research group received standard care along with three sessions of blow bottle exercise each day. The results demonstrated substantial variations in respiratory rate, heart rate, and oxygen saturation between the study group and the control group. It was associated with the practice of breathing exercises.^[6]

The researcher made use of Pender's (2002 revision) health promotion model. The theory's first phase in this investigation is individual features and experiences. In this initial stage, the researcher chose kids between the ages of 3 and 8 who had lower respiratory tract infections, and they evaluated respiratory parameters using an observational checklist. Behavior-specific cognitions and feelings are the second phase. The scientists determined that doing the balloon-blowing activity would help to preserve lung function, increase lung function, and decrease the probability of respiratory infections.

Kim and Lee (2012) assessed the effects of balloon-blowing activities on lung capacity by analyzing the findings of a study. In comparison to the control group, the balloon-blowing training group's pulmonary function dramatically improved, according to the results. The act of blowing balloons has positive effects on lung health, according to the study.^[7]

The third phase is the behavioral result, according to the health promotion model of Pender. The researcher believed that the kids with LRTI (ages 3–8) had good attitudes regarding the activity of blowing air into a balloon to enhance lung function. Finally, the investigator discovered that the study group's respiratory metrics were superior compared to the control group.

Martina *et al.* (2015) conducted a study in several institutions, Porur, to evaluate the impact effects of massage therapy on the lung health of kids who have infections of the lower respiratory tract. It was straightforward to divide a sample of 60 toddlers into the study and control groups. The control group just got regular care, whereas the research group received routine care as well as treatment with massage for 3 days straight, both in the morning and the evening, respectively. According to the findings, massage treatment considerably improved lung functioning. According to the study, among the study group's toddlers with lower respiratory tract infections, it showed a connection among the mother's education level, respiratory health, and childcare provider. There was no correlation

between respiratory status and specific demographic characteristics in the research group's post-test.^[8]

Sreelatha (IJNR) 2016 the earlier in the research, it was shown that wheezing respiration was present in less than half of both groups before the balloon-blowing exercise, but in 90% of the kids among the intervention group, there was normal breathing after 2 days. These results are supported by research was done by Das *et al.*, who also examined the impact of balloon and bubble treatment on physiologic parameters and discovered that, after 6 days of balloon; therapy, none of the 17 children (or 57% of them) had normal breath sounds.^[9]

Das *et al.* (2018), the study's findings are consistent with those of Sreeletha, who compared the effects of incentive spirometry and balloon treatment in promoting respiratory function in 20 children in each group. Seven children's wheeze decreased following balloon treatment for 2 weeks, but nothing from it decreased after incentive spirometry for 2 weeks, according to research.^[10]

CONCLUSION

Based on the study's findings, it was determined that blowing balloons may help children with lower respiratory tract infections improve their respiratory parameters.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest regarding the research, data analysis, and publication of the article titled

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