

EFFECTIVENESS OF BALLOON-BLOWING EXERCISE ON RESPIRATORY PARAMETERS AMONG CHILDREN WITH LOWER RESPIRATORY TRACT INFECTION

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ABSTRACT

Objective: This study was conducted to assess the effectiveness of balloon-blowing exercise on respiratory parameters among children with lower respiratory tract infection.

Methods: A quantitative research approach and quasi-experimental (two-group pretest-posttest design) were adopted for this study. The sample size was 40 children with lower respiratory tract infection and used non-probability convenience sampling technique.

Results: The results showed that the mean posttest score of respiratory parameters was 31 of the experimental group who were administered balloon blowing exercise with routine care which was higher than the control group posttest mean score of 23.35 having routine care and the t value was 4.21 ($p < 0.001$) which showed that there was a significant difference in the post-test score of respiratory parameters in control and experimental groups.

Conclusion: The study concluded that balloon-blowing exercise was effective to improve the respiratory parameters among children with lower respiratory tract infection.

Keywords: Children, Lower Respiratory tract Infection, Observational Checklist, Respiratory parameters, Balloon blowing exercise.

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INTRODUCTION

Children are the nation's most important and the greatest resource. They are the present and the future of each country in the world. Children should be protected and their health should be maintained. Child development consists of physical growth, intellectual, emotional, and social development [1].

Children are not like adults. They are in a dynamic process of growth and development and are particularly vulnerable to acute and chronic effects of pollutants in their environment, which leads to diseases such as respiratory tract infections, pneumonia, and diarrhea which may cause death among the children so they must be taken care properly [2].

The respiratory system is a frequent site of illness in children. Most of the respiratory conditions are stressful for children than adult, more often leading to airway obstruction or respiratory failure [3]. The respiratory system mainly classified as upper respiratory tract infection and lower respiratory tract infection [4].

Lower respiratory tract infection is a generic term for an acute infection of the trachea, airways, and lungs, which make up the lower respiratory system and the conditions that occur due to infection in lower respiratory tract are bronchitis, bronchiolitis, croup, pneumonia, bronchial asthma, pneumothorax, collapse, obstructive emphysema, pulmonary edema, and lower respiratory tract infections associated with wheezing [5,6].

According to the Indian Academy of Pediatrics (2022), It was estimated that 5.2 million children died worldwide in 2019, mostly from preventable and treatable causes [7]. According to the World Health Organization, respiratory infections account for 6% of the total global disease burden. One-third of the total deaths occur due to acute respiratory infection and in the worldwide around 6.6 million under-five children die each year. Globally mortality due to acute respiratory

infection accounted for 40% in India, Indonesia, Bangladesh, and Nepal [8].

The lower respiratory tract infection causes the overproduction of mucus and other fluids, leading to difficulty in breathing and inhibiting gas exchange in the lungs. If the lower respiratory tract infections are not treated on time, then it may cause permanent lung damage or risk of respiratory failure. To treat this and for faster recovery, there are various non-pharmacological methods which can be used for the therapeutic purpose. One of the best non-pharmacological methods which can be used for the recovery of children is balloon blowing exercise [9].

Balloon-blowing exercise helps in the improvement of pulmonary functions, respiratory function, respiratory muscle strength, maintenance or improvement of chest mobility, and correction of abnormal breathing patterns [10].

The child has small upper and lower airways which results in a great chance of respiratory difficulties and respiratory failure as compared to the adults. The tissues of the respiratory tract are delicate and do not produce sufficient mucus whereas in adults' sufficient amount of mucus is produced. Hence, the children are more prone to have respiratory infections and as well as it causes other complications if not treated properly [11].

Children are particularly vulnerable to acute and chronic effects of the environment, which leads to infectious diseases. Acute lower respiratory Infection is one of the leading causes of 29% of mortality in children [12].

Lower respiratory infections constitute a leading cause of death. It accounts for 1.5 million child deaths in the world, annually. Globally, 30-60% of pediatric outpatient attendance and 20-30% of hospital

Table 1: Frequency and percentage distribution of demographic variables of children with lower respiratory tract infection in the control group and experimental group (n=40)

Demographic variables	Control group		Experimental group	
	Frequency	Percentage	Frequency	Percentage
Age of the child				
4-5 years	11	55	11	55
6-7 years	2	10	3	15
8-12 years	7	35	6	30
Gender of child				
Male	11	55	11	55
Female	9	45	9	45
Transgender	0	0	0	0
Order of Birth				
First child	7	35	10	50
Second child	9	45	5	25
Third child and above	4	20	5	25
Type of Family				
Nuclear	15	75	12	60
Joint	3	15	7	35
Extended	2	10	1	5
Separated	0	0	0	0
Residence				
Rural	12	60	12	60
Urban	8	40	8	40
Religion				
Hindu	20	100	18	90
Muslim	0	0	2	10
Christian	0	0	0	0
Others	0	0	0	0
Occupation of Father				
Professional	0	0	0	0
Semi-professional	0	0	1	5
Clerical	0	0	1	5
Skilled worker	1	5	1	5
Semiskilled	8	40	9	45
Unskilled	11	55	8	40
Unemployed	0	0	0	0
Occupation of Mother				
Professional	0	0	0	0
Semi professional	0	0	0	0
Clerical	0	0	0	0
Skilled worker	0	0	2	10
Semiskilled	0	0	1	5
Unskilled	0	0	1	5
Unemployed	20	100	16	80
Monthly Family Income				
≥97451	0	0	0	0
48751-97450	0	0	0	0
36551-48750	0	0	0	0
24351-36550	0	0	2	10
14551-24350	13	65	8	40
4851-14550	7	35	10	50
≤4850	0	0	0	0
Frequency of respiratory tract infection				
No	8	40	11	55
1-2 times	12	60	6	30
3-4 times	0	0	2	10
>4 times	0	0	1	5
Duration of Hospitalization				
1-3 days	9	45	5	25
4-5 days	6	30	12	60
>5 days	5	25	3	15
Previous habits of balloon blowing				
Yes	7	35	3	15
No	13	65	17	85

Table 2: Effectiveness of balloon blowing exercise on the respiratory parameters of children with lower respiratory tract infection (n=40)

Group	Test	Mean	SD	Mean Diff.	Independent "t" value	Level of significance
Control group (n=20)	Posttest	25.35	5.50	5.65	4.21	HS (p-value≤0.001)
Experimental group (n=20)	Posttest	31	2.45			

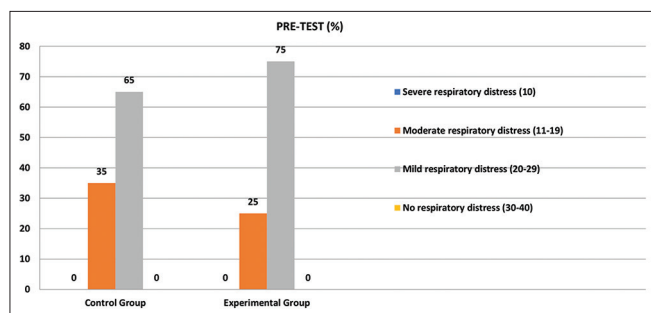


Fig. 1: Frequency and percentage distribution based on the pretest score of the control group and experimental group

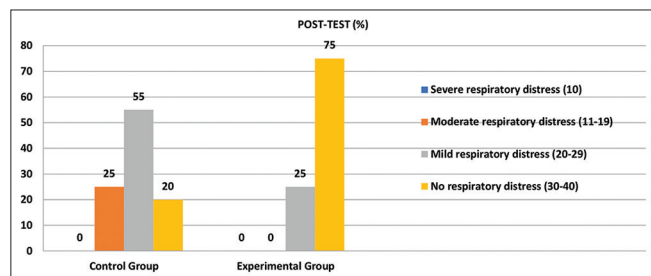


Fig. 2: Frequency and percentage distribution based on the post - test score of control group and experimental group

admissions are due to lower respiratory tract infections. Chronic illnesses such as deafness, breathing difficulty, and their subsequent disability among children, and their origin to inadequately treated episodes of lower respiratory tract infection [13]. Hence, to increase the rate of the recovery and to reduce the underlying complications related to lower respiratory tract infection. The balloon-blowing exercise can be helpful for recovery speedily and reduction of length of stay in the hospital for children as well as balloon is the one of the play items for the children which will show less fear toward the balloon-blowing exercise as compared to the use of other devices such as spirometry [9].

Objectives

1. To assess the pre-test and post-test scores of respiratory parameters among children with lower respiratory tract infections
2. To determine the effectiveness of balloon-blowing exercise on respiratory parameters among children with lower respiratory tract infections
3. To find out the association between respiratory parameters among children with lower respiratory tract infections of the control group and experimental group with selected demographic variables.

METHODS

The research approach adopted for this study was quantitative (quasi-experimental research) approach.

The research design used in the study was quasi-experimental research design (two-group pre-test post-test design). The sample size was 40 children with lower respiratory tract infection and the sampling technique used was non-probability convenience sampling technique.

The tool used for data collection was an observational checklist to assess respiratory parameters and the data interpretation was done by Descriptive statistics and Inferential statistics.

RESULTS

- Section A: Description of demographic variables of the children as shown in the above Table 1.
- Section B: Frequency and percentage distribution of pre-test and post-test of respiratory parameters of children with lower respiratory tract infection as shown in the above Figs. 1 and 2 respectively.

- Section D: Effectiveness of balloon blowing exercise on the respiratory parameters of children with lower respiratory tract infection as shown in the above Table 2.
- Section E: Association between pre-test scores of respiratory parameters in the control and experimental group with demographic variables of children.

There was no significant association with the age of the child, gender of the child, order of birth, type of family, residence, religion, occupation of father, occupation of mother, monthly family income, frequency of respiratory tract infection, duration of hospitalization, and previous habit of balloon blowing. Hence, the stated hypothesis is rejected at $p < 0.05$ level of significance.

DISCUSSION

In this study on the effect of balloon-blowing exercise on the respiratory parameters of children with lower respiratory tract infection, the mean difference of the posttest of the control and experimental group was 5.65 and the calculated t value was 4.21 and it was more than the table value (2.02) as shown in the above Table 2. Hence, it showed that there was a significant difference in the post-test score of respiratory parameters in the experimental group.

CONCLUSION

The main conclusion drawn out from the present study was that most of the children with lower respiratory tract infection in the post-test score of respiratory parameters had mild, moderate, and normal changes in respiratory parameters whereas in the experimental group had mild and normal changes in respiratory parameters. These showed that the balloon-blowing exercise was effective to improve respiratory parameters and as well as the children had faster recovery this exercise was feasible and cost effective.

AUTHORS CONTRIBUTION

In this study, both the authors have contributed equally to the research work and manuscript.

CONFLICTS OF INTEREST

There are no such conflicts of interests by the authors.

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