Journal of Chemical Health Risks

www.jchr.org

JCHR (2023) 13(6), 2927-2935 | ISSN:2251-6727

"Effectiveness of Respiratory Exercises on the Outcome of Respiratory Status among School Age Children Admitted with Respiratory Infections at a Selected Hospital in Jaipur"

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(Received: 07 October 2023 Revised: 12 November Accepted: 06 December)

KEYWORDS
Respiratory infection, Respiratory status, School age children, Effectiveness etc.

ABSTRACT:

Introduction: Respiratory infection has become a global health priority. Not only is chronic respiratory disease a leading cause of worldwide morbidity and mortality, but the COVID-19 pandemic has heightened attention on respiratory health and the means of enhancing it. Subsequently, and inevitably, the respiratory system has become a target of the multi-trillion-dollar health and wellness industry. [1]

Dyspnoea and exercise limitation are among the most common symptoms experienced by patients with various chronic lung diseases and are linked to poor quality of life.[2]

Acute respiratory infections (ARIs) are classified as upper respiratory tract infections (URIs) or lower respiratory tract infections (LRIs). The upper respiratory tract consists of the airways from the nostrils to the vocal cords in the larynx, including the paranasal sinuses and the middle ear. The lower respiratory tract covers the continuation of the airways from the trachea and bronchi to the bronchioles and the alveoli.[3]

Respiratory infections represent the most commonly diagnosed medical condition in these groups, estimated to be responsible for ~36,000 to 100,000 medical encounters affecting an estimated 25,000 to 80,000 recruits each year.[4]

In India, around 400 000 children aged above five years die every year from ARI-related diseases. The figure accounts for 13–16% of all child deaths among paediatric hospital admissions (Jain et al., 2001; Vashishtha, 2010). As a cause of approximately one-fourth of

global annual deaths of children aged above five years, ARI is a significant public health concern in India.[5]

Methods: A quasi experimental design (Pre-test, Post-test, control group design) was used to determine the effectiveness of respiratory exercises on 11 experimental and 11 control group of school age children who were selected by using Convenient Sampling Technique.

Result: The finding in the study shows that the calculated t value i.e. 7.94 is more than the tabulate value that is 1.94 at 10 df (0.000 p value) while the calculated t value i.e. 0.54 is less than the tabulate value that is 1.94 at 10 df (0.602 p value). So, we can say that intervention (respiratory exercise) is effective for outcomes of respiratory status among school age children in experimental group and we can also say that intervention (respiratory exercise) is not effective for outcomes of respiratory status among school age children in control group.

Conclusion: On the basis of the finding, it is concluded that the intervention (respiratory exercise) is effective for outcomes or respiratory status among the school age children admitted with respiratory infections at a selected hospital in Jaipur.

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JCHR (2023) 13(6), 2927-2935 | ISSN:2251-6727

Introduction

The high incidence of acute respiratory infection (ARI)-related morbidity and mortality is a major public health concern in developing countries. This study aimed to quantify regional inequalities and the degree of association between childhood ARI and background factors. In 2016, from 68.06 million episodes, an estimated 652 572 children aged below five years and more age group died because of lower respiratory infections (Troeger et al., 2018; Walker et al., 2013) reported that the incidence of severe ARI is the highest in Southeast Asian and African regions. India is one of the 15 highest burdened countries in terms of total pneumonia episodes and related childhood mortality. In India, around 400 000 children aged above five years die every year from ARI-related diseases. The figure accounts for 13–16% of all child deaths among paediatric hospital admissions (Jain et al., 2001; Vashishtha, 2010). As a cause of approximately one-fourth of global annual deaths of children aged above five years, ARI is a significant public health concern in India[4], A study was conducted to evaluate the effect of PLB on cardiac, pulmonary and oxygenation level in patients with Chronic Obstructive Pulmonary Disease (COPD). A three-group clinical trial study with experimental and control which was purposefully conducted with the participation of patients with COPD and healthy individuals referring in 2017 in Madani hospital Khoy.[6]

A study was conducted and data was analyzed by univariate and multiple logistic regression analysis. Overall, 51.1% (203) of the subjects had at least one symptom of ARI in the preceding 2 weeks. The manifestations of ARI included allergic rhinitis (183, 46.1%), dry cough (75, 18.9%), throat pain and fever (54, 13.6%), wheezing (39, 9.8%) and ear discharge (28, 7.1%).[7]

Our objective was to examine if children with early-life respiratory tract infections had increased risks of lower lung function and asthma at school age. children with early-life lower, not upper, respiratory tract infections had a lower school-age FEV_1, FEV_1/FVC and $FEF_{75\%}$ (z-score range: −0.09 (95% CI −0.14– −0.04) to −0.30 (95% CI −0.36– −0.24)).

Children with early-life lower respiratory tract infections had a higher increased risk of school-age asthma than those with upper respiratory tract infections (OR range: 2.10 (95% CI 1.98–2.22) to 6.30 (95% CI 5.64–7.04) and 1.25 (95% CI 1.18–1.32) to 1.55 (95% CI 1.47 1.65), respectively).[8]

The mortality rate from ARI varies greatly by region. More than 12 million children respiratory tract infection in paediatrics. There were no restrictions on date, language, participant age, or type of publication. with severe ARI were admitted to hospitals each year, according to the data from global burden of disease in 2010. Up to 50% of children&39s visits to hospitals around the world are due to ARI. Over 2400 children under the age of five per day pass away from pneumonia.[9]

A prospective study was conducted to determine the prevalence, age distribution and epidemiological factors associated with asthma in 5 villages of Ludhiana. The study group composed of 2,275 children, 1,253 males and 1,022 females. Data was collected through questionnaire and screening of prescriptions and documents and analysis was done by Fischers Z test. The study results revealed that, 37.9% children with asthma had the family history of allergy, 13.8% of cases had the family history of smoking, overcrowding was noted in 55.2% and pet animals 13.85%. The mean loss of school days over one year was 16.5 days and out of 2,271 children 58 were diagnosed to have asthma (34 males and 24 females) giving the prevalence rate of 2.6%.[10]

This study used a quasi-experiment method with a pre-test- post-test without a control group design approach. The sample consisted of 32 school-aged children and adolescents who were divided into two intervention groups. Group 1 underwent modified PLB by blowing into a water-filled bottle through a straw and Group 2 was provided with modified PLB by blowing a party whistle. The intervention was conducted one time in a day, in a rest time, for 10 min. The results showed that modified PLB by blowing into a water-filled bottle through a straw was more effective in reducing respiratory rate (RR) and improving oxygen saturation (SpO2) than modified PLB by blowing a party whistle. Modified PLB intervention by blowing into a water-filled bottle through a straw improved the oxygenation status of children affected by oxygenation problems.[11]

In 2016, from 68.06 million episodes, an estimated 652 572 children aged below five years died because of lower respiratory infections (Troeger et al., 2018; Walker et al., 2013) reported that the incidence of severe ARI is the highest in Southeast Asian and African regions.[12]

Methods

The research approach used was the quantitative research approach and research design adopted was quasi experimental design Pre -test, Post test control group design. The study was done to evaluate the effectiveness of respiratory exercises on the outcome of respiratory status among school age children admitted with respiratory infection. A pilot study should be carried out with as much care as the major study so that any detected weakness will be truly representative of inadequacies inherent in the major study. Subject for the pilot study should possess the same characteristics as individual who will compose the main sample. That is pilot subject should be chosen from the same population

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as subjects for the major study. Formal permission will seek to the medical superintendent of Tagore Hospital and Research Institute, Jaipur, to conduct the pilot study. The Pilot study will be conducted from 17/07/2023 to 22/07/2023 on 22 school age children in which 11 school age children for experimental group and 11 school age children for control group admitted with respiratory infections at Tagore Hospital and Research Institute, Jaipur. The tools are consisting of demographic data and assessment scale of pulmonary function. The data collected was analysed using split half method.

Results

Section I: Description Of Demographic Variables Of The School Age Children

S. No.	Variables	Experimental group		Control group	
		Frequency	Percentage	Frequency	Percentage
1.	**Age in years**				
	06 – 07	2	18.18%	3	27.27%
	08 – 09	4	36.36%	4	36.36%
	10 – 11	4	36.36%	2	18.18%
	12 – 13	1	09.09%	2	18.18%
2.	**Sex/ Gender**				
	Male	5	45.45%	6	54.54%
	Female	6	54.54%	5	45.45%
3.	**Education**				
	UKG to I std	3	27.27%	2	18.18%
	II to III std	4	36.36%	4	36.36%
	IV to V std	3	27.27%	4	36.36%
	VI to VII std	1	9.09%	1	9.09%
4.	**Religion**				
	Hindu	7	63.63%	6	54.54%
	Muslim	3	27.27%	3	27.27%
	Christian	1	9.09%	1	9.09%
	Sikh	0	00%	1	9.09%
5.	**Family income/ capita**				
	Rs <10000	1	9.09%	2	18.18%
	10001 – 15000	3	27.27%	3	27.27%
	15001 – 20000	5	45.45%	4	36.36%
	>20000	2	18.18%	2	18.18%
6.	**Residence**				
	Urban	9	81.81%	8	72.72%
	Rural	2	18.18%	3	27.27%
7.	**Type of family**				
	Nuclear	1	9.09%	2	18.18%
	Joint	8	72.72%	7	63.63%
	Extended	2	18.18%	2	18.18%
8.	**Type of allergy**				
	Food	0	00%	0	00%
	Environment	6	54.54%	4	36.36%
	Plants	0	00%	0	00%
	No allergy	5	45.45%	7	63.63%
9.	**Past history of any respiratory disease**				
	Yes	8	72.72%	7	63.63%
	No	3	27.27%	4	36.36%
10.	**If yes specify**				
	Bronchitis	2	25%	1	14.28%
	Pharyngitis	1	12.5%	0	00%
	Pneumonia	5	62.5%	6	85.71%
	Any other	0	00%	0	00%

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11.	**Family habit of smoking**				
	Yes	5	45.45%	4	36.36%
	No	6	54.54%	7	63.63%
12.	**Family history of respiratory disease**				
	Yes	3	27.27%	2	18.18%
	No	8	72.72%	9	81.81%
13.	**Current diagnosis of disease of child**				
	Bronchitis	3	27.27%	3	27.27%
	Pharyngitis	2	18.18%	3	27.27%
	Pneumonia	5	45.45%	4	36.36%
	Any other	1	9.09%	1	9.09%
14.	**Duration of disease**				
	< 1 week	1	9.09%	2	18.18%
	> 1 week	3	27.27%	2	18.18%
	> 2 week	4	36.36%	5	45.45%
	> 3 week	3	27.27%	2	18.18%

Section II: Assess The Level Of Respiratory Status Of School Age Children

a. Level of respiratory status of school age children of experimental group before intervention

Table no. 2: Level of respiratory status of school age children of experimental group before intervention

S. No.	Aspect	Max. Score	Mean	Median	Standard Deviation
1.	Heart Rate	33	2.54	3	0.68
2.	Oxygen Saturation	44	3.18	3	0.98
3.	Respiratory rate	33	2.63	3	0.50
4.	Chest expansion	44	3.36	4	1.02
5.	Breath holding time	33	2.63	3	0.67
Overall			**14.36**	**15**	**2.50**

b. Level of respiratory status of school age children of experimental group after intervention

Table no. 3: Level of respiratory status of school age children of experimental group after intervention

S. No.	Aspect	Max. Score	Mean	Median	Standard Deviation
1.	Heart Rate	33	1.36	1	0.50
2.	Oxygen Saturation	44	1.27	1	0.46
3.	Respiratory rate	33	1.45	1	0.68
4.	Chest expansion	44	1.54	4	0.93
5.	Breath holding time	33	1.45	1	0.68

b. Level of respiratory status of school age children of control group before intervention

Table no. 4: Level of respiratory status of school age children of control Group before intervention

S. No.	Aspect	Max. Score	Mean	Median	Standard Deviation
1.	Heart Rate	33	2.63	3	0.50
2.	Oxygen Saturation	44	2.63	3	0.92
3.	Respiratory rate	33	2.72	3	0.46
4.	Chest expansion	44	3.27	3	0.78
5.	Breath holding time	33	2.63	3	0.67
Overall			13.90	14	2.07

c. Level of respiratory status of school age children of control group after intervention

Table no. 5: Level of respiratory status of school age children of control group after intervention

S. No.	Aspect	Max. Score	Mean	Median	Standard Deviation
1.	Heart Rate	33	2.54	3	0.52
2.	Oxygen Saturation	44	3.09	3	0.70
3.	Respiratory rate	33	2.54	3	0.68
4.	Chest expansion	44	2.63	3	0.80

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5.	Breath holding time	33	2.72	3	0.46
Overall			13.54	14	1.69

Section III: Comparison Between Level Of Respiratory Status Of School Age Children Between Experimental And Control Group

Table no. 6: Comparison between level of respiratory status of school age children between experimental and control group after intervention

S. No.	Aspect	Experimental Group			Control Group		
		Mean	Median	Standard Deviation	Mean	Median	Standard Deviation
1.	Heart Rate	1.36	1	0.50	2.54	3	0.52
2.	Oxygen Saturation	1.27	1	0.46	3.09	3	0.70
3.	Respiratory rate	1.45	1	0.68	2.54	3	0.68
4.	Chest expansion	1.54	4	0.93	2.63	3	0.80
5.	Breath holding time	1.45	1	0.68	2.72	3	0.46
Overall		7.09	7	1.37	13.54	14	1.69

Section IV: Assess The Effectiveness Of Respiratory Exercise Among The School Age Children

Table no. 7: Mean, median, SD and t value for experimental group

S. No.	Group	Aspect	Mean	Median	Standard deviation	Mean difference	t value	P value
1.	Experimental group	Before Intervention	14.36	15	2.50	7.07	7.94	0.000
		After Intervention	7.09	7	1.37			
2.	Control group	Before Intervention	13.90	14	2.07	0.36	0.54	0.602
		After Intervention	13.54	14	1.63			

Section V: Association Between Respiratory Status Of School Age Children Admitted With Respiratory Infections And Their Selected Demographic Variables Before And After Providing Respiratory Exercises In Experimental And Control Group

Table no. 8: Association Between Respiratory Status Of School Age Children With Their Demographic Variables Before Providing Respiratory Exercises In Experimental Group

S. No.	Demographic variables		Df	Tabulated value	X^2 value	P value
1.	Age	06 – 07	6	12.59	13.06	0.04
		08 – 09				
		10 – 11				
		12 – 13				
2.	Sex / gender	Male	2	5.99	0.24	0.88
		Female				
3.	Education	UKG to I std	6	12.59	1.58	0.95
		II to III std				
		IV to V std				
		VI to VII std				
4.	Religion	Hindu	6	12.59	3.31	0.76
		Muslim				
		Christian				
		Sikh				
5.	Family income / capita	Rs<10000	6	12.59	12.71	0.04
		10001 – 15000				
		15001 – 20000				
		>20000				
6.	Residence	Urban	2	5.99	6.51	0.03
		Rural				
7.	Type of family	Nuclear	4	9.49	8.59	0.07
		Joint				
		Extended				
8.	Type of allergy	Food	6	12.59	2.12	0.90
		Environment				

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		Plants				
		No allergy				
9.	Past history of any respiratory disease	Yes	2	5.99	3.43	0.18
		No				
10.	Family habit of smoking	Yes	2	5.99	8.31	0.01
		No				
11.	Family history of respiratory disease	Yes	2	5.99	7.21	0.02
		No				
12.	Current diagnosis of disease of child	Bronchitis	6	12.59	13.2	0.04
		Pharyngitis				
		Pneumonia				
		Any other				
13.	Duration of disease	< 1 week	6	12.59	1.58	0.95
		> 1 week				
		> 2 week				
		> 3 week				

Table no. 9: Association between respiratory status of school age children with their demographic variables after providing respiratory exercises in experimental group

S. No.	**Demographic variables**		**Df**	**Tabulated value**	**X^2 value**	**P value**
1.	Age	06 – 07	6	12.59	15.43	0.01
		08 – 09				
		10 – 11				
		12 – 13				
2.	Sex / gender	Male	2	5.99	1.25	0.53
		Female				
3.	Education	UKG to I std	6	12.59	12.91	0.04
		II to III std				
		IV to V std				
		VI to VII std				
4.	Religion	Hindu	6	12.59	3.31	0.76
		Muslim				
		Christian				
		Sikh				
5.	Family income / capita	Rs<10000	6	12.59	13.76	0.03
		10001 – 15000				
		15001 – 20000				
		>20000				
6.	Residence	Urban	2	5.99	1.14	0.56
		Rural				
7.	Type of family	Nuclear	4	9.49	6.64	0.15
		Joint				
		Extended				
8.	Type of allergy	Food	6	12.59	2.12	0.90
		Environment				
		Plants				
		No allergy				
9.	Past history of any respiratory disease	Yes	2	5.99	4.27	0.11
		No				
10.	Family habit of smoking	Yes	2	5.99	2.26	0.32
		No				
11.	Family history of respiratory disease	Yes	2	5.99	7.63	0.02
		No				
12.	Current diagnosis of disease of child	Bronchitis	6	12.59	2.21	0.89
		Pharyngitis				
		Pneumonia				
		Any other				
13.	Duration of disease	< 1 week	6	12.59	12.91	0.04

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		> 1 week				
		> 2 week				
		> 3 week				

Table no. 10: Association between respiratory status of school age children with their demographic variables before providing respiratory exercises in control group

S. No.	Demographic variables		Df	Tabulated value	X^2 value	P value
1.	Age	06 – 07	6	12.59	3.66	0.72
		08 – 09				
		10 – 11				
		12 – 13				
2.	Sex / gender	Male	2	5.99	2.39	0.30
		Female				
3.	Education	UKG to I std	6	12.59	15.50	0.01
		II to III std				
		IV to V std				
		VI to VII std				
4.	Religion	Hindu	6	12.59	2.00	0.91
		Muslim				
		Christian				
		Sikh				
5.	Family income / capita	Rs<10000	6	12.59	14.37	0.02
		10001 – 15000				
		15001 – 20000				
		>20000				
6.	Residence	Urban	2	5.99	6.51	0.03
		Rural				
7.	Type of family	Nuclear	4	9.49	11	0.02
		Joint				
		Extended				
8.	Type of allergy	Food	6	12.59	2.39	0.88
		Environment				
		Plants				
		No allergy				
9.	Past history of any respiratory disease	Yes	2	5.99	2.17	0.33
		No				
10.	Family habit of smoking	Yes	2	5.99	7.77	0.02
		No				
11.	Family history of respiratory disease	Yes	2	5.99	7.21	0.02
		No				
12.	Current diagnosis of disease of child	Bronchitis	6	12.59	2.21	0.89
		Pharyngitis				
		Pneumonia				
		Any other				
13.	Duration of disease	< 1 week	6	12.59	1.58	0.95
		> 1 week				
		> 2 week				
		> 3 week				

Table no. 11: Association between respiratory status of school age children with their demographic variables after providing respiratory exercises in control group

S. No.	Demographic variables		Df	Tabulated value	X^2 value	P value
1.	Age	06 – 07	6	12.59	3.66	0.72
		08 – 09				
		10 – 11				
		12 – 13				
2.	Sex / gender	Male	2	5.99	0.78	0.67

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		Female				
3.	Education	UKG to I std	6	12.59	15.12	0.01
		II to III std				
		IV to V std				
		VI to VII std				
4.	Religion	Hindu	6	12.59	2.98	0.81
		Muslim				
		Christian				
		Sikh				
5.	Family income / capita	Rs<10000	6	12.59	13.65	0.03
		10001 – 15000				
		15001 – 20000				
		>20000				
6.	Residence	Urban	2	5.99	1.14	0.56
		Rural				
7.	Type of family	Nuclear	4	9.49	1.30	0.86
		Joint				
		Extended				
8.	Type of allergy	Food	6	12.59	0.24	0.99
		Environment				
		Plants				
		No allergy				
9.	Past history of any respiratory disease	Yes	2	5.99	7.21	0.02
		No				
10.	Family habit of smoking	Yes	2	5.99	7.63	0.02
		No				
11.	Family history of respiratory disease	Yes	2	5.99	0.076	0.96
		No				
12.	Current diagnosis of disease of child	Bronchitis	6	12.59	3.45	0.75
		Pharyngitis				
		Pneumonia				
		Any other				
13.	Duration of disease	< 1 week	6	12.59	14.66	0.02
		> 1 week				
		> 2 week				
		> 3 week				

On the basis of the finding, it is concluded that the intervention (respiratory exercise) is effective for outcomes or respiratory status among the school age children admitted with respiratory infections at a selected hospital in Jaipur

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