ARTICLE

ON

A STUDY TO ASSESS THE EFFECTIVENESS OF BREATHING EXERCISES AS A PLAY WAY METHOD ON RESPIRATORY SIGNS AND PULMONARY PARAMETERS AMONG CHILDREN WITH LOWER REPIRATORY TRACT INFECTIONS AT SELECTED HOSPITAL, FARIDKOT,PUNJAB.

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ABSTRACT

INTRODUCTION: Lower respiratory tract infections (LRIs) inflict a high burden of disease in children worldwide and are urgently needed to differentiate this burden. Lower respiratory tract infections refer to infections affecting the trachea, bronchi, bronchioles and lungs. Due to lower respiratory tract infections, respiratory signs are observed i.e. wheezing, increased respiratory rate and use of accessory muscles. Peak flow rate and oxygen saturation get also affected. To overcome breathing difficulty, breathing techniques are helpful. The ultimate goal is for children to be able to relax quickly when faced with breathing difficulty. Breathing exercise as an integral part plays a significant role in airway clearance and parenchyma expansion by improving the efficiency of respiratory muscles. Modified breathing exercise is mandatory in children because they might not co-operate like adults. Various modified forms of breathing exercises like group exercises, running, balloon blowing, abduction, adduction and forward movement of upper limbs, blowing air into the water with a straw, blowing a trumpet, flute and mouth organ playing are found effective in children.

AIM OF THE STUDY: The study aimed at assessing the effectiveness of breathing exercises as a play way method on respiratory signs and pulmonary parameters among children with lower respiratory tract infections at selected hospital, Faridkot, Punjab.

MATERIAL AND METHODS: The research design was quasi experimental and the data for study was collected from Dec,2015 to Jan, 2016 in the pediatric wards of GGSMH, Faridkot on 90 children with LRTIs (45 in control/conventional care group and 45 in experimental group/Breathing exercises as a play way method) selected through non-purposive sampling. The socio-demographic data was collected through structured interview schedule and standardized tool i.e. Severity and exacerbation grade scale, peak flow meter and pulse oximetry used to assess severity of respiratory signs and pulmonary parameters.

RESULTS: The results of the study revealed that the control/ conventional care and experimental group/breathing exercises were homogenous in terms of selected socio demographic variables, respiratory signs and pulmonary parameters. Beneficial effects of breathing exercises on respiratory signs and pulmonary parameters were found to be statistically significant at $p< 0.05$. In comparison of experimental group and conventional care group, there was more reduction in respiratory signs and more improvement of pulmonary parameters in experimental group as compared to conventional group.

CONCLUSIONS: Thus, it is concluded that breathing exercises as a play way method is found to be more effective in reducing respiratory signs and in improving pulmonary parameters as compared to conventional care group.

KEY WORDS: Breathing exercises, Play way method, Respiratory signs, pulmonary parameters and Lower respiratory tract infections.

INTRODUCTION

"When I am having a breathing difficulty I feel like a fish in the pond without water"

Jessie. P.

BACKGROUND OF THE STUDY

Breathing is an uninterrupted bodily activity that controls the mental and emotional responses of the body. The cells of the body derive the energy they need from the oxidation of carbohydrates, fats and proteins. As with any type of combustion, this process requires oxygen. Certain vital tissues, such as those of the brain and the heart, cannot survive for long without a continuous supply of oxygen. Breathing correctly means that the body is being supplied with the right amount of oxygen, replenishing the brain and other vital organs with essential nutrients. If breathing is not done appropriately, the body can be robbed of oxygen, leading to a host of conditions; the skin can suffer when not receiving enough fresh oxygenated blood, the muscles can tire easily during a workout as they are not getting the right amount of oxygen and also feel constantly tired and lethargic due to lack of enough vital nutrients being carried in the blood[1].

Breathing exercises as a play way method can be incorporated in routine care for early recovery and beneficial effects on respiratory signs. **Farid, F.J Atri et al.** conducted a study to examine the effects of course of aerobic exercise on pulmonary function and tolerance of activity in asthmatic patients. Significant changes were observed in FEV1, FVC, PEF, PEF 25-75%, MVV, RF and 6 MWT between asthmatic patients of the two groups ($P \leq 0.05$), but FEV1/FVC showed no significant changes. This study showed that aerobic exercises in asthmatic patients lead to an improvement in pulmonary functions[2].

Breathing techniques are helpful for reducing breathing difficulty. The ultimate goal is for children to be able to relax quickly when faced with stressful situations. Breathing exercise as an integral part plays a significant role in airway clearance. Modified breathing exercise is mandatory in children because they might not co-operate like adults. The principle is to attract children and not to create boredom. It can be accompanied by musical tone that would evince interest in a child. Various modified

forms of breathing exercises like group exercises, running, balloon blowing, abduction, adduction and forward movement of upper limbs, blowing air into the water with a straw, blowing a trumpet, flute and mouth organ playing are found effective in children[3].

OBJECTIVES

1. To assess pre-interventional score of respiratory signs and pulmonary parameters among children with lower respiratory tract infections in experimental and conventional care group.
2. To assess post-interventional score of respiratory signs and pulmonary parameters among children with lower respiratory tract infections in experimental and conventional care group.
3. To compare pre-interventional and post-interventional score of respiratory signs and pulmonary parameters among children with lower respiratory tract infections in experimental and conventional care group.

MATERIALS AND METHODS

Research Approach

Quantitative experimental research approach was used for the study.

Research Design

Quasi-experimental Research design i.e interrupted time series research design was chosen for the study.

Research setting

The study was conducted on children of 6-12 years with lower respiratory tract infections admitted in paediatric wards of GGSMH, Faridkot.

Study Population

The study population consists of children in the age group of 6-12 years admitted in paediatric department with lower respiratory tract infections at GGSMH, Faridkot.

Sample size and Sampling technique

The sample was selected by using Non-probability purposive sampling technique and consists of 90 children admitted in the paediatric wards at G.G.S.M.H, Faridkot. In this study, 45 children will be assigned to the experimental group and 45 to the conventional care group

Research tool

Research tool used for the study consists of 3 parts. Part I includes Severity and exacerbation grade scale(to assess respiratory signs), Part II was Peak flow metry(to assess peak flow rate) and Part III was Pulse oximeter (to assess oxygen saturation).

ETHICAL CONSIDERATIONS

Study approval was taken from research and ethical committee of the Baba Farid University of Health Sciences, Faridkot and University College of Nursing, Faridkot. Keeping in mind the legal rights of the study subjects, only those who were willing to participate and given the written informed consent were included in the study.

ANALYSIS OF DATA

Analysis of the data was by using descriptive (frequency, percentage, mean and standard deviation) and inferential statistics (independent t- test, Chi square and Repeated measured ANNOVA). Statistical analysis was performed using SPSS version 20.

RESULTS

The results of data analysis is organized and presented under following major headings:

SOCIODEMOGRAPHIC CHARACTERISTICS OF STUDY SUBJECTS

TABLE 1 **N=90**

S. NO	SOCIODEMOGRAPHIC VARIABLES	CONVENTIONAL GROUP		EXPERIMENTAL GROUP		
		f	%	F	%	
1.	**Age of child (in years)**					χ2=2.250
a)	6 to 8 years	28	62.2	28	62.2	df=4
b)	9 to 10 years	13	28.9	13	28.9	p value=0.690
c)	11 to 12 years	4	8.9	4	8.9	
2.	**Gender**					χ2=0.014
a)	Male	24	53.3	24	53.3	df=1
b)	Female	21	46.7	21	46.7	p value=0.905
3.	**Residence**					χ2=0.060
		15			24.4	df=1
a)	Urban area	30	33.3	11	75.6	p value=0.806
b)	Rural area		66.7	34		
4.	**Educational status of child**					
a)	I to II class	28	62.2	27	60	χ2=1.851
b)	III to IV class	13	28.9	14	31.1	df=4
c)	V to VIII class	4	8.9	4	8.9	p value=0.763
5.	**Birth Order of child**					
a)	First child	24	53.3	25	55.6	χ2=6.552
b)	Second child	17	37.8	16	35.6	df=4
c)	Third child	4	8.9	4	8.9	p value=0.162

6.	**Family history of Lower respiratory tract infections**					χ2=0.025
a)	Yes	24	53.3	22	48.9	df=1
b)	No	21	46.7	23	51.1	p value=0.873
7.	**Pet animals in home**					χ2=1.067
a)	Yes	26	57.8	23	51.1	df=1
b)	No	19	42.2	22	48.9	p value=0.302
8.	**Frequency of LRTI attack in last year**					
a)	One to three times Four to five times	29	64.4	26	57.8	χ2=4.478
b)	More than five times	14	31.1	17	37.8	df=4
c)	None	-	-	-	-	p value=0.345
d)		2	4.4	2	4.4	
9.	**Any history of congenital heart disease**					χ2=0.342
a)	Yes	9	20	8	17.8	df=1
b)	No	36	80	37	82.2	p value=0.559

(Non- Significant at p < 0.05)

Table 1 depicts the frequency and percentage distribution of Breathing exercises group and Conventional care group by their socio demographic variables. As per age, study subjects in Conventional group, study subjects i.e. 28 (62.2%) aged in between 6-8 years followed by 13 (28.9%) aged in between 9-10 years and least in 4(8.9%) aged in between 11-12 years. Whereas in Experimental group majority of subjects falls in the same age group of 6-8 years i.e. 28 (62.2%) followed by 13 (28.9%) aged in between 9-10 years and least in 4 (8.9%) aged 11- 12 years. As per gender, study subjects in Conventional group, 24(53.3%) were male followed by 21(46.7%) females. However in Experimental group (breathing exercises) study subjects were also male 24(53.3%) followed by female 21(46.7%). As per residence, in conventional group majority of the study subjects were also from Rural area i.e. 30 (66.7) and 15 (33.3%) from urban area. Whereas in Experimental group, majority of study subjects i.e. 34 (75.6%) were from Rural area followed by 11 (24.4%) from Urban area. Regarding educational status of child, majority of the study subjects in Conventional group i.e. 28 (62.2%) were in I –II class followed by 13 (28.9%) in III-IV class and least in V to VIII class i.e. 4(8.9%). However in Experimental group, 27(60%) were in I –II class followed by 14 (31.1%) in III-IV class and least in V to VIII class i.e. 4(8.9%)..As per birth order of child, majority of study subjects in Conventional group, 24 (53.3%) were first child in birth order followed by 17(37.8%) second child and least are third child in order i.e. 4(8.9%) .However in Experimental group were first child i.e. 25(55.5%) followed by 16(35.6%) second child and least are third child in birth order i.e. 4(8.9%).The observed data reveals that in Conventional care group,24(53.3%) study subjects had family history of Lower respiratory tract infections and 21(46.7%) had no family history of Lower respiratory tract infections. However in Experimental group,22(48.9%) study subjects had family history of Lower respiratory tract infections and 23(51.1%) had no history of family history of Lower respiratory tract infections. Regarding pet animals in home in Conventional care group, 26(57.8%) study samples had pet animals in their homes while 19(46.2%) had no pet animals in their homes. However in case of Experimental group ,slightly more than half i.e. 23(51.1%) study samples had pet

animals in their homes, followed by 22(48.9%) study samples had no pet animals in their homes. In conventional group, 11(24%) study samples had dog,4(8.8%) had both cow dog,3(6.6%) had both cow buffalo,4(8.8%) had cow and 4(8.8%) had buffalo in their homes as a pet. Rest 42.2% study samples had not any pet in their homes. In experimental group, 6(13.3%) study samples had dog,6(13.3%) had cow,5(11.11%) had buffalo,4(8.8%),1(2.22%) had both cow buffalo and 1(2.22%) had both dog buffalo in their homes as a pet. As per frequency of LRTI attack in last year in Conventional care group, study subjects 29(64.4%) had one to three attacks of LRTIs in last year followed by 14(31.1%) had four to five attacks of LRTIs and 2(4.4%) subjects had no attacks of LRTIs in last year. However in Experimental group, study subjects 26(57.8%) had one to three attacks of LRTIs in last year followed by 17(37.8%) had four to five attacks of LRTIs and 2(4.4%) subjects had no attacks of LRTIs in last year. As per any history of congenital heart disease ,majority of the study subjects in Conventional care group i.e. 36(80%) had no history of congenital heart disease and least subjects i.e. 9 (20%) had history of congenital heart disease. Whereas in case of Experimental group, study subjects i.e. 37(82.2%) had no history of congenital heart disease and least subjects i.e. 8(17.8%) had history of congenital heart disease.

Table 2

N=90

Findings related to Mean score of Baseline assessment before intervention of respiratory signs in experimental and conventional care group on Day 1					
Attribute under study	**n**	**Mean ± (SD)**	**t value**	**Df**	**p value**
Experimental group before Breathing exercises	45	5.07±1.250	0.498	88	0.620
Conventional care group before conventional care	45	5.13±1.265			
Findings related to Mean score of Baseline assessment before intervention of peak flow rate in experimental and conventional care group on Day 1					
Experimental group before breathing exercises	45	65.47±9.423	5.365	88	0.000
Conventional care group before conventional care	45	55.22 ± 8.676			
F indings related to Mean score of Baseline assessment before intervention of oxygen saturation in experimental and conventional care group on Day 1					
Experimental group before breathing exercises	45	94.33 ±2.246	0.760	88	0.449
Conventional care group before conventional care	45	94.16±2.213			

(Non Significant at p < 0.05)

Table 2(a) depicts the mean score of baseline assessment of respiratory signs in both groups having the mean and SD 5.07±1.250 in experimental and 5.13±1.265 in control group for which t value is 0.498 at df 44 with p value 0.620 is found to be statistically non significant at p<0.05.The mean score of baseline assessment of peak flow rate in both groups having the mean and SD 65.47 ± 9.423 in experimental and 55.22 ± 8.676 in control group for which for which t value is 5.365 at df 88 with p value 0.000 is found to be statistically significant at p<0.001.The mean score of baseline assessment of oxygen saturation in both groups having the mean and SD 94.33 ±2.246 in experimental and 94.16±2.213 in control group for which for which t value is 0.760 at df 88 with p value 0.449 is found to be statistically non significant at p<0.05.

FINDINGS RELATED TO ASSESSENT OF PRE- INTERVENTIONAL AND POST-INTERVENTIONAL SCORE OF RESPIRATORY SIGNS AND PULMONARY PARAMETERS AMONG CHILDREN WITH LRTIs.

Table 3(a)

Pre and Post -interventional mean score of respiratory signs in conventional care group.

Severity and exacerbation grade scale	Mean	Std. Deviation
Pre interventional mean score of respiratory signs Day 1(O1)	5.20	1.29
Post interventional mean score of respiratory signs Day 1(O2)	5.16	1.26
Post interventional mean score of respiratory signs Day 2(O3)	4.78	1.16
Post interventional mean score of respiratory signs Day 3(O4)	4.11	1.13

Table 3(a) depicts the score of respiratory signs in conventional care group. In conventional group, score of respiratory signs was decreasing with respect to observations. Pre-interventional mean score of respiratory signs on Day 1(O1) was 5.20 (1.29) .On same day post interventional mean score of respiratory signs in second observation (O2) had reduced i.e. 5.16(1.26).Thereafter on second day, post interventional mean score in third observation(O3) found 4.78(1.16) which was reduced from second observation. On third day, post interventional mean score in fourth observation (O4) was 4.11(1.13) which was low from all previous observations.

Table 3(b)

Pre and Post -interventional mean score of respiratory signs in experimental group

Severity and exacerbation grade scale	Mean	Std. Deviation
Pre interventional mean score of respiratory signs Day 1(O1)	5.07	1.25
Post interventional mean score of respiratory signs Day 1(O2)	4.91	1.29
Post interventional mean score of respiratory signs Day 2(O3)	3.53	1.60
Post interventional mean score of respiratory signs Day 3(O4)	1.67	1.66

Table 3(b) depicts the score of respiratory signs in experimental group. Score was also decreasing with respect to observations. Pre-interventional mean Score of respiratory signs on Day 1(O1) was 5.07(1.25). On same day post interventional mean score of respiratory signs in second observation (O2) had reduced i.e. 4.91 (1.29). Thereafter on second day, post interventional mean score in third observation (O3) found 3.53 (1.60) which was reduced from second observation. On third day, post interventional mean score in fourth observation (O4) was 1.67(1.66) which was low from all previous observations. From table it is evident that decline of mean scores of respiratory signs has occurred more rapidly in experimental group as compared to conventional care group.

Table 4(a)

Pre and Post -interventional mean peak flow rate in conventional care group.

Peak flow rate	Mean	Std. Deviation
Pre interventional mean peak flow rate Day 1(O1)	55.22	8.67
Post interventional mean peak flow rate Day 1(O2)	55.96	8.65
Post interventional mean peak flow rate Day 2(O3)	57.31	8.79
Post interventional mean peak flow rate Day 3(O4)	58.51	8.99

Table 4(a) depicts mean peak flow rate in conventional care group**.** Mean peak flow rate in conventional group was increasing with respect to observations. Pre-interventional mean peak flow rate on Day 1(O1) was 55.22(8.67). On same day post interventional peak flow rate in second observation (O2) assessed and it was improved i.e. 55.96(8.65).Thereafter on second day, post interventional mean peak flow rate in third observation (O3) assessed and found 57.31(8.79) which was improved from second observation. On third day, post interventional mean peak flow rate in fourth observation (O4) was 58.51 (8.99) which had also improved from all previous observations.

Table 4(b)

Pre and Post -interventional mean peak flow rate in experimental group

Peak flow rate	Mean	Std. Deviation
Pre interventional mean peak flow rate Day 1(O1)	65.47	9.42
Post interventional mean peak flow rate Day 1(O2)	67.42	9.15
Post interventional mean peak flow rate Day 2(O3)	72.73	9.41
Post interventional mean peak flow rate Day 3(O4)	80.29	10.28

Table 4(b) depicts mean peak flow rate in experimental group. Mean peak flow rate was also increasing with respect to observations. Pre-interventional mean peak flow rate in conventional group on Day 1(O1) was 65.47(9.42). On same day post interventional peak flow rate in second observation (O2) assessed and it was improved i.e. 67.42(9.15). Thereafter on second day, post interventional mean peak flow rate in third observation (O3) assessed and found 72.73 (9.41) which were improved from second observation. On third day, post interventional mean peak flow rate in fourth observation (O4) was 80.29 (10.28) which had also improved from all previous observations. From table it is evident that there is rapid improvement of mean peak flow rate in experimental group as compared to conventional care group.

Table 5(a)

Pre and Post -interventional mean oxygen saturation rate in conventional group

Oxygen saturation rate	Mean	Std. Deviation
Pre interventional mean oxygen saturation rate Day 1(O1)	93.98	2.19
Post interventional mean oxygen saturation rate Day 1(O2)	94.80	2.28
Post interventional mean oxygen saturation rate Day 2(O3)	95.60	1.87
Post interventional mean oxygen saturation rate Day 3(O4)	96.24	1.59

Table 5(a) depicts mean Oxygen saturation rate in conventional care group. Mean oxygen saturation rate was increasing with respect to observations. Pre-interventional mean oxygen saturation rate on Day 1(O1) was 93.98(2.19).On same day post interventional mean oxygen saturation rate in second observation (O2) had improved i.e 94.80(2.28).Thereafter on second day, post interventional mean oxygen saturation rate in third observation (O3) found 95.60(1.87) which is improved from second observation. On third day, post interventional mean oxygen saturation in fourth observation (O4) was 96.24 (1.59) which had also improved from all previous observations.

Table 5(b)

Pre and Post -interventional mean oxygen saturation rate in experimental group

Oxygen saturation rate	Mean	Std. Deviation
Pre interventional mean oxygen saturation rate Day 1(O1)	94.33	2.24
Post interventional mean oxygen saturation rate Day 1(O2)	95.31	2.09
Post interventional mean oxygen saturation rate Day 2(O3)	96.84	1.58
Post interventional mean oxygen saturation rate Day 3(O4)	99.13	1.16

As per oxygen saturation rate, mean oxygen saturation rate in experimental group was also increasing with respect to observations. Pre-interventional mean oxygen saturation rate on Day 1(O1) was 94.33 (2.24). On same day post interventional mean oxygen saturation rate in second observation (O2) had improved i.e. 95.31 (2.09). Thereafter on second day, post interventional mean oxygen saturation rate in third observation (O3) found 96.84 (1.58) which was improved from second observation. On third day, post interventional mean oxygen saturation rate in fourth observation (O4) was 99.13 (1.16) which had also improved from all previous observations.

Table 6

FINDINGS RELATED TO COMPARISON OF MEAN DIFFERENCES OF SCORES OF RESPIRATORY SIGNS AND PULMONARY PARAMETERS WITHIN AND BETWEEN BOTH GROUPS

Variables	No. of observations	Conventional Group		Experimental Group		Time effects	Group effects	Time*group
		Mean	SD	Mean	SD			
Score of respiratory signs	Day 1(O_1)	5.20	1.29	5.07	1.25	F=473.58	F=473.58	F=126.52
	Day 1(O_2)	5.16	1.26	4.91	1.29	df=2.1	df=1	df=2.1
	Day 2(O_3)	4.78	1.16	3.53	1.60	<0.001*	<0.001*	<0.001*
	Day 3(O_4)	4.11	1.13	1.67	1.66			
Peak flow rate	Day 1(O_1)	55.22	8.67	65.47	9.42	F=440.77	F=59.55	F=182.50
	Day 1(O_2)	55.96	8.65	67.42	9.15	df=1.5	df=1	df=1.508
	Day 2(O_3)	57.31	8.79	72.73	9.41	<0.001*	<0.001*	<0.001*
	Day 3(O_4)	58.51	8.99	80.29	10.28			
Oxygen saturation rate	Day 1(O_1)	93.98	2.19	94.33	2.24	F=297.78	F=11.19	F=42.86
	Day 1(O_2)	94.80	2.28	95.31	2.09	df=1.784	df=1	df=1.784
	Day 2(O_3)	95.60	1.87	96.84	1.58	<0.001*	<0.001*	<0.001*
	Day 3(O_4)	96.24	1.59	99.13	1.16			

Highly Significant at <0.001

Table 6 depicts time effects, group effects and time interaction group within and between both groups. Score of respiratory signs has significant difference across the observations due to time within the group and between the Experimental and conventional group. F value was computed and found 473.58 which is highly significant at <0.001.Peak flow rate has also significant difference across the observations due to time within the group and between the experimental and control group .F value for time effects was computed and found 440.77 which is highly significant at <0.001.Oxygen saturation has significant difference due to time across the observations within the group and between the experimental and control group. F value for time effects was computed and found 297.78 which is highly significant at <0.001.

As per group effects, Score of respiratory signs has significant difference across the observations within the group and between the Experimental and conventional group. F value for time effects was computed and found 473.58 which is highly significant at <0.001. Peak flow rate has also significant difference across the observations within the group and between the experimental and control group. F value for time effects was computed and found 59.55 which is highly significant at <0.001.Oxygen saturation has significant difference across the observations within the group and between the experimental and control group. F value for group

effects was computed and found 11.19 which is highly significant at <0.001.

As per interaction of time and group, Score of respiratory signs has significant difference across the observations within the group and between the Experimental and conventional group. F value for group effects was computed and found 126.52 which is highly significant at <0.001.Peak flow rate has also significant difference across the observations within the group and between the experimental and control group. F value for group effects was computed and found 182.50 which are highly significant at <0.001.Oxygen saturation has significant difference across the observations within the group and between the experimental and control group. F value for time*group effects was computed and found 42.86 which is highly significant at <0.001.

Table 7

Pair wise comparisons of mean differences of scores for respiratory signs within and between both groups

Group	(I) time	(J) time	Mean Difference (I-J)	p value
1	1	2	0.044	1.000
		3	0.422*	.000
		4	1.089*	.000
	2	3	0.378**	.001
		4	1.044*	.000
	3	4	0.667*	.000
2	1	2	0.156**	.040
		3	1.533*	.000
		4	3.400*	.000
	2	3	1.378*	.000
		4	3.244*	.000
	3	4	1.867*	.000

*The mean difference is significant at the <0.001 level.

** Significant at <0.05 level.

Table 7 depicts Pair wise comparisons of mean differences of observations within and between both groups. In conventional group(1), mean difference of first and second observation is non-significant. By looking at the significance values we can see that significant differences lies between first & third observation and first & fourth observation. Significant differences also lies between second & third observation and second & fourth observation. Mean difference between third and fourth observation is also significant. All mean differences between observations except first and second observation are significant at <0.001.

In experimental group(2), by looking at the significance values we can see that significant differences lies between first & second observation, first & third observation, and first & fourth observation. Significant results also lie between second & third observation and second & fourth observation. Mean difference between third and fourth observation is also significant. All mean differences between observations are significant at <0.001.

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Table 8

Pair wise comparisons of mean differences of peak flow rate within and between both groups

Group	(I) time	(J) time	Mean Difference (I-J)	P value
1	1	2	-0.733*	.000
		3	-2.089*	.000
		4	-3.289*	.000
	2	3	-1.356*	.000
		4	-2.556*	.000
	3	4	-1.200*	.000
2	1	2	-1.956*	.000
		3	-7.267*	.000
		4	-14.822*	.000
	2	3	-5.311*	.000
		4	-12.867*	.000
	3	4	-7.556*	.000

* The mean difference is significant i.e. <0.001

Table 8 depicts Pair wise comparisons of mean differences of observations within and between both groups. In conventional group(1), by looking at the significance values we can see that significant differences lie between first & second observation, first & third observation and first & fourth observation. Significant results also lie between second & third observation and second & fourth observation. Mean difference between third and fourth observation is also significant. All mean differences between observations are significant at <0.001.In experimental group(2), by looking at the significance values we can see that significant differences lies between first & second observation, first & third observation, and first & fourth observation. Significant results also lie between second & third observation and second & fourth observation. Mean difference between third and fourth observation is also significant. All mean differences between observations are significant at <0.001.

Table 9

Pair wise comparisons of mean differences of oxygen saturation rate within and between both groups

Group	(I) time	(J) time	Mean Difference (I-J)	P value
1	1	2	-0.822*	.000
		3	-1.622*	.000

		4	-2.267*	.000
	2	3	-0.800*	.000
		4	-1.444*	.000
	3	4	-0.644*	.000
2	1	2	-0.978*	.000
		3	-2.511*	.000
		4	-4.800*	.000
	2	3	-1.533*	.000
		4	-3.822*	.000
	3	4	-2.289*	.000

*. The mean difference is significant at the <0.001 level.

Table 9 depicts pair wise comparisons of mean differences of observations within and between both groups. In conventional group(1),, by looking at the significance values we can see that significant differences lie between first & second observation, first & third observation and first & fourth observation. Significant results also lie between second & third observation and second & fourth observation. Mean difference between third and fourth observation is also significant. All mean differences between observations are significant at <0.001.

In experimental group(2), by looking at the significance values we can see that significant differences lies between first & second observation, first & third observation, and first & fourth observation. Significant results also lie between second & third observation and second & fourth observation. Mean difference between third and fourth observation is also significant. All mean differences between observations are significant at <0.001.

Hence, findings of present study revealed that breathing exercises as a play way method are more effective in reducing the respiratory signs of children having lower respiratory tract infections as compared to conventional care. Although, in case of conventional care, respiratory signs were relieved and pulmonary parameters were improved. But there is rapid relief of respiratory signs and improvement of pulmonary parameters in experimental group.

DISCUSSION

Findings of present study revealed that pre test intervention values and post intervention values after breathing exercises of respiratory signs and pulmonary parameters are more significantly different. These findings were consistent with the findings of **Bernadi L (1998)** [4] in support of effects of selected breathing exercises on cardiopulmonary parameters. Cardio pulmonary parameters of children were recorded on first, second and third post operative day, the parameters were assessed twice in the day with 3 hours of interval between two recordings. On post operative day 1, difference was found in mean respiratory rate (t=1.86) and mean lung volume (t=2.169) of children of both the group. On post operative day 2nd (t=1.71) and 3rd (t=1.877) difference was found in mean lung volume change was not found between the cardio pulmonary parameters of children of experimental group with abdominal surgery before and after intervention. It indicates that the selected breathing exercise which has given in the form of play was found to be effective in prevention of post operative cardio pulmonary complications.

Present study had contributed in significant improvement of oxygen saturation and peak flow rate in experimental group(used breathing exercises as a play way method). The study findings were consistent with the findings of **Peter. N., (2009)** [5] 135 children aged (1-14.5 years) received deep breathing exercises. The assessment of SaO2 (>91%) is mild/moderate, (<91%) is severe at P<0.01. In post test SaO2 is inversely related to initial SaO2. SaO2 increased more in severe group than the mild to moderate group (2.3% Vs 0.6%) at P<0.01. Peak flow rate also has significant increase in value after intervention.

These findings were further supported by a study conducted by **Pneumol. P**[6] (2008) in which among 50 samples, 25 patients received inspiratory muscle training. In pre test the maximum expiratory pressure was (48.32+/-5.706) and peak expiratory

flow (173.6=/-50.817) at P >0.05. After intervention the post values of MEP was 109.9+/-18.041 and PEF value were 312+/- 54.848 at P< 0.0001. There is increased significance of respiratory parameters in inspiratory muscle training than the control group.

CONCLUSION

The present study assessed the effectiveness of breathing exercises as a play way method on respiratory signs and pulmonary parameters among children.Based on statistical findings, it is evident that breathing exercises as a play way among children with Lower respiratory tract infections significantly reduced the severity of respiratory signs and increased the peak flow rate as well as oxygen saturation rate. Children with LRTIs suffers a lot with respiratory signs, breathing difficulties and many secondary problems. So, In order to reduce the bad consequences of LRTIs, costly treatment and to promote early recovery strategies should be planned so as to implement it in the clinical setting. Breathing exercises can cause significant reduction of respiratory signs and improvement of pulmonary parameters.

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