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THE EFFECT OF NEBULIZED SALBUTAMOL THERAPY VERSUS NEBULIZED SALBUTAMOL AND CHEST PHYSIOTHERAPHY ON THE RESPIRATORY STATUS OF CHILDREN WITH WHEEZING BRONCHITIS: A STUDY

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ABSTRACT

The prevalence of wheezy bronchitis is worldwide. A child has tripled over the past ten years and now estimated at 155 million children has wheezy bronchitis, Breathing with a rasp or whistling sound. The high-pitched variable intensity expiratory sound emanating from lower respiratory tract, which is called where or singing in the chest. This study was conducted with the aim to evaluate the effectiveness of chest physiotherapy with nebulization salbutamol on the respiratory status of the children with wheezy bronchitis. An experimental approach was used for the study. A factorial design was chosen to determine the effectiveness of NST versus NST with chest physiotherapy. The sample were consists of 80 children aged 3 months to 12 years with wheezy bronchitis. 40 children were in an experimental group INST only and 40 were in an experimental group II, NST with chest physiotherapy were allotted randomly. Data's were collected using observation checklist. The data that were collected were analyzed using descriptive and inferential statistics. The study findings showed the obtained t value was significant at p<0.05 level. The finding shows that the chest physiotherapy with nebulization was effective in improving respiratory status among children with wheezy bronchitis.

KEYWORDS

Chest physiotherapy, Nebulizedsulbutamol, Wheezy bronchitis, Children and 3 months to 12 years.

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INTRODUCTION

A child is an important asset to the family and children are precious gift from God. Children are the future pillars of the Nation. Only a healthy child can become healthy citizen and a healthy citizen makes a healthy nation. According to WHO report, 2000 says that respiratory conditions impose an enormous burden on society. The top five respiratory diseases account for 17.4 percent of all deaths and 13.3 percent of all Disability-Adjusted life years, lower respiratory tract infection, chronic obstructive pulmonary disease, COPD, tuberculosis and lung cancer are each among the leading ten causes of death worldwide. Demographic changes and also changes in health care systems like schooling, income, usage of tobacco is likely to lessen communicable disease. While the burden of chronic respiratory diseases (CRD) including asthma, wheezy bronchitis, COPD and lung cancer will worsen because of tobacco use and population ageing. Wheezy bronchitis is associated with the world worsening pollution, lifestyles, eating habits, transport and work, inbalances in the human body weakens the immune system (Global Report, 2001).

While the reasons for wide variations in wheezy bronchitis prevalence around the world are not known. It is clear that incidence is on the rise, with Australia having a higher prevalence than almost all other countries. Currently the studies being conducted in 155 centers around the globe, this gives a valuable international comparison of the prevalence and characteristics of wheezy bronchitis. The international pattern of prevalence cannot be completely explained by our current knowledge of recognized risk factors for the development of asthma. Contrary of popular belief is that the global pattern of wheezy bronchitis prevalence provides evidence that air pollution is not a major risk factor for the development of wheezy bronchitis rather it is merely a minor trigger in some individuals.

Christina, T (2016) studied about urban dust microbiome: Impact on later atopy and wheezing and found that about two-thirds of the mothers (68%) held a high educational level compared with mothers with low or medium education (32%). During the months in summer and autumn, more dust samples were obtained than in winter and spring. There was very weak correlation between fungal and bacterial diversity (Spearman's rho = -0.05). At the 6-year follow-up, 27% of the children were sensitized to aero-allergens, with 40% at 10 years. Ever wheezing at the age of 10 years was reported for 43% of the children.

Silver, E J *et al* (2005) studied the effectiveness of nebulized salbutamol therapy to treat wheezing in children aged 2 to 24 months and found that 85 patients were enrolled in the nebulizer group and 83 in the spacer group. The nebulizer group received a placebo metered-dose inhaler with a spacer followed by nebulized salbutamol. The spacer group received albuterol by a metered-dose inhaler with a spacer followed by nebulized isotonic sodium chloride solution. Treatments were given every 20 minutes by a single investigator blinded to group assignments. Pulmonary index score and oxygen saturation were measured initially and ten minutes after each treatment[1-5].

OBJECTIVE OF THE STUDY

1. To assess the respiratory status of children with wheezy bronchitis.
2. To find out the effect of NST in improving respiratory status of children with wheezing bronchitis.
3. To find out the effect of NST and chest physiotherapy in improving respiratory status of children with wheezing bronchitis.
4. To compare the effect of NST versus NST and chest physiotherapy in improving respiratory status of children with wheezing bronchitis.

HYPOTHESES OF THE STUDY

- The mean respiratory status score of the children with wheezy bronchitis after the NST will be higher than the mean respiratory status score before NST.
- The mean Respiratory status score of the children with wheezy bronchitis after the NST and chest physiotherapy will be higher than the mean pretest respiratory status score before NST and chest physiotherapy.
- The mean respiratory status score of the children with wheezy brionchitis who received NST and chest physiotherapy will be higher than the respiratory score of the children who received NST.

Table No.1 shows that the experimental group I, Out of 40 children 10 (25%) were between 2-12 months of Age. 14 (35%) were between 1-3 years of Age. 10 (25%) were between 3-6 years of Age. 4 (10%) were between 6-9 years of Age, 2 (5%) were between 9-

12 years. Regarding gender 22 (55%) were male and 18(45%) were female children.

In experimental group II Out of 40 children 10 (25%) were between 3-12 months of Age. 16 (40%) were between 1-3 years of Age. 10 (25%) were between 3-5 years of Age, 3 (7.5%) were between 6-9 years. 1 (2.5%) were between 9-12 years of Age. Regarding gender 2 (50%) were male and 20 (50%) were female children.

Table No.2 represents the pretest respiratory status score of experimental group I and II. It is evident that 22 (27%) of children had normal respiratory rate, 58 (72.5%) had altered pulse rate, 20 (25%) had normal temperature rate, 58 (72.5%) had altered temperature rate, 24 (30%) had no chest retraction, 56 (70%) of children had chest retraction, 18 (22%) were not used accessory muscle while breathing, 22 (27%) didn't have nasal flaring while expiratory, 58 (78.5%) children had nasal flaring, 23(29%) had equal chest movement while breathing, 57(71.3%) unequal equal chest movement, 27 (34%) not had cough, 5.3(66.3%) children had audiable wheezing, 22 (27%) had equal air entry, 58(72.5%) had decreased air entry, 58 (72.5%) had mild to moderate dyspnoea, 19 (24%) had normal shape of the chest, 61 (76.3%) had asymmetric chest, 15 (22%) had normal breath sounds, 17 (21.5%) had abnormal breath sounds, 63 (77.5%) had normal oxygen saturation, 58 (72.5%) had decreased in oxygen saturation.

Table No.3 shows the pretest and posttest at 2 degree of freedom, the calculated chi-square value was 7.1 for the pulse rate calculated chi-square value was 6.56 for the temperature calculated chi-square value was 11.57, for the chest retraction calculated chi-square value was 6.38, for the use of accessory muscles calculated value was 8.06, for the nasal flaring calculated chi-square value is 5.9, for the air entry calculated chi-square value is 6.2, for the oxygen saturation calculated chi-square value is 3.35, for the dyspnoea calculated chi-square value is 2.32, for the shape of chest calculated chi-square value is 3.74. So the findings shows that the posttest respiratory status score was higher than the pretest respiratory status score.

For distribution of the samples based on wheezing calculated chi-square value is 1.04, for expansion of chest calculated chi-square value is 2.12, for the cough calculated chi-square value is 2.11, on pretest and posttest at 2 degree of freedom the calculated chi-square value were no significant at0.05 level. So these findings shows that there is no significant difference in 2nd, 3rd, 4th and 5th day of respiratory status.

Table No.4 shows that the mean posttest respiratory status score 19.45>17.4 of pretest respiratory status score of experimental group I is significant at 0.05 level at't'=8.9. To test the statistical significance of the following null hypotheses was stated as follows, there will be no significant difference between the pretest and posttest of respiratory status of children with wheezy bronchitis. The obtained't' value at df (39) is 8.9 which is significant at 0.05 level, since the obtained 't' value is higher than the table value the null hypothesis H_{01} is rejected and research hypotheses H_1 is accepted. Therefore it can be concluded that posttest respiratory status score after received NST was higher than the pretest respiratory status score.

Table No.5 shows that for the distribution of the samples based on respiratory rate on 2nd, 3rd, 4th and 5th day at degree of freedom the calculated chi-square value was 10.04, for the pulse rate calculated chi-square value was 7.65 for the temperature calculated chi-square value was 14.61, for the chest refraction calculated chi-square value was 33.32, for the nasal flaring calculated chi-square value was 5.24, for wheezing calculated chi-square value was 11.37, for air entry calculated chi-square value was 15.45, for the breath sound calculated chi-square value was 6.88, for the oxygen saturation calculated chi-square value was 5.78, for the use of accessory muscle calculated chi-square value was 5.68, for the cough calculated chi-square value was 7.97, for the dyspnoea calculated chi-square value was 15.75, for the shape of chest calculated chi-square value was 18.01. So these findings shows that there is significant difference in the respiratory status in the present and posttest on the 2nd, 3rd, 4th and 5th day.

Table No.6 shows that the mean posttest respiratory status score 23.5>17.4 of pretest respiratory status score of experimental group II is significant at 0.05 level at't'= 23.95. To test the statistical significance of the following null hypotheses was stated as follows, there will be no significant difference between the pretest and posttest of respiratory status of children with wheezy bronchitis. The obtained't' value is significant at 0.05 level, since the obtained 't' value is higher than the table value the null hypothesis H_{02} is rejected and research hypotheses H_2 is accepted. Therefore it can be concluded that posttest respiratory status score after received NST and chest physiotherapy was higher than the pretest respiratory status score[6-14].

Table No.7 shows that the mean posttest respiratory status score 23.5 of the experimental group II on the 5th day was higher than the mean posttest respiratory status score (19.45) of experimental group I on the 5thday.The null hypotheses was stated as follows, there will be no significant difference between the experimental group I and experimental group II of posttest respiratory status of children with wheezy bronchitis. The obtained't' value 13.64 is significant at 0.05 level, since the obtained t' value is higher than the table value the null hypothesis H_{03} is rejected and research hypotheses H_3 is accepted. So the above findings supports the research hypothesis.

Table No.1: Distribution of the demographic characteristics of the children with wheezy bronchitis, in both Group I and Group II

S.No	Demographic Characteristic	Group I Nebulized Salbutamol		Group II Nebulized Salbutamol with chest physiotherapy	
		F	P	F	P
Child's Age					
1	3-12 Months	10	25	10	25
2	1-3 Years	14	35	16	40
3	3-6 Years	10	25	10	25
4	6-9 Years	4	10	3	7.5
5	9-12 Years	2	5	1	7.5
Sex					
6	Male	22	55	20	50
7	Female	18	45	20	50

Table No.2: Distribution of samples based on respiratory status Before the Intervention Group I (NST)

S.No	To assess the respiratory status	Normal respiratory		Altered respiratory status		Normal		Altered respiratory status	
		f	%	f	%	f	%	f	%
1	Respiratory Rate/ mt	10	25	30	75	12	30	28	70
2	Pulse Rate/ mt	8	20	32	80	10	25	30	75
3	Temperature / mt	8	20	32	80	12	30	28	30
4	Chest retraction	13	32	27	68	11	27	29	73
5	Use of accessory muscle	9	23	31	77	9	23	31	77
6	Nasal flaring	11	27	29	73	11	27	29	73
7	Expansion of chest	12	30	28	70	11	27	29	73
8	Coughing	13	32	27	68	14	35	26	65
9	Wheezing	14	35	26	65	12	30	28	70
10	Air entry	11	27	29	73	11	27	29	73
11	Shape of the chest	11	27	29	73	11	27	29	73
12	Dyspneoa	10	25	30	75	9	23	31	77
13	Breath sounds	7	17	33	83	11	27	29	73
14	Oxygen saturation	11	27	29	68	11	27	29	73

Table No.3: Distribution of samples based on respiratory status on 2^{nd}, 3^{rd}, 4^{th} and 5^{th} day after received NST (Group II)

S.No	Variables		Pretest		Posttest								Chi-square result
					Day 2		Day 3		Day 4		Day 5		
1	Respiratory Rate / mt	N	10	30	11	29	13	27	14	26	16	24	7.1
		%	25	75	27	73	32	68	35	65	40	60	
2	Pulse Rate / mt	N	8	32	11	29	13	27	15	25	18	22	6.56
		%	20	80	27	73	32	68	37	63	45	55	
3	Temperature / mt	N	8	32	11	29	13	27	16	24	18	22	11.57
		%	20	80	27	73	32	68	40	60	45	55	
4	Chest retraction	N	11	29	12	28	14	26	18	22	20	20	6.38
		%	27	73	30	70	35	65	45	55	50	50	
5	Use of Accessory muscle	N	10	30	11	29	13	27	14	26	18	22	8.06
		%	25	75	27	73	32	68	35	35	45	55	
6	Nasal flaring	N	9	31	12	28	14	26	17	23	18	22	5.9
		%	23	77	30	70	35	65	43	57	45	55	
7	Expansion of the Chest	N	10	30	12	28	13	27	14	26	16	24	2.12*
		%	25	75	30	70	32	65	35	65	40	60	
8	Cough	N	13	27	13	27	14	26	17	23	18	22	2.11*
		%	32	68	32	38	35	65	43	57	45	55	
9	Wheezing	N	13	27	14	26	15	25	16	24	17	23	1.04*
		%	32	68	35	65	37	63	40	60	43	57	
10	Air entry	N	10	30	11	29	13	27	16	24	18	22	4.99
		%	25	75	27	73	32	68	40	60	45	55	
11	Shape of the chest	N	11	29	11	29	13	27	16	24	18	22	3.74
		%	27	73	27	73	32	68	40	60	45	55	
12	Dyspnoea	N	13	27	13	27	14	26	17	23	18	22	2.32
		%	32	68	32	68	35	65	43	57	45	55	
13	Breath sounds	N	11	29	12	28	16	24	18	22	20	20	6.2
		%	27	73	30	70	40	60	45	55	50	50	
14	O_2 Saturation	N	11	29	12	28	13	27	15	25	18	22	3.35
		%	27	68	30	70	32	68	37	63	45	55	

Note: * Not significant at 0.05 level.

Table No.4: Comparison of mean pretest and posttest respiratory status score of experimental Group 1 (N=40)

S.No	Variables		Mean	Mean Difference	Standard Deviation	't' Value
1	Experimental Group I (N=40)	Pretest Posttest	17.4 19.45	2.04	1.44	8.9

Table No.5: Distribution of samples based on respiratory status on 2nd, 3rd, 4th and 5th day after received NST with chest Physiotherapy

S.No	Variables		Pretest		Posttest								Chi-square result
					Day 2		Day 3		Day 4		Day 5		
1	Respiratory Rate / mt	N	7	33	12	28	13	27	16	24	20	20	10.04
		%	17	27	30	70	32	68	40	60	50	50	
2	Pulse Rate / mt	N	9	31	12	28	13	27	16	24	20	20	7.65
		%	23	77	30	70	32	68	40	60	50	50	
3	Temperature / mt	N	7	33	12	28	13	27	17	23	18	22	14.61
		%	17	27	30	70	32	68	43	57	45	55	
4	Chest retraction	N	12	28	13	27	13	27	14	26	17	23	33.2
		%	30	70	32	68	32	68	35	65	43	57	
5	Use of Accessory muscle	N	8	32	12	28	14	26	17	23	18	22	11.54
		%	20	80	30	70	35	65	43	57	45	55	
6	Nasal flaring	N	10	30	11	29	12	28	16	24	18	22	5.24
		%	25	75	27	73	30	70	40	60	45	55	
7	Expansion of the chest	N	9	31	10	30	13	27	16	24	17	23	5.68
		%	23	77	25	75	32	68	40	60	43	57	
8	Cough	N	7	33	11	29	12	28	15	25	18	22	7.97
		%	17	27	27	73	30	70	37	63	45	55	
9	Wheezing	N	7	33	12	28	15	25	18	22	20	20	11.37
		%	17	27	30	70	37	63	45	55	50	50	
10	Air entry	N	9	31	11	29	14	26	18	22	20	20	15.45
		%	23	77	27	73	35	65	45	55	50	50	
11	Shape of the chest	N	8	32	11	29	13	27	14	26	18	22	18.01
		%	20	80	27	73	32	68	35	65	43	57	
12	Dyspnea	N	7	33	12	28	14	26	18	22	20	20	15.75
		%	17	27	30	70	35	65	45	55	50	50	
13	Breath sounds	N	7	33	10	30	12	28	14	26	17	23	6.88
		%	17	27	25	75	30	70	35	65	43	57	
14	O_2 Saturation	N	11	29	12	28	16	24	17	23	20	20	5.78
		%	27	73	30	70	40	63	43	57	50	50	

Table No.6: Comparison of mean pretest and posttest respiratory status score of Experimental Group I1 (N=40)

S.No	Variables		Mean	Mean Difference	Standard Deviation	't' Value
1	Experimental Group I (N=40) Group II	Pretest Posttest	17.75 23.5	5.75	1.50	23.95

Table No.7: Comparison of posttest respiratory status score of experimental Group I and Group II on 5th day (N=80)

S.No	Variables	Mean	Standard Deviation	't' Value
1	Group I (N=40)	19.45 23.5	1.44 5.75	13.64*

*Significant at 0.05 level.

CONCLUSION

The effective NST in posttest was significantly higher than the pretest. The effectiveness of NST and chest physiotherapy in posttest was significantly higher than the pretest. The comparison of NST and chest physiotherapy in posttest was significantly higher than the NST

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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