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"A Quasi– Experimental Study To Assess The Effectiveness Of Breathing Exercises On Respiratory Status Among Children Undergoing Nebulisation Therapy Of Selected Hospital In Hi-Tech Medical College And Hospital, Bhubaneswar, Odisha."

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A quasi-experimental study (non-randomized control group pre-post-test design) was adopted to evaluate the effectiveness of deep breathing exercises among children undergoing nebulisation therapy .The study include 60 samples of patients who were selected by purposive sampling technique. Respiratory assessment score and bio-physiological parameters are method used for data collection procedure. Experimental group received intervention of deep breathing exercises for 15-25 minutes a day. With regard to age, 9(30%) in experimental group and 10(33.3%) in control group belongs to the age group of 5-8 years and 9(30%) in experimental group and 9(30%) in control group belonged to the age group of above 8 years. Considering the gender, 17 (56.6%) subjects in the experimental group and 14(46.6%) in the control group were females and the remaining were males. For experimental group – breathing exercises were given for 10-15 minutes. For control group – nebulisation given to children thrice a day for 4 weeks. Mean, standard deviation, t-test, Pearson's chi-square test is used for statistical analysis. Regarding bio physiological parameter, the reduction is statistically significant (p=0.001***) in both groups. Thus, the author concludes that improvement in respiratory status seen in children who receive breathing exercises and nebulisation simultaneously. Thus, children with respiratory diseases will benefit from the intervention in improving their respiratory status by doing breathing exercises.

KEYWORDS: Assess, Effectiveness, Deep Breathing Exercises, Nebulisation therapy.

INTRODUCTION

Every child is precious for a mother. There are many dreadful diseases which endanger the life of a child. One among those is the respiratory diseases which accounts for high mortality among children less than five years of age.

Respiratory disease is a medical term that encompasses pathological conditions affecting the oropharynx and trachea, bronchi, bronchioles, alveoli, pleura and pleural cavity, the nerves and muscles of breathing. Respiratory diseases range from mild and self-limiting, such as common cold, to life-threatening entities like bacterial pneumonia, pulmonary embolism, and lung cancer.

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 notable role in airway clearance and parenchyma expansion by enhance the efficiency of respiratory muscles. The principle is to mesmerize the 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, spirometry, adduction and forward movement of upper limbs, blowing air into the water with a straw, blowing a trumpet, candle blowing, flute and mouth organ playing are found effective in children**.**

In India, as per **centre for Disease control** (CDC) 30-50% of people were visited for pursuing medical facility and 20-40% having hospital admissions. In India, more than 4lakh deaths every year are due to pneumonia accounting for 13-16% of all deaths in the paediatric hospital admissions. In 2001 to 2009 there is 50% increase in cases of acute respiratory infection and approximately3,404 death occur in 2010.In urban areas, acute respiratory infection consists over two-thirds of child diseases.

Das s, Mukherjee s, kudu et al (2008)A comparative study was conducted on effects of deep breathing exercises on dyspnoea at rest and during exercise in respiratory distress. Deep breathing exercises promoted a slower and deeper breathing pattern both at rest and during exercise. Deep breathing has a variable effect on dyspnoea when performed voliticully during exercise by patient. The study showed effectiveness of deep breathing exercises in patient at rest.(1)

Nord (1991) conducted a study on effects of slow breathing exercises and music in patients with asthma. The aim was to evaluate respiratory status using (DGBE) device guided slow breathing exercises and listening to music over a period of 10 months in patients with asthma,48 patients using DGBE exercises and 42 patients in a CD group listening to music from a CD player, for 15 mins three times a week. The result revealed that respiratory status was significantly improved in the DGBE and CD groups respectively. No significant differences were found in respiratory disorders between the groups neither at inclusion nor after 10 months. The study concluded that person centered care with breathing exercises and listening to music can reduce respiratory distress in asthmic patients.(2)

Anderson (2010) conducted a study on regular slow breathing exercise effect on breathing patterns at rest. The sample was 40 participants with stage 1 respiratory disorders were taught device guided breathing (DGB) daily for 15 minutes. Participants practiced breathing exercises at home for 4 weeks. The result showed that the DGB (device guided breathing) intervention decreased clinic resting BP; resting breathing rate and increased resting tidal volume. This study concluded that a short-term autonomic mechanism mediated the observed changes in resting BP. (3)

Mohamed (2013) conducted a quasi- experimental study to examine the effect of deep breathing exercises on breathing disorders among newly diagnosed patients with essential Respiratory disorders in medical and surgical departments at a general government hospital at cairo, Egypt. Convenient samples of 100 paediatric patient aged 5-18 years were chosen for this study. Pre-test and post- test intervention were taken after and before breathing exercises. The result was high statistically significant difference was found in patients taking nebulisation therapy. The study concluded that practising slow deep breathing exercises decrease the respiratory problems away to some extent.(4)

(Pendle Ling, 2006) A study was conducted to assess the "effectiveness of breathing exercise in children undergoing nebulisation therapy" At selected asthma clinic, Columbia. The aim of the study was to assess the effectiveness of breathing exercises on children undergoing nebulisation therapy. There were selected 29 pre -school children (2-5 years) from outpatient department who undergoing nebulisation by random assignment. Observer ratings collected with the observational scale of behavioural distress. The 't'=3.83

was significant as $p<0.01$ level shows that breathing exercises was effective in decreasing dyspnoea of children, aged 2-5 years undergoing nebulization therapy.[5]

PROBLEM STATEMENT

"A Quasi – experimental study to assess the effectiveness of breathing exercises on respiratory status among children undergoing nebulisation therapy of selected Hospital in Hi-tech Medical college and hospital , Bhubaneswar."

OBJECTIVES OF THE STUDY

1. To determine the effectiveness of breathing exercises on respiratory status of children in experiment group.
2. To assess the effectiveness of breathing exercises on respiratory status of children in control group.
3. To compare the respiratory status of children with respiratory disorder in experimental and control group before and after administration of breathing exercises.
4. To find out the association between respiratory status of children with their selected socio - demographic variables.

ASSUMPTION

1. After the breathing exercise breathing difficulty will be improve among patients undergoing nebulization therapy in experimental group.
2. Deep breathing exercises reduce breathlessness.
3. Breathing exercise training has some effect on knowledge of patient with respiratory diseases.

HYPOTHESIS

H_1: There will be significant difference in the mean-post intervention respiratory status among children undergoing nebulisation therapy in experimental and comparison group.

H_2: There will be significant association of respiratory status among children undergoing nebulisation therapy with selected variables.

CONCEPTUAL FRAMEWORK

The conceptual framework of the present study was developed by the investigator is based on Nola benders health promotion model **(1997**) that is mostly applicable while dealing with promoting deep breathing exercises and improving breathing pattern.

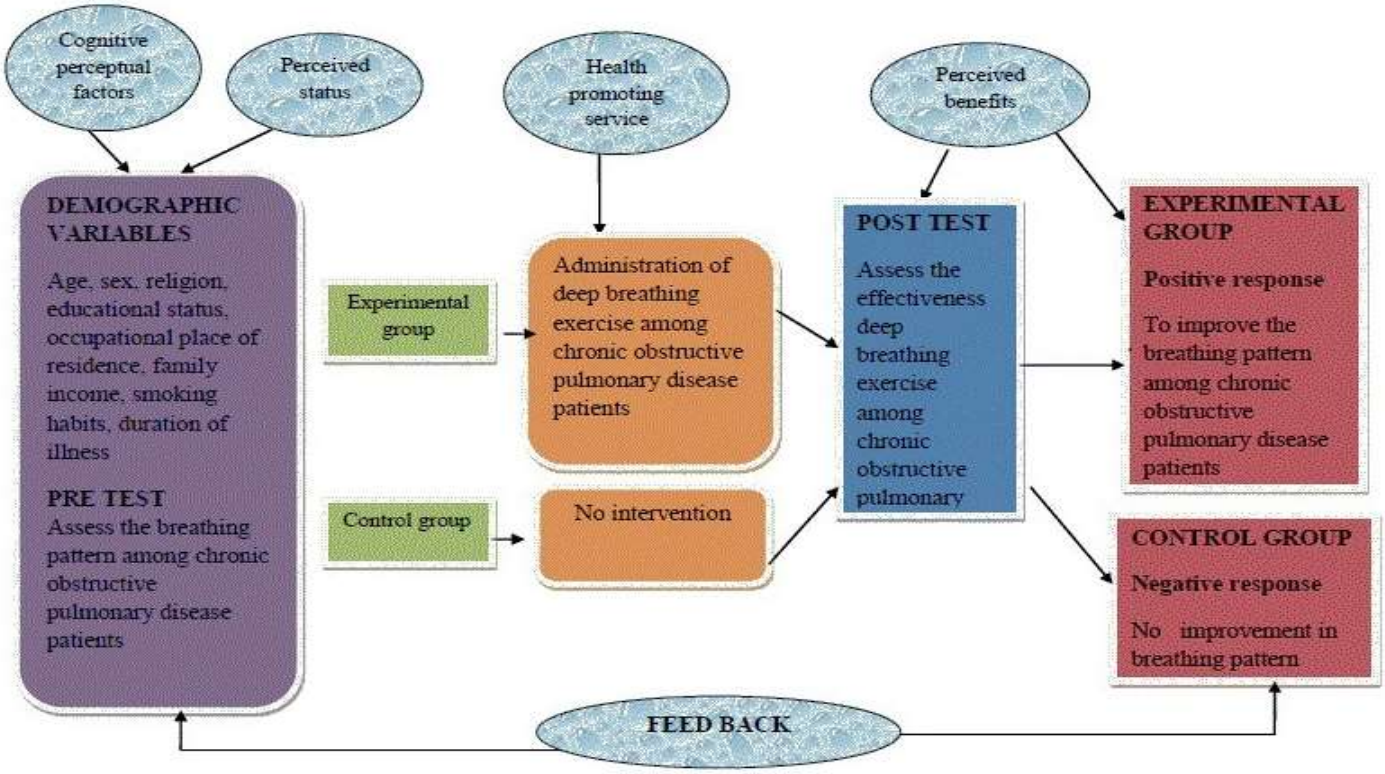

Figure: 1 Nola benders health promotion model (1997)

METHODOLOGY

Study Design

The research design adopted for the study is Quasi Experimental design.

SCHEMATIC REPRESENTATION OF THE STUDY

Experimental group	O1	X	O2
Control group	O1	-	O3

O1- before intervention experimental group and control group

O3- after nebulisation assessment of respiratory status control group

cX- intervention- deep breathing exercises

O2- assessment of respiratory status after breathing exercises

Study Setting

The setting of present study was conducted in Hi-Tech medical college and Hospitals, Bhubaneswar, Odisha.

Population

Target population: - All the children having respiratory disorders are selected in hi-tech medical college and hospital, Bhubaneswar.

Accessible population:- The population research to which the researchers can apply their conclusion.

Sampling Method

In the present study**, Non-Probability Purposive Sampling Technique** namely purposive sampling technique was used to make the study more practicable and feasible.

Sample Size

In this study, a total number of **60** samples were taken.

INCLUSION CRITERIA:

- Patients who are available during the period and data collection.
- Patients having respiratory disorders like asthma, bronchitis, bronchiolitis, LRTI'S.
- Children's who are undergoing through nebulisation therapy.
- Children's and parents who were willing to participate in the study.
- Children's who are hospitalised for 7 days.

EXCLUSION CRITERIA:

- Children's who were critically ill and with ventilator support.
- Children with respiratory diseases associated with other diseases conditions such as cardiac diseases.
- Mothers of children who were not willing to participate in the study.

DESCRIPTION OF TOOLS

SECTION-A

Demographic data consisting of Age, gender, family history of any respiratory diseases, duration of disease, occupation of father and mother, immunization status, weight of the child, frequency of hospitalisation, duration of hospital stay, exposure of passive smoking at home, place of living, family income.

SECTION-B

Respiratory status assessment

1) Clinical parameters which include chest movements, work of breathing, chest retraction, nasal flaring, air entry, breath sounds, capillary refill test, cough, sputum nature and use of accessory muscle.it is done by inspection, auscultation and suctioning.

2) Bio physiological measurements includes heart rate, respiratory rate and oxygen saturation by palpation, inspection and by using pulse oximeter.

PILOT STUDY

The pilot study was conducted after getting formal administrative permission. The pilot study was conducted in the paediatric wards at HI-TECH medical college and hospital, Bhubaneswar, for the period of one week from 29.11.2021 to 5.12.2021. formal permission was obtained from the medical superintendent, HI-TECH medical college and hospital. 10 samples (five for experimental group and five for control group) that fulfilled the inclusion criteria were chosen from the main population by using convenient sampling technique. Verbal consent was obtained from the parents of children's and data was collected. The instrument was found reliable for proceeding with the main study. The suggestion made were to increase the size from fifty to sixty. The intervention is carried out for one week. The other opinion and suggestion were incorporated in the main study to accomplish the objectives of the study.

DATA COLLECTION (Methods and Techniques)

1. Permission was obtained from the Medical Superintendent, HI-TECH Medical college and hospital. The period of study was from 14.12.2021 to 13.01.2022.
2. After obtaining formal permission , brief introduction was given to the mother of children regarding the study and verbal consent was obtained from them. Children those who fulfilled the inclusion criteria were chosen for the study and divided into two groups.

PART-1

Assessing the demographic variables.

PART-2

Assessing the respiratory status of the children, samples were selected based on convenient sampling technique and first 30 samples (experimental group) were assigned for breathing exercises and next 30 samples (control group) undergoing nebulisation therapy. For the experimental group intervention were given for 1 hour for three days and for control group nebulisation therapy were given for 30 minutes thrice a day. (includes assessment and recording time). On the day of admission pre assessment was done on respiratory status which includes clinical parameters and bio-physiological parameters and the scores were recorded for both group continuously for 3 days before and after intervention. The post assessment was done on respiratory status on day third after last intervention.

INTERVENTION

For experimental group breathing exercises given for 1 hour. Breathing exercises are practised and then respiratory status has been assessed by using tool includes clinical parameters and bio-physiological parameters.

For control group-nebulisation therapy is given thrice a day to those who were having respiratory disorders then respiratory status has been assessed by using tool.

SCORING TECHNIQUE:

RESPIRATORY STATUS ASSESSMENT:

CLINICAL PARAMETERS :

Score

0 – Normal

1- 7 – Mild distress (35%)

8 – 14 – Moderate distress (36-70%)

15-20 – Severe distress (71-100%)

BIO-PHYS IOLOGICAL PARAMETERS (BPM)

Heart rate

90-110 beats/minute	- 0 (Normal)
Above 110 – 124 beats/minute	- 1 (T achy cardia)
Above 124 beats/minute	- 2 (Severe tachycardia)

Respiratory rate

24-30 breaths / minute - 0 (Normal)

Above 30- 44 breaths /minute - 1 (Tachypnoea)

Above 44 breaths /minute - 2 (Severe tachypnoea)

Oxygen Saturation (SaO2)

91 – 100% - 0 (Normal SaO2)

85 – 90 % - 1 (Low SaO2)

Less than 85% - 2 (Very low SaO2)

Score:

0 – Normal BPM

1-3 – Mild/ Moderately altered BPM

4- 6 – Severely altered BPM

DATA ANALYSIS

1. Organization of data in master- sheet.
2. Demographic variables in categories were given in frequencies with their percentages.
3. Respiratory status assessment and bio physiological measurements were given in mean and standard deviation and student t-t est.
4. Association between demographic variables and Respiratory status assessment and bio physiological measurements were analysed using Pearson chi-square test.
5. Simple bar diagram, Multiple bar diagram, Pie diagram were used to represent the data.
6. $P<0.001$ was considered statistically significant. All statistical tests were two tailed test.

ETHICAL CONSIDERATION

Approval from Dissertation Committee and community Authorities. Informed conset from participants. Assurance of anonymity, confidentiality, and privacy. Voluntary participation.

Result

DEMOGRAPHIC PROFILE

Demographic Variables		Group			
		Experiment (N=30)		Control (N=30)	
		n	%	n	%
Age	3-6 Yrs.	12	40.00%	10	33.30%
	7.10 Yrs.	10	33.30%	14	46.70%
	11-15 Yrs.	8	26.70%	6	20.00%
Gender	Male	20	66.70%	17	56.70%
	Female	10	33.30%	13	43.00%
History of Respiratory Diseases	Yes	15	50.00%	24	80.00%
	No	15	50.00%	6	20.00%
Duration of Diseases	<1Week	20	66.70%	13	43.30%
	>1Week	10	33.30%	17	56.70%
Occupation of Father	Employee	16	53.30%	11	36.70%
	Business	11	36.70%	16	53.30%
	Others	3	10.00%	3	10.00%
Occupation of Mother	Employee	18	60.00%	16	53.30%
	Business	9	30.00%	9	30.00%
	Others	3	10.00%	5	16.70%
Immunization Status	Up to Date	26	86.70%	22	73.30%
	Not Up to Date	4	13.30%	8	26.70%
Weight	Below Normal	24	80.00%	24	56.70%
	Normal	6	20.00%	6	43.00%
Frequency of Hospitalisation	Full Time	12	40.00%	14	46.70%
	One Time	18	60.00%	16	53.30%
Duration of Hospital Stay	<3days	11	36.70%	16	53.30%
	3-5days	14	46.70%	9	30.00%
	6-7days	2	6.70%	5	16.70%
	>7 days	3	10.00%	0	0.00%
Exposure to Passive smoking at home	Exposed	10	33.30%	7	23.30%
	Not Exposed	20	66.70%	23	76.70%
Place of Living	Rural	4	13.30%	3	10.00%
	Semi Urban	10	33.30%	9	30.00%
	Urban	16	53.30%	18	60.00%
Family Income	<Rs. 5000	1	3.30%	6	0

	Rs. 5000-7000	26	86.70%	24	80.00%
	>Rs.7000	3	10.00%	6	20.00%

COMPARISONS OF PRE AND POST TEST CLINICAL PARAMETERS SCORE AMONG EXPERIMENTAL GROUP CHILDREN

Clinical parameter Score	**No. of children**	**Pretest**	**Posttest**	**Student's paired t-test**
		Mean±SD	**Mean±SD**	
	30	11.33±2.32	4.17±2.48	t=24.88 P=0.001*** DF=29

Significant at P≤0.05 highly significant at P≤0.01 very high significant at P≤0.001.

COMPARISON OF PRETEST AND POSTTEST BIOPHYSIOLOGICAL PARAMETERS SCORE AMONG EXPERIMENTAL GROUP CHILDREN

LEVEL OF BIO-PHYSIOLOGICAL PARAMETERS		**PRETEST SCORE**		**POSTTEST SCORE**		**PEARSON CHI SQUARE TEST**
		N	**%**	**N**	**%**	
Experimental group	Normal	0	0.00%	13	43.30%	$\chi 2$ = 13.14 P = (0.001***) DF = 2
	Mild/ moderate	12	40.00%	17	56.70%	
	Severe	18	60.00%	0	0.00%	

On an average, children with respiratory disorder are reduced their bio physiological parameter score . In pre-test none of the children had shown normal bio- physiological parameter score, 12 (40.0%) showed mild to moderate and 18 (60.0%) showed severe.

In post test 13(43.3%) of children moved to normal, 17(56.7%) of children moved to mild/moderate from severely altered bio physiological parameters. This reduction is statistically significant (P=0.001***). Statistical significance was calculated by using chi square test. Thus it is evident that breathing exercises is more effective in improving bio physiological parameter score.

COMPARISON OF PRE AND POSTTEST CLINICAL PARAMETERS SCORE AMONG CONTROL GROUP CHILDREN

	No. of children	**Pre-test Mean±SD**	**Post-test Mean±SD**	**Student's paired t-test**
Clinical parameter score	30	11.17±1.89	7.90±1.32	t=6.65 P=0.001*** DF =29

*Significant at P≤0.05 ** highly significant at P≤0.01 *** very high significant at P≤0.001 ***

On an average, children with respiratory disorder showed a decline in their clinical parameter score from 11.33 to 7.90 after the administration of breathing exercise. Due to nebulisation, they were able to reduce 3.27 score from base line score. This reduction was statistically significant. Statistical significance was

calculated by using student's paired 't' test. Thus it is evident that children with respiratory disorders shows less improvement in their clinical parameters score after administration of breathing exercise.

COMPARISON OF PRE AND POST TEST BIOPHYSIOLOGICAL PARAMETER SCORE AMONG CONTROL GROUP CHILDREN

LEVEL OF BIOPHYSIOLOGICAL PARAMETERS		PRETEST SCORE		POSTTEST SCORE		PEARSON CHI SQUARE TEST
		N	%	N	%	
Control group	Normal	1	3.30%	0	0.00%	$\chi 2$ = 9.85 P = 0.001 DF = 2
	Mild/ moderate	14	46.70%	25	46.70%	
	Severe	16	53.30%	5	53.30%	

On an average, respiratory disorder children are slowly reduced their biophysiological parameter score. In pre-test one child 1 (3.3%) had shown normal biophysiological parameter score, 14 (46.7%) showed mild to moderate and 16 (53.3%) showed severe alternation in biophysiological parameter.

In post test none of the children moved to normal, 25 (46.7%) of children moved to mild/moderate and 5 (53.3%) of children stayed in severely altered bio physiological parameters. This reduction is also statistically significant. Statistical significance was calculated by using chi-square test. Thus it is evident that nebulisation alone is less effective in children with respiratory disorders ad improves biophysiological parameters score slowly.

ASSOCIATION BETWEEN POSTTEST LEVEL OF BIOPHYSIOLOGICAL PARAMETERS SCORE AND DEMOGRAPHIC

Demographic Variables		Level of Bio Physiological Parameters				Total	Pearson chi Square Test
		Normal		Mild/moderate / Distress			
		n	%	n	%		
Age	3-6 Yrs.	7	41.20%	10	58.80%	17	X^2=0.07 P=0..78 DF=1
	7-10 Yrs.	6	46.20%	7	53.80%	13	
	11-15 Yrs.	0	0.00%	0	0.00%	0	
Gender	Male	9	45.00%	11	55.00%	20	X^2=0.07 P=0.79 DF=1
	Female	4	40.00%	6	60.00%	10	
History of Respiratory Diseases	Yes	1	33.30%	2	66.70%	3	X^2=0.14 P=0.71 DF=1
	No	12	44.40%	15	55.60%	27	
Duration of Diseases	<1Week	8	33.30%	16	66.70%	24	X^2=4.89 P=0.03 DF=1
	>1Week	5	83.30%	1	16.70%	6	
Occupation of Father	Employee	8	33.30%	7	53.80%	15	X^2=6.39 P=0.02 DF=1
	Business	5	83.30%	3	30.00%	8	
	Others	2	66.70%	5	83.30%	7	
Occupation of Mother	House wife	5	83.30%	2	66.70%	7	X^2=6.39 P=0.02 DF=1
	Employee	3	30.00%	5	83.30%	8	

	Others	7	53.80%	8	33.50%	15	
Immunization Status	Upto Date	13	50.00%	13	50.00%	26	X^2=3.52 P=0.06 DF=1
	Not Upto Date	0	0.00%	4	100.00%	4	
Weight	Below Normal	8	33.30%	16	66.70%	24	X^2=4.89 P=0.03 DF=1
	Normal	5	83.30%	1	16.70%	6	
Frequency of Hospitalisation	First time	4	33.30%	8	66.70%	12	X^2=0.81 P=0.36 DF=1
	>1 time	9	50.00%	9	50.00%	18	
Duration of hospital stay	<3 days	4	36.40%	7	63.60%	11	X^2=0.34 P=0.54 DF=1
	>3 days	9	47.40%	10	52.60%	19	
Exposure to passive smoking at home	Exposed	1	10.00%	9	90.00%	10	X^2=4.90 P=0.02 DF=1
	Not Exposed	12	60.00%	8	40.00%	20	
Place of Living	Rural / Semi Urban	7	20.00%	3	30.00%	10	X^2=4.34 P=0.04 DF=1
	Urban	6	30.00%	14	70.00%	20	
Family Income	<Rs 7000	11	40.70%	16	59.30%	27	X^2=0.73 P=0.39 DF=1
	>Rs 7000	2	66.70%	1	33.30%	3	

DISCUSSION

The demographic variables shows that less than half of the proportion the age of the child in experimental group (40%) and in control group (46.7%) belongs to the age between 3-6 years. The weight of the children was found to be of equal proportion (80%). The duration of hospital stay for the majority was 53.3% in control group and 36.7% in experimental group who stayed for less than 3days in hospital during illness and majority 46.7% in experimental group and 30% in control group stayed for 3-5 days. Concerned with the exposure of passive smoking at home the majority 66.7% in experimental group and 76.7% in control group were not exposed to passive smoking. The place of living for the majority (66.7%) in experimental group and (60.0%) in control group lived in urban area.

Breathing exercises was found to be very effective in improving the respiratory status of children. The present study revealed that in experimental group there was a quick reduction in clinical parameter distress score from 11.33 to 4.17 after the administration of breathing exercises. Concerned with the bio-physiological parameters, in pre-test none of the children had shown normal bio-physiological parameter score, 12 (40.0%) showed mild to moderate and 18(60.0%) showed severe BPM. In post test 13(43.3%) of children moved to normal, 17(56.7%) of children moved to mild/moderate from severely altered biophysiological parameters. This reduction is statistically significant (p=0.001***). Thus breathing exercises was more effective than nebulisation alone for children with respiratory disorders. In this present study children with normal weight, less duration of hospital stay during illness had better improvement in respiratory status and were statistically significant both in experimental (p=0.001**) and control group(P=0.01*).

CONCLUSION

The study revealed that breathing exercises was very effective than nebulisation alone in improving the respiratory status among children with selected respiratory diseases (p=0.001***).

An improvement in the respiratory status and thereby decreasing further complication could be achieved by performing breathing exercises among children with respiratory disorders. Thus children with respiratory diseases will benefit from the intervention in improving their respiratory status by clearing the

lung secretions thereby enhancing speedy recovery and reducing the duration of hospital stay. There was a moderate significant association with their normal weight and less duration of hospital stay during illness in the improvement of the respiratory status.

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