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Effects of Assisted Autogenic Drainage and Chest Physical Therapy in Children Suffering from Pneumonia

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Abstract

The study started after RIRS's approval and Helsinki's declaration. The current study is based on the fact that newer techniques like Assisted Autogenic Drainage must be introduced as chest physical therapy is one of the oldest ways of clearing the chest. The objective is to determine the effectiveness of Assisted Autogenic Drainage in children with Pneumonia. A Quasi-experimental study, with a sample of n=60, was selected through Epi and calculated as Out of 70 approached patients, 56 met inclusion criteria. The patients were divided based on convenience into Group A. Group B. Group A patients were given standard medical and nursing care and chest physical therapy. Group B patients were given an additional treatment of AAD with a predetermined frequency, intensity, and duration. The data was collected after informed and signed. The data was analyzed using SPSS version 23. The study showed significant results while within group comparison for only one variable with p=-1.515. However, in between-group comparisons, some variables showed significant results with p>0.05, and others showed Non-significant results with p<0.05. Chest physical therapy is more effective than Assisted Autogenic Drainage in treating children with Pneumonia.

Keywords: Assisted Autogenic Drainage; Chest Physical Therapy; Respiratory Severity Scoring rubric-Heart Rate.

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1. Introduction

The world is a global village. As the technology is increasing, the burden of diseases is also increasing. Pneumonia is one of the dreadful diseases. Various antibiotics and chest clearance techniques are used to treat the disease effectively [1] Pneumonia can be a fatal disease if not treated timely and correctly. The global burden of Pneumonia is increasing day by day [2]. Pneumonia is an infection of the lower respiratory tract which involves inflammation of the alveoli in the later stages of the disease [3].

The main complaint of the patients suffering from Pneumonia involves the accumulation of secretions in the respiratory tract that results in infection and added inflammation of the lower respiratory tract. Antibiotics provide the primary cover, and for secondary management, various techniques of chest physical therapy are used worldwide. The current research is based on evidence about the use and effectiveness of assisted autogenic drainage in children of different ages suffering from Pneumonia and cystic fibrosis [4].

Evidence supports the use of autogenic drainage and physical chest therapy, besides other chest physical therapy techniques, as an assistive technique in clearing a patient's chest and helping reduce the work of breathing by assessing different tools like respiratory distress scoring, etc. Autogenic Drainage Autogenic Drainage is an airway clearance technique that uses controlled breathing and minimal coughing to clear secretions from the chest. It involves hearing and feeling the secretions as the patient breathes out until they reach high enough so that, with minimal effort, they are coughed out. It uses different volumes of lungs to mobilize, lose, and move the secretions from more minor to larger airways [5].

Assisted Autogenic Drainage Technique is a modified form of Autogenic Drainage [6], both working on the same principles but with the difference that it is used in infants and children. The therapist places his hands on the child's chest to achieve different lung volumes and then manually increases the expiratory flow [7].

Globally more work needs to be done in this regard. This research has opened another gateway for the researchers, especially in my region.

2. Objectives

- To determine the effectiveness of assisted autogenic drainage in children with Pneumonia.
- To find the best practical method to treat children suffering from Pneumonia.

3. Study Hypothesis

Null hypothesis: None of the treatment protocols effectively cleared the chests of children suffering from Pneumonia.

Alternate hypothesis: Either of the study protocol effectively cleared the chests of the children suffering from Pneumonia.

4. Significance Of Study

Since the late 1990's work has continuously been done on chronic respiratory diseases like Cystic Fibrosis about Autogenic Drainage. However, according to our knowledge, regarding Assisted Autogenic Drainage in children suffering from Pneumonia, there is little work done [8]. A study conducted in March 2017 in South Africa states that AAD is of significant importance while treating chronic respiratory diseases; however, its efficacy in a direct effect on acute respiratory diseases has yet to be studied. This study will be going to add Evidence-Based Treatment in the practice of Cardiopulmonary Rehabilitation. [9] It could effectively treat Pneumonia in the Children population through Assisted Autogenic Drainage technique of chest clearance. It will help treat children suffering from Pneumonia by adding literature using an evidence-based Chest Physical therapy treatment.

5. Materials and Methods

5.1 Study Design

It was a Quasi-experimental study comprising two groups: Group A and Group B.

5.2 Setting

The study was conducted, after approval, in Fauji Foundation Hospital Islamabad, from the Paedes ward, PICU, HDU, Chest ward, and Male and Female Medicine wards.

5.3 Duration

The current study was a total of 06 months after synopsis approval.

5.4 Sample size

As calculated from the Epi tool (2017), the sample size was n=60. A total of 70 patients were approached, out of which 51 meet the Inclusion criteria of this research. However, 10 patients were dropped off during the research due to discharge.

5.5 Sampling Technique

A nonprobability type of convenient sampling was used.

5.6 Inclusion Criteria

- Children suffering from Pneumonia between the ages 5-15 years with class III & IV on the pneumonia severity index.
- Both genders are included in the study.
- Patients on 2nd & 3rd generation antibiotic therapy for Pneumonia are included.

5.7 Exclusion Criteria

- Children with Musculoskeletal, Neuromuscular, and Cardiovascular co-morbidities.
- Children with diagnosed lobular Pneumonia.

5.8 Data Collection Procedure

This research was initiated after getting approval from an advanced study & research committee (RIRC) of Riphah Institute of Rehabilitation Sciences, Riphah University Islamabad. The research was conducted according to the Pakistan Medical Research Council (PMRC) ethical guidelines and the Declaration of Helsinki. The anonymity and confidentiality of participants were maintained throughout the research. Informed consent was obtained from all the study participants before recruiting for the study. A total of 70 patients were approached, out of which 56 patients met the inclusion and exclusion criteria. The patients were recruited for the study after primary screening through the inclusion and exclusion criteria.

6. Intervention

The data in the current study was collected through the self-structured questionnaire with signed consent. The subjects were selected based on Inclusion and exclusion criteria and then allocated to Groups A and B according to a Quasi-experimental study. The treatment session was given once daily. There was an ongoing assessment of variables daily, i.e., from day 0 up to day 07 throughout the treatment protocol duration on the Self-structured Questionnaire along with signed consent. The standard Treatment was given to Group A patients [10], and Group B [11] patients were given additional AAD, and it included the following:

Table 1: Showing interventions given to both groups.

Group A	**Group B**
Group A was given Treatment, involving: 2nd and 3rd generation cephalosporin's (antibiotic therapy) *BD. Nebulization with beta-2 agonist/Ipratropium bromide * 4 hourly. Deep breathing exercises *15 repetitions *OD. Chest percussions (mild intensity) *OD	Group B was given an additional treatment with AAD, including: Additional treatment of AAD *5 minutes – 2 attempts with 1 minute gap *OD along with standard treatment protocol.

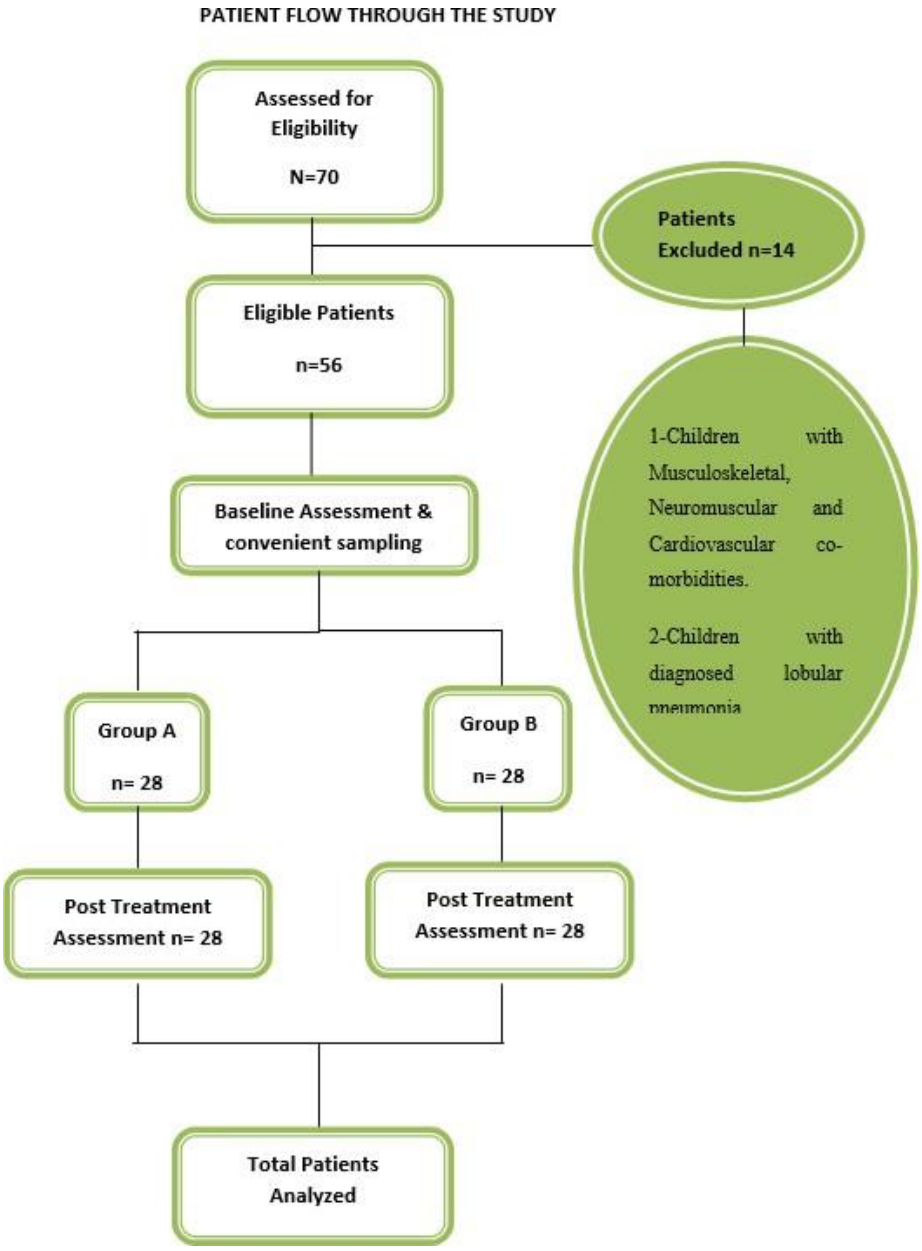

Figure 6

7. Analysis

The parametric and non-parametric variables were separated, and further statistical tests were applied. In the current research, all variables were non-parametric except Heart rate. Heart rate was the only parametric variable. The statistical tests were applied likewise. The continuous variables were assessed through mean, frequency, and standard deviations. Both between-group and within-group analyses were performed based on the Alternate and Null hypothesis, as both conditions were assessed, i.e., overall comparison and specific comparison of both techniques was the study's objective. For between-group comparison of the Non-parametric variables of Group A and Group B Mann-Whitney U test was applied, and for the Parametric variable Independent T-test was performed. For the Non-parametric variable, the Wilcoxon test was applied. For both within and between groups, comparison Median and IQ were compared along with the p-value. The statistical

significance was assumed at p>0.05 at the least significant, p>0.005 as more significant, and p>0.001 as the most significant value.

8. Results

Demographics: A total of 56 patients were recruited in the study, out of which 28 were in Group A and the other 28 were in Group B. The frequency of males was 17 and females was 29, as given in the table below. The mean age of pneumonia patients was 5.98 years for Group A patients and 6.17 years for Group B patients. The mean length of stay for both groups was 6 days. Out of a sample of 56, 18 belonged to the lower class rest, 38, belonged to the middle class. The co-morbidities of other Pneumonia were also found, with 5 suffering from kidney diseases and 13 patients suffering from cardiac diseases; Pneumonia developed in 21 patients secondary to other diseases however 17 patients only suffered from Pneumonia. According to the results of this study, 4 patients fall into Class IV according to the pneumonia severity index, and the rest, 52, fall into Class III. (Figure 1-4)

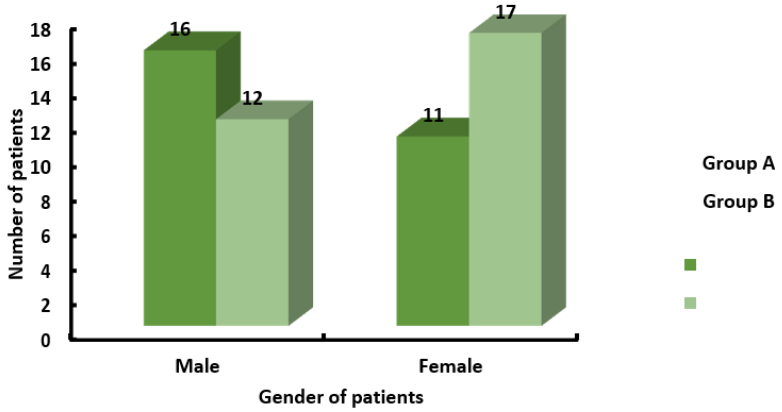

Figure 1: Showing mean age of pneumonia patients in both groups. The mean age of pneumonia patients was found to be 5.98 years for Group A patients and 6.17 years for Group B patients.

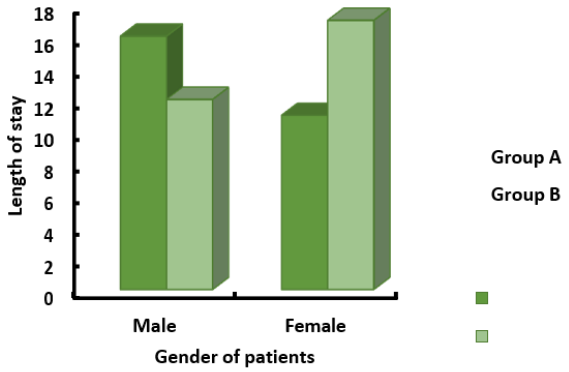

Figure 2: showing mean length of stay of both groups.

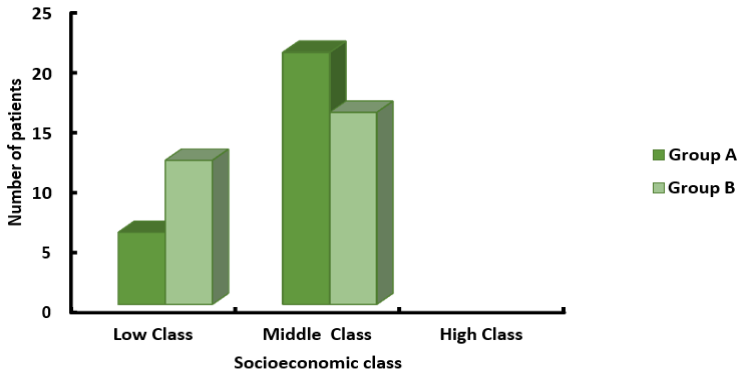

Figure 3: Showing socioeconomic status of pneumonia patients in both groups. The mean length of stay for both groups was 6 days. Out of sample of 56, 18 belonged to lower class rest 38 belong to middle class.

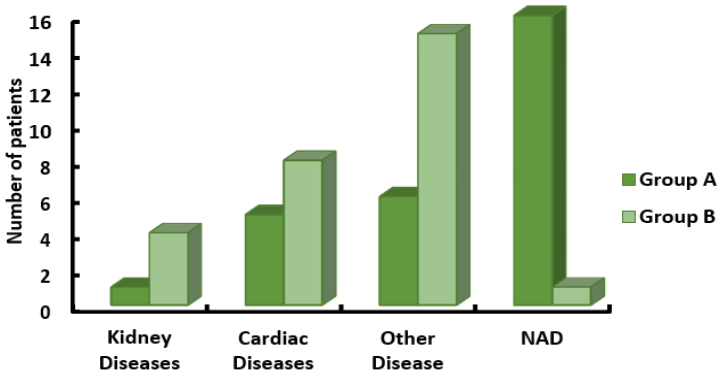

Figure 4: Showing co-morbidities of patients suffering from pneumonia.

Between-group comparison:

Independent 2-sample T-test was applied to analyze the parametric variables for Between Group comparison of Group A and Group. The statistical results showed that between-group comparison for pulse rate shows non-significant results with $p<0.05$. (Figure 5).

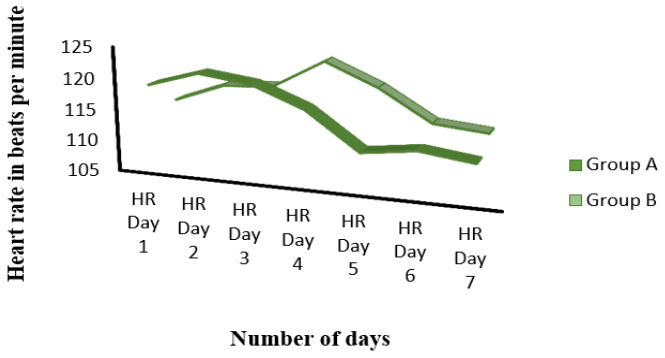

Figure 5: Showing variation in Heart rate from Day 1 through Day7 in both groups.

Mann Whitney U-Test was applied to analyze the results for Non-parametric variables between-group comparison of Group A and Group B. Between-group comparison for Temperature showed non-significant results on all days (Table 2). Respiratory rate showed non-significant improvement between-group comparisons with p-values available in Table 3. Oxygen saturation results for between-group analyses were also non-significant on all days, with p-values in Table 4. Results for arterial blood gases were also non-significant on all days reference Table 5. The between-group comparison of pages' early warning signs showed significant improvement on Day 5 with p= -1.515 (Table 6). The between-group comparison of respiratory rate on all days showed non-significant results (Table 7). The chest auscultation showed non-significant improvement throughout 7 days of the session with p-values given in Table 8. Between-group comparison of all sub-variables of respiratory distress, scoring showed non-significant results except intercostal retraction on day 4. Intercostal retraction showed significant improvement on day 4 with p= 0.052. (Table 9)

Table 2: Showing temperature variation for both groups from day 1 to day 7.

Temperature in degree centigrade	Group A Median (IQ)	Group B Median (IQ)	Z-value	p-value
Day 1	98.60 (0.4)	98.60(0.3)	-0.077805	0.937983
Day 2	98.60(1.4)	98.60(0.4)	-0.302361	0.762377
Day 3	98.80(0.1)	98.60(0.4)	-1.692276	0.090593
Day 4	98.60(0)	98.60(0)	-0.192799	0.847116
Day 5	98.80(1.4)	98.60(1.4)	-0.331503	0.740265
Day 6	98.60(0.4)	98.60(0.4)	-1.274034	0.202651
Day 7	98.60(0)	98.60(1)	-0.788417	0.430453

Table 3: Showing Between group comparisons respiratory rates from day 0 up to day 7. There was no statistical difference found.

Variable Respiratory rate in Breath / minute	Group A Median (IQ)	Group B Median (IQ)	Z-value	p-value
Day 1	31(12)	30(14.75)	-0.393	0.693
Day 2	30(20)	31(10)	-0.234	0.814
Day 3	35(9.5)	35(6)	-0.008	0.992
Day 4	35(5.25)	32(4)	-0.598	0.549
Day 5	34(16)	30(14)	-0.960	0.336
Day 6	30(12)	30(9.6)	-0.365	0.714
Day 7	29(18)	30(6)	-1.157	0.246

Table 4: Showing Between group comparisons of oxygen saturation from day 0 up to day 7. There was no statistical difference found.

Variables Oxygen saturation in %	Group A Median (IQ)	Group B Median (IQ)	Z-value	p-value
Day 1	95(3)	95(3)	-0.066821	0.946724
Day 2	96(2)	97(2)	-0.864966	0.387057
Day 3	97(2)	97(1)	-1.073108	0.283223
Day 4	96(0)	94(0.25)	-0.840474	0.400643
Day 5	96(2)	97(3)	-0.048147	0.961599
Day 6	98(2)	97(0.25)	-0.990877	0.321745
Day 7	98(1.25)	97(4)	-0.063983	0.948984

Table 5: Showing Between group comparisons of arterial blood gases from day 0 up to day 7. There was no statistical difference found.

Arterial blood gases in mmHg	Group A Median (IQ)	Group B Median (IQ)	Z-value	p-value
pH Baseline	7.33(0.03)	7.33(0.03)	-0.420631	0.674025
pH Day 7	7.36(4)	7.36(3.75)	-0.974172	0.329971
pO2 Baseline	80(1.75)	79(1)	-0.909710	0.362976
pO2 Day 7	89(0.04)	89(0.02)	-0.718126	0.472679
pCO2 Baseline	46(4)	46(2)	-0.221753	0.824506
pCO2Day 7	43(2)	43(2)	-0.026258	0.979052

Table 6: Showing between group comparisons of Paedes early warning sign scoring from day 0 up to day 7. There was no statistical difference found.

Paedes Early Warning Sign Scoring	Group A Median (IQ)	Group B Median (IQ)	Z-value	p-value
Day 1	2(3)	2.5(3)	-0.278886	0.780333
Day 2	2(3)	3(3)	-0.267312	0.789229
Day 3	3(3)	3(1)	-0.183364	0.854512
Day 4	3(1)	2(0)	-1.049292	0.294044
Day 5	2(3)	1(3)	-1.515600	-1.515600*
Day 6	1(3)	1(2)	-0.083172	0.933715
Day 7	1(1)	1(1)	-0.994739	0.319863

Table 7: Showing Between group comparisons of respiratory rate scoring from day 0 up to day 7. There was no statistical difference found.

Respiratory Severity Scoring Rubric	Group A Median (IQ)	Group B Median (IQ)	Z-value	p-value
Day 1	2(1)	2(1)	-1.664	0.096
Day 2	2(1)	2(1)	-0.278	0.781
Day 3	2(1)	2(2)	-0.949	0.342
Day 4	2(2)	1.5(1)	-0.878	0.380
Day 5	2(1)	1(1)	-0.321	0.748
Day 6	1(1)	1(1)	-0.135	0.893
Day 7	1(1)	1(0)	-0.951	0.341

Table 8: Showing Between group comparisons of chest auscultation status from day 0 up to day 7. There was no statistical difference found.

Status	Median (IQ)	Median (IQ)	Z value	P value
Wheeze Day 1	2(0)	2(0)	-0.588	0.556
Wheeze Day 2	2(0)	2(0)	-1.000	0.317
Wheeze Day 3	2(0)	2(0)	0.000	1.000
Wheeze Day 4	2(0)	2(0)	0.000	1.000
Wheeze Day 5	2(0)	2(0)	0.000	1.000
Wheeze Day 6	2(0)	2(0)	0.000	1.000
Wheeze Day 7	2(0)	2(0)	-1.000	0.317
Crackles Day 1	2(0)	2(0)	-0.691	0.489
Crackles Day 2	2(0)	2(0)	-1.085	0.278
Crackles Day 3	2(0)	2(0)	-0.048	0.961
Crackles Day 4	2(0)	2(0)	-0.833	0.405

Table 9: showing respiratory distress scoring. Results showed no significance difference.

Variable Respiratory distress scoring	Group A Median (IQ)	Group B Median (IQ)	Z-value	p-value
Chest Movement Day1	1(0)	1(1)	-0.900	0.368
Chest Movement Day2	1(0)	1(0)	-0.341	0.733
Chest Movement Day3	1(0.25)	1(1)	-0.309442	0.757
Chest Movement Day4	1(0)	1(0.75)	-0.261116	0.794
Chest Movement Day5	1(1)	1(1)	-0.131876	0.895
Chest Movement Day6	2(1)	2(1)	-0.619620	0.536
Chest Movement Day7	2(1)	2(0.25)	-0.872186	0.383

Within-group comparison:

Friedman test was applied to assess non-parametric variables for Within Group variables comparison. Within-group comparison of Temperature showed significant improvement in group A patients with p=0.003. However, group B patients showed less significant results. (Table 10)Within-group comparison of respiratory rate showed significant results in group A patients with p= 0.026; however, group B patients showed less significant results. (Table 11)Within-group comparison of Oxygen saturation in percentages showed equally significant results for both Group A and Group B, with p=0.000 for both groups. (Table12)Within-group comparison of arterial blood gases showed significant results for both groups, with p=0.000 for groups A and B. (Table 13) Within-group comparison for pediatric early warning sign scoring showed significant results for both groups, with p=0.000 for group and group B. (Table 14) Within-group comparison of respiratory distress, scoring showed significant results for chest movement with p=0.000 for both Group A and Group B (Table 15). For intercostal retractions, the results showed for group B with p=0.001 (Table 16). For xiphoid retractions, the within-group comparison showed non-significant results for both groups (Table 17). Nasal flaring results were also non-significant for Group A and Group B (Table 18). The expiratory grunt was the last sub-variable of respiratory distress scoring; it also showed non-significant results for both Group A and Group B within the group comparison (Table 19). Chest auscultation status for within-group comparison showed variable results with different p-values. Wheeze showed non-significant improvement (Table 20); however, crackles were significantly improved in group A patients with p=0.022 (Table 21). Within-group results for Rhonchi showed significant improvement in both groups with p=0.000 (Table 22).

Table 10: Showing within group comparison of Temperature from day 0 up to day 7. There was a significant effect found.

Variable	Temp Day1	Temp Day2	Temp Day3	Temp Day4	Temp Day5	Temp Day6	Temp Day7	p-value
Group A Median (IQ)	98.60(0.65)	98.60(1.4)	98.60(1.4)	98.60(0.4)	98.60(0.1)	98.60(0)	98.60(0)	0.003**
Group B Median (IQ)	98.60(0.1)	98.60(1.4)	98.60(1.4)	98.60(0.65)	98.60(0.65)	98.60(0.1)	98.60(0)	.156*

Table 11: Showing within group comparison of Respiratory rate from day 0 up to day 7. There was a significant effect found.

Variable	RR Day1	RR Day2	RR Day3	RR Day4	RR Day5	RR Day6	RR Day7	p-value
Group A Median (IQ)	33(14)	31(16.25)	35(20.75)	35(12)	34(9.5)	30(8.5)	29(5.25)	0.026*
Group B Median (IQ)	30(13.5)	30(15.75)	35(6.25)	33(10)	30(6)	30(5.75)	30(4)	0.049*

Table 12: Showing within group comparison of Oxygen saturation from day 0 up to day 7. There was a significant effect found.

Variable	SaO2 Day1	SaO2 Day2	SaO2 Day3	SaO2 Day4	SaO2 Day5	SaO2 Day6	SaO2 Day7	p-value
Group A Median (IQ)	94(2.25)	96(2)	97(2.25)	97(2)	97(2)	98(1.25)	98(0)	0.000*
Group B Median (IQ)	94(2)	96(1.25)	96(2)	97(4)	97(1.25)	98(0.25)	98(0.25)	0.000*

Table 13: Showing within group comparison of Arterial blood gases from day 0 up to day 7. There was a significant effect found.

Variable	pH Baseline	pH Day7	pO2 Baseline	pO2 Day7	pCO2 Baseline	pCO2 Day7	p-value
Group A Median(IQ)	7.33(0.03)	7.36(0.04)	80(4)	89(4)	46(2)	43(2)	0.000*
Group B Median(IQ)	7.33(0.03)	7.36(0.02)	79(4)	89(2)	46(1)	43(2)	0.000*

Table 14: Showing within group comparison of Pedes Early Warning sign scoring from day 0 up to day 7. There was a significant effect found.

Variable	PEWS Day1	PEWS Day2	PEWS Day3	PEWS Day4	PEWS Day5	PEWS Day6	PEWS Day7	p-value
Group A Median (IQ)	2(3)	2(2.25)	3(3.25)	2(3)	2(3)	1(1)	1(1)	0.000*
Group B Median (IQ)	2(3)	2(3)	2(3)	2(2)	1(1)	1(1)	1(0)	0.000*

Table 15: Showing within group comparison of First sub variable of respiratory distress scoring- chest movement from day 0 up to day 7. There was a significant effect found.

Variable	Chest movementDay1	Chest movementDay2	Chest movementDay3	Chest movementDay4	Chest movementDay5	Chest movementDay6	Chest movementDay7	p-value
Group A Median (IQ)	1(0)	1(0)	1(0)	1(0)	1(0)	1(0)	1(0)	0.000*
Group B Median (IQ)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	0.000*

Table 16: Showing within group comparison of Second sub variable of respiratory distress scoring- Intercostal retraction from day 0 up to day 7. There was a significant effect found.

Variable	Intercostal retractions Day1	Intercostal retractions Day2	Intercostal retractions Day3	Intercostal retractions Day4	Intercostal retractions Day5	Intercostal retractions Day6	Intercostal retractions Day7	p-value
Group A Medan (IQ)	2(1)	2(1)	2(1)	2(1)	2(1)	2(1)	2(1)	0.018*
Group B Median (IQ)	2(0)	2(0)	2(1)	2(1)	2(1)	2(1)	2(0)	0.001***

Table 17: Showing within group comparison of Third sub variable of respiratory distress scoring- Xiphoid retraction from day 0 up to day 7. There was no significant effect found.

Variable	Xiphoid retractions Day1	Xiphoid retractions Day2	Xiphoid retractions Day3	Xiphoid retractions Day4	Xiphoid retractions Day5	Xiphoid retractions Day6	Xiphoid retractions Day7	p-value
Group A Median (IQ)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	0.423
Group B Median (IQ)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	0.271

Table 18: Showing within group comparison of Fourth sub variable of respiratory distress scoring- Nasal flaring from day 0 up to day 7. There was no significant effect found.

Variable	Nasal flaring Day1	Nasal flaring Day2	Nasal flaring Day3	Nasal flaring Day4	Nasal flaring Day5	Nasal flaring Day6	Nasal flaring Day7	p-value
Group A Median (IQ)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	1.000
Group B Median (IQ)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	1.000

Table 19: Showing within group comparison of Fifth sub variable of respiratory distress scoring- Expiratory grunt from day 0 up to day 7. There was no significant effect found.

Variable	Expiratory	Expiratory	Expiratory	Expiratory	Expirator	Expiratory	Expiratory	
Group A Median (IQ)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	1.000
Group B Median (IQ)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	1.000

Table 20: Showing within group comparison of first sub variable of chest auscultation- wheeze from day 0 up to day 7. There was no significant effect found.

Variable	Wheeze Day1	Wheeze Day2	Wheeze Day3	Wheeze Day4	Wheeze Day5	Wheeze Day6	Wheeze Day7	p-value
Group A Median (IQ)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	0.313
Group B Median (IQ)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	0.313

Table 21: Showing within group comparison of second sub variable of chest auscultation- crackles from day 0 up to day 7. There was a significant effect found.

Variable	Crackles Day1	Crackles Day2	Crackles Day3	Crackles Day4	Crackles Day5	Crackles Day6	Crackles Day7	p-value
Group A Median (IQ)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	0.022*
Group B Median (IQ)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	0.423

Table 22: Showing within group comparison of third sub variable of chest auscultation- rhonchi from day 0 up to day 7. There was a significant effect found.

Variable	Rhonchi Day1	Rhonchi Day2	Rhonchi Day3	Rhonchi Day4	Rhonchi Day5	Rhonchi Day6	Rhonchi Day7	p-value
Group A Median (IQ)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	0.000*
Group B Median (IQ)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	0.000*

9. Discussion

Pneumonia is one of the leading causes of death among children of developing countries. A brief antibiotic therapy along with chest physical therapy is effective in reducing the load of disease worldwide. Chest physical therapy in patients of pneumonia mainly aims at clearing secretions from the chest and making the airways clear so that a better gas exchange can be possible. A number of studies have been done in this regard in which various chest clearance techniques are and had been used.

The current research was done to find out the effectiveness of assisted autogenic drainage in children between the age group 5- 15 years hospitalized with pneumonia. The primary outcome measure was Vital signs including respiratory rate, oxygen saturation, heart rate and temperature. Secondary outcome measures include Arterial blood gas analysis, Pedes early warning sign score and Chest X rays. The results of current research indicate that the treatment given to Group A patients that is Chest physical therapy was significantly effective in treating

the patients with pneumonia however, the assisted autogenic drainage gives no harm to the patients showing less significant results than chest physical therapy. The results for between group analysis between Group A (Chest physical therapy) and Group B (Assisted autogenic drainage), were non-significant with $p<0.05$.

Evidence supports that L.Corten and colleagues in July 2017 conducted an RCT on infants suffering from pneumonia who underwent bi-daily Assisted Autogenic Drainage Technique for 10-30 minutes compared with control group who were given Standard nursing care, the secondary outcome measure, included Respiratory rate, oxygen saturation and heart rate. No significant differences were found for the other outcome measures at time of discharge. No adverse events were reported. Within the intervention group, a significant reduction in RR adjusted for age was found. [12]

The results of current research show significant improvement when within the group analysis was done between Group A and Group B patients with Primary outcome, which was measured throughout from day 01 up to day 07,that is vital signs including Respiratory rate, Temperature and oxygen saturation. In group A patients significant improvement is seen in respiratory rate ($p= 0.026$*) which is more significant than Group B patients with $p= 0.049$*.

Another study conducted by W.Kamal and colleagues in December 2015 claims that chest physiotherapy in pediatric population suffering from pneumonia, with secondary outcome measure being respiratory rate, temperature and oxygen saturation. There were significant differences in terms of median time to clinical resolution ($p=0.012$) and the study group had greater improvement in respiratory rate (40 to 30 b/m vs 39 to 34 b/m) and in arterial oxygen saturation (93 to 98% vs 93 to 95%) than the control group. The conclusion of study was that chest physiotherapy is effective for pediatrics hospitalized with pneumonia. [13] Significant improvement in second variable of primary outcome that is temperature is seen after 7 sessions of CPT in patients of group A with $p= 0.003$* as compared to the patient being given additional Assisted autogenic drainage technique treatment with $p= 0.156$.

Evidence suggests that L.Corten in April 2015 also conducted a study in order to find out the effects of chest physiotherapy with no physiotherapy in children suffering from pneumonia, the results of the study were showing no effective significant difference in both the groups except that one group was showing cough and rhonchi for longer period than the other group.[14] Another secondary outcome chest auscultation was also assessed throughout 7 days, the results show significant improvement in Crackles auscultated in Group A ($p= 0.022$*) and Rhonchi in both groups that is Group A ($p=0.000$*) and Group B (0.000*), however wheeze shows insignificant results for both groups with $p= 0.313$ for Group A and for Group B $p=0.313$, both showing insignificant statistical results. Furthermore Chaves G.S and colleagues in March 2015, conducted a research in order to find out effects of chest physiotherapy in decreasing the resolution time of clinical symptoms of the disease. The outcome measures included signs of respiratory distress including inward drawing of chest, nasal flaring, expiratory grunt, intercostal retractions and oxygen saturation. Results indicate a significant improvement in respiratory rate and oxygen saturation whereas the other included study failed to show that standardized respiratory physiotherapy and positive expiratory pressure decrease the time to clinical resolution and the duration of hospital stay. [15]

The fourth secondary outcome respiratory distress was also assessed throughout 07 days of technique, the results show significant improvement for two sub variables that is chest movement and Intercostal retractions with p= 0.000 for Group A and p=0.000 for Group B. The results for Intercostal retractions of Group B were more significant than in patients of Group A with p= 0.001*** and Group A p= 0.018*. Rest all sub variables including xiphoid retractions p= 0.423 for Group A and p= 0.271 for Group B. Nasal flaring also showed insignificant improvement resultantly non-significant results for Group A p=1.00 and for Group B p=1.00, Expiratory grunt showing non-significant results for both groups with p= 1.00 for Group A and p=1.00 for Group B. M.P. McIlwaine and colleagues in June 2014 has studied the effects of expiratory flow rates on Autogenic Drainage. The results concluded PEFR L/min produced by huffing was higher than that produced by coughing. Moreover AD generates sufficiently high PEFRs to mobilize secretion proximally; Cough does not improve PEFR whereas Huffing does improve PEFR. Therefore AD is effective in mobilizing secretions proximally. [16]

Lukrefka J.L in Sep 2012 studied effects of chest physiotherapy as an adjuvant treatment in pediatrics complicated and hospitalized with community acquired pneumonia. The primary outcomes were reduction in respiratory rate and severity score (respiratory rate, recession, fever, oxygen saturation and chest x-ray) from baseline to discharge. Secondary outcome was duration of hospitalization. Respiratory rate and severity score significant decreased between admission to discharge within each group; however, there were no differences when comparing groups. Also, there was no significant difference in duration of hospitalization between the control and intervention groups (6 vs 8 days, p=0.11, respectively). [17]

The current research results as mentioned above also showed significant improvement in primary outcome measure Fever and respiratory rate with p>0.05. C.Paludo studied the effects of chest physiotherapy in 2008 with secondary outcomes including duration of respiratory symptoms and signs. The intervention group had a longer median duration of coughing (5.0 vs 4.0 days, p=0.04) and of rhonchi on lung auscultation (2.0 vs 0.5 days, p=0.03) than the control group. The study was concluded as Chest physical therapy if used as adjunctive in such patient, it won't hasten the clinical resolution of disease.[18] In current study saturation of oxygen the current study shows significant results for both group treatments with Group A (p= 0.000*) and for Group B (p= 0.000*). James B.Franklin and colleagues in September 2007 conducted a comparison study between Forced expiratory technique, cough and Autogenic drainage. Results indicate that standard Chest physical therapy along with forced expiratory technique is showing more significant (p>0.05) results than autogenic drainage alone. [19] The results of current research indicate that chest physical therapy including nebulization followed by deep breathing exercises along with chest percussions that is the standard physical therapy treatment shows significant improvement in both primary and secondary outcome measures, as compared to when an additional treatment with assisted autogenic drainage is added. The secondary outcome measures of current research also include Arterial blood gas analysis variable with three sub variables including pH, pO2 and pCO2 were showing significant results for both groups that is Group A (p=0.000*) and Group B (p=0.000*), when compared on day 07 with baseline data collected on day 01 of the treatment. The second secondary outcome measure was pedes early warning sign which shows significant results in both groups that is Group A (p=0.000*) and Group B (p=0.000*). Overall results of current research indicate that the treatment given to Group A patients that is Chest physical therapy was significantly effective in treating the patients with pneumonia however, the assisted

autogenic drainage gives no harm to the patients showing less significant results than chest physical therapy.

10. Conclusion

The study results concluded that both treatment groups showed improvement by reducing the Temperature, improving oxygen saturation and respiratory rate, improving respiratory distress scoring, pedes early warning signs, rubric scoring, and improving chest clearance, but standard chest physical therapy was found to be more effective in the management of children suffering from Pneumonia as compared to the Assisted autogenic drainage technique.

11. Limitations

The current study included following limitations:

1. Small sample size was used.
2. It was a short duration study.
3. Age limit was less.

12. Conflict of interest

The author declares that she has no conflict of interest.

13. Funding/Sourcing

It was a non-funded project.

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