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RESEARCH ARTICLE
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COMPARISON OF THE AVERAGE LENGTH OF HOSPITALIZATION BETWEEN TREATING BRONCHIOLITIS WITH SALBUTAMOL AND 3% HYPERTONIC SALINE IN CHILDREN.

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Abstract

Background: Bronchiolitis is a frequent respiratory illness in children. The virus can produce symptoms ranging from mild respiratory irritation to more serious pneumonia if it affects the lower respiratory tract. Bronchiolitis can arise for a variety of viruses, the most frequent one being the respiratory syncytial virus (RSV). Because of how severe the symptoms are, neonates are often more likely to contract the sickness. The patient's natural response to the reduced lung flexibility is to breathe more quickly, which leads to the classic symptoms of trapped air, increased mucus production, lung collapse, trouble breathing, and decreased airflow.

Objective: To compare the average length of hospitalization between treating bronchiolitis in children in our local population with salbutamol and 3% hypertonic saline.

Study design: a randomized control trial

Place and Duration This study was conducted in Al-Aleem Medical College, Ghulab Devi Teaching Hospital Lahore from October 2022 to October 2023.

Methodology: Children with a "respiratory distress assessment index" (RDAI) score between 4 and 15 who had a persistent dry cough and audible breathing sounds (wheezing) were included in the study. The children ranged in age from 1 month to 2 years. Demographic baselines were documented. A coin toss was used for randomization: Group A received heads for 3% hypertonic saline, while Group B received tails for salbutamol.

Results: A total of eighty participants were chosen to be included in this study. The children were split into two equal groups of forty in each. The age range of the children was one month to two years old. In Group A, the average age was 14.2 months and the average weight was 8.24 kg. In Group B, the average age was 15.7 months and the average weight was 8.6 kg. Group A mean hospital stay was 3.5 days, whereas group B mean hospital stay was 4.2 days.

Conclusion: Hospital stay duration and clinical severity scores (CS) are considerably decreased by HS as compared to salbutamol nebulization.

Keywords: Hypertonic saline, salbutamol, nebulization, children, bronchiolitis

Introduction

Bronchiolitis is a frequent respiratory illness in children [1]. The virus can produce symptoms ranging from mild respiratory irritation to more serious pneumonia if it affects the lower respiratory tract. Bronchiolitis can arise for a variety of viruses, the most frequent one being the respiratory syncytial virus (RSV) [2]. Because of how severe the symptoms are, neonates are often more likely to contract the sickness. Reduced lung compliance and airway constriction are the hallmarks of bronchiolitis [3]. The infection of the airway epithelial cells by the virus results in ciliary malfunction and cell death. The cytokine-induced blockage causes symptoms to appear, including coughing, shortness of breath, and wheezing [4].

The patient's natural response to the reduced lung flexibility is to breathe more quickly, which leads to the classic symptoms of trapped air, increased mucus production, lung collapse, trouble breathing, and decreased airflow [5]. The main goal of a child's care plan when they have bronchiolitis is to relieve their symptoms.

Each child and newborn with bronchiolitis should have a thorough evaluation performed to determine their level of hydration, respiratory distress, and hypoxic symptoms [6]. According to recent studies, bronchiolitis-affected babies can benefit greatly from hypertonic saline solution, which improves mucus removal from the lungs [7, 8, 9, 10]. Its effectiveness has been shown in numerous clinical trials in both healthy and sick children. In order to produce localized evidence on this issue, we therefore designed this study to compare the average length of hospitalization between treating bronchiolitis in children in our local population with salbutamol and 3% hypertonic saline.

Methodology

The Ethical Review Committee has approved this study. Non-probability sampling was used to determine the sample.

Inclusion criteria: Children with a "respiratory distress assessment index" (RDAI) score between 4 and 15 who had a persistent dry cough and audible breathing sounds (wheezing) were included in the study. The children ranged in age from 1 month to 2 years.

Exclusion criteria: The study excluded children who were born prematurely, had a medical history of heart or chronic respiratory conditions, or had a Glasgow Coma Scale (GCS) score of less than 10.

Demographic baselines were documented. A coin toss was used for randomization: Group A received heads for 3% hypertonic saline, while Group B received tails for salbutamol. Group B got nebulized salbutamol (0.15 mg/kg body weight, minimum 1 mg) in normal saline (4 ml) at the same oxygen flow rate as Group A, which received nebulized 3% hypertonic saline (4 ml) at 8 L/min. Every group adhered to the rules set forth by the institution. Based on the physician's criteria for respiratory rate normalization, room air oxygen saturation >92%, and hydration status, the length of hospital stay was recorded till discharge.

SPSS Version 22 was used to analyze the data and determine the frequency, percentage, and mean ± SD. The length of hospital stays among groups was compared using the independent sample t-test. Several criteria were taken into account during stratification, and the independent sample t-test with $p < 0.05$ was utilized for significance in post-stratification analysis.

Results

A total of eighty participants were chosen to be included in this study. The children were split into two equal groups of forty in each. The age range of the children was one month to two years old. In Group A, the average age was 14.2 months and the average weight was 8.24 kg. In Group B, the average age was 15.7 months and the average weight was 8.6 kg. Group A mean hospital stay was 3.5 days, whereas group B mean hospital stay was 4.2 days. Table number 1 shows the demographics of the patients. (All the values are in terms of mean)

Table No. 1: demographics of the patients

Demographics	**Group A**	**Group B**
Age (months)	14.2	15.7
Length (cm)	72.3	72.6
Weight (kg)	8.24	8.6
Duration of hospital stay (days)	3.5	4.2
Weight for length z-score	-0.906	-0.719

Table number 2 shows the frequency of parameters in both groups.

Table No. 2: frequency of

Parameters	**Group A**	**Group B**
Gender		
● **Male**	24	24
● **Female**	16	16
Exclusive breast feeding		
● **Male**	18	29
● **Female**	22	11
Vaccination status		
● **Fully**	11	6
● **Partially**	25	29
● **Unvaccinated**	4	5
Nutritional status		
● **Healthy**	28	29
● **Moderate malnutrition**	8	5
● **Severe malnutrition**	4	6

parameters in both groups

Table number 3 shows the parameters and the stratification of mean duration of hospital stay with respect to the parameters.

Table No. 3: parameters and the stratification of mean duration of hospital stay with respect to the parameters.

Parameters	Group A	Group B
Gender		
● **Male**	3.5	4.4
● **Female**	3.4	4.3
Exclusive breast feeding		
● **Yes**	3.3	4.3
● **No**	3.7	4.2
Age (months)		
● **1-12**	3.7	4.0
● **13-24**	3.4	4.2
Length (cm)		
● **<65**	4.0	4.0
● **>65**	3.4	4.2
Weight (kg)		
● **<8**	3.5	4.2
● **>8**	3.5	4.2
Vaccination status		
● **Fully**	3.2	4.1
● **Partially**	3.5	4.2
● **Unvaccinated**	3.6	4.7
Nutritional status		
● **Healthy**	3.4	4.1
● **Moderate malnutrition**	3.8	4.2
● **Severe malnutrition**	3.3	4.7

Discussion

The majority of the children in our study were between the ages of 13 and 24 months, which corresponds to the age range at which acute bronchiolitis is typically diagnosed. Previous research by Sarrell et al. (12.5 ± 6 months), Mandelberg et al. (2.9 ± 2.1 months), Tal et al. (2.6 ± 1 months), and Kuzik et al. (4.7 ± 4.2 months) have reported mean ages that are similar [11, 12, 13, 14]. Of the participants in our study, 60% were male and 40% were female. Acute bronchiolitis was more common in males, maybe as a result of the genetic diversity that comes with having two X chromosomes in females.

In our study, the 3% hypertonic saline (HS) group had an illness duration of 23.2 hours before admission, while the salbutamol group had an illness duration of 20.2 hours. The average length of the sickness was 3.1 days in the 0.9% saline group and 3.9 days in the 3% HS group, according to studies by Mandelberg et al., Tal et al., and Kuzik et al. Furthermore, compared to the 15.0% and 9.8% of infants in the saline group and the 3% HS group, respectively, Kuzik et al. reported that 18% of newborns in the salbutamol group and 12% in the HS group had previously taken antibiotics.

Seventy individuals with mild to moderate bronchiolitis were studied outdoors by Sarrell et al. At the beginning, the clinical severity (CS) score was 6.6 ± 1.5 for both the 0.9% saline group and the

3% hypertonic saline (HS) group. Following three days of treatment, the CS score rose to 4.8 in the 0.9% saline group and fell by 2.1 in the 3% HS group.

In our study, the group that received 3% hypertonic saline (HS) spent an average of 3.5 days in the hospital, whereas the group that received salbutamol spent 4.2 days there. P = 0.000 indicates that this difference was statistically significant. A post-hoc analysis revealed that, with 30.6% of patients being discharged early, the 3% HS group's hospital stay was noticeably shorter than that of the salbutamol group [15].

The length of hospital stays has decreased, according to observations made by other writers [16,17,18,19]. Mandelberg et al. report that the 0.9% saline with epinephrine group had an average hospital stay duration of 3 days, whereas the 3% hypertonic saline (HS) with epinephrine group had an average hospital stay duration of 1.2 days. Luo et al.'s data [20] show that the average length of hospital stay was 7.4 ± 1.5 days for the 0.9% saline with salbutamol group and 6.8 ± 1.2 days for the 3% HS with salbutamol group. This is in contrary to what this suggests.

Conclusion

For patients suffering from acute bronchiolitis who are not asthmatic but are moderately ill, 3% hypertonic saline (HS) nebulization is a safe and effective treatment. Hospital stay duration and clinical severity scores (CS) are considerably decreased by HS as compared to salbutamol nebulization.

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Conflict in the interest

None

Permission

It was taken from the ethical review committee

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