A Comparative Study to Assess Effect of Hypertonic Saline (3%Nacl) versus Salbutamol Nebulization Therapy on Breathing Pattern among the Children Suffering with Lower Respiratory Tract Infection Admitted to the Selected Hospitals of Central Gujarat

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Abstract

Background of the study: In the contemporary epoch, In India there is a rapid health transition with major and increasing burden of chronic non communicable diseases, supremely hypertension, cancer, diabetes mellitus, chronic lung disease and stroke and increased age was one the cardinal cause of elevated blood pressure. **Objectives:** 1) to assess breathing pattern of children suffering with lower respiratory tract infection after nebulization therapy with hypertonic saline (3%Nacl). 2) To assess breathing pattern of children suffering with lower respiratory tract infection after nebulization therapy with salbutamol. 3) To compare the effect of hypertonic saline (3%Nacl) and Salbutamol nebulization therapy on breathing pattern of children suffering with lower respiratory tract infection.4) To find out the association between selected demographic variables and breathing pattern of children suffering with lower respiratory tract infection after nebulization therapy with hypertonic saline (3%Nacl) and salbutamol. **Methodology:** A comparative study was carried out by selecting 86 children which were suffering with LRTI through non probability purposive sampling technique. Demographic data was collected by questionnaire as well as breathing pattern was assessed by modified clinical severity score. **Result:** The study finding shows that the mean clinical severity score 1.4283 with hypertonic saline nebulization therapy was lesser than the mean clinical severity score 1.8469 with salbutamol nebulization therapy with the mean difference of was 0.4186. ANOVA calculated; P value is 0.000which less than 2.91 (df 2, level of significant 0.05).so, that H_0 is rejected. This indicates that the hypertonic saline (3% Nacl) is effective to improve breathing pattern compare to salbutamol nebulization therapy.

Conclusion: The research study concluded that hypertonic saline(3% Nacl) nebulization therapy is more effective compare to salbutamol nebulization therapy.

Keywords: *3% Nacl, Hypertonic Saline, Salbutamol, Lrti, Children, Clinical Severity Score, Nebulization therapy.*

Introduction

Young children are precious in their own right and they are the future of the nation. Illnesses of the child engulf the whole family in a vicious cycle of apprehension, anxiety, helplessness and disturbed lifestyle. Lower Respiratory Tract Infection place a considerable strain on the health budget and are generally more serious than Upper respiratory infections.[1]

Lower respiratory tract infection is most commonly present in infancy period characterized by cough, wheezing, tachypnea and fever. Lower respiratory tract infection is the major reason of infant hospitalization in both developed and developing countries. Although it is common there is no current standard treatment. Supportive care is the only evidence based treatment option. Many studies focused on testing the effects of bronchodilators such as β2-agonsits, epinephrine,

glucocorticoids and magnesium sulphate with controversial results.[2]

The lower respiratory tract begins from the trachea and ends in the lungs. The tract enters into the lungs and divides in the bronchi. Then each bronchus divides further into smaller air pipes that are bronchioles. The bronchioles appear from the secondary and tertiary bronchi. These bronchioles end in small air sacs which known as alveoli. Many alveoli bunch up together and form the alveolar sac. From these alveoli the blood capillaries go out. The exchange of air occurs in every alveolus and the capillaries which go out of these alveolar sacs and spread throughout the body carry the blood which came in from veins spread in the body. The infection which occurs in the lower respiratory tract of human body is usually termed by the doctors as lower respiratory tract infection. The infections begin from the lower larynx and can also attack the bronchi and even the whole lungs. The common illnesses are bronchitis, pneumonia, bronchitis and flu.[1]

The primary cause of lower respiratory tract infection is various kinds of viruses that attack our system. The viruses that enter our body often take the shape of structural proteins and hence pass through unrecognized by the human immune system. Also viruses secrete some toxins which are stronger due to this immunity drops down and further humans are infected with the respective virus. After completion of incubation period the victim's body represents the clinical signs and symptoms.[5]

Bronchitis is a common lower respiratory tract infection. There are two kinds of Bronchitis; acute and chronic. The virus swells the bronchial tubes which causes difficulty in breathing, thus the infection affects the airways. About 4% of the people in a population of 1000 are affected by this virus. Acute or chronic disease is decided by the stage of the virus infection and the presentation of its structure.[3]

Pneumonia is another lower respiratory tract infection. It is caused by streptococcus pneumonia. The virus causes a great damage to the lung and the mortality rate is 25% of the patients affected by the virus. If a child below the age of 5 is affected, then he or she might not survive at all. Flu is caused by the influenza viruses and affects both the upper and the lower respiratory tracts. Bacterial meningitis caused by the virus Neisseria meningitides can cause lower respiratory tract infection. Scarlet fever causes by Group-A streptococcus. Tuberculosis caused by the bacteria mycobacterium tuberculosis which causes a consistent damage to the lungs. Bronchiolitis is also a lower respiratory tract infection. It is caused by RSV or respiratory syncytial virus. It mainly affects the respiratory tracts and the airways of little children. [3]

Lower respiratory tract infection (LRTI) are the third most important cause of mortality globally and are responsible for more than 4 million deaths annually.[4]

A nebulizer is a medical device which converts liquid medicine into vapor, mist or aerosol so that it can be inhaled directly into the air tubes or lungs. It uses electricity to generate compressed air which converts liquid form of medicine into vapors; much in the same way as an old style "Flit" sprayer does.[4]

Methodology

The study was executed by using quantitative research approach with comparative descriptive study design. The elected population for the study was children who are suffering with Lower Respiratory Tract Infection in selected hospitals of central Gujarat. Participants were selected by calculating power analysis with using the formula $n = 2(\sigma/\Delta)^2 (Z_\alpha + Z_{1-\beta})^2$. In that n = Sample size, σ = Standard deviation = 1, Δ = critical difference = 0.5, Z_α = Error (5%) = 1.96, $Z_{1-\beta}$ = Power (80%) = 0.84. So, 86 samples were selected and assigned in to two groups by using non-probability purposive sampling technique, the participants who elected in hypertonic saline group (3% Nacl) and salbutamol group were observed once a day for three days. Independent variable was hypertonic saline (3%Nacl) and Salbutamol nebulization therapy. as well as dependent variable was breathing pattern and demographic variables were age in month, gender, Is the baby on any medications for LRTI? Symptoms at admission, Duration of hospital stay, Oxygen requirement. All the data was collected by utilizing Demographic data was collected by questionnaire as well as breathing pattern was assessed by modified clinical severity score. Pilot study was conducted from 7th April to 20th April 2019 among 10 patients Hypertonic nebulization therapy (3%nacl) (5) &Salbutamol nebulization therapy (5) in baby children hospital, Ahmedabad to identify feasibility of the samples and reliability of the tool. The main study was conducted in different children hospitals .Moreover, the data was analysed and interpreted by using descriptive

and inferential statistics.

Results

1. **Breathing pattern of children suffering with lower respiratory tract infection after nebulization therapy with hypertonic saline (3%Nacl).**

Clinical severity score	f	%	Mean	SD	Median	T value	P-Value
Mild	06	13.95					
Moderate	31	72.09	1.4283	0.4737	1.500	18.94	0.000
Severe	06	13.95					

2. Breathing pattern of children suffering with lower respiratory tract infection after nebulization therapy with salbutamol. N=43

Clinical severity score	f	%	Mean	SD	Median	T Value	P-Value
Mild	01	2.33					
Moderate	17	29.53	1.8469	0.3387	1.9167	15.64	0.000
Severe	21	48.84					

3. **Effect of Hypertonic saline (3% Nacl) nebulization therapy (ANOVA)**

Source	DF	Adj SS	Adj MS	F-Value	P-Value	Mean of 3 days
Factor	2	281.2	140.583	158.44	0.000	2.2674
Error	513	455.2	0.887			1.5465
Total	515	736.3				0.4709

Table value p= 2.91(df 2, level of significant 0.05)

4. **Effect of salbutamol nebulization therapy (ANOVA)**

Source	DF	Adj SS	Adj MS	F-Value	P-Value	Mean of 3 days
Factor	2	179.5	89.7684	112.83	0.000	2.5407
Error	512	407.3	0.7956			1.9006
Total	514	586.9				1.0988

Table value p= 2.91(df 2, level of significant 0.05)

There is a no significant association between selected demographic variables and breathing pattern of children suffering with lower respiratory tract infection after hypertonic saline(3% Nacl) and salbutamol nebulization therapy except symptoms at admission.

Disscussion

In this study it is found that majority of the participants 31(72.09%) were having moderate clinical severity score 6 (13.95%) were having mild and severe clinical severity score among the children suffering with lower respiratory tract infection after nebulization therapy with hypertonic saline.

In this study, majority of the participants 21(48.84%) were having severe clinical severity score, only 1 (2.33%) were having mild clinical severity score and 17(29.53%) were having moderate clinical severity score among the children suffering with lower respiratory tract infection after nebulization therapy with salbutamol.

During assessment it is noted that the mean clinical severity score 1.4283 with hypertonic saline (3% Nacl) nebulization therapy was lesser than the mean clinical severity score 1.8469 with salbutamol nebulization therapy with the mean difference of was (0.4186). ANOVA calculated P value is less than 0.05, it is 0.000. So, we can strongly reject our H_0. This indicates that the hypertonic saline (3% Nacl) is effective to improve breathing pattern compare to salbutamol nebulization therapy.

There is a no significant association between selected demographic variables and breathing pattern of children suffering with lower respiratory tract infection after hypertonic saline (3% Nacl) and salbutamol nebulization therapy except symptoms at admission.

Conclusion

The research study concluded that hypertonic saline (3% Nacl) nebulization therapy is more effective compare to salbutamol nebulization therapy. The common side effects of salbutamol nebulization therapy are fine tremor, anxiety, headache, muscle cramps, dry mouth, and palpitation. Other symptoms may include tachycardia, arrhythmia, flushing of the skin, myocardial ischemia (rare), and disturbances of sleep and behaviour.

Ethical Clearence : The study was approved by the research committee, IEC – 10/05/2019- ARIP/IEC/19/19 and a formal written permission was gathered from the authority of.

Statement of Informed consent : Informed consent was obtained from the parents.

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