RISK FACTORS FOR DEATH IN CHILDREN AGED BETWEEN 1 MONTH TO 12 YEARS WHO WERE HOSPITALISED FOR PNEUMONIA

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A R T I C L E   I N F O

A B S T R A C T

Introduction: Acute Respiratory Tract Infection Is An Important Cause Of Morbidity In The Children. On An Average, Children Below 5 Years Of Age Suffer About 5 Episodes Of Ari Per Child Per Year, Thus Accounting For About 238 Million Attacks. Consequently, Although Most Of The Attacks Are Mild And Self Limiting Episodes, Acute Respiratory Tract Infection Is Responsible For About 30-50 Percent Of Visit To Health Facilities And For About 20-40 Percentage Of Admission To Hospitals.

Methods : 140children Between The Age Of 1 Month To 12 Years, Who Were Admitted (In Patients) To The Department Of Paediatrics, Who Was Clinically And Radiologically Confirmed As Pneumonia Were Taken In This Case Control Study. Among Those Children Who Died Of Pneumonia Were Taken As Cases (20) And Child Who Got Treated For Pneumonia And Discharged Were Taken As Control(120).

Results: In This Study More Death Occurred In Children Less Than One Year Of Age 65%. Lack Of Exclusive Breast Feeding Was Observed 6 Times More Commonly Among Children Who Died Of Pneumonia Than Those Who Survived With Pneumonia. Children Partially Immunized For The Age Were 4.3 Time At Risk Of Death From Pneumonia Than Fully Immunized For Age With Pneumonia. Among Socio-Demographic, Environmental And Nutritional Variables, Partially Immunized Child Grade Iii And Iv Malnutrition Were Having Statistically Significant Association With Pneumonia Mortality. In This Study 15(75.0%) Cases Had History Of Bad Child Rearing Practice While 5(25.0%) Cases Did Not Have Any Such History. In Controls 28(23.3%) Children Had History Of Bad Child Rearing Practices And 92 (76.7%) Did Not Have. In This Study 4 (20.0%) Cases Had Diarrhoea And 16 (80.0%) Cases Did Not Have Diarrhoea. In Control Group 11 (9.2%) Children Had Diarrhoea While 109 (90.8%) Children Did Not Have Diarrhoea. It Is A Significant Risk Factor For Death Among Children With Pneumonia.

Conclusion: From This Study, The Following Risk Factors Are Significantly Associated With Mortality In Children With Pneumonia. Children Who Have Lack Of Exclusive Breast Feeding In The First 6 Months, Immunization Not Appropriate For Age, Grade 2, 3, 4 Malnutrition, Bad Child Rearing Practices, Presence Of Altered Sensorium, Chest Retraction, Grunt, Shock, Diarrhoea, Associated Infections And Congenital Heart Disease.

INTRODUCTION

Acute respiratory tract infection remains a global source of concern particularly in third world countries, where the higher prevalence of some risk factors may predispose young children to severe bacterial pneumonia.Acute respiratory tract infection is an important cause of morbidity in the children. On an average, children below 5 years of age suffer about 5 episodes of ARI per child per year, thus accounting for about 238 million attacks. Consequently, although most of the attacks are mild and self limiting episodes, acute respiratory tract infection is

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responsible for about 30-50 percent of visit to health facilities and for about 20-40 percent of admission to hospitals. Acute lower respiratory tract infection is being increasingly recognized as a major cause of childhood mortality, being associated with a 3rd of all under five deaths in developing countries. Pneumonia was estimated to account for 3.1 million under five deaths in the third world countries annually. In India, hospital records show that upto 13 per cent of inpatient deaths in paediatric ward are due to acute respiratory tract infection. The proportion of death due to acute respiratory tract infection in the community is much higher as many children die at home. "The reason for high case fatality may be that children are either not brought to hospital or brought to the hospital too late. According to WHO estimates, respiratory infections caused 9,87,000 deaths in India of which 9,69,000 were due to acute lower respiratory tract infection, 9000 due to otitis media.

METHODS AND MATERIALS

This study was conducted in the Department of Paediatrics, Raja muthiah medical college and hospital, Annamalaiuniversity, Chidambaram. This study was conducted between the year November 2013 to October 2014. It is a case control study, were 120 children taken as controls and 20 children taken as cases. Children with our study criteria, who got admitted for pneumonia and died of pneumonia during the hospital stay, during our study period were analysed. Controls were selected from the children with our study criteria, who got admitted, underwent treatment and recovered from pneumonia during the study period. Inclusion Criteria were all children between 1 month and 12 years of age hospitalized for pneumonia. Exclusion Criteria were Persistent Pneumonia, Recurrent Pneumonia, Aspiration pneumonia (including Hydrocarbon), Nosocomial pneumonia. Diagnosis of pneumonia was made based on clinical and radiological features consistent with pneumonia. All children admitted for pneumonia (who met our study criteria) were included for our study. For all these children a detailed history and physical examination was undertaken to elicit various potential risk factors and these were recorded in a predesigned proforma.

RESULTS

The present study was carried out in RMMCH, Chidambaram, which is 1200, bedded tertiary care hospital serving the rural population. The present study was done to identify the risk factors for death in children aged between 1 month to 12 years who were hospitalized for pneumonia.

Table 1 Age distribution of study population

Age	Cases n(%)	Control n(%)	t^2 value	P value	OR	95% CI for OR
1 month to 1 years	13 (65.0%)	66 (55.0%)	0.689	0.7051	0.62	0.4, 3
13 month to 5 years	5 (25.0%)	39 (32.5%)			0.53	0.3, 1.9
61 month to 12 years	2 (10.0%)	15 (12.5%)				

*OR – Odds Ratio, * 95% CI-95% Confidence Interval for Odds Ratio

Table 2 Sex distribution of study population

Sex	Cases n(%)	Control n(%)	t^2 value	P value	OR	95% CI for OR
Female	9 (45.0%)	51 (42.5%)	4.37	0.8343	1.24	0.82,2.32
Male	11 (55.0%)	69 (57.5%)				

* OR – Odds Ratio, * 95% CI-95% Confidence Interval for Odds Ratio

Table 3 Breastfeeding status

Breastfeeding status	Cases n(%)	Control n(%)	t^2 value	P value	OR	95% CI for OR
No exclusive breast feeding	15 (75.0%)	19 (15.8%)	32.64	<0.0001	6	4.2,13.9
Exclusive breast feeding	5 (25.0%)	101 (84.2%)				

* OR – Odds Ratio, * 95% CI-95% Confidence Interval for Odds Ratio

Table 4 Immunization status

Immunization status	Cases n(%)	Control n(%)	t^2 value	P value	OR	95% CI for OR
Partially immunization (not immunized for age)	13 (65.0%)	28 (23.3%)	14.37	<0.0001	4.3	2.8, 7.5
Fully immunized	7 (35.0%)	92 (76.7%)				

Table 5 Nutritional status

Nutritional status	Cases n(%)	Control n(%)	t^2 value	P value	OR	95% CI for OR
Grade III, IV Malnutrition	2 (10.0%)	20 (16.7%)	5.582	0.0514	8.9	4.9,17.1
Grade I, II	14 (70.0%)	50 (41.7%)				
Normal Nutrition	4 (20.0%)	50 (41.7%)			1.24	0.7,2.5

Table 6 Bad child rearing practices

Bad child rearing practices	Cases n(%)	Control n(%)	t^2 value	P value	OR	95% CI for OR
Present	15 (75.0%)	28 (23.3%)	21.50	0.0001	2.05	1.3,3.4
Absent	5 (25.0%)	92 (76.7%)				

Table 7 Chest indrawing

Chest indrawing	Cases n(%)	Control n(%)	t^2 value	P value	OR	95% CI for OR
Present	16 (80.0%)	59 (49.2%)	6.552	0.0105	2.5	1.6, 3.4
Absent	4 (20.0%)	61 (50.8%)				

Table 8 Grunt

Grunt	Cases n(%)	Control n(%)	t^2 value	P value	OR	95% CI for OR
Present	8 (40.0%)	36 (30.0%)	18.62	0.0001	6.2	2.9,15.4
Absent	12 (60.0%)	84 (70.0%)				

Table 9 Shock in the study population

Shock	Cases n(%)	Control n(%)	t^2 value	P value	OR	95% CI for OR
Present	10 (50.0%)	4 (3.3%)	41.48	0.0001	38.8	14.9,108.4
Absent	10 (50.0%)	116 (96.7%)				

Table 10 Associated diarrhoea in study population

Diarrhoea	Cases n(%)	Control n(%)	t^2 value	P value	OR	95% CI for OR
Present	4 (20.0%)	11 (9.2%)	14.103	<0.0001	4.5	2.4,10.8
Absent	16 (80.0%)	109 (90.8%)				

Table 11 Type of x-ray in study population

Type of x-ray	Cases n(%)	Control n(%)	t^2 value	P value	OR	95% CI for OR
Broncho pneumonia	15 (75.0%)	85 (70.8%)	15.89	0.004	1.86	1.42,3.42
Pneumonia/ pneumonitis	3 (15.0%)	20 (16.7%)			0.7	0.32,2.37
Consolidation	2 (10.0%)	15 (12.5%)				

DISCUSSION

Pneumonia is one of the commonest problem in paediatric practice particularly in a developing country like India. Most of the death in acute lower respiratory tract infection are due to pneumonia. Most of the pneumonia death occur in areas with lowest standard of health care. Pneumonia is also one of the important cause of mortality and morbidity in infants and children in our country.This study was conducted among 20 patients who died during hospital stay for pneumonia and compared with 120 children who got discharged after recovery from pneumonia. Both the dead and recovered children were in the age group of 1 month to 12 years.RajahMuthiah Medical college and Hospital, Annamalai University, Chidambaram , where this study was conducted, largely caters to economically underpriviledged. Most of our study population were from families with a per capita income of less than 600 rupees per month.In this study, the maximum number of deaths were noticed under the age of 1 year, and this group constituted 65 percent of cases studied. In control group 66 per cent patients were under the age of 1 year. Over all more than 50 percent of the children (both in controls and cases) in the study population were under the age of 1 year. This predominant incidence of mortality in pneumonia during infancy has been emphasized by most of the workers. As the age increase mortality decrease.

Previous studies also showed that the pneumonia was six times more frequent in the 1st year of age than later in children under 5 years 20 younger age is associated with increased risk of severe disease 40. . Particularly age less than   1 year is a risk factor for acute respiratory tract infection morbidity. In our study, we observed that children who were immunized for age are likely to have less mortality in pneumonia as compared to those who were incompletely immunized. P value <0.0001) This association is also reported in other studies 18,24 Mothers utilizing immunization services are better aware of health care facilities and probably seek early consultation for illness of their children. Awareness of mothers leading to early identification of illness probably avoid severe illness. The reported association was not found in one study.23Breast feeding and malnutrition are the two nutritional variable considered in this study. Lack of exclusive breast feeding for the first 6 months and malnutrition significantly associated with pneumonia death (P value <0.0001,0.0001 respectively). Both were independent risk factors for pneumonia mortality. To see the true protective effect of exclusive breast feeding upto 6 months we did the entire calculation again after excluding children below 6 moths of age.

The final result were not different.Breast feeding was protective against streptococcus pneumonia in the first 2 years of age and it is protective against Hemophilus influenza type (b) disease from 2-5 month of age. 59-61Breast feeding provide several physical and biochemical barriers against infection agents that are still are not wholly understood. The act of breast feeding limits infants exposure to environmental pathogen that may be introduced through contaminated food, fluid and feeding devices. However human milk also contains bio-active constituents that functions alone or in combination to aid, develop and enhance infants immune systems.Artificially fed babies were 3-4 likely to die from pneumonia than exclusive breastfed babies. Partially breastfed babies come somewhere to between. Only 1 percent of breastfed infants were likely to contact pneumonia. Malnutrition is a significant independent predictor of mortality. Malnutrition is the syndrome that results from the interaction between poor diet and disease and leads to most of the anthropometric deficit observed among children in the world's less developed countries. Malnutrition potentiates effect of infection and contributes to more than half of the deaths of children under 5 years of age.

It has been estimated that in India, 65 per cent i.e. nearly 80 million children under five years of age suffers from varying degree of malnutrition. Malnutrition is often found to start in the womb and ends in the tomb. Even children with mild to moderate malnutrition rather than only those with severe forms of malnutrition have an increased risk of dying. Malnutrition is strongly associated with an increased risk of mortality from acute lower respiratory tract infection and pneumonia. A dose response reduction between decreasing weight for age and increasing risk of mortality was apparent in this study and previous study. Malnutrition rather acting in a simple addictive fashion, was in fact observed to multiply the number of deaths caused by infectious disease. In our study malnutrition is an independent predictor of mortality. The odds of children with Grade III, IV malnutrition dying from pneumonia is 8.5 times the odds of children with normal nutrition surviving from pneumonia. As the malnutrition increase from grade I to Grade IV the mortality also increases.

SUMMARY

From this study, the following risk factors are significantly associated with mortality in children with pneumonia.

Children who have lack of exclusive breast feeding in the first 6 months, immunization not appropriate for age, grade 2, 3, 4 malnutrition, lack of pre hospital antibiotics, bad child rearing practices, presence of altered sensorium, chest retraction, grunt, shock, diarrhoea, associated infections like septicemia and pyogenic meningitis, congenital heart disease. The following factors are found to be independent risk factors for mortality in children with pneumonia were Lack of exclusive breast feeding in the first 6 months, Grade II, III, IV Malnutrition, Refusal of feeds or inability to feed, Lack of prehospital antibiotics, Presence of altered sensorium, grunt, shock, Associated infections and Congenital Heart Disease, Bad child rearing practice, Native medication

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