ORIGINAL ARTICLE

Factors Associated with Adverse Outcome in Pneumonia Among Children <5 Years of Age

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ABSTRACT

Objective: The objective of our study was to evaluate the factors associated with adverse outcome in pneumonia among children <5 years of age

Methodology: A total of 100 children again between 1 month and 59 months of age with adverse outcome were selected in the study. Contributing factors at admission were noted for all the children who were treated as per treatment protocol. Children were followed up to assess outcome which can be recovery from disease, need for ventilation, death or development of complications. Contributing factors and presence of adverse outcome was accorded.

Results: Frequency of associated factors was recorded as 34%(n=34) had <6 months of age, 30%(n=30) had low weight, 22%(n=22) had ALOC, 16%(n=16) had changes in arterial blood gases, 68%(n=68) had radiological changes while 41%(n=41) had lack of exclusive breast fed.

Conclusion: We concluded that radiological changes, lack of exclusive breast fed <6 months of age and low weight are the significant indicator of adverse outcome.

Keywords: Pneumonia, children, adverse outcome, contributing factors

INTRODUCTION

Pneumonia contributes a significant portion of all childhood deaths globally. Around 156 million cases of pneumonia occurs annually in young children (with more than 10 million cases in Pakistan. Approximately 1.4 million deaths occurs, of these deaths 90-50% are in the developing countries.²⁻³ Currently, effective management strategy to control the mortality rate due to pneumonia is dependent on appropriate antibiotic therapy. Various earlier prospective studies reveal that lack of exclusive breast-feeding, <1 year of age, severity of infection, worsening of clinical condition, hypoxia and associated morbidities e.g. HIV and diarrhea are the main independent predictors of childhood mortality due pneumonia.¹⁻⁴

Due to improved health awareness and progress in socioeconomic status, an increased proportion of deaths due to pneumonia occur in hospital.⁴ However, very few studies evaluated such data in our country. Further studies are required to evaluate the incidence of contributing factors of childhood mortality due to pneumonia. This information may help in early detection and controlling strategies.

Studies from Mozambique³ found 16% severe pneumonia in 0-23 months aged children hospital admissions; whereas anemia, HIV infection, hypoxemia, bacteremia and malnutrition are associated with fatal episodes of pneumonia. In a retrospective study from India⁴ in children aged 1-59 months, case fatality rate was 8.2%. Altered sensorium 12.8%, weight for age<2Z score 57%, need for assisted ventilation 47% and age (1-6 months) 64.4%, were associated with mortality among clinically and radiologically diagnosed pneumonia cases. Need for assisted ventilation alone was found to be an independent risk factor for mortality in children with pneumonia among all the study groups. Tiewsoh K et al enrolled 200 children aged 2-60 months, 20.5% needed mechanical ventilation and 10.5% died, 56.5% needed a change of antibiotics because of worsening of hypoxia, 63.5% children had radiographically confirmed pneumonia and 45% did not receive exclusive breast-feeding.⁵ A study from Spain on children aged 2-59 months, 689 children included in this analysis, 8.0% required intensive care and 4% died. In a longitudinal study from Brazil on children aged 1 month to 12 years, a total of 860 children were included in the study. There were 26 deaths, with a CFR of 3%, only disease severity remained associated to death in the multivariate analysis. Pneumonia is more common and more likely to be fatal in children with severe malnutrition. In prospective study in children with CAP from Europe 3.7% children admitted with pneumonia developed pulmonary complications. 9

There is wide variation in mortality rate ranging from less than 3% to more than 10% in various studies and development of complications in 3.7% of patient admitted with pneumonia. Moreover, the factors reported are varied, with some factors (e.g. need for ventilation, change of antibiotics) are only evident as the disease progress. Very little information available from local studies. Hence, a study is need to determine the mortality of this common illness and determine factors which can be evaluated at admission for triage of sick children so as to reduce mortality.

METHODOLOGY

We enrolled a total of 100 cases hospitalized between 1 month and 59 months with a diagnosis of pneumonia whereas those whose final diagnosis is tuberculosis pneumonia or chemical pneumonitis following kerosene ingestion and whose parents do not give consent to participate in study were excluded from the study. All tests results were taken from a same laboratory. All Xray reports were reported by a radiologist of at least SR level. Demographic details of patients were gathered and presence or absence of all the factors mentioned in proforma was noted. Bio data was entered in a predesigned structured proforma. Source of data collection/variables were clearly stated. Contributing factors at admission were noted for all the children who were treated as per treatment protocol. Children were followed up to assess outcome which can be recovery from disease, need for ventilation, death or development of complications. Contributing factors and presence of adverse outcome was accorded. The data mainly entered in (SPSS) version 21. Weight was calculated as mean. Qualitative variables like adverse outcome and exclusive breast feeding, altered level of consciousness, changes in arterial blood gases and radiological changes were calculated and presented in frequency and percentage.

RESULTS

We found 79%(n=79) were between 1-24 months of age whereas 21%(n=21) had 25-59 months of age, mean+sd was calculated as 15.30+13.21 months. (Table No. 1)

Gender distribution shows that 55%(n=55) were male whereas 45%(n=45) were females. (Table No. 2)

Frequency of associated factors was recorded as 34%(n=34) had <6 months of age, 30%(n=30) had low weight, 22%(n=22) had

ALOC, 16%(n=16) had changes in arterial blood gases, 68%(n=68) had radiological changes while 41%(n=41) had lack of exclusive breast fed. (Table No. 3)

Table 1: Age Distribution (n=100)

Age(in months)	No. of patients	%
1-24	79	79
25-59	21	21
Total	100	100
Mean+SD	15.30+13.21	

Table 2: Gender Distribution (n=100)

Gender	No. of patients	%
Male	55	55
Female	45	45
Total	100	100

Table 3: Frequency of Associated Factors

Associated factors	No. of patients	%
<6 months of age	34	34
Low weight	30	30
ALOC	22	22
Changes in arterial blood gases	16	16
Radiological changes	68	68
Lack of exclusive breast fed	41	41

DISCUSSION

There is wide variation in mortality rate ranging from less than 3% to more than 10% in various studies and development of complications in 3.7% of patient admitted with pneumonia. Moreover, the factors reported are varied, with some factors (e.g. need for ventilation, change of antibiotics) are only evident as the disease progress. Very little information available from local studies. Hence, a study is need to determine the mortality of this common illness and determine factors which can be evaluated at admission for triage of sick children so as to reduce mortality.

In our study, of 100 cases, 34%(n=34) had <6 months of age, 30%(n=30) had low weight, 22%(n=22) had ALOC, 16%(n=16) had changes in arterial blood gases, 68%(n=68) had radiological changes while 41%(n=41) had lack of exclusive breast fed.

Previous data reveal that Tiewsoh K et al enrolled 200 children aged 2-60 months, 20.5% children had need of mechanical ventilation (M V) and mortality was in 10.5%, 56.5% had need of change in antibiotics because of worsen hypoxia, 63.5% children had radiographically confirmed pneumonia and 45% with lack of exclusive breast-feeding.⁵

Another study from Spain on children aged 2-59 months, 689 children included in this analysis, 8.0% required intensive care and 4% died. Another study revealed 13% had severe pneumonia.²

In another prospective study in children with CAP from Europe 3.7% children admitted with pneumonia developed pulmonary complications.⁹ The above data support our results.

J. Stekelenburg and others determined the factors contributing to high mortality caused by pneumonia among childrenunder 5 years of age in Kalabo District and found low weight a significant contributing factor.¹⁰

Another study confirmed that malnutrition was a significant risk factor for pneumonia in developing countries.¹¹ However, this association was not found in industrialized nations.¹¹

Educational level of parents, particularly mother's schooling had an inverse relation of morbidity and mortality due to childhood pneumonia.¹² However, in this study maternal education was not evaluated being the limitation of our study.

There is evidence of a causal relationship between poor socioeconomic conditions and pneumonia, with a greater frequency of CAP episodes in children from less privileged backgrounds. However, in our study, this factor was also not evaluated being the limitation of our study.

Our data is primary and we could not compare with other local studies, as very little data is available, however, our findings need validation through local studies.

CONCLUSION

We concluded that radiological changes, lack of exclusive breast fed <6 months of age and low weight are the significant indicator of adverse outcome.

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