Original Article

Acute Respiratory Infection among Children aged 2 Month to 5 Years: Do Children with Initially "No Pneumonia" Progress to Pneumonia?

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Objective: To document the percentage of children (aged 2 months to 5 years) with initial diagnosis of "No pneumonia" progressing to pneumonia and determine any risk factors involved.

Study Design: Case series study.

Place and Duration: Outpatients Department, Children hospital, Pakistan Institute of Medical Sciences (PIMS), Islamabad from November 2008 to March 2009.

Materials and Methods: A total of 840 patients (aged 2 months up to 5 years) with acute respiratory tract infections were include in the study by convenience sampling technique. The patients were grouped as group I with age range of 2 months to < 12 months and Group II with age range of 12 months to 59 months. Date were collected using a structured proforma. Data entry and analysis were performed using EPI INFO ver. 6.04 software.

Results: Total number of children enrolled in this study was 840, with an IMCI case definition diagnosis of "No pneumonia". The age range was 2 months to 59 months with a mean of 13.783 (±12.06) months. There were 497 (59.16%) patients in group I and 343 (40.83%) in group II. 539 (64.2%) were male and 301 (35.8%) were female. Their duration of illness ranged from one day to 20 days with a mean of 4.5 (±3.10) days.

On follow-up after 2 days 112 (13.33%) patients were found to have developed Pneumonia. Age less than 12 months, clinically severe malnutrition and lack of breastfeeding were found to be risk factors for development of pneumonia.

Conclusion: A significant proportion of children diagnosed with "No pneumonia" progress to develop pneumonia. Age < 12 months, clinically severe malnutrition and lack of breast feeding are important risk factors for the development of pneumonia in these children.

Key words: *No pneumonia. WHO ARI guidelines,* Integrated Management of *Childhood Illness.*

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Introduction

Acute infections of the lower respiratory tract are an important cause of morbidity and mortality in developing countries. These are responsible for the death of more than two million children under the age of 5 years annually.[1] World health organization (WHO) developed a case management strategy in the 1980s aiming to reduce pneumonia related deaths. This was a cornerstone of the acute respiratory infection (ARI) program and was later incorporated into the integrated management of childhood illness (IMCI) guidelines, which include primary care and hospital based case management.[2] Respiratory tract infections are the most common reason for patients to consult in primary care with children consulting more than any other age group.[3] One in five children who consult for a respiratory tract infection returns during the same illness episode and many of these visits are unnecessary.[4] Unnecessary re-consulting can increase the pressure on clinicians to prescribe antibiotics. Guidelines of the National institute for health and clinical excellence (NICE) recommend against the immediate use of antibiotics for most children who have respiratory tract infections, and

promote efficient communication and information provision including an indication of the likely duration of illness.[5] Prescribing for non-specific upper respiratory tract infections, which declined in the late 1990's, is once again increasing.[6] Unnecessary antibiotics use wastes the healthcare resources, encourages further consulting in the future for similar illnesses,[7] contributes to the problem of antibiotic resistance and unnecessarily exposes patients to risk of adverse effects.[8]

The present study was undertaken to establish which proportion of our children with an initial diagnosis of "No pneumonia" later progress to pneumonia during the same illness.

Material and Methods

This Study was conducted in the Outpatients Department of Children Hospital, Pakistan Institute of Medical Sciences (PIMS), Islamabad from November 2008 to March 2009.

969 children with a diagnosis of "No Pneumonia" according to the WHO and IMCI guidelines for pneumonia were enrolled in the study. Sampling was done with non probability convenience sampling technique. The patients were screened by a physician trained in IMCI screening methodology for pneumonia. Patient data and clinical findings were recorded on a proforma. Addresses and telephone numbers of all enrolled children were noted and they were called for a follow-up reassessment after two days, or early if they developed fast breathing (A respiratory rate of 50 or more breaths per minute in children 2 months to less than 12 months and 40 or more breaths per minute in children aged 12 months to 59 months- these children are classified as Pneumonia) or, lower chest in drawing, became sicker or developed general danger signs of inability to drink, lethargy/ abnormally sleepy, Strider when calm or convulsions, (such children are classified as Severe pneumonia or very severe disease as per IMCI Guidelines).

On Follow-up after two days the children were again assessed for pneumonia according to IMCI guidelines. Those who developed severe pneumonia were to be admitted; those with pneumonia were prescribed appropriate oral antibiotics for home treatment of pneumonia while those with "No Pneumonia" were given cough and cold remedies and sent home.

The patients were grouped as group I with age range of 2 months to < 12 months and Group II with age range of 12 months to 59 months. The purpose of this grouping was to see if age was a risk factor in the development of pneumonia.

The Data were recorded and analyzed using EPI INFO ver. 6.4, statistical software for data recording and analysis, developed by Center for Disease Control (CDC), Atlanta USA.

Results

A total of 969 patients with a diagnosis of 'No pneumonia" were initially enrolled, however 129 were lost to follow-up for reassessment after 2 days. Therefore 840 patients could be further. The age range was 2 months to 59 months with a mean of 13.783 (±12.06) months. There were 497 (59.16%) patients in group I and 343 (40.83%) in group II. 539 (64.2%) were male and 301 (35.8%) were female. Their duration of illness ranged from one day to 20 days with a mean of 4.5 (±3.10) days.

The demographic indicators of patients are presented in table I. Symptomtology is presented in table II.

Table I : Demographic Indicators (n=840)

Variables	Number (%) (±SD)
Age (months)	13.783 (±12.06)
Male	539 (64.2%)
Female	301 (35.8%)
Duration of illness (days)	4.5 (±3.10)
Weight in Kg	7.9 (±2.5)
Height in cm	70.8 (±12.3)
Nutritional status	
Normal	630 (75%)
Grade I malnutrition	112 (13.3%)
Grade II malnutrition	70 (8.3%)
Grade III malnutrition	28 (3.3%)

On follow-up after 2 days, 112 (13.33%) patients were found to have progressed to pneumonia i.e. fast breathing with a respiratory rate of 50 or more breaths per minute in children 2 months to less than 12 months and 40 or more breaths per minute in children aged 12 months to 59 months. No patients were found to be in the category of severe pneumonia, i.e. presence of chest in-drawing, strider or danger signs.

Age less than 12 months, clinically severe malnutrition and lack of breastfeeding were found to be risk factors for development of pneumonia.

Table II: Clinical Symptoms (n= 840)

Positive variables in patients	Number (%)
Fever	833 (99.2%)
Cough	840 (100%)
Vomiting	196 (21.7%)
Diarrhoea	154 (18.3%)
Breast feeding	546 (65%)
History of wheeze	77 (9.2%)
Immunization up to date	623 (74.2%)

Discussion

The patients we studied with acute respiratory infections constituted significant proportion of the total patients attending our outdoor department. The incidence of acute respiratory infections and pneumonia is reported to be most strongly and consistently associated with young age, with the highest reported rates in children aged 2-6 months.[9, 10] One study suggests that world wide, most episodes (>95%) of early childhood pneumonia in children aged 0-4 years occur in developing countries, at an incidence rate of 0.28 episodes per year.[11] Other factors associated with pneumonia include male gender,[10] Malnutrition,[12,13] micronutrient deficiency,[14,15] low immunization coverage,[16,17] low household income,[18] overcrowding,[19] poor breast feeding practices,[20,21] and exposure to indoor air pollution.[22,23]

In our study a significant proportion of children diagnosed with "No pneumonia" progressed to develop pneumonia. Acute respiratory infections manifesting with cough and/or difficult breathing without elevation of respiratory rate are classified as 'No pneumonia" according to IMCI classification. However, some of these patients seem to progress to involvement of lower respiratory tract i.e. pneumonia. A review of literature could not find any local study, which endeavored to determine what percentage of "No pneumonia cases" progressed to pneumonia at follow-up after two days, however a few published studies determining pneumonia rates in the population were available. In 2002 a study of children aged 2-59 months in Karachi found low pneumonia rates (8.2 per 100 child years of observation) but the study was limited by small proportion of cases that presented at study clinics.[24] Another study conducted in Gilgit estimated pneumonia incidence rates per 100 child years of observations as 29.9 for pneumonia and 8.1 for severe pneumonia.[25]

In our study the "No pneumonia" cases that progressed to develop pneumonia, did so within 72 hours of initial visit to hospital. We found a strong relationship of development of pneumonia with young age (less than 12 months), clinically severe under nutrition and lack of breast-feeding, which is in conformity with previously conducted studies as discussed above. No statistically significant relationship could be established with immunization status or low household income.

Our study has limitations. We did not assess a relationship of the illness with overcrowding and exposure to environmental pollutants.

Our study reemphasizes the fact that follows up visit of patients with "No pneumonia" after two days is very important as regards case detection of pneumonia.

Conclusion

A significant proportion of children diagnosed with "No pneumonia" progress to develop pneumonia. Age < 12 months, clinically severe malnutrition and lack of breast feeding are important risk factors for the development of pneumonia in these children.

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