

## Frequency of Risk Factors Associated with Community-Acquired Pneumonia in Infant - A Suburban Tertiary Care Hospital Survey

MAVRAH ZAFAR<sup>1</sup>, MAHAM UMAIR KHAN<sup>3</sup>, ANEELA ZAREEN<sup>3</sup>, GULFREEN WAHEED<sup>4</sup>

### ABSTRACT

**Aim:** To determine the frequency of risk factors like improper vaccination and low birth weight associated with community-acquired pneumonia in infant, secondary objective was to determine the seasonal trend in the community-acquired pneumonia (CAP) in infant

**Methodology:** A cross sectional survey was conducted from Nov1<sup>st</sup>, 2014 to Oct 31<sup>st</sup>, 2015 in the Department of Pediatrics, Avicenna Teaching Hospital, Lahore. In it consecutively, infants, both male and female, fulfilling World Health Organization criteria for pneumonia (cough or difficulty in breathing, and tachypnea for <7 days) aged between 28 days to one year were enrolled.

Data was entered and analyzed using SPSS 21. Frequency and percentages were given for categorical data like appropriate birth weight, vaccination status etc. and numeric data like age, duration of hospital stay was presented in mean±SD.

**Results:** According to the survey, 67(38.5%) infants were breast fed, 76(43.7%) were taking formula milk or solid food and 31(17.8%) were taking solid food/formula milk with breastfeeding. Similarly 48(27.6%) have been vaccinated properly with pneumococcal vaccine, 79(45.4%) were not vaccinated and 47(27%) did not take vaccination according to the recommended schedule. In infants with community acquired pneumonia most of the infants i.e., 142(81.6%) were with appropriate birth weight where as 30(17.8%) were with low birth weight and 1(0.6%) was with large birth weight. 97(55.7%) of the infant's parents were illiterate.

**Conclusion:** Form the study it is found that formula milk feed, improper vaccination and monsoon season followed by winter season are the risk factors of community acquired pneumonia in infants. Whereas preterm or low birth weight is not a risk factor for the CAP.

**Keywords:** Community acquired pneumonia, Risk factors, Low birth weight, Vaccination, winter

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### INTRODUCTION

Pneumonia due to bacterial infections is known as community acquired pneumonia under 2012 ICD-9-CM Diagnosis Code 486<sup>1</sup>. Globally 81% of deaths during first two year of life are due topneumonia<sup>2</sup> and 97% of these mortalities are occurring in developing countries<sup>(3)</sup>. Community acquired pneumonia is one of the common and serious infections in western countries as well and it is documented that in neonates, and infants younger than three months, pneumonia is caused by infection which is usually received from the mother<sup>4</sup>.

In Pakistan most of the infants admitted in hospitals, usually have low birth weight and present with infectious diseases. And among the infectious diseases, after septicemia, pneumonia is the most frequent infectious disease<sup>5</sup>. Similarly risks of respiratory infections are more common in preterm

Infants as compared to term infants<sup>6</sup>.

The rationale of the study was to determine the frequency of risk factors, especially low birth weight, improper vaccination and seasonal variation, associated with community acquired pneumonia in Pakistan. Determination of risk factors of CAP is important for its prevention, early diagnosis and treatment and this work will be served as base line study for further research.

### SUBJECTS AND METHODOLOGY

A cross sectional survey was conducted from November 1<sup>st</sup>, 2014 to October 31<sup>st</sup>, 2015 in the Department of Pediatrics, Avicenna Medical College and Hospital, Lahore. In it consecutively, infants, both male and female, fulfilling World Health Organization (WHO) criteria for pneumonia (cough, difficulty in breathing, and tachypnea for <7 days) aged between 28 days to one year were enrolled.

Data was entered and analyzed using SPSS 21. Frequency and percentages were given for categorical data like appropriate birth weight, vaccination status etc. and numeric data like age, duration of hospital stay was presented in mean±SD.

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<sup>1</sup>Registrar, Dept of Pediatrics, Avicenna Medical College, Lahore.

<sup>2</sup>Registrar, Dept of Medicine, Avicenna Medical College, Lahore.

<sup>3</sup>Assistant Professor, Department of Pediatrics, Avicenna Medical College, Lahore.

<sup>4</sup>Professor, Obs. & Gynae, Avicenna Medical College, Lahore.

Correspondence to Dr. Mavrah Zafar

Email: mavrahzafar29@gmail.com

## RESULTS

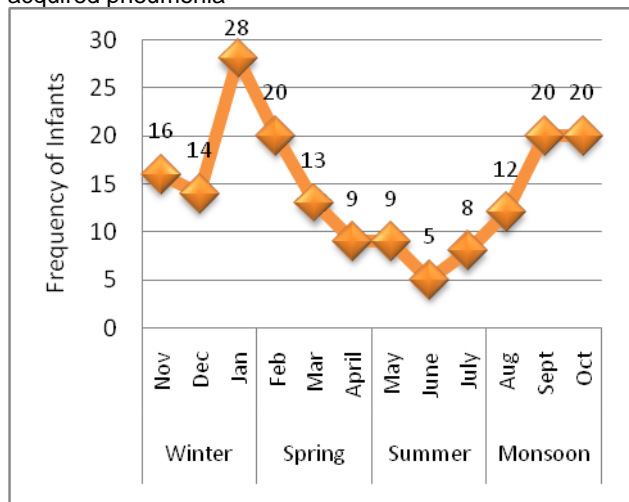
In this study 174 subjects were selected, among them 77(44.3%) were boys and 97(55.7%) were girls. The mean age of boys was 6.913±0.32 months and mean age of girls was 6.201±0.31months.

Table1: Frequency distribution of infants according to risk factors

	Yes	No	Other
Appropriate birth weight	142 (81.6%)	31 (18.4%)	
Pneumococcal conjugate vaccine	48 (27.6%)	79 (45.4%)	4 (27%)
Upper respiratory tract infection	59 (33.9%)	115 (66.1%)	
Breast feeding	67 (38.5%)	76 (43.7%)	31 (17.8%)
Parent literacy	77(44.3%)	97(55.7%)	

In this study it was observed that 67(38.5%) infants were breast fed, 76(43.7%) were taking formula milk or solid food and 31(17.8%) were taking solid food/formula milk with breastfeeding. Similarly 48(27.6%) had been vaccinated properly with Pneumococcal Conjugate Vaccine in three doses at 6 weeks, 10 weeks and 14 weeks. 79(45.4%) infants were not vaccine and 47(27%) did not take the pneumococcal vaccine properly or according to the recommended schedule. In infants with community acquired pneumonia most of the infants, 142(81.6%) were with appropriate birth weight where as 30(17.8%) were with low birth weight and 1(0.6%) was with large birth weight. The parents of 97(55.7%) of the infants were illiterate.

Fig.1: Monthly frequency distribution of community acquired pneumonia



It was observed that in monsoon season the frequency of the infants with pneumonia starts increasing and in winter season the incidence reaches on its peak.

## DISCUSSION

According to WHO, Pneumonia and Diarrhea are the commonest causes of infant mortality in world. There are many risk factors of Community-acquired Pneumonia in the literature such as malnutrition, over-crowding, low birth weight, HIV and the lack of pneumococcal immunisation.

The interest in the current study was to determine the role of low birth weight, seasonal effects and proper vaccination in infants with Pneumococcal Conjugate Vaccine according to the recommended schedule. In Pakistan the vaccination against Pneumonia is done according to the Expanded Programme of Immunization (EPI) with Pneumococcal Conjugate Vaccine which is administered in infants at 6<sup>th</sup>, 10<sup>th</sup>, 14<sup>th</sup> weeks of age<sup>7</sup>.

In this study it was found that male to female ratio was 1:1.25. And overall the mean age of the infants were 6 weeks. Infants who were vaccinated for pneumonia and those who were not vaccinated had no statistical significant age difference. Whereas, it is generally considered that the non-vaccinated infants are at more risk than the vaccinated ones. Recently, it has been reported that sometimes pneumonia is acquired from the hospitals, in neonates it could be acquired from the ventilator or through eternal feeding<sup>7,8</sup> and in infants aged more than 28 days it is acquired after 48 hours of admission while they were not diagnosed as pneumonia before admission. The reported reasons for this were long stay on mechanical ventilator, gastric tube usage and sedative and analgesic use<sup>9</sup>. In our study population co-morbidities were present in only 4(2.29%) infants and two of them were with cerebral palsy and the other two were having congenital heart disease.

There are many risk factors but a study conducted in India has reported that solid fuel like wood and coal usage is also a risk factor for indoor air pollution leading to pneumonia in infants aged between 2-35 months<sup>10</sup>. In rural areas of Pakistan, in winter seasons houses are kept warm by burning coal or solid fuels indoors. Similarly, another study reveals that environmental tobacco smoke is also a strong risk factor for serious respiratory syncytial virus (RSV) infection<sup>11</sup>. In our study, in more than 33% of the infants, upper respiratory tract infection was documented. So, this could be taken as an important risk factor in infants with community acquired pneumonia (CAP).

The infants who are not breast fed by their mother are at greater risk of acquiring CAP than the infants who are breast fed<sup>12</sup>. It is generally thought that the preterm and low birth weight infants are at more risk to morbidity and mortality<sup>13</sup> but in this study, it was found that CAP was present in appropriate birth weight infants (81.6%) and those who were not breast fed by mothers(p-value 0.047). It is an established fact that maternal breast feeding enhances the immunity in infants<sup>13</sup>. It is also documented in a recent study that the risk of pneumonia in term babies was 3.6 times higher than in preterm babies<sup>6</sup>. Our study also supports these results.

Although, Community-acquired Pneumonia is associated with complications like bacteremia, lung abscess and pleural effusion, but immunization against pneumonia, early diagnosis and treatment with effective antibiotics used in adequate doses for an appropriate duration results in reduced morbidity and mortality<sup>14</sup>. In our study, 27.6% infants were admitted with CAP despite being vaccinated by Pneumococcal Conjugated Vaccine, this could be due to infection with atypical bacteria like *Mycoplasma pneumoniae* and *Chlamydia pneumoniae* which are reported as etiological agents of mild to moderate CAP requiring hospitalisation<sup>15</sup>. The study has limitation that is based on the patients admitted in a single suburban tertiary care hospital. Further research is needed to explore other risk factors and their relation to CAP.

## CONCLUSION

From the study it is found that formula milk feed, improper pneumococcal vaccination and monsoon season followed by winter season are the risk of community acquired pneumonia.

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