



A STUDY ON RISK FACTORS OF DEVELOPMENT OF PNEUMONIA

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ABSTRACT

**BACKGROUND:** Childhood pneumonia is the leading single cause of mortality in under five children. The incidence is estimated to be 0.29 episodes per child-year in developing and 0.05 episodes per child-year in developed countries. This translates into about 156 million new episodes each year worldwide, of which 151 million episodes are in the developing world. Of all community cases, 7–13% is severe enough to be life-threatening and require hospitalization. Substantial evidence revealed that the leading risk factors contributing to pneumonia incidence are lack of exclusive breastfeeding, under nutrition, indoor air pollution, low birth weight, crowding and lack of measles and pertussis immunization.

**MATERIAL AND METHODS:** It was a prospective study and data was collected from 200 children hospitalized in a tertiary care hospital aged >28 days to 5 yrs over a period of 1 year.

**RESULTS:** Higher incidence of pneumonia was found in increasing birth order. Lack of exclusive breastfeeding and severe malnutrition PEM-III were significant risk factors for pneumonia (p value 0.02, 0.005). Passive smoking is directly associated with occurrence of pneumonia in children (p value 0.04). Illiteracy is also associated with pneumonia. The association of chullah smoking is equally strong (p value 0.03). Pallor is directly associated with pneumonia, lesser the hemoglobin more is the chance of pneumonia (p value 0.12).

**CONCLUSION:** Despite the lack of data, mainly for the developing regions of the world, morbidity and mortality estimates and the main risk factors presented in this review could contribute to an understanding of the burden of pneumonia in children aged less than 5 years in developing countries and to informed care and vaccine policy.

KEYWORDS :

INTRODUCTION:

Pneumonia was first described by Hippocrates. (460–370 BC). Pneumonia is an acute infection of lung tissue (alveoli). Pneumonia is one of the main focus ARI preventing and controlling program.

Acute respiratory infections caused 4 million child deaths each year – 2.6 million in infants (0–1 years) and 1.4 million in children aged 1–4 years. Pneumonia is the leading cause of morbidity and mortality in Under Five year children. The WHO incidence is 0.37 episodes/child/year. India accounts for 36% of deaths of under five years due to Pneumonia. Over one million children will die before their fifth birthday, nearly all of which are preventable. Childhood clinical pneumonia is caused by a combination of exposure to risk factors related to the host, the environment and infection. Streptococcus pneumonia and Haemophilus influenza are the main bacterial causes of pneumonia. Therefore, no single intervention can effectively prevent, treat, or control pneumonia may help in decreasing the incidence of pneumonia.

Pneumonia has a great burden of morbidity and mortality in developing countries, which results in economic and social pressures on families and the country as a whole.

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| Risk factors that affect incidence of childhood clinical pneumonia in the community in developing countries |
| <b>Definite risk factors</b>  |
| Malnutrition (weight-for-age z-score < -2)  |
| Low birth weight (< 2500 g)   |
| Non-exclusive breastfeeding   |
| Lack of measles immunization (within the first 12 months of life)   |
| Indoor air pollution  |
| Crowding  |
| <b>Likely risk factors</b>  |
| Parental smoking  |
| Zinc deficiency   |
| Mother's experience as a caregiver  |

|  |
|--|
| Concomitant diseases (e.g. diarrhoea, heart disease, asthma) |
| <b>Possible risk factors</b>                                 |
| Mother's education   |
| Day-care attendance  |
| High altitude (cold air)                                     |
| Vitamin A deficiency   |
| Birth order  |
| Outdoor air pollution  |

AIMS AND OBJECTIVES:

To study risk factors of development of pneumonia.

MATERIALS AND METHODOLOGY:

INCLUSION CRITERIA:

- Hospitalized Patients with fever, cough
- +/-respiratory distress of less than 14 days
- Patients having radiological evidence of pneumonia

EXCLUSION CRITERIA:

- Patients with,
- multi organ dysfunction syndrome
  - Congenital anomalies of thorax and lung
  - persistent pneumonia
  - ventilator associated pneumonia
  - PLHIV

Pneumonia was defined according to clinical signs or radiological findings. Classification of severity of pneumonia was based on the guidelines of IMNCI. Age-specific respiratory rate cut offs for tachypnea were based on values given by WHO.

Pre-formed proforma were filled up consisting of demographic data and present hospitalization details.

Statistical analysis was performed and difference in proportion were assessed by the Pearson Chi square test.

**RESULTS AND ANALYSIS:**

|                                     |            | Chest X-ray Abnormal (%) | Chest X-ray normal | Total | <i>p value</i> |
|-------------------------------------|------------|--------------------------|--------------------|-------|----------------|
| Birth Order<br>(n=200)              | 1          | 28(14)                   | 41(20.5)           | 69    | 0.9            |
|                                     | 2          | 38(19)                   | 44(22)             | 82    |                |
|                                     | 3          | 15(7.5)                  | 20(10)             | 35    |                |
|                                     | >4         | 08(4)                    | 6(3)               | 14    |                |
| PEM GRAPDE<br>PEM Grade<br>(n=200)  | I          | 53(26.5)                 | 20(10)             | 73    | 0.02           |
|                                     | II         | 14(7)                    | 6(3)               | 20    |                |
|                                     | III        | 63(31.5)                 | 18(9)              | 81    |                |
|                                     | IV         | 12(6)                    | 14(7)              | 26    |                |
| Exclusive Breast feeding<br>(n=200) | YES        | 33(16.5)                 | 56(28)             | 89    | 0.005          |
|                                     | NO         | 78(39)                   | 33(16.5)           | 111   |                |
| Measles Immunization<br>(n=117)     | Taken      | 45(38.5)                 | 47(40)             | 92    | 0.18           |
|                                     | Not taken  | 16(13.7)                 | 9(7.8)             | 25    |                |
| Immunization<br>(n=200)             | Complete   | 39(19.5)                 | 50(25)             | 89    | <0.05          |
|                                     | Incomplete | 91(45.5)                 | 20(10)             | 111   |                |
| Maternal Education(n=200)           | Illiterate | 114(57)                  | 11(5.5)            | 125   | 0.31           |
|                                     | Literate   | 65(32.5)                 | 10(5)              | 75    |                |
| Air pollution<br>(n=200)            | Yes        | 142(71)                  | 2(1)               | 144   | 0.04           |
|                                     | No         | 37(18.5)                 | 19(9.5)            | 56    |                |
| Chullah smoking<br>(n=200)          | Yes        | 145(72.5)                | 5(2.5)             | 150   | 0.03           |
|                                     | No         | 34(17)                   | 16(8)              | 50    |                |
| Pallor<br>(n=200)                   | Yes        | 123(61)                  | 18(9)              | 141   | 0.12           |
|                                     | No         | 56(28)                   | 3(2)               | 59    |                |

In present study, higher incidence of pneumonia was found in increasing birth order. Malnutrition and lack of exclusive breastfeeding was statistically significant association with occurrence of pneumonia (*p* value 0.02, *p* value 0.005). They were independent risk factors for pneumonia. Exclusive breastfeeding has multiple positive effects such as nutritional benefits and allows the mother to pass on key components of her immune system to her child to strengthen the infant's immunity, thereby protecting infants from pneumonia, diarrhoea, and other infections.

Immunization was statistically significant association with occurrence of pneumonia. This was independent of maternal age or education. Awareness of mothers leading to early identification of illness probably avoids severe illness.

Passive smoking and chullah smoking is statistically significant association with occurrence of pneumonia. Use of biomass fuels (wood, crop-residues, animal dung), coal and other media (kerosene) are predominant contributors to indoor air pollution.

Pallor is directly associated with pneumonia, lesser the hemoglobin more is the chance of pneumonia (*p* value 0.12).

**CONCLUSION:**

As per present study, Lack of exclusive breastfeeding till 6 months, severe malnutrition, immunization, air pollution and passive smoking were found to be statistically significant modifiable risk factors in causing pneumonia, whereas Birth order, maternal education were found to be statistically insignificant.

Key interventions to control pneumonia would include promotion of exclusive breastfeeding in first six months and appropriate nutritional supplements immunization against specific pathogens, early diagnosis and treatment of the disease, and improvements in environmental living conditions (e.g. safe drinking water, sanitation, hygiene, low household air pollution).

Pneumonia prevention is not only about saving the lives of children, but it is also about preventing illness, hospita-

lization, and related economic costs.

Apart from health facility based intervention, community based actions should be taken in form of increasing female literacy, health education, women empowerment and gender equality.

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