

## A Comparative Research to Examine the Risk Variables for Pediatric Patients Hospitalized with Community Acquired Pneumonia at Darbhanga Medical College

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### Abstract

**Aim:** Comparative study to evaluate the risk factors for patients admitted with community acquired pneumonia in Pediatric patients.

**Methods:** Patients of Community- Acquired Pneumonia aged 2 months upto 5 years of age who were admitted to the Paediatrics department were taken as cases (N=100). Controls (N=100) taken from healthy children between the ages of 2 months upto 5 years of age of age visiting the Department of Paediatrics, Darbhanga Medical College and Hospital, Laheriasarai, Darbhanga, Bihar, India. All the cases of community-acquired Pneumonia aged 2 months upto 5 years of age who were admitted to the Paediatric department were included in this study.

**Results:** In the present study, 60% of males were infected with CAP in contrast to 40% of females. The majority of the cases (75%) belonged to the urban locality. Lower socioeconomic status, lower maternal and paternal education, overcrowding and indoor air pollution were associated with CAP. In our study, 47% of the cases and only 11% of the control have a history of LRTI/ asthma/ allergy/ rhinitis/ CHD/ diarrhea in the last 3 months that was statistically significant. In our study, 17 % of cases have a family history of Asthma/Allergy/TB/Rhinitis in comparison to 5% in the controls. In the present study, 28% of the cases of CAP were incompletely immunized in contrast to 6% in the controls. In the present study among those who were previously treated 80% landed up with severe pneumonia in comparison to 50% in those who presented directly

**Conclusion:** Concentrated efforts are needed to strengthen the health facilities and immunization coverage in the population. Public awareness should also be increased to improve the better utilisation of available resources. Improving the socio-economical status of people are welcome, this can take a long time to bear fruit.

**Keywords:** Children 2 months upto 5 years of age, Community-acquired pneumonia, Risk factors

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## Introduction

Pneumonia is an acute inflammation of the pulmonary parenchyma that can be caused by various infective and non-infective origins, presenting with physical and radiological features compatible with pulmonary consolidation of a part or parts of one or both lungs.[1]

Community acquired pneumonia is an acute illness acquired in the community with symptoms suggestive of LRTI (lower respiratory tract infection), together with presence of a chest radiograph of intra pulmonary shadowing which is likely to be new and has no clear alternative cause.[1,2]

Pneumonia is one of the leading causes of death and morbidity, both in developing and developed countries and is the commonest cause of hospitalization in adults and children.[3] It is estimated that India together with Bangladesh, Indonesia and Nepal account for 40% of global acute respiratory infection; 90% of mortality is due to pneumonia, mostly bacterial in origin.[4] Community Acquired Pneumonia is a common disease with an incidence of about 20%-30% in developing countries to an incidence of 3-4% in developed countries. In the assessment and management of Community Acquired Pneumonia [CAP], disease assessment is crucial, guiding therapeutic options. Knowledge of relevant prognostic factors might be useful for early identification of patients at high risk requiring intensive care treatment. Even though most of the burden in terms of mortality and morbidity occurs in the developing world, little studies have been done to know the factors associated with an adverse prognosis in CAP in this region. Little information is available from India regarding prognostic factors in patients with community acquired pneumonia [CAP].

## Material and methods

This questionnaire-based case-control, comparative study was conducted in the Department of Pediatrics, Darbhanga medical college and Hospital, Laheriasarai, Darbhanga, Bihar, India, India. Patients of Community- Acquired Pneumonia aged 2 months upto 5 years of age who were admitted to the Paediatrics department were taken as cases (N=100). Controls (N=100) were taken from healthy children between the ages 2 months upto 5 years of age of age visiting the Department of Paediatrics, Darbhanga Medical College and Hospital, Laheriasarai, Darbhanga, Bihar, India, for the period of 2 years. All the cases of community-acquired Pneumonia aged 2 months upto 5 years of age who were admitted to the Paediatric department were included in this study.

### Inclusion criteria

As per WHO classification,

All patients with pneumonia and severe pneumonia aged 2 months upto 5 years of age requiring admission.

### Exclusion criteria

Infants aged less than 2 months, Children more than 5 years of age

Patients of WHO classified pneumonia as requiring admission but were denied by parents

Data collection procedure

Risk factors that were evaluated included demographic, socioeconomic variables, housing, significant past and family history, birth variables, nutritional variables, immunization, delayed presentation, and previous treatments.

### Results

In the present study, 60% of males were infected with CAP in contrast to 40% of females. The majority of the cases (75%) belonged to the urban locality. Lower socioeconomic status, lower maternal and paternal education, overcrowding and

indoor air pollution were associated with CAP. Basic sanitation facilities were found to be better in control groups. Birth order of 3 or more, vaginal, non-institutional, preterm deliveries, significant past and family history were significantly associated with CAP. Failure to exclusively breastfeed the baby for 6

months, bottle feeding, malnutrition and incomplete immunization were significantly associated with CAP. The severity of pneumonia was also analyzed in the present study for different risk factors. Delayed presentation and previous treatment were the two factors found to increase the severity of pneumonia.

**TABLE-1: Distribution of demographic variables**

Variable		CASE (%)	CONTROL (%)	CHI-SQUARE	p-VALUE
Age	<1yr	60(60)	63(63)	1.53	0.25 (NS)
	>1YR	40(40)	37(37)		
Gender	Male	70(70)	52(52)	12.505	0.0009 (HS)
	FEMALE	30(30)	48(48)		
Localit y	Rural	25(25)	14(14)	421	0.0001 (HS)
	URBAN	75(75)	86(86)		

**TABLE-2: Distribution of socioeconomic variables**

Variable		Case (%)	Control (%)	Chi-Square	P-Value
Socio Economic Class	Upper	0	0	75.9	0.0004 (HS)
	Upper Middle	19 (19)	43 (43)		
	Lower Middle	28 (28)	45 (45)		
	Upper Lower	52(52)	12(12)		
	Lower	3(1)	0		
Over Crowding	Present	60(60)	8(8)	122.549	0.0001 (HS)
	Absent	40(40)	92(92)		
Indoor Smoke	Present	445(45)	15(15)	53.539	0.0016 (HS)
	Absent	55(55)	85(85)		

**TABLE-3: Association of significant past history, family history with cap**

Variable		Case(%)	Control(%)	Chi-Square	P-Value
SIGNIFICANT PAST HISTORY	PRESENT	47(47)	11(11)	65.009	0.0016 (HS)
	ABSENT	57(57)	89(89)		
SIGNIFICANT FAMILY HISTORY	PRESENT	17(17)	5(5)	18.893	0.0000 (HS)
	ABSENT	83(83)	95(95)		

**TABLE-4: Association of nutrition and immunization with cap**

Variable		Case(%)	Control(%)	Chi-Square	P-Value
Ebf For 6 Months	Yes	62(62)	85(85)	28.096	0.0013 (HS)
	NO	38(38)	15(15)		
Weight For Age	>-2sd	50(50)	92(92)	124.017	0.0005 (HS)
	-2SD TO -3SD	24(24)	8(8)		
	<-3SD	26(26)	0		

Immunization	Complete	72(72)	94(94)	38.479	0.0001 (HS)
	INCOMPLETE	28(28)	6(6)		

## Discussion

Pneumonia in children under five years of age is a leading cause of morbidity and mortality in India and other developing countries.[5-7] Identifying risk factors for childhood pneumonia that are amenable to intervention is of public health importance. In our study, most of the cases were infants (60%), similar to Cunha et al 2000[8] which concluded lower age as a risk factor for developing pneumonia. This might be because in young children immunity is not well established, and also because of narrow airways, relatively short bronchial trees, and incomplete development of lungs.

Males outnumber the females in our study; this might be due to early reporting and hospitalization of a male child. In our study, 75% of the cases belonged to the urban locality. The presence of many comorbidities and disease history has been accepted as risk factors for CAP. Children who have a concomitant chronic illness may have their immunity lowered making them more susceptible to severe disease. In our study, 47% of the cases and only 11% of the control have a history of LRTI/asthma/ allergy/ rhinitis/ CHD/ diarrhea in the last 3 months that was statistically significant. In our study, 17 % of cases have a family history of Asthma/Allergy/TB/Rhinitis in comparison to 5% in the controls that were significant which is in concordance to Mahalanabis et al 2002[9] who concluded that history of asthma in siblings or family were 2.4 times more prone to develop pneumonia Somaya Aftab et al 2017[10] had concluded that the inability to initiate and continue exclusive breastfeed in the baby increases the risk of pneumonia. Similarly, In our study Failure to exclusively

breastfeed for 6 months has been shown to increase the risk of CAP.[11] In our study bottle feeding appears to increase the risk of CAP, as 51% of the cases were bottle-fed in comparison to 21% in control groups and this difference was found to be significant. C J Watkins 1979 reported fewer episodes of acute pneumonia in children who were breastfed than in children who were bottle-fed. [12] The synergism between malnutrition and pneumonia is well known. Our study also concludes weight for age less than -3SD as a risk factor for developing pneumonia.

Incomplete immunization had shown to be a risk factor for CAP. It has been an undisputed fact that childhood immunizations are protective against childhood illnesses. In the present study, 28% of the cases of CAP were incompletely immunized in contrast to 6% in the controls. Mahalanabis et al 2002 in Calcutta concluded that the poor economic status of parents was associated with a nearly fivefold increased risk of pneumonia.[9] Our study has also reproduced a similar result as around 52% of the cases belong to the lower or upper lower class in contrast to 12% in the control group. In our study lower educational status of parents was found to be associated with CAP. Roth DE et al 2008<sup>11</sup> also drew a similar association between the lower educational status of parents and the risk of pneumonia, hospitalizations, and mortality.

Studies from different parts of the world had reported indoor air pollution caused by indoor smoking and the use of biomass as a cooking fuel to increased respiratory morbidity in children.[13] The present study also concludes indoor air pollution as a risk factor for CAP. In our study, 45% of pneumonia cases were exposed to

indoor smoke in comparison to 15% in controls and this association was found to be significant.

The severity of pneumonia was also analyzed in the present study for different risk factors, only previous treatment and delayed presentation were the two factors found to increase the severity of pneumonia. In the present study among those who were previously treated 80% landed up with severe pneumonia in comparison to 50% in those who presented directly. Those who were previously treated might be severely ill from the start of the illness itself which can explain higher severity among the previously treated children. However, we did not have the details of their previous treatment which might have been inadequate. Somaya Aftab 2017[10] In their study also concluded that delay in presentation is a risk factor for complicated pneumonia.

### Conclusion

Concentrated efforts are needed to strengthen the health facilities and immunization coverage in the population. Public awareness should also be increased to improve the better utilisation of available resources. Improving the socio-economical status of people are welcome, this can take a long time to bear fruit.

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