



Received: 17-07-2024
Accepted: 27-08-2024

International Journal of Advanced Multidisciplinary Research and Studies

ISSN: 2583-049X

Risk factors of Community Acquired Pneumonia: A Cross-sectional study at Kushtia Medical College hospital

¹ Dr. Sabiha Akther, ² Dr. Masuda Parvin, ³ Dr. Farhana Rahman, ⁴ Dr. Mahbuba Tajmila, ⁵ Dr. Tasnia Mahmud
Evana

^{1,2,3} Assistant Professor, Department of Pediatrics, Kushtia Medical College, Kushtia, Bangladesh

⁴ Junior Consultant (Pediatrics), 250 Beded General Hospital, Meherpur, Bangladesh

⁵ MBBS (DU), CCD (BIRDEM), DMUD (Daffodil International University), DCP (AFIP), Consultant, Pathology, Testo Life Hospital, Dhaka, Bangladesh

DOI: <https://doi.org/10.62225/2583049X.2024.4.5.3201>

Corresponding Author: Dr. Sabiha Akther

Abstract

Community acquired pneumonia (CAP) a serious childhood clinical condition caused by bacteria, virus or fungi. It is promptly responsible for mortality and morbidity. The aim of the study is to evaluate the etiological factors of CAP patients. This study which was comparative cross-sectional, starting from at indoor and outdoor division of Paediatrics, Kushtia Medical College Hospital. In this study, 180 patients were enrolled. Among them, 90 respondents were suffering from CAP (case), on the other hand, 90 respondents were not suffering from pneumonia (control). It is found that, 46.1% respondents were less than 12 months. Among the respondents, 62.2% respondents were male. Out

of 180 respondents, 33 case (18.3%) respondents were completely immunized. In case of control respondents, more patients were completely immunized comparing to pneumonic patients. Majority of the patients (65.6%) didn't have positive history of previous hospitalization in due to any causes. In this clinical study, majority of cases underwent C/S procedure (37.2%) whereas, 44.4% cases had mature child-birth. To determine all the etiological factors causing CAP, it is a must to increase the clinical studies and raise social awareness against this public health life threatening problem.

Keywords: Immunization, Low Birth-Weight, Morbidity, Mortality, Major

Introduction

Community acquired pneumonia (CAP), a name of major life-threatening cause, is mostly dangerous in children. Nowadays, we are facing this common problem over the world, so it is becoming a common cause of discussion in public health. To reduce the economic burden, early diagnosis, finding the causes behind this problem and treatment according to the causes are very vital for recovery ^[1]. The increased prevalence rate of mortality and morbidity are frequently seen in the developing countries comparing to the developed countries, due to the delayed diagnosis and unsatisfactory treatment facilities ^[2].

Around the world, almost 156 million yearly new cases of pneumonia are diagnosed, among them, 61 million cases are found from the South East Asia Region (SEAR). Around 3.1 million annual death reports have been found from the SEAR countries. In spite of having limited clinical studies in this region, the approximate incidence of pneumonia is per episodes per child year, whereas the world average is 0.26 and the average for the developing countries 0.29 ^[3].

Common risk factors for this region includes malnutrition, Indoor air pollution, non-breast feeding, etc. In Asia-pacific region, Streptococcus Pneumoniae is one of the major threats for CAP. In spite of having some emergence of pneumococcal infections by non-vaccine types records, there is a hope of vaccination against pneumococci has brought a positive change in the declination of incidence rate of CAP ^[4].

Being 2nd most common causes of hospitalization for CAP. Smoking, in house air pollution for example, cooking by firewood, nearby brick-field, mosquito coils and others factors exaggerate these clinical conditions. CAP is very common in childhood; however, caesarean babies are more prone to this infection ^[5].

In case of clinical symptoms, typical and atypical pneumonia vary minorly from person to person. Fever, tachycardia, chills & sweats, cough with breathing difficulty & feeding difficulty are the common clinical manifestation of CAP, majority of

patients complain for cough [6].

To alter the increasing rate of mortality and morbidity of CAP in children, the early diagnosis and management is a must. The commonest complications of CAP are parapneumonic effusions and empyema. Hospitalization is advised by the physicians according to the patient’s clinical manifestations, complications and life-threatening risk factors. Previous clinical studies illustrated that, 30-50% of low-risk patients who got admitted into hospitals, have home management according to physician’s instructions. Moderate to high-risk patients, are suggested to be hospitalized due to their poor prognostic factors [7]. Combination of antibiotics are commonly used in the treatment of CAP [8].

Vaccination hugely reduces the burden of CAP over the world specially the developing countries like Bangladesh. Within 2017, 141 countries around the world, had got pneumococcal conjugate vaccine (PCV) [9]. In the year of 2009, Bangladesh introduced Hemophilus influenzae type b (Hib) conjugate vaccine. After Pakistan, Bangladesh becomes the 2nd country to introduce 10-valent PCV (PCV10) on a 6th, 10th, and 14th week schedule in Expanded Programme on Immunization (EPI) in the year of 2015 [8].

Material & Methods

This study which was comparative cross-sectional, starting from January 2023 to July 2023 at indoor and outdoor division of Paediatrics, Kushtia Medical College Hospital. In this study, 180 patients were enrolled. Among them, 90 respondents were suffering from CAP (case), on the other hand, 90 respondents were suffering from other than pneumonia, with clinical illness like fever, cold, skin problems and so on. Sampling was done by convenient technique.

Collecting all the information by using a data collection sheet which contained structured Questionnaire along with baseline, demographic and clinical data. Data were collected from the subjects after detecting patient clinical symptoms (fever, cough or difficult breathing, chest indrawing, fast breathing and radiological evidence of pneumonia). All information regarding clinical features were recorded in the information collection sheets with written consent from the respondents. Patients were suggested to do CBC and chest X-Ray.

All the information were entered in SPSS for analysis (version 25.0; IBM Corp). We performed frequency analysis as a descriptive analysis to observe the socio-demographic variables as well as clinical characteristics, immunization, birth history of the patients.

Inclusion Criteria:

1. Patients with CAP.
2. Patient clinical symptoms (fever, cough or difficult breathing, chest indrawing, fast breathing and radiological evidence of pneumonia).
3. Patient with written consent.

Exclusion Criteria:

1. Other respiratory illness.
2. Refuse to give consent.
3. Patient >11 years.

Results

Table 1 below showed socio-demographic characteristics of the respondents. It is found that, 46.1% respondents were less than 12 months. Majority of the pneumonia patients (43.3%) resided in rural areas of Bangladesh. On the other hand, 52.2% respondents live in high air pollution.

Table 1: Socio-demographic characteristics of the Respondents (N=180)

Age distribution of the respondents (Month)	Frequency (%)	
<12M	83(46.1%)	
12-24M	40 (22.2%)	
25-36M	20 (11.1%)	
37-48M	10 (5.6%)	
49-60M	14 (7.8%)	
>60M	13 (7.2%)	
Distribution of the respondents according to location	Case (Frequency)	Control (Frequency)
Rural	78 (43.3%)	62 (34.4%)
Urban	28 (15.6%)	12 (6.7%)
Distribution of the respondents according to presence of Air pollution	Frequency (%)	
High	94 (52.2%)	
Medium	58 (32.2%)	
Low	27 (15%)	

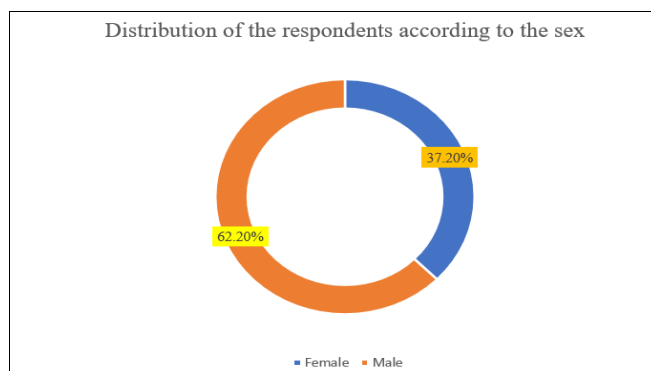


Fig 1: Distribution of the respondents according to sex (N=180)

Fig 1 resembles distribution of the respondents according to the sex. Here, we can see that, 62.2% respondents were male.

Table 2 illustrated distribution of respondents according to immunization. Out of 180 respondents, 33 case (18.3%) respondents were completely immunized. In case of control respondents, more patients were completely immunized comparing to pneumonic patients.

Table 2: Distribution of Respondents according to immunization (N=180)

Trait	Complete (Frequency)	Not immunized (Frequency)	Partially immunized (Frequency)
Case	33 (18.3%)	16 (8.8%)	41 (22.8%)
Control	63 (35%)	9 (5%)	18 (10%)

Table 3 showed birth history of the respondents. We have found that, majority of cases underwent C/S procedure (37.2%) whereas, 44.4% cases had mature child-birth.

Table 3: Birth History of the Respondents (N=180)

Distribution of the Respondents according to maturity during birth	Preterm	Term
Case	10 (5.5%)	80 (44.4%)
Control	15 (8.3%)	75 (41.7%)
Distribution of the Respondents according to birth procedure	C/S	NVD
Case	67 (37.2%)	23 (12.8%)
Control	50 (27.8%)	40 (22.2%)

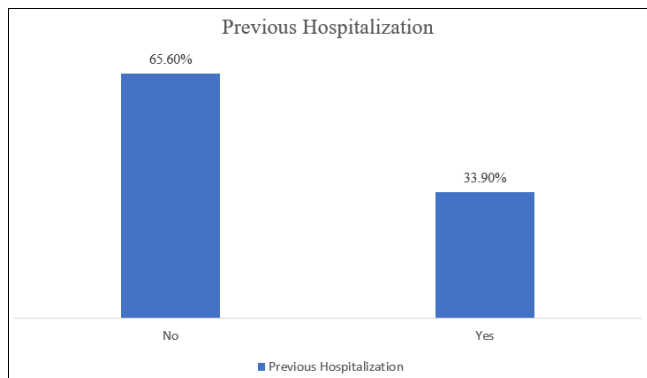


Fig 2: Previous hospitalization of the Respondents (N=180)

Fig 2 above illustrates previous hospitalization of the respondents. Majority of the patients (65.6%) didn't have positive history of previous hospitalization in due to any causes.

Table 4 showed feeding history of the respondents according to cases and controls. Among 180 respondents, 45.5% pneumonia cases had history of bottle feeding whereas, only 17 cases had history of breast feeding.

Table 4: Feeding history of the respondents (N=180)

Feeding method	Case (Frequency)	Control (Frequency)
Breast feeding	17 (9.4%)	72 (40%)
Bottle feeding	82 (45.5%)	9 (5%)

Table 5 illustrated clinical findings of respondents. In this clinical study, in CBC report, 57 case respondents had leukocytosis. On the other hand, 76 case respondents had homogenous opacity in CXR finding.

Table 5: Clinical findings of respondents

CBC findings			
Frequency	Leukocytosis	Neutrophilia	Normal
Case	57	30	3
CXR findings			
Frequency	Homogenous Opacity	Bilateral Pneumonia	Normal
Case	76	4	10

Discussion

Pneumonia is a potential lethal condition as well as a name of great threat of public health all over the world. In last two decades, the number of CAP cases is increasing in an alarming rate specially in children age group. For satisfactory prognosis, patient should be accurately diagnosed in time. Early diagnosis and proper treatment depend not only on the definite investigations, but also associating with the seriousness of clinical symptoms and co-morbidities [10].

In this was comparative cross-sectional study, 180 patients were enrolled. Among them, 90 respondents were suffering from CAP (case), on the other hand, 90 respondents were not suffering from pneumonia (control). Demographic and clinical manifestations were recorded for this clinical study. Several Asian study reports indicated that, the highest burden of CAP at 65/100 child-years were found <11 months of age group of children [11]. Similarly, in our study, majority (46.1%) respondents were less than 12 months. Presenting study resembles that, 62.20% respondents were male. Another Bangladeshi study also resembles that majority (21.5%) of the severe pneumonic patients were female comparing to male (19.1%) [12].

In case of vaccination, Bangladesh has touched the milestone that is, 97% vaccination coverage in 2018 according to the statistical data, thus the ultimate goal of mortality rate dropped down [13]. It has not only reduced the mortality rate, but also brought a positive change in cost effectiveness. In our present study, the patients who did not have pneumonia, were more completely immunized comparing to pneumonic patients.

There were six studies found in Nepal, Ethiopia, India, Tanzania, Brazil, and Egypt whereas, low-birth weight children were 1.96 times more prone to pneumonia comparing to normal birth weight children [14].

In this clinical study, in CBC report, 57 case respondents had leukocytosis whereas, only 19 control respondents had leukocytosis. There is an Indian study occurred in 2015-2016, revealed that, severe pneumonia patients had significantly more leukocytosis compared to pneumonia patients (78% versus 22%) [15]. On the other hand, 76 pneumonia patients had homogenous opacity in CXR finding. In previous studies conducted in 7 countries (Bangladesh, the Gambia, Kenya, Mali, South Africa, Thailand, and Zambia) resembles that 54% of CXRs were abnormal. Consolidation CXR was one of the main risks of increasing mortality [16].

Breast feeding plays an important role in reducing the overall mortality rate of CAP in children. In previous studies, pneumonia mortality was found higher among not breastfeed compared to exclusively breastfeed infants 0-5 months of age and among not breastfed compared to breastfed infants and young children 6-23 months of age [17].

Conclusion

In early age, pneumonia is a common scenario. In spite of being an alarming problem for public health experts, there is limitations of clinical studies due to lack of funds specially in developing countries like Bangladesh. To raise social awareness, we have to find out the exact etiological factors to prevent CAP in childhood age. Besides these clinical studies, increased immunization, breast feeding and declined rate of air pollution will also enhance the overall quality of life of these patients.

References

- Zar HJ, Andronikou S, Nicol MP. Advances in the diagnosis of pneumonia in children. *Bmj*, 2017, 358.
- Leung AK, Wong AH, Hon KL. Community-acquired pneumonia in children. *Recent patents on inflammation & allergy drug discovery*. 2018; 12(2):136-144.
- Ghimire M, Bhattacharya SK, Narain JP. Pneumonia in South-East Asia region: public health perspective.

- Indian Journal of Medical Research. 2012; 135(4):459-468.
4. Song JH, Huh K, Chung DR. Community-acquired pneumonia in the Asia-Pacific region. In *Seminars in Respiratory and Critical Care Medicine*. Thieme Medical Publishers. 2016; 37(6):839-854.
 5. Alterman N, Kurinczuk JJ, Quigley MA. Caesarean section and severe upper and lower respiratory tract infections during infancy: Evidence from two UK cohorts. *PLoS One*. 2021; 16(2):e0246832.
 6. Lamping DL, Schroter S, Marquis P, Marrel A, Duprat-Lomon I, Sagnier PP. The community-acquired pneumonia symptom questionnaire: a new, patient-based outcome measure to evaluate symptoms in patients with community-acquired pneumonia. *Chest*. 2002; 122(3):920-929.
 7. Halm EA, Teirstein AS. Management of community-acquired pneumonia. *New England Journal of Medicine*. 2002; 347(25):2039-2045.
 8. Chetty K, Thomson AH. Management of community-acquired pneumonia in children. *Pediatric Drugs*. 2007; 9:401-411.
 9. Wahl B, O'Brien KL, Greenbaum A, Majumder A, Liu L, Chu Y, *et al.* Burden of *Streptococcus pneumoniae* and *Haemophilus influenzae* type b disease in children in the era of conjugate vaccines: Global, regional, and national estimates for 2000-15. *The Lancet Global Health*. 2018; 6(7):e744-757.
 10. File TM. Community-acquired pneumonia. *The Lancet*. 2003; 362(9400):1991-2001.
 11. DeAntonio R, Yarzabal JP, Cruz JP, Schmidt JE, Kleijnen J. Epidemiology of community-acquired pneumonia and implications for vaccination of children living in developing and newly industrialized countries: A systematic literature review. *Human vaccines & immunotherapeutics*. 2016; 12(9):2422-2440.
 12. Naheed A, Breiman RF, Islam MS, Saha SK, Tabassum Naved R. Disparities by sex in care-seeking behaviors and treatment outcomes for pneumonia among children admitted to hospitals in Bangladesh. *PloS one*. 2019; 14(3):e0213238.
 13. Goodman D, Crocker ME, Pervaiz F, McCollum ED, Steenland K, Simkovich SM, *et al.* Challenges in the diagnosis of paediatric pneumonia in intervention field trials: recommendations from a pneumonia field trial working group. *The Lancet Respiratory Medicine*. 2019; 7(12):1068-1083.
 14. Karmany PA, Rahardjo SS, Murti B. Effect of Low Birth Weight on the Risk of Pneumonia in Children Under Five: Meta-Analysis. In *The International Conference on Public Health Proceeding 2020*; 5(1):106-106.
 15. Kasundriya SK, Dhaneria M, Mathur A, Pathak A. Incidence and risk factors for severe pneumonia in children hospitalized with pneumonia in Ujjain, India. *International journal of environmental research and public health*. 2020; 17(13):4637.
 16. Mahomed N. Diagnostic Utility of Chest X-rays in Childhood Community Acquired Pneumonia in the Era of Bacterial Conjugate Vaccines, Antiretroviral Therapy, Molecular Diagnostics and Computer Aided Diagnosis (Doctoral dissertation, University of the Witwatersrand, Faculty of Health Sciences), 2017.
 17. Lamberti LM, Zakarija-Grković I, Fischer Walker CL, Theodoratou E, Nair H, Campbell H, Black RE. Breastfeeding for reducing the risk of pneumonia morbidity and mortality in children under two: A systematic literature review and meta-analysis. *BMC Public Health*. 2013; 13(Suppl 3(Suppl 3):S18.