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Original Article

Clinical and Demographical Characteristics of Young Infant Pneumonia — Observations from a Tertiary Care Hospital

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ABSTRACT

Introduction: *Pneumonia remains a significant cause of morbidity and mortality among young infants, particularly in low- and middle-income countries. This study aims to explore the demographic and clinical characteristics of young infants diagnosed with pneumonia in a tertiary care hospital.* ***Methods & Naterials:*** *This prospective study was conducted at Dhaka Shishu Hospital, Dhaka, Bangladesh, from January 2019 to December 2020. Young infants with pneumonia admitted to Dhaka Shishu (Children) Hospital were considered as the study population. A total of 210 patients were included in this study by simple random sampling technique. Data were analyzed by Statistical Package for Social Science (SPSS 23.0).* ***Result:*** *The study examined 210 young infants with pneumonia, revealing a predominance of cases in the 29-59 day age group (53.3%), with a higher proportion of males (57.1%). Common clinical symptoms included difficulty in breathing (100%), inability to feed (81.9%), and fever (64.3%). Physical examination findings showed that most infants were dyspneic (95.2%), had severe chest indrawing (94.8%), and exhibited elevated body temperature (59.5%).* ***Conclusion:*** *This study provides important insights into the clinical and demographic profiles of young infants with pneumonia, shedding light on the disease's presentation in a tertiary care environment. The majority of the infants were aged 29-59 days, with a predominance of male subjects. The common clinical symptoms included difficulty in breathing, inability to feed, and fever, with respiratory distress being a hallmark feature of the condition.*

Keywords: *Pneumonia, Young Infant, Respiratory Distress, Tachypnea*

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INTRODUCTION

Pneumonia remains one of the leading causes of morbidity and mortality in young infants globally, particularly in developing countries where access to healthcare and timely intervention may be limited. It is a significant cause of hospitalization and death among infants under the age of one, accounting for a substantial proportion of childhood illnesses. According to the World Health Organization (WHO), pneumonia is the leading infectious cause of death in children under five years of age, with the majority of these deaths occurring in low- and middle-income countries (LMICs) [1]. Pneumonia in young infants is often categorized as either viral or bacterial in etiology, though mixed infections are also common [2]. The predominant causative organisms vary based on geographic location, with respiratory syncytial virus (RSV), influenza, and parainfluenza viruses being major contributors in many areas [3]. Bacterial pathogens such as *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Staphylococcus aureus* are also frequently identified in the etiology of pneumonia in infants, especially in severe cases that require hospitalization [4]. The presentation of pneumonia in young infants can be subtle and nonspecific, making diagnosis challenging. Symptoms such as fever, cough, difficulty breathing, poor feeding, and irritability can overlap with other common infantile illnesses, complicating the diagnostic process [5]. The clinical severity of pneumonia can vary widely, from mild cases that resolve with outpatient care to severe cases that require intensive medical intervention, including mechanical ventilation and intensive care unit (ICU) admission [6]. Factors such as the infant's age, nutritional status, and the presence of underlying comorbidities like congenital heart disease or prematurity can influence the course and outcome of pneumonia [7]. Infants with lower birth weight or those who are immunocompromised are particularly susceptible to severe forms of pneumonia, requiring early intervention and prolonged hospital care [8]. The demographic characteristics of infants hospitalized with pneumonia also reveal important patterns. Studies have shown that certain sociodemographic factors, including maternal education, socioeconomic status, and access to healthcare, can significantly impact the incidence and outcomes of pneumonia in young infants. In high-income countries, vaccination programs targeting pneumococcal and Haemophilus influenzae type b (Hib) infections have reduced the burden of bacterial pneumonia in infants, yet challenges persist, particularly in regions with low vaccination coverage [9]. Conversely, in LMICs, factors such as poor sanitation, malnutrition, and limited healthcare infrastructure contribute to a higher incidence of severe pneumonia and associated

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complications [10]. In addition to the direct clinical and demographic factors, seasonal variations also play a role in the incidence of pneumonia in young infants. Respiratory infections tend to increase during colder months, with winter and rainy seasons in certain regions correlating with a rise in cases of pneumonia, particularly viral pneumonia [11]. Furthermore, emerging threats such as antimicrobial resistance (AMR) are increasingly becoming a concern in the treatment of pneumonia in young infants. Overuse and misuse of antibiotics have led to the development of resistant strains of pathogens, complicating treatment regimens and leading to longer hospital stays and worse outcomes [12]. Given the complex nature of pneumonia in young infants, a multifaceted approach is necessary for prevention, diagnosis, and treatment. Interventions that improve maternal and child health, increase vaccination coverage, promote breastfeeding, and enhance access to healthcare services are critical in reducing the incidence of severe pneumonia in infants. Moreover, strengthening healthcare systems to support early diagnosis and timely treatment is essential to improving survival rates, particularly in resource-limited settings [13]. This study aims to contribute to the understanding of the clinical and demographic characteristics of young infant pneumonia by examining the epidemiological trends and clinical features observed in a tertiary care hospital setting.

METHODS & MATERIALS

This prospective study was conducted at Dhaka Shishu Hospital, Dhaka, Bangladesh, from January 2019 to December 2020. Young infants with pneumonia admitted to Dhaka Shishu (Children) Hospital were considered as the study population. A total of 210 patients were included in this study by simple random sampling technique. Patients with pneumonia meeting the inclusion and exclusion criteria were included in the study after proper informed written consent from the parents or local guardians. A standard questionnaire was designed to collect data from the respondents. Pneumonia was diagnosed by both clinical (fever, cough, difficulty in breathing, unable to feed, severe chest wall indrawing, tachypnea, grunting, crepitation over the lung fields on auscultation) and radiological (chest x-ray) evidence. All the data were entered into a personal computer and thoroughly checked for any possible errors and then processed and analyzed by Statistical Package for Social Science (SPSS 23.0). Data were expressed as numbers and percentages for categorical variables or mean and range (minimum and maximum) for quantitative variables. The results of the statistical analysis were presented in tables. The research protocol was approved by the Ethical Review Committee (ERC) of the Bangladesh Institute of Child Health (BICH), Dhaka.

Inclusion criteria:

- Age: Below 2 months (young infants)
- Gender: Both male and female
- Diagnosed as pneumonia
- Required hospitalization

Exclusion criteria:

- Young Infants with birth weight <2 kg
- Young Infants with congenital heart disease, heart failure, shock, meningitis
- Young Infants with complicated pneumonia (pleural effusion, empyema)
- Young Infants who require ICU care within 2 calendar days of hospitalization
- Young Infants who are referred to the hospital while already receiving antibiotics

RESULTS

Table I summarizes the demographic characteristics of the 210 subjects, showing a predominance of those aged 29-59 days (53.3%), with a mean age of 29.20 ± 16.82 days. Males constituted 57.1% of the sample, and the mean weight was 3.30 ± 0.87 kg. The average disease duration before admission was 3.07 ± 1.02 days, reflecting timely medical attention.

Table – I: Demographic characteristics of the studied subjects (*n*=210)

Variables	Number	Percentage (%)
Age (days)		
0 - 2	9	4.3
3 - 28	89	42.4
29 - 59	112	53.3
Mean ± SD	29.20 ± 16.82	
Gender		
Male	120	57.1
Female	90	42.9
Weight (kg) Mean± SD	3.30 ± 0.87	
Disease duration before admission (days) Mean± SD	3.07 ± 1.02	

Table II highlights the baseline clinical symptoms of the 210 subjects, with all presenting difficulty in breathing (100%). Other common symptoms included inability to feed (81.9%), fever (64.3%), and cough (41.0%), while less frequent symptoms were grunting (2.9%) and persistent vomiting (1.4%).

Table – II: Baseline Clinical Symptoms of the Studied Subjects (*n* = 210)

Symptoms	Number	Percentage (%)
Cough	86	41.0
Difficulty in breathing	210	100.0
Unable to feed	172	81.9
Persistent vomiting	3	1.4
Grunting	6	2.9
Fever	135	64.3

Table III summarizes the physical examination findings of the 210 subjects, with the majority presenting as dyspneic (95.2%) and showing severe chest indrawing (94.8%). Fever (temperature >100.4°F) was observed in 59.5% of cases, while grunting was rare (2.9%). The mean respiratory rate was 66.26 ± 3.52 breaths per minute, the mean heart rate was 137.86 ± 11.94 beats per minute, and the average SpO_2 was 93.81 ± 2.80%.

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Table – III: Physical Examination Findings of the Studied Subjects (*n* = 210)

Physical Examination Findings	Number	Percentage (%)
Appearance		
Normal	10	4.8
Dyspneic	200	95.2
Temperature (>100.4°F)	125	59.5
Grunting	6	2.9
Severe chest indrawing	199	94.8
Respiratory Rate (RR) (/min)	66.26 ± 3.52	
Heart Rate (HR) (/min)	137.86 ± 11.94	
SpO_2 (%)	93.81 ± 2.80	

Table IV presents the systemic examination findings of the 210 subjects, with all showing the normal position of the trachea, apex beat, and vesicular breath sounds. Added crepitations were found in 63.8% on the right, 19.5% on the left, and 16.7% in both lungs. Rhonchi was less common, with 3.3% on the right, 1.4% on the left, and 14.3% in both lungs.

Table – IV: Systemic Examination Findings of the Studied Subjects (*n* = 210)

Systemic Examination Findings	Number	Percentage (%)
Position of trachea (normal)	210	100.0
Apex beat (normal)	210	100.0
Breath sound (vesicular)	210	100.0
Added sound (crepitation)		
Right	134	63.8
Left	41	19.5
Both	35	16.7
Added sound (Rhonchi)		
Right	7	3.3
Left	3	1.4
Both	30	14.3

DISCUSSION

The demographic characteristics of the 210 infants included in this study reveal a mean age of 29.20 ± 16.82 days, with the majority of subjects being between 29 and 59 days old (53.3%). This finding aligns with previous studies, which suggest that pneumonia is most common in infants aged 1–2 months, a period when the immune system is still developing and when infants are more vulnerable to infections. Furthermore, males constituted 57.1% of the study population, a gender distribution consistent with other research indicating that male infants tend to have a higher incidence of pneumonia compared to females [14,15]. The average disease duration before admission was 3.07 ± 1.02 days, which suggests that most infants received timely medical attention. This is important, as early diagnosis and treatment of pneumonia can significantly reduce the risk of severe complications and mortality [16]. However, delayed recognition of symptoms and late presentation are common in resource-limited settings, which may contribute to poor outcomes. The fact that all infants in the study presented with difficulty in breathing is consistent with the hallmark feature of pneumonia, reflecting the severity of respiratory involvement in this population [17]. Baseline clinical symptoms such as fever, inability to feed, and cough were commonly reported in the study, with 64.3%, 81.9%, and 41.0% of infants presenting with these symptoms, respectively. Difficulty in breathing was reported in all subjects (100%), highlighting its critical role in the clinical assessment of pneumonia. Fever is a common sign of infection, and its prevalence in pneumonia cases is well-documented in the literature [8]. The inability to feed was another prominent symptom, which is frequently observed in young infants with pneumonia due to respiratory distress or generalized illness [18]. Physical examination findings further emphasized the severity of pneumonia in this cohort. Dyspnea was present in 95.2% of cases, while severe chest indrawing was observed in 94.8% of subjects. These signs are indicative of significant respiratory distress and are commonly seen in severe forms of pneumonia [19]. The prevalence of fever (>100.4°F) in 59.5% of the study population reflects the febrile response to infection and underscores the need for close monitoring of body temperature in infants with pneumonia. The mean respiratory rate (66.26 ± 3.52 breaths per minute) and heart rate (137.86 ± 11.94 beats per minute) also indicate a heightened physiological response to the infection. Tachypnea and tachycardia are often observed in infants with pneumonia and are useful indicators of the severity of respiratory distress [20,21]. The findings from the systemic examination were largely within normal limits, with all infants presenting with normal position of the trachea, apex beat, and vesicular breath sounds. The presence of added sounds, such as crepitations and rhonchi, was noted in a portion of the study population. Crepitations were more commonly heard on the right (63.8%), followed by both lungs (16.7%) and the left (19.5%). Rhonchi, a sign of airway obstruction due to mucus or inflammation, was less frequently observed. These added lung sounds are consistent with findings from other studies, which show that pneumonia often presents with crackles and wheezing due to airway involvement and inflammation [22]. The microbial etiology of pneumonia in young infants varies based on geography, immune status, and other risk factors. In this study, we did not focus on the specific microbial agents; however, studies indicate that respiratory viruses, such as respiratory syncytial virus (RSV), influenza, and parainfluenza, are the most common causes of pneumonia in infants under 2 months of age [23]. Bacterial pathogens such as *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Staphylococcus aureus* are also frequently implicated, especially in severe cases requiring hospitalization. Early and accurate identification of the causative organism is critical in guiding treatment and ensuring the appropriate use of antibiotics, particularly in resource-limited settings where laboratory diagnostics may not always be available [24]. The use of vaccines, such as the pneumococcal conjugate vaccine (PCV) and Haemophilus influenzae type b (Hib) vaccine, has led to a significant reduction in the incidence of bacterial pneumonia in some regions, particularly in high-income countries [25]. However, vaccination coverage remains a challenge in many low- and middle-income countries, where pneumonia remains a leading cause of death among young children [10].

Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

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CONCLUSION

This study provides important insights into the clinical and demographic profiles of young infants with pneumonia, shedding light on the disease's presentation in a tertiary care environment. The majority of the infants were aged 29-59 days, with a predominance of male subjects. The common clinical symptoms included difficulty in breathing, inability to feed, and fever, with respiratory distress being a hallmark feature of the condition.

RECOMMENDATION

It is recommended that healthcare providers in tertiary care settings maintain a high index of suspicion for pneumonia in young infants presenting with symptoms such as difficulty in breathing, inability to feed, and fever. Early identification and intervention are crucial to managing respiratory distress and preventing complications. Further studies with larger sample sizes and longitudinal follow-up are needed to explore the long-term outcomes and potential risk factors for pneumonia in young infants.

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