

Demographic Factors and Clinical Presentation of Children under 12 years Admitted With Pneumonia In Benazir Bhutto Hospital Rawalpindi, 2018

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Abstract

Background: The spectrum of respiratory illness is quite broad and encompasses diseases of upper and lower airways of both communicable and non-communicable types. Morbidity and mortality caused by lower respiratory tract infections is significantly high in children particularly in those younger than 5 years of age. Among these pneumonias, the most serious illness and can be difficult to diagnose and differentiate from clinically similar conditions due to inadequate radiologic and pathologic methods available, especially in resource poor countries.

Objective: The objective of current study is to explore the socio-demography and spectrum of clinical features at presentation of children from birth till 12 years of age, admitted with diagnosis of pneumonia at department of paediatrics BBH, district Rawalpindi.

Methods: This paper presented a prospective quantitative case study of community acquired pneumonia at Department of Paediatrics of Benazir Bhutto Hospital Rawalpindi for the year 2018. Applying purposeful/convenience sampling for every admitted case, of under 12 years children with diagnosis of Community acquired pneumonia, the children were subjected to a detailed history and clinical examination. The demographic profile and clinical features of each case were recorded on a study Performa. The data was entered in SPSS 24 and analysed for descriptive statistics. Chi Square test was applied to measure the association between clinical features at presentation. A p-value of less than 0.05 at 95% CI was considered significant.

Results: Out of 1287 patients that were admitted with possible diagnosis of pneumonia 60.2% were males while 39.8% were females with a ratio of 1.4:1. Community acquired pneumonia was found to be significantly more common in children of parents having low income levels, a private job and with less education background.

Pneumonia was significantly diagnosed more often in infants (1-12m) who made up 72.5% of total sample, (n=933). The commonest symptoms in all age groups were fever and cough, seen in 92.5% and 87% patients respectively. The next most common presenting feature was breathing difficulty in 40% and reluctance to feed/anorexia in 25% of patients. Among the clinical signs, chest in-drawings were observed in 90% and nasal flaring in 37% while crepitation were heard in 53% and wheeze in 9.4 % of cases. Out of 1287 cases, 8.70% children (n=112) died. Among all deaths, 80.3 % (n=90) occurred in the infant age group.

Conclusions: Respiratory illness is one of the commonest causes of admission in paediatric wards of a tertiary care hospital. Despite advancement in preventive and management strategies, broncho-pneumonia is still a serious respiratory disease and clinical presentation on admission is strongly related with a high likelihood of diagnosis of pneumonia in low resource settings.

Keywords: Demography, Clinical Presentation, Paediatric Pneumonia.

Introduction

Each year 5.4 million under 5 year old children die worldwide and more than 50% of these deaths are due to preventable causes mainly infections like pneumonia, diarrhoea and malaria¹. Recent era has shown a significant decline in childhood mortality but lower respiratory tract infections are still documented to be the number one killer in children aged younger than 5 years. Of all LRTI pneumonia alone was responsible for deaths of 880,000 children under the age of five years in 2017, accounting for 16.2% of all deaths in this age group². Pneumonia is a very frequently encountered childhood illness and is one of the most common cause of attendance and admission at health care facilities in resource poor countries, especially in Asia and Africa.³ Incidence of LRTIs and their associated mortality varies according to the age of the patient and ethnicity. The highest burden of disease is seen in younger age groups as 81% of total deaths from LRTI are documented in children below 2 years of age. Globally, a systematic review found Pneumonia as the leading cause of morbidity and mortality in children aged below 5 years.⁴

Pneumonia is defined as the inflammation of lung tissue caused by an infectious agent. Commonly practiced World Health Organization operational definition is based entirely on clinical features (cough or difficulty in breathing and tachypnoea). Etiological factors are variable and depend on the age of the patient, source of infection (community or hospital acquired pneumonia) as well as underlying host defects (e.g. immunodeficiency). Viruses are the most common causative agents in preschool children, although in several cases multiple infectious agents can be identified.⁵

In the developing countries, the term lower respiratory tract infection (LRTI) is commonly used instead of pneumonia, because of difficulties associated with radiological and pathological verification of clinical diagnosis. Despite the

advancement in diagnostic and treatment techniques and availability of new conjugate vaccines against pathogens like H. influenza and S. pneumonia the burden of disease in the paediatric population is still unacceptably high especially in developing countries which account for 99% of all pneumonia related deaths⁶

Materials and Methods

This prospective quantitative case study was done for a period of one year from January 2018 to December 2018. The study population consisted of all children under 12 years of age, who were admitted in Paediatric ward of Benazir Bhutto Hospital, Rawalpindi, either from OPD or emergency department, with a clinically diagnosed and /or radiologically confirmed cases of pneumonia. Applying purposeful/convenience sampling every case were subjected to a detailed history and clinical examination. The questionnaire containing identification, socio demographic status, and clinical profile at presentation was filled after taking written consent from the caregivers. Ethical approval was taken from the internal review board of the Rawalpindi Medical University. The detailed data on each case was recorded on excel sheets and descriptive analysis was done using SPSS 24. Chi Square test was applied to measure the association between clinical features at presentation. A p-value of less than 0.05 at 95% CI was considered significant.

Result

A total of 1,287 patients with diagnosis of pneumonia were enrolled in this study, where 39.8% were females and 60.2% males. In the present study, 72.5% cases of pneumonia occurred in infants (n=933), 18.5% between 1-5 years (n=240), while only 5.5 % (n=69) neonates were reported as having pneumonia. Table 1 shows the base line demographic characteristics of study population.

Table 1: Age and Gender

Base-line characteristics	Count (n=1287)	%
Age	< 1m	5.5
	1m-12m	72.5
	1y-5y	18.5
	> 5 y	3.5
Sex	Male	60.2
	Female	39.8
Birth history	Full Term	91.1
	Pre-term	8.08
	Post term	0.8
Mode of delivery	SVD	78
	LSCS	22
Cry after birth	Immediate cry	83.3
	Delayed cry	16.7
Breast feeding	Breast fed	92.4
	Never breast fed	7.6

The mode of delivery was mostly spontaneous vaginal delivery (SVD) i.e. 78% while 22% were delivered by lower segment caesarean section (LSCS). 91.1% (n=1173) children were born at full term, while 8% cases were born pre term. Regarding birth history, most of the children i.e. 83.5 % had immediate cry after birth whereas 16.7 % had a history of delayed cry. 92.4 % of study population received breast feeding for variable duration but a very small number of children 7.6% (n=97) were never breast fed.

Regarding the parental characteristics, pneumonia was found more commonly in children of parents having low educational background i.e. 57.4% parents had education levels of matriculation or less. 74% parents were employed in private job/businesses while 54.7% belonged to lower socioeconomic group.

The commonest symptoms in all age groups were fever and cough, seen in 92.5% and 87% patients respectively., which were most significantly common in children younger than one year (p < 0.05).

The next most common presenting feature was breathing difficulty in 40% and reluctance to feed/anorexia in 25% of patients. Among the clinical signs, chest in drawings were observed in 90% and nasal flaring in 37% while crepitations were heard in 53% and wheeze in 9.4 % cases. Wheeze was significantly observed in children less than one year.

Table 2: Parental Characteristics

Characteristics	Frequency (n)	Percentage(%)
Education years		

Middle or less	372	28.9
Matric	368	28.5
Intermediate	203	15.8
Bachelors	285	22.2
Masters and above	59	4.6
No of children		
1-2	759	59
3-4	374	29
> 5	154	12
Employment type		
Public/ Govt.	64	27.4
Private	170	72.2
Income level		
Lower class	704	54.75
Middle class	535	41.55
Upper class	48	3.70

Table 3: Spectrum of Clinical Features

Clinical features	Neonate n= 69	Infant n=939	Child n=240	Child n=45	Total (n=1287)	P-value
Mean RR	65	61	53	40	SD (7.86)	0.000
Fever	59	862	226	45	1192	0.031
Cough	44	845	205	25	1119	0.000
Nausea/vomiting	1	84	20	5	110	0.283
Reluctance to feed	20	260	39	9	328	0.007
Anorexia	58	303	139	16	516	0.000
Difficulty in breathing	50	895	198	16	1159	0.77
Lower chest in-drawings	33	345	83	09	470	0.005
Nasal flaring	8	113	24	07	152	0.217
Use of accessory muscles	89	93	91	95	SD (3.19)	0.000
Mean SPO ₂	3	22	14	07	46	0.000
Decreased air entry	28	513	124	17	682	0.021
Crepitation	10	90	20	04	124	0.021
Wheeze						

Discussion

CAP is not a simple disease to manage. To make an etiological diagnosis and initiate appropriate treatment accordingly is usually a challenging endeavour. Testing for causative agent in CAP is difficult as well as cumbersome due to the low yield of blood cultures, the difficulty in obtaining adequate sputum specimens and reluctance on the part of clinician to perform pulmonary aspirates and bronco-alveolar lavage in paediatric patients⁷. Clinical features and

presentations in children with respiratory problems are more often indicative of clinical diagnosis of pneumonia and its appropriate treatment.

This observational study on 1287 children with CAP was carried out to elucidate the clinical presentation of pneumonia in our setup which will help in determining future management practices.

The study identified a significant proportion of under-five pneumonia burden with male and female ratio of 1.4: 1. A study conducted on children hospitalized with pneumonia in Dhaulagiri Zonal Hospital of Nepal showed male to female ratio of 1.5:1 with a significant proportion of the under-five pneumonia burden⁸. Higher number of presentations of pneumonia cases among hospitalized male children than in female has been reported by the studies conducted in Bangladesh, where the male female ratios were 2:1 and 1.4:1 respectively⁹. This could also be due to higher incidence of care seeking for males as compared to female offspring, given the preference for male children in the south Asian regions.

The incidence of pneumonia was significantly high in infants as this age group accounted for 72.5% of the cases in our study and this high incidence shows a need to identify any risk factors in this specific population and it also corresponds to a study conducted in rural western region of Nepal by Amrit Banstola where 49% of the total pneumonia patients fell in the similar age range⁸.

The common symptoms of pneumonia, documented in our study were consistent with other studies. A study conducted by Shamoon et al between Aug 2002 and January 2003 in Amman showed that the most sensitive and specific clinical symptoms for predicting pneumonia in children were cough in 71%, fever in 70% and tachypnoea in 65% of the patients (10). Another study also documented cough as the commonest symptom at presentation in 76% followed by fever in 64% cases⁴.

Respiratory tract infections in early childhood can readily lead to respiratory distress and sometimes to severe dyspnoea, which requires hospitalization. The clinical signs required to classify the severity of the disease can be easily assessed with physical examination and should be recorded for all patients presenting with pneumonia symptoms at admission in any health facility, especially at tertiary care units or referral centres.¹¹ In addition to these clinical signs the children requiring immediate hospitalization are those having the World Health Organization suggested danger signs like drowsiness, feeding difficulties, vomiting and convulsions.

Although numerous guidelines exist regarding management of childhood pneumonia on an outpatient basis, there is paucity of data regarding hospitalized cases. Our study is an evidence-based approach attempting to evaluate demographic factors and analyse clinical features of hospitalized childhood pneumonia. Our data reproduces World Health Organization (WHO) data which highlights that a large number of hospitalized childhood respiratory cases are diagnosed as bacterial pneumonia. As it is very complex to establish etiology of a childhood CAP. Pneumonia is defined as infection of the lung parenchyma characterized by an inflammatory response and fluid-filled alveoli (alveolar exudates consisting of pus and cellular debris). This finding can be manifested as "crepitation", "crackle" or "rales" on clinical examination (auscultation) of the lungs. Laboratory findings along with a chest radiograph showing an evidence of consolidation is more likely a "bacterial" etiology versus a viral etiology. A definitive diagnosis can only be made when a bacterial pathogen is isolated from a sterile body fluid or site by culture or by Polymerase Chain Reaction (PCR). In severe cases, a bronchoscopy may be indicated. It is important to mention that sensitivity of a blood culture to yield a bacterial pathogen is estimated to be around 30 percent¹². This remains one of the limitations of our study that a "presumptive" diagnosis of a bacterial cause is based only on clinical examination finding of "crepitation" or "crackles" and not supported by laboratory or radiological evaluations. Since cost is the major hurdle in this case, this remains an item for discussion and improvement in our setup. Nevertheless, it is important to mention that viruses account for most cases of childhood CAP. Therefore, clinicians need to remain vigilant regarding unnecessary abuse of antibiotics in these children. Our finding that infants suffered higher morbidities (hypoxia) compared to their older counterparts is also consistent with data in literature (12) (13). Higher prevalence of wheezing in older children can be explained by higher level of exposure of these children to environmental triggers including passive smoke, outdoor allergens, and viruses. According to British Thoracic Society (BTS), pulse oximetry <92% suggests disease severity. As Lack of resources for radiological evaluation of pneumonia remains a challenge. It may be reasonable to recommend pulse oximetry over a chest radiograph for assessment of these high risk pneumonia cases in a cost-effective yet productive way.

It may be inferred that neonates are protected by passive immunities from their mothers up to 6 months of age; concerns with inadequate passive immunities may remain due to secondary immunodeficiency as a result of malnutrition in their mothers. Evidence exists regarding reduced placental transfer of Hib antibodies from malnourished mothers to their infants ¹⁴. As in our study the majority of the mothers belong to Low socio-economic statuses that may further add up to the chances of malnutrition. It has been reported that most mortality in pneumonia cases occurs post-hospital discharge at home. The outcome is even worse in the setting of an underlying malnutrition.

Criteria for physical assessment of paediatric community-acquired pneumonia include auscultation, respiratory rate, condition of respiratory assistance muscles and cyanosis. Recent studies have also described that respiratory rate, wheezing, chest in-drawings and SpO₂ at room air are all useful criteria for the assessment of respiratory status ¹⁵. In young children feeding difficulties are also an important sign of disease severity

Conclusion

The results of this study will help the policy makers, health professionals and stakeholders in better understanding the situation of pneumonia in Rawalpindi district. In children younger than 12 years, no single historical feature or finding can reliably differentiate pneumonia from other paediatric respiratory illnesses, yet there are certain clinical features that are strongly related with a high likelihood of pneumonia. As the methods for pneumonia case detection using WHO criteria of a child having cough with or without tachypnoea and lower chest in-drawings are fairly easy to understand and apply, they should be taught to primary care physicians, nurses and even mothers, allowing them to seek medical advice early.

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