Prevalence and Pattern of Pneumonia among Children Admitted into University of Port Harcourt Teaching Hospital: A Two Year Review

Nneka Gabriel-Job[1*] and Uju S. Azubogu[1]

[1]*University of Port Harcourt Teaching Hospital, Nigeria.*

Authors' contributions

Article Information

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ABSTRACT

Introduction: Pneumonia is the leading cause of death among children, it accounts for 17.0% of under- five deaths in Nigeria yearly. The aim of this study is to determine the pattern of pneumonia among children in Port Harcourt.

Materials and Methods: A 2year retrospective descriptive study was done; the admission and discharge records at the children emergency ward (CHEW) and folders of patients admitted for pneumonia were used to retrieve information.

Results: A total of 2169 children were admitted into CHEW from 2017- 2018, this comprised of 1089 (50.2%) males and 1080 (49.8%) females. Of the 2169 children, 286 (13.2%) of them had pneumonia. More males (16.9%) compared to females (9.4%) had pneumonia, with a significant gender difference. (Σ^2 = 26.29, p = < 0.001) Males were twice more likely to have pneumonia compared to the females (OR = 1.95, CI= 1.51-2.54). The highest prevalence of Pneumonia (27.1%) was amongst children < 1 year old (P = <0.001). Thirteen (4.6%) of those that had

*Corresponding author: Email: ngabrieljob2014@gmail.com;

pneumonia died. Mortality was highest (9.2%) among those who presented late (> 5 days after onset of symptoms.) (Σ^2 =10.73, p = 0.03).

Conclusion: Childhood pneumonia is still a burden among children in Port Harcourt. Early presentation to the hospital may reduce the mortality.

1. INTRODUCTION

Pneumonia is an inflammation of the lung parenchyma caused by microbial organisms [1]. It is a leading cause of morbidity and mortality among under-five children especially in developing countries [1]. Pneumonia accounts for 15% of all deaths of children under-five, killing 808,694 children worldwide [2].

Nigeria accounts for 127,000 pneumonia related deaths worldwide, making it one of the countries with the highest burden of pneumonia in childhood [3,4]. The prevalence of Pneumonia in Nigeria ranges from 13.3% to 23.9% [5,6].

Viruses and bacteria are the most common aetiological agents of pneumonia with bacterial agents accounting for the most severe disease presentations and complications [2]. *Respiratory syncytial* virus is the most common viral causes of pneumonia while *Streptococcus pneumonia* and *Haemophilus Influenza* remain the most important bacterial pathogens documented from previous studies. [1,7,8]. Pneumonia may be transmitted through air-borne droplets from coughing and sneezing or through haematogenous spread especially in the newborn [2]. The clinical features of pneumonia include cough, fever, fast breathing, chest in drawing, inability to feed or drink [2,9]. Wheezing may occur in viral infections [2].

The predisposing factors linked to pneumonia include: malnutrition, absence of exclusive breastfeeding, overcrowding with indoor air pollution, low weight at birth, lack of optimal immunization [2,10]. Clinical conditions such as Human Immunodeficiency Virus infection, sickle cell anaemia, and malnutrition can affect the severity and outcome of pneumonia cases [11].

It has been reported that prompt diagnosis and treatment can improve the outcome of pneumonia, however the ability of caregivers to recognize the symptoms and danger signs of pneumonia can determine the time they seek treatment [12,13]. The time of presentation to the hospital is also an important determinant of the outcome. Early presentation was a predictor of good outcome from a study in Nigeria [14]. However, there still exists delays in hospital presentation among children with pneumonia a factor that may be responsible for the high mortality rates in Nigeria [14].

This study is intended to determine the prevalence of pneumonia among children in Port Harcourt as well as the relationship between the time of presentation and the outcome of pneumonia.

2. PATIENTS AND METHODS

2.1 Study Design

A retrospective descriptive study carried out among children admitted into the children emergency ward (CHEW) over a two year period (January 2017- December 2018).

2.2 Study Area

This study was carried out in the CHEW of the University of Port Harcourt Teaching Hospital (UPTH).

2.3 Study Population

Children aged 1 month to 17 years admitted into the children emergency ward within the period under review admitted for pneumonia. Children less than one month old were not included in the study as they were admitted in special care baby unit (SCBU). In all the patients recruited, the diagnosis of pneumonia was made based on the clinical features of cough, fever, fast breathing and auscultatory finding as well as chest radiograph findings.

2.4 Methods

The study is a retrospective study, the admission and discharge records of children admitted into the CHEW were reviewed and folders numbers of patients admitted for pneumonia were obtained, the folders of patients admitted for

pneumonia were retrieved and necessary information for this study were obtained. The diagnosis of pneumonia was based on symptoms at presentation, clinical findings and radiological reports.

A data entry form was used to document the following information age, sex, symptoms at presentation, feeding and immunization history, level of education of parents/care givers, duration of symptoms before presentation, duration of hospital stay and outcome. The duration of symptoms before presentation was grouped into early (0-2 days), intermediate (3-5 days) or late (> 5 days) as described in a previous study in Nigeria [14].

2.5 Statistical Analysis

Data was analyzed with SPSS version 25 statistical software. Results were expressed in proportions, percentages, and frequency tables. Chi square and t-test was conducted to compare different subgroups. Confidence interval was set at 95% and a p value of ≤ 0.05 was considered as significant.

3. RESULTS

A total of 2169 children were admitted from the January 2017- December 2018. This comprised of 1089 (50.2%) males and 1080 females (49.8%). 312 of them was recorded to have been admitted for pneumonia, 26 of the folders could not be retrieved, therefore 286 of the folders were used to obtain the necessary information.

The overall prevalence of pneumonia was 286/2169 (13.2%), more males 184 (16.9%) compared to the females 102 (9.4%) had pneumonia (P < 0.001, OR 1.95, CI 1.51-2.54) Table 1.

Pneumonia occurred more among those that were less than 1 year old 101 (27.1%) followed by those who were between the ages of 1-4 years 143 (14.9%) while the least prevalence was among those that were 5 years and above (5.0%). This was statistically significant (Σ^2=113.64, P <0.001) The overall prevalence of pneumonia among under five children was 42.0%, while the prevalence among those above 5 years of age was 5.0% (Table 2).

The ages of those who had pneumonia ranged from 1 month to 17 years with a mean age of 3.73 ±3.01 years. One hundred and one (35.3%) of the patients were less than 1 year old, 143

(50.0%) were 1-4 years old while those that were 5 or more years were 42 (14.7%). One hundred and eighty four (64.3%) of them were males and 102 (35.7%) of them were females (Table 3).

Table 1. Prevalence of pneumonia

Gender	Diagnosis of pneumonia		Total
	Yes (N%)	No (N%)	N %
Male	184(16.9)	905(83.1)	1089(100.0)
Female	102(9.4)	978(90.6)	1080(100.0)
Total	286(13.2)	1883(86.8)	2169(100.0)

Σ^2 = 26.3, p < 0.001, DF =1

Of the 286 participants 106 (37.0%) had complete immunization for age while 180 (63.0%) had incomplete or no immunization. 94 (32.9%) of those with pneumonia were exclusively breast fed while 192 (67.1%) were not. The common symptoms at presentation were cough, fast breathing and fever. Other symptoms were catarrh, poor /refusal to suck and convulsion (Table 3).

One hundred and thirteen (39.5%) of them presented early (within 2 days of onset of symptoms) while 75 (26.2%) presented between 3-5 days and 98 (34.3%) after 5 days of onset of symptoms. Thirteen (4.6%) of the patients died, mortality was highest 9 (9.2%) among those who presented late (More than five days after the onset of symptoms) followed by those who presented between 3-5 days 3 (4.0%) and 1 (0.9%) among those who presented early (within 2 days of onset of symptoms) (Table 4).

Table 2. Prevalence of pneumonia by age

Age (years)	Diagnosis of pneumonia		Total
	Yes	No	
< 1	101(27.1)	272(72.9)	373(100.0)
1-5	143(14.9)	819(85.1)	962(100.0)
>5	42(5.0)	792(95.0)	834 (100.0)
Total	286(13.2)	1883(86.8)	2169(100.0)

Σ^2 = 113.6, DF=1, P <0.001

4. DISCUSSION

Pneumonia is an important cause of death among children, it accounts for 20% of mortality worldwide, with about 2 million deaths among under five children each year [1,2]. Pneumonia is a common condition seen in the paediatric emergency wards [15].

The prevalence of pneumonia in this study is 13.2%, this finding is lower than findings from

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Table 3. Characteristics of the participant treated for pneumonia

Variables	Frequency (N=286)	Total (%)
Age		
<1	101	35.3
1-4	143	50.0
≥ 5	42	14.7
Gender		
Male	184	64.3
Female	102	35.7
Complete Immunisation		
Yes	106	37.0
No	180	63.0
Exclusively breast feed		
Yes	94	32.9
No	192	67.1
Symptoms at presentation		
Cough	281	98.3
Fast breathing	279	97.6
Fever	273	95.5
Catarrh	154	53.5
Poor suck/refusal to suck	72	25.2
Vomiting	65	22.7
Noisy breathing	35	12.2
Convulsion	17	5.9

Multiple responses were noted for the symptoms

Table 4. Relationship between the time of presentation and outcome

Duration of symptoms	Outcome			Total (%)
	Discharged	**DAMA**	**Died**	
Early ≤2 days	110(97.3)	2(1.8)	1 (0.9)	113(100.0)
Intermediate 3-5days	70(93.3)	2(2.7)	3(4.0)	75(100.0)
Late > 5 days	84(85.7)	5(5.1)	9(9.2)	98(100.0)
Total	264(92.3)	9(3.1)	13(4.6)	286(100.0)

χ^2 = 10.7, df = 4, p = 0.03 . DAMA= Discharged against medical advice

previous hospital-based study in Makurdi and Enugu, Nigeria where the prevalence of pneumonia was reported as 27.68% [8] and 31.6% [16] respectively. The possible explanation for this is that the sample size of the previous two studies were much smaller and the sample population were under five children who are more prone to this illness [5]. This differed from the index study with a much larger sample size and a study population involving children of all ages except neonates. The prevalence of pneumonia reported in this study is however similar to the 13.3% reported in Ilorin, Nigeria [5].

More males (16.9%) compared to the females (9.4%) had pneumonia (p < 0.001, OR 1.95, CI 1.51-2.54) a finding that is similar to other previous findings [5,8]. This finding could be due to gender disparities that can occur in health, as more males may be brought to the hospital for medical care than the females.

The finding of this study supports that young age is a risk factor to pneumonia as the prevalence was higher among the under-fives compared to the older age group. Even amongst the under-fives it was higher among the infants. This finding is similar to that from a previous study were it was reported that pneumonia was more prevalent among those who were less than 5 years of age [5].

The common symptoms of pneumonia presented by patients in this study is similar to the World Health Organization's (WHO) report on the clinical features of pneumonia in children [2].

Several risk factors have been linked to pneumonia in childhood [17-20]. Over 60% of the pneumonia cases in this study were children with poor immunization and breastfeeding history. This finding collaborates the finding by Amai, et al. [8] who had reported in a study done

in Makurdi, Nigeria, that the predictors of pneumonia were lack of exclusive breastfeeding and immunization. Similarly Roux, et al. [21] reported that the incidence of Pneumonia was reduced among children who were adequately immunized with the pneumococcal vaccine. They however opined that the young infants were more at risk of Pneumonias because at this age they may not have completed the primary series of the immunization and therefore reported young age as a confounder.

Delay in seeking medical care as reported by previous authors [14,22] is a factor that affects the morbidity and mortality pattern of children with pneumonias, especially among the under-fives. The finding of this study showed that the time of presentation significantly affected the outcome of pneumonia as the number of deaths increased as the duration from onset of symptom to the time of presentation increased. Among those that presented early (within 2 days of onset of symptoms) 0.9% of them died as against the 9.2% of those that presented late (more than 5 days). The possible reason for this delay could be that the care givers may confuse the symptoms with other illnesses or may attempt home treatment first. This is supported by previous reports that every fifth child with respiratory infections had malaria –pneumonia symptoms overlapping and that home treatment of respiratory infection with antibiotics is common in Nigeria with many of the caregivers seeking care from chemists and other unorthodox places for symptoms of acute respiratory infections [22].

Similarly, another study [23] had also reported that pneumonia cases may be initially overlook by the care givers because of the similarity in symptoms with other illnesses especially malaria in children. According to Ibrahim, et al. [14], the time of presentation to the health facility depends on the age of the patient, severity of the symptoms and family size. This study, however did not establish the reason for the delays at presentation.

5. CONCLUSION

Childhood pneumonia still remains a burden among children especially among children less than 5 years of age but early presentation to the hospital and treatment may reduce the mortality. Adequate immunization and exclusive breast feeding are important factors that could reduce the disease burden. It is recommended that children should be adequately immunized,

breastfed and that care givers should endeavour to seek treatment from health facilities as soon as their children become ill.

CONSENT

It is not applicable.

ETHICAL APPROVAL

Approval was from the University of Port-Harcourt Teaching Hospital ethic committee.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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