

Childhood Pneumonia and under-five morbidity and mortality at the University of Port Harcourt Teaching Hospital- a situational analysis

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ABSTRACT

Background: Childhood mortality which remains high in children under the age of 5 years is largely due to infectious and other preventable causes such as Human immunodeficiency virus/ Acquired Immunodeficiency Syndrome (HIV/AIDS), pneumonia and malaria¹. The prevention of pneumonia deaths is therefore an important approach if the 4th Millennium Development Goal (MDG4) is to be attained.

Aim: The aim of this study was to describe the pattern, clinical features, management and complications of pneumonia in under-five children admitted in the University of Port Harcourt Teaching Hospital (UPTH) and to highlight their morbidity and mortality.

Methods: This was a retrospective cross sectional descriptive study of children diagnosed with pneumonia who were admitted into the children's wards between January 2007 and December 2009. The case notes of all children diagnosed of pneumonia who were admitted into the paediatric wards as recorded in the ward register, were reviewed.

Results: Five hundred and ninety-two children met the inclusion criteria. The yearly number ranged from 107 in 2007 to 213 in 2009. The quarterly distribution showed a peak during the north east wind (harmattan) season. Their ages ranged from <1-168 months (mean age 13.2 months, SD=19.84). Neonates accounted for 24.5% of all cases, while 66.9% were Infants and Under-fives were 97.1%. They were 333(56.3%) males and 251(42.4%) females, with a M: F ratio of 1.3:1. Pneumonia alone was the diagnosis in 127(54.7%) while 106(45.7%) had pneumonia plus other associated conditions, the commonest being malaria. Heart failure was the commonest complication 69(29.7%). The children who completed their immunization in infancy according to the National program on immunization schedule were 61.2% of cases, those who were exclusively breast feeding for the first six months of life - 31.9%, while HIV/AIDS was observed in 9.1%. The case fatality rate was 9.0% with 79.2% of them as infants.

Conclusion: Pneumonia which is still prevalent in under-fives in this environment is associated with significant morbidity and mortality especially among infants. Efforts to address this contributor to under-five morbidity and mortality is required if MDG4 is to be attained.

Keywords: Pneumonia, under-five mortality, morbidity, MDG4.

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INTRODUCTION

Pneumonia is responsible for 19% of all deaths in children less than 5 years the world over, with over 70% of this mortality occurring in sub-Saharan Africa and South East Asia¹.

More than half of the world's annual new pneumonia cases are concentrated in just five countries where 44% of the world's children aged less than 5 years live- India (43million), China (21.1million), Pakistan(9.8million), Bangladesh(6.4million), and Nigeria (6.1million)^{2,5}. Pneumonia is one of the commonest causes of morbidity and mortality in infancy and childhood in Nigeria⁶⁻¹⁰ as well as the second commonest cause of death in children in UPTH⁶. Studies on pneumonia within Nigeria and abroad have revealed seasonal variations in the incidence^{8,11,12}. It has also been shown that the leading risk factors contributing to Pneumonia incidence are the lack of exclusive breast feeding, under nutrition, indoor air pollution, domestic use of smoke-generating firewood, low birth weight, crowding and lack of measles immunization². Children from the poorest families, living in rural areas and whose mothers are less educated are also more likely to die from pneumonia^{2,8,13}.

Pneumonia contributes to 56-86% of all deaths attributed to measles. The pathogenesis may be due to the virus itself or superimposed viral or bacterial infection occurring in 47-55% of cases¹⁴.

Childhood pneumonia^{15,16} is commonly caused by Pneumococcus (30-50%), haemophilus influenzae type b(10-30%) staphylococcus aureus and respiratory syncytial virus.

Pneumonia can be controlled by childhood immunization against haemophilus influenzae type b and streptococcus pneumoniae infections, improvement of nutrition and prevention of low birth weight, control of indoor air pollution arising from household use of solid fuels and passive smoking in house holds and prevention and management of HIV infections.²

In spite of its huge toll on human life, relatively few global resources are dedicated to tackling this problem^{6,7}. Furthermore utilisation of available low cost evidence based interventions for pneumonia prevention and treatments have continued to be poorly utilised¹⁷. Hence the aim of this retrospective study of childhood pneumonia at the University of Port Harcourt Teaching Hospital (UPTH) Port Harcourt, was to describe the pattern, clinical features, management and complications of pneumonia

among under-five children admitted in to the paediatric wards of the hospital and to highlight morbidity and mortality from pneumonia.

MATERIALS AND METHODS

The records of five hundred and ninety-two children admitted with a clinical diagnosis of pneumonia as registered in the registers of the special care baby unit, children emergency ward and children's medical wards of the University of Port Harcourt Teaching Hospital were identified and only 232 folders were retrieved from the Medical Records Department, as the other folders could not be found. The Department of Paediatrics in the hospital runs a Diarrhoeal Diseases/Acute Respiratory (infections) disease Unit in which all children presenting with diarrhoeal and respiratory infections are assessed and those requiring admission, admitted into the Special Care Baby Unit(SCBU), children's emergency ward or children's medical wards 1 or 2. Children presenting at the hospital with cough and or difficult breathing were evaluated for pneumonia. A diagnosis of pneumonia was made if the child had cough or difficult breathing with fast breathing, chest in drawing or stridor in a calm child. Additional findings included the presence of chest signs such as crepitations and radiological evidence of pneumonia. All folders of children who qualified for the study that was found, were retrieved and data on the age and sex of patients, duration of illness before admission, duration of hospitalization, month and year of admission, immunization status, and duration of exclusive breast feeding, HIV/AIDS status and outcome of disease were extracted.

Limitations: - The record keeping system in the medical records department of UPTH is quiet poor. With a retrieval rate of 39.1%, information, on biodata, compliations and outcome of disease was retrieved from the nurses ward records for those whose folders could not be retrieved.

DATA ANALYSIS

Statistical analysis was carried out using the statistical package for social sciences (SPSS) version 11.6 and Epi info version 6.04. Descriptive statistics was computed with simple frequencies.

RESULTS

In the 36 months period under review (January 2007 to December 2009), 3,508 patients were admitted into the paediatrics department, with 592(16.9 %) diagnosed with pneumonia alone or pneumonia associated with other diseases.

Out of the 592 admissions for pneumonia, there were 333(56.3%) males and 251(42.4%) females, (male: female ratio of 1.3: 1).

The patients were aged between 0.08years and 14 years (<1month and 168months) mean age 13.2 months, SD=19.84. as shown in (Table1).

Infants constituted 396 (66.9 %), while 575 (97.1 %) were under-fives.

The quarterly distribution of the 592 cases revealed a peak incidence during the Harmartan months of October to December.

The records of 232 (39.2%) cases of pneumonia were available for further analysis. One hundred and forty two (61.2 %) of the cases were fully immunized for age, while 74(31.9 %) were exclusively breastfed for 6 months. HIV/AIDS was found in 21(9.1%) of the cases. The commonest symptoms reported were cough 176(75.9%) , fever 164(70.7%) , fast breathing 123 (53.0%) and catarrh 99(16.7%)(Table 2).

The main clinical signs were respiratory distress observed in 194 (83.6%), tachypnoea in 184 (79.3%), crepitations in 121 (52.2%) , hepatomegaly in 99 (42.7%) , tachycardia in 88 (37.9%) and rhonchi in 13(9.9%).

Pneumonia alone was found in 127 (54.7 %), while 106 (45.7 %) had pneumonia with one or more associated conditions as shown in Table 3. The commonest associated condition was malaria 67(28.9%)(Table 3).

Chest radiographs were available in 125(53.9 %) of the 232 patients, of these 5 (2.2 %) had pleural effusion. Other radiological abnormalities were perihilar and basal mottled opacities 125(53.9 %) and lung collapse 2(0.9%).

Haematological investigations were available in 179(77.2%) patients and these revealed packed red blood cell volume (PCV) ranging between 2 to 58 percent. Haemoglobin (Hb) concentration ranged from <1 to 19.3g per dl, while the Hb was below 5g per dl in 9. Thirty (12.9 %) required blood transfusion while 6(2.6%) had more than one transfusion.

Common complications that occurred included heart failure 69(29.7%), Anaemia 52(22.4%), febrile convulsion 9(3.9 %), pleural effusion 5(2.2%) and lung collapse 2(0.9%) (Table 4).

Drug treatment depended on the age of the patient at presentation. Patients under three months of age were treated with intravenous ceftriazone or cefurozime and gentamycin, during the first 48hours. Patients above three months of age are given intravenous crystalline penicillin six hourly during the first 48 hours. In those suspected to have staphylococcal infection, intravenous ampicillin and cloxacillin were administered. Oxygen therapy was administered in 100(43.1 %) patients while 41 (17.7%) had digoxin.

The duration of antibiotic therapy ranged between 5 and 14 days, while the duration of hospitalization ranged between 1 and 60 days. Thirteen (2.2 %) were discharged against medical advice. Mortality occurred in 53 (9.0 %) and 42(79.2%) of them were infants aged <1 to 11months, 32(60.4%) males and 19(35.8%) females, 2(3.8%) had no indication of their sexes. Mortality was 23.8% (5) among the 21 patients with HIV/AIDS, 25% among those children who were not exclusively breastfed while survival was highest 83(56.8%) among children who were fully immunized for age.

DISCUSSION

Pneumonia accounts for almost 1 in 5 under- five deaths worldwide, yet little attention is paid to this disease¹⁸. It is one of the leading causes of childhood mortality in Nigeria^{7,9, 19} and other developing countries⁵ as well as the second commonest cause of death in children admitted in University of Port Harcourt teaching Hospital⁶. About 70% of all the

Table 1: Age Distribution in 592 Patients with Pneumonia from registers between January 2007-December 2009.

Age in months	Frequency	Percentage of total
<1	145	24.5
>1 -5	155	26.2
6-11	96	16.2
12-23	122	20.6
24-35	38	6.4
36-47	14	2.4
48-59	5	0.8
60-119	9	1.5
?120	4	0.7
Not stated	4	0.7
Total	592	100.0

Table 2. Clinical features in 232 Patients with Pneumonia whose records were available.

Features	Number of patients	Percent of total
Symptoms		
Cough	176	75.9
Fever	164	70.7
Fast breathing	123	53.0
Catarrh	99	42.7
Vomiting	30	12.9
Diarrhoea	18	7.8
Convulsion	9	3.9
Excessive crying	2	0.9
Signs		
Respiratory distress	194	83.6
Intercostal/Subcostal recession	190	81.7
Tachypnoea	184	79.3
Flaring alae nasi	126	54.3
Crepitation	121	52.2
Hepatomegaly	99	42.7
Tachycardia	88	37.9
Rhonchi	23	9.9

Table 3. Distribution of Associated Conditions in 232 Patients with Pneumonia

Conditions	Number of Patients	Percentage of Total
Malaria	67	28.9
Anaemia	52	22.4
Septicaemia	33	14.2
Acquired immunodeficiency syndrome	21	9.1
Congenital heart disease	20	8.6
Tonsillitis	20	8.6
Sickle cell anaemia	6	2.6
Asthma	6	2.6
Candidiasis	4	1.7
Kwashiorkor	2	0.9
Otitis media	1	0.4
Marasmus	1	0.4

Table 4. Complications of Pneumonia cases

	Frequency	Percentage
Heart failure	69	29.7
Anaemia	52	22.4
Febrile convulsion	9	3.9
Pleural effusion	5	2.2
Lung collapse	2	0.9

cases of Pneumonia in our study were infants. This observation is in agreement with earlier studies from Nigeria,^{9,20,21} and other parts of the world^{22,23}. The high prevalence of pneumonia in infants may be due to the highest susceptibility to infections due to a combination of immature host immune system and constant contact with numerous viral and bacterial agents in the environment^{24,25}. The viral infections alters the properties of normal mucosal secretions, inhibits phagocytosis, modifies the bacterial flora and may temporarily disrupt the normal epithelial layer of the respiratory passage²⁶.

The seasonal increase in the prevalence of Pneumonia noted at the beginning of the harmattan season contrast to that reported by other workers in Nigeria where the seasonal increase occurred during the rainy season^{9,12}. However, these periods are both cold and families usually remain indoors during these period, also harmattan period is usually windy, with dust particles being blown into the atmosphere this will increase the spread of droplet infections. The major features of cough, fever and respiratory distress observed in this study are similar to observations in previous reports^{7,9,27}.

Heart failure occurred in sixty-nine patients, 48(69.6%) of these survived because of early diagnosis and treatment. Mortality rate in patients in whom heart failure complicated bronchopneumonia was 36 percent in the series reported by Bondi and Jaiyesimi²⁸ and it is comparable to 37.7% in our study.

This study highlights the poor record keeping system at the University of Port Harcourt Teaching Hospital. Out of the 592 cases of pneumonia seen over the thirty-six months period only two-hundred and thirty-two folders were available for further analysis with a retrieval rate of (39.1%). This was a major limitation of this study.

The mortality rate of 9.0% in this present study is comparable to that of previous reports^{28, 29}. It is pertinent to mention that 32% of the deaths occurred in patients with pneumonia associated with other conditions this is lower than what was found by Ibrahim²⁹ in Sokoto where 50% of those with pneumonia associated with other conditions died. The reason for the lower value in this study might be because of the activity of our acute respiratory (infections) disease unit where these patients are quickly sorted out on arrival to the hospital and promptly attended to.

Low rate of exclusive breastfeeding and complete immunization 31.9% and 61.2% respectively could account for more severe disease resulting in complications such as heart failure in this study. According to WHO³⁰ one quarter of deaths from pneumonia may be prevented from immunization against measles and whooping cough, while several hundred thousand deaths are preventable by exclusive breastfeeding for the first six months of life. This statement is applicable to our locality and

indeed most parts of the developing world.

CONCLUSION

Pneumonia is still prevalent in under-fives in Port Harcourt. Pneumonia occurred more commonly among males with a peak incidence during the dry windy season (harmatan). Heart failure was the most frequent complication observed. The observed mortality from pneumonia in this study is high, especially in infancy, among unimmunized children who were not exclusively breastfed. HIV/AIDS infection was also a significant contributing factor to the high mortality.

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