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Socio-demographic and clinical pattern of childhood pneumonia in a tertiary hospital in Sokoto, Nigeria

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Abstract

Context: Pneumonia is the world's leading infectious killer of children, particularly under- fives. Practical, achievable and affordable key interventions have been identified to reduce morbidity and mortality from Pneumonia. Despite these measures, it still remains a disease that has significant impact on child's survival.
Objectives: To determine the sociodemographic and clinical features of Pneumonia in hospitalized children at Usmanu Danfodiyo University Teaching Hospital (UDUTH), Sokoto, Nigeria.
Materials and methods: A retrospective review of records of children admitted for Pneumonia over a 30-month period and relevant information eg. age, gender, symptoms and signs were documented.
Results: Of the189 children reviewed, 114(60.3%) were below 1 year of age, males were 108(57.1%) with a M:F ratio of 1.3:1. One hundred and twenty three (65.0%) belonged to the low socio-economic class (SEC) and only 95(50.3%) were fully immunized. Cough and fever were the commonest presenting symptoms while crepitations, chest in drawing and tachypnoea were the commonest signs. Majority 178(94.2%) had Bronchopneumonia while 11(5.8%) had Lobar Pneumonia. 151(79.9%) were discharged, 1(0.5%) absconded and 37(19.6%) died. Cough and fever were seen in more children that died, however it was not significant. Similarly, more children that had crepitations, tachypnoea, chest indrawing and hypoxaemia died, only chest in drawing was significantly associated with mortality (p=0.020).
Conclusion: Pneumonia is still a common cause of mortality, socio-demographic and clinical features remain similar to other reports. Despite the availability of preventive measures and treatment guidelines, mortality remains high. We recommend and advocate for equitable access to quality primary health care in order to prevent, diagnose and treat pneumonia.

Keywords: Children, Clinical features, Pneumonia, Socio-demographic, Sokoto

Introduction

Pneumonia is the world's leading infectious killer of children, claiming the lives of more than 800,000 children under the age of five every year, more than 2,000 every day.[1-2] It is the single largest cause of under five deaths in Nigeria, accounting for 140,520 (19%) of all under five deaths in 2017.[3]

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In developing countries, World Health Organization (WHO) has adopted operational definition of pneumonia which based on easily recognizable clinical parameters (signs and symptoms) that are said to be reliable for diagnosing the disease.[4,5]
Practical, achievable and affordable key interventions have been identified to reduce morbidity and mortality from Pneumonia which include protection (ensuring the child receives appropriate nutrition from birth); prevention (including vaccines and HIV prevention); and treatment (improved care seeking, case management, and provision of antibiotics and

oxygen).[2,6,7] Despite these measures, Pneumonia still remains a disease that has significant impact on child's survival.

Studies have been conducted in children with Pneumonia in Ilorin,[8-10] Ibadan,[11-13] Enugu,[14] and Abuja[15] looking at various aspects of Pneumonia including sociodemographic factors, clinical presentation or aetiologic agents. A previous study by Ugege *et al*[16] was conducted in same facility but did not look at some sociodemographic characteristics of the children, hence we sought to identify these factors. This study was designed to determine the sociodemographic and clinical features of Pneumonia in hospitalized children at UDUTH, Sokoto, Nigeria.

Material and methods

This was a retrospective observational study conducted on children admitted primarily for Pneumonia at the Emergency Paediatric Unit (EPU) of UDUTH, Sokoto, Nigeria. The hospital is a major referral health centre providing both general and specialist paediatric care. Sokoto State has two major seasons namely wet and dry.[17] The dry season starts from October and lasts up to May or June in some parts of the state. While the wet season starts in May and lasts up to September or October. The harmattan, a dry, cold and fairly dusty wind is experienced in the state between November and February during the dry season.

The study participants were children aged >1 month to 15 years, managed for pneumonia over a 30-month period from 1st January, 2017 to 30th June, 2019.

Patients managed for Pneumonia in EPU during the study period were identified in the admission and discharge register and case notes of the children were retrieved. The diagnosis of Pneumonia was based on clinical findings of age-specific tachypnoea, cough, and evidence of respiratory distress, reduced or absent breath sounds, bronchial breath sound or coarse crepitations in the case notes.

A questionnaire was used to document relevant information. The study variables included the gender, age, place of domicile, parental SEC calculated based on average of parental occupation and highest educational qualification as described by Oyedeji.[18] The mean of four scores in table I below (two for the father and two for the mother) approximated to the nearest whole number was the social status assigned to the child. Socio-economic classes I and II were grouped as the upper socio-economic status, SEC III was grouped as middle socio-economic status, while SEC IV and V were grouped as the lower socio-economic status.

The relevant history, examination findings, anthropometry, duration of hospital stay, complications and outcome were also documented.

Available documented chest radiographs results were classified as normal or abnormal (presence of patchy opacities in one or more lobes or lobar/segmental consolidation).

The subjects were children aged between 1 month and 13 years presenting to the EPU with clinical features of Pneumonia comprising cough of less than 14 days duration, fever, difficulty in breathing or fast breathing, tachypnoea and auscultatory findings of one or more of reduced breath sound intensity, bronchial breath sounds, or crepitations.[17] For those with Haemoglobin oxygen saturation (SpO2) measurement, hypoxaemia was defined as an arterial oxygen saturation of less than 90% as recorded by pulse oximetry.[9]

Inclusion criteria included children admitted with a primary diagnosis of Pneumonia with or without complications over the study period. Exclusion criteria included children with sepsis, bronchiolitis, asthma and measles (as not all children with Pneumonia are captured as such).

Ethical approval

The study was approved by UDUTH Research and Ethics Committee.

Statistics

Data analysis was performed using the Statistical Package for Social Sciences (SPSS) software, version 23.0. Means and standard deviations (SD) were used for numerical variables. Categorical variables were summarized using proportions and percentages, while Chi-Square (X^2) and Fisher's exact tests were used to compare the proportions. A p value of < 0.05 was considered significant.

Results

There were 5203 admissions during the study period with 243 recorded cases of Pneumonia giving a prevalence of 4.7% of all admissions. However,

only 189 folders were retrieved. The mean age was 18.83±27.64 months, with a range of 1 to 172 months (14 years 3 months). Majority of the children were below 1 year of age as shown in table 1.

Table 1: Age range of study population

Age range (years)	Frequency	Percentage
< 1	114	60.3
1-5	63	33.3
6-10	8	4.2
11-15	4	2.1
Total	189	100.0

There were more males 108(57.1%) than females 81(42.9%), giving a M:F ratio of 1.3:1. Majority of the children were from the urban areas 89.9%, and 127(67.2%) presented during the dry season which comprises of the harmattan period. One hundred and twenty- three (65.0%) belonged to the low socio-economic class and only 95(50.3%) were fully immunized as shown in table 2 below.

Table 2: Socio-demographic characteristics of the study population

Variable	Frequency	Percentage
Gender		
Male	108	57.1
Female	81	42.9
Place of domicile		
Rural	170	89.9
Urban	19	10.1
Season		
Dry	127	67.2
Rainy	62	32.8
Immunisation status		
Fully	95	50.3
Partly	63	36.0
Not immunised	26	13.8
Socio-economic class		
High	33	17.5
Middle	33	17.5
Low	123	65.0

Cough and fever were the commonest presenting symptoms while presence of crepitations, chest in drawing and tachypnoea were the commonest signs as shown in table 3 below.

Table 3: Distribution of clinical features of the study population

Clinical features	Frequency	Percentage
Cough	185	97.9
Fever	178	94.2
Crepitation	173	91.5
Chest in drawing	160	84.7
Tachypnoea	159	84.1
Tachycardia	137	72.5
Rhonchi	29	15.3
Pallor	24	12.7
Bronchial breath sounds	4	2.1
Cyanosis	3	1.6

Some had multiple symptoms and signs

178(94.2%) children were diagnosed with Bronchopneumonia while only 11(5.8%) were diagnosed with Lobar Pneumonia. One hundred and two (54.0%) had oxygen saturation measured of which 41(40.2%) had hypoxaemia. However, 70(37.0%) had supplemental oxygen administered including some without measured oxygen saturation.

Chest radiograph was done in only 82(43.4%) children of which 69(84.1%) were reported as abnormal while 13(15.9%) were reported as normal.

Complications were observed in 26(13.8%) of the children which included heart failure which was present in 24(92.3%), acute kidney injury in 1(3.8%) and empyema thoraces in 1(3.8%).

The mean duration of hospital stay was 7.26±8.46 hours with a range of 6 hours to 60 days. With regards to outcome, 151(79.9%) were discharged and 1(0.5%) absconded while 37(19.6%) died.

There was no significant relationship between gender and age nor with development of complications as shown in table 4 below.

Table 4: Relationship between gender and some variables

	Gender n(%)		
Variable	**Male 108(57.1)**	**Female 81(42.9)**	**P value**
Age range (years)			
< 1	65	49	0.605#
1-5	37	26	
6-10	5	3	
11-15	1	3	
Immunisation status			
Fully	53	42	**0.049***
Partly	45	23	
Not immunised	10	16	
Socio-economic class			
High	22	11	0.327*
Middle	16	17	
Low	70	53	
Complications			
Yes	13	15	0.215*
No	95	66	
Diagnosis			
Bronchopneumonia	101	77	0.452#
Lobar pneumonia	7	4	
Outcome			
Alive	89	63	0.427*
Died	19	18	

#=Fishers exact, *= Chi square

Even though more children that presented with cough or fever died, it was not statistically significant. Similarly, more children that had crepitations, tachypnoea, chest indrawing and hypoxaemia died, only chest in drawing was significantly associated with mortality (p=0.020) as shown in table 5 below.

Table 5: Association with some clinical features and outcome

Variable	Discharged f(%)	Died f(%)	P value
Cough	149	36	0.585*
Fever	142	36	0.695*
Crepitations	137	36	0.204*
Tachypnoea	128	31	0.945#
Chest in drawing	124	36	**0.020***
Hypoxaemia	28	13	0.080#

f=frequency, %=percentage, #-Chi square, *=Fischers' exact

Discussion

Childhood Pneumonia is a global leading cause of morbidity and mortality especially in under-fives.[1,20] The prevalence of 4.7% was higher than the prevalence of 3.7% reported by Ugege et al,[16] however their study was conducted over a one-year period which may be responsible for the slight variation. Majority of the children in this study were under-fives which is in agreement with other studies,[8,16,22-24] as Pneumonia commonly affects under-fives.[1,21] More than half of the children were aged less than one year, similar to findings from Ilorin,[8] Abuja,[15] Sokoto,[16] India,[24] and Uganda.[25]

This study showed that more males were affected with Pneumonia than females, which is similar to reports from Ilorin,[8-11] but contrasts earlier findings in Sokoto.[16]

Majority of the children were from the urban areas than the rural areas; similar to findings from Enugu[14] and India.[24] This may be due to the location of the study area in Sokoto metropolis which is more accessible to the urban dwellers. Another reason may be due to a greater health seeking behavior of the urban dwellers than those from the rural areas.

Most of the children belonged to the lower SEC similar to studies done in other areas in and outside Nigeria.[8-10,22-24,27] This is not surprising because of the effect of poverty on child health indices in developing countries which leads to increasing rates of preventable diseases and demand for emergency health care services.[28]

The most frequent constitutional symptoms in the current study were cough and fever which were present in almost all the children. Fever and cough are also the commonest symptoms in reports by other researchers.[8,10,11,15] Similarly, the commonest signs were chest indrawing, tachypnoea and presence of crepitations. these are similar to findings by Abdulkarim et al,[8] Fagbule et al,[10] Johnson et al[11] all from Ilorin and Ahmed et al[15] from Abuja. These clinical features except for crepitations have been found to be indeed useful for diagnosis of Pneumonia in developing countries.[4,5,8] Cough and difficult or fast breathing are used to identify and treat or refer cases at primary and secondary levels; which must be strengthened using the Integrated management of childhood illnesses (IMCI) guidelines[29] so as to help reduce delays in treatment/referral to hospitals and also reduce complications.[8]

Bronchopneumonia was the most common form of Pneumonia similar to reports by Abdulkarim et al,[8] Ibraheem et al,[9] Fagbule et al,[10] Johnson et al[13] and Ugege et al.[16] Reason may be because it is commoner in under-fives which were the majority of the study population.

An abnormal radiological finding was found in 36.5% of the children, which is similar to the WHO reported 34.3% for clinical diagnosis of radiographic pneumonia in children presenting to a pediatric emergency department.[30] It is however, lower than 88.0% reported by Ahmed et al[15] and higher than 7.5% reported by Fagbule et al.[10] Although, not all the children had chest radiographs done.

The most frequent complication was heart failure, which is consistent with the findings of other workers.[8,10,16,30]

Majority of the children were discharged, and mortality was higher than reports from other parts of the country.[8,10,13,15,16] Reason for the variation maybe due to study methodology. Even though fever, cough, tachypnea, chest in drawing and crepitation were seen in more children that died, only chest in drawing was significantly associated with mortality.

Conclusion

This study showed pneumonia is common in under-fives, with fever and cough as the commonest presenting symptoms. Crepitations, chest in drawing and tachypnoea were the commonest signs, however, only chest in drawing was significantly associated with mortality.

Pneumonia still remains a common cause of mortality, socio-demographic and clinical features remain similar to other reports. Despite the availability of preventive measures and treatment guidelines, mortality remains high. We recommend and advocate for equitable access to quality primary health care in order to prevent, diagnose and treat pneumonia. There is need for strong political will, involvement of both private and public sectors in addition to non-governmental organizations to unite in the fight against Pneumonia.

References:

1. Save The Children. Fighting for breath in Nigeria. A call to action to stop children dying from Pneumonia. 2020. (https://resourcecentre.savethechildren.net/fighting-breathe-nigeria-call-action-stop-children-dying-pneumonia accessed 29 July 20202).
2. Save the Children. Fighting for breath: a call to action on childhood pneumonia. London, UK 2017.
3. Chao F, You D, Pedersen J, Hug L, Alkema L. National and regional under-5 mortality rate by economic status for low-income and middle-income countries: a systematic assessment. The Lancet Global Hlth. 2018;6(5):e535-547.
4. Rudan I, Boschi-Pinto C, Biloglav Z, Mulholland K, Campbell H. Epidemiology and etiology of childhood pneumonia. Bull Wld Hlth Organ 2008;86:412-416.
5. WHO. Acute respiratory infections in children: case management in small hospitals in developing countries- a manual for doctors and senior health workers. WHO/ARI/90.5.1990:1-69.
6. World Health Organisation. Ending preventable child deaths from pneumonia and diarrhoea by 2025: The integrated Global Action Plan for Pneumonia and Diarrhoea (GAPPD). Geneva, Switzerland 2013.
7. Chopra M, Mason E, Borrazzo J, Campbell H, Rudan I, Liu L, et al. Ending of preventable deaths from pneumonia and diarrhoea: an achievable goal. Lancet 2013;381(9876):1499-506.
8. Abdulkarim AA, Ibraheem RM, Adegboye AO, Johnson WBR, Adeboye MAN, Childhood pneumonia at the University of Ilorin Teaching Hospital Ilorin, Nigeria. Niger J Paed 2013;40(3):284-289.
9. Ibraheem RM, Johnson WBR, Abdulkarim AA. Relationship between some risk factors of pneumonia and hypoxaemia in hospitalized Nigerian children. AJRM 2014;10(1):18-25.
10. Fagbule D, Adedoyin MA, Nzeh DA. Childhood pneumonia in the University of Ilorin Teaching Hospital. Nig J Paediatr 1987;14:73–78.
11. Johnson WB, Aderele WI, Osinusi K, Gbadero D. Acute lower respiratory tract infections in hospitalized urban pre-school Nigerian children: A clinical overview. Afr J Med Sci 1994;23(2):127-138.
12. Johnson AW, Aderele I. The association of household pollutants and socio=economic risk factors with the short-term outcome of acute lower respiratory infections in hospitalized pre-school Nigerian children. Ann Trop Paediatr 1992;12(4):421-432. doi:10.1080/02724936.1992.11747609
13. Johnson AWBR, Aderele WI, Osinusi K, Gbadero D. Community acquired pneumonia in hospitalized urban young Nigerian children: clinical and haematological correlates of diagnosis and outcome. Nig J Peadiatr 2001;28(4):101-114.
14. Ujunwa FA, Ezeonu CT. Risk factor for acute respiratory tract infections in under five children in Enugu, South-east Nigeria. Ann Med Health

Sci Res 2014;4(1):95-99.
15. Ahmed PA, Yusuf KK, Dawodu A. Childhood acute lower respiratory tract infections in Northern Nigeria: At risk factors. Niger J Paed 2015;42(3):188-193. doi.10.4314/njp.v42:3.3
16. Ugege MO, Yusuf T, Ibitoye PK, Ameh B, Mada IL. Pattern of childhood pneumonia in Usmanu Danfodiyo University Teaching Hospital, Sokoto. Proceedings from the Paediatric Association of Nigeria Conference, Calabar, 2014. Niger J Paed 2014;41(3):285-292. A020.
17. Sokoto - Wikepedia. https://en.wikipedia.org/wiki/Sokoto Accessed 06 September 2020.
18. Oyedeji GA. Socio-economic and cultural background of the hospitalized children in Ilesha, Nigeria. J Paediatr 1985; 12: 111–117.
19. Stein R, Marostica P. Community-acquired pneumonia. Pediatr Res Rev 2006; 75: S136-137.
20. Aderele WI, Johnson AW. Pneumonias. In: Azubuike JC, Nkanginieme KEO, eds. Paediatrics and Child Health in a Tropical Region. 2nd ed. Owerri: African Educational Services; 2007:425-441.
21. Forgie IM, O'Neill KP, Lloyd- Evans N, Leinonen M, Campbell H, Whittle HC, et al. Etiology of acute lower respiratory tract infections in Gambian children: I. Acute lower respiratory tract infections in infants presenting at the hospital. Pediatr Infect Dis J 1991;10:33-41.
22. Fagbule D, Parakoyi DB, Spiegel R. Acute respiratory infections in Nigerian children: Prospective cohort study of incidence and case management. J Trop Pediatr 1994;40:279-284.
23. Oyejide C, Osinusi K. Acute respiratory tract infections in children in Idikan community, Ibadan, Nigeria: Severity, risk factors and frequency of occurrence. Rev Inf Dis 1990;12:1042–1046.
24. Nirmolia N, Mahanta TG, Boruah M, Rasaily R, Kotoky RP, Bora R. Prevalence and risk factors of Pneumonia in under five children living in slums of Dibrugarh town. Clin Epid Global Hlth 2018;6(1):1-4.
25. Nartando R, Hildenwall H, Peterson S, Kaddu-Mulindwa D, Kalyesubula I, Tumwine JK. Bacterial aetiology and outcome in children with severe pneumonia in Uganda. Ann Trop Paed 2008;28:253-260.
26. Azab SFA, Sherief LM, Saleh SH, Elsaeed WF, Elshafie MA, Abdelsalam SM. Impact of socio-economic status on the severity and outcome of community acquired Pneumonia among Egyptian children: a cohort study. Inf Ds Poverty 2014;3(1):14. doi:10.1186/2049-9957-3-14
27. Ahmed H. Effects of poverty on child health and paediatric practice in Nigeria: An overview. Ann Afr Med 2007;6:142-156.
28. WHO, UNICEF, Federal Ministry of Health, Nigeria. Integrated Management of Childhood Illness. Assess and Classify the sick child 2months up to 5years. 2007; 7-14.
29. Tagbo BN, Ude AC, Ibe BC. Predictive value of respiratory rate thresholds on pneumonia among preschool children. Nig J Paediatr 2002;29(4):108-112.
30. Victora CG, Fuchs SC, Flores AC, Fonseca W, Kirkwood BR. Risk factors for pneumonia among Brazilian children in a metropolitan area. Pediatrics 1994;93:977-985.