ORIGINAL ARTICLE

An audit of paediatric mortality patterns in a Nigerian teaching hospital

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ABSTRACT

Background: The 4th millennium development goals (2002) reported that sub-Saharan Africa countries including Nigeria have a persistently high childhood mortality rates in-spite of all the preventive and interventional measures to reduce this ugly trend. **Patients and Methods:** Childhood mortality data was obtained from the medical records department and post-mortem records of the pathology departments over a 5-year period from January 2007 to December 2011. The selection criteria include all case notes with mortality records involving children admitted into the paediatrics department through the labour ward and the obstetrics theater, children emergency unit (CHER), paediatric out-patient clinic. **Results**: A total of 12,442 children were admitted during this period. Of this, 711 paediatric deaths were documented accounting for 17.5%. The male to female mortality ratio was 1.4:1. The age range was from birth to 17 years. Neonatal deaths accounted for the most common cause of death constituting 344 (48.4%) of all deaths. Among the neonatal mortality patterns, severe birth asphyxia/perinatal asphyxia was the most common cause of early neonatal deaths accounting for 97 (28.2%). Septicaemia accounted for the most frequent cause of infant mortality accounting for 28 (21.8%). Among the under-5 age group, severe malaria constituted the most common cause of death accounting for 52 (36.6%) cases while malignancy topped the list of 5-17 years mortality rate constituting 15 (15.4%) cases. **Conclusion:** Perinatal and neonatal deaths constitute the vast majority of death in our environment with most of the deaths resulting from severe birth asphyxias, prematurity. Again in the post-neonatal period, infections and other preventable diseases constitute the most common cause of death in children of under age group of five years. Above 5 years childhood malignancies constitutes the highest mortality pattern.

Key words: Childhood, mortality, neonates, prematurity, sepsis, severe birth asphyxia

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INTRODUCTION

A lot of studies on childhood mortality patterns in Africa have no comprehensive statistics. This is so because most reports are hospital based and not all cases of deaths involving children present to these health institutions. However, the 4th millennium development goals (2002) reported that sub-Saharan Africa countries including Nigeria have a persistent high childhood mortality rates in-spite of all preventive and interventional measures to reduce this ugly trends.[1] Conventionally nearly all the death of children globally comes from developing countries.[2] Specifically, about 99% of the 7.7 million recordable death of children globally in 2010 occurred in developing countries including Nigeria.[3] Studies have shown that about 16% of all under-5 children die annually in sub-Saharan Africa.[1,4] In Nigeria alone, 11.6% of the total population of children die anually.[4] Again the under-5 mortality rates in Nigeria is as high as 183 per 1000 children.[5]

Most of these children die from preventable communicable diseases and malnutrition disorders. Studies have shown that about half to two-thirds of these preventable diseases have malnutrition as a major underlying risk factor.[6,7] These challenges have been attributed to poor environmental health conditions, poverty and ignorance as mainly responsible for the high mortality rates experienced in Africa. The role of advocacy for preventive approach including immunization programs, exclusive breast feeding practices and control of diarrhea diseases have only minimally reduce childhood mortality in our environment.[7,8]

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The aim of this study is to audit the disease prevalence and mortality patterns during neonatal and post-neonatal periods in a tertiary healthcare provider in Nigeria.

PATIENTS AND METHODS

Mortalities involving children admitted into the paediatric department through the labour ward and the obstetrics theater, children emergency unit (CHER), paediatrics out-patient clinic within the age brackets from birth to 17 years were analyzed at the Irrua Specialist Teaching Hospital, a (primary, secondary and tertiary) hospital that provides all levels of health care. Childhood mortality data was obtained from the medical records department and post-mortem records of the pathology departments over a 5-year period from January 2007 to December 2011. All cases of mortality record involving paediatric surgery were excluded from this study. Demographic information derived from the case notes includes age, sex, clinical history, clinical diagnosis and the cause of death. The causes of death were broadly classified into non-communicable and communicable diseases.

Data obtained were entered in Microsoft excel, transferred, coded and expressed as percentage for categorical variables and the mean ± standard deviation (SD) for continuous variables using the statistical packaging for social sciences (SPSS) version 17 statistical package (SPSS) incorporated, Chicago, Illinois, USA.

RESULTS

The total number of children admitted in this period was 12,442. Of this, a total of 711 paediatric mortalities were documented accounting for 17.5% as shown in Table 1. Among this 402 deaths occurred in males while 290 deaths occurred in females. Hence the male to female ratio was 1.4:1. The age range was from birth to 17 years. Neonatal deaths accounted for the most common cause of death constituting 344 (48.4%) of all deaths. This was followed by deaths occurring among under-5 children (1-5 years) and infants (28 days-1 year) constituting 142 (20.0%) and 128 (18.0%), respectively. In neonatal age group deaths occurring in the first week of life is more frequent than those occurring after the first week of life ($P < 0.001$). In post neonatal age group death occurring among children under age 5 are more common than death occurring above 5 years ($P < 0.001$).

Among the neonatal mortality patterns, the mean mortality age was 3.6 days ± 3.4 S.D. The most common causes of early neonatal mortality were severe birth asphyxia/perinatal asphyxia and prematurity accounting for 97 (28.2%) and 94(27.3%) cases, respectively. This again is closely followed by septicaemia constituting 92 (26.7%) cases. A handful of deaths also resulted from hyperbilirubinaemia accounting for 23 (6.7%) cases. Others causes of neonatal deaths are sequentially highlighted in Table 2.

Among the infant mortality patterns, the mean age was 7.2 months ± 4.8 S.D. Of the 128 infant mortality patterns documented during this period, septicaemia accounted for the most frequent cause of infant mortality accounting for 28 (21.8%). Bronchopneumonia and severe malaria constituted 24 (18.7%) and 20(15.6%) respectively. Other common causes of death in this age group are seen in Table 3.

Table 1: Shows the overall patterns of diseases causing death in paediatric age groups

Age	Male	Female	Number (%)
Birth-28 days	197	147	344 (48.4)
>28 days-12 months	73	55	128 (18.0)
>12 months-5 years	82	60	142 (20.0)
>5-17 years	61	49	97 (13.6)
Total	402	290	711 (100)

Table 2: Shows the patterns of diseases causing death in neonatal age groups

Causes of death	Number (%)
Severe birth asphyxia/perinatal asphyxia	97 (28.2)
Prematurity	94 (27.3)
Septicaemia	92 (26.7)
Hyperbilirubinaemia	23 (6.7)
Haematological/haemolytic disorder	8 (2.3)
Neonatal tetanus	6 (1.7)
Congenital heart disease	4 (1.2)
Meconium aspiration syndrome	4 (1.2)
Severe anaemia	4 (1.2)
Spinal bifida	2 (0.6)
Multiple congenital abnormality	2 (0.6)
Congenital pneumonia	1 (0.3)
Others	7 (2.0)
Total	344 (100)

Table 3: Shows the patterns of diseases causing death in infant age groups

Causes of death	Number (%)
Septicaemia	28 (21.8)
Bronchopneumonia	24 (18.7)
Severe/cerebral malaria	20 (15.6)
HIV/AIDS	17 (13.3)
Meningitis	7 (5.5)
Congenital heart disease	7 (5.5)
Intestinal obstruction/Intus-susception	6 (4.7)
Viral haemorrhagic fever	5 (3.9)
Gastroenteritis	5 (3.9)
PEM	2 (1.6)
Aspiration pneumonia	2 (1.6)
Severe anaemia/anaemic hearth failure	1 (0.8)
Others	4 (3.1)
Total	128 (100)

A total of 142 children under the age of 5 years were documented. The mean mortality age was 2.4 years ± 1.6 S.D. Among these severe malaria constituted the most common cause of death accounting for 52 (36.6%) cases. This was followed by septicaemia, viral haemorrhagic fever and bronchopneumonia accounting for 19 (13.4%), 17 (12%) and 10 (7.1%) cases, respectively. Human immunodeficiency virus/acquired immunodeficiency syndrome accounted for 9 (6.4%). Table 4 shows the other list of mortality patterns of under-5 years.

A total of 97 deaths were recorded between the ages of 5 to 17 years. The mean age was 9.2 years ± 3.0 S.D. Malignancy and septicaemia topped the list constituting 15 (15.4%) cases each while meningitis and severe malaria constituted 9 (9.3%) and 7 (7.2%) cases, respectively. The rest of the list is seen in Table 5.

Table 4: Shows the patterns of diseases causing death in 1-5 years age groups

Causes of death	Number (%)
Severe malaria	52 (36.6)
Septicaemia	19 (13.4)
Viral haemorrhagic fever	17 (12.0)
Bronchopneumonia	10 (7.1)
HIV/AIDS	9 (6.4)
Childhood Malignancy	6 (4.2)
Severe anaemia/anaemic hearth failure	6 (4.2)
Meningitis	5 (3.5)
Tuberculosis	4 (2.8)
Gastroenteritis	3 (2.1)
PEM	3 (2.1)
NYD	2 (1.4)
Tetanus	1 (0.7)
Others	5 (3.5)
Total	142 (100)

DISCUSSION

The emphasis of this discussion is based on paediatric mortality patterns confirmed through the records department with available case notes. Brought-in-dead (BID) patients and children that died in the children emergency room (CHER) without case notes were completely excluded from this study. However, only few of the majority of the mortality cases had a post-mortem examination carried out on them, hence majority of the mortality patterns were strictly based on clinical diagnosis with emphasis on the primary medical condition as the certified cause of death.

In this study, the overall paediatric mortality rate was 17.5%. This is comparable to previous similar study done by Wemmander *et al.,*[9] in Zaria, Northern Nigeria where paediatric mortality accounted for 15.1%. Nevertheless this figure is higher than the 9.5% documented by Ayoola *et al.,*[10] in Ibadan western Nigeria and 12.6% reported by Fatugba *et al.,*[11] in Shagamu, western Nigeria. Again, our finding is higher than report from outside Nigeria which accounted for 7.8% mortality rate reported by Krug *et al.*[12] The reason for this high prevalence childhood mortality patterns is partly due to the fact that most cases presenting at the teaching hospital setting are complicated cases which may have been managed wrongly by trado-medical practitioners, chemists operators and other uncertified heath practitioners and spiritual homes. Furthermore due to poverty, lack of infrastructures, inadequate health education, poor environmental sanitation and poor control of acute diarrhoea diseases have tremendously contributed to this high mortality rates in paediatric age groups in our locality.

This study has shown that neonatal death constituted the first majority of paediatric mortality patterns. This constituted 48.4% of all recordable paediatric deaths. This colossal finding is however slightly less than the than the 57.3% and 54.7% reported by other Nigerian researchers.[8,11]

Table 5: Shows the patterns of diseases causing death in 5-18 years age groups

Causes of death	Number (%)
Septicaemia	15 (15.4)
Malignancy	15 (15.4)
Meningitis	9 (9.3)
Severe malaria	7 (7.2)
Severe anaemia/anaemic hearth failure	7 (7.2)
Renal failure/nephritic syndrome	6 (6.2)
Sickle cell disease	6 (6.2)
Viral haemorrhagic fever	6 (6.2)
RTA	4 (4.1)
HIV/AIDS	4 (4.1)
Hepatitis	3 (3.1)
Tuberculosis	2 (2.1)
Burns	2 (2.1)
Tetanus	2 (2.1)
Congestive cardiac failure	2 (2.1)
Others	7 (7.2)
Total	97 (100)

RTA – Road traffic accident HIV/AIDS – Human immunodeficiency virus/acquired immunodeficiency syndrome

Notwithstanding, our finding is higher when compared to previous studies.[4,10,13] Among the neonatal death in this study, severe birth and perinatal asphyxia accounted for the most common cause of death constituting 28.2%. Nonetheless this is slightly lower but similar to reports by Fajolu *et al.,*[8] where severe birth and perinatal asphyxia accounted for 36%. Once more our finding is similar although slightly higher than the 20.4% reported by Eke *et al.,*[14] in Port-Harcourt, southern Nigeria. Now this was closely followed by death patterns resulting from prematurity. This thus accounted for 27.3% of all neonatal deaths. This report is contrary to other reports from other centres where prematurity was far the most common cause of neonatal mortality[13,15,16] The reason for this high prevalence of severe birth asphyxia and prematurity may be attributable to poor antenatal and perinatal care.

Again poverty, lack of adequate health education, poor health facilities are other contributory factors to neonatal mortality in this environment. This is sharply in contrast to Caucasian series where neonatal deaths from prematurity and severe birth asphyxia are relatively low[17] maternal mortality. Yet again our findings are quite different from previous similar report by Ayoola *et al.,* where neonatal tetanus was the most common cause of neonatal mortality. In our list neonatal tetanus was an uncommon cause of neonatal death. The reason was partly based on the fact that this is a more recent study. Since the enactment of the 4th millennium goals efforts have been geared towards creating awareness on childhood diseases and the control of communicable diseases, improving infrastructures. Specifically, more potent vaccines have improve control of communicable diseases, thereby, preventing the occurrence of tetanus and vaccine preventable diseases supports the low death rates recorded for tetanus and other vaccine preventable diseases. Mortality pattern from septicaemia in this study is relatively high and accounted for vast majority of deaths. This again is similar to series of reports by other researchers. The reason for this high incidence is partly due to contaminations from unhygienic cord care practices and other traditional practices including tribal marking and abdominal scarifications and other unhealthy practices, delivery conducted by unqualified health personnel , unhygienic environment and poor health education among parents.[10,16] No case of neonatal malaria was seen in this study. Once again this is similar to other researchers reports.[16]

In the post-neonatal period infection constitutes the vast majority of death in this study. Among the infant mortality patterns septicaemia was the most common cause of mortality. This is slightly different but similar to other reports where a sizable number of death results from septicaemia. Other infections including bronchopneumonia, meningitis, severe malaria, viral haemorrhagic fever constitutes a significant cause of postnatal deaths.[10] However, in this study, children between the ages of 5 and 17 years died more from childhood malignancies accounting for 15.5% of all recordable death in this age group. This is similar to work done by other researchers where childhood malignancies accounted for 16% of all death in this age group.[10] Other non-communicable disease causing death in this age group include haematological disorders like sickle cell anaemia;traumatic disorders including road traffic accidents (RTA)/burns and renal disorders.

In conclusion, neonatal deaths constitute the vast majority of death in our environment with most of the deaths resulting from severe birth asphyxias and prematurity. Again in the post-neonatal period infection and other preventable disease constitutes the most common cause of death in children of under-5 age group. Above 5 years childhood malignancies constitutes the highest mortality pattern. Finally, it is long overdue to reduce the mortality patterns resulting from deaths communicable and preventable diseases including neonatal death if the 4th millennium development goal is effective in our locality in particular and in Nigeria in general.

REFERENCES

1. Fotso JC, Ezeh AC, Madise NJ, Ciera J. Progress towards the child mortality millennium development goal in sub-Saharan Africa. The dynamics of population growth, immunization and access to clean water. BMC Public Health: 218 taken from http://www/pubmed central.nih.gov/article render. fcgi? artid: 2000892 [Last accessed on 2008 Jan 2].
2. Black RE, Morris SS, Bryce J. Where and why are 10 million children dying each year. Lancet 2003;361:2226-34.
3. Rajaratnam JK, Marcus JR, Flaxman AD, Wang H, Levin-Rector A, Dwyer L, *et al*. Neonatal, postnatal, childhood and under-5 mortality for 187 countries, 1970-2010: A systematic analysis of progress towards millennium development goal 4. Lancet 2010;375:1988-2008.
4. Fagbule D, Joiner KT. Pattern of childhood mortality at the University of Ilorin Teaching Hospital. Nig J Paediatr 1987;14:1-5.
5. UNICEF. Statistical Tables: Health, official summary of the state of the world's children 2003;12.
6. Bryce J, Black RE, Walker N, Bhutta ZA, Lawn JE, Steketee RW. Can the world afford to save the lives of 6 million children each year? Lancet 2005;365:21932200.
7. Bryce J, Boschi-Pinto C, Shibuya K, Black RE. WHO estimates of the causes of death in Children. Lancet 2005;365:1147-52.
8. Fajolu IB, Egri-Okwaji MTC. Childhood mortality in children emergency centre of the Lagos University Teaching Hospital. Nig J Paediatr 2011;38:131-5.
9. Wemmanda RD, Alli FU. Condition associated with the risk of death within 24 hours of admission in Zaria, Nigeria. Anns Afr Med 2004;3:134-7.
10. Ayoola OO, Orimadegun AE, Akinsola AK, Osinusi K. A five-year review of childhood mortality at the university college hospital, Ibadan. West Afr J Med 2005;24:175-9.
11. Fatugba B, Ogunlesi T, Adekanbi F, Olanrewaju D, Olowu A. Comparative analysis of childhood deaths in Sagamu, Nigeria: Implication for the forth MDG. SAJCH 2007;1:106-11.
12. Krug A, Patrick M, Pattinson RC, Stephen C. Childhood death auditing to improve paediatric care. Acta Paediatr 2006;95:1467-73.
13. Ojukwu JU, Ogbu CN, Nnebe-Agmadu UH. Post-neonatal medical admissions into the paediatric wards of Ebonyi State University Teaching Hospital, Abakaliki: The initial experience and outcome. Nig J paediatr. 2004; 31: 79-86.
14. Eke FU, Frank-Briggs A, Ottor J. Childhood mortality in Port-Harcourt, Nigeria. Anil Aggrawal's Internet Journal of Forensic Medicine and Toxicology 2001;2.1-7.
15. Ekure EN, Iroha EO, Egri-Okwaji MTC, Ogedengbe OK. Perinatal mortality at the close of the 20th century in Lagos University teaching hospital. Nig J Paediatr 2004;31:14-8.
16. Nte AR, Ekanem EE, Gbaraba PV, Orumabo RS, Odu N. Social and environmental influences on the occurrence of neonatal tetanus in some riverine communities in Nigeria. Trop Doc 1997;27:734-5.
17. Steel N, Reading R. Epidemiology of childhood mortality. Curr Paediatr 2002;12:151-6.

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