

A five-year review of childhood mortality at the University College Hospital, Ibadan

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Summary

Introduction: The present study sought to provide a comprehensive description of causes of mortality in a local Nigerian children population as a measure of their health status.

Methods and patients: A retrospective study of the pattern of mortality among 12,522 children admitted into all the six wards of the department of Paediatrics, University College Hospital, Ibadan during a five-year period (January 1996 – December 2000) was done.

Results: There were 1,185 deaths with an overall mortality rate of 9.5 per cent. There was no significant change in childhood mortality rate over the five years reviewed. Of the 1185 deaths, 48.8% occurred within 24 hours and neonatal deaths accounted for 50.8% of the total number of deaths. The leading causes of death were neonatal tetanus, Prematurity/low birth weight, neonatal septicaemia, severe birth asphyxia, meningitis, severe malaria, pneumonia, septicaemia, severe malnutrition, and measles. Deaths from sickle cell anaemia were found only among children above 5 years of age.

Conclusions: Majority of deaths occurred in neonates and were preventable.

Key-words: Mortality, Neonates, Infants, Under-5.

Résumé

Introduction: L'objet de cette étude est de donner une description détaillée des causes de mortalité chez la population rurales des enfants nigériens comme la mesure pour le statut de leur santé.

Méthodes et patients: Une étude rétrospective de la tendance de mortalité chez 12,522 enfants admis dans tous les six salles du département de pédiatrie collégiale hospitalier universitaire, Ibadan pendant une période de cinq ans (janvier 1996 décembre 2000) a été effectuée.

Resultat: Il y avaient 1,185 morts avec un taux de rendement total de mortalité de 9,5% il n'y avait aucun changement sensible dans le taux de mortalité d'enfance au cours de bilan de 5 ans d'étude. Entre 1,185 morts, 48,8% a eu lieu en moins de 24 heures et morts néonataux constituent 50,8% de rendement total des morts. Les causes principaux des morts étaient tétanos néonatal, poids de naissance bas/prématuré, septicémie neonatale sous alimentation grave, et la rougeole. Morts attribuables à

la drépanocytose sont trouvées seulement chez des enfants âgés de plus de 5 ans.

Conclusion: Le grand nombre des morts arrivait chez les néonates sont évitables.

Introduction

More than 10 million children die every year from preventable causes, almost all in developing countries. Ninety percent of these deaths occur in just 42 countries¹. According to WHO figures, the world's average child mortality rate in the year 2000 was 67 per 1000 live births with marked improvement from 85 per 1000 in 1990.² But in Africa, the child mortality rates are averagely 150 per 1000 live births, which is 8 times that seen in Europe.² In 7 African countries, there has been little or no change in child mortality rate over the past 50 years.³

Currently, infant and under-5 mortality rate in Nigeria are estimated as 110 per 1000 and 183 per 1000 respectively.⁴ In Nigeria and many developing countries, due to various constraints in community based research, hospital records of morbidity and mortality rates are still the basis of many published health statistics.⁵ In spite of their limitations, these set of data are significant pointers to disease pattern in the community.⁶

Three previous studies carried out at the University College Hospital (UCH) Ibadan have examined pattern of paediatric deaths.⁷⁻⁹ Hendrickse⁷ and Adeyokunnu et al.⁸ examined the pattern of deaths in all the paediatric wards in the hospital while Bamgboye and Familusi⁹ reviewed mortality pattern at the emergency ward only. The two earlier studies covered the periods, 1964-1966 and 1969-1973 respectively while the latter included 1978, 1981-1986. The purpose of this study is to review the current pattern of childhood mortality in UCH, Ibadan, Nigeria.

Methodology

The Paediatrics Department of the University College Hospital (UCH), Ibadan serves as a tertiary referral centre for all health centres in Ibadan and other parts of Nigeria. The department comprises of six wards with one hundred and fifty-eight beds.

The case records of all patients presenting from 1996 to 2000 were examined retrospectively to document the total number of admissions and all deaths that occurred on the wards. The information extracted from these records included age at admission, the gender, causes of death,

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place of referral, duration of admission and date of death. The extracted data were entered into structured questionnaires, checked and corrected for errors; they were entered into computer and analyzed using the SPSS 11 software for windows package for data entries, frequencies and cross tabulations. All data, which were either not available or unknown on any item during cross-tabulations, were excluded from the denominator of the rates calculated.

Results

During the five-year period, a total of 12,522 children were admitted into the department out of which were a total of 1,341 deaths. Out of the 1,341 deaths, 156 were

Table 1 Yearly distribution of childhood deaths at UCH Ibadan, 1996-2000

Year	Total number admissions (% of total)	Number of deaths	Death rate (%)
1996	1910 (15.3)	132	6.9
1997	2263 (18.1)	267	11.8
1998	3528 (28.2)	224	6.4
1999	2486 (19.9)	293	11.8
2000	2335 (18.5)	269	11.5
Total	12522 (100)	1185	9.5

Table 2 Proportional death rate of children by month over the five year period – 1996-2000.

Month	Frequency	Percent
January	94	7.9
February	76	6.4
March	123	10.4
April	110	9.3
May	74	6.2
June	78	6.6
July	127	10.7
August	148	12.5
September	74	6.2
October	93	7.8
November	98	8.3
December	90	7.6
Total	1185	100.0

Table 3 The age group and sex distribution of deaths

Age	Deaths		Total n (%)
	Male	Female	
0-28days	330	287	617 (52.1)
29days-1year	107	93	199 (16.8)
>1year-5years	138	106	244 (20.6)
Over 5years	86	39	125 (10.5)
Total	661	524	1185
n (%)	(55.8)	(44.2)	(100)

Table 4 Principal causes of deaths in all age groups

Causes of death	Number of cases	%
Neonatal tetanus	163	13.8
Prematurity and Low birth weight	136	11.5
Neonatal Septicaemia	124	10.5
Severe birth asphyxia	124	10.5
Meningitis	87	7.3
Severe Malaria	73	6.2
Pneumonia	56	4.7
Septicaemia	55	4.6
Severe malnutrition	52	4.4
Measles	42	3.5
Malignancies	41	3.5
Gastroenteritis	31	2.6
Severe anaemia	29	2.4
Tuberculosis	28	2.4
Neonatal Jaundice	26	2.2
Sickle Cell anaemia	26	2.2
Renal diseases	13	1.1
Congenital malformation	12	1.0
Hepatitis	11	.9
Congenital Heart disease	10	.8
Post neonatal tetanus	10	.8
Burns	7	.6
Acquire heart disease	6	.5
Infantile cholestasis	5	.4
HIV/AIDS	4	.3
Other Neuologic infection	3	.3
Metabolic disorder	3	.3
Rabies	2	.2
Kerosene poisoning	2	.2
Drug reactions	2	.2
Unknown/Brought in dead	1	.1
Pyomyositis	1	.1
Total	1185	100.0

excluded from further analysis due to incomplete information with regard to date of death and cause of death so 1,185 had acceptable data for this study resulting in overall mortality rate of 9.5 percent. The mean age was 18.4months with the oldest child being 17years. There were 661 males and 524 females, with a M:F ratio of 1.3:1.

The annual admission pattern and proportional death rates for each year is as shown in Table 1. The highest number of admissions was recorded in 1998 while

Table 5 Causes of deaths among the neonates

Causes of death	Number of cases	%
Neonatal tetanus	163	26.4
Prematurity/Low birth weight	136	22.0
Neonatal Septicaemia	124	20.1
Severe birth asphyxia	123	19.9
Meningitis	26	4.2
Neonatal Jaundice	26	4.2
Congenital malformation	12	1.9
Congenital Heart disease	4	.6
Pneumonia	2	.3
Metabolic disorder	1	.2
Total	617	100.0

Table 6 Causes of deaths among age 29 days-1year

Causes of death	Number of cases	%
Septicaemia	32	16.1
Severe Malaria	26	13.1
Pneumonia	25	12.6
Meningitis	23	11.6
Severe malnutrition	21	10.6
Gastroenteritis	18	9.0
Measles	15	7.5
Severe anaemia	7	3.5
Tuberculosis	7	3.5
Malignancies	6	3.0
Infantile cholestasis	5	2.5
Sickle Cell anaemia	3	1.5
Post neonatal tetanus	3	1.5
Renal diseases	2	1.0
Hepatitis	2	1.0
HIV/AIDS	1	.5
Unknown/Brought in dead	1	.5
Congenital Heart disease	1	.5
Metabolic disorder	1	.5
Total	199	100.0

1996 had the lowest record. The yearly mortality rates ranged from 6.4% to 11.8%.

The number of deaths for each month of the years in review is shown in Table 2. The highest number of deaths was recorded in the months of August (12.5%), July (10.7%) and March (10.4%) while the least number of deaths were recorded in May (6.2%) and September (6.2%)

In 88 (7.4%) of these deaths the ante-mortem diagnoses were complemented with findings at autopsy (autopsy ratio 1:12.4). Five hundred and seventy-nine (48.8%) of the deaths occurred within 24 hours of admission, while 370 (31.2%) occurred within 3-7 days of admission. Only 236 deaths (20.0%) occurred after a week of admission. The age group and sex distribution of deaths

Table 7 Causes of deaths among age 1-5years

Causes of death	Number of cases	%
Severe Malaria	32	13.1
Severe malnutrition	31	12.7
Meningitis	29	11.9
Measles	27	11.1
Pneumonia	22	9.0
Severe anaemia	17	7.0
Malignancies	15	6.1
Septicaemia	12	4.9
Gastroenteritis	11	4.5
Tuberculosis	10	4.1
Sickle Cell anaemia	10	4.1
Hepatitis	7	2.9
Congenital Heart disease	4	1.6
Post neonatal tetanus	4	1.6
Burns	2	.8
Renal diseases	2	.8
Other Neuologic infection	2	.8
Kerosene poisoning	2	.8
Drug reactions	2	.8
HIV/AIDS	1	.4
Acquire heart disease	1	.4
Pyomyositis	1	.4
Total	244	100.0

are shown in Table 3. Six hundred and seventeen (51.8%) of the total deaths occurred in neonates, 232 (19.7%) occurred in older infants (29 days – 1 year), 200 (16.9%) deaths were in children aged greater than 1 to 5 years, while 137 (11.6%) were in the age group older than 5 years. There was a progressive decline in the numbers of deaths as the ages increased.

Causes of death

The disease entities identified among the 1185 deaths are listed in order of their prevalence in Table 4. Most common causes of deaths were neonatal tetanus 163 (13.8%), prematurity/low birth weight 136 (11.5%), neonatal septicaemia 124 (10.5%), severe birth asphyxia 124 (10.5%), meningitis 87 (7.3%), severe malaria 73 (6.2%), pneumonia 56 (4.7%) and septicaemia 55 (4.6%). Least among identified causes of deaths were rabies and kerosene poisoning.

There were significant differences in the leading causes of death in the different age groups as shown in tables 5 to 8. The principal causes of death among the neonates were neonatal tetanus 163 (26.4%), prematurity/low birth weight 136 (22.0%), neonatal septicaemia 124 (20.1%), severe birth asphyxia 123 (19.9%), meningitis 26 (4.2%) and neonatal jaundice 26 (4.2%) (Table 5). Septicaemia (16.1%) was the leading cause of death among the infants beyond the neonatal age group; this

Table 8 Causes of deaths among age above 5years

Causes of death	Number of cases	%
Malignancies	20	16.0
Severe Malaria	15	12.0
Sickle Cell anaemia	13	10.4
Septicaemia	12	9.6
Tuberculosis	11	8.8
Meningitis	9	7.2
Renal diseases	9	7.2
Pneumonia	7	5.6
Severe anaemia	5	4.0
Burns	5	4.0
Acquired heart disease	5	4.0
Post neonatal tetanus	3	2.4
Gastroenteritis	2	1.6
HIV/AIDS	2	1.6
Rabies	2	1.6
Hepatitis	2	1.6
Congenital Heart disease	1	.8
Other Neurologic infections	1	.8
Metabolic disorder	1	.8
Total	125	100.0

was closely followed by severe malaria (13.1%), (Table 6). However, among the age group 1-5years (Table 7), severe malaria (13.1%) severe malnutrition (12.7%) and meningitis (11.9%) were the three leading causes of deaths. Among the children above 5years (Table 8), malignancies (16.0%), severe malaria (12.0%) and sickle cell anaemia (10.4%) were the three leading causes of deaths.

Table 9 Distribution of deaths from different referring centres

Referring centre	Number of cases	Percent
General hospitals	560	47.3
No referral	300	25.2
Private hospitals	220	18.6
UCH outpatient clinics	60	5.1
Primary health centres	25	2.1
Other Tertiary health centres	20	1.7
Total	1185	100.0

Five hundred and sixty (47.3%) of the all deaths were referred from general hospitals, 300 (25.2%) were admitted without referral notes, 220 (18.6%) came from private hospitals and 60 (5.1%) were from other departments of the hospital (Table 9). The highest number of deaths, 690 (58.2%) occurred in the emergency ward which had the highest number of admissions over the five-year period, while the least number of deaths occurred in North West 2 ward (3.1%), which also had the lowest number of admissions over the five-year period.

Out of the six childhood vaccine-preventable diseases, neonatal tetanus for which there were 163 cases over this time period has the highest case fatality of 13.8%. Others are measles (3.5%) and tuberculosis (2.4%).

Discussion

In Africa, it has been hard to establish the causes of deaths at community level where the majority take place.¹⁵ Therefore hospital based data despite their inadequacies, are useful indicators of the community health status and particularly of childhood population.¹⁶ Teaching hospitals are expected to provide mainly tertiary service however, the UCH Ibadan offers primary to tertiary care without discrimination. Therefore the diversity of cases seen is representative of paediatric cases in the community.

This present study has shown an overall mortality rate of 9.5%. This is an improvement compared with 14% and 13% obtained previously in similar studies carried out in the same department by Hendrickse⁴ and Adeyokunnu et al⁵ respectively more than 2 decades ago and reports from Congo.¹⁶ It is also comparable to an overall mortality of 11.6% reported from University of Ilorin teaching hospital in 1987 but higher than reports from Benin.¹⁷ This may be explained by improved infrastructure in the hospital compared with earlier years. There is also a reduction in the incidence and deaths from diarrhoeal diseases due to effectiveness of preventive programmes like Control of Diarrhoeal diseases and the Integrated Management of Childhood Illnesses. There is improved health awareness and health education.

The finding of higher death proportion among male children has been reported earlier.^{8,10-11} The low level of awareness on the benefit and importance of post mortem

examination may be part of the reasons for the low autopsy rate (7.4%) obtained in this study. Children who died within 24 hours of admission accounted for 48.8% of the total deaths. This compares with 50% reported by Morley¹² and 32.8% reported by Fagbule et al.¹¹ The fact that neonatal deaths contributed more than half of the paediatric mortality in the hospital was earlier reported by Fagbule et al¹¹ and Akindele et al.¹³

The finding of neonatal tetanus as the most common cause of deaths in the neonates was in contrast with earlier reports^{7-8,13} in which low birth weight and prematurity were responsible for most of the deaths in the neonatal age group. Although its death toll has reduced by a third in the last decade worldwide, there is a noticeable upsurge up to 62% in Nigeria.¹⁸⁻¹⁹ Major risk factors identified to be associated with this surge are incomplete or no maternal tetanus immunisation, lack of paternal education, delivery outside health facility, untrained personnel at delivery, use of contaminated instruments for cutting umbilical cord at birth and other unhygienic cord care practices.²⁰

In the review by Hendrickse, malaria was responsible for 15%, 20%, and 14% of deaths in the age groups, 0-1, 1-5, and 5-14 respectively. Comparable values of 13.1%, 13.1% and 12.0% respectively were obtained in this study but there was no death primarily attributable to malaria in the neonatal age group. In contrast, Adeyokunnu et al reported 3% and 4% for age group 1-5 and above 5 years respectively. A probable explanation for this may be the lack of awareness of the possibility of congenital malaria hence, failure to have a blood film examination for malaria parasites in this age group.

Infections such as pneumonia, meningitis and measles and malnutrition remained very important problems among the under 5. The finding of malignancies (16%) as the most common cause of death in children above age of 5 years was also reported by previous investigators but this proportion represents a slight decrease from the reported 23.8%. Congenital malformations were responsible for 1% of the overall causes of death. This proportion represents a remarkable decrease compared with the findings of Hendrickse and Adeyokunnu studies.^{8,9} Adeyemo et al¹⁴ studied the contribution of major congenital malformations to morbidity among neonates referred to the University College Hospital, Ibadan, Nigeria over a four year period (1992-1995). Major congenital malformations were found in 11.1% of 1276 neonatal referrals and ranked fourth among the most common problems in such neonates (after sepsis, jaundice and tetanus but ahead of prematurity and perinatal asphyxia).

Similar to other reports¹¹ deaths due to sickle cell anaemia were mainly in children above five years who had various types of crises precipitated by infections including malaria. Majority of the deaths were referred from the secondary health services.

The occurrence of almost half of the deaths in the emergency ward is not surprising because this ward is

usually the first port of call for most referrals to the hospital, the biggest of all the wards in the department and there was no restriction to admission both day and night hence the high admission and mortality especially in the first two days of admission. In addition, facilities for resuscitation are still grossly inadequate. This study has further highlighted the fact that majority of childhood deaths in Nigeria are preventable.

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