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Childhood mortality in children emergency centre of the Lagos University Teaching hospital

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Abstract *Background:* Infant and childhood mortality has remained high in developing countries like Nigeria with only marginal reductions achieved over the past two decades despite several interventions to reduce morbidity and mortality from the common causes of death in children. It is therefore important to examine the current pattern of mortality in children and compare it with previous reports from this centre so as to determine if newer interventions are needed or if these current interventions need to be strengthened for more effective reduction in childhood mortality.

Objective: The aim of this study was to examine the pattern of childhood mortality in the children emergency centre of the Lagos University Teaching Hospital (LUTH).

Materials and Methods: Admission and discharge records from October 2007 to November 2008 were reviewed retrospectively, the age, sex, diagnosis and duration of hospital stay before death were analyzed.

Results: Four hundred and forty six children (446) out of the 4031 children admitted during the study Period died, giving a mortality of 11.1%. More than half of the deaths (55.4%) occurred within 24hours of arrival in hospital. Neonates accounted for 54.7% of deaths.

The common causes of death in the neonates were perinatal asphyxia (36.1%), neonatal jaundice (21.3%), prematurity (16.3%) and septicaemia (11.5%), while in the older children anaemia, septicaemia, severe malaria and acute respiratory illnesses were the commonest conditions accounting for 22.6%, 16.3%, 12.1% and 9.9% of deaths respectively.

Conclusion: Childhood mortality in LUTH is still high with majority of deaths occurring in infancy especially in the neonatal period. Efforts to prevent perinatal asphyxia, the most common cause of death in the neonatal period, should be intensified and education on the prevention, early identification and management of conditions such as neonatal jaundice, malaria, anaemia and acute respiratory illnesses should also be strengthened.

Introduction

Despite the various intervention programs to improve child survival such as baby friendly initiative, control of diarrhoeal disease, immunization programmes, roll back malaria etc, the childhood mortality rates in most developing countries have remained high with only marginal reductions achieved over the past two decades.

The average annual reduction in the under five mortality rate from 1990-2007 for Nigeria was 1.2% compared with 3.0% for the industrialized countries[1]. Factors responsible for this include among others poor utilization of available health services and when they are utilized patients present late [2,3] with 40.1% - 64.2% of deaths occurring within 24 hours of arrival in the hospital.[4-6] The common causes of death in children especially in the developing countries are still largely preventable diseases such as perinatal asphyxia, septicaemia,

acute respiratory illnesses, diarrhoea and malaria. An earlier study done in this centre in 1990 reported a mortality rate of 14.3% in children in the emergency room, and 91.5% of these children were less than five years.[7]

The major causes of death in this earlier study were protein energy malnutrition, neonatal jaundice, diarrhoeal diseases, pneumonia, severe anaemia and prematurity.

This retrospective study was carried out to examine the current pattern of childhood mortality at the children emergency centre of the Lagos University Teaching Hospital (LUTH).

Materials and Methods

Registration, admissions and discharge records of the children emergency room and case notes of patients who died in the children emergency room of the Lagos University Teaching Hospital from November 2007 to October 2008 were reviewed. Information obtained included age, sex, clinical and or laboratory diagnosis and duration of hospital stay before death. Data was presented in numbers and percentages, chi square was used to compare groups, and a p-value of ≤ 0.05 was considered significant.

Results

During the 12 month period of the study, a total of six thousand, eight hundred and fifty nine (6859) children were seen at the children emergency centre of LUTH. Four thousand and thirty one (4031) children (M: F 1.5:1) were admitted and four hundred and forty-six (264 male and 182 female) died in the emergency room giving an overall mortality of 11.1%. Three hundred and ninety-four (88.3%) of these deaths were in children under 5years of age. More than half of the total deaths (54.7%) were in neonates and 91percent of these deaths occurred in the first week of life. Table 1 shows the percentage mortality amongst admissions in the different age groups. In the neonatal age group, neonates in the first week of life were more likely to die than those more than 1 week old (p=0.000) while in the post neonatal age group, children under 5 years were more likely to die than those more than 5 years (p = 0.01)

Table 1: Mortality rate in the different age groups

Age group	Total no of admissions	Total no of deaths (%)
Neonatal age group ≤ 7 days	972	222 (22.8)
8-28days	325	22 (6.7)
Post neonatal age group 1-59months	1813	150 (8.3)
>60months	921	52 (5.6)
Total	4031	446 (11.1)

Table 2 shows the duration of admission before death with two hundred and forty seven (55.4%) deaths occurring within 24 hours of arrival. Forty-six of the deaths within 24 hours (18.6%) occurred within the first 6 hours of arrival in the hospital. Eight children had no diagnosis recorded and were excluded from further analysis.

Table 2: Duration of admission before death in the different age groups

Age (n)	Duration of admission before death	
	≤ 24 hours	*>24 hours*
≤ 7 days (222)	108	114
8-28 days (22)	11	11
1-11 months (79)	46	33
12-59 months (71)	43	28
≥ 60 months (52)	39	13
Total (446)	247	114

Table 3 shows the different diseases leading to death in neonates. The major diseases in the neonatal period were perinatal asphyxia (36.1%), neonatal jaundice (21.3%), prematurity (16.3%) and septicaemia (11.5%).

Table 3: Diseases resulting in deaths among neonates

Disease	Number	Percentage
Perinatal asphyxia	88	36.8
Neonatal jaundice	52	21.7
Prematurity	40	16.7
Sepsis	28	11.7
Meningitis	2	0.8
Anaemia	4	1.6
HIV	3	1.2
Congenital heart disease	2	0.8
Surgical cases	3	1.2
Chromosomal anomaly	1	0.4
Neonatal tetanus	1	0.4
Others	16	6.7
Total	239	100

Table 4 shows the diseases leading to death in children beyond the neonatal period. Anaemia, septicaemia, severe malaria and acute respiratory illnesses were the commonest diseases resulting in death in children under 1 year but outside the neonatal period accounting for 22.6%, 16.3%, 12.1% and 9.9% respectively.

Table 4: Diseases resulting in death among children outside the neonatal period

Diagnosis	Age in months			
	1-11 n (%)	12-59 n (%)	=60 n (%	Total n (%)
Anaemia	14 (18.2)	20 (28.6)	9 (17.3)	43 (21.6)
Septicaemia	23 (29.8)	8 (11.4)	2 (3.8)	33 (16.6)
Severe malaria	3 (3.9)	11 (15.7)	12 (23.1)	26 (13.1)
ARI	15 (19.5)	3 (4.3)	2 (3.8)	20 (10.1)
Meningitis	3 (3.9)	6 (8.6)	2 (3.8)	11 (5.5)
HIV	6 (7.8)	3 (4.3)	1 (1.9)	10 (5.0)
PEM	2 (2.6)	2 (2.9)	-	4 (2.0)
SCD	-	3 (4.3)	1 (1.9)	4 (2.0)
Burns	-	-	3 (5.9)	3 (1.5)
Measles	1 (1.3)	2 (2.9)	-	3 (1.5)
Intestinal obstruction	-	1 (1.4)	3 (5.9)	4 (2.0)
Typhoid enteritis	-	1 (1.4)	5 (9.6)	6 (3.1)
Tetanus	-	-	2 (3.8)	2 (1.0)
Diarrhoeal diseases	4 (5.2)	5 (7.1)	1 (1.9)	10 (5.0)
Malignancy	-	1 (1.4)	2 (3.8)	3 (1.5)
Others	6 (7.8)	4 (5.7)	7 (13.5)	17 (8.5)
Total	77 (100.0)	70 (100.0)	52 (100.0)	199 (100.0)

Tables 5 and 6 show a comparison of the pattern of disease causing death in the neonatal and post neonatal age groups respectively over 18 years in LUTH. Table 5 shows a significant reduction in the deaths from neonatal tetanus and neonatal jaundice from 1990 compared with the present study while there was. In the post neonatal age group, the deaths from PEM, diarrhoeal diseases, and febrile convulsion significantly reduced, however there was a significant increase in the deaths from malaria, severe anaemia, septicaemia and HIV as shown in table 6.

Table 5: Pattern of disease causing death among neonates in Lagos University Teaching Hospital over 18 years

	Number (%)		
Disease	1990*	2008+	p-value
Neonatal jaundice	179 (35.3)	52 (21.7)	0.000
Aspyhxia	64 ((12.6)	88 (36.8)	0.000
Prematurity	78 (15.4)	40 (16.7)	0.636
Sepsis	62 (12.2)	28 (11.7)	0.840
Neonatal tetanus	73 (14.4)	1 (0.4)	0.000
Others	51 (10.1)	30 (12.7)	0.307
Total	507	239	

* From reference 7
+ Present study

Table 6: Pattern of disease causing death in the outside the neonatal period in Lagos University Teaching Hospital over 18 years

	Number (%)		
Disease	1990*	2008+	p-value
PEM	211(24.6)	4 (2.0)	0.000
Diarrhoeal diseases	122 (14.2)	10 (5.0)	0.000
ARI	110 (12.8)	20 (10.1)	0.281
Severe anaemia	80 (9.3)	43 (21.6)	0.000
Malaria	47 (5.5)	26 (13.1)	0.000
Septicaemia	35 (4.1)	33 (16.5)	0.000
Measles	21 (2.5)	6 (3.0)	0.649
HIV	0 (0)	20 (10.1)	0.000
Meningitis	40 (4.7)	11 (5.5)	0.610
Sickle cell disease	47(5.5)	4 (2.0)	0.061
Febrile convulsion	35 (4.1)	0 (0.0)	0.007
Others	109 (12.7)	22 (11.1)	0.521
Total	857	199	

* From reference 7
+ Present study

Discussion

This study showed a mortality of 11.1 percent amongst children admitted in the emergency room of LUTH during the study period. This is higher than 9.9 percent, 5.1 percent and 9.5 percent reported in some other parts of the country[6,8,9] and also higher than 8.2 percent and 7.8 percent reported in some other African countries[2,10] It is however similar to the 12.6 percent reported in Sagamu over a ten year period[11], but lower than 14.3 percent and 15.1 percent reported in an earlier study from this centre[7] and from Zaira[4] respectively.

More than half of the deaths (55.4%) occurred within 24 hours of arrival in hospital, this was higher than figures of 40.1% reported from a recent study in Zaria[4] and 43.7% reported from Zimbabwe.[12] An earlier study from Zaria however reported a figure of 57.6%[6] similar to that in this present study. The factors that were significantly associated with deaths within 24 hours of admission in the Zaria study included the presence of seizures before admission, heart failure, altered consciousness and moderate to severe dehydration at presentation. Delay in commencement of treatment which was promptly prescribed (attributed to inability of parents to pay for the treatment) was also significantly associated with deaths within 24 hours of admission. This present study however did not evaluate factors associated with deaths within 24 hours of admission.

Neonates accounted for 54.7% of the deaths within the study period, similar to the 57.3% reported in Sagamu[11] but higher than figures of 23.5-37.2% reported in Ibadan, Ilorin and also in an earlier study from this centre respectively.[13-15] Perinatal asphyxia was the leading condition resulting in death in the neonatal age group (36.1%) in this study and this could be a reflection of poor utilization of antenatal and delivery services or may be due to ignorance of the birth attendants in the art of neonatal resuscitation. Neonatal jaundice, prematurity and septicaemia were also major contributors to neonatal mortality in this study just as had been reported by other studies.[7,10,13,14] It is however interesting to note as shown in table 5 that neonatal tetanus accounted for only 0.4percent of deaths among neonates compared to the 14.4percent (p = 0.00) reported in an earlier study also from this centre.[11] This is probably because of various interventions to eradicate neonatal tetanus and this includes improved maternal immunization.

There was however an increase in the percentage of deaths from perinatal asphyxia in the present study. This may be as a result of lack of access to and poor utilization of available health care services and this may be a pointer to the need for more healthcare providers to be trained in neonatal resuscitation especially at the community level. Present ongoing efforts in the country such as the "Neonatal resuscitation" and "Helping babies breathe" programmes should be further intensified to help reduce deaths from perinatal asphyxia.

Beyond the neonatal period the commonest diseases resulting in death were severe anaemia followed by infections, severe malaria and acute respiratory illnesses. When the earlier study from this centre by Lesi et al[7] which looked at mortality from January 1989 to December 1990 was compared with the present study, a significant reuction in there was a significant reduction in mortality from diarrhoeal diseases and protein energy malnutrition and febrile convulsion in this study compared to the earlier study (14.2 to 5 %, 24.6 to 2 % and 4.1 to 0 % for diarrhoeal diseases, protein energy malnutrition and febrile convulsion respectively) in the post neonatal age group (Table 6).

This reduction could be attributed to child survival strategies such as promotion of breastfeeding and use of oral rehydration solution in management of diarrhoea at home before presenting at the hospital. There was however a significant increase mortality due to malaria septicaemia, severe anaemia and HIV in the present study compared to the earlier study. Possible factors that may be responsible for this include poor socioeconomic and environmental conditions and delay and or poor management of these conditions before presentation in hospital. HIV also accounted for some deaths in this study while it did not in the earlier study; this could be due to the fact that the earlier study was done when awareness to HIV infection was just beginning in the country. The contribution of measles to mortality was however similar in both studies.

In the current state of neglect of some of the programmes on child survival, reinforcement could be necessary to sustain them and further reduce mortality. Interventions such as the roll back malaria, National programme on immunization (NPI), prevention of mother to child transmission (PMTCT) and early infant diagnosis (EID) of HIV must all be strengthened to help reduce childhood mortality in Nigeria to help Nigeria move nearer attaining the Millennium development goals.

One limitation of this study was the incomplete data obtained in some of the cases and this is a known limitation of retrospective studies.

Conclusion

This study shows that childhood mortality in LUTH is still high with more than of the deaths occurring within 24 hours of admission in hospital. Majority of these deaths were in infancy especially in the early neonatal period and the most common cause of death in this period was perinatal asphyxia. Efforts to reduce perinatal asphyxia should be intensified by ensuring that deliveries are attended to by personnel who are trained in neonatal resuscitation. The roll back malaria programme should be strengthened and PMTCT, EID and treatment of children with HIV should be scaled up. Education on the prevention, early identification and management of conditions such as neonatal jaundice, malaria, anaemia and acute respiratory illnesses should also be strengthened.

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