

CONDITIONS ASSOCIATED WITH THE RISK OF DEATH WITHIN 24 HOURS OF ADMISSION IN CHILDREN IN ZARIA, NIGERIA

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Abstract

Background: While infant and childhood mortality rates have remained high in underdeveloped countries, an important aspect of this mortality is the rate of death within 24 hours of admission to a Hospital.

Method: We retrospectively reviewed the records of 202 children who died over a 20-month period.

Results: Eighty one (40.1%) of these children died within 24 hours of admission, with 30/81 (37.0%) of them receiving no drug treatment up to the time their death. A history of convulsion, the presence of severe anaemia, heart failure and impaired conscious level at admission were significantly associated with the risk of dying within 24 hours of admission to the hospital.

Conclusion: Delay in commencement of treatment, most likely caused by inability of parents or relatives to make available drugs for commencement of therapy is a major contributory factor for early death in our Hospital.

Key words: Risk of death, admission, children, delay

Introduction

Infant and childhood mortality rates have remained very high in underdeveloped countries, with one in every six African Child dying before the age of 5 years.¹ Nigeria is ranked among the top 15 nations with the highest under-five-mortality rates in the world.² A very important aspect of mortality among children in the tropics is the rate of death within 24 hours of admission to a Hospital. In Kenya, 64.9 % of Hospital death occurred within 24 hours of admission³ while in Harare, 43.7% of 460 deaths occurred within the first 24hours of admission.⁴ In our sister Hospital in Kaduna, 64.2% of the deaths in the emergency Paediatric unit occurred within 24 hours of admission⁵ while in an earlier study from our centre, 57.6% of deaths occurred within 24 hours of admission.⁶ Although prognostic indicators have been described for specific disease such as malaria, lower respiratory tract infection, gastroenteritis and malnutrition,⁷ children often present with multiple problems. Also without adequate laboratory support, the clinical feature of disease entities overlaps.

This study aims to identify the conditions associated with the risk of death within 24 hours of admission.

Materials and Methods

The records of all children admitted to the Paediatric wards of Ahmadu Bello University Teaching

Hospital, (ABUTH) Zaria and died over a 20-month periods (1st January 2002- 31st August 2003) were retrieved from the medical records department and reviewed. The relevant data were extracted and analyzed. These include age, sex, time of the day patient was admitted, length of history, the main symptoms and signs at admission, duration of Hospital stay before death. The time of admission was divided to correspond with shift duty of our nursing staff. We divided death into those that occurred within 24 hours of admission and those who died after 24 hours of admission. Statistical analysis of data was by Chi-square test (X^2) test. A p value of < 0.05 was taken as statistically significant.

Results

From 1st January 2002 to 31st August 2003, 1689 children were admitted into the two main wards of Paediatrics department (Emergency Paediatric Unit and the Paediatric Medical ward). The male to female ratio (M: F) is 1.5:1. Two hundred and fifty-five children died during this period, giving a Hospital mortality rate of 15.1%. The records of 202 children who died during this period were retrieved, a patient record retrieval rate of 79.2%.

Table 1 shows the age and sex distribution of the 202 children who constituted the study population. The male: female ratio of those who died was 1.1:1, which is lower than the ratio of male to female of total admission (1.5:1).

Eighty one (40.1%) of the mortality cases died within 24 hours of admission while 121 (59.9%) died after 24 hours of admission. Table 2 shows the conditions associated with the risk of death within 24 hours of admission. Considering the history of the child's illness, a history of convulsion before admission was found to be significantly associated with the risk of dying within 24 hours of admission. There were 37 children who had a history of convulsion, 23 (62.2%) died within 24 hours of admission as against 14 (37.8%) who died after 24 hours of admission ($P = < 0.005$). The presence of moderate to severe anaemia ($P = < 0.005$), heart failure ($P = < 0.005$), and impaired conscious level ($P = < 0.001$) at admission were the main conditions associated with risk of dying within 24 hours of

admission. Among patients with impaired conscious level at admission, the presence of seizure at admission was more significantly associated with the risk of dying within 24 hours of admission (< 0.001) compared to those with impaired conscious level without seizure (< 0.025). The history of fever, diarrhoea, the length of illness as well as time of the day patient was admitted and the presence of moderate to severe dehydration were not found to be significantly associated with risk of dying within 24 hours of admission. Of the 81 children who died within 24 hours of admission, 30 (37.0%) did not receive any drug treatment up to the time of their death although drugs were promptly prescribed at admission.

Table 1. Age and sex distribution of the study population

Age	Death within 24hrs			Death after 24hrs			Total
	M	F	Total	M	F	Total	
≤7days	1	1	2	1	-	1	3
8 – 28days	-	1	1	-	-	-	1
29days – 12mo	14	12	26	20	25	45	71
13mo – 60mo	24	21	45	37	27	64	109
≥61mo	5	2	7	5	6	11	18
Total	44	37	81	63	58	121	202

Table 2. Comparison of death within and after 24 hours of admission with regards to significant risk factor

Risk factor at admission	Death within 24 hours (n = 81)	Death after 24 hours (n = 121)	P value
History of fever	60	81	>0.05
History of diarrhoea	37	72	>0.05
History of convulsion	23	14	<0.005
Length of history			
≤7days	43	47	>0.05
>7days	38	61	
Time of admission			
8.01am – 2.00pm	16	30	>0.05
8.01am – 2.00pm	21	42	
9.01pm – 8.00am	44	49	
Dehydration	30	48	>0.05
Anaemia	31	33	<0.005
Heart failure	14	5	<0.005
Impaired consciousness	26	9	
With seizure	16	5	<0.001
Without seizure	10	4	<0.025

Discussion

This study has revealed that, contrary to expectations, the mortality rate in our hospital has increased over the years. The mortality rate of 15.1% in this study is higher than the 9.9% reported by Aikhionbare et al⁶ over a decade ago. Similarly, this is higher than the 12.1% reported by Abdurrahman in Kaduna⁵ as well as mortality rates reported from other parts of the country⁸ and elsewhere.^{3, 9, 10} While the reasons for

this increase in the mortality may not be obvious, it is likely to be a reflection of decline in the quality of medical services in our Hospitals.

The 40.1% rate of death within 24 hours of admission to Hospital in this study is similar to the 43.7% reported by Chawla et al⁴ from Zimbabwe but lower than the 57.6% earlier reported by Aikhionbare et al⁶ and 64.9% by Menge et al³ from Kenya. Most workers have stressed the role of late presentation of patient to Hospital as the cause of high mortality rate

shortly after admission to Hospitals in the tropics.^{3, 11, 12} However other factors may be contributory. In this report, 37% of the children who died within 24 hours of admission did not receive the drug treatment prescribed at admission up to the time of their death. What may be a major contributory factor to this unfortunate situation is the fact that in our Hospital, as well as in most Hospitals across the country, services are on a "cash and carry" basis. Our emergency trays are always empty. We think that this delay in the commencement of treatment may be a more important factor in early deaths at our Hospital. Other workers have also highlighted delay in attendance or inadequate or untimely care of patients on arrival at Hospital as an important cause of death within 24 hours of admission in the tropics.^{13, 14}

A history of convulsion before admission, presence of moderate to severe dehydration, heart failure and impaired consciousness at admission were found to be significantly associated with death within 24 hours of admission in this study. Although febrile convulsion has been reported as a common cause of neurological emergency in Africa,¹² the significant association of history of convulsion and impairment of conscious level with early death may be due to the high prevalence of cerebral malaria and acute bacterial meningitis in this environment, two clinical conditions that are commonly associated with these clinical features and both have a high mortality rate.^{15, 16} However the findings of an increased risk of death within 24 hours of admission in children who present with moderate to severe anaemia and heart failure is worrisome. Transfusion with blood and blood products, which can be done within few hours of admission to a Hospital, is the main treatment of a patient with severe anaemia. The commonest cause of heart failure in our environment is anaemia, of which transfusion with blood and blood products is the main stay of management. Delay in the commencement of therapy with this simple measure is most likely to be the cause of significant association of severe anaemia and heart failure with early death on admission to a Hospital rather than the expertise of the medical staff in these Hospitals. Apart from the payment of money for the processing of the blood including screen for infections, patients are requested to provide donors to replace the used blood, which often delay the release of blood for transfusion. From our experience over the years, the financial aspect (payment of money) is often the main cause of delay in releasing blood and blood products for transfusion.

We did not find the time of day patient was admitted to the Hospital significant for risk of death within 24 hours of admission, although in both groups of patients, there were more admission between the hours of 9.01pm and 8.00am. This is a period that corresponds with the least number of Hospital workers on duty. This tends to suggest that delay in commencement of treatment; caused by inability of parents or relatives to make available drugs for early commencement of treatment is the major contributory factor for early death in our Hospitals.

We conclude that in spite of expected technological advancement in medical care, our Hospital mortality rate has remained high, with high percentage of this children dying within 24 hours of admission to the Hospital. Our present Hospital policy of dawn payment before medical services are offered, which include medical emergencies, is a major contributory factor. There is need to review this policy in order to reduce the rate of early deaths in our Hospital. While we would not advocate for free medical services in face of depressed economy, however, the Hospital should be able to work out an effective mechanism of cost recovery after a patient has received emergency treatment.

References

1. World Health reports 1999: making a difference. WHO, Geneva 1999.
2. The state of the world children, 1999: basic indicators. UNICEF 1999; 96.
3. Menge I, Esamai F, Van Reken D, Anabwani G. Paediatric morbidity and mortality at the Eldoret District Hospital, Kenya. *East Afr Med J* 1995; 72: 165-169.
4. Chawla V, Haufton B. Pattern of childhood mortality at Harare central hospital, Zimbabwe. *East Afr Med J* 1988; 65: 238-245.
5. Abdurrahman MB. Why our children die: a study of mortality pattern in an emergency paediatric unit in Kaduna, Nigeria. *Nigerian Medical Practitioner* 1983; 5: 157-162.
6. Aikhionbare HA, Yakubu AM, Naida AM. Mortality pattern in the emergency paediatric unit of Ahmadu Bello University Teaching Hospital Zaria. *Cent Afr J Med* 1989; 35: 393-396.
7. Berkley JA, Ross A, Mwangi I et al. Prognostic indicators of early and late death in children admitted to a district hospital in Kenya: cohort study. *Br Med J* 2003; 326: 361-366.
8. Ibeziako SN, Ibekwe RC. Pattern and out come of admission in the children emergency room of the University of Nigeria Teaching Hospital, Enugu. *Nigerian Journal of Paediatrics* 2002; 29: 103-107.
9. Wolf BHM, Ikeogu MO. Deaths at home and in hospital in Zimbabwe. *Arch Dis Child* 1992; 67: 600-602.
10. Singhi S, Jain V Gupta G. Paediatric emergencies at a tertiary care hospital in India. *J Trop Paediatr* 2003; 49: 207-211.
11. Antia-Ogbong OE. Paediatric emergencies in Calabar. *Nigerian Medical Practitioner* 1992; 23:51-55.
12. Iloeje SO. Paediatric neurologic emergencies at the University of Nigeria Teaching Hospital. *West Afr J Med* 1997; 17: 80-84.
13. Molyneux E. Paediatric emergency care in developing countries. *Lancet* 2001; 357: 86-87.
14. Nolan T, Angos P, Cunha AJLA et al. Quality of hospital care for seriously ill children in less

- developed countries. *Lancet* 2001; 357: 106-110.
15. Berkley JA, Mwangi I, Mellington F, Mwarumba S, Marsh K. Cerebral malaria versus bacterial meningitis in children with impaired consciousness. *J Med* 1999; 92: 151-157.
 16. McIntyre PB, Berkley CS, King SM et al. Dexamethasone as adjunctive therapy in bacterial meningitis. *JAMA* 1997; 278: 925-931.
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