

Post-neonatal Medical Admissions into the Paediatric Ward of Ebonyi State University Teaching Hospital, Abakaliki: The Initial Experience and Outcome

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Summary

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Background: In spite of its limitations, hospital-based data on diseases and deaths in children serve as a pointer to what exists in the community at large. Information obtained from such reviews is usually beneficial in re-evaluating existing services, the pattern of illnesses and deaths or changes if any, and in improving facilities and patient care.

Objective: To document the admission diagnoses and deaths among post-neonatal medical cases admitted to the paediatric ward of the Ebonyi State Teaching Hospital (ESTH), Abakaliki during the first two years of its functional operation.

Design: A retrospective study of hospital records.

Patients and Methods: The case files of all patients aged above one month to 15 years, admitted to the paediatric ward of ESTH, Abakaliki from January 1, 1999 to December 31, 2000, were reviewed and analyzed. Surgical and trauma cases were excluded.

Results: Of the 718 patients admitted during the period, 484 patients met the criteria for the study. The youngest child was six weeks old and the oldest, 15 years; 69.1 percent were aged five years and below with a male preponderance. There was a discharge rate of 82.6 percent and a mortality of 12.2 percent with 71.2 percent and 52.5 percent of deaths occurring in the under-fives and within 24 hours of presentation, respectively. The commonest causes of admission in the group as a whole were severe malaria (22.3 percent), gastroenteritis (12.8 percent), pneumonia (10.5 percent) and measles with complications (6.8 percent). In the under-five age group, severe malaria (24.6 percent), gastroenteritis (17.4 percent), pneumonia (14.1 percent), measles with complications (7.4 percent) and HIV/AIDS (5.9 percent) were the commonest causes of admission. Bronchopneumonia (19.1 percent), HIV/AIDS (14.3 percent) and measles with complications (11.9 percent) and gastroenteritis with severe dehydration (9.5 percent) were the major causes of death. In the above-fives, severe malaria (17.3 percent), congenital/acquired heart diseases (10.7 percent), meningitis (10.7 percent) and malignancy (10.0 percent) were major causes of admission, while meningitis (29.4 percent) and cerebral malaria (17.6 percent) were the leading causes of death.

Conclusion: The morbidity and mortality in the children were mostly due to infectious and communicable diseases. The study indicates that improvement in health care policy, with particular attention to health education, socio-economic conditions and comprehensive immunization against communicable diseases, should reduce the disease burden and increase survival rate of children in our environment. Measures to prevent paediatric HIV infection are also advocated.

Keywords: Post-neonatal, medical admissions, diseases, deaths, under-fives, above-fives, Abakaliki

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Introduction

APPROXIMATELY 12 million children die annually before reaching the age of five years in developing countries.¹ Infectious and communicable diseases such as respiratory infections, diarrhoea, malaria, measles and malnutrition account for 70 percent of the deaths.¹ Most of the published health statistics in Nigeria are based on hospital records, and it is well recognized that these are inadequate as sources of information for the entire

population. However, despite these limitations, hospital records of morbidity and mortality patterns serve as pointers to what exists in the population. The information obtained from such studies may form a basis for health care planning, improving existing facilities and patient care. Although there have been earlier reports on the pattern of childhood morbidity and mortality from some centres in the country,^{2,6} these predated the upsurge of HIV infection, and to our knowledge, there has not been any report from Ebonyi State University Teaching Hospital (EBSUTH), Abakaliki.

The study was undertaken at the EBSUTH, Abakaliki which was designated a teaching hospital in 1991 but became fully functional in 1997. It is a state owned, young tertiary centre serving the whole of Ebonyi State and some parts of Cross River State. The Ebonyi State's population for the year 2000 was estimated at about 2.1 million. This was projected from the 1991 National Population Census figure with a growth rate of three percent. The state has high humidity and temperature, while the famous Ebonyi River from which people draw water for consumption and farming creates several breeding sites for mosquitoes in the rainy and dry seasons. Hence, as in other parts of the state, malaria is endemic. The majority of the indigenes are subsistent farmers. The hospital has been a sentinel site for HIV/AIDS national surveys since 1999. The paediatric ward became fully functional in January 1999. The unit consisted of four sections designated for medical, surgical, emergency and isolation cases with a total of 20 beds. Emergency cases receive initial care in the emergency section of the paediatric ward or at the hospital main emergency room prior to transfer to the paediatric ward while the Children's Emergency Room was under construction. Cold cases were admitted directly to the ward from the paediatric outpatients clinic. The Children's Emergency Room became fully operational in January 2001.

In this report, we describe our initial experience with childhood diseases and deaths in the paediatric ward over a two-year period.

Patients and Methods

The study was retrospective and descriptive in design and covered a period of 24 months from January 1, 1999 to December 31, 2000. The case files of all children aged above one month to 15 years admitted into the paediatric ward, as recorded in the ward register, were retrieved and reviewed. Apart from neonatal cases, surgical/trauma cases were also excluded from the review. Information extracted from the records included age, sex, principal final diagnosis, duration and outcome of hospitalization. The principal final diagnosis was

based on the final assessment by the managing unit, and this was often based on the presenting clinical features, with or without the results of laboratory tests. The diagnosis of malaria for instance, was supported by the presence of malaria parasites in the blood film; anaemia was diagnosed on clinical grounds and confirmed by haemoglobin estimation, and sickle cell disease by haemoglobin electrophoresis. Measles was based on the clinical features, and gastroenteritis on clinical features with or without stool analysis or culture. Patients with protein energy malnutrition were classified according to the modified Welcome Classification. The diagnosis of septicaemia and/or meningitis was based on the clinical features with or without positive blood culture or abnormal cerebrospinal fluid (CSF) analysis, respectively, while that of malignancy was based on the clinical features, ultrasound report and biopsy results. Patients with pneumonia were diagnosed either clinically or by chest radiographs or both. HIV/AIDS was based on positive ELISA test on a patient with features of the WHO clinical case definition of HIV/AIDS in Africa; this was confirmed by the Western blot test carried out at the University of Nigeria Teaching Hospital, Enugu. The good clinical response to certain medications by some patients was used to assign the final diagnosis in some cases. Because this study was retrospective in nature, those with incomplete data entry were excluded. The cause of death as documented after weekly mortality reviews was taken as the final cause of death. The outcome was classified as discharge, discharged against medical advice and death.

The data obtained was analyzed using bar chart, frequency tabulations, cross tabulations and EPI-INFO package, Version 6.

Results

As recorded in the ward register, 718 patients were admitted during the study period. However, 234 of this number were neonatal, surgical, trauma cases, or had incomplete data; they were excluded from the study. The case files of the remaining 484 patients whose ages ranged from six weeks to 15 years were retrieved and reviewed. In 1999, 181 cases were admitted, while 303 were admitted in 2000. There were 276 males and 208 females (M: F=1.33:1). Three hundred and thirty-four patients (69.1 percent) were under the age of five years, with a peak in the age bracket, six weeks to two years (Table I). The cumulative monthly admission figures show that admissions were highest in January and July, corresponding to peaks of the hot dry and wet seasons, respectively (Fig.1).

Reasons for admissions

The overall major reasons for admissions are shown in Table II. Severe malaria (22.3 percent) was the

Table I

Age and Sex Distribution in 484 Paediatric Patients

Age Interval	Number of Patients			% of Total
	Males	Females	Total	
6 weeks - 2 years	168	112	280	57.9
>2 - 5 years	29	25	54	11.2
>5 - 10 years	48	47	95	19.6
>10 - 15 years	31	24	55	11.3
Total	276	208	484	100.0

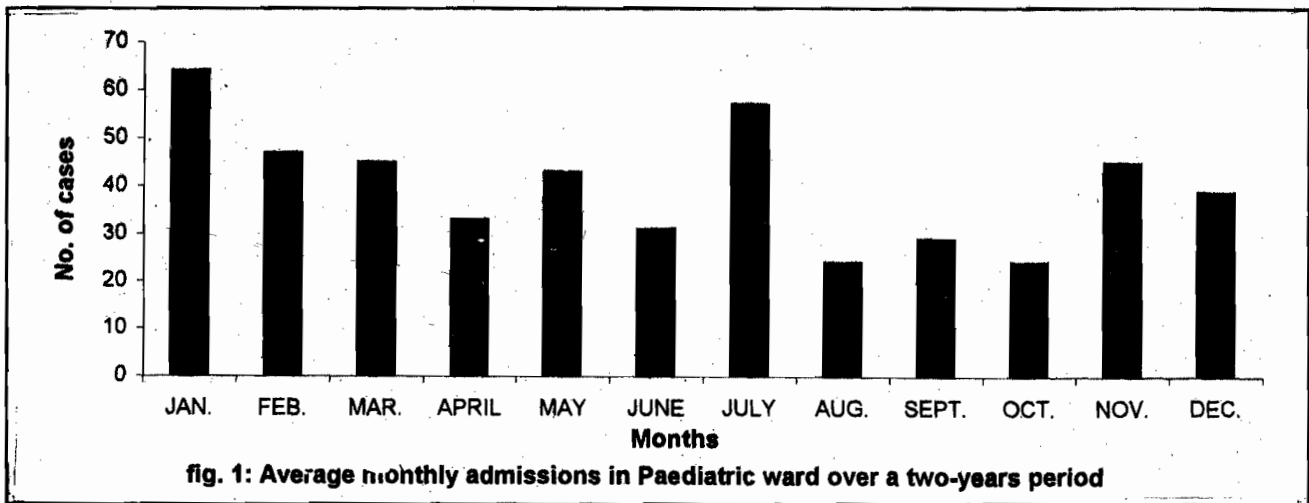


Table II

Main Reasons for Admission in 484 Patients

Condition	Number of Patients	Percent of Total
Severe malaria	108	22.3
Gastroenteritis	62	12.8
Pneumonia	51	10.5
Measles with complications	33	6.8
Sickle cell disease (SCD)	26	5.4
Meningitis	24	5.0
HIV/AIDS	22	4.5
Severe anaemia (excluding severe malaria and SCD)	20	4.1
Malignancy	18	3.7
Cardiac diseases	18	3.7
Septicaemia (proven and suspected)	17	3.5
Afebrile seizure	15	3.1
Protein energy malnutrition	12	2.5
Hepatitis with complications	8	1.7
Bronchial asthma	8	1.7
Miscellaneous	57	11.8
Total	484	100.0

Table III

Main Reasons for Admission in 334 under-five Children

<i>Condition</i>	<i>Number of Patients</i>	<i>Percent of Total</i>
Severe malaria	82	24.6
Gastroenteritis	58	17.4
Pneumonia	47	14.1
Measles with complications	25	7.4
HIV/AIDS	20	5.9
Sickle cell disease (SCD)	18	5.4
Severe anaemia (excluding severe malaria and SCD)	17	5.1
Afebrile seizures	13	3.9
Protein energy malnutrition	11	3.3
Urinary tract infection	11	3.3
Septicaemia (proven and suspected)	10	3.0
Meningitis	8	2.4
Tuberculosis	5	1.5
Bronchiolitis	4	1.2
Malignancy	3	0.9
Congenital heart disease	2	0.6
Total	334	100.0

commonest cause of admission, followed by gastroenteritis (12.8 percent), then pneumonia (10.5 percent) and measles with complications (6.8 percent). The main reasons for admissions among the under-fives are shown Table III. Severe malaria was the commonest reason for admission (24.6 percent) followed by gastroenteritis (17.4 percent) and then pneumonia (14.1 percent). Thirty-seven (45.1 percent) of the 82 patients with severe malaria had severe anaemia necessitating blood transfusion, 13 (15.9 percent) had febrile convulsions, seven (8.5 percent) had haemoglobinuria, five (6.1 percent) had jaundice, and four cases (4.9 percent) had cerebral malaria; the parasite count ranged from negative to hyperparasitaemia.

Acute watery diarrhoea was documented in most of the patients with gastroenteritis; 11 percent, 34 percent and 13 percent of those with this condition had mild, moderate and severe dehydration, respectively. Bronchopneumonia was documented in 34 (72.3 percent) of the 47 cases of pneumonia, while the rest were lobar pneumonias. Chest x-rays carried out in 28 cases (59.6 percent) revealed that six cases were complicated by pleural effusion and two by pneumothorax. Bronchopneumonia was the commonest complication of measles in 19 (76.0 percent) of the 25 cases. Two patients had croup and diarrhoea with dehydration, while cancrum oris and kwashiorkor were documented in one case each.

Eighteen (90.0 percent) of the 20 patients with HIV/

AIDS had positive ELISA tests in addition to documented maternal HIV infection. The remaining two patients had received blood transfusion in another facility prior to the onset of illness; their parents were ELISA seronegative. Eleven (61.1 percent) of the 18 patients with SCD presented with vaso-occlusive crises, four had severe anaemia requiring blood transfusion while three had septicaemia with acute chest syndrome. Aetiological factors of severe anaemia in 17 patients who did not have severe malaria and SCD included bronchopneumonia, septicaemia, kwashiorkor, and urinary tract infection in six, four, four and three cases, respectively. Six of those with malnutrition had kwashiorkor, three were marasmic and the remaining two had marasmic-kwashiorkor.

Six (75.0 percent) of the eight cases of meningitis were due to *Haemophilus influenzae* while the remaining two were caused by *Streptococcus pneumoniae*. Three (30.0 percent) of the 10 patients with suspected septicaemia had positive blood cultures (*Salmonella paratyphi A*, *Staphylococcus aureus* and *Haemophilus influenzae*) while the rest were treated on clinical grounds. Of the five cases of tuberculosis, one had tuberculous spinal disease while the rest had pulmonary tuberculosis complicated by pleural effusion in one case. The three patients with malignancy had Burkitt's lymphoma while the two with congenital heart disease had ventricular septal defect (VSD) with heart failure.

The main reasons for admission in the above-fives

are shown in Table IV. The commonest of these were severe malaria (17.3 percent), followed by congenital/acquired heart diseases, meningitis (10.7 percent each), and malignancy (10.0 percent). Of the 26 cases of severe malaria, eight had severe anaemia requiring blood transfusion, six presented with febrile convulsion and five, cerebral malaria. Three of the 16 cases of cardiac diseases were congenital and 13 acquired. The congenital cases were of ventricular septal defect type. The acquired cases were rheumatic heart disease, cardiomyopathy and hypertensive heart disease in five, four and four cases, respectively. *Streptococcal pneumoniae* was the causative organism in nine (56.3 percent) of the 16 cases of meningitis; others were *Neisseria meningitidis* in four cases (25.0 percent) and *Haemophilus influenzae* in three (18.7 percent). Burkitt's lymphoma was the commonest form of malignancy recorded in 10 (66.7 percent) of 15 cases, while two cases each, had hepatoma, and non-Hodgkin's lymphoma and one child had osteosarcoma.

Six (75.0 percent) of the eight cases of SCD presented in vaso-occlusive crises, while the rest received blood transfusion because of severe anaemia. Measles in eight cases was complicated by bronchopneumonia in five (62.5 percent), subcutaneous emphysema in two and croup in one case. All the eight cases of hepatitis were due to type B virus and three patients had cirrhosis. The cases of suspected peptic ulcer disease were diagnosed on clinical grounds, while the four cases of

pneumonia which were of lobar distribution, were confirmed by chest X-ray. There were two cases of rabies from the miscellaneous group, and they both died.

Outcome of hospitalization

Table V shows the outcome of hospitalization. Four hundred (82.6 percent) of the 484 patients were discharged home; 35.7 percent of them within 72 hours of admission, to be followed up in the paediatric outpatient clinic. The average duration of hospital stay in these cases was 11.6 days. Nineteen patients (3.9 percent) were taken away against medical advice by their parents and six (1.2 percent) absconded before paying their hospital bills. Financial constraints and prolonged hospital stay were responsible for most of those who absconded, or were discharged against medical advice.

Fifty-nine patients (31 males and 28 females) died, a mortality of 12.2 percent. Thirty-one (52.5 percent) deaths occurred within 24 hours of admission, 13 patients (22.1 percent) died between 24 and 96 hours and the rest after 96 hours.

Causes of death

Forty two (71.2 percent) of the 59 deaths were in children under the age of five years. Table VI shows the main causes of death in the 42. Bronchopneumonia was the commonest cause of death in eight (19.1

Table IV

Main Reasons for Admission in 150 above-five Children

<i>Condition</i>	<i>Number of Patients</i>	<i>Percent of Total</i>
Severe malaria	26	17.3
Congenital/acquired heart diseases	16	10.7
Meningitis	16	10.7
Malignancy	15	10.0
Asthma	8	5.3
Sickle cell disease (SCD)	8	5.3
Measles with complications	8	5.3
Hepatitis with complications	8	5.3
Suspected peptic ulcer disease	7	4.7
Septicaemia (proven and suspected)	7	4.7
Acute glomerulonephritis/nephrotic syndrome	6	4.0
Tetanus	6	4.0
Dog bite	4	2.7
Gastroenteritis	4	2.7
Pneumonia	4	2.7
Severe anaemia (excluding severe malaria and SCD)	3	2.0
Miscellaneous	4	2.6
Total	150	100.0

Table V*Outcome of Hospitalization in 484 Patients*

<i>Outcome</i>	<i>No of Cases</i>	<i>Percent of Total</i>
Number discharged	400	82.6
DAMA*	19	3.9
Absconded	6	1.2
Died	59	12.2
Time of death [< 24 hours]	31	52.5
24 - 96 hours]	13	22.1
[> 96 hours]	15	25.4
Mean duration of hospital stay (survivors)	11.6 days	

*DAMA = Discharged against medical advice

percent), followed by HIV/AIDS in six (14.3 percent) and measles with complications in five (11.9 percent). All the HIV patients had features of full blown AIDS at the time of death and their ages ranged from one to two years. Four of those with measles died of bronchopneumonia while the other died of septicaemia with cancrum oris. Due to late presentation, the three patients with severe anaemia from severe malaria died before they could be transfused. The four deaths from gastroenteritis were due to the associated severe dehydration within six to 12 hours of presentation. The two cases of febrile seizures died of complications of home management; they had received traditional medicine through the nose and mouth and sustained wound infection from intentional burns to the feet that were carried out by the parents in attempts to arrest the seizures. The miscellaneous group consisted of one case each, of hepatic encephalopathy and Burkitt's lymphoma.

The main causes of death in those above five years

Table VI*Main Causes of Death in Children aged less than Five Years*

<i>Condition</i>	<i>Number of Patients</i>	<i>Percent of Total</i>
Bronchopneumonia	8	19.1
HIV/AIDS	6	14.3
Measles with complications	5	11.9
Gastroenteritis with severe dehydration	4	9.5
Septicaemia (proven and suspected)	4	9.5
Severe malaria with severe anaemia	3	7.1
Kwashiorkor	3	7.1
Bronchiolitis	3	7.1
Febrile seizure	2	4.8
Meningitis	2	4.8
Miscellaneous	2	4.8
Total	42	100.0

Table VII*Main Causes of Death in Children aged Five Years and above*

<i>Condition</i>	<i>Number of Patients</i>	<i>Percent of Total</i>
Meningitis	5	29.4
Cerebral malaria	3	17.6
Hepatic encephalopathy	2	11.8
Malignancy	2	11.8
Rabies	2	11.8
HIV/AIDS	1	5.9
Sickle cell disease	1	5.9
Tetanus	1	5.9
Total	17	100.0

are shown in Table VII. Meningitis was the commonest cause of death (29.4 percent), followed by cerebral malaria (17.6 percent). Four (80.0 percent) of the five cases of meningitis were caused by *Streptococcus pneumoniae*, while one case was due to *Haemophilus influenzae*. Two of the three cases of cerebral malaria also had severe anaemia; they received blood transfusion. The two cases of hepatic encephalopathy had prior hepatitis B infection following blood transfusion in another facility. Those who died of malignancy had osteosarcoma and non-Hodgkin's lymphoma, while both cases of rabies died.

Discussion

This study has shown that infectious diseases predominated as the leading causes of admissions and deaths in the post-neonatal period, especially in the under-fives in the paediatric ward of EBSUTH. When compared with earlier reports from some centres in Nigeria,^{2,7} the findings in the present series show that the pattern of childhood diseases and deaths have remained largely unchanged. The age and sex distribution of patients in this study did not differ appreciably from that reported in other studies.^{2,7} In this study, severe malaria was the commonest cause of admission. This is similar to the studies in Zambia⁸ and the Cameroons⁹ but in contrast to the series from Benin⁵ and Lagos⁷ which indicated that respiratory infections and gastroenteritis, in that order, were the commonest causes of admission. Measles with its complications (7.4 percent) was also a notable cause of admission in the present study; some studies from Nigeria^{2,7} have however, reported lower figures of 2.8 percent and 5.7 percent, respectively while Diakparomre and Obi⁵ and Slutsker *et al*,¹⁰ reported higher figures of 17.0 percent and 20.6 percent, respectively. It is noteworthy that protein energy malnutrition was recorded in only 2.5 percent in the present study. This is similar to observations from Benin,⁵ but lower than the figures from Uganda.¹¹

Under-fives constituted over two thirds of the total admissions in this series, thus reflecting the relatively high morbidity in this age group with the resultant greater number of deaths. Severe malaria, gastroenteritis, pneumonia, measles and HIV/AIDS were the main reasons for their admission, while bronchopneumonia, HIV/AIDS and measles were the major causes of death. WHO and UNICEF had recognized malaria, gastroenteritis and pneumonia as major causes of morbidity and mortality especially in under-fives in our environment,¹²⁻¹⁴ this was confirmed in this study. These preventable diseases are proving difficult to eradicate probably because of the deteriorating environmental conditions, ignorance and poor socio-economic

situation in Nigeria. These have resulted in the continued high prevalence of respiratory infections such as pneumonia, and measles which are associated with overcrowding, and gastroenteritis which is partly due to inadequate sanitation and poor water supply. Complicating this gloomy picture is the upsurge in the HIV/AIDS pandemic. The present study has shown the appearance of HIV infection in the profile of paediatric admission diagnoses. This finding was in contrast to previous studies in Nigeria^{2,7} that predated the HIV/AIDS pandemic but similar to other studies elsewhere in Africa.^{11,15,16} HIV infection was responsible for 5.9 percent and 14.3 percent of the under-fives admissions and deaths respectively, in the present series. These figures are reasonably high and may represent an underestimation as most cases do not present in the hospital for the diagnosis to be made. As a result of this, HIV infection appears to be threatening the advances that have been made on child survival in sub-Saharan Africa.

There was an appreciable decline in infection related conditions in children above five years. However, severe malaria continued to be the commonest condition for admission in this age group. Also, in contrast to the situation in the under-fives, there was an appreciable increase in the number of admissions and deaths attributable to meningitis in those above five years old. This is in conformity with the observation by Adeyokunnu, Taiwo and Antia⁴ but in contrast to the reports from Ilorin⁶ and Port Harcourt¹⁷ where mortality from meningitis was commoner in the under-fives. Of note was the emergence of non-infectious disorders such as cardiac diseases and malignancy in this group, although the contribution of malignancy to the number of admissions and deaths was moderate. Malignancy was a significant cause of mortality in Ibadan⁴ and Ilorin⁶ in the above-fives, with a mortality of 23.8 percent and 4.8 percent, respectively compared to zero percent in the under-fives in both studies. A possible explanation may be that due to several bouts of infectious diseases in infancy, older children may have acquired some form of immunity. As indicated by Adeyokunnu, Taiwo and Antia, it is likely that as we try to control infectious and nutritional diseases, the relative incidence of malignancies in childhood morbidity and mortality will increase significantly.⁴

The overall mortality of 12.2 percent in the present study was higher than the 6.8 percent and 10.0 percent observed in Lagos⁷ and Benin,⁵ respectively, but slightly lower than 13.0 percent reported from the Cameroons⁹ and the 14.0 percent from Ibadan,⁴ while Orach¹¹ observed an even higher rate of 18.0 percent in Uganda. It is worthy to note that 52.5 percent of all deaths in the present series occurred within 24 hours of admission.

It would seem that the reason for this high mortality might be a delay in seeking medical attention. It is a well-known fact that most of our children are subjected to alternative forms of treatment before presenting to tertiary centres. This finding corresponds to similar observations made by Antia-Obong¹⁸ and Iloeje.¹⁹

While bronchopneumonia, HIV/AIDS and measles were the major causes of death in the under-fives, meningitis and cerebral malaria were the major causes of death in the above-fives. This is in conformity with the studies from the Camerouns,⁹ Malawi¹⁰ and Uganda¹¹ as well as previous Nigerian studies^{4,7} predating the HIV/AIDS upsurge. It was significant that deaths due to diarrhoeal diseases were lower than in earlier studies.^{4,6,7,17} This reduction was most probably due to increased health education and the use of oral rehydration solutions by most mothers/caretakers. Malaria related deaths in the present review were 17.6 percent in the above-fives compared to 7.1 percent in the under-fives. This differs from observations from Ilorin⁶ where no malaria related deaths were reported in both under and above-fives and Ibadan,⁴ where the corresponding figures were three percent and four percent, respectively.

This study has highlighted infections as the principal causes of admissions and deaths in children in the study area. There is an urgent need for stronger preventive measures against these groups of disorders if we are to alter these gloomy pictures in the near future. Therefore, apart from ensuring comprehensive routine immunization against these preventable diseases, promotion of childhood survival strategies, health education and improvement of socio-economic condition of the general population are advocated. Measures to reduce paediatric HIV infection are urgently needed. These measures should help to reduce the mortality in the near future.

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