

The Triple Scourge of HIV/AIDS, Tuberculosis and Malaria are the Leading Causes of Morbidity and Mortality in the Emergency Paediatrics Unit in North Central Nigeria.

OGUCHI, S^{1*}, BODETHOMAS, F¹; HYACINTH, I.H²; BOSE, T.B²; OKUPE, S¹; EBONYI, A¹.

¹Department of Paediatrics, Faculty of Medical Sciences, Jos University Teaching hospital; ²Department of Paediatrics, Jos University Teaching Hospital, Jos, Nigeria.

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ABSTRACT

Disease patterns in children tend to change with time especially in the light of improved or sometimes worsened socio-economic standards coupled with interventional measures aimed at combating childhood illnesses.

The Objective of the review was to describe the current morbidity and mortality pattern and identify the leading causes of morbidity and mortality of children attending the Jos University teaching Hospital. Consecutive patients admitted in to the hospital's Emergency Paediatrics Unit (EPU) were studied over a year period. We reviewed the clinical records of patients admitted in to the Emergency Paediatrics Unit over a year beginning in June 2006.

Five hundred and fifteen children were admitted during the period of one year. There were 316 male and 199 female children with a male: female ratio of 1.5:1. Children aged below two years constituted 47% of all admissions. More patients were admitted in the months of November and December compared to other months of the year. Malaria, HIV/AIDS and tuberculosis dominated the cases of infections admitted and were seen throughout the year. There were nine cases of poisoning; six (66%) were due to kerosene and organophosphates. Outcome data was available only on 369 cases. Of these, 296 (90.2%) survived intact, 8 (2.2%) developed complications while 21 (5.1%) died. The mean (standard deviation) duration of stay in the unit was 5.1 (5.6) hours. Of the the 21 children who died, 11 (52.4%) were accounted for by HIV/AIDS, tuberculosis and malaria related complications.

We conclude that HIV/AIDS, tuberculosis and malaria were the leading causes of morbidity and mortality in the north central city of Jos and this has a huge implication for the human and economic development of this region.

*Correspondence to: Dr. Oguchi, S
Department of Paediatrics, Faculty of Medical Sciences.
Jos University Teaching hospital,
Jos, Nigeria.
Tel: 234-8023082213
E-mail:

Introduction

The pattern of morbidities and mortalities in children in emergency rooms across Nigeria appeared to be changing^{1, 2, 3, 4} owing to gradual but consistent improvement in the socioeconomic standards of the people and due to preventive measures supported by governments and nongovernmental organizations among which the programmes^{1, 5, 6, 7} of WHO, UNICEF, UNFPA, PEPFAR are visible. Measles, malnutrition, Malaria, Gastroenteritis, neonatal tetanus and Acute Respiratory Infections (ARI) were the major childhood killers in the 1970s and 80s.¹ There is paucity of recent data on morbidity and mortality patterns in the paediatric unit of most hospitals in the north central Nigeria. Morbidity and mortality data are very useful for public health planning and research. We studied all children aged 0-15 years that were admitted into the Emergency Paediatrics Unit (EPU) of the Jos University Teaching Hospital, Jos and followed them up until discharged or death from the unit in order to describe the morbidity and mortality pattern and identify the leading causes of morbidity and mortality in these children. University of Jos Teaching Hospital is the main referral tertiary institution in the north-central part of Nigeria.

Patients and Methods

The descriptive cohort study was carried out in the emergency room of the Paediatrics department of the Jos University Teaching Hospital (JUTH) situated in the north central geopolitical zone of Nigeria. The zone is made up of six states with a total population of about 20 million people. JUTH serves as the main tertiary referral centre for the states in this area of the country.

Consecutive patients admitted in to the hospital's Emergency Paediatrics Unit (EPU) were entered in to the register after admission. Resuscitation was accorded prime priority as other services follow in logical order. Documentation was made of the patient's biodata, the medical history, physical findings (which included anthropometric measurements – weight, height, and head circumference if child was aged less than 2 years) and laboratory investigations were carried out as indicated by the patient's condition. All patients had baseline investigations (haematology – Packed cell volume, full blood count and blood chemistry - electrolytes, urea and creatinine, blood sugar levels). Additional investigations were dictated by the patient's clinical condition. Treatment was instituted as indicated by the clinical condition and the outcome of management was recorded at the end of stay in the EPU. Patients were detained in EPU until they were well enough to be transferred to the Paediatric Medical Ward after stabilization for the completion of therapy, discharged home if fully recovered from illness, transferred to another centre of excellence if better management was anticipated or discharged to pathology department for postmortem in cases of deaths. All patients were kept under the continuous supervision of the team and reviewed in the context of a new laboratory result or as occasioned by change in clinical status. The decision to terminate stay in the emergency room was taken by a senior doctor who could be a senior registrar or consultant except in the event of demise of patient when interns or registrars certified the patient dead and broke the news to the parents or accompanying relative. The outcome of hospitalization in the EPU and the duration of stay in the unit were documented at the end of the emergency room care.

Outcome was defined as survival intact, survival with sequelae (complication) or death. Record was also made of transfers to Paediatrics Medical Ward (PMW) or to another centre of excellence and those discharged home. Data generated was entered in to a computer soft ware, SPSS version 16.0, for analysis. Proportions were compared using the Chi-squared test.

Results

A total of 515 children were admitted during the period of June 2006 – July 2007. There were 316 male and 199 female children with a male: female ratio of 1.5:1. Children aged below two years constituted the largest group of EPU admissions (Figures 1 and 2). There were 240 (47%) children under two years of age. More patients were admitted in the months of November and December compared to other months of the year (Figure 3). Infectious diseases form the majority of cases admitted (Figure 4; Table 1). Haematology/oncology, respiratory and central nervous system disorders were also common causes of admission (Figure 4 and Table 1). Malaria, HIV/AIDS and tuberculosis dominated the cases of infections admitted over the period under review (Table 2). Malaria, HIV/AIDS and tuberculosis cases were seen throughout the year (Figure 5). Nine cases of poisoning were encountered out of which six (66%) were accounted for by kerosene and organophosphates (Table 3). Out of the 515 children admitted, outcome data was available only on 369 cases and of these, 296 (90.2%) survived intact, 8 (2.2%) developed complications while 21 (5.1%) died (Table 4). More male than female children, 14/84 versus 7/58 ($X^2 = 10.98$; $P = 0.98$) died. Mortality was not influenced by age of the children. Eighteen out of 102 under-five versus 3/18 children aged greater than five years died. The mean (standard deviation (SD)) duration of stay in the unit was 5.1 (5.6) hours. Seventy-five percent (75%) of the children spent a total of 6 hours in the unit. Two children were referred to another centre of excellence for neurosurgical services and 5 other patients left the unit against medical advice as a result of dissatisfaction with the progress of the children's clinical illness. Of the the 21 children who died, 11 (52.4%) were accounted for by HIV/AIDS, tuberculosis and malaria related complications (Table 5).

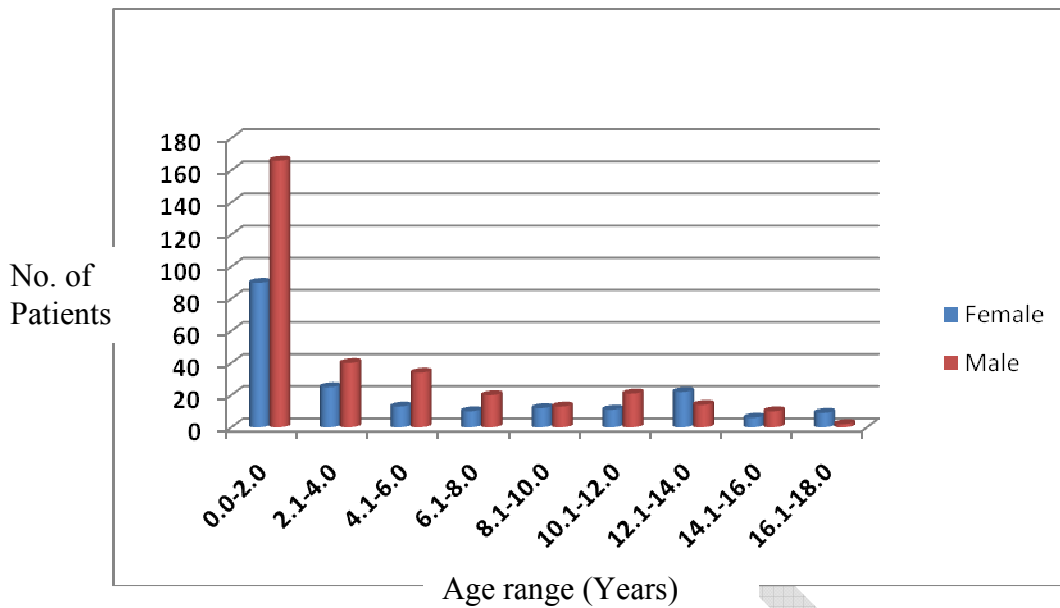


Fig1. Age and Sex distribution of Patients on Admission in the Study

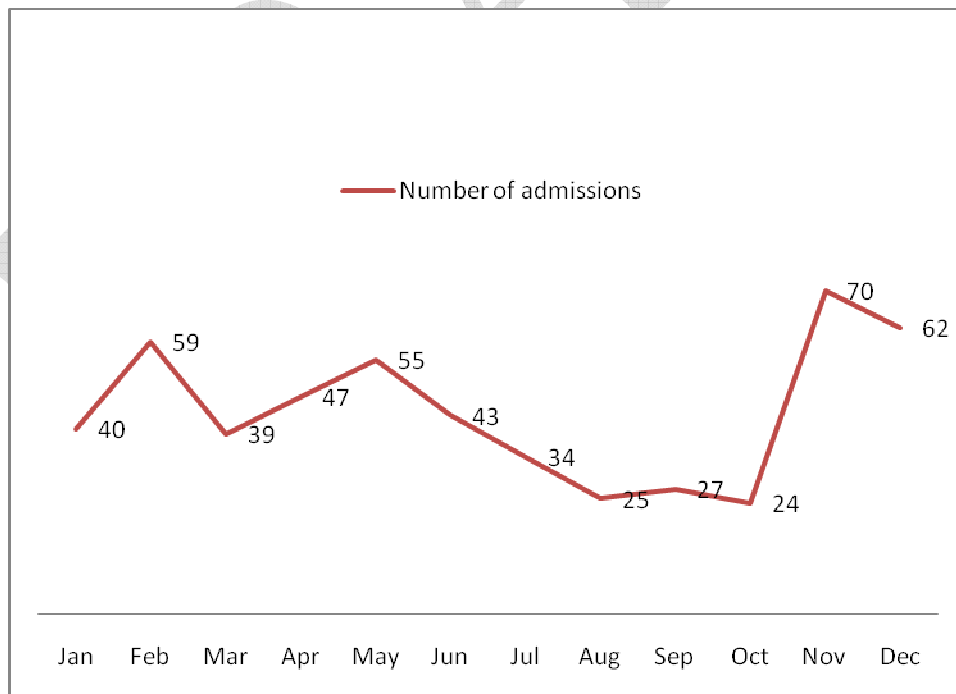


Fig2. Monthly Admission Pattern at Jos University Teaching hospital over a 1- year period

Figure 4. Distribution of Diseases by Systems

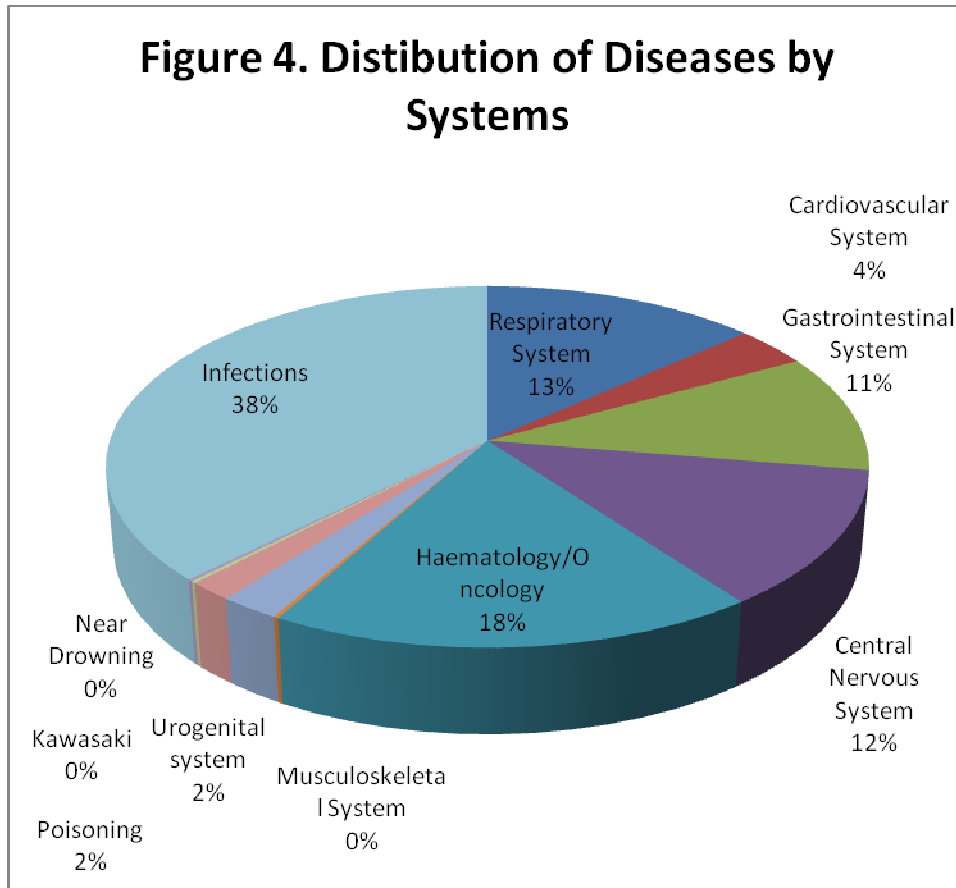


Fig3. Distribution of diseases by systems among patients on admission at Jos University Teaching Hospital over a 1-year period.

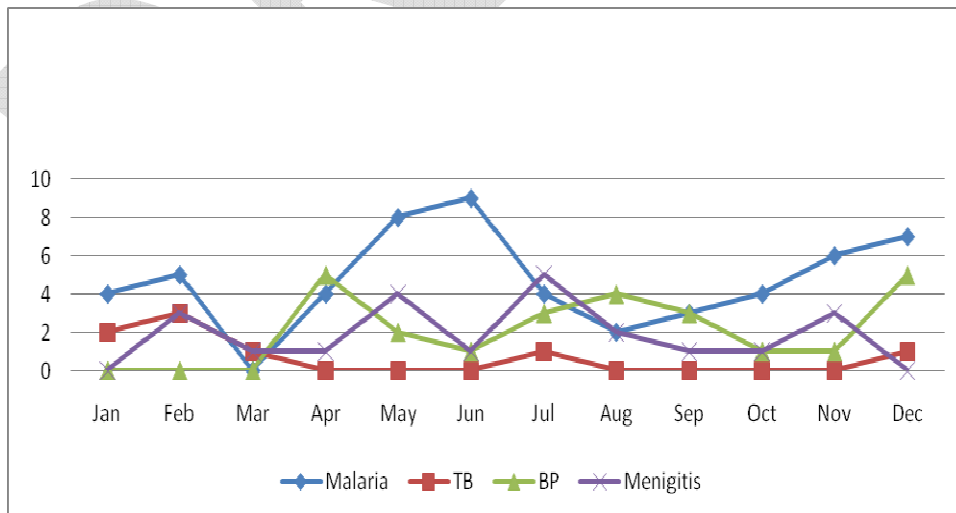


Fig4. Monthly patient flow of major causes of mortality in Emergency paediatrics unit, JUTH over a 1-year period

Table 1. Disease Distribution by Organ/Systems

Organ/System	Number of Patients	Percentage
Infections (Multi-systemic)	198	37.4
Haematology/Oncology	96	18.1
Central Nervous System	65	12.3
Gastrointestinal	56	10.6
Urogenital	12	2.3
Musculoskeletal	1	0.2
Miscellaneous	12	2.3
Miscellaneous		
Poisoning	9	1.7
Near Drowning	1	0.2
Kawasaki Syndrome	1	0.2
Total	529	100

Table 2 Analysis of Cases of Infections over the period of one year

Condition	Types	Number	Percentage
Malaria Acute	uncomplicated	22	
	Severe	53	
	Subtotal	75	23.3
Septicaemia		51	15.8
Pneumonia		48	14.9
HIV/AIDS		35	10.9
Tuberculosis	Pulmonary	18	
	CNS	10	
	Disseminated	2	
	Spinal	2	
	Abdominal	1	
	Subtotal	33	10.2
Typhoid fever		33	10.2
Acute Tonsillitis		21	6.5
Gastroenteritis		13	4.0
Acute viral hepatitis		8	2.5
Bronchiolitis		2	0.6
Infective endocarditis		1	0.3
Tetanus		1	0.3
		1	0.3

Table 3. Poisoning cases

Causes of Poisoning	Number	Percentage
Kerosene	3	33.3
Organophosphates	3	33.3
Food Poisoning	2	22.2
Unspecified	1	11.1
Total	9	100.0

Table 4. Outcome of management in 369 children

Outcome	Frequency	Percentage
Survived intact / transferred to P M W*	296	80.2
Discharged home without sequelae	37	10.0
Died	21	5.7
Survived with Sequelae (Complications)	8	2.2
Left hospital against Medical Advice (LAMA)	5	1.4
Transferred to another center of excellence	2	0.5

PMW* = Paediatrics Medical Ward

Table 5. Analysis of Mortality

Cause of Death	Number	Percentage
HIV and AIDS and co-morbid conditions	5	23.8
Severe Malaria	3	14.3
Tuberculosis	3	14.3
Acute Bacterial Meningitis	2	9.5
Pneumonia	2	9.5
Sickle Cell crises	1	4.7
Severe Malnutrition	1	4.7
Acute viral Hepatitis	1	4.7
Congenital Heart disease	1	4.7
End Stage Renal Disease (ESRD)	1	4.7
Diarrhoea with Severe Dehydration	1	4.7
Total	21	100

Discussion

Children aged 5 years and below dominated the cases with male preponderance in the emergency room admissions. It is not surprising as this age group has been shown to be more vulnerable to morbidities compared to the older age group.^{1, 5} Malaria, HIV and AIDS, septicaemia and tuberculosis were among the leading causes of admissions. Previous studies on the central highlands of plateau had shown a high prevalent rate of malaria cases.^{6, 7, 8} It is interesting to note correspondingly high rates of HIV/AIDS and TB related morbidities. Between 2002 and 2008, the national sentinel surveillance of HIV infection in ante natal women consistently showed that the north central states had higher median sero-prevalence rates which surpass the national average of 4.4%.⁹ It is therefore not surprising that HIV/AIDS case load appears high in this review. The HIV virus is transmitted from mother to child; this mode of transmission is responsible for 90 percent of cases of HIV infection in children. Children with rapidly progressive disease tend to manifest clinical symptoms and signs before the age of five years.¹⁰ Congenital malaria and tuberculosis are known to occur in children whose mothers have these diseases.¹¹

It appeared that the admissions to ER were to some extent seasonal with more patients admitted in the months of April to June (for malaria) and November to December. The reason for this finding is not completely understood. However, transmission of malaria peaks at this time of the year on the plateau in view of the wet season and the collected water in the craters where tin mining activities took place previously.⁹ The environmental conditions at this period of the year strongly support the bionomics of the anopheles mosquitoes; the vector for *P. falciparum*. The rains begin about April with an August break and declines by the end of October. Similarly, meningitis begins to feature in the ER admissions at this time of the year. As the rains tail off and the temperature rises above the prevailing baseline for most of the year, meningitis is favoured, hence the rise in its incidence. The infectious disease conditions continued to play a major role in the ER admissions; malaria, HIV and tuberculosis being the major culprits apart from respiratory tract infections. This finding may point to the lack of effective preventive strategies against these rampart diseases of children in the tropics. There is currently no effective vaccine against malaria in the country, most mothers and their infants do not sleep under insecticide treated bed nets. HIV prevention through prevention of mother to child (PMTCT) strategy is not universally accessible and adherence to antiretroviral drugs poses a challenge to pregnant women taking this medication. Overcrowding resulting from poor housing conditions predisposes to tuberculosis and respiratory tract infections. Until these factors are sufficiently addressed tuberculosis will continue to dominate admissions of children to hospital in our sub-region.

The mortality rate of 5% is serious. Most of the children dying were admitted for infectious diseases and came to hospital at the advanced stages of their conditions. Late presentation may be accounted for by ignorance, lack of functioning primary care facility in the patient's immediate vicinity, patronage of ill equipped medicine vendors and quacks at the periphery who make referrals at terminal stages of illness. Poverty rendering early transfer of patients to hospital a subject of family meeting hence, undue delay and the acuteness of some of the conditions like severe malaria could also be factors contributing to mortality.

Of interest in this study is the finding that about 1% of children were removed out of the hospital against medical advice. In most instances parents resort to this behavior when they have received advice from alternative medical practitioners who would have promised cure using 'natural' or 'traditional' means or methods. Often mortalities or sequelae from these types of incidences cannot be estimated with any degree of accuracy.

Conclusion

The trio of HIV/AIDS, tuberculosis and malaria remain the greatest cause of morbidity and mortality in the north central states of Nigeria and this has a huge implication for the human and economic development of this region. Hence a concerted effort is needed to reverse this trend.

Future studies / Recommendations

We recommend that in all our hospitals, early infant diagnosis for HIV should be made available for prompt intervention and reduced mortality from AIDS. The use of rapid diagnostic tools for malaria should be deployed to the more peripheral health facilities to enable early recognition of malaria and prompt and effective treatment. Case detection of tuberculosis should be pursued at the home based setting if significant reduction in morbidity and mortality is to be expected. Nigeria needs to pursue public health practice at home based levels for effective disease control.

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