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Morbidity and mortality of childhood illnesses at the emergency paediatric unit of the University of Benin Teaching Hospital, Benin City.

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Abstract Objective: To describe the pattern of morbidity and mortality as seen at the Emergency Paediatric Unit of the University of Benin Teaching Hospital, Benin City.

Methods: A retrospective study in which records of admissions over a two-year period were obtained from the medical and ward records. Information retrieved included age, sex, diagnosis, duration of stay in the unit and outcome.

Results: A total of 3,261 patients aged between 29 days and 16 years were admitted into the Children Emergency Room during the period. Of these, 1,835 (56.3%) were males while 1,426 (43.7%) were females. The total number of under-fives admitted was 2,289 (70.2% of total admissions). The major causes of admission were malaria (44.4%), respiratory tract infections (17.8%) and gastroenteritis with moderate or severe dehydration (10.1%). There were 992 (30.4%) discharges while 2,126 (65.2%) were transferred to the paediatric wards for further management. One hundred and forty-three (4.4%) patients died

during the period with over 80% being children five years or less. Severe malaria accounted for the largest number of deaths (29.4%) in the unit, followed by meningitis (16.9%) and septicaemia (15.4%) with over 80% of the deaths being from infectious diseases.

Conclusion: Infectious diseases are still the major causes of morbidity and mortality especially in under-fives in our locality. The role of environmental sanitation, health education and good nutrition in the health of the child must be brought to the fore. The nation's immunisation schedule should include vaccines against infectious organisms like *Haemophilus influenzae* and *Streptococcus pneumoniae* which are major causes of pneumonia and meningitis in childhood. Also, a boost in the coverage of our health insurance scheme would be a step in the right direction.

Key Words: Pattern, morbidity, mortality, Emergency Paediatric Unit, admissions.

Introduction

Under-five mortality in Nigeria is high.^{1,2} However, the Millennium Development Goal⁴ targets to reduce under-five mortality rate.³ An appraisal of the morbidity and mortality pattern in our Emergency Paediatric Unit would avail us the opportunity to assess our strides in working towards this goal.

Also, child survival efforts can be effective only if they are based on accurate information about causes of deaths.

The Emergency Paediatric Unit (EPU) of the University of Benin Teaching Hospital (UBTH), Benin City started

in August 1976.⁴ It is presently a component of the Accident and Emergency (A&E) complex of the hospital.

The aim of this unit is to provide care for children who require prompt life-saving measures after which they are discharged as soon as possible from the unit preferably within 24 to 48 hours of admission either by transfer to the main paediatric wards or home to continue treatment as out-patients. The attending paediatrician and nursing staff prioritizes all patients according to the severity of their condition (Emergency Triage Assessment and Treatment; ETAT)⁵ ensuring that the more critically ill child is attended to first. This study was undertaken to describe the pattern of morbidity and mortality as seen in the unit especially since the last audit⁴ was done over 30 years ago.

Patients and Methods

This retrospective study reviewed the admission and out-patient attendance registers of all children seen at the EPU of UBTH, Benin City, from January 2009 to December 2010. Ward records of all patients seen; admitted patients, transfers out/ discharges and deaths were utilized for the purpose of this study. Data extracted from the records included age, sex, diagnosis, duration of stay in the unit and outcome as far as the unit is concerned. Outcome is classified as discharge, transfer to the main paediatric wards and death. The duration of stay in the unit of the patients who died were also retrieved from the death records. Ethical approval was obtained from the Ethics Committee of UBTH.

Diagnosis of malaria was on the basis of the presence of asexual forms (trophozoites/ring forms) of malaria parasites⁶ and or satisfactory clinical response to antimalarial therapy. Bacterial meningitis was defined as a positive cerebrospinal fluid (CSF) culture, or bacteria noted on a Gram stain.⁷ However, prior to presentation, some of the patients with meningitis had received various forms of treatment including antibiotic therapy from chemists and private medical practitioners. Consequently, cultures of CSF were negative in such cases and diagnosis was based on clinical findings, biochemical and cytological changes in the CSF. Similarly, the diagnosis of septicaemia was based on positive blood cultures and/or clinical findings.

The data obtained were entered into a spreadsheet and analysed. Statistical analysis involved calculation of percentages, ratios and means.

Results

During the period of the study, 10,044 patients aged between birth and 17 years were seen at the out-patient section of the EPU (Paediatric Casualty). Of these, 3,261 patients (32.5%) were admitted into the Children Emergency Room (CHER) for in-patient care while 6,783 (67.5%) were treated as out-patients. Of those admitted, 1,835 (56.3%) were males while 1,426 (43.7%) were females; giving a M: F ratio of 1.3: 1. The age range of the admitted patients was 29 days - 17 years. The total number of under-fives admitted was 2,289 (70.2% of total admissions). The duration of stay in the unit ranged between 10 minutes and six days.

The major causes of admission were malaria (44.4%), respiratory tract infections (17.8%) and gastroenteritis with moderate or severe dehydration (10.1%). They accounted for 72.3% of the admissions (Table 1). Most (69.1%) of the cases of respiratory tract infections were bronchopneumonia. 'Miscellaneous' in table 1 include malignancies (acute lymphoblastic leukaemia, hodgkin's lymphoma), excessive bleeding in haemophilic secondary to tongue laceration and post-circumcision, surgical

emergencies, congenital and acquired heart diseases, cellulitis, measles with complications, pulmonary tuberculosis, nephrotic syndrome, chronic renal failure, diabetic ketoacidosis, , seen within the study period.

Paediatric Acquired Immune Deficiency Syndrome (AIDS) constituted 1.6% of the admissions while accidental poisoning contributed 1.3% (Table 1). Kerosene ingestion was the commonest (67.4%) form of poisoning followed by alcohol intoxication (11.6%). Four of the children with alcohol intoxication were less than three years old but one of them was a ten year old. They were all males.

Table 1: Major Causes of Admission into the Children Emergency Room

Condition	No. of Patients	% of Total Admissions
Severe malaria	1449	44.4
Respiratory tract infections	582	17.8
Gastroenteritis	329	10.1
Haemoglobin-SS Disease	245	7.5
Meningitis	112	3.4
Septicaemia	109	3.3
Acute severe asthma	53	1.6
Febrile convulsion	52	1.6
Paediatric AIDS	51	1.6
Accidental poisoning	43	1.3
Miscellaneous	236	7.2
Total	3,261	100.0

Nine hundred and ninety-two patients (30.4%) were discharged from the unit after treatment while 2,126 (65.2%) were transferred to the main Paediatric wards for further management (Table 2).

Table 2: Outcome of Admitted Patients

Outcome	No. of Patients	% of Total Admissions
Discharged	992	30.4
Transferred out	2126	65.2
Died	143	4.4
Total	3261	100.0

One hundred and forty-three (4.4%) patients died during the period consisting of 72 males and 71 females (Table 3). The mean duration of stay in the unit prior to death was 17 hours while their mean age was 38 months; with over 80% being five years or less (Table 3). Seventy-one (49.6%) deaths occurred in the first year of life; although a peak mortality of 31.5% occurred among children aged two to five years (Table 3).

Table 3: Age and Sex Distribution among 143 Deaths

Age	No. of Patients	M	F	% of Total
1-6 months	29	15	14	20.3
7-12 months	42	26	16	29.3
2-5 years	45	21	24	31.5
>5 years	27	10	17	18.9
Total	143	72	71	100.0

Severe malaria accounted for the largest number of deaths (29.4%) in the unit, followed by meningitis (16.9%) and septicaemia (15.4%) (Table 4). Thus, over 80% of the deaths were caused by infectious diseases.

Table 4: Major Causes of Mortality in Admitted Patients

Condition	No. of Deaths	% Mortality	% of Total Admissions
Severe malaria	42	29.4	1.29
Meningitis	24	16.9	0.74
Septicaemia	22	15.4	0.67
Paediatric AIDS	12	8.4	0.37
RTIs	11	7.7	0.34
Hb-SS Disease	7	4.9	0.21
Gastroenteritis	4	2.8	0.12
Accidental poisoning	2	1.4	0.06
Miscellaneous	19	13.3	0.58
Total	143	100.0	4.39

AIDS : Acquired Immune Deficiency Syndrome

RTIs : Respiratory tract infections

Hb-SS Disease : Haemoglobin-SS Disease

Discussion

The current study revealed that infectious diseases are the major causes of morbidity and mortality in CHER, UBTH, Benin City. This is in consonance with the findings from various other studies over the past decades.⁸⁻¹² Malaria, respiratory tract infections and gastroenteritis which were the major causes of admission are recognized by the World Health Organisation as the major causes of under-five morbidity and mortality either as a single entity or in combination with other causes.^{13,14} Fortunately, the core programme of integrated management of childhood illnesses (IMCI) targets these diseases.¹⁵

Majority of the deaths in this series occurred among under-fives as was also documented by previous studies,^{8,10-12} thus indicating their vulnerability and the need to pay special attention to this group of children if an overall reduction in child mortality rate is to be achieved.

The leading role of malaria as a cause of childhood hospitalisation and mortality in this series has also been documented by other authors from Nigeria¹⁰⁻¹² and other

African countries such as Ghana, Kenya, Tanzania, Zambia,¹⁶ Sierra Leone,¹⁷ Ethiopia¹⁸ and Mozambique.¹⁹ Their reports¹⁶⁻¹⁹ also confirm bacterial infections like pneumonia, gastroenteritis and meningitis as major causes of childhood morbidity and mortality. This is similar to findings from a study conducted at the paediatric emergency department of a tertiary care teaching and referral hospital in Kabul, Afghanistan to assess the morbidity and mortality pattern of illness in paediatric population where the most common illnesses were diarrhoea and respiratory infections.²⁰

The mortality rate of 2.8% from gastroenteritis in the present study is close to the one of 2.6% reported by Diakparome⁴ from the same centre over three decades ago and by Ransome-kuti²¹ in Lagos almost four decades ago. We seem not to have improved over the years.

Measles with its complications was one of the major paediatric emergencies in the earlier report from Benin City.⁴ However, this was not prominent in the present study as there were fewer cases of measles and when they presented they were usually admitted directly into the side-rooms of the main paediatric wards for barrier nursing while those requiring emergency care were first managed in CHER before transfer to the main wards. These few cases were in the miscellaneous group. This is similar to documentations from other Nigerian¹² and African studies.^{16,19} Measles occurrence may have declined because of the effects of the National Programme on Immunization (NPI).

The low number of measles morbidity and mortality is a success story, but high immunization coverage rates must be sustained.

Severe malnutrition was also not prominent in the current study unlike in the previous study conducted in our centre where it constituted 2.1% of the total emergency admissions. Probably the effect of health education is paying out. It is important to note, however that paediatric AIDS did not feature in the earlier Benin series⁴ as was the case in the present study. The onset of the Human Immunodeficiency Virus (HIV) epidemic in West Africa began²² in 1985 but was first diagnosed in Nigeria²³ in 1986. HIV/AIDS infection in children has modified the morbidity and mortality pattern among them. It has also affected childhood immunization and nutrition of infants. It is an important cause of morbidity and death in children in developing countries like ours and action needs to be taken against this growing threat.

The overall mortality of 4.4% in the current study as opposed to 10% mortality in the earlier Benin study⁴ is a great improvement. Despite inadequate facilities, over 95% of our admitted patients were salvaged.

Some patients remained in the unit for as long as six days either because they required acute emergency care for the period or for logistic reasons in which case there may be no bed space at the main paediatric wards to enable their transfer.

Conclusion

Infectious diseases are still the major causes of morbidity and mortality especially in under-fives in our locality. Achievement of the millennium development goal of reducing child mortality by two-thirds from the 1990 rate will depend on renewed efforts to prevent and control malaria, acute respiratory infections and diarrhoea in the Africa region. The role of environmental sanitation, health education and good nutrition in the health of the child must be brought to the fore. Vaccination against infectious organisms like *Haemophilus influenzae* and *Streptococcus pneumoniae* which are major causes of pneumonia and meningitis in childhood should be introduced into the nation's immunization schedule as part of the NPI. The reports of the causes of child morbidity and deaths should

be used to guide public-health policies and programmes. Also, a boost in the coverage of our health insurance scheme would be a step in the right direction.

Conflict of interest: none

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References

- Adetunji J. Trends in under-five mortality rates and the HIV/AIDS epidemic. *Bull WHO* 2000; 78:1206.
- UNICEF, WHO. Countdown to 2015 decade report (2000-2010): taking stock of maternal, newborn and child survival. 2010.
- WHO/MDG 4: Reduce Child Mortality. http://www.who.int/topics/millennium_development_goals/child_mortality/en/ accessed 9th December, 2011.
- Diakparome MA, Obi JO. The Pattern of Paediatric Emergencies in the University of Benin Teaching Hospital. *Niger J Paed* 1980; 7:43-5.
- WHO/ Emergency Triage Assessment and Treatment; ETAT. http://www.who.int/child_adolescent_health/documents/9241546875/en/ accessed 9th December, 2011.
- World Health Organisation: Action Programme on severe and complicated malaria. *Trans R Soc Trop Med Hyg.* 2000; 94:190.
- Berkley JA, Mwangi I, Ngetsa CJ, Mwarumba S, Lowe BS, Marsh K, et al. Diagnosis of acute bacterial meningitis in children at a district hospital in sub-Saharan Africa. *Lancet* 2001; 357:17537.
- Ibeziako SN, Ibeke RC. Pattern and outcome of admissions in the Children's Emergency Room of the University of Nigeria Teaching Hospital, Enugu. *Niger J Paed* 2002; 29:103-7.
- Antia-Obong OE. Paediatric Emergencies in Calabar. *Nig Med Pract.* 1992; 23:51-5.
- Fagbule D, Joiner KT. Pattern of childhood mortality at the University of Ilorin Teaching Hospital. *Niger J Paed* 1987; 14:1-5.
- Adeyokunnu AA, Taiwo O, Antia AU. Childhood mortality among 22,255 consecutive admissions in the University College Hospital, Ibadan. *Niger J Paed* 1980; 7:7-15.
- Elusiyan JBE, Obiajunwa PO, Adejuyigbe EA, Olowu WA, Adeodu OO, Owa JA, et al. Pattern of Morbidity and Mortality among Children hospitalized at the Obefemi Awolowo University Teaching Hospital, Ile-Ife. *Niger J Paed* 2009; 36: 22-28.
- Bryce J, Boschi-Pinto C, Shibuya K, Black RE, WHO Child Health Epidemiology Reference Group. WHO estimates of the causes of death in children. *Lancet* 2005; 365: 114752.
- Integrated management of the sick child. WHO Division of Diarrhoeal and Acute Respiratory Control. *Bull WHO* 1995; 73:735-40.
- WHO/Technical updates of the guidelines on the IMCI. Evidence and recommendations for further adaptations. http://www.who.int/maternal_child_adolescent/documents/9241593482/en/index.html accessed 29th December, 2011.
- Petit PL, van Ginneken JK. Analysis of hospital records in four African countries, 1975-1990, with emphasis on infectious diseases. *J Trop Med Hyg.* 1995; 98:217-27.
- Hodges M, Williams RA. Registered infant and under-five deaths in Freetown, Sierra Leone from 1987 to 1991 and comparison with 1969-1979. *West Afr J Med* 1998; 92: 958.
- Muhe L, Byass P, Freij L, Sandstrom A, Wall S. A one-year community study of under-fives in rural Ethiopia: patterns of morbidity and public health risk factors. *Public Health* 1995; 109: 99109.
- Sacarlal J, Nhacolo AQ, Sigauque B, Nhalungo DA, Abacassamo F, Sacoor CN, et al. A 10 year study of the cause of death in children under 15 years in Manhica, Mozambique. *BMC Public Health* 2009; 9:67.
- Prasad AN. Disease profile of children in Kabul: the unmet need for health care. *J Epidemiol Community Health* 2006; 60: 2023.
- Ransome-kuti O. The problems of paediatric emergencies in Nigeria. *Nig Med J.* 1972; 2:62-70.
- HIV/AIDS in Africa. http://en.wikipedia.org/wiki/HIV/AIDS_in_Africa accessed 10th December, 2011.
- HIV/AIDS Health Profile. USAID/Nigeria http://www.usaid.gov/our_work/global_health/aids/Countries/africa/nigeria.pdf accessed 10th December, 2011.