

Pattern of Morbidity and Mortality at the Children Emergency Unit of Enugu State Teaching Hospital, Park lane, Enugu.

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Abstract

Pediatric emergency services are expected to form a key component of attaining universal coverage of quality healthcare as a target of the Sustainable Development Goals. In order to achieve this, accurate information about the causes of morbidity and mortality is essential. This retrospective study was conducted at the Children Emergency Room (CHER) of Enugu State University Teaching Hospital (ESUTH), Enugu. The admission records of all the children that were admitted into CHER of ESUTH over a three year period from July 2011 to June 2014 were reviewed. Frequency distributions of all relevant variables were reported as tables, charts and prose. Test of significance for discrete variables was done using the Chi-square test. A p-value <0.05 was regarded as significant. A total of 2869 children were seen during the three year period of study. Acute gastroenteritis, malaria, pneumonia and sepsis were the most frequent reasons for admission into the children emergency room. The major causes of death included sepsis, acute gastroenteritis, pneumonia and malaria. Mortality was highest among children under the age of 5 years, with infants constituting over 50% of the mortalities. Anticipating peak periods during seasonal variations can improve patient outcomes. Most mortalities occur within 24 hours of arrival at hospital, thus more efforts should be made to improve health seeking behaviour and reduce late presentation.

Keywords: Morbidity, Mortality, Children Emergency Unit, Enugu.

INTRODUCTION

The Sustainable Development Goals (SDGs) represent the transition from the Millennium Development Goals and goal five has universal coverage of quality healthcare as a target, including the prevention and treatment of communicable and non-communicable diseases (United Nations, 2000). Pediatric emergency services as a regular source of sick care are expected to form a key component of this target. In order to achieve this, accurate information about the causes of morbidity and mortality is essential (Bryce et al. 2005).

Thus the pattern of presentation and outcome should be monitored periodically in order to provide better quality of care, effective distribution of hospital resources and institute adequate preventive measures. Specifically this knowledge facilitates the anticipation of problems and the preparation of standard treatment protocols. It also serves as an important internal auditing tool which can

identify areas of strength and areas of weakness that can be improved upon.

This study is the first audit of the children's emergency room of this teaching hospital and it is hoped that it will be used as a bench mark for future assessments and also provide a platform for comparison by researchers in other parts of the country and the world.

MATERIALS AND METHOD

This was a descriptive, retrospective study conducted at the Children Emergency Room (CHER) of Enugu State University Teaching Hospital (ESUTH), Enugu. It is a tertiary health facility in the South-East region of Nigeria. It provides all levels of health care and it's open for 24 hour service. Children from age of 1 day to 18 years are seen in CHER. The unit caters to patients from all parts of the region and beyond and includes direct presentations, children referred from the institution's out-patient departments as well as referrals from other

primary and secondary health facilities within the region.

The admission records of all the children that were admitted into CHER of ESUTH over a three year period from July 2011 to June 2014 were reviewed. Ethical approval was obtained from the Ethics Committee of ESUTH. Data extracted from the records included age, sex, date of presentation, clinical diagnosis, duration of admission outcome and time of death. The diagnoses represent the final diagnoses reached mainly after review by the team of Doctors working in CHER and were based mostly on clinical features and relevant laboratory investigations where possible. Diagnosis of sepsis and acute gastroenteritis were mainly

clinical while that of malaria was with microscopy or malaria rapid diagnostic test. In a few cases, no diagnosis was reached before the patient's demise or transfer to the ward.

Statistical analysis was done using the Statistical Package for Social Sciences (SPSS) version 19. Frequency distributions of all relevant variables were reported as tables, charts and prose. Test of significance for discrete variables was done using the Chi-square test. A p-value <0.05 was regarded as significant.

RESULTS

A total of 2869 children were seen during the three year period of study. There were a total

Table 1: Major causes of admission into the children emergency room

Diagnosis	Frequency	Percentage of total
Acute gastroenteritis	645	22.9
Malaria	563	19.9
Pneumonia	353	12.5
Sepsis	303	10.7
Upper Respiratory Tract Infection	140	5.0
Meningitis/Encephalitis	72	2.6
Sickle Cell Anaemia crises	70	2.5
Bronchiolitis	64	2.3
Acute bronchial asthma	62	2.2
Seizure disorder	50	1.8
Severe Malnutrition	42	1.5
Renal diseases	41	1.5
Enteric fever	37	1.3
Cellulitis	19	0.7
Gastritis	15	0.6
Childhood poisoning	13	0.5
Foreign body aspiration	9	0.3
Malignancies	8	0.3
Pyomyositis	8	0.3
Bites and stings	7	0.2
HIV/AIDS	6	0.2
Drug reaction	6	0.2
Tetanus	5	0.2
Diabetic Ketoacidosis	5	0.2
Acute Osteomyelitis	4	0.1
Psychiatric disorder	3	0.1
Surgical emergencies*	101	3.5
Miscellaneous+	85	3.0
No diagnosis	84	3.0
Total	2820	100.0

* Appendix A+ Appendix B

of 1622 males and 1247 females, giving a male: female ratio of 1.3: 1. There were 2818 children with ages documented ranging from 14 days to 18 years. The mean age was 41.99 ± 54.37 months. Children under the age of 5 years comprised 75.8%. Acute gastroenteritis, malaria, pneumonia and sepsis were the most frequent reasons for admission into the children emergency room (CHER), Table 1.

Most (85.2%) of the admitted children were either treated and discharged home or transferred

to the paediatric ward. There mortality rate was 5.8%, Table 2. The major causes of death included sepsis, acute gastroenteritis, pneumonia and malaria. However, in terms of case fatality rate, sepsis, AIDS, meningitis/encephalitis, foreign body aspiration and severe malnutrition topped the list. Table 3. Mortality was highest among children under the age of 5 years, with infants constituting over 50% of the mortalities, Table 4.

Table 2: Outcome of admission

Outcome	Frequency	Percentage
Discharged home	1226	43.5
Transferred to the ward	1176	41.7
Referred to other specialties or hospitals	86	3.0
Discharged against medical advice	68	2.4
Dead	163	5.8
Missing data	101	3.6
Total	2820	100.0

Table 3: Major causes of mortality among the 163 children

Diseases	Frequency	Percentage of total mortality	Case fatality rate (%)
Sepsis	51	31.3	16.8
Acute gastroenteritis	28	17.2	4.3
Pneumonia	25	15.3	7.1
Malaria	24	14.7	4.3
Meningitis/ Encephalitis	8	4.9	11.1
Severe malnutrition	4	2.5	9.5
Surgical emergencies	2	1.2	2.0
Renal diseases	1	0.6	2.4
Aspiration of foreign body	1	0.6	11.1
AIDS	1	0.6	16.7
Bronchiolitis	1	0.6	1.6
Bronchial asthma	1	0.6	1.6
No diagnosis	16	9.8	19.0
Total	163	100.0	100.0

Table 4: Age related morbidity and mortality

Age group	Admission		Mortality		
	Frequency	% of total	Frequency	% of total deaths	% of admission
< 12 months	1011	35.9	86	52.8	8.5
1 – < 5years	1125	39.9	57	35.0	5.1
5 – < 10 years	314	11.1	8	4.9	2.5
≥ 10 years	323	11.5	10	6.1	3.1
Undocumented age	47	1.7	2	1.2	4.3
Total	2820	100.0	163	100.0	5.8

More than 60% of the deaths occurred within 24 hours of presentation, Table 5 and mean duration of stay for the mortalities was 1.9 ± 1.4 days. Mortality in relation to time was almost equal between the two 12 hour shifts, Table 6

Table 5: Duration of admission in relation to mortality

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Table 6: Time of death in relation to mortality

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Admission was highest during the dry season months of November to March. With a second lower peak at the peak of rainy season (July). Mortality tended to follow the pattern of admission with highest mortalities occurring between November and March, Figure 1.

Figure 2 compares the major causes of morbidity and mortality in relation to the months of the year. AGE peaks at the beginning of the year which is dry season and it's at its lowest ebb during the rainy season.

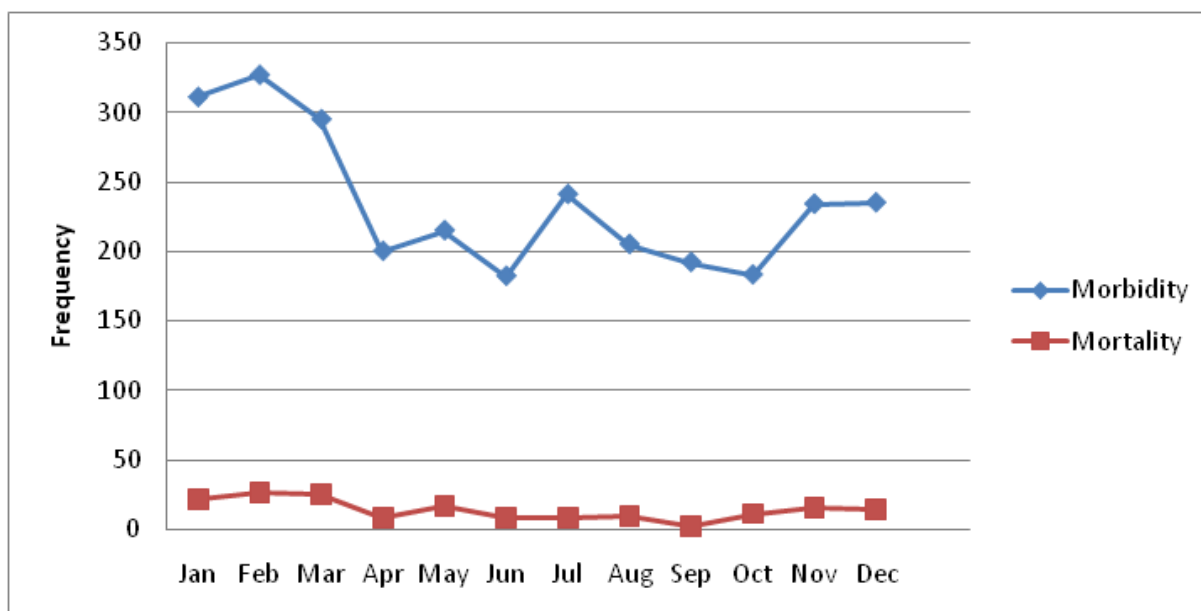


Figure 1: Pattern of morbidity and mortality by month

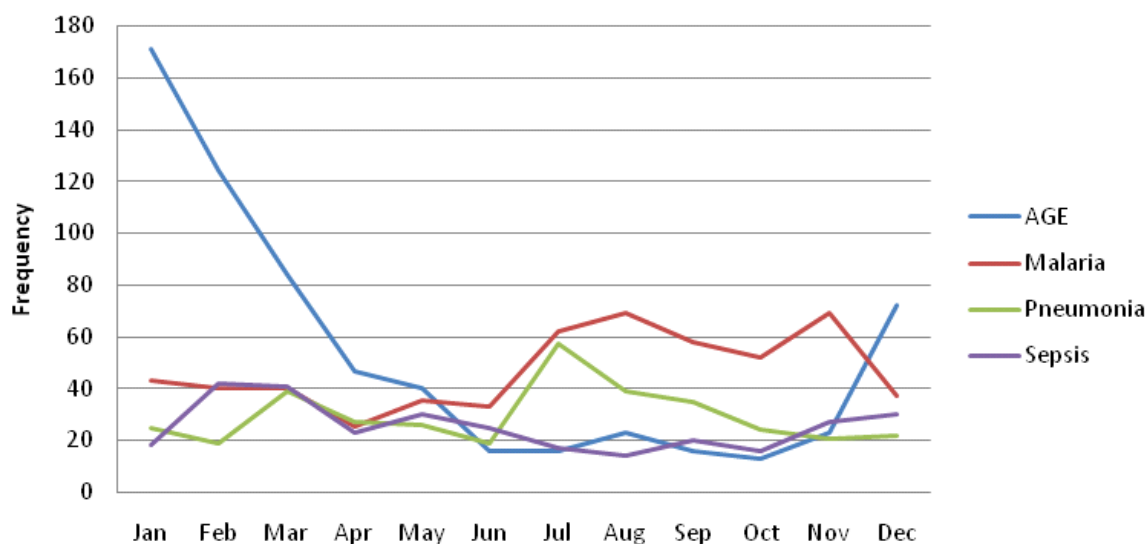


Figure 2: Presentation of the major causes of morbidity and mortality by month

DISCUSSION

Children under the age of 5 years made up majority of the admissions. This finding was consistent with the results of similar studies in the south east region of Nigeria (Anyanwu et al, 2014; Ezeonwu et al, 2014; Ndukwu and Onah, 2015). This population group is at considerably higher risk of developing severe diseases like malaria, and acute gastroenteritis, than others (Pelletier et al, 1995; Oguonu et al, 2014; WHO, 2015; Mohammed and Tamiru, 2014; UNICEF, 2012).

Acute gastroenteritis, malaria, pneumonia and sepsis were the most frequent reasons for admission into the Children Emergency Room. This indicates that infectious diseases are the major cause of morbidity in our environment and this pattern has been reported from different parts of the country (Ezeonwu et al, 2014. Edelu et al, 2014. Okechukwu and Nwalozie, 2011. Fajolu and Egri-Okwaji, 2011). This is also consistent with WHO/UNICEF findings and has been the reason behind health related programs such as

the Integrated Management of Childhood Illnesses (IMCI), management of Common Childhood Illnesses (MCCI), which are geared towards addressing these common childhood diseases.

The mortality rate of 5.8% was similar to the rates reported in Abakaliki, south east Nigeria and Asaba, South West, Nigeria (Anyanwu et al, 2014; Ezeonwu et al, 2014). However Edelu et al in 2014 reported a decline from 5.1% to 3.9% after an increase in the number and cadre of doctors working in the emergency unit of University of Nigeria Teaching Hospital, Enugu. This underscores the importance of effective distribution of hospital resources and the need for periodic monitoring and evaluation of interventions in terms of reducing childhood deaths.

The top four causes of death were sepsis, acute gastroenteritis, pneumonia and malaria which were the same four identified as the most frequent reasons for admission. However, in terms of case fatality rate, which is an important outcome indicator that measures the severity of disease (Roberts, 2000), sepsis, meningitis /encephalitis, foreign body aspiration, severe malnutrition and AIDS topped the list.

Mortality was highest among children under the age of five years with infants constituting over 50% of the mortalities. Although progress has been made since the 1990s by reducing by half the childhood mortality rate, it still falls short of the Millennium Development Goal 4 (MDG 4) target of a two-thirds reduction in the under-five mortality rate (UNICEF, 2015). The risk of a child dying before completing five years of age is still highest in the African Region and is about 7 times higher than that in the European Region and in 2015, it was estimated that 5.9 million children under the age of five would die (WHO, 2015). Thus there is still need to make child survival a priority as we look beyond the MDGs.

More than 60% of the deaths occurred within 24 hours of presentation. Late presentation has been identified as a modifiable risk factor for under five mortality which can be utilized in efforts to reduce these preventable deaths (Mdala and Mash, 2015). Therefore health education and awareness creation as well

as improvement in the socio-economic status of the population will go a long way in improving their health seeking behaviour and reduce late presentation.

Admission was highest during the dry season months of November to March. Mortality tended to follow the pattern of admission with highest mortalities occurring between November and March. This is consistent with the patterns noted in the same region (Anyanwu et al, 2014; Edelu et al, 2014).

Considering the major causes of morbidity and mortality which are AGE, malaria, pneumonia and sepsis, AGE is most frequent during the dry season which spans from the last month of the year to the first three months of the year. This coincides with the Rota virus season (Tagbo et al, 2014). Malaria on the other hand tended to be more during the second half of the year which is predominantly rainy season. This may be attributed to the increased presence of breeding grounds for mosquitoes in form of blocked drainages and bushes around the homes. A similar trend was recorded in The Gambia, West Africa (Brewstar and Greenwood, 1993). The month of July, which is regarded as the peak of the rainy season also coincides with the peak of pneumonia presentation. Mortality in relation to time was almost equal between the two 12 hour shifts. This suggests that off-hour admissions do not independently increase odds of death in the Children Emergency Room.

CONCLUSION

Infectious diseases continue to be the major cause of morbidity and mortality amongst the under-five age group. Anticipating peak periods during seasonal variations can improve patient outcomes. Most mortalities occur within 24 hours of arrival at hospital, thus more efforts should be made to improve health seeking behaviour and reduce late presentation.

Appendix A

Head injury, appendicitis, trauma, upper gastrointestinal bleeding, intussusception, foreign body aspiration, strangulated hernia, acute abdomen, ruptured viscus, hydrocele, abscess, epigastric hernia, umbilical hernia.

Appendix B

Whooping cough, septic abortion, cardiac

arrhythmia, electrocution, septic arthritis, recurrent abdominal pain, acute flaccid paralysis, infantile colic, menstrual disorder, syncope, rheumatic fever, rectal prolapse, urticaria, orbital abscess, muscular dystrophy, skin infection, measles, chicken pox, haemophilia, viral hepatitis, burns, gastritis, cellulitis, pots disease, hysteria.

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