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Original Research

# A Review of Post Neonatal Paediatric Admission Pattern and Outcome in a Public Tertiary Health Facility in Nigeria.

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## Abstract

**Background**: Admissions over the years have been largely due to preventable aetiologies and the possible outcomes are discharge, death, referral or discharge against medical advice. This study aimed to understand the patterns of postneonatal paediatric admissions and outcomes from a public tertiary health facility in South-West Nigeria.

**Methodology**: A descriptive retrospective study of paediatric admissions over a 2-year period. Information concerning age, sex, diagnosis and outcome were extracted from patients' medical records. Data was presented in numbers and percentages, Chi-square was used to compare groups and a p-value of <0.05 was accepted as significant.

**Results**: There were a total of 875 admissions, over the 24 months period, with a male-female ratio of 1.3:1. Malaria, sepsis, sickle cell crises, pneumonia, pharyngotonsilitis and acute watery diarrhoea constituted the six leading causes of all admissions. The mortality rate for all admissions was 5.0% while the under-five mortality rate was 3.9%. Seven hundred and ninety nine (91.3%) of the admitted patients were discharged, 44 (5.0%) died, 30 (3.4%) DAMA and two (0.3%) patients were referred.

**Conclusions**: A large percentage of children still die from preventable and treatable diseases. Prompt health seeking behaviour, enrollment of more citizens on insurance scheme, and adoption of the newly developed malaria vaccine will help reduce child mortality. Also, early referral of patients by private hospitals should be encouraged and paediatricians to have a high index of suspicion for the diagnosis of septicaemia.

**Keywords**: Patients, Admissions, Outcome, Child Mortality, Nigeria

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## Introduction

About a quarter of the world population is under 15 years of age and there is a global effort, by agencies like the World Health Organization and United Nation Education Fund, to maintain child health and reduce morbidity and mortality. [1, 2] These efforts included promoting exclusive breastfeeding, adequate and appropriate complementary feeds, vitamin supplementation, immunization services, reduction of household air pollution, provision safe drinking water, provision of oral rehydration salt sachets, zinc tablets, promotion of the use of insecticide treated net and the recently developed malaria vaccine. [2, 3]

Children are more likely to be ill due to less developed immune systems to fight off infections that can spread from person to person. [3] Common causes of admissions and mortality over the years are largely due to preventable aetiologies. These include malaria, septicaemia, severe anaemia, diarrheal diseases, meningitis and pneumonia. [5-8] These disease conditions commonly lead to death of children under the age of 5 years. [4-10]

Preparing for unexpected events is an important part of keeping children safe and healthy all year long. The paediatric emergency is one of the inlets into the paediatric care services where children with potentially life threatening illnesses or injuries are managed. It is often a busy and strenuous service area. [11] There are diverse forms of emergency presentations in the children emergency units, however, the most common cases are severe anaemia, respiratory distress, dehydration, seizures, loss of consciousness, accidents and trauma. [5]

Possible outcome of admitted children include discharge home, death, referral to a more comprehensive health facility or discharge against medical advice (DAMA). Factors that could predict outcome include malnutrition, prior treatment at home by non-doctors, low socioeconomic status, presentation at night and late presentation to the health facility. [12, 13]

This study aimed to understand the patterns of postneonatal paediatric admissions and outcomes from Federal Teaching Hospital, Ido-Ekiti, a public tertiary health facility in Nigeria. As knowledge of these admission pattern will help in the training and retraining of the medical first-hand responders at the children emergency. Also, needed emergency drugs, blood transfusion facilities and equipment can be made available. These would help reduce preventable adverse outcomes of admitted children.

## Materials and Methods

This was a descriptive retrospective study done out over a 2-year period (1st of January 2021 to 31st of December 2022). The study was carried out at the Department of Paediatrics, Federal Teaching Hospital, Ido-Ekiti (FETHI). Ido-Ekiti is a rural settlement in Ekiti State, Nigeria. FETHI is one of the two tertiary health facilities in Ekiti state. It serves the health needs of the citizens and also as a referral centre to the neighbouring States. The Department of Paediatrics runs a firm system (Firm A, B and C). Each firm has two to three subspecialty units. Services provided include both in-patient and out-patient services for all children. The Emergency Paediatrics Unit (PEU) has three couches, seven cots three beds and equipment and drugs for immediate emergency care. The manpower readily available include the different cadre of medical personnel and at least two nurses per shift.

All the children admitted in the Department of Paediatrics over the 2-year period were recruited. The admission and discharge records of EPU and of all patients admitted directly into the children-ward, from the specialist clinics and children-outpatients, were obtained from the Medical Records. Information concerning the age, sex, final diagnosis and outcome were extracted. The final diagnosis is the diagnosis made at discharge by the most senior in the team and the possible outcomes were discharged, discharged

against medical advice (DAMA), referred and death. Ethical approval with registration number ERC/2022/12/07/870A was obtained from the Ethical Committee of the hospital.

Data was presented in numbers and percentages, Chi-square was used to compare groups and a p-value of <0.05 was accepted as statistically significant.

## Results

Table 1 shows there were a total of 875 admissions over the 24 months period. There were 492 (52%) males and 383 (43.8%) females giving a male-female ratio of 1.3:1. Malaria and its complications, sepsis, sickle cell crisis, pneumonia, pharyngotonsilitis and acute watery diarrhoea constituted the six (accounting for 72.4%) leading causes of all admissions. (Table 1) Cases of acute abdomen (typhoid septicaemia, acute appendicitis, and intussusception), acute severe malnutrition and malignancies made up 3.8%, 1.7% and 1.4% of the admissions respectively.

Table 2 shows the distribution of cases according to age group. Infants were 194 (22.2%) of the admissions. Children aged one year to less than five years were 338 (38.6%) of the admissions. While children aged five years to less than 15 years and those above 15 years of age were 315 (36.0%) and 28 (3.2%) of the admissions respectively.

There was a total of 44 death. Mortality was higher among the male admissions, 26 (59.1%), as compared to the females, 18 (40.9%). This however was not statistically significant with a p-value=0.709 (Table 3). Age group five to less than 15 years had the highest mortality of 15 (34.1%) and this was significant (p-value=0.001) while the least mortality was found after 15 years of age. The under-five (U5) mortality rate was 3.9% while the mortality rate for all admissions was 5.0%.

Table 5 shows the outcome of the admissions. Seven hundred and ninety nine (91.3%) of the admitted patients were discharged while 44 (5.0%) died. Thirty patients (3.4%) DAMA and two (0.3%) patients were referred.

## Discussion

The number of admissions over the study period is small compared to those seen in other tertiary institutions. [5, 7, 14] The study by Sa'ad et al, [7] had over a thousand admissions despite the study was carried out over a year period. This may be due to cosmopolitan location of the study facility. Also, study by Onubogu et al, [14] had more than twice the admissions in our study carried out over the same study duration. The reduction in number of admissions in our study may be largely due to the rural location of the hospital. Also, there was a three months industrial action by the National Association of the Resident doctors during the months under review. The male predominance in this study is in keeping with previous studies. [4-10] This may be due to the sociocultural values placed on the male child which may lead to parents preferably seeking healthcare for their male children. This is however in contrast to the findings of Sa'ad et al, [7] in Bauchi where there were equal sex admissions.

There was higher mortality prevalence among the males. Similar findings had been observed in other Nigerian studies. [4-10] This has been linked to sex differences in genetic and biological compositions, with males being biologically weaker and more susceptible to disease. The double X chromosome in females is thought to confer high immunity as compared to their male counterparts. [16]

Malaria with its complications and sepsis were the leading causes of the admissions. Sadly, Malaria has remained the leading cause of hospital admissions in Sub-Saharan Africa over the last few decades despite the concerted efforts of local and international organizations in combating the scourge in the region. [9, 17-21] Strengthening of the various programmes aimed at curbing malaria by stakeholders at

different levels could help stop this menace. Also, early diagnosis and appropriate treatment of malaria reduces morbidity and under 5 mortality. Widely acceptance and vaccination of children with the newly developed malaria vaccine will bring a tremendous reduction in the number of hospital admissions and mortalities caused by malaria.

The mortality rate for all admissions was 5.0%. This figure is higher than 3.7% and 3.9% recorded in Akure, [6] and Enugu, [4] respectively but similar to 5.8% documented in Asaba.[5] More of the deaths occurred in children under 5 and this is similar to most previous findings. [4-10] Under 5 mortality rate is a major health concern worldwide particularly in sub-Saharan Africa where children are 15 times more likely to die before the age of 5 than children in high income countries. [22, 23] The United Nation general assembly in 2015 established the Sustainable Development Goal with the third goal aiming to end preventable deaths of U-5, with all countries aiming to have an U-5 mortality rate of 25 or fewer deaths per 1,000 live births, by 2030. [2] Adequate health seeking behaviour by the general public and early referral of patients by private health facility to a tertiary health facility with possibly paediatric specialists should be promoted as these could help reduce drastically child mortality. Also, the general public should be educated on the ills of giving herbal preparations to a sick child.

The referral rate was 0.3%. This was lower than the 0.4%, 0.8%, 1.0%, 2.2% and 3.3% reported in Umuahia, [24] Asaba,[5] Yobe,[25] Port Harcourt,[14] and Azare[7] respectively. The referrals in this study were to a State Teaching Hospital due to proximity to the care givers' home.

The DAMA rate was 3.4%. This was similar to a prevalence of 3.2% observed in Ado-Ekiti [26] but lower than 4.1% and 7.5% noted in Port Hacourt[14] and Bayelsa[27] respectively. Financial constraint top the reasons why patients DAMA. This is not unexpected as healthcare financing in Nigeria is majorly out of pocket and only 3% of the population are registered on the National Health Insurance Scheme (NHIS).

## Conclusion and recommendation

It is sad to note that a large percentage of children still die from preventable and treatable diseases like malaria and sepsis. Childhood morbidity and mortality is still high among children under-five. The government should step up efforts to enroll more of the citizens on the National Health Insurance Scheme so as to reduce out of pocket payment which is the main reason for delayed presentation to hospital and DAMA. Widely acceptance and incorporation of the newly developed malaria vaccine will likely decrease death by malaria. Also, early referral of patients to the tertiary hospital by private hospitals should be encouraged. Paediatricians as well are to have a high index of suspicion for the diagnosis of septicaemia so that treatment is started early enough to avert mortality.

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**Conflicts of interest**

There are no conflicts of interest.

**Table 1**: Distribution of admission

| **Disease** | **Frequency (n)** | **Percentage (%)** |
|---|---|---|
| Malaria | 175 | 20.0 |
| Sepsis | 156 | 17.8 |
| Sickle cell crises | 94 | 10.7 |
| Pneumonia | 77 | 8.8 |
| Pharyngotonsilitis | 72 | 8.3 |
| Acute watery diarrhea | 60 | 6.9 |
| Acute abdomen* | 33 | 3.8 |
| Malnutrition | 15 | 1.7 |
| Malignancy | 12 | 1.4 |
| Burns | 11 | 1.3 |
| Tissue infections† | 10 | 1.1 |
| UTI | 9 | 1.0 |
| Acute severe asthma | 9 | 1.0 |
| Bronchiolitis | 8 | 0.9 |
| Renal‡ | 8 | 0.9 |
| CHD | 7 | 0.8 |
| Seizure disorder | 6 | 0.7 |
| Others | 113 | 12.9 |
| **Total** | **875** | **100** |

*Typhoid septicaemia, acute appendicitis, intussusception

†Septic arthritis, osteomyelitis, pyomyositis, cellulitis

‡Chronic kidney disease, acute glomerulonephritis, rapidly progressive Glomerulonephritis

UTI: Urinary tract infection, CHD: congenital heart disease

**Table 2**: Distribution of mortalities by age group

| **Age group (years)** | **Frequency (%)** | **Mortality** | **$X^2$** | **p-value** |
|---|---|---|---|---|
| 1 month to < 1 | 194 (22.2) | 11 | 26.99 | 0.001 |
| 1 to < 5 | 338 (38.6) | 10 | | |
| 5 to < 15 | 315 (36.0) | 15 | | |
| 15 to 18 | 28 (3.2) | 8 | | |
| **Total** | **875 (100)** | **44** | | |

**Table 3**: Distribution of mortalities by sex

| Sex | Frequency (%) | Mortality | $X^2$ | p-value |
|---|---|---|---|---|
| Male | 492 (56.2) | 26 | 0.140 | 0.709 |
| Female | 383 (43.8) | 18 | | |
| **Total** | **875 (100)** | **44** | | |

**Table 4**: Distribution of mortalities by age group

| Age group (years) | Mortality | Percentage (%) |
|---|---|---|
| 1 month to < 1 | 11 | 25.0 |
| 1 to < 5 | 10 | 22.7 |
| 5 to < 15 | 15 | 34.1 |
| 15 to 18 | 8 | 18.2 |
| **Total** | **44** | **100** |

**Table 5**: Distributions of admissions by outcome

| Outcome | Frequency (n) | Percentage % |
|---|---|---|
| Discharged | 799 | 91.3 |
| Death | 44 | 5.0 |
| DAMA | 30 | 3.4 |
| Referral | 2 | 0.3 |
| **Total** | **875** | **100** |

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