Original Article

# Pattern and Outcome of Childhood Admissions in a Public Tertiary Health-care Facility in South-Western Nigeria

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## ABSTRACT

**Background:** Periodic evaluations of the pattern of morbidity and mortality are an aspect of health status which can be used in planning improved medical services.

**Objective:** The objective of this study is to determine the pattern and outcome of childhood admissions in Federal Medical Centre, Owo, Ondo-State, Nigeria.

**Materials and Methods:** A retrospective study of the hospital records of children aged 1 month to 17 years, admitted over 1 year (1st of November 2018 – 31st of October 2019).

**Results:** A total of 1043 children were admitted with mean age 55.6 ± 53.5 months. There were 611 (58.6%) males and 432 (41.4%) females, of which 673 (64.5%) were below 5 years of age. The age group and sex distribution of the study population are significantly related ($\chi^2 = 8.852$, $P = 0.012$). Infections accounted for 80.0% of the morbidities, with malaria (45.3%) being the major cause. There were 955 (91.6%) discharges, one (0.1%) transferred out, 19 (1.8%) discharged against medical advice and 68 (6.5%) mortality. The outcome of the patient is significantly related to the age group ($\chi^2 = 13.760$, $P = 0.032$). There were 68 (6.5%) mortality during the study period, of which 55 (80.9%) were under-five children. Malaria with its complications accounted for 33 (48.5%) of the deaths. Fifty (73.5%) of the 68 deaths occurred within 24 h of admission which is not significant ($\chi^2 = 1.734$, $P = 0.420$).

**Conclusion:** Infection remained the major cause of morbidity and mortality for which malaria was the principal aetiology and under-five children mostly affected.

**Key words:** Admission, childhood, morbidity, mortality, outcome, pattern

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## INTRODUCTION

The childhood period is a critical period that is laden with illnesses and diseases which might require hospitalisation. Some of the illnesses may lead to death if not well managed, especially in resource-poor countries where health-care services are suboptimal and have a relatively low paediatrician-to-child ratio.[1] Despite the global decline in the child mortality rate as a result of the erstwhile Millennium Development Goals,[2] under-five mortality in sub-Sahara African is still high, with Nigeria being the second largest contributor.[3]

Studies have shown a changing pattern of diseases managed on the paediatric wards in Nigeria[4-6] and in other parts of Africa.[7] In previous studies, the major causes of morbidities and mortalities were protein-energy malnutrition, diarrhoea diseases, measles and pneumonia.[8,9] However, recent studies suggested malaria and its complications, pneumonia, HIV-related diseases (AIDS) and septicemia to be the leading causes of morbidity and mortality.[4-6,10,11]

Irrespective of the situation, periodic review of clinical practice is an important exercise every health-care facility should undertake to evaluate the existing services to improve patients care and outcomes. One way of doing this is by looking at the records of patients admitted to the health facilities.

There is no published work on this research theme from the Federal Medical Centre, Owo, Ondo-State, Nigeria, which is

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a public tertiary hospital. Therefore, the present study aimed to determine the pattern and outcome of childhood admissions in Federal Medical Centre, Owo, Ondo-State, Nigeria. The information from the study may provide a frame work for policy making and health planning. This will also provide information on the progress of preventive programs already in place.

## MATERIALS AND METHODS

This is a descriptive retrospective study done over a period of 1 year (1st of November 2018 – 31st of October 2019). The study was conducted at the Department of Paediatrics, Federal Medical Centre, Owo, Ondo-State, Nigeria. The hospital is the only tertiary health facility in Ondo State. It has a 35-bed facility for paediatrics patients excluding the neonatal ward. It serves as referral centre and also accepts self-reported cases.

The department of paediatric provides both in-patient and out-patient services for all children. There is a children's emergency unit where children are admitted and later transferred to the neonatal ward or paediatrics medical ward. There is a general paediatric outpatient clinic and the consultant (specialist) clinic through which patients can also be admitted into the wards.

The admission registers, discharge registers and the case notes of children admitted to the children emergency unit and paediatrics wards were obtained from the Medical Records Department of the hospital. The medical records of all admission aged 1 month–17 years were obtained and relevant data extracted. Data obtained from the records included: the dates of admission and birth, age, gender, final diagnosis, outcome and date of discharge. The duration of hospital stay was calculated from the date of admission and date of discharge. Final diagnosis is the diagnosis on discharge after the treatment by the most senior person in the team, possible outcome was discharge alive, discharge against medical advice (DAMA), referral and death. Ethical approval with registration number FMC/OW/380/VOL. LXXX/197 was obtained from the ethical committee of the hospital.

Data were analyzed using the Statistical Package for the Social Sciences software version 20.0 (IBM. Corp., Armonk, NY, USA) of the IBM. The frequencies, means and standard deviations and cross-tabulations were done. Means and proportions were compared using the Student's *t*-test. Comparison of categorical variables and test for association were made using the Chi-square test. The probability $P < 0.05$ was taken as statistically significant.

## RESULTS

There were a total of 1043 paediatrics cases admitted during the study period comprising of 611 males and 432 females with a male-to-female ratio of 1.4:1. The age range of the cases was 1–204 months with a mean age of 55.6 (53.5) months. The mean age of males was 51.2 (51.1) months and 62.0 (56.3) months for the females. Under-five children accounted for 64.5% of the admission. Table I shows the pattern of admission of the patients based on age group and sex distribution. There is a significant association between the age group and sex ($\chi^2 = 8.852$, $P = 0.012$).

Further analysis of the morbidities by the age group of the patients is shown in Table II. About 80% of the morbidities are due to infectious diseases and malaria accounted for 45.3% of these morbidities. Of the 79 patients with gastroenteritis, 23 (29.1%) had severe dehydration and (56) 70.9% had moderate dehydration. Seventeen (1.6%) patients were confirmed to have Lassa fever and 46 (4.5%) patients had mainly surgical cases while one patient had acute flaccid paralysis. Sixty-four (6.2%) of the patients were co-managed with the surgical unit, these included road traffic crash (52), cellulitis (9) and neuroblastoma (3) patients.

Nine hundred and seventy-five (93.5%) patients survived and were discharged, referred or DAMA while 68 (6.5%) died as shown in Table III. Most deaths 55 (80.9%) were among the under-five patients. The deaths included 36 (52.9%) males and 32 (47.1%) females. There was a significant relationship between survival and death across the age group ($\chi^2 = 11.082$, $P = 0.004$).

Table IV shows the details of the outcome of admission by age grouping. Nine hundred and fifty-five (91.6%) patients of the total admitted cases were discharged of which 564 (59.1%) were male and 391 (40.9%) were female. One male patient was referred out. Fifty-five (80.9%) of the deaths occurred in the age group of <5 years. There was a significant association between the outcome and age group of the patients ($\chi^2 = 13.760$, $P = 0.032$)

Table V showed the causes of mortality in relation to age group. The total number of deaths was 68 and malaria was a major contributor, accounting for 33 (48.5%) of death, followed by sepsis 14 (20.6%) while sickle cell anemia and road traffic injury accounted for one (1.5%) death each. There was no

**Table I: Distribution of the study population by age group and sex**

| Age groups (months) | Sex, *n* (%) | | | $\chi^2$ | *P* |
|---|---|---|---|---|---|
| | Males | Females | Total | | |
| 1-12 | 164 (63.8) | 93 (36.2) | 257 (24.6) | 8.852 | 0.012 |
| >12-60 | 252 (60.6) | 164 (39.4) | 416 (39.9) | | |
| >60-204 | 195 (52.7) | 175 (47.3) | 370 (35.5) | | |
| Total | 611 (58.6) | 432 (41.4) | 1043 (100) | | |

**Table II: Distribution of the study population by diagnoses and age groups**

| Diagnoses | Age group in months, *n* (%) | | | |
|---|---|---|---|---|
| | 1-12 | >12-60 | >60-204 | Total |
| Malaria | 79 (30.8) | 221 (53.2) | 172 (46.5) | 472 (45.3) |
| Pneumonia | 48 (18.7) | 31 (7.5) | 9 (2.4) | 88 (8.4) |
| Gastroenteritis | 36 (14.0) | 30 (7.2) | 13 (3.5) | 79 (7.6) |
| Sepsis | 38 (14.8) | 25 (6.0) | 11 (3.0) | 74 (7.1) |
| Sickle cell anemia | 3 (1.2) | 19 (4.6) | 35 (9.5) | 57 (5.5) |
| Road traffic injury | 3 (1.2) | 18 (4.3) | 31 (8.4) | 52 (5.0) |
| Meningitis | 4 (1.6) | 9 (2.2) | 12 (3.2) | 25 (2.4) |
| Pharygotonsilitis | 5 (1.9) | 12 (2.9) | 3 (0.8) | 20 (1.9) |
| Lassa fever | 1 (0.4) | 6 (1.4) | 10 (2.7) | 17 (1.6) |
| Bronchiolitis | 15 (5.8) | 1 (0.2) | 0 (0.0) | 16 (1.5) |
| Appendicitis | 0 (0.0) | 2 (0.5) | 13 (3.5) | 15 (1.4) |
| Intussusception | 8 (3.1) | 4 (1.0) | 0 (0.0) | 12 (1.2) |
| Urinary tract infection | 0 (0.0) | 2 (0.5) | 9 (2.4) | 11 (1.1) |
| Cellulitis | 1 (0.4) | 5 (1.2) | 5 (1.4) | 11 (1.1) |
| Burns | 1 (0.4) | 8 (1.9) | 2 (0.5) | 11 (1.1) |
| Nephrotic syndrome | 0 (0.0) | 3 (0.7) | 7 (1.9) | 10 (1.0) |
| Osteomyelitis | 1 (0.4) | 2 (0.5) | 5 (1.4) | 8 (0.8) |
| Asthma | 0 (0.0) | 2 (0.5) | 5 (1.4) | 7 (0.7) |
| Undernutrition | 4 (1.6) | 1 (0.2) | 0 (0.0) | 5 (0.5) |
| Typhoid fever | 0 (0.0) | 1 (0.2) | 3 (0.8) | 4 (0.4) |
| Poisoning | 1 (0.4) | 1 (0.2) | 2 (0.5) | 4 (0.4) |
| Malignancy | 1 (0.4) | 1 (0.2) | 1 (0.3) | 3 (0.3) |
| Tetanus | 0 (0.0) | 0 (0.0) | 3 (0.8) | 3 (0.3) |
| Seizure disorder | 0 (0.0) | 2 (0.5) | 1 (0.3) | 3 (0.3) |
| Congenital heart disease | 0 (0.0) | 2 (0.5) | 0 (0.0) | 2 (0.2) |
| Acute flaccid paralysis | 0 (0.0) | 1 (0.2) | 0 (0.0) | 1 (0.1) |
| Others | 7 (2.7) | 8 (1.9) | 18 (4.9) | 33 (3.2) |
| Total | 257 | 416 | 370 | 1043 |

**Table III: Distribution of the survival and mortality of the study population by age group**

| Age groups (months) | Outcome, *n* (%) | | | $\chi^2$ | *P* |
|---|---|---|---|---|---|
| | Survived | Died | Total | | |
| 1-12 | 231 (23.7) | 26 (38.3) | 257 (24.6) | 11.082 | 0.004 |
| >12-60 | 387 (39.7) | 29 (42.6) | 416 (39.9) | | |
| >60-204 | 357 (36.6) | 13 (19.1) | 370 (35.5) | | |
| Total | 975 (100.0) | 68 (100.0) | 1043 (100.0) | | |

significant association between the cause of mortality and age group ($\chi^2 = 16.624$, $P = 0.549$). The details of the duration of hospital stay before death is shown in Table VI. About three-quarter of deaths occurred in < 24 h of admission which is not significant ($\chi^2 = 1.734$, $P = 0.420$).

## DISCUSSION

The total number of children admitted during the study period was 1043, which was similar to studies in other tertiary health facilities,[12,13] but lower than studies from secondary health-care facilities[14] and mission hospital.[15] This could be due to the population differences in the locations of the facilities quoted and possibly because our centre is a tertiary healthcare centre and a referral point expected to receive lower number of patient attendance than what obtains at the lower levels of care. In this study, the under-five children accounted for the significantly higher percentage of admission which was similar to other studies.[5,10,16,17] The consistency of this finding further drives home the reality of the burden of childhood illnesses in this age group and it calls for concerted efforts and well-coordinated approach toward the sustenance of Child Survival Programme for the under-five children in Nigeria.

More males were admitted than females in this study which was similar to the findings in Benin,[17] Enugu[18] and Ondo.[14] This could be due to the increased vulnerability of males biologically to disease than females and the fact that males are better cared for. The ratio is however in contrast to the findings in Bauchi[12] where equal sex distributions of childhood admission were reported. The difference may be due to regional variation in the health-seeking behaviour of the care-giver for cultural reasons.[19]

Infectious diseases, particularly malaria, was the most common cause of morbidities in this study which was similar to studies from the other parts of Nigeria[14,18] and elsewhere in Africa.[20,21] Studies conducted a few decades ago showed

**Table IV: Distribution of outcome of admission by age group**

| Outcome | Age group in months, *n* (%) | | | | $\chi^2$ | *P* |
|---|---|---|---|---|---|---|
| | 1-12 | >12-60 | >60-204 | Total | | |
| Discharge | 228 (23.9) | 379 (39.7) | 348 (36.4) | 955 | 13.760 | 0.032 |
| Referred out | 0 (0.0) | 1 (100.0) | 0 (0.0) | 1 | | |
| DAMA | 3 (15.8) | 7 (36.8) | 9 (47.4) | 19 | | |
| Died | 26 (38.3) | 29 (42.6) | 13 (19.1) | 68 | | |

DAMA: Discharge against medical advice

**Table V: Distribution of causes of mortality by age group**

| Diagnoses | Age group in months, *n* (%) | | | | $\chi^2$ | *P* |
|---|---|---|---|---|---|---|
| | 1-12 | >12-60 | >60-204 | Total | | |
| Malaria | 14 (42.4) | 13 (39.4) | 6 (18.2) | 33 | 16.624 | 0.549 |
| Sepsis | 7 (50.0) | 5 (35.7) | 2 (14.3) | 14 | | |
| Pneumonia | 3 (37.5) | 3 (37.5) | 2 (25.0) | 8 | | |
| Gastroenteritis | 1 (12.5) | 5 (62.5) | 2 (25.0) | 8 | | |
| Lassa fever | 0 (0.0) | 1 (50.0) | 1 (50.0) | 2 | | |
| SCA | 1 (100.0) | 0 (0.0) | 0 (0.0) | 1 | | |
| Undernutrition | 0 (0.0) | 1 (100.0) | 0 (0.0) | 1 | | |
| RTA | 0 (0.0) | 1 (100.0) | 0 (0.0) | 1 | | |

RTA: Road Traffic Accident, SCA: Sickle Cell Anaemia

**Table VI: Duration of hospital stay before death and age group**

| Duration of hospital stay | Age group in months, *n* (%) | | | | $\chi^2$ | *P* |
|---|---|---|---|---|---|---|
| | 1-12 | >12-60 | >60-204 | Total | | |
| <24 h | 21 (42.0) | 19 (38.0) | 10 (20.0) | 50 | 1.734 | 0.420 |
| 2-5 days | 5 (27.8) | 10 (55.6) | 3 (16.7) | 18 | | |

that protein-energy malnutrition, diarrhea diseases, measles and pneumonia were the leading cause of morbidity in children.[8,9,22] This shows that much has changed in the three decades concerning the pattern of morbidities among Nigerian children. This might among other factors be due to the rising prevalence of malaria parasite resistance to anti-malarial drugs in recent time.[23]

The overall mortality rate of 6.5% in this study is comparable to what was reported in other tertiary health care facilities.[17,18,24,25] This is also similar to the mortality reported in secondary health-care facilities.[11,14,15,26] This could be because the tertiary health-care centers sometimes provide primary and secondary health-care services in Nigeria[10] which might cause over-work and thereby reduce the efficiency and effectiveness of the tertiary healthcare in providing specialized care. It is important to note that secondary health-care facilities also provide tertiary care.[10]

The mortality rate of this present study is higher than some studies in Nigeria[5,24,25] but lower than other studies reported from other parts of Nigeria.[4,10,12,13] The differences could be due to methodologies, where some studies included the neonates.[4,10,13] Furthermore, data of other studies[24,25] were only from the children emergency wards.

Malaria with its complications is the major infectious disease accounting for deaths in this study. This finding is also in tandem with the reports from other studies in Nigeria[10,13,14] and Mozambique.[19] There is, therefore, the need for joint efforts at combating the scourge of malaria to achieve a significant reduction in childhood morbidity and mortality in sub-Saharan Africa. The stakeholders at different levels need to strengthen existing malaria control programmes and ensure proper implementation of the interventions toward stemming the tide of the disease. Improved and consistent environmental sanitation, availability and accessibility to and use of insecticide-treated mosquito nets for all, are among other interventions that can be deployed.

The duration of hospital stay among children is mostly short and this is because most childhood illnesses are acute and treatable. Most deaths of children in our study occurred within 24 h of hospital stay and are predominantly among the under-five age group. This further supported the need for health-care programmes targeted at this age group. Late presentation to the hospital is a major cause of early death among children admitted.[27] The late presentation might be due to financial constraints,[28] poorly resourced, unresponsive and culturally inappropriate health and nutrition services, food insecurity, poor access to health-care services, lack of good hygiene, female illiteracy, poverty, geographic and political marginalization.[29] May not be due to all these reasons, maybe female literacy, financial constraints, ignorance and occasionally attitude of health-care workers.[29]

DAMA from admission is a medico-legal issue which is often encountered in resource-poor countries. The DAMA in our present study was 1.8% which is similar to studies from other teaching hospitals.[12,16,24,30,31] The reasons for the DAMA included financial constraints, inconveniences of the care giver in the hospital, lack of understanding of the child's health condition,[30,31] resort to native care, dissatisfaction with hospital care and unfriendly hospital personnel[31,32] among others.

## CONCLUSION

Infectious diseases were the major cause of childhood morbidity and mortality, with a bulk of the children affected in the under-five age group. Malaria and other preventable diseases accounted for the major cause of morbidity and mortality. It is therefore recommended that focused and free under-five health-care programmes be initiated.

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## Conflicts of interest

There are no conflicts of interest.

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