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# Morbidity and Mortality Statistics in Paediatric Medical Ward of Bingham University Teaching Hospital, Jos

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**To cite this article:**

Shehu Maryam, Davou Kaneng Nyam, Ubanyi Tina Onyeka, Mava Yakubu, Esegbe Edwin Ehi, Yakubu Alhassan Mela. Morbidity and Mortality Statistics in Paediatric Medical Ward of Bingham University Teaching Hospital, Jos. *American Journal of Internal Medicine*. Vol. 7, No. 3, 2019, pp. 51-55. doi: 10.11648/j.ajim.20190703.11

**Received:** May 6, 2019; **Accepted:** June 3, 2019; **Published:** June 12, 2019

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**Abstract:** Background: Approximately seventy-five percent of the deaths that occur in children excluding neonatal deaths in sub-Saharan Africa result from preventable and curable diseases like pneumonia, diarrhea and malaria. A hospital-based morbidity and mortality pattern can be used to appraise the demographic profile and burden of disease in a community. AIM: To determine the morbidity and mortality pattern of children admitted into the PMW of BHUTH, Jos. Methodology: This was a retrospective study. Admissions into the paediatric medical ward of Bingham University Teaching hospital, Jos between October 2017 to October 2018 were reviewed, with data from the admission and discharge records of the ward. Data was analyzed using SPSS version 20. A p value < 0.05 was considered statistically significant. Ethical clearance was gotten from the ethical committee of the hospital. Results: A total of 357 children aged 1 month-15 years were admitted over the study period, of these, 189 (52.9%) were males, and 168 (47.1%) were females with a male:female ratio of 1.1:1. The age range was 1-168 months. Two hundred and twenty-seven (63.6%) of the children were under 5 years old. The major cause of mortality in children less than 5 years of age were BPN, Sepsis and malaria with 2 (18.2%) each respectively. The cause of morbidity was majorly due to malaria 70 (20.2%), followed by various crisis of SCA 42 (12%). The highest case fatality rate was from viral haemorrhagic fever (VHF) with 28%, followed by Acute bacterial meningitis (ABM) and Protein energy malnutrition (PEM) with complications each having 15.4% respectively. The length of hospital stay was inversely proportional to mortality and the difference was statistically significant ( $\chi^2 = 24.58, p < 0.00$ ). The trend of sex distribution and morbidities showed that the month with the highest morbidity was in October 2017 with 44 admissions, the highest number of male morbidities was in January, 2018 with 26 males, while the month with the highest number of morbidities for females was in October 2017 with 21 patients. Out of all the 357 admissions, (92.7%) were discharged, (2.2%) left against medical advice, (0.6%) were referred, while (4.5%) died. Conclusion: The burden of paediatric morbidity and mortality is on children under 5 years and the causes are mainly preventable. An emphasis and focus on malaria eradication, vaccination and other child survival strategies will help to reduce childhood morbidity and mortality.

**Keywords:** Paediatric, Morbidity, Mortality, Medical, Jos

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## 1. Introduction

About 28% of the total world population is made up of children that are less than 15 years of age [1]. The World Health Organization documented that about half of the total deaths in Africa is found in children younger than 14 years [2]. About 4.6 million childhood deaths occur every year [3].

More than 26,000 children under the age of five die around the world every day, mostly from preventable causes [4]. Child mortality is a sensitive indicator of a country's development and telling evidence of its priorities and values, therefore it was a good thing when childhood mortality rates dropped from 11.9 million deaths to 7.7 million deaths from 1990 to 2010 [3, 5].

The under- five mortality rates in the world was more in

sub-Saharan Africa, with 50% occurring in the region, followed by south Asia with 33% and with less than 1% occurring in the developed countries [6]. Approximately seventy-five percent of the deaths that occur in children excluding neonatal deaths in sub-Saharan Africa result from preventable and curable diseases like pneumonia, diarrhea and malaria [7].

Childhood morbidity and mortality in developing countries are high. A Large-scale data reporting of paediatric morbidity and mortality in developing countries done by Duke et al documented that majority of the cause of deaths were from infectious diseases [8]. A number of studies done in Nigeria reported that children suffer from various infectious and vaccine preventable diseases leading to significant morbidity and mortality [9-13]. The most common childhood killers have been identified to be Pneumonia, diarrhoea, malaria, measles, malnutrition, tuberculosis, and human immune deficiency virus [8].

The increasing number and degree of childhood morbidity and mortality are aggravated by different factors, like delay in seeking medical treatment, poverty, unsafe drinking water, poor sanitation, inadequate hygiene, diarrhea, and poor nutritional status [14-15]. Childhood mortality in paediatric departments is commonly caused by preventable infectious and reversible diseases, so urgent treatment and resuscitation are the key in reducing poor outcomes [16]. Early diagnosis and treatment of pneumonia, sepsis, malaria, and diarrheal diseases has been shown to reduce childhood mortality in acute pediatric hospitals [17-18].

A hospital-based mortality and mortality pattern can be used to appraise the demographic profile and burden of disease in a community. Information obtained from the review will be helpful in assessing and re-evaluating existing services and in improving facilities and patient care [19- 20]. This study was carried out to determine the morbidity and mortality pattern of children admitted into the PMW of BHUTH, Jos.

## 2. Methodology

This was a retrospective cross-sectional descriptive study from October 1, 2017 to October 31, 2018. The case files of all children aged one month to 14 years admitted into the paediatric wards as recorded in the ward register, were reviewed. Neonatal and surgical cases were excluded from the study. Data retrieved from the case files included age, gender, diagnosis and duration of hospitalization. Data collected was entered into a spread sheet using SPSS 20.0 for Windows® statistical software which was also used for analysis. Descriptive statistics was used to analyze the obtained data.

## 3. Results

A total of 357 children were admitted over the study period, of these, 189 (52.9%) were males, and 168 (47.1%) were females with a male: female ratio of 1.1:1. Mean age

was 59.06 ± 51.16 months, with the youngest 1 month old, and the oldest 168 months old (14 years). Two hundred and twenty seven (63.6%) of the children were under 5 years, of which majority were males as shown in Table 1.

**Table 1.** Age and Gender Distribution of the Children.

Age	Male n (%)	Female n (%)	Total n (%)
< 5 Years	124 (34.7)	103 (28.9)	227 (63.6)
> 5 Years	65 (18.2)	65 (18.2)	130 (36.4)
Total	189 (52.9)	168 (47.1)	357 (100)

Table 2 shows the top seven diagnosis were malaria, sickle cell anaemia (SCA), Acute diarrhoeal disease (ADD), URTI, Sepsis, Typhoid fever and Pneumonia respectively. Other Reportable infectious cases like Viral haemorrhagic fever, TB, Measles and acute flaccid paralysis were also seen.

**Table 2.** Diagnosis and frequency.

Diagnosis	Frequency	Percentage
Malaria	72	20.2
SCA	43	12.1
ADD	28	7.8
URTI	25	7.0
Sepsis	25	7.0
Typhoid fever	23	6.4
Broncho Pneumonia	21	5.9
Febrile Convulsion	20	5.6
Protein Energy Malnutrition	13	3.6
Acute Bacterial Meningitis	13	3.6
Urinary tract infection	12	3.4
Viral haemorrhagic fever	7	2.0
Tuberculosis	6	1.7
Acute glomerulonephritis	5	1.4
Nephrotic syndrome	4	1.1
Food poisoning	3	0.8
Severe Anaemia	3	0.8
Bronchial Asthma	3	0.8
PUD	2	0.6
Diabetes Mellitus	2	0.6
Rheumatic Fever	2	0.6
Nephroblastoma	2	0.6
Aspiration Pneumonitis	2	0.6
Acute flaccid paralysis	2	0.6
Measles	1	0.3
Hiv/Aids	1	0.3
Others	17	4.8
Total	357	100

The proportion of the under- five mortality is 68.8% as against 31.2% for those above the age of five years as depicted in table 3.

**Table 3.** Age and Sex Distribution of the Mortalities.

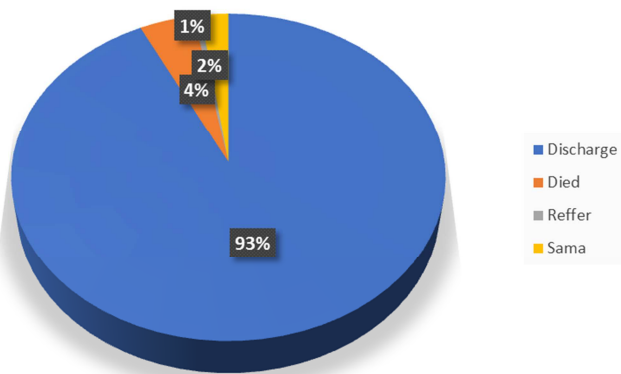
Age	Male n (%)	Female n (%)	Total n (%)
< 5 Years	6 (37.4)	5 (31.4)	11 (68.8)
> 5 Years	2 (12.6)	3 (18.6)	5 (31.2)
Total	8 (50.0)	8 (50.0)	16 (100.0)

The causes of death in under- fives are shown in Table 4. Pneumonia, Sepsis and severe Malaria were the commonest cause of death with each having 18.2% respectively.

**Table 4. Causes of Mortality in Children Under the Age of 5.**

Diagnosis	Frequency (n)	Percentage
Sepsis	2	18.2
Severe BPN	2	18.2
Severe Malaria	2	18.2
PEM	2	18.2
VHF	1	9.1
Diarrhoeal Disease	1	9.1
AKI	1	9.1
Total	11	100

The causes of death in children above the age of 5 years are shown in Table 5. Meningitis had the highest percentage with 40%.



**Figure 1. Outcome of Hospital admissions.**

**Table 5. Causes of Mortality in Children > 5 Years of age.**

Diagnosis	Frequency (n)	Percentage
Meningitis	2	40.0
Sepsis	1	20.0
Severe BPN	1	20.0

Diagnosis	Frequency (n)	Percentage
VHF	1	20.0
Total	5	100

About 93% of the total admissions were discharged, 4% died and 2% of the patients signed against medical advice. Only 1% of the patient were referred.

The case fatality rate was highest in Viral hemorrhagic fever with 28.6%, followed by acute bacterial meningitis and PEM with 15.4% respectively, while severe malaria had the least with 2.8%.

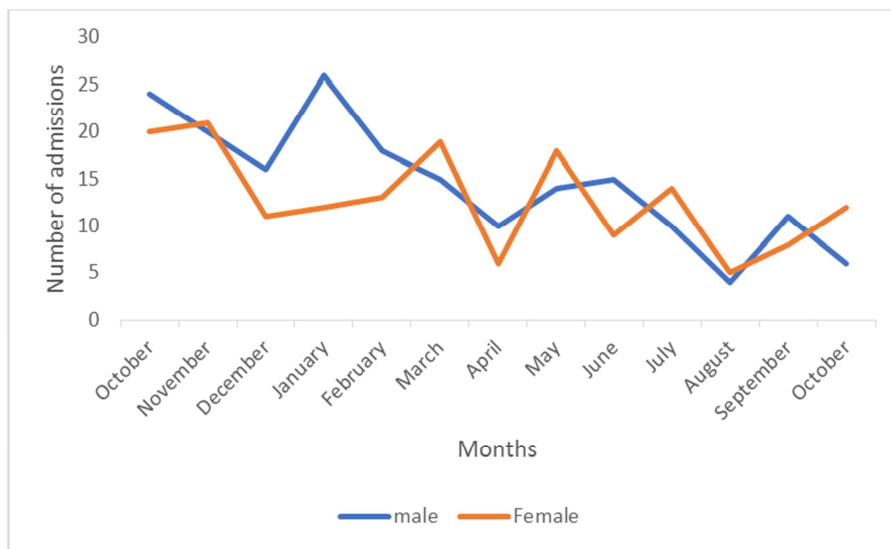
**Table 6. Diagnosis and Case Fatality Rate.**

Diagnosis	Total number	Mortality	CFR (%)
VHF	7	2	28.6
Meningitis	13	2	15.4
PEM	13	2	15.4
Severe BPN	21	3	14.3
Sepsis	25	3	12.0
ADD	28	1	3.6
Severe Malaria	72	2	2.8

The length of stay was inversely proportional to mortality. Majority of the mortality took place within 72 hours of admission. There was a significant difference between the number of mortality and the length of stay ( $\chi^2 = 24.58, p < 0.00$ ).

**Table 7. Mortality and Duration of Admission.**

Duration of Admission (hours)	Mortality (%)
< 72 hours	14 (87.5)
> 72 hours	2 (12.5)
Total	16 (100)



**Figure 2. Trend of sex distribution of morbidities in BHUTH from October 2017 to October 2018.**

### 4. Discussion

There was a male preponderance in total admission seen in the Paediatric medical ward of BHUTH, Jos. This could

because of the demographic population, the increased biological vulnerability of males to infection or because males are believed to be more important than females and so when they are sick, medical help is sought for them quickly than the females. This result is comparable to what was

obtained by Toma et al in Jos [12], Abhulimhen-Iyoha in Benin [10], Garba et al in Gusau [21] and Anyanwu et al in Abakaliki [13]. Other studies done by Adhikeri et al in Nepal [22] and Gordon et al [23] in Ethiopia also had male preponderance.

Children less than 5 years of age contributed to about 65% of the total admission, this could be explained by the low immunity against infectious diseases in this age group, making them susceptible to infections. This is similar to other studies done all over Nigeria and outside the country [10, 12, 8, 21-24].

Infectious diseases like Malaria, Acute diarrhoeal disease, Upper respiratory tract infections, Sepsis, Typhoid fever and Broncho pneumonia were the major causes of morbidity. Although Sick cell anaemia which is an autosomal recessive haematological disease was the second highest cause of admission, they all came as a result of various crises which were mostly precipitated by infectious diseases, this is similar to what was obtained by Toma et al in Jos [12]. The high morbidity pattern from infectious disease like malaria, URTI, ADD, Typhoid fever shows the need for more control and eradication measures against malaria, the need to strengthen our immunization programme and sanitation measures. The result is comparable to what was obtained by Toma et al in Jos [12] and Garba et al in Gusau [21]. Respiratory tract infections and acute diarrhoeal diseases accounted for very high number of morbidity in this study, which is similar to what was obtained in study done in Benin [10], Osogbo [11], Abakaliki [13], Ethiopia [23], Nepal [22] and Papua-New Guinea [8].

The over all mortality rate in BHUTH was 4.5%. The under- five mortality rate was 3.1% which was higher than those greater than five years old with the mortality rate of 1.4%. This could be explained by the vulnerability of those under five. The causes of mortality in under-fives and over five- year old children were infectious diseases; however, PEM was a major cause of death that was seen in the under-fives but not in those above five years old. A plausible explanation is because PEM is a disease of under-fives. The mortality rate is lower than that obtained in other studies around Nigeria where the mortality rate ranged between 6.5%-12.6% [21, 13, 24-26,]. The reason for this could be because of the location and difference in age range and Paediatric units included. The mortality rate in Nigeria was similar to that obtained in the different hospitals in Papua-New Guinea, which ranged between 1%-11%, while in Ethiopia the mortality rate was about 10% [8, 23].

The major cause of mortality in under-fives were Sepsis, severe BPN, Malaria and PEM, while in those above five years of age ABM was the major cause of death. The absence of PEM being a cause of death in those above five years of age is due to the fact that PEM is a disease of under-five. Malaria was also not a cause of mortality in those older than five years old, the reason could be because they have developed some level immunity against malaria. This is similar to what was obtained in other studies were Sepsis, Malaria, Meningitis, Pneumonia and PEM accounted for

most of the mortalities [10-13, 21]. However, this is in contrast to what was obtained by George et al and Chukwu et al were HIV and Malignancies were the major cause of mortality respectively [20, 24]. It is of worthy to note that VHF was also a cause of mortality in this study. This is expected as BHUTH serves as a referring center for VHF (Lassa).

Viral haemorrhagic fever had the highest CFR in this study. A plausible explanation is because, it's a documented fact that VHF have very high case fatality rate [27]. Acute bacterial meningitis and PEM also had high case fatality rate. This is comparable to what was obtained by Toma et al and Duru et al [12, 28]. This is in contrast to what was obtained by Chukwu et al in Enugu, where Tetanus had the highest CFR., [10] severe PEM had a similar CFR 28.7%, to that of the current study.

The duration of hospital stay was inversely related to mortality. This could be because the first 24-48hrs of admission are crucial to the survival of patients. It could also be because of late presentation due to poor health seeking behavior. In the study done by Gordon et al, about one third of the mortalities occurred within 24hrs of admission.

The dry (harmattan) season (October-February) had the highest number of admissions compared to the raining and hot season. This could be because of the high rate of morbidity from Malaria, which is said to peak between October to January [13, 23].

## 5. Conclusion

The morbidity and mortality pattern found in the PMW of BHUTH Jos, showed that infectious diseases such as Malaria, Pneumonia, Acute Bacterial Meningitis and Sepsis are the major cause of Morbidity and Mortality in the Hospital. Viral haemorrhagic fever had the highest case fatality rate. Non-communicable diseases like PEM and SCA also account for a lot of morbidity and mortality.

The morbidity and the mortality burden are more in children younger than the age of 5 years, reflecting the need for improvement on health programmes like child survival strategies and integrated management of childhood illness (IMCI) that is directed towards children less than five years old. More health education and enlightenment campaign environmental sanitation and good hygiene.

Therefore, there is the need to improve on immunization coverage and child survival strategies and integrated management of childhood diseases in the state. Health educational programs on child-hood nutrition and how to prevent SCA needs to be intensified.

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