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Full Length Research Paper

Childhood morbidity and mortality: Prevalence, aetiology and related factors as seen at a tertiary institution, Southern Nigeria.

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ABSTRACT

Aim: To determine the prevalence, aetiology and related factors of childhood mortality in Abia State University Teaching Hospital Aba, Abia state, southeast Nigeria.

Study design: Retrospective study.

Place and duration of study: Data were obtained from admission case records of children admitted to children's emergency unit and the ward from January 1st to December 31st 2016.

Methodology: We included 582 subjects (359 males, 223 females) whose data were analyzed using statistical software SPSS version 16.

Results: The prevalence of childhood mortality was 11.7%. Malaria (40.2%), Diarrhea (22.4%), Sepsis (13.1%), Pneumonia (12.0%) constituted the leading causes of morbidity. Majority of the patients (81.3%) were discharged home, 22.4% discharged against medical advice while 11.7% died. Leading causes of mortality were Malaria (38.2%), Sepsis (20.6%), and Diarrhea (19.1%). Significantly more children in age bracket 1 to 11 months (7.2%) than older age groups (4.6%) suffered mortality p=0.000. Most deaths occurred in the months of January (14.7%) and February (19.1%).

Conclusion: Malaria, Diarrhea, Sepsis and Pneumonia are leading causes of morbidity and mortality with deaths occurring significantly more in infants.

Keywords: Childhood mortality, Aetiology, Aba

INTRODUCTION

Childhood mortality is an indicator of the availability and utilization of health services and development of a country (Anon, 1990).

Though there has been a decreasing trend of childhood mortality over the last 2 decades, childhood morbidity and mortality have remained high particularly in developing countries (Onyiriuka AN, 2005; Grover VL, 2004).

It was reported in 2012 that 7.6 million children aged under five die annually worldwide with 3.7 million deaths occurring in sub-Saharan Africa (UNICEF, 2018). Another report has it that 25% of children born in developing countries die before their 5th birthday while less than 2% of such deaths occur in developed nations (Nations Inter-agency Group for Child Mortality Estimation Levels and trends in child mortality: Report, 2011).

Childhood morbidity and mortality are usually due to diseases of infectious origin particularly in the under-five age group among which the leading causes are Pneumonia, Diarrhea and Malaria (Oloruntoba EO, 2014). Most of the diseases usually result from lack of hygienic environment, poor water supply or poor hygienic practices (Lugangira K, 2017). Most of these

diseases also can be prevented by vaccines and early diagnosis and prompt utilization of healthcare services where available (Brown J, 2013).

Child mortalities in developing nations are always an estimate due to the difficulty in data collection and storage (Child Mortality Estimates, 2015). Hospital data collection is usually more feasible and they still provide a reliable insight into the disease prevalence in the community.

Evaluation of childhood morbidity and mortality in a community affords an insight into the prevailing disease conditions (Bilheimer LT, 2010) and also helps in prioritizing healthcare services. Subsequent evaluations provide a veritable tool for monitoring the disease trend in such a community.

We therefore undertake to evaluate the prevalence, etiology and related factors of childhood mortality in Abia State University Teaching Hospital Aba, Abia State.

PATIENTS AND METHODS

All admissions of children aged 1 month to 16 years from January 2016 to December 2016 were retrospectively reviewed.

The study was conducted in Abia State University Teaching Hospital (ABSUTH), located at Aba, the commercial nerve centre of Abia State southeast Nigeria, located 45 kilometers south of Umuahia, the state capital. The hospital serves as a secondary health care institution and referral centre for peripheral hospitals in Aba and neighbouring states of Rivers and Akwa-ibom, south-south and Imo, south east Nigeria.

The Department of Paediatrics is manned by 6 consultants, 12 registrars and 8 house officers (who do 3 month rotation before proceeding to other departments). All cases of admission were reviewed by at least the registrar on call before commencement of further management. Diagnosis was made on the patient on the basis of clinical features and laboratory results.

All the case records of children admitted to the children emergency unit and to the ward were perused and relevant information–age, gender, diagnosis, duration and outcome of admission extracted and documented on a structured questionnaire. Exclusion criteria were surgical patients, children with gross congenital malformation, those aged more than 16 years and patients with incomplete data. Ethical clearance was obtained from the Ethics Committee of the Teaching Hospital. Data were analyzed using SPSS Version 16. Proportion and chi-square analysis were done. Statistical significance was set at p value<0.05.

RESULTS

There were a total of 604 admissions out of which 22 had inadequate data and were discarded hence 582 were used for subsequent analysis. A total of 68 deaths were recorded out of 604 giving a child mortality rate of 11.7%. There were 359 males and 223 females giving male: female ratio of 1.6:1 (Table 1).

Table 1. Age and gender distribution of patients.

Age (Months)	Male	Female	Total
1 – 11	141	89	230
12 – 59	142	89	231
≥ 60	76	45	121
Total	359	223	582

Malaria 234 (40.2%), Diarrhea 108 (22.44%), Sepsis 76 (13.06%), Pneumonia 70 (12.03%) were the leading causes of morbidity in the patients (Table 2).

Table 2. Diagnosis in the patients.

Diagnosis	Frequency	Percentage (%)
Malaria	234	40.2
Diarrhea	108	22.44
Sepsis	76	13.06
Pneumonia	70	12.03
Meningitis	19	3.26
Acute severe asthma	7	1.2
Nephrotic syndrome	7	1.2
Seizure disorder	7	1.2
Sickle cell anaemia	6	1.03
Severe malnutrition	6	1.03
Congenital heart disease	5	0.08
Intra-abdominal malignancy	4	0.07
Leukaemia	4	0.07
Acute renal failure	4	0.07
Tonsillitis	4	0.07
Conjunctivitis	4	0.07
Others	17	2.92
Total	582	100

Four hundred and seventy three (81.3%) of the subjects were discharged while 68 (11.7%) died. Other details are in (Table 3).

Table 3. Outcomes of hospital admission.

Outcome	Number	Percentage (%)
Discharged home	473	81.3
Dead	68	11.7
Discharged against Medical Advice	16	2.7
Absconded	13	2.2
Referred	12	2.1
Total	582	100

The leading causes of mortality in the study were Malaria 26(38.2%), Sepsis 14 (20.6%), Diarrhea 13 (19.1%). Other details are shown in (Table 4).

Table 4. Cause of death in childhood.

Diagnosis	Frequency	Percentage (%)
Malaria	26	38.2
Sepsis	14	20.6
Diarrhea	13	19.1
Pneumonia	5	7.3
Meningitis	4	5.9
HIV	2	2.9
PEM	2	2.9
Leukaemia	1	1.5
Osteosarcoma	1	1.5
Total	68	100
HIV: Human Immunodeficiency Virus; PEM: Protein Energy Malnutrition.		

Association between Age and mortality is significant as p Value is less than 0.05. Significantly more of the children in age bracket 1 to 11 months suffered mortality than the older age groups (Table 5).

Table 5. Admission and mortality in relation to age.

Age (Months)	Number of admissions	Mortality	Percentage (%)	p Value
1-Nov	230	42	7.2	0
59-Dec	231	15	2.6	0
>60	121	11	1.9	0

Most deaths occurred in months of January and February and were due to Malaria 10 (14.7%) and Diarrhea 9 (13.2%), Table 6.

Table 6. Cause of Death with relationship to Monthly Distribution.

Month	Cause of death					
	Malaria	AWD	BPN	Sepsis	Meningitis	LEUK
Jan	6	1	1	2	-	-
Feb	4	8	4	-	1	-
Mar	3	-	-	-	-	-
Apr	-	-	-	3	-	-
May	4	-	-	-	-	-
June	1	1	-	-	-	-
July	4	-	-	3	-	-
Aug	1	-	-	3	-	1
Sept	3	1	-	1	-	-
Oct	3	-	-	3	-	-
Nov	1	-	-	3	-	-
Dec	-	1	1	3	-	-
Total	30	12	6	18	1	1
AWD: Acute watery Diarrhea; BPN: BronchoPneumonia; LEUK: Leukaemia						

DISCUSSION

The prevalence of mortality rate obtained in this study is 11. 7%. It is higher than 6.5% recorded in a mission hospital in Abakaliki South East Nigeria (Onyiriuka AN, 2005) but close to 12. 2% recorded in a tertiary institution in same Abakaliki and equals UNICEF 2012 estimates of 11.7% for Nigeria (UNICEF-Child Mortality, 2012; Natarao JP, 2013). The lower result obtained in the mission hospital might be as a result of their managing less difficult cases with greater success and lesser mortality rates and referring more difficult cases to tertiary institutions and ours being a tertiary institution and handling more difficult referral cases has greater tendency to record greater mortality. Moreover, estimates of health data being quoted for developing countries by international organizations such as UNICEF(UNICEF-Child Mortality, 2012) are often based on values obtained from tertiary institutions, and possibly this is why our own figure equals Nigeria UNICEF estimate.

The male-female ratio obtained in this study shows a male preponderance. Such male preponderance in gender ratio has been reported severally in previous studies (Lugangira K, 2017; Adeboye MA, 2010). This might be explained possibly by gender bias on the part of parents in health seeking behavior in favour of males and more predispositions of males by their genetic structure to certain illnesses including Pneumonia and Diarrhea (Pongou R, 2013).

Our study reveals that Malaria, Diarrhea, Sepsis and Pneumonia as leading causes of morbidity. This report is in consonance with the reported causes childhood

morbidity and mortality as observed particularly in developing countries (Adeboye MA, 2010).

In the prevailing circumstance of overcrowding, poor environmental sanitation, inadequate personal hygiene, largely unavailable potable water supply, inadequate immunization coverage in developing nations of which Nigeria is one, these illnesses are bound to persist. Also measures to reduce the scourge of Malaria as in "Roll back Malaria" including utilization of insecticide treated net, early diagnosis and treatment of illness and even good environmental hygiene are poorly observed by caregivers of children. It is reported for instance that only 42% of Nigerian households have at least 1 insecticide treated net while 29% of children aged under-five sleep in it (Afolabi BM, 2009). Immunization for rotavirus and pneumococcal vaccine are haphazardly applied and other vaccines are inadequate in many immunization centers hence the persistence of high morbidity and mortality rates of these diseases (Peny JM, 2005).

Therefore urgent and persistent measures including advocacy for the provision of effective and functional health centers and materials including vaccines close to the habitation of the citizenry; encouragement of healthcare staff by ensuring regular payment of remuneration as well as health education of the populace on the need for environmental and personal hygiene should be instituted. Government at all levels should make genuine and determined effort to improve the socioeconomic condition of the citizenry in order to realize a decrease in the trend.

Our study reveals that overwhelming majority (81.3%) of the cases was discharged, 2.7% were discharged against medical advice and 2.2% absconded. Our discharge rate is similar to that reported in Gusau (Bilkisu GI, 2014), northwest Nigeria but higher than reports from many other parts of country (Peny JM, 2005; Abhulimhen-Iyoha BI, 2012).

The similarity between our own high discharge rate and that of Gusau could be because these are tertiary institutions also receiving and managing less difficult secondary healthcare cases as well as incorporating children emergency and ward care with tendency towards high discharge rate while most of the other studies were emergency care reports (Abhulimhen-Iyoha BI, 2012; Saad YM, 2015) with possible transfer to the wards of stabilized recovering cases, retaining and managing severely ill cases and registering higher mortality and lower discharge rates.

Also quality human and material resources being expectedly more in tertiary institutions than secondary healthcare establishments could impact on their treatment outcome with higher discharge rates.

In this study as many as 2.7% of the patients were discharged against medical advice (DAMA). This is a sizeable proportion considering the fact that most of these patients often proceed to seek medical attention in inappropriate places or even proceed home where they are given ill-advised native or herbal concoction and medications often with grave health consequences or even death.

Studies have indicated that the reason for DAMA is primarily due to inadequate information to the patient on the disadvantages of such an action (Baptist AP, 2007). Other reasons could be lack of satisfaction for hospital services and attitude of the medical staff (Baptist AP, 2007).

There is therefore need to institute a culture of thorough and patient explanation of the consequences of DAMA to the patient and caregivers by the attendant staff; adequate care and dedication by medical staff with regular supervision by seniors as well as improvement of facilities as necessary.

The leading causes of mortality in our study were Malaria, Sepsis and Diarrhea. Mortality in our study as in most other reports is particularly prevalent in those aged under five (Abdullah S, 2007). The immune system of these young children are not yet fully developed (Leuridan E, 2010). Exclusive breast feeding which helps to protect against respiratory illness and Diarrheal diseases amongst other benefits is not practiced by a large proportion of mothers and in the circumstance of poor environmental sanitation, lack of potable water and low immunization coverage, all make these very young kids prone to morbidity and mortality following illness (Lugangira K, 2017; Joshi PC, 2014).

The leading causes of mortality portrayed in our study were Malaria (38.2%), Sepsis (20.6%), and Diarrhea (19.1%) as shown Table 4. Such a report has been noted severally in previous studies (Baptist AP, 2007). WHO indicated that these illnesses are largely preventable (Campagne G, 1999).

Poverty, illiteracy, overcrowding, poor environmental sanitation and usage of unsafe drinking water as well as failure in the utilization of available health services are significant risk factors for such illnesses and death (Lugangira K, 2017).

Effective adoption of developmental parameters in the health sector including effective immunization, effective application of "Roll back Malaria"–measures, improvement in the socioeconomic conditions of the populace are achievable steps to reduce morbidity and mortality in children. Application of these measures in developing countries such as Bangladesh produced remarkable reduction in under five mortality from 65 to 52 per 1000 live births and neonatal mortality from 71

to 30 per 1000 live births from 2007-2009 (Sayem AM, 2011).

Our study also reveals that children less than 12 months suffered significantly more mortality than the older age groups. This observation has been universally reported previously (Oloruntoba EO, 2014). This is the age group where trans-placental immunity derived from the mother wanes (Leuridan E, 2010) and the baby's immunity is gradually picking up resulting in their susceptibility to infection, morbidity and mortality. Also in a situation where the practice of exclusive breast feeding is not optimal and babies most often live in unhygienic environment with unhygienic water supply and immunization coverage often inadequate; all these factors predispose the baby almost inevitably to infections and often death far and above the older age groups which develop greater host immune response with repeated infections and greater ability to survive (Oloruntoba EO, 2014; Lugangira K, 2017; Brown J, 2013).

Therefore increased effort should be made towards educating the populace on the benefits and need for exclusive breastfeeding by newly birthed mothers, and sustained environmental and personal hygiene, regular immunization of children and prompt utilization of health services aimed at reducing infant mortality.

Our study recorded highest mortality during the months of January and February due to high mortality from Malaria and Diarrhea. Previous ports have indicated more childhood deaths occurred in February than other months of the year (Mouneke UV, 2013).

Previous reports have acknowledged Malaria to be the most leading cause of mortality in Nigeria (Leuridan E, 2010). Malaria is also acknowledged to record high mortality throughout the year being holoendemic in Nigeria (Chukwuocha UM, 2011). High mortality from Diarrhea could be explained by the fact that rotavirus has the highest incidence in cool dry months equivalent to harmattan season of January to February in Nigeria. Also during the dry season there is shortage of water supply hindering the level environmental and personal hygiene; windy weather with increased atmospheric and environmental dust with increased incidence of Diarrheal disease and mortality arising therefrom.

CONCLUSION

Childhood mortality is still unacceptably high and the causes are largely preventable-Malaria, Diarrhea and Sepsis.

RECOMMENDATIONS

It would therefore be necessary to educate the populace on the essence and preparation of salt sugar solution in the appropriate manner and also provision of graduated litre containers should be made universally available for the preparation of commercial oral rehydration salt solution for appropriate measurement and administration by care givers to children when they develop Diarrhea.

Effort should be made by the government particularly at the local government level to provide potable water for communities.

Environmental cleanliness with regular supervision by environmental health officers to ensure compliance should be instituted.

Education of the populace on the use of insecticide treated bed nets should be rigorously pursued.

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