Prevalence of diarrhea and its associated risk factors in children aged 1–60 months at Aba, South East Nigeria

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ABSTRACT

Background: Diarrhea is a major cause of childhood morbidity and mortality worldwide, particularly in low resource nations. To achieve the Sustainable Developmental Goal 3.2, effective steps should be taken to stem the tide of childhood diarrhea and its associated mortality. **Objective:** The objective of the study was to determine the prevalence of diarrhea and its associated risk factors in children aged 1–60 months presenting to our health facility. **Materials and Methods:** In the present retrospective study, we reviewed medical records of children aged 1–60 months with diarrhea admitted to the Children Emergency Room and Pediatric Medical Wards of the Abia State University Teaching Hospital, Aba, from January 1, 2015 to December 31, 2016. **Results:** The prevalence of diarrhea was 11.2%. The study consisted of 68 males and 32 females with male:female ratio of 2.1:1. Around half (53%) of the children belonged to the age group of 1–12 months, 40% in the age group of 13–36 months, and 7% children belonged to the age group of 37–60 months. Most of the cases (88%) reported of acute watery diarrhea. The greatest monthly prevalence was in February (47%). Mortality rate was 22% which was significantly more among the infants, than among the age groups of 13–24 months and 25–36 months, respectively (p=0.019). **Conclusion:** The prevalence and mortality rates of diarrhea in this study were high. The mortality was significantly more among infants. Curbing the mortality of diarrhea in the under-five age group requires adopting specific measures to prevent and manage diarrhea, with special focus on infants.

Key words: *Aba, Diarrhea, Prevalence, Related factors*

Diarrheal diseases have been a major public health concern affecting mostly low- and middle-income countries of the world especially in sub-Sahara Africa and Asia [1]. In developing nations, diarrhea is one of the five killer diseases in children below 5 years; however, it remains the second greatest killer of children aged below 5 years, worldwide [2]. Estimated 1.7 billion episodes of childhood diarrhea occur globally with over three-quarters of the episodes occurring in children aged <5 years, with most mortalities occurring within the first 2 years of life [3,4]. It accounts for 700–800 thousand childhood deaths in Africa annually, with most of these occurring in sub-Sahara Africa [5]. In Nigeria, among children below 5 years, diarrhea accounts for over 16 % of deaths, with estimate of 150,000 deaths annually [5].

The prevalence of diarrhea has a seasonal variation, with increased episodes during the cool dry seasons in different parts of the world. It is often due to rotavirus etiology and presents a lower peak in warm rainy season in the tropics due to bacterial etiology [5,6]. The prevalence of childhood diarrhea varies from country to country being most prevalent in the lower and middle income nations and least prevalent in the developed nations [1]. It could also vary in prevalence and seasonality with different

populations in a particular country. For instance, the prevalence is higher in the northern than in the southern part of Nigeria, with the peak period occurring earlier and longer than in the south. These peak seasons corresponds to the occurrence of the cool dry Harmattan seasons in these areas. The prevalence of rotavirus associated diarrhea reported recently from different parts of Nigeria showed 32.2% in Kaduna [7], 25% in Sokoto [8], 18.5% in Ibadan [9], and 19.2% in Benin [10].

To achieve the Goal 3.2 of the Sustainable Developmental Goal, which aims at stemming down the prevalence of neonatal mortality to 12.5% and under-five mortality to 25% by the year 2030, sustained efforts must be made to curb the prevalence of diarrhea and its associated mortality. Such efforts must include determining the prevalence and associated risk factors of diarrhea in our society. The previous studies about the prevalence of diarrhea were conducted in the northern and south-western parts of Nigeria. There is paucity of data on diarrhea among children from the south-eastern part of the country. Hence, the present study was undertaken to determine the prevalence of diarrhea and its associated risk factors as seen at our health facility. The result obtained could give an insight into the magnitude of the problem, elucidate the factors related to the prevalence and form

a veritable tool in formulating policies aimed at curbing the trend of childhood diarrhea.

MATERIALS AND METHODS

In the present study, a retrospective review of medical records of children with diarrhea was carried out at the Department of Paediatrics of Abia State University Teaching Hospital, Aba from January 1, 2015, to December 31, 2016. This hospital serves as a tertiary health care institution and referral center for peripheral hospitals in the state, and its environs. The department of pediatrics is manned by 6 consultants, 12 registrars, and 10 house officers (who do 3 monthly rotations before proceeding to other departments). All patients presenting at the Children Emergency Room (CHER) and the Children's Out Patient (CHOP) Clinic were reviewed by the registrar on call. Diagnosis was made on patients based on clinical features and laboratory results. Diarrhea was defined as having three or more loose stools in 24 h.

Ethical clearance was obtained from the Ethics Committee of the hospital before commencing on the study. All the case records of children aged 1–60 months with the diagnosis of diarrhea, seen within the study period, at the CHER and the CHOP clinic, were retrieved from the Medical Records Department. Information retrieved included month of presentation, age, gender, diagnosis, duration, and outcome of admission. Exclusion criteria were neonates, those aged more than 60 months and patients with inadequate data. The results were presented in prose and frequency tables. Data were analyzed using SPSS Version 16. Statistical significance was set at $p<0.05$.

RESULTS

In our study, 1036 children aged 1–60 months were admitted over the study period. One hundred and forty-six had inadequate data; therefore, only 890 were used for further analysis. Among them, 100 children had diarrhea giving a prevalence of 11.2%. There were 68 males and 32 females with male:female ratio of 2.1:1. Most cases of diarrhea (83%) occurred in the first 2 years of life with 57 (57%) occurring in the 1st year of life and only 4 (4%) occurring in the 4th and 5th years of life. Other details are shown in Table 1.

Overwhelming, majority 88 (88%) of the diagnoses were acute watery diarrhea (AWD). Dysentery and persistent diarrhea constituted 6% each of the total cases of diarrhea. Majority 47 (47%) of the diarrhea cases were seen in the month of February. Second (12%) and third (10%) highest peaks of diarrhea were recorded in the months of March and September (74%) of the patients, respectively. Although, many were discharged home while 22 died giving a mortality rate of 22% (Table 2).

Vast majority, 16 (72.7%), of the mortality occurred in patients with AWD while 3 (13.6%) and 3 (13.6%) occurred in patients with dysentery and persistent diarrhea, respectively. Admission in the 1–12 month age group was 57 with 16 suffering mortality (giving a mortality rate of 28.1%) while admission in

Table 1: Age distribution of the patients

Age (months)	Number	Percentage
1–12	57	57
13–24	26	26
25–36	13	13
37–48	2	2
49–60	2	2

Table 2: Characteristics of diarrhea and outcome

	Variable	Number (n=100)	Percentage
Type of diarrhea	Acute watery diarrhea	88	88
	Dysentery	6	6
	Persistent diarrhea	6	6
Monthly distribution of patients with diarrhea	January	4	4
	February	47	47
	March	12	12
	April	2	2
	May	6	6
	June	6	6
	July	2	2
	August	2	2
	September	10	10
	October	2	2
	November	2	2
	December	4	4
Outcome of admission	Discharge home	74	74
	Dead	22	22
	DAMA-Discharged against medical advice	4	4

the 13–24 month and 25–36 month age groups were 26 and 13, respectively, with four and two patients, respectively, suffering mortality in these groups (giving a mortality rate of 15.4% each in ether group). The mortality is significantly more in the 1–12 months age group than in the 13–24 months and 25–36 months age groups, respectively ($p=0.019$) (Table 3).

DISCUSSION

The prevalence of diarrhea that was noted in the under five in this study was 11.2%. This is less than the 18.8% estimated for Nigerian children by the WHO report in 2009 [11] and 13.4% noted in Samaru, Zaria Northwest Nigeria [12] but higher than 10.3% obtained in Demographic Health Survey (DHS) for Nigeria in 2013 [13]. The prevalence noted in our study being lower than that of Samaru study could be due to the scarcity of potable water and poor environmental sanitation reported in that study. Furthermore, it has been reported that prevalence of childhood diarrhea is more in northern than southern Nigeria [13]. The prevalence reported in our study being higher than that in the DHS, 2013 could be explained by the fact that the survey data were obtained by an oral interview with 35.6% of the household interviewed classified as rich, while 22.9% were poor. It is known

Table 3: Relationship between age, type of diarrhea, and mortality

Age(months)	No	Mortality	Mortality rate (%)
1–12	57	16	28.1
13–24	26	4	15.4
25–36	13	2	15.4
37–48	2	-	0.0
49–60	2	-	0.0
Diarrhea type			
Acute watery diarrhea	88	16	72.7
Dysentery	6	3	13.6
Persistent diarrhea	6	3	13.6

that the prevalence of diarrhea is lower in the richer populace. Meanwhile, our study was in a hospital setting involving on-going cases in the general population and therefore likely to give a more accurate representative and higher value.

Our study reveals that overwhelming majority (83%) of the patients were in the age group of 1–24 months with 57% of cases occurring in the 1–12 month age group, which is similar to the observation reported in the previous studies [14-16]. Within the first 12 months of life, series of activities and occurrences which predispose the infant to diarrhea include the following: (1) The common practice of non-exclusive breast feeding, which deprives the infant the protective coverage of the gut with immunological protein like immunoglobulin A, (2) Bottle feeding which can lead to introduction of contaminated material to the infant from inadequate sterilization of the bottle, (3) Waning of maternally derived immunity and inadequate development of infant's immunity, (4) Introduction of weaning feeds of which the process of preparation and administration could be contaminated, and (5) Commencement of crawling by the infant and exploration of the environment which can lead to contamination of hands that are readily put into the mouth [17-19].

Diarrhea was more common in males than females among the patients, which is similar to most previous reports [14-16]. This might be explained by the greater predisposition of the male sex to certain infectious diseases including diarrhea [20]. Our study indicates that most of the diarrhea cases were AWD. This also is the observation in the previous studies [21]. Acute watery diarrhea in the literature is known as the most common type of diarrhea that often precedes the other types [22]. Furthermore, AWD is most commonly caused by rotavirus which is the most common cause of diarrhea generally [23]. We observed greater prevalence of diarrhea in the month of February. The months of December to March have been noted as peak periods of diarrhea prevalence in Nigeria [24-26]. The peak prevalence of diarrhea within these months could be explained by the occurrence of rotavirus diarrhea which being the most common cause of diarrhea worldwide occurs during cool dry months of the year [25].

Mortality rate of 22% was observed in our study. This is higher than the 6.2% reported in a study conducted at Akoko, in Ondo state [27]. The higher value obtained in our study could be as a result of the fact that our data were obtained from real cases in a hospital setting portraying a truer representation of the reality

while that of Ondo was obtained by oral interview of caretakers of the kids with diarrhea and their study spanned over only a period of 2 weeks. We also noted that majority of deaths occurred in the patients with the diagnosis of AWD. This could be explained by the fact that the vast majority of the patients also had AWD which could easily lead to severe dehydration and death if not promptly managed.

Our study also revealed that significantly more mortality occurred in the 1–12 months age group than in the older age groups of 13–24 and 25–36 months, respectively. This observation agrees with the previous reports [27,28]. Higher occurrence of mortality in infants with diarrhea than in older age groups could be explained by the fact that infants have greater tendency to exposure to pathogenic agents of diarrhea. Those exposure result from improper unhygienic feeding practices of the infant during weaning as well as by their crawling and other exploratory activities resulting in more contamination of the body and fingers which are readily deposited in the mouth. Again, their host defensive mechanism being relatively immature predisposes them to greater morbidity and mortality than the older age groups [29,30]. Small sample size and retrospective nature of study in a single hospital limit a true reflection of the prevalence of childhood diarrhea in the community. We further recommend a community based large scale research including etiologic factors of diarrhea and impact of immunization on the prevalence of diarrhea.

CONCLUSION

The prevalence and mortality rate of diarrhea in this study were high. Furthermore, mortality was significantly more in the 1–12 month age group. Measures likely to curb the incidence of diarrhea will need particular focus on infants. These will include widespread practice of exclusive breastfeeding, regular washing of hands before preparation and administration of feeds, avoidance of use of feeding bottles, hygienic disposal of human and animal feces, regular use of ORS, and maintenance of environmental and personal hygiene. All these will go a long way in curbing the trend of diarrhea among the under-fives.

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