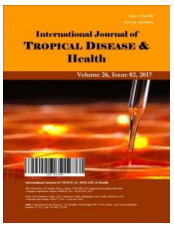

International Journal of TROPICAL DISEASE & Health

33(4): 1-11, 2018; Article no.IJTDH.46321
ISSN: 2278–1005, NLM ID: 101632866

Prevalence of Diarrhoea and Associated Sociodemographic Factors among Children Receiving Care in the Paediatrics Department of Federal Medical Centre (FMC) Yenegoa, Bayelsa State, Nigeria

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/IJTDH/2018/46321
Editor(s):
(1) Dr. Cihad Dundar, Professor, Department of Public Health, Faculty of Medicine, Ondokuz Mayis University, Turkey.
Reviewers:
(1) Tsaku Paul Alumbugu, Coal City University, Nigeria.
(2) Eman Hashem Radwan, Damanhour University, Egypt.
(3) Unyime Israel Eshiet, university of Uyo, Nigeria.
Complete Peer review History: http://www.sciencedomain.org/review-history/28034

Original Research Article

Received 09 October 2018
Accepted 27 December 2018
Published 31 December 2018

ABSTRACT

Background: The environmental problem that has been of great concern to inhabitants at the local, state and federal government levels is the generation and disposal of waste. The aim of the study was to assess the prevalence of diarrhoea and the associated sociodemographic factors among children receiving care in the paediatrics department of Federal Medical Centre (FMC) Yenegoa, Bayelsa State, Nigeria.
Methods: This was a descriptive cross-sectional study among caregivers attending the paediatrics department of the Federal Medical Centre Yenagoa, Bayelsa, State Nigeria. The sample size of 303 participants was recruited for this study. A systematic random sampling technique was used. The inclusion criteria was all caregivers of out-patients seen in the paediatrics department and have agreed to participate in the study. Thus, Care-givers of seriously ill children and caregivers that are

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not adults were excluded from this study. An interviewer-administered questionnaire was used to collect relevant information. Data was analysed using Statistical Package for Social Science (SPSS) version 23 software. A descriptive analysis, chi-square test were performed, and inferential analysis was also performed, statistical significance was set at $p \leq 0.05$. Ethical approval for the study was sought and obtained from the Research and Ethics Committee of the University of Port Harcourt, Nigeria. Also informed consent was obtained from the prospective participants before recruitment.

Results: The mean age of the children was 8.56 ± 5.785 years old, with 176(58.1%) of the children being females. It showed that 172(56.8%) of the caregivers were females. A greater percentage age of the respondents was within 36-45 years with 119(39.3%) of respondents being in this age group. The overall prevalence of diarrheal disease among children aged 1month-18years was 53(17.5%). There was no significant association between age and sex of child with episodes of diarrhoea. Knowledge, attitude and practice on domestic waste management with proper washing of hands after defecating was significantly associated with episodes of diarrhoea.

Conclusion: This study concluded that the prevalence and period prevalence (2 weeks prior to the study) of diarrhoea was relatively low among children a month-18 years, who received care. Age and sex of child have no influence on episodes of diarrhoea. Thus, knowledge, attitude and practice on domestic waste disposal with proper washing of hands after defecating have influence on episodes of diarrhoea. The Government should minimize the magnitude of childhood diarrhoea by implementing various strategies, such as health education, improved child care, improved immunization services especially rotavirus and improved collection of waste from dump sites by the environmental sanitation authorities are quite essential.

Keywords: Diarrhoea; paediatrics; care-givers and Bayelsa.

1. INTRODUCTION

Diarrhea is the second biggest killer of children in Nigeria, responsible for about 16% of child's death every year. Nigeria was estimated to have a total number of annual child deaths due to diarrhea to be 151,700 [1]. There are an estimated 1.7 billion cases of diarrhoea with an average of 2.9 episodes/child/year, and an estimated 1.87 million deaths among children under five years [2]. It constitutes a major burden in low and middle-income countries (LMIC) where it is the second leading cause of death in children under 5 years of age with 90% of all diarrhoea-related deaths [3].

Diarrheal disease mostly affects children under two years of age, and may be life-threatening, particularly in those who are malnourished or have impaired immunity [4]. These causative pathogens of diarrhea are found in faecal matter and are transmitted from the stool of one individual to the mouth of another (faecal-oral transmission) which may be spread through contaminated water, food, hands, eating and drinking utensils, flies, and dirt under fingernails [5].

Children are affected by diarrhoea mainly due to poor environmental sanitation and hygiene, inadequate water supplies and poverty. In hospitals, up to a third of total paediatric admissions are due to diarrheal diseases and up to 17% of all deaths among admitted paediatric patients are diarrhoea related [6].

Diarrhea is an immediate health threat to children; it also has long-term negative effects on the country's socio-economic development [7]. Infant diarrheal infections have sequelae which impact on children lives. Several studies have quantified these long-term effects of early childhood diarrhea and parasitic infections during the critical, formative first two years of life. The long-term effects include growth shortfalls, substantially impaired physical fitness, diminished cognitive capacity and delayed achievements at school [8]. Diarrhea indirectly, has adverse effect on health, educational performance and school attendance of these children. Thus it can be stated that diarrhea affects key areas of development such as health, economy and education. In Nigeria, there is a regional discrepancy in the distribution of diarrhea.

Diarrhoeal diseases account for nearly 3.3 million deaths annually and that a further 1.5 billion people suffer at any time from parasitic worm infestations coming from human faecal matter and solid wastes in the environment [9]. Absence of good management of faecal matter is a major

environmental threat to the Worlds water resources and a fundamental stumbling block in the advancement of human dignity [9]. In Yenagoa and most communities in the Niger Delta region, faecal waste disposal is into surrounding rivers which can lead to contamination and these rivers usually serve as sources of drinking water for other people that do not have access to portable water [9].

However, in the paediatrics department of Federal Medical Centre (FMC) Yenegoa, Bayelsa, no study is available on the prevalence of diarrhea in under-five children. Therefore, this study sought to assess the prevalence of diarrhoea and the associated sociodemographic factors among children receiving care in the paediatrics department of Federal Medical Centre (FMC) Yenegoa, Bayelsa State, Nigeria.

2. METHODS

2.1 Study Area

This study was carried out in the paediatrics department of the Federal Medical Centre Yenagoa, Bayelsa State. The Federal Medical Centre Yenagoa is a 400 bedded hospital located in the heart of the State capital and with the central aim of providing qualitative tertiary health care services to meet the needs of the people of Bayelsa State and neighbouring towns in Rivers and Delta States such as Mbiama, Ahoada, Okogbe, Patani, Bomadi, Ekeremor e.t.c. Bayelsa State is one of the oil producing states in the Niger Delta region of the country. However, the people are predominantly civil servants while others are into fishing, farming, trading and illegal oil activities.

2.2 Study Design

A hospital-based cross-sectional study design was employed to collect data from care-givers of out-patients who received treatment in the paediatrics department, to assess diarrhoea prevalence and associated factors.

2.3 Study Population

This study was conducted among care givers of patients who received treatment in the paediatrics department. Children between the ages of a month and eighteen years are attended to in the paediatrics department on a twenty four hour basis, stabilized before taken to the children medical ward for those that require admission. The Federal Medical Centre Yenagoa annual report for 2016 shows that an average of 1100 patients are seen monthly in the paediatrics department.

2.3.1 Inclusion criteria

All caregivers of out-patients seen in the paediatrics department and have agreed to participate in the study.

2.3.2 Exclusion criteria

Care-givers of seriously ill children and caregivers that are not adults were excluded from this study.

2.4 Sample Size Determination

The sample size was calculated using single population proportion formula [10] with the following assumptions; proportion 86%, which was obtained from a previous study done in Accra Ghana [11]. Using 5% margin of error at 95% confidence level, the sample size was 303 after considering 10% non-response rate.

2.5 Sampling Method

The sample was obtained using a systematic sampling technique. First, listing of the size of the population was done by determining the average number of patients seen per month which was 1100 patients, with an average of 55 patients per day, which was obtained via the hospital record for the department of paediatrics. Secondly, the sampling interval was obtained using the formula k=N/n, where k = interval, n total number of patients receiving care at the paediatrics department month= 1100 and n = sample size= 303. The sampling interval obtained was 4. Finally, the first index patient was selected by starting at the first number from the list of patients who have registered their name with the nurses and given identity numbers on that day and seated accordingly to their numbers. A random number is selected between 1-4 by balloting to identify the index or first patient to be sampled, from the index or first individual, the next individual was sampled by adding the sampling interval which was (4) and subsequently individuals were selected in the same manner by adding the sampling interval to the number found for the previous individual selected (basic sampling unit). This was done

until the required sample size 303 was obtained within the estimated time frame (one month).

2.6 Study Instrument

A pre-tested semi-structured interviewer-administered questionnaire with close and open ended questions was used to collect relevant information such as socio-demographics which was filled by consented respondents who met the inclusion criteria for this research. The questionnaire was designed by the researcher using a combination of knowledge from the review of various literatures on this topic.

2.6.1 Operationalization of the study variables

The dependent variable was childhood diarrheal disease. The independent variables consist of the demographic and non-medical related characteristics of the respondents. These include the age groups, Gender (male/Female), marital status, educational status, religion, type of accommodation and proper washing of hands.

2.7 Data Collection Procedure

Two research assistants were recruited to participate in the data collection. The research assistants were doctors in the paediatrics department who were fluent in English and had an understanding of the local language. The research assistants were taken through a one-day training which entailed: explaining the objectives and methodology, training on interviewing and communication skills. The duration of data collection lasted for a period of 4 weeks with a minimum of 8 mins per interview and 15 interviews per day.

2.8 Measurement of Diarrheal Disease

Childhood diarrheal disease, the dependent variable of this study, was defined as having three or more loose or watery stools in 24 hours during the period of data collection. The prevalence of diarrhoea was calculated using the number of children who reportedly had at least one episode of diarrhoea within the period of the data collection as numerator and the overall number of children that were part of the study.

2.9 Data Analysis

The data was analyzed using Statistical Package for Socioal Sciences (SPSS) version 23. Data was first entered cleaned, organized, coded in Microsoft Excel 2013 version then exported into the SPSS for analysis. Descriptive statistics were conducted to describe the background characteristics of the respondents. The analysis involved the calculation of descriptive statistics (such as frequency distributions, percentages and means and median) to describe the background characteristics of the respondents and inferential statistics chi-square test of independence). Continuous variables were expressed as means ± standard deviation while categorical variables were expressed as absolute frequencies.

Bivariate analysis showing was performed using Pearson's Chi square. The inferential statistics were presented as, p value which provides the level of significance, Odds ratio, which gives the degree or magnitude of relationship, and Confidence intervals (CIs) were reported as the value that encircles the population or 'true' value. A p value of less than 0.05 was considered statistically significant.

2.10 Ethical Clearance

Ethical approval of this study was sought from the ethics committee of the University of Port Harcourt before commencement of the study. An informed consent was also obtained from prospective participants before recruitment into the study. Confidentiality of the participant's information was observed by the use of codes.

3. RESULTS

A total number of 303 questionnaires were administered among care givers of out-patients attending the paediatrics department of the Federal Medical Centre Yenegoa, 303 questionnaires were consistent and completely filled, giving a response rate of 100%.

3.1 Socio-demographic Characteristics of Respondents

Table 1, shows the socio-demographics distribution of respondents in respect to age, sex, and religion of respondents. In the total sample of 303 respondents which comprise of children and caregivers, 145(47.9%) of the children were under-five, 176(58.1%) of the children were female. More than half 119(39.3%) of the caregivers were between the ages of 36-45 years, while more than half 172(56.8%) of the

caregiver's spouses were females, while 131(43.7%) were males. A greater percentage 168((55.4%) were married. Most 220(72.6%) were Christians.

Table 2 shows the socio-demographics distribution of respondents in respect to level of education and occupation of respondents. In the total sample of 303 respondents more than half 168(55.4%) were married, 120(39.6%) of the respondents had completed their tertiary education. One hundred and ten (36.3%) of the respondents were civil servants. Only few 16(5.3%) reside in a duplex accommodation.

3.2 Prevalence of Diarrhoea among Children Seen in the Paediatrics Department

The Fig. 1 shows that out of the 303 children seen at the paediatrics department less than one-quarter 53(17.5%) had frequent stooling 3-4 times daily.

3.3 Period Prevalence of Diarrhoea (2 Weeks' Period)

The Fig. 2 shows that out of the 303 children seen at the paediatrics department, less than one-quarter 56(18.5%) experienced frequent stooling 2 weeks prior to presentation seen in paediatrics department.

In Table 3, there was no statistically significant association observed between age and sex of child with episodes of diarrhoea.

In Table 4, there was no statistically significant association observed between age, sex marital status, religion and level of education of caregivers with episodes of diarrhoea.

In Table 5, there was no statistically significant association observed between level of education and type of accommodation with episodes of diarrhoea.

In Table 6, there was a statistically significant association was observed between level of knowledge of caregivers on domestic waste disposal and episodes of diarrhoea, as those who had poor knowledge were 6.5 times more at odds in having episodes of diarrhoea among their wards compared to those who had good knowledge.

A statistically significant association was observed between attitude of caregivers towards

Table 1. Socio-demographic characteristics of respondents

Variable	Frequency (n=303)	Percentage (%)
Age of Child (in years)		
≤5	145	47.9
6-10	81	26.7
11-15	46	15.2
>15	31	10.2
Mean ± SD	*8.56 ± 5.785*	
Sex of child		
Male	127	41.9
Female	176	58.1
Age of care givers (years)		
15-25	41	13.5
26-35	114	37.6
36-45	119	39.3
46-55	16	5.3
>55	13	4.3
Sex of care givers		
Male	131	43.2
Female	172	56.8
Religion		
Christianity	220	72.6
Islam	44	14.5
African Traditional Religion	39	12.9

Table 2. Socio-demographic characteristics of respondents (Contd)

Variable	Frequency (n=303)	Percentage (%)
Marital status		
Single	77	25.4
Married	168	55.4
Separated/divorced	45	14.9
Widowed	13	4.3
Level of education completed		
No formal education	68	22.4
Primary education	27	9.0
Secondary education	88	29.0
Tertiary education	120	39.6
Occupation		
Student	37	22.2
Trader	72	23.8
Farmer	28	9.2
Fishing	19	6.3
Civil servants	110	36.3
Business executives	37	12.2
Type of accommodation		
Public compound	66	21.7
Self-contain	80	26.4
One bedroom flat	55	18.2
Two bedroom flat	61	20.1
Three bedroom flat	25	8.3
Duplex	16	5.3

proper domestic waste disposal and episodes of diarrhoea among their wards, as those who had negative attitude towards proper domestic waste disposal were 6.8 times more at odds in having episodes of diarrhoea among their wards compared to those who positive attitude.

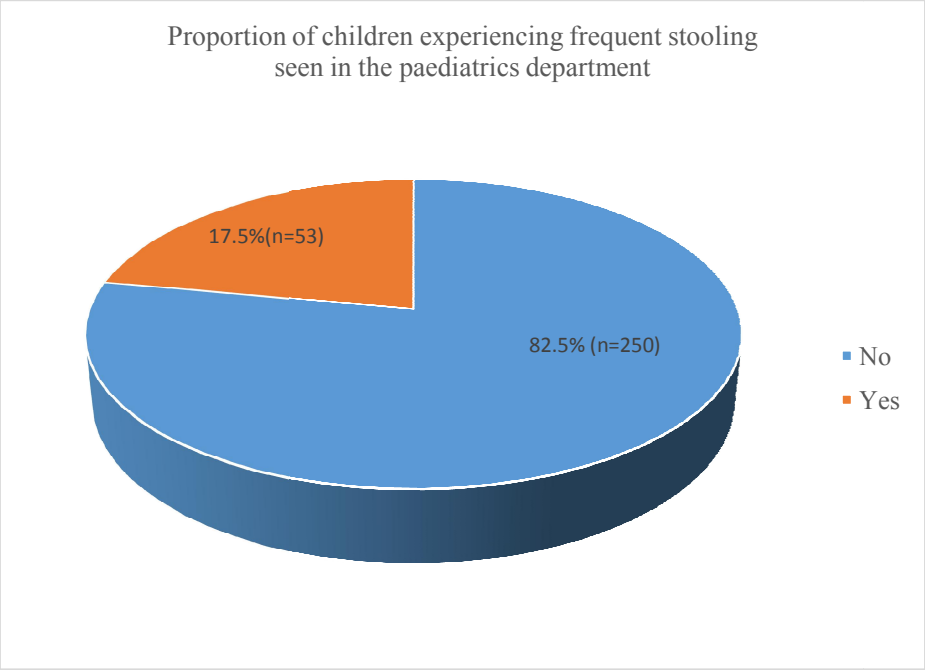

Fig. 1. Proportion of children experiencing frequent stooling seen in paediatrics department

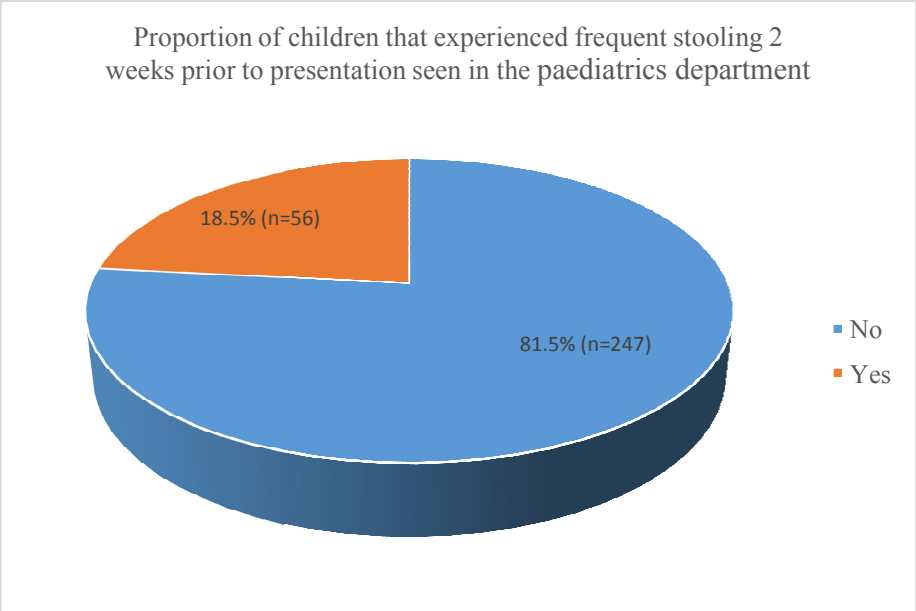

Fig. 2. Proportion of children that experienced frequent stooling 2 weeks prior to presentation seen in the paediatrics department

Table 3. Association between socio-demographics characteristics and prevalence of diarrhoea

Socio-demographic Characteristics	Episodes of diarrhoea (3-4 times daily)			df	χ2 (p-value)	OR (95% CI)
	Yes Freq (%)	No Freq (%)	Total Freq (%)			
Age of the child						
≤ 5 years	24(45.3)	121(48.4)	145(47.9)	1	0.170 (0.763)	1.13 (0.62-2.05)
> 5 years	29(54.7)	129(51.6)	158(65.8)			
Total	**53(100)**	**250(100)**	**303(100)**			
Sex of the child						
Male	26(49.1)	101(40.4)	127(41.9)	1	1.346 (0.284)	1.42 (0.78-2.57)
Female	27(50.9)	149(59.6)	176(58.1)			
Total	**53(100)**	**250(100)**	**303(100)**			

**Statistically significant (p<0.05)*

A statistically significant association was observed between caregivers practice of proper domestic waste disposal and episodes of diarrhoea, as those who had poor practice towards proper domestic waste disposal were 2.26 times more at odds in having episodes of diarrhoea among their wards compared to those who had good practice.

In Table 7, there was a statistically significant association was observed between proper washing of hands after defecation and episodes of diarrhoea, as those who don't properly washed their hands after defecation were 2.32 times more at odds in having episodes of diarrhoea compared to those who properly washed their hands after defecation.

4. DISCUSSION

The present study investigated the prevalence of diarrheal occurrence and sociodemographic characteristics among caregivers of patients (children) who received care at paediatrics department of FMC, Yenegoa. The overall prevalence of diarrhoea in this study was 17.5%. This could be linked to the fact that the paediatrics department of FMC Yenegoa, apart

from managing children related specifically cases of diarrhoea, does not provide education on diarrhoea prevention and home management to caregivers presenting to the paediatrics department. This implies that enlightenment and proper health education may succeed in

Table 4. Association between socio-demographics characteristics and prevalence of diarrhoea (Contd)

Socio-demographic Characteristics	Episodes of Diarrhoea (3-4 times daily)			df	χ2 (p-value)	OR (95% CI)
	Yes Freq (%)	No Freq (%)	Total Freq (%)			
Age of Caregiver						
≤ 35 years	25(47.2)	130(52.0)	155(51.2)	1	0.408 (0.548)	0.82 (0.45-1.49)
> 35 years	28(52.8)	120(48.0)	148(48.8)			
Total	**53(100)**	**250(100)**	**303(100)**			
Sex						
Male	18(34.0)	113(45.2)	131(43.2)	1	2.250 (0.169)	0.62 (0.33-1.16)
Female	35(66.0)	137(54.8	172(56.8)			
Total	**53(100)**	**250(100)**	**303(100)**			
Marital status						
Single/divorced/separated/widowed	22(41.5)	113(45.2)	135(44.6)	1	0.241 (0.651)	0.86 (0.47-1.56)
Married	31(58.5)	137(54.8)	168(55.4)			
Total	**53(100)**	**250(100)**	**303(100)**			
Religion						
Christianity	38(71.7)	182(72.8)	220(72.6)	1	0.027 (0.999)	0.947 (0.49-1.83)
Islam/African traditional religion	15(28.3)	68(27.2)	83(27.4)			
Total	**53(100)**	**250(100)**	**303(100)**			

**Statistically significant (p<0.05)*

Table 5. Association between socio-demographics characteristics and prevalence of diarrhoea (Contd)

Socio-demographic Characteristics	Episodes of diarrhoea (3-4 times daily)			df	χ2 (p-value)	OR (95% CI)
	Yes Freq (%)	No Freq (%)	Total Freq (%)			
Level of education completed						
Secondary school and below	34(64.2)	149(59.6)	183(60.4)	1	0.379 (0.538)	1.21 (0.65-2.24)
Tertiary	19(35.8)	101(40.4)	120(39.6)			
Total	**53(100)**	**250(100)**	**303(100)**			
Type of accomodation						
Public compound	11(20.8)	55(22.0)	66(21.8)	1	0.040 (0.858)	0.92 (0.44-1.92)
1-3 Bedroom flat/Duplex	42(79.2)	195(78.0)	237(78.2)			
Total	**53(100)**	**250(100)**	**303(100)**			

Table 6. Association between knowledge, attitude and practice of domestic waste disposal with prevalence of diarrhoea

Variable	Episodes of diarrhoea (3-4 times daily)			df	χ2 (p-value)	OR (95% CI)
	Yes Freq (%)	No Freq (%)	Total Freq (%)			
Level of knowledge on proper waste disposal						
Poor	29(54.7)	39(15.6)	68(22.4)	1	8.443 (0.000)*	6.537 (3.44-12.3)
Good	24(45.3)	211(84.4)	235(77.6)			
Total	**53(100)**	**250(100)**	**303(100)**			
Attitude towards proper waste disposal						
Negative	30(56.6)	40(16.0)	70(23.1)	1	0.582 (0.000)*	6.84 (3.61-12.9)
Positive	23(43.4)	210(84.0)	233(76.9)			
Total	**53(100)**	**250(100)**	**303(100)**			
Practice towards proper waste disposal						
Poor	49(92.5)	211(84.4)	260(85.8)	1	2.329 (0.137)	2.26 (0.77-6.63)
Good	4(7.5)	39(15.6)	43(14.2)			
Total	**53(100)**	**250(100)**	**303(100)**			

Table 7. Association between personal hygiene and prevalence of diarrhoea

Variable	Episodes of diarrhoea (3-4 times daily)			df	χ2 (p-value)	OR (95% CI)
	Yes Freq (%)	No Freq (%)	Total Freq (%)			
Proper washing of hands after defecating of the child						
No	32(60.4)	99(39.6)	131(43.2)	1	7.692 (0.006)*	2.32 (1.26-4.26)
Yes	21(39.6)	151(60.4)	172(56.8)			
Total	**53(100)**	**250(100)**	**303(100)**			

empowering the care-givers of patients (children) with skills for waste disposal, management of diarrhoea and diarrhoea prevention, and this would have reduced the number of children necessitating hospital care for the same reason.

Much higher prevalence was found in similar study in Yemen which reported a given prevalence of 29.07% [12]. Also in similar study in Ethiopia also reported relatively higher prevalence of 22.1% [13]. However much lower prevalence was found in a similar study in Jos, which reported a prevalence of 2.7% [14] also in Northwest Ethiopia also reported relatively higher prevalence of 21.5% [15]. This difference in prevalence of diarrhea can be attributed to poor hygiene, poor environmental sanitation practices and seasonal variability as at when the various studies were conducted.

Knowledge of caregivers of patients on domestic waste disposal was statistically significantly associated with episodes of diarrhea, with those with poor knowledge to be 6.5 times more at odds in having episodes of diarrhea. Attitude of care caregivers of patients towards domestic waste disposal was statistically significantly associated with episodes of diarrhea, with those

with negative attitude to be 6.8 times more at odds in having episodes of diarrhoea. Also the caregiver's practice of proper domestic waste disposal was statistically significant associated with episodes of diarrhoea with those who had poor practice to be 2.26 times more at odds in having episodes of diarrhoea among their wards. This may be due to the fact that good knowledge of domestic waste disposal is likely to enhance household health and sanitation practices. This knowledge can increase awareness about the transmission and prevention methods of diarrhea. It also encourages changes in behavior at the household level. However, there was no statistically significantly association between socio-demographics characteristics with episode of diarrhea. This finding is in contrast with similar study in Jos where reported diarrheal episodes were found to have a bivariate association with educational status of the caregiver, and sex of child [14]. Also in similar study in Yemen episodes of diarrhoea were seen to be significantly associated with children who were aged <12 months, and with those whose had no or low-level education [12]. The possible explanation for this difference could be the variation in the sociodemographic characteristics of the study subjects, socioeconomic development, and study periods. People's life style, behavioural changes, and communication strategies of these areas could also be possible explanations for the observed differences.

It was found that less than one-fifth (18.5%) of the children included in the study reported diarrheal disease in the 2 weeks before the survey. However much higher prevalence was found in a similar study in Northwest Ethiopia, which reported a prevalence of 21.5% [15]. Also in Senegal a relatively higher prevalence of 26% [16] was reported. A similar study in Rwanda reported the 2-week period prevalence of diarrhoea among under five children to be 26.7% [17]. The possible explanation for this difference could be the variation in the socioeconomic development, and study periods confirming regional variation in the prevalence of diarrhea.

5. CONCLUSION

The study revealed that the prevalence and period prevalence (2 weeks prior to the study) of diarrhoea was relatively low among children a month-18 years, who received care. There was no significant association between age and sex of child with episodes of diarrhoea. Knowledge, attitude and practice on domestic waste disposal with proper washing of hands after defecating were significantly associated with episodes of diarrhoea. The government should minimize the magnitude of childhood diarrhoea by implementing various strategies, such as health education, improved child care, improved immunization services especially rotavirus and improved collection of waste from dump sites by the environmental sanitation authorities are quite essential.

6. LIMITATION OF THE STUDY

1. Recall bias. Some respondents found it difficult to recall answers to some of the questions in the questionnaire.
2. Seasonal desirability bias: The occurrence of diarrhoea was determined based on the reports of caregivers without the confirmation of physicians. As such the study might be affected by social desirability bias. However, the data was collected by trained research assistants.
3. Seasonal variability: The occurrence of diarrhoea obtained 2 weeks' period prior data collection and data collection was conducted in one month. This does not account for seasonality; hence data are not comparable either across sites or over time.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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