



**PREDICTORS OF ORAL REHYDRATION THERAPY USE AMONG CAREGIVERS OF UNDER-FIVES WITH DIARRHEAL DISEASES IN BWARI AREA COUNCIL, ABUJA, NIGERIA**

**Egenti BN<sup>\*1</sup>, Umejesi AH<sup>2</sup>, Yalma RM<sup>3</sup> and Adogu PO<sup>4</sup>**

<sup>1</sup>Dept of Community Medicine, University of Abuja, Nigeria.

<sup>2</sup>College of Health Sciences, University of Abuja Nigeria.

<sup>3</sup>Dept of Community Medicine, University of Abuja, Nigeria.

<sup>4</sup>Dept of Community Medicine, Nnamdi Azikiwe University Awka, Nigeria.

**\*Corresponding Author: Egenti BN**

Dept of Community Medicine, University of Abuja, Nigeria.

Article Received on 15/11/2021

Article Revised on 06/12/2021

Article Accepted on 27/12/2021

**ABSTRACT**

Diarrhoea is one of the major causes of death in children under five years of age and has remained a significant health problem globally. The use of ORS is been advocated in the management of childhood diarrhoea. WHO suggests ORS begins at home at the first sign of diarrhoea in order to prevent dehydration. This study aims to identify the predictors of Oral Rehydration Therapy use among mothers of under five children with diarrhoeal diseases in Bwari Area Council, Abuja, Nigeria. Questionnaires were used to collect the data. A total of four hundred and six respondents were studied. Data was analysed using descriptive statistics and Chi-square test. The statistical significance was set at a p-value of <0.05. Logistic regression analysis was employed to further test significant associations of ORS use. Most of the mothers 83.5% have heard of diarrhoeal disease and their major source of information was from the health worker 54.1%. Majority of them 90.6% are aware of ORT, 33.9% stated the correct composition of ORS, while 71.7% were able to prepare it correctly. 73.7% of mothers perceived diarrhoea to be a serious health condition. Of the 22.4% respondents who reported that their child had diarrhoea in the past 2 weeks before the survey, 42.9% treated at home using ORS. There is a significant association between knowledge of diarrhoea and the level of education ( $P=0.010$ ). There is a significant association between ORS use and marital status ( $\chi^2=20.608$ ,  $p < 0.001$ ), and type of the toilet facility ( $\chi^2 = 7.974$ ,  $p = 0.019$ ). This study concludes that there is good knowledge of diarrhoea observed among the study participants, hence the use of ORS is also high. This implies that knowledge of diarrhoea and ORS are determinants of ORS utilization. Better understanding of diarrhoea and the importance of rehydration using ORS is important for those with poor knowledge of diarrhoea. A child life can be saved with correct management of childhood diarrhea. Therefore efforts should be geared towards improving the quality of care at communities and rural areas.

**INTRODUCTION**

Diarrhoea is one of the major causes of death in children under five years of age, disproportionately affecting children in low and middle income countries.<sup>[1]</sup> It has remained a significant health problem globally. Diarrhoea is regarded as the second leading cause of death worldwide among under five children.<sup>[1,2]</sup> The number of children affected is rising steadily and Sub-Saharan Africa is the most affected region in the world.<sup>[3]</sup> Diarrhoea is a preventable disease but has high morbidity and mortality. Treatment regimen for diarrhoea recommended by the World Health Organization (WHO) and United Nations Children's Fund (UNICEF) is the Oral Rehydration Therapy (ORT) and continued feeding.<sup>[4]</sup>

Mortality that results from diarrhoea alone is very high in young children compared to Acquired Immune

Deficiency Syndrome (AIDS), malaria and measles combined. Diarrhoea predisposes children to secondary infection. In Nigeria, diarrhoea is the major killer of children yearly, thus it is a serious public health challenge.<sup>[5-7]</sup> Diarrhoeal disease occurs more commonly in HIV-infected than in uninfected children, and their outcomes are worse. Administration of Anti-retroviral therapy (ART) and restoring immune function are critical for the prevention and treatment of diarrhoea in children with HIV infection.<sup>[8-10]</sup> Diarrhoeal disease is a significant health problem globally while ORT is a public health intervention recommended by WHO and UNICEF. Adequate knowledge has been admitted as a prerequisite for the adoption of desirable health behavior. It has been asserted that when a person is well informed, the individual will be equipped to make the right decision concerning the health of the children. Mothers should have adequate knowledge of childhood diseases, among

which is diarrhoea. This knowledge will help them to take adequate care of their children. For there to be a significant reduction in morbidity and mortality due to diarrhoea, there has to be improvement in diarrhoea case management in homes within the community.

ORT is an intervention used to save the lives of under five children during episodes of diarrhoea and is a very effective way of combating mortality. However, millions of children die every year due to failure to initiate therapy early and replace fluid effectively.<sup>[11]</sup> The use of Oral Rehydration Solution (ORS) in managing diarrhoea reduces dehydration and deaths related to it. ORT is culturally acceptable, economically cheap and practically sound. It is one of the medical advances of the 20<sup>th</sup> century because of its simplicity and scope to save lives. The WHO Programme for the Control of Diarrhoeal Disease began in the 1970's and while global ORS access rates have improved substantially over the past years, rate of ORS use have stagnated.<sup>[12]</sup> Zinc is a new intervention for the treatment of diarrhoea in developing world. It is safe, effective, reduces the duration and severity of the diarrhoea episode, and also decreases stool output. It also prevent future diarrhoea for up to three months. It is important that the full course of zinc is taken alongside with ORS. Under five children constitute an important population group in terms of vulnerability to health conditions that could adversely affect their health and well-being. The survival of under-fives children having diarrhoea dramatically improves with access and use of ORT.<sup>[13]</sup>

Some studies have shown clearly that caregiver's responses and the use of ORT is in line with their knowledge and attitudes towards this therapy and that is why some of them resort to traditional remedies or prescriptions, instead of giving rehydrating ORT to their children during episodes of diarrhoea.<sup>[14,15]</sup> Despite great concern with regards to their safety, there is strong evidence that unconventional remedies are still being used to treat diarrhoea in some parts of developing countries and this is consistent with reports from other similar contexts across countries.<sup>[16,17]</sup> These misconceptions in the ORT attitudes of caregivers is compounded by their apparent poor knowledge and awareness. Despite attempts that have been made to increase ORT awareness, the success rate is still low.<sup>[18,19]</sup>

In terms of practices, preparing ORT correctly is the key to effective treatment of diarrhoea. However, according to several studies, most caregivers still give hypo/hyper-osmolar ORT mixtures to their children.<sup>[20]</sup> Globally, diarrhoea accounts for high level of mortality among under five in developing countries.<sup>[21]</sup> In the developing world as a whole, about one third of infant and child deaths are due to diarrhoea and approximately 70% of diarrhoeal deaths are caused by dehydration.<sup>[22,23]</sup>

In Nigeria, it has continued to constitute serious health and socio-economic challenges. An estimated 1.5 million

children die each year from diarrhoea. About 80% of these death are in the first two years of life.<sup>[22]</sup> Also infant mortality rate are twice as high in rural setting as they are in urban setting due to poor hygiene and poor sanitation.<sup>[2,24]</sup> Of the annual 3 million infant births in Nigeria, approximately 170,000 results in death that are due to poor knowledge and management practices of childhood diarrhoea.<sup>[14,22]</sup> Malnutrition is a predisposing factor for mortality among children with diarrhoea.<sup>[25]</sup> The most important aspect of management of diarrhoea is therefore, the prevention of dehydration which can be achieved at home using ORT and maintaining good nutrition.<sup>[26]</sup> The Nigerian government has tried to provide this life saving treatment to the communities but only few of the under-fives children with diarrhoea receive any form of ORT. This has created great concern among stakeholders in the country.<sup>[27,28]</sup> Therefore, there is a need to identify the factors that determine the use of ORT in the management of childhood diarrhoea.

This study sought to determine the mothers/caregivers knowledge and practice of home management of diarrhoea using ORT and also identify factors that predict non-use of ORS.

## METHODOLOGY

**Study Area:** Bwari Area Council is situated in the North Eastern region of Abuja between latitude 9.28333 of the equator and longitude 7.38333 (in decimal degree) of the Greenwich meridian, with an area of 914km<sup>2</sup> as at 2006.<sup>[29]</sup> It is bordered to the North by Kaduna state, to the East by Nassarawa state, to the South by Kogi state and to the West by Niger state. Bwari Area Council has a population of 229,274 at the 2006 census with a projected figure of 581,100 in 2016.<sup>[30]</sup> According to National Population Commission (NPC) 2017; its present population is estimated to be 713,186. Bwari Area Council is one of the six area councils in FCT, Abuja and it is made up of ten wards namely, Bwari Central, Dutse, Kubwa, Igu, Kawu, Byazhin, Kuduru, Shere, Ushafa, and Usuma. Each ward has different communities, ranging from five to thirty-three with a total population of 713,186. Dutse ward is made of up eleven communities with population of 232,960. Kubwa ward is made up of ten communities with a population of 135,965. Byazhin ward is made up of sixteen communities with a population of 54,050 and Ushafa ward is made up of seven communities with a population of 40,015 (culled from Bwari Area Council secretariat Statistics 2018). There are two different climatic seasons in the area, the rainy season spans from March to October and the dry season occurs from November to February. The inhabitants of the area are mainly farmers while few engage in trading business and civil services. Sources of water supply range from streams, borehole and municipal water supply. Refuse disposal is by open dumping inside nearby bushes or by the road sides. Sewage disposal is mainly by the use of pit latrine, however few households use the water closet system. Endemic diseases in this area include diarrhoea, malaria, acute respiratory tract infection, malnutrition and

measles.

**Study Population:** The study population was mothers with children aged 0-59 months in the selected communities who consented to be studied.

**Study Design:** The study was an explanatory quantitative and qualitative assessment of oral rehydration therapy utilization.

**Sample Size Estimation:** Sample size for this study was determined using Leslie-kish formula, which is  $n = z^2pq/d^2$  Where;  $n$  = minimum sample size,  $z$  = standard normal deviate set at 1.96 corresponding to 95% confidence level  $p$  = proportion of mothers using ORS<sup>[32,40]</sup>  $q = 1 - P$  = Proportion of mothers not using ORS,  $d$  = degree of accuracy desired, usually set at 0.05. Thus  $n=384$ . However, to accommodate for non-response rate at 10%, i.e. 10% of 384 = 38.4 Sample size ( $n$ ) is now  $384 + 38.4 = 423$

**Sampling Technique:** A multistage cluster sampling technique was employed in selecting the subjects for the study. The Six area councils in FCT were grouped according to rural and urban. Bwari Area council which is made up of both rural, urban and peri-urban communities was purposively selected and grouped into clusters called wards. Out of the ten wards that make up Bwari Area Council, simple random sampling using the balloting method was used to select four wards namely Kubwa, Byazhin, Dutse and Ushafa. The four selected wards are made up of ten, sixteen, eleven and seven communities respectively. By the use of simple random sampling, five out of ten communities in Kubwa, eight out of sixteen communities in Byazhin, six out of eleven communities in Dutse and four out of seven communities in Ushafa were selected from the study communities. Therefore, a total of twenty- three communities were sampled in the selected wards. Each community is a representative of a cluster, and all the eligible households in the selected communities were recruited for the study. Nineteen households from each community were interviewed with one respondent from each household. When a selected household is not eligible, it was replaced with an eligible household, until the required sample size was attained.

## RESULT

**Table 1: Socio-Demographic Characteristics of the Respondents.**

Variables	Frequency (n=406)	Percentage (%)
<b>Age range (years)</b>		
≤19	36	8.9
20-29	204	50.2
30-39	124	30.5
40-49	37	9.2
≥50	5	1.2
Total	406	100
<b>Level of Education</b>		
No formal education	116	80.4
Primary	119	19.6

**Data Collection:** Data was collected using a pre-tested, interviewer-administered semi-structured questionnaire. For effective data collection, six research assistants were recruited and trained for three days on how to administer the questionnaire which comprised of six sections. Section A captured socio-demographic data of the respondents, Section B was on the knowledge of mothers on the causes, signs and symptoms of diarrhoea. Section C was on the knowledge of the correct composition and preparation of ORT, Section D entailed Utilization of ORS in the management of diarrhoea. Section E was on the barriers for utilization of ORT in the management of diarrhoea and Section F was on the methods of diarrhoea prevention.

**Data Analysis:** The quantitative data collected, after sorting and coding was entered into the computer and analyzed using SPSS (Statistical package for social sciences) Version 20. Frequency tables were generated for relevant variables. Descriptive statistics such as frequencies and percentages were used to summarize variables. The Chi square test was used to ascertain the association between the categorical variables while logistic regression was used to control possible confounders and identify the predictors of ORT use in the study population. The statistical significance was set at  $p$  value  $< 0.05$ .

**Ethical Considerations:** Ethical clearance for the study was obtained from the Ethics committee of University of Abuja Teaching Hospital Gwagwalada, Abuja. A written informed consent was obtained from the participants before administering the questionnaire. Permission was also obtained from the traditional rulers of each community.

**Limitations:** There was language barrier during administration of the questionnaire which was overcome by the use of an interpreter. There were repeated visits due to non-availability of the mothers /caregiver; therefore they were sensitized more about the visit. The study was cross sectional and as such conclusions on the observed associations cannot be strongly generalized.

Secondary	105	25.9
Tertiary	66	16.3
<b>Occupation</b>		
House wife	136	33.5
Trader	208	51.2
School teacher	18	4.4
Farmer	19	4.7
Civil servant	22	5.4
Unemployed	3	0.7
<b>Marital status</b>		
Single	24	94.6
Married	369	3.5
Divorced	13	2.0
<b>Relationship to child</b>		
Mother	383	94.6
Aunt	14	3.5
Grand mother	8	2.0
<b>Source of drinking water</b>		
Tap	198	48.8
Sachet	85	20.9
Well	51	12.6
borehole	71	17.5
others	1	0.2
<b>Type of Toilet Facility</b>		
Water closet	247	60.8
Pit latrine	153	37.7
Bush	6	1.5

Majority of the participants were within the age group of 20-29 years (50.2%); with 29.3% having attained only primary education, 25.9% attained secondary education, 16.3% attained tertiary education while 28.6% did not have any formal education. Also 51.2% are traders, 33.5% are house wives, 5.4% are civil servants, 4.7% are farmers,

4.4% are teachers while 0.7% is unemployed. Their major source of water supply is tap water (48.8%), but some of them use sachet water (20.9%), 17.5% uses borehole water while 12.6% uses well water. Also 247 (60.8%) dispose of their sewage by water closet, 153 (37.7%) uses pit latrine and six participants (1.5%) uses bush.

**Table 2: Knowledge of diarrhea and use of ORS among the respondents.**

Knowledge and use items	Yes (%)	No (%)
<b>Heard about diarrhea</b>	339 (83.5)	67 (16.5)
<b>Source of information</b>		
Health worker	220(54.1)	0
Friend	74(18.2)	0
TV/Radio	85(20.9)	0
Books/Magazines	12(2.9)	0
Others	15(3.9)	0
<b>Consider diarrhea a serious illness</b>	299 (73.6)	107 (26.4)
<b>Causes</b>		
Contaminated food	228 (56.2)	178 (43.8)
Teething	101 (24.9)	305 (75.1)
Weaning	64 (15.8)	342 (84.2)
Micro-organism	42 (10.3)	364 (89.7)
Open defecation	74 (67.5)	132 (32.5)
<b>Had Diarrhea 2 Weeks prior to Survey</b>	91(22.4)	315(77.6)
<b>Action when child has diarrhea</b>		
Treat at home with ORS	39(42.9)	0
Visit a health facility	45(49.5)	0
No response	7(7.6)	0
<b>Heard of ORS</b>	368 (90.6)	38 (9.4)
<b>Source of Information</b>		

Health worker	288(70.8)	288(70.8)
Friends	45(11.1)	45(11.1)
TV/Radio	63(15.5)	63(15.5)
Books/Magazines	2(0.5)	2(0.5)
Others	8(2.2)	8(2.2)
<b>Previous use of ORS</b>	161(39.7)	245 (60.3)
<b>Have ORS at home</b>	107(26.4)	299 (73.6)
<b>Know Correct Composition</b>	138 (34.0)	268 (66.0)
<b>Know how to prepare ORS</b>	291 (71.7)	115 (28.3)
<b>Correct volume of Water used</b>	254 (62.6)	152 (37.4)
<b>Give ORS as soon as Diarrheastarts</b>	312(76.7)	94 (23.3)
<b>Know when to discard ORS</b>	202 (49.8)	204 (50.2)
<b>Timely commencement of ORS</b>	280 (68.8)	126(31.2)

In table 2, among the 406 participants, 339 (83.5%) have heard of diarrheal disease. About 54.1% heard about diarrhea from a health worker while 291 (73.65%) perceived it as a serious condition. Furthermore, 368 (90.6%) have heard of ORS while 161 (39.7%) have used it

during an episode of diarrhea. Again 299 (73.65%) did not have ORS sachet at home, 71.7% knew the correct preparation of ORS while 68.8% commenced use of ORS once diarrhea starts.

**Table 3: Knowledge of diarrhea as they relate to socio-demographics of the respondents.**

Variables	Knowledge of diarrhea		Total	X <sup>2</sup>	P-value
	Good (N=187)	Poor (N=218)			
<b>Age</b>					
≤19	12 (6.4)	24 (11.0)	204(50.4)	4.429	0.351
20 – 29	98 (52.4)	106 (48.6)	123(30.4)		
30 – 39	60 (32.1)	63 (28.9)	37 (9.1)		
40 – 49	14 (7.5)	23 (10.6)	5 (1.2)		
≥50	3 (1.6)	2 (0.9)	36 (8.9)		
≤19	12 (6.4)	24 (11.0)	204(50.4)		
<b>Level of Education</b>					
No formal education	46 (24.6)	70 (32.1)	116(28.6)	11.292	<b>0.010*</b>
Primary	67 (35.8)	52 (23.9)	119(29.4)		
Secondary	39 (20.9)	65 (29.8)	104(25.7)		
Tertiary	35 (18.7)	31 (14.2)	66(16.3)		
<b>Occupation</b>					
House wife	65 (34.8)	71 (32.6)	136(33.6)	2.830	0.726
Trader	98 (52.4)	110 (50.5)	208(51.4)		
School teacher	7 (3.7)	11 (5.0)	18(4.4)		
Farmer	6 (3.2)	13 (5.9)	19(4.7)		
Civil servant	9 (4.8)	12 (5.5)	21(5.2)		
Unemployed	2 (1.1)	1 (0.5)	3(0.7)		
<b>Relationship to child</b>					
Mother	181 (96.8)	202 (92.7)	383(94.6)	4.487	0.106
Aunt	5 (2.7)	9 (4.1)	14(3.5)		
Grand-mother	1 (0.5)	7 (3.2)	8(1.9)		
<b>Marital status</b>					
Single	9 (4.8)	15 (6.9)	24(5.9)	3.831	0.280
Married	173 (92.5)	195 (89.4)	368(90.9)		
Divorced	5 (2.7)	8 (3.7)	13(3.2)		
<b>Caregiver's Religion</b>					
Christianity	65 (34.8)	93(42.7)	158(39.0)	3.627	0.163
Islam	122 (65.2)	125 (57.3)	247(61.0)		
<b>Source of Drinking Water</b>					
Tap water	83 (44.4)	115 (52.8)	198(49.0)	6.206	0.184
Sachet water	37 (19.8)	47 (21.6)	84(20.7)		
Well water	28 (14.9)	23 (10.5)	51(12.6)		
Borehole	39 (20.9)	32 (14.6)	71(17.5)		



Others	0 (0)	1 (0.5)	1(0.2)		
<b>Type of Toilet Facility</b>					
Water closet	123 (65.8)	124 (56.9)	247(61.0)	4.221	0.121
Pit latrine	63 (33.7)	90 (41.3)	153(37.8)		
Bush	1(0.5)	4 (1.8)	5(1.2)		

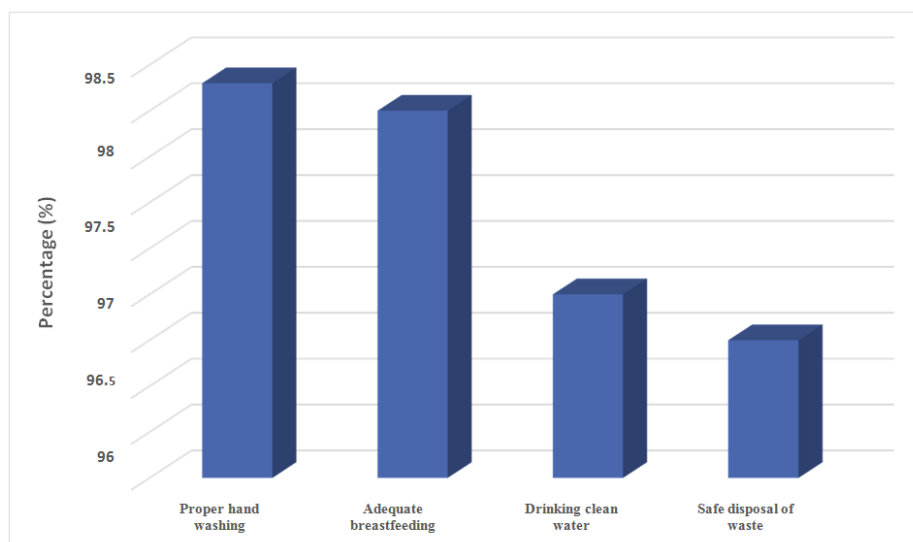
Table 3 shows there is a significant association between knowledge of diarrhea and the level of education (P=0.010): Whereas 35.8% of respondents with primary

education had good knowledge of diarrhea only 24.6% of those with no formal education had the same knowledge.

**Table 4: Use of ORS as they relate to socio-demographics of the respondents.**

Variables	ORS Utilization			X <sup>2</sup>	P-value
	Yes (N=352)	No (N=50)	Total		
<b>Age</b>					
≤19	32 (9.1)	4(8.0)	36(9.0)	9.246	0.055
20 – 29	169(48.0)	35(70.0)	204(50.7)		
30 – 39	112(31.8)	8(16.0)	120(29.9)		
40 – 49	34(9.7)	3(6.0)	37(9.2)		
≥50	5(1.4)	0(0.0)	5(1.2)		
≤19	32(9.1)	4(8.0)	36(9.0)		
<b>Level of Education</b>					
No formal education	103(29.3)	13(26.0)	116(28.9)	0.601	0.896
Primary	100(28.4)	16(32.0)	116(28.9)		
Secondary	91(25.8)	14(28.0)	105(26.1)		
Tertiary	58(16.5)	7(14.0)	65(16.1)		
<b>Occupation</b>					
House wife	114(32.4)	19(38.0)	133(33.1)	2.996	0.701
Trader	182(51.7)	25(50.0)	207(51.5)		
School teacher	16(4.5)	2(4.0)	18(4.5)		
Farmer	17(4.8)	2(4.0)	19(4.7)		
Civil servant	21(6.0)	1(2.0)	22(5.5)		
Unemployed	2(0.6)	1(2.0)	3(0.7)		
<b>Relationship to child</b>					
Mother	333(94.6)	46(92.0)	379(94.3)	4.504	0.105
Aunt	10(2.8)	4(8.0)	14(3.5)		
Grand-mother	8(2.3)	0(0.0)	8(2.0)		
<b>Marital status</b>					
Single	14(4.0)	10(20.0)	24(6.0)	20.608	<0.001*
Married	324(92.0)	38(76.0)	362(90.0)		
Divorced	11(3.1)	2(4.0)	13(3.2)		
<b>Source of Drinking Water</b>					
Tap water	175(49.7)	22(44.0)	197(49.0)	5.085	0.279
Sachet water	68(19.3)	15(30.0)	83(20.6)		
Well water	48(13.6)	3(6.0)	51(12.7)		
Borehole	60(17.0)	10(20.0)	70(17.4)		
Others	1(0.3)	0(0.0)	1(0.2)		
<b>Type of Toilet Facility</b>					
Water closet	215(61.1)	30(60.0)	245(60.9)	7.974	<b>0.019*</b>
Pit latrine	134(38.1)	17(34.0)	151(37.6)		
Bush	3(0.8)	3(6.0)	6(1.5)		

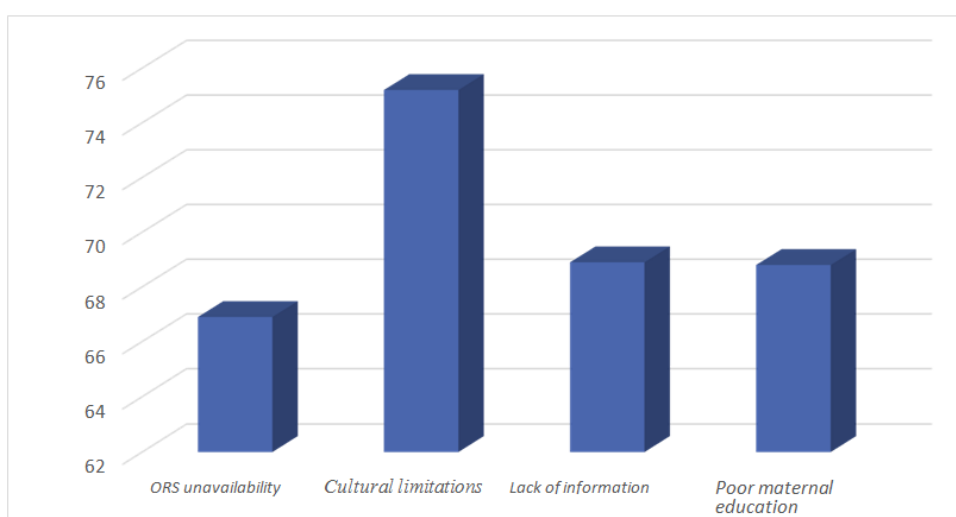
Table 4 shows that there is a significant association between ORS use and marital status ( $x^2=20.608$ ,  $p < 0.001$ ), and type of the toilet facility ( $x^2=7.974$ ,  $p = 0.019$ ).



**Fig 1: Methods of Diarrhea Prevention among the Respondents.**

The most common method of diarrheal prevention was proper hand washing (98.3%). Others are adequate breast

feeding (98%), drinking clean water (96%) and safe disposal of stool (95.8%).



**Fig. 2: Factors Influencing the Utilization of Oral Rehydration Therapy among the Respondents.**

The factors influencing ORT use in the management of diarrhoeal disease includes cultural differences, poor

maternal education, lack of information on ORS preparation and non-availability of ORS.

**Table 5: Logistic regression to identify Predictors of ORS Use among the Respondents.**

Variables	Crude odds ratio	Adjusted odds ratio	95% Confidence interval		p-value
			Lower	Upper	
Age of the mother	1.521	1.411	0.938	2.122	0.099
Level of education	0.996	0.844	0.612	1.165	0.303
Occupation	1.138	1.097	0.790	1.522	0.581
Decision maker on health	1.030	1.083	0.535	2.191	0.825
Marital status	4.180	4.167	1.658	10.475	<b>0.002*</b>
Source of drinking water	0.977	1.006	0.770	1.314	0.968
Type of toilet facility	0.800	0.799	0.444	1.439	0.455

The table above showed that marital status of the caregiver is a predictor of ORS use and the respondents who are married are four times more likely to use ORS

compared to those who are not married. (OR=4.167, P-value= 0.002).

**Findings from the Qualitative Analysis: Analysis Tree**  
A total of thirty-two (32) mothers/caregivers participated in four sessions of focus group discussions (FGD) and each session lasted approximately 60minutes. The

moderator trained in qualitative inquiry guided the discussion to ensure all participants responds to the question.

The key findings are shown in the table below:

**Table 4.8: Findings of the Qualitative Analysis.**

Objectives	Research Questions	Findings
To determine the knowledge of diarrhoea among mothers of under five children	Familiarity with diarrhoea	<ul style="list-style-type: none"> <li>• Very familiar</li> <li>• R6-No idea</li> </ul>
	What are the causes of diarrhoea	<ul style="list-style-type: none"> <li>• Dirty environment,</li> <li>• Eating spoil/contaminated food,</li> <li>• Teething,</li> <li>• Drinking dirty water,</li> <li>• Not being hygienic,</li> <li>• Microorganism</li> </ul>
	How can diarrhea be prevented	<ul style="list-style-type: none"> <li>• Ensuring clean environment,</li> <li>• Drinking clean water,</li> <li>• Thorough hand washing,</li> <li>• Thorough washing of hands before and after preparing baby food</li> </ul>
To determine the knowledge of ORT use among mothers of under five children	Have you heard of ORT	<ul style="list-style-type: none"> <li>• Yes</li> </ul>
	How does ORT work?	<ul style="list-style-type: none"> <li>• ORT works by reducing the number of times a child has diarrhoea</li> <li>• Prevents the child from getting more sick,</li> <li>• ORT works by stopping diarrhoea</li> </ul>
	What are the components of ORT	<ul style="list-style-type: none"> <li>• Salt,</li> <li>• Sugar and</li> <li>• Water</li> </ul>
	How can it be prepared?	<ul style="list-style-type: none"> <li>• ORT is prepared by using one liter of water to mix a sachet of ORS</li> </ul>
	What are the benefits of ORT	<ul style="list-style-type: none"> <li>• It prevents the child from getting dehydrated or looking sickly.</li> <li>• It helps a child to recover faster.</li> </ul> <p>It helps by improving the child's strength.</p>
		<ul style="list-style-type: none"> <li>• It reduces the number of times the child has diarrhoea</li> </ul>
To determine the level and pattern of ORT use among the study population	Have you used ORT before?	Yes, No (R4, R8, R11, R29)
	When do you discard prepared ORS?	ORT is discarded after 24hrs. ORS is discarded after 12 hours (R3, R4, R14, R15, R16), After 6 hours (R18)
To identify methods of diarrhoea prevention among mothers of under five children	How can diarrhea be prevented	<ul style="list-style-type: none"> <li>• Ensuring clean environment,</li> <li>• Drinking clean water,</li> <li>• Thorough and constant handwash,</li> <li>• Thorough washing of hands before preparing baby food</li> </ul>
To identify the barriers influencing ORT use among the study population.	What are the reasons why people do not use ORS?	<ul style="list-style-type: none"> <li>• Some people believe that diarrhoea stops with or without ORS.</li> <li>• Some children don't like the taste of the mixture which makes a child vomit.</li> <li>• People do not use ORS due to distance to a facility to buy it.</li> <li>• Lack of knowledge on how to prepare it,</li> <li>• Financial constraint – (Access- financial and geographical) (R7), cost of ORS (R16)</li> </ul>
	How to improve ORT utilization? What do you think need to be done to motivate people to use it?	<ul style="list-style-type: none"> <li>• Improving on the taste of the solution.</li> <li>• Educating the mothers on the importance</li> </ul>



		and relevance of ORS (R3). • Distribution of ORS freely as a mass campaign (R7)
--	--	--

## DISCUSSION

This study was conducted to identify predictors of oral rehydration therapy use among mothers/ caregivers of under-fives with diarrhoeal diseases in Bwari Area Council, Abuja. A study population of 406 participants were recruited and the study sample were made of mostly biological mothers, with primary education being their highest level of education.

Most of the respondents (83.5%) have heard of diarrhoea, because it is a common illness, and more than half of the respondents (54.1%) reported that they heard of diarrhoea from a health worker. This finding is in agreement with a study carried out in Ibadan, Nigeria where 98% respondents were aware of diarrhoea although the percentage is higher than that reported in this study and health worker was the major source of information on diarrhoea. Several studies have also shown that health workers are a major channel for effective and reliable dissemination of health information to the general populace. Findings in this study have also shown that the role of health worker in dissemination of information about diarrhoea and its management is very important.

Knowledge on the causes of diarrhoea among mothers of under-fives was identified as contaminated food and drinks (56.2%), teething (24.9%), weaning (15.8%) and micro-organism (10.3%). This report disagrees with a study done in Enugu where most mothers identified teething as the major cause of diarrhoea but agrees with a study done in Kenya where respondents identified unclean water and contaminated food and drinks as the major cause of diarrhea.<sup>[33]</sup>

A qualitative study done in Malawi showed that teething as a cause of diarrhoea is a normal development of the child and needs no treatment, and respondents that perceived it as a cause of diarrhoea are less likely to use ORT for the management of diarrhoea. In this study, most respondents (73.6%) were aware of the severity of the condition as they were able to identify at least one danger sign associated with diarrhoea that should warrant seeking medical attention.

Majority of the respondents 317 (77.9%) prefer taking their children to the hospital during episodes of diarrhoea. We discovered that seeking advice or treatment from a health facility for the current episode of diarrhoea was associated with ORT use. This finding is in keeping with a study conducted in Kenya<sup>[30,34,34,35]</sup> where the caregivers who seek care at a health facility were more likely to use ORT than their counterparts. In a qualitative study done in Kenya, many of the caregivers needed advice from the health workers to be able to use ORT for their children.<sup>[35]</sup> This is not in line with the

WHO recommendation that fluids should be given immediately at the onset of diarrhea.<sup>[36]</sup>

In this study, the presence of ORS sachet at home during the onset of diarrhoea was not associated with ORT use. This is not in agreement with a study conducted in Uganda.<sup>[37]</sup>

Another study also indicated that many caregivers wait for the advice of the health workers to ensure that ORS is suitable.<sup>[35]</sup> This misunderstanding might be the reason for lack of association between the presence of ORS at home and ORT use. These data therefore highlight the need for health education among parents on the need to manage some aspects of diarrhoea at home, so that the child will not be dehydrated before reaching the hospital.

Some respondents still initiate treatment at home from the onset of a child's diarrhoeal episode. In this study, previous use of ORS was not associated with ORT use in the current episode of diarrhoea. This finding is not in agreement with studies done in Nigeria,<sup>[32]</sup> where caregivers who gave ORT to their children in the past were more likely to use ORT during the current episode of diarrhoea. A greater proportion of respondents (90.6%) reported to have heard about ORS. Similar findings were observed in studies from Pakistan (90%), Nigeria (85%) and Iran (79%). Major sources of information about ORS among respondents were health worker (70.8%). Only 138 (34.0%) of respondents knew the correct composition of ORS. This report is not in agreement with the study carried out in Ibadan Nigeria, where majority of the respondents knew the correct composition of ORS.<sup>[38,39]</sup>

Mothers who had never heard of ORS are less likely to know about ORS composition. Most respondents (71.7%) were able to describe the correct method of preparation of ORS. This agrees with studies from Nigeria (60.3%) and Pakistan (74.5%). More practical health education is still needed on ORS composition and preparation for those respondents with little knowledge. Of the 406 respondents, about 22.4% of the respondents reported that their child had suffered from diarrhoeal episode in the past two weeks before the survey, and 42.9% respondents had actually used ORS during the child's most recent episode, although 39.7% respondents reported to have used ORS in the treatment of diarrhoea at one point.

Among 87.6% respondents who had used ORS, about 69.0% of them reported to have commenced administration of ORS on time while 31% commenced administration of ORS late. 49.8% of the respondents were able to store and dispose of the ORS properly while 50.2% of them stored and disposed of it improperly. Most of the respondents in this study knew that proper hand

washing (98.3%), adequate breast feeding practice (98%), drinking clean water (96%), and safe disposal of refuse (95.8%) are ways of preventing childhood diarrhoea. This finding also reflects a study done in Nasarawa state, Nigeria where mothers identified hygiene, provision of clean water and treatment of infections as ways to prevent diarrhoea.<sup>[40]</sup>

The study also portrays availability of ORS, cultural differences, educational status and knowledge as determinants of utilization of ORS. These perceived determinants/barriers had also been identified by other scholars as a factor preventing use of ORS.<sup>[34,41]</sup> Although these factors were identified as predictors to utilization of ORS, the logistic regression conducted in the study shows statistical significant relationship between the independent variables and ORS use.

Also the study shows that marital status and the type of toilet facility is significantly associated with ORS use. There is no statistical significant association between age of the mother, educational status and ORS use. This finding is consistent with the studies carried out in Ethiopia and Nigeria.<sup>[11,22]</sup>

The focus group discussions conducted revealed a wide range of beliefs of mothers regarding childhood diarrhoea. There are various beliefs about diarrhoea and its management, and this can be an obstacle towards adopting ORT. Most of the mothers believed that diarrhoea is a normal development of children especially when the teeth is sprouting out, while others still think that it is a serious condition caused by exposure to contaminated food and drinks and requires medical attention. This finding is in line with a qualitative study done in Kenya.<sup>[42]</sup>

Many of the respondents said that diarrhoea is one of the major common childhood diseases in the study area. The participants also said that the occurrence of diarrhoea is high during the rainy season because of the contamination of their water source. This study identifies some of the factors that may be helpful to understand mothers' motivation to use or not to use ORT for the treatment of diarrhoeal disease. Indeed, some reasons given by the mothers not to use ORT includes: that diarrhoea stops with or without ORS, lack of information on how to prepare ORT, financial constraint, non-availability of ORT, while some said the taste of ORS causes the child to vomit.

The qualitative assessment also revealed that increased knowledge of diarrhoea and ORT correspond to increase ORT use. Though all the barriers identified cannot be modified, designed educational interventions can be a better approach to modify some of them. The focus group discussion conducted showed that majority of the respondents are familiar with diarrhoea while only one respondent stated otherwise. All the respondents who accepted being familiar with diarrhoea as a health

condition highlighted that the major causes of the condition include the following: Not keeping environment clean, especially where there is a crawling child. When the baby puts the same hands with which she/he crawls with into his mouth or picks dirty objects and put in the mouth, it may cause the child to have diarrhoea, eating or giving a child spoiled or contaminated food, drinking contaminated water, micro-organisms which find themselves into the body system also could cause diarrhoea.

In addition to the causes of diarrhoea, FGD respondents presented the following as ways in which diarrhoea can be prevented: Ensuring to keep environment clean, boiling water before drinking, thorough hand washing before and after preparing food for babies. All respondents in the qualitative aspect of the study indicated that they are aware of Oral Rehydration Salt Solution and that it works by reducing the number of times a child has diarrhoea. Respondents also highlights that ORS prevents a child from looking sickly, especially when having diarrhoea and that it also stops or serves as therapy for diarrhoea. The components of ORT mentioned by all FGD respondents include salt, sugar and water. Respondents mentioned that ORT is prepared by mixing one sachet of ORS in a liter of water and stir till the whole content dissolves.

ORT is prepared by using one liter of water to mix a sachet of ORS (R1). Respondents went further to highlight the benefits of ORT as below: it prevents the child from getting dehydrated or looking sickly, it helps a child to recover faster, it helps by improving the child's strength and it also reduces the number of times the child has diarrhoea.

Out of the thirty-two (32) FGD participants interviewed, twenty-eight (28) stated that they have used ORT to control diarrhoea, while only four (4) of the respondents said that they have not used it before. Also when asked when they think it is right to discard prepared ORS, twenty-six (26) respondents stated that, it is best to discard it after 24 hours, five (5) respondents said, to discard after 12 hours while only one (1) respondent said, to discard ORS after 6 hours.

Respondent feedback when asked about the barriers to utilizing ORT amongst mothers of under five children, were: with or without the use of ORS that diarrhoea could stop on its own. Some people believe that diarrhoea stops with or without ORS (R1). Most respondents also mentioned that some children do not like the taste of ORS, therefore vomits it when given and this retards the parents from using it as a therapy. Some children don't like the taste of the mixture which makes a child vomit (R6). Knowledge of how to prepare ORT was also identified as a constraining factor to utilization. Another barrier identified by respondents upon interview is access. Access to ORS sachet as categorized by respondents was seen in two different ways:

a) Geographical access: Respondents highlighted that people do not use it because of the distance from their residents and facilities they could purchase it, People do not use ORS due to distance to a facility to buy it (R21).  
 b) Financial access: Some respondents also highlighted that the cost of ORS also prevents people from using it. Recommendation to improve utilization of ORT were given in three ways and to three different actors as follows: a) **Manufacturers:** There is need to convey to those producing ORS that children don't seem to like the taste of the product and this deters their consumption of it, thus care-givers stops using it as therapy for what it meant for. b) **Government:** Just like mass campaign for mosquito net and immunization, respondent suggest that ORS should be widely distributed free of charge to allow those with financial barrier, the ability to access and use the product. a) **Users:** Educating the mothers on the importance and relevance of ORS.

In conclusion, the use of oral rehydration therapy is a proven intervention in the management of diarrhoeal diseases. From the study, there is high level of awareness of this intervention. Hence, the use of ORT by most respondents is also high. However, there is need for promoting healthy behavior among mothers/caregivers. There is also need for public health intervention on the importance of ORS use for the treatment of diarrhoeal disease and prevention of dehydration. Health education should focus on the benefits, early initiation, and preparation of ORT. It is also important to identify and encourage caregivers with no previous experience of ORT and who do not have much contact with the health facility to use ORT at the onset of diarrhoea, in order to improve its use.

#### RECOMMENDATIONS

1. Good personal hygiene and proper hand washing practices should be encouraged especially among single caregivers/ mothers at all times. This will help to prevent spread of infection. Continued feeding during diarrhoeal episodes is also encouraged for faster recovery and prevents chance of getting malnourished.
2. There is need for community-based awareness campaign by the Non-Governmental Organization, Community based organizations and religious groups on home management of childhood diarrhoea with ORS. This will help the community at large to respond to diarrhoeal disease timely to avoid complications that might arise. It could also lead to a decrease in the number of children who are hospitalized or die as a result of the complications.
3. The government at all level should ensure and sustain regular provision and availability of ORS Sachets at an affordable price. This will enable the caregivers access ORS easily. Training and retraining of health workers to educate mothers on the early administration of ORS at home in an episode of diarrhoea. Message should also focus on the danger signs of diarrhoea disease.

#### REFERENCES

1. Tambe A, Nzefa L, Noline N. Childhood Diarrhea Determinants in Sub-Saharan Africa: A Cross Sectional Study of Tiko-Cameroon. *Challenges*, 2015; 6(2): 229–243.
2. Woldu W, Bitew BD, Gizaw Z. Socioeconomic factors associated with diarrheal diseases among under five children of the nomadic population in northeast Ethiopia. *Trop. Med. Health*, 2016; 44(1): 40-48.
3. Carvajal-Vélez L, Amouzou A, Perin J, Maïga A, Tarekegn H, Akinyemi A, et al. Diarrheamanagement in children under five in sub-Saharan Africa: does the source of care matter? A Countdown analysis. *BMC Public Health*, 2016; 16(1): 830-844.
4. Ogez D, Rickard D. The prevalence and management of diarrheal diseases in children under age five in a rural village of Ghana. *J Investig Med.*, 2013; 61(1): 197-210.
5. Bryce J, Boschi-Pinto C, Shibuya K, Black RE. WHO estimates of the causes of death in children. *Lancet*, 2005; 365(9465): 1147–1152.
6. Charyeva Z, Cannon M, Oguntunde O, Garba AM, Sambisa W, Bassi AP, et al. Reducing the burden of diarrhea among children under five years old: lessons learned from oral rehydration therapy corner program implementation in Northern Nigeria. *J Heal Popul Nutr.*, 2015; 34(1): 4-11.
7. Folasade Iyun B, Adewale Oke E. Ecological and cultural barriers to treatment of childhood diarrhea in riverine areas of Ondo State, Nigeria. *Soc Sci Med.*, 2000; 50(7): 953–964.
8. Elfstrand L, Florén C-H. Management of chronic diarrhea in HIV-infected patients: current treatment options, challenges and future directions. *HIV/AIDS.*, 2010; 2: 219–24.
9. CDC. Diarrhea: Common Illness, Global Killer. *Centers Dis Control Prev.*, 2012; 1–4.
10. Derouin F, Lagrange-Xelot M. Treatment of parasitic diarrhea in HIV-infected patients. *Expert Rev Anti Infect Ther.*, 2008; 6(3): 337–349.
11. Mengistie B, Berhane Y, Worku A. Predictors of Oral Rehydration Therapy use among under-five children with diarrhea in Eastern Ethiopia: a community based case control study. *BMC Public Health*, 2012; 12(1): 1029-1035.
12. Lindsey M Linters, Jai K Das, Zulfiqar A Bhutta. Systematic review of strategies to the use of oral rehydration solution at the household level. *BMC Public Health*, 2013; 13.
13. Telmesani AM. Oral rehydration salts, zinc supplement and rota virus vaccine in the management of childhood acute diarrhea. *J Fam Community Med.*, 2010; 17(2): 79–82.
14. Ukegbu A, Ukegbu P. Mothers' knowledge, Perceptions and practices of Home based management of Childhood Diarrhea in a Rural Community in Anambra State, Nigeria. *Niger J Nutr Sci.*, 2011; 31(2): 8–10.
15. Olakunle JM, U OV, Buhari M, Kamaldeen A. Ijprbs

- Assessment of Mothers' Knowledge of Home Management of Childhood Diarrhea in a Nigerian Setting. *Int J Phamaceutical Res Bio-Science*, 2012; 1(4): 168–184.
16. Taylor CE, Greenough WB. Control of Diarrheal Diseases. *Annu Rev Public Health*, 1989; 10(1): 221–244.
  17. Yalaw E. A qualitative study of community perceptions about childhood diarrhea and its management in Assosa District, West Ethiopia. *BMC Public Health*, 2014; 14(1): 975–980.
  18. Bhutta ZA, Das JK. Global Burden of Childhood Diarrhea and Pneumonia: *What Can and Should Be Done?*, 2013; 131(4): 634–636.
  19. Zwisler G, Simpson E, Moodley M. Treatment of diarrhea in young children: results from surveys on the perception and use of oral rehydration solutions, antibiotics, and other therapies in India and Kenya. *J Glob Health*, 2013; 3(1): 010403.
  20. Atia AN, Buchman AL. Oral rehydration solutions in non-cholera diarrhea: a review. *Am J Gastroenterol*, 2009; 104(10): 2596–2604.
  21. Carvajal-Vélez L, Amouzou A, Perin J, Maïga A, Tarekegn H, Akinyemi A, et al. Diarrheamanagement in children under five in sub-Saharan Africa: does the source of care matter? A Countdown analysis. *BMC Public Health*, 2016; 16(1): 830–843.
  22. WHO and UNICEF. The global burden of childhood diarrhoea : Why children are still dying and what can be done - WHO, UNICEF. WHO., 2009; 68.
  23. Digre P, Simpson E, Cali S, Lartey B, Moodley M, Diop N. Caregiver perceptions and utilization of oral rehydration solution and other treatments for diarrhea among young children in Burkina Faso. *J Glob Health*, 2016; 6(2): 020407.
  24. Farthing M, Salem M, Lindberg G, Dite P, Khalif I, Salazer-Lindo E, et al. Acute diarrhea in adults and children: a global perspective. *World Gastroenterol Organ*, 2012; 1–24.
  25. Black RE. Persistent diarrhea in children of developing countries. *Pediatr Infect Dis J.*, 1993; 12(9): 751–764.
  26. WHO /UNICEF. WHO / UNICEF joint statement clinical management of acute diarrhoea. *WHO Libr.*, 2004; 1–8.
  27. UNICEF W. Diarrhoea: Why children are still dying and what can be done? WHO/ UNICEF Report: 1–16. *Lancet.*, 2009; 375(9718): 870–872.
  28. Agbede CO, Kio JO, Oladutele O. Diarrhea Treatment Behaviour among Mothers of Under-five Children Attending Primary Health Care Clinic in Ibadan, Oyo State, Nigeria. *Br J Med Res.*, 2016; 17(12): 1–7.
  29. Uzonu U.I. Urbanisation and Deforestation using GIS in Bwari Area Council Abuja. *FUPRE Journal of Scientific and Industrial Research*, 2018; 2(2): 93–100.
  30. Bwari city map, Culled from Bwari city road map, Statistics by National Populationcommission, 2018.
  31. Araoye MO. Research Methodology with Statistics for Health and Social Sciences, Nathadex publishers, 2004; 1: 115–120.
  32. Ene-Obong HN, Iroegbu CU, Uwaegbute AC. Perceived Causes and Management of Diarrhoea in Young Children by Market Women in Enugu State, Nigeria. *J Heal Popul Nutr.*, 2000; 18(2): 97–102.
  33. Vasantharopan A, O'Reilly C, Omoro R, Kotloff K, Farag T, Levine MM, et al. Home-based diarrhea case management and the risk of all-cause mortality in the Kenya global enterics multicenter study (GEMS) site. *Am J Trop Med Hyg.*, 2013; 89(5): 428–433.
  34. Blum LS, Oria PA, Olson CK, Breiman RF, Ram PK. Examining the use of oral rehydration salts and other oral rehydration therapy for childhood diarrhea in Kenya. *Am J Trop Med Hyg.*, 2011; 85(6): 1126–1133.
  35. WHO. The treatment of diarrhoea : a manual for physicians and other senior health workers. *World Heal Organ*, 2005; 1–50.
  36. Nsabagasani X, Ogwal-Okeng J, Mbonye A, Ssengooba F, Muhumuza S, Hansen EH. Availability and utilization of the WHO recommended priority lifesaving medicines for under five-year old children in public health facilities in Uganda: a cross-sectional survey. *J Pharm policy Pract*, 2015; 81: 18–24.
  37. Adimora GN, Ikfuna AN, Ilechukwu G. Home management of childhood diarrhoea: Need to intensify campaign. *Niger J Clin Pract*, 2011; 14(2): 237–241.
  38. Agbolade MO, Dipeolu IO, Ajuwon AJ. Knowledge and use of oral rehydration therapy among mothers of Under-Five children in a military barrack in Ibadan, Nigeria. *African J Biomed Res.*, 2015; 18(1): 7–15.
  39. Mashoto KO, Malebo HM, Msisiri E, Peter E. Prevalence, one week incidence and knowledge on causes of diarrhea: household survey of under-fives and adults in Mkuranga district, Tanzania. *BMC Public Health*, 2014; 14: 985–992.
  40. Ogunrinde OG, Raji T, Owolabi OA, Anigo KM. Knowledge, attitude and practice of home management of childhood diarrhoea among caregivers of under-5 children with diarrhoealdisease in northwestern Nigeria. *J Trop Pediatr.*, 2012; 58(2): 143–146.
  41. Ansari M, Izham Mohamed Ibrahim M, Azmi Hassali M, Ravi Shankar P, Koirala A, JangThapa N. Mothers' beliefs and barriers about childhood diarrhea and its management in Morang district, Nepal. *BMC Res Notes*, 2012; 5(1): 576–581.
  42. Blum LS, Oria PA, Olson CK, Breiman RF, Ram PK. Examining the use of oral rehydration salts and other oral rehydration therapy for childhood diarrhea in Kenya. *Am J Trop Med Hyg.*, 2011; 85(6): 1126–1133.