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## **Home Management of Diarrhoea by Caregivers Presenting at the Diarrhoea Training Unit of a Tertiary Hospital in Southern Nigeria**

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### **Authors' contributions**

*This whole work was carried out in collaboration between both authors. Both authors read  
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### **ABSTRACT**

**Background:** Diarrhoea is a leading cause of under – five morbidity and mortality. Diarrhoea deaths can be prevented by adequate case management of diarrhoeal episodes in children. With majority of cases being treated initially or completely in the home and community, the level of awareness of diarrhoea and simple home management practices among caregivers are key determining factors to reducing diarrhoea morbidity and mortality in children.

**Aim:** To determine caregivers' perception, knowledge and practice of home management of diarrhoea of children under five years of age presenting to the Diarrhoea Training Unit of a tertiary hospital in Southern Nigeria.

**Study Design:** A clinic – based descriptive cross sectional study.

**Place and Duration of Study:** The study was carried out in the Diarrhoea Training Unit of the University of Port Harcourt Teaching Hospital, Rivers State, Nigeria from July to December 2013.

**Methodology:** A structured pre–tested questionnaire was used to collect data from caregivers on demographic characteristics, knowledge and practice of diarrhoea home treatment. There were 8 knowledge and 10 practice questions; each was scored a point

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if correctly answered. The caregivers were grouped into those having good, moderate and poor knowledge or practice according to scores obtained.

**Results:** Of the 157 caregivers, 29.3% had a good level of knowledge, while 33.8% had good level of practice of the home management of diarrhoea. A higher knowledge score was significantly associated with the Social class ( $P=.002$ ) and mother's educational level ( $P=.002$ ). A higher practice score was also significantly associated with the Social class ( $P<.001$ ) and mother's educational level ( $P<.001$ ). After adjusting for other factors, mother's educational level was significantly associated with both level of knowledge ( $P=0.022$ ) and practice ( $P=0.012$ ) of the home management of diarrhea.

**Conclusion:** The study has shown a low level of knowledge and practice among the caregivers as regarding the home management of diarrhoea. A higher level of education in mothers was significantly associated with a higher level of knowledge and practice.

*Keywords: Diarrhoea; knowledge; practice; caregivers.*

## 1. INTRODUCTION

Diarrhoea is defined as the passage of three or more loose or watery stools in a 24-hour period [1]. It is a leading cause of childhood death and the second most common cause of death worldwide [2]. Globally in 2010, there were 1.731 billion episodes of diarrhoea (36 million of which progressed to severe episodes) in children younger than 5 years. In 2011, 700 000 episodes of diarrhoea led to death [2]. Diarrhoea has its major impact in the developing countries where there is a lack of safe water, improper means of disposal of human faecal waste, intense crowding in rudimentary houses and often poor standards of personal hygiene [3]. Under such conditions various pathogens that cause diarrhoea are readily transmitted to young children, resulting in an enormous burden of disease. Global deaths from diarrhoea of children in developing countries aged less than 5 years were estimated at 1.87 million, approximately 19% of total child deaths [4]. The World Health Organization (WHO) African and South-East Asia Regions combined contained 78% (1.46 million) of all diarrhoea deaths occurring among children in the developing world [4]. In these countries, children experience an average of 3 episodes of diarrhoea per year [5] and in some areas, the average exceeds nine episodes each year [1]. Where episodes are frequent, children may spend more than 15% of their days with diarrhea [1]. Each episode deprives the child of nutrients necessary for growth, thus diarrhoea is a major cause of malnutrition and malnourished children are more likely to die from diarrhoea [6].

In Nigeria, diarrhoeal diseases are the 3<sup>rd</sup> leading cause of death in children below 5 years, accounting for 16% of the Nigerian under 5 mortality rate [7]. Most of these deaths are as a result of severe dehydration, which could have been prevented by oral rehydration therapy (ORT) using Salt Sugar Solution (SSS) or Oral Rehydration Salt (ORS) [7]. Since 1979 oral rehydration therapy has been the cornerstone of diarrhoea management worldwide with over 150 countries undertaking to attain 80% ORT coverage by 1995 with a view to achieving a reduction of 50% in mortality attributable to diarrhoea by the year 2000 [8]. In May 2004, WHO and UNICEF released a joint statement to decrease diarrhoea deaths among the world's most vulnerable children. This statement recommended the use of low osmolality ORS [9] that reduces the need for intravenous fluids, and Zinc supplementation as an

adjunct therapy that decreases the duration and severity of the diarrhoea episode and the likelihood of subsequent infection in 2 to 3 months following treatment [9]. WHO and UNICEF recommend 20 mg of zinc per day for 10 – 14 days for infants and children, and 10 mg for infants under six months of age, while the low osmolar ORS is given according to the child's dehydration status and treatment plan.[9] Despite the evidence of benefits, there has been little progress on the widespread use of ORS and Zinc for diarrhoea treatment. The situation is even worse in Nigeria where the use of ORT is 38% out of which ORS use is only 34% [10]. This means that Nigeria is still far from achieving the 1995 target of 80% ORT coverage [8]. With Nigeria's exclusive breast feeding rate at 17%, and with 16% of infants under 2 months of age still being bottle fed, [10] and bottle feeding being a major risk factor for diarrhoeal diseases, [11] the under 5 aged children in Nigeria may still be in danger of diarrhoea morbidity and mortality.

The 2013 Nigeria Demographic and Health survey has put the country's under-five mortality rate at 128 deaths per 1,000 live births, implying that one in every 8 children born in Nigeria may die before their 5<sup>th</sup> birthday [10]. Though the level has dropped significantly from the 201 deaths per 1000 live birth recorded in 2003, Nigeria still has a long way to go to achieve the Millennium Development Goal (MDG) target of 64 deaths per 1000 live births by 2015 [12]. If the MDG4 must be attained, greater attention must be given to reducing diarrhoea morbidity and mortality [12] since it is a major contributor to the under 5 morbidity and mortality. Studies have shown that only 29% [10] of children with diarrhoea in Nigeria are treated in the health facility. 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. The few studies [13,14] carried out on home management of diarrhoea in Nigeria have shown an unsatisfactory level of knowledge and poor methods of home management of childhood diarrhoea. There is however no current study on the subject matter in the South – South geopolitical zone of Nigeria. This study seeks to determine the current caregivers' perception, knowledge and practice of home management of diarrhoea in Southern Nigeria and compare with previous findings in other parts of the Country and beyond. The findings in this study will form the bases of extensive education on diarrhoeal management within the community.

## **2. MATERIALS AND METHODS**

This was a clinic-based descriptive cross sectional study carried out on 157 caregivers of children with diarrhoea attending the Diarrhoea Training Unit (DTU) of the University of Port Harcourt Teaching Hospital, Port Harcourt from July to December 2013. Port Harcourt, the capital city of Rivers State, is located in the South-South geo-political zone of Nigeria. Rivers State covers a land area of 12,910 sq km. Port Harcourt is a cosmopolitan city with diverse Nigerian ethnic groups and foreigners living in the city, but the indigenous ethnic groups are the Ikwerres and Okrikas. Port Harcourt is the nerve center of the oil industry. The major occupations revolve around oil and gas exploration. There are also manufacturing industries as well as federal and state government projects. The urban nature of the area and oil exploration and production activities has caused a great influx of people from all over Rivers State and neighbouring States. Its vegetation is that of an equatorial rain forest and mangrove swamp. There is abundant rainfall almost all year round, starting about March and lasting till November, with a mean annual temperature of about 27°Celsius.

The University of Port Harcourt Teaching Hospital is the largest tertiary hospital in the State. All children between the ages of 1 to 59 months with diarrhoea, except those with emergency presentations, are seen in the DTU. The unit is run by Paediatrics Consultants and resident doctors. All diarrhoea patients are assessed by a doctor and treated accordingly according to the WHO and UNICEF recommendations [5,9]. The nurse in the DTU teaches caregivers how to prepare and administer ORS according to the doctor's prescription. Patients with severe complications needing admission are admitted into the Children's Emergency Ward for management.

All caregivers of children seen in the DTU from July to December 2013, who gave consent, were included in the study. Caregivers of children needing emergency services and those who did not give consent were excluded from the study. Sample size estimation was determined using the formula [15] for estimating minimum sample size for descriptive studies when studying proportions with an entire population size < 10,000 using an estimated population size of 250 caregivers of 250 children between 1 – 59 months of age, based on the records of patients seen in the DTU from July to December in 2012. It was assumed that 50% of the caregivers would have adequate knowledge of home management of diarrhoea at a 95% confidence level with a 5% margin of error. This gave a sample estimate of 151 caregivers. However, a sample size of 157 caregivers was used based on the period of the study.

Data was collected using a structured, pre-tested questionnaire containing information on socio-demographic characteristics of the patients and their caregivers, medical history of the current diarrhoeal illness, caregivers knowledge of diarrhoea aetiology, home management and caregivers practices of diarrhoea home management and prevention. The questionnaire was designed by the researchers and it was reviewed by a panel of specialist paediatric consultants to ascertain the face validity. After pre – testing, ambiguous questions were removed or modified. The questionnaires were self – administered by literate caregivers and interviewer – administered to illiterate caregivers. There were 8 questions on knowledge and awareness and 10 on attitudes and practice of home management and prevention of diarrhoea. The questions on knowledge and awareness included questions on the cause of diarrhoea, awareness, knowledge of preparation and preservation of ORS and SSS and awareness of the use of zinc for home management of diarrhoea. The practice questions included questions on treatment given for the present and previous diarrhoea episodes, the use of SSS, ORS and zinc for home management of diarrhoea, feeding and hand washing practices. Each was scored one point. The level of knowledge was classified as poor for respondents scoring 0–3 out of 8 points (ie <50%), moderate for those scoring 4 – 5 out of 8 points (ie 50–75%), and good for those scoring 6 – 8 out of 8 points (ie >75%). The level of practice was classified as poor for respondents scoring 0 – 4 out of 10 points (ie <50%), moderate for those scoring 5 – 7 out of 10 points (ie 50 – 75%), and good for those scoring 8 – 10 out of 10 points (ie>75%). In other words, scoring less than 50% of maximum points was classified as poor, 50 – 75% as moderate and above 75% as good levels of knowledge or practice. The socio-economic status was determined by the social classification scheme developed by Oyedepi [16].

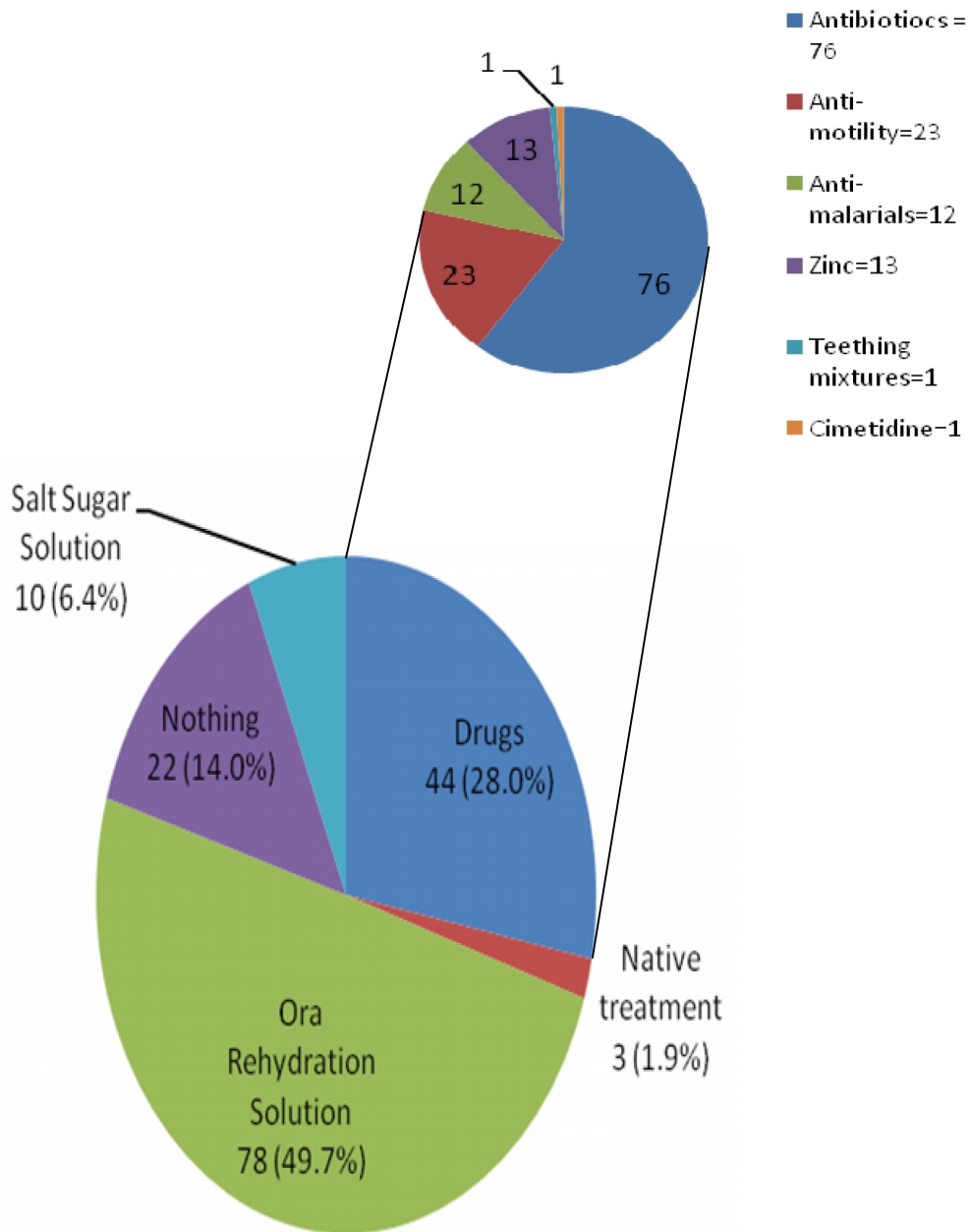
Data were collated and analyzed using the Epi info version 7.1.3 soft ware. Bivariate analysis involved the use of Chi-Square for testing the significance of associations between categorical variables. Logistic regression was carried out for multivariate analysis. The level of significance was set at  $p < 0.05$ .

### 3. RESULTS

A total of 157 caregivers of patients aged 1–59 months presenting with diarrhoea to the DTU were recruited into the study. Table 1 shows some socio–demographic characteristics of the respondents. Majority (95.5%) were the biologic mothers of the patients and the highest age group represented was the 26–35 year age group consisting of 109 (69.4) of the respondents. The ages of the patients ranged from 2 to 59 months with a mean age of  $17.75 \pm 12.00$  months and a mode of 24 months. There were 92 (58.6%) males and 65 (41.4%) females presenting with diarrhoea giving a male to female ratio of 1.4:1. Acute diarrhoea (duration lasting less than or equal to 14 days prior to presentation) was the presenting symptom in 151 (96.2%) of the patients while persistent diarrhoea (duration lasting more than 14 days) was the presenting symptom in the remaining 6 (3.8%) patients. Non–bloody diarrhoea was seen in 139 (88.5%) and bloody diarrhoea occurred in 18 (11.5%) of the patients. Fig. 1 shows the treatment given at home by caregivers prior to presentation at the DTU. Of the 157 caregivers, 78 (49.7%) gave their children Oral Rehydration Solution (ORS) and 44 (28.0%) gave different types of drugs consisting of antibiotics, anti-malarials, anti-motility agents, Zinc and Teething mixtures.

**Table 1. Socio–demographic characteristics of caregivers**

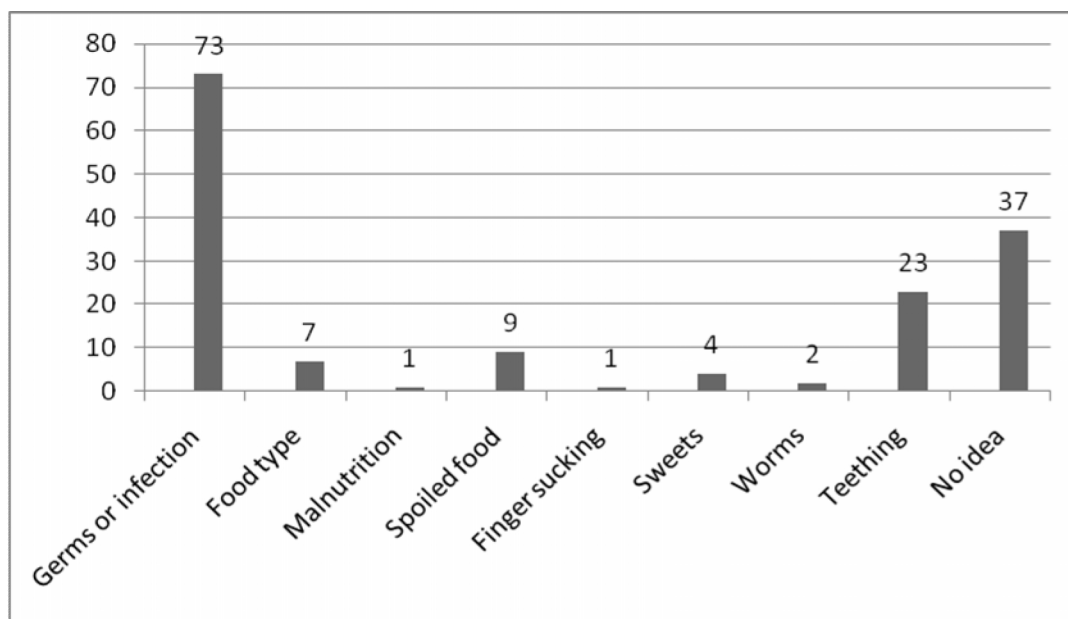
<b>Variable</b>	<b>Variable category</b>	<b>No (%)</b>
<b>Relationship</b>	Biologic father	3 (1.9)
	Biologic mother	150 (95.5)
	Others	4 (2.5)
<b>Age group</b>	<15	4 (2.5)
	15–25	15 (9.6)
	26–35	109 (69.4)
	36–45	26 (26.6)
	>45	3 (1.9)
<b>Gender</b>	Males	4 (2.5)
	Female	153 (97.5)
<b>Marital status</b>	Married	152 (96.8)
	Divorced	1 (0.6)
	Single	3 (1.9)
	Widowed	1 (0.6)
<b>Social class</b>	I	33 (21.0)
	II	69 (43.9)
	III	48 (30.6)
	IV	7 (4.5)
	V	0 (0.0)



**Fig. 1. Treatment given by caregivers for diarrhoea prior to presentation at clinic**

On the question of the most common cause of diarrhoea in children, 73 (46.5%) answered correctly, contamination of food or water by germs or infectious organisms (Fig. 2). Table 2 shows the responses to some questions on knowledge and practice of home management and prevention of childhood diarrhoea. The highest scored knowledge-based question was

the awareness of use of ORS in the home management of diarrhoea while the lowest scored was the knowledge of correct preparation of Salt Sugar Solution (SSS). Of the 157 respondents, 141 (89.9%) were aware of the use of ORS in the home management of diarrhoea and 11 (7.0%) had correct knowledge of the preparation of SSS. The highest scored practice questions were continuing feeding / breast feeding during a diarrhoeal episode while the lowest scored was the use of Zinc in the home management of diarrhoea. Of the 157 respondents, 147 (93.6%) continued feeding the child during a diarrhoeal episode and 40 (25.5%) used Zinc as part of the home management of diarrhoea. Of the 8 caregivers who stopped breast feeding during diarrhoea, 3 (37.5%) stated that the child refused to suck, 2 (25%) thought it worsens the diarrhoea, 2 (25%) gave no reasons and one (12.5%) thought it made the child weak. Of the 10 caregivers that stopped other feeds during diarrhoea, 4 (40%) thought it caused vomiting, 3(30%) gave no reasons, 2 (20%) stated that the child refused feeds during diarrhoea and one (10%) thought the food was too sugary.

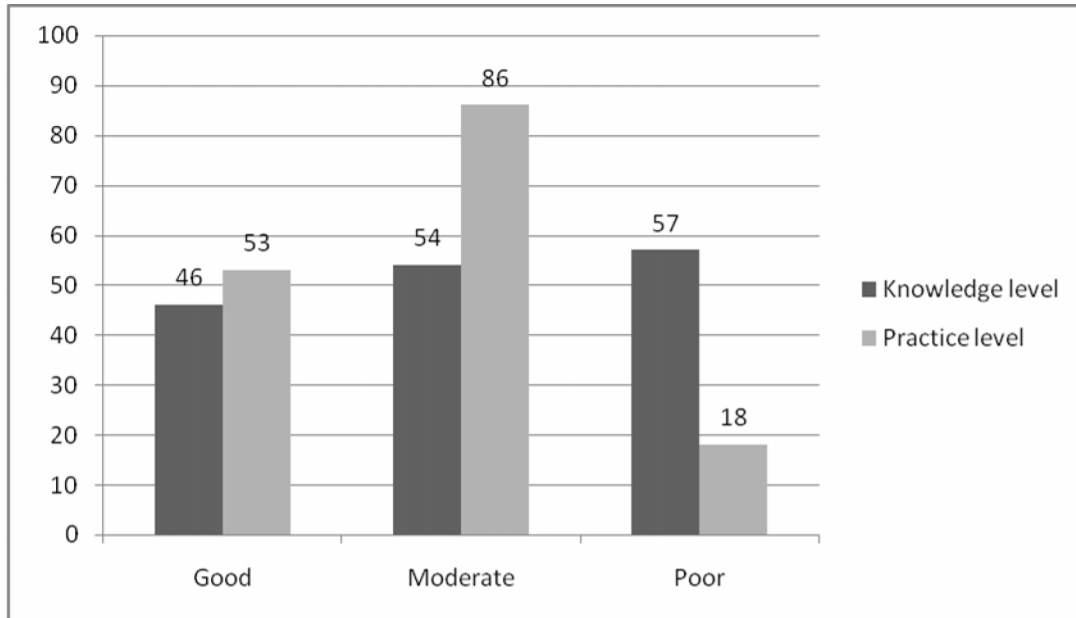


**Fig. 2. Knowledge of the most common cause of childhood diarrhoea among respondents**

None of the 157 respondents responded correctly to all the 8 knowledge – based questions. The highest score for the knowledge – based questions was 7 out of 8 points obtained by 19 (12.1%) of the respondents. Four (2.5%) of the 157 respondents scored the maximum of 10 out of 10 points for the practice – based questions (Table 3). Of the 157 respondents, 46 (29.3%) had good level of knowledge while 53 (33.8%) had a good level of practice of the home management of diarrhoea (Fig. 3). Of the 46 caregivers with good level of knowledge of home management of diarrhoea, 28 (60.9%) showed a good level of practice, while 25 (22.5%) of the 111 caregivers with moderate or poor level of knowledge of management of diarrhoea showed a good level of practice ( $P < 0.001$ ).

**Table 2. Knowledge and practice-based responses to home management and prevention of diarrhea**

	<b>Knowledge/practice-based question</b>	<b>Yes N (%)</b>	<b>No N (%)</b>
<b>Salt sugar solution (SSS)</b>	Awareness of use in diarrhea management	107 (68.2)	50 (31.8)
	Correct knowledge of preparation	11 (7.0)	146 (93.0)
	Correct knowledge of preservation	71 (45.2)	86 (54.8)
	Use in diarrhoea management	49 (31.2)	108 (68.8)
<b>Oral rehydration solution (ORS)</b>	Awareness of use in diarrhea management	141 (89.8)	16 (10.2)
	Correct knowledge of preparation	70 (44.6)	87 (55.4)
	Correct knowledge of preservation	120 (76.4)	37 (23.6)
	Use in diarrhoea management	122 (77.0)	35 (22.3)
<b>Zinc</b>	Awareness of use in diarrhea management	58 (36.9)	99 (63.1)
	Use in diarrhoea management	40 (25.5)	117 (74.5)
<b>Breast feeding Feeding</b>	Continued during diarrhoea	149 (94.9)	8 (5.1)
	Continued during diarrhoea	147 (93.6)	10 (6.4)
<b>Hand washing</b>	Before feeding child	129 (82.2)	28 (17.8)
	After cleaning child's faeces	129 (82.2)	28 (17.8)
	After self use of the toilet	136 (86.6)	21 (13.4)
<b>Abstinence from un-prescribed drugs during diarrhoea</b>		50 (31.8)	107 (68.2)



**Fig. 3. Level of knowledge and practice of respondents to the home management of diarrhea**

Table 4 shows the relationship between the level of knowledge and some socio-demographic characteristics of the respondents. A higher knowledge score was significantly



associated with the Social class ( $P=.002$ ) and mother's educational level ( $P=.002$ ). Table 5 shows the relationship between the level of practice and some socio-demographic characteristics of the respondents. A higher practice score was also significantly associated with the Social class ( $P<.001$ ) and mother's educational level ( $P<.001$ ). Table 6 shows the logistic regression analysis of various variables relating to the level of knowledge and practice of home management of diarrhoea. After adjusting for various factors, mother's educational level significantly influenced both level of knowledge ( $P=0.022$ ) and practice ( $P=0.012$ ) of the home management of diarrhoea.

**Table 3. Scores of respondents for questions on knowledge and practice of diarrhoea home management**

Score	Practice-based response scores (n)	Percent (%)	Knowledge-based response scores (n)	Percent (%)
0	0	0.0	6	3.8
1	0	0.0	11	7.0
2	2	1.3	19	12.1
3	4	2.5	21	13.4
4	12	7.6	26	16.6
5	26	16.6	28	17.8
6	21	13.4	27	17.2
7	39	24.8	19	12.1
8	35	22.3	0	0.0
9	14	8.9	-	-
10	4	2.5	-	-
Total	157	100.0	157	100.0

**Table 4. Relationship between level of knowledge and some socio-demographic characteristics of the respondents**

	Score			$\chi^2$ for trend or $\chi^2$	p value
	Good knowledge N (%)	Moderate or Poor knowledge N (%)	Total N		
<b>Age group of caregiver</b>					
<15	2 (50.0)	2 (50.0)	4	0.79	0.373
15-25	1 (6.7)	14 (93.3)	15		
26-35	32 (29.4)	77 (70.6)	109		
36-45	11 (42.3)	15 (57.7)	26		
>45	0 (0.0)	3 (100.0)	3		
<b>Gender of caregiver</b>					
Male	2 (50.0)	2 (50.0)	4	0.20	0.335
Female	44 (28.8)	109 (71.2)	153		
<b>Social class</b>					
1	14 (42.4)	19 (57.6)	33	9.73	0.002*
2	25 (36.2)	44 (63.8)	69		
3	6 (12.5)	42 (87.5)	48		
4	1 (14.3)	6 (85.7)	7		

	Score			$\chi^2$ for trend or $\chi^2$	p value
	Good knowledge N (%)	Moderate or Poor knowledge N (%)	Total N		
5	0 (0.0)	0 (0.0)	0		
<b>Mother's educational level</b>					
University graduate	34 (40.5)	50 (59.5)	84	9.53	0.002*
Complete secondary school education	11 (16.9)	54 (83.1)	65		
Incomplete secondary school education	1 (33.3)	2 (66.7)	3		
Primary school education	0 (0.0)	5 (100.0)	5		
No formal education	0 (0.0)	0 (0.0)	0		

\*=significant

**Table 5. Relationship level of practice and some socio-demographic characteristics of the respondents**

	Score			$\chi^2$ for trend or $\chi^2$	p value
	Good practice N (%)	Moderate or Poor practice N (%)	Total N		
<b>Age group of caregiver</b>					
<15	3 (75.0)	1 (25.0)	4	0.60	0.439
15–25	4 (26.7)	11 (73.3)	15		
26–35	36 (33.0)	73 (67.0)	109		
36–45	10 (38.5)	16 (61.5)	26		
>45	0 (0.0)	3 (100.0)	3		
<b>Gender of caregiver</b>					
Male	1 (25.0)	3 (75.0)	4	0.39	0.585
Female	52 (34.0)	101 (66.0)	153		
<b>Social class</b>					
1	17 (51.5)	16 (48.5)	33	16.79	<0.00
2	29 (42.0)	40 (58.0)	69		
3	7 (14.6)	41 (85.4)	48		
4	0 (0.0)	7 (100.0)	7		
5	0 (0.0)	0 (0.0)	0		

Continue Table 5.....

	Score			$\chi^2$ for trend or $\chi^2$	p value
	Good practice N (%)	Moderate or Poor practice N (%)	Total N		
<b>Mother's educational level</b>					
University graduate	39 (46.4)	45 (53.6)	84	13.68	<0.001*
Complete secondary school education	14 (21.5)	51 (78.5)	65		
Incomplete secondary school education	0 (0.00)	3 (100.0)	3		
Primary school education	0 (0.0)	5 (0.0)	5		
No formal education	0 (0.0)	0 (0.0)	0		

\*=*significant***Table 6. Logistic regression analysis of factors relating to level of knowledge and practice of home management of diarrhea**

Variable	Knowledge level			Practice level		
	Odds ratio	Coefficient	P-value	Odds ratio	Coefficient	P-value
<b>Age (Reference&lt;15 years)</b>						
15-25 years	0.2339	-1.4529	0.3445	0.4986	-0.696	0.6438
26-35 years	0.6927	-0.3671	0.7366	0.2297	-1.4709	0.2651
36-45 years	1.617	0.4806	0.6713	0.4595	-0.7777	0.5644
>45 years	0	-13.1963	0.9603	0	-15.4254	0.9687
Sex (Male/Female)	2.4572	0.899	0.4307	0.4371	-0.8275	0.5761
Father's education	0.4688	-0.7576	0.1282	0.5586	-0.5823	0.2359
Father's job	1.227	0.2046	0.5429	1.8039	0.5899	0.0812
Mother's education	3.0263	1.1073	0.0221*	3.4801	1.247	0.0116*
Mother's job	0.989	-0.0111	0.958	1.212	0.1923	0.3587
Socioeconomic class	1.3988	0.3356	0.6326	0.8396	-0.1748	0.8056

\*=*significant*

#### 4. DISCUSSION

The present study has shown a generally low level of knowledge and inappropriate practices among caregivers on different aspects of the home management of childhood diarrhoea. In this study, about half (49.7%) of the caregivers had appropriately administered ORS to their children with diarrhoea prior to presentation but over a quarter (28%) had inappropriately administered other drugs, the most common being antibiotics. This bias towards the inappropriate use of antibiotics in children with diarrhoea is corroborated by a similar study [17] in the Dominican Republic where 73% of the caregivers recommended the use of

antibiotics for treatment of their children with diarrhoea. The high popularity of the use of drugs such as antibiotics and anti – diarrhoeal agents in children with diarrhoea has been reported by other studies [18,19]. Antibiotics are however not recommended for the treatment of the common viral acute diarrhoea in children except in diarrhoea caused by bacteria such as *Shigella spp. (flexneri, sonnei, boydi and dysenteriae)*, *Escherichi coli*, *Salmonella spp.* etc. [20] In Nigeria, antibiotics can be procured over the counter without a doctor's prescription. This practice for the home treatment of diarrhoea by caregivers can lead to wide spread antibiotic resistance and diversion from proper treatment of diarrhoea, besides other detrimental effects of inappropriate use of antibiotics in children.

In the current study almost half (46.5%) of the caregivers gave the correct response to the most common cause of diarrhoea in children as contamination of food or water by germs or infectious organisms. This is similar to the 52% of mothers in Iran [21] that correctly identified the cause of diarrhoea. It however contrasts sharply with the findings in earlier studies by Uchendu et al. [13] and Bachrach and Gardner [22] where up to 52.6% and 82% of caregivers respectively, perceived tooth eruption to be a major cause of diarrhoea compared to 14.6% of caregivers perceiving same in the present study. This incorrect perception can be dangerous if the caregivers assume that teething children who have diarrhoea are undergoing a normal phase of development and no special treatment is needed. The difference observed between the studies may be related to the time the studies were carried out. The earlier studies were carried out in 1997 and 2006, compared to the present study that was carried out in 2013. There may have been an increased dissemination of health information on diarrhoea with the passing years. It may also be related to the general perception of diarrhoea among caregivers in the specific areas as information is often shared rapidly (whether correct or incorrect) among people within a community. For instance, the most popular perceived cause of diarrhoea among mothers in Punjab, Pakistan in 1998 was “too much food” [23].

The relatively high awareness (89.9% of respondents) of the use of ORS in the home management of diarrhoea reported in this study is similar to findings noted in other studies [14,17,24]. The inadequate knowledge of the correct preparation of a sachet of ORS with a litre of water observed in this study also mirrors findings from some other studies [13,25]. Over half of the respondents indicated that a sachet of ORS is to be mixed with less than or more than a litre of water. This may be due to the fact that caregivers have not fully differentiated the amount of water used to prepare the earlier introduced SSS (600mls) from that used to prepare ORS (1L). This unfortunate practice by home caregivers can result in either hypotonic or hypertonic dehydration in children receiving these incorrectly prepared ORS mixtures, leading to increased morbidity and mortality [26]. A study [17] in the Dominican Republic on the contrary, reported a high knowledge of ORS preparation by caregivers. This may have been because the community studied had been earlier chosen by local health-promotion groups for health education interventions, reflecting the advantage of continued health education.

Despite the relatively high awareness of ORS among the caregivers (89.9%), a lower percentage (77%) reported ever using it and an even lower percentage (49.7%) had used it for the current diarrhoeal episode of their child prior to presentation. This falls short of the 1995 target of 80% ORT coverage [8]. Similar trends reporting the gap between cognition of

ORS and its actual utilization are observed in other studies [14,17,22]. This mismatch between the level of awareness and use of ORS may be due to several reasons such as a poor knowledge of the reason for its use, lack of faith in its use, increased emphasis on alternative medicine in the media, lack of availability, amongst others. This shows that a superficial understanding of ORS is not enough and consistent effort is required to emphasize on the importance of ORS in resolving dehydration during diarrhoea, particularly in children; since they are more likely to be dehydrated from diarrhoea [27].

Awareness of the use of SSS for the home management of diarrhoea was lower (68.2%) than that of ORS in the present study, its actual use was also low (31.2%) and the correct knowledge of its preparation was abysmally low (7%) as seen in other studies [17,25]. This lower level of awareness and knowledge of preparation may be because SSS was more emphasized earlier when the packaged powdered ORS was unavailable, but with the availability of the already packed low osmolar ORS sachet by WHO its use has reduced. Preparation of ORS with a litre of water is also relatively easier to teach by health care workers and easier to perform by home caregivers than SSS in which 600mls of water is mixed with 10 table spoons of granulated sugar and a tea spoon of salt, hence it's declining popularity. A study [28] sponsored by the UNICEF in Cross River State of Nigeria in 1996 reported however, that 96% of mothers prepared SSS correctly. This marked discrepancy in the knowledge of SSS preparation may not be unconnected to the fact that the study was carried out in the period when the ORT campaign of 1991-95 by the National Diarrhoeal Diseases Program (NCDDP) was going on. This reinforces the need for continued health education and mass media campaigns on diarrhoea home management.

In addition to ORT, the WHO recommends Zinc supplementation and continued feeding for the treatment of diarrhoea. The finding of just over a third (36.9%) of caregivers with the awareness of the use of zinc for diarrhoea management in this study is a marked improvement from earlier studies in Uganda, [29] Kenya [30] and India [31] where 17%, none and less than 1% of caregivers respectively, were aware of its use. The actual use of zinc for the treatment of diarrhoea in this study, although by just about a quarter of caregivers, is also much higher than findings of the above mentioned studies. The timing of the studies may have contributed to this finding. The Kenyan study was commenced in the same year (2006) that the use of zinc was introduced in Kenya and the Ugandan and Indian studies were conducted barely 3 – 4 years after introduction of Zinc in the respective Countries. It may be assumed that there was insufficient time for maximal widespread enlightenment on the use of zinc from the time of its introduction in these Countries to the time the studies were carried out.

The high percentage of caregivers continuing breast feeding and feeding with other foods in this study compares favourably with other studies [13,17,21,25]. It however differs from a Tanzanian study [18] where up to 46.7% of mothers stopped breast feeding their children during diarrhoea. The authors explained this finding on the cultural beliefs that breast feeding of a child with diarrhoea may exacerbate the severity of the disease, the belief being more pronounced when the mother is suspected to be pregnant [32]. Food intake should never be restricted during or following diarrhoea, rather the goal should be to maintain the intake of energy and other nutrients at a higher level in order to prevent the vicious cycle of worsening malnutrition and infection.

Concerning hand washing in the prevention of diarrhoea, over 80% of the caregivers in this study admitted to always washing their hands with soap and water after visiting the toilet, after cleaning child's faeces and before feeding child. A study in India [30] showed similar findings with 99% of caregivers washing their hands after using the toilet, and 60% before feeding their child. Kaatano et al. [18] also reported that proper hand washing before feeding the child and watching/protecting their children from eating contaminated foodstuffs were commonly reported by caretakers as measures taken to protect their children against diarrhoea. However, they did not determine the percentage of caregivers that actually practiced hand washing as a measure for the prevention of diarrhoea.

Overall, there was a low level of knowledge and awareness of the home management of diarrhoea among respondents in this study, with 29.3% having a good level of knowledge. This finding is comparable to findings by Ghasemi et al. [33] where 28.8% of the caregivers were classified as having a good knowledge of the home management of diarrhoea. Khalili et al. [21] however reported a much lower level of knowledge of caregivers (3.7%) compared to the present study. This may be as a result of the high proportion of uneducated and unemployed caregivers, with a lower socioeconomic class in their study, compared to the present study. They also reported a lower level of good practices by caregivers in the home management of diarrhoea in their study (2.3%) compared with the present study (33.8%). The methodology of the present study however differed from the studies by Ghasemi et al [33] and Khalili et al. [21] Ghasemi et al. [33] assessed only knowledge of diarrhoea management using a 22 item questionnaire and Khalili et al. [21] assessed both knowledge and practice using 10 questions each for knowledge and practice while the present study assessed both knowledge and practice using 8 questions for knowledge and 10 for practice. The significant association between socioeconomic class, mother's level of education and the level of knowledge and practice of the home management of diarrhoea observed in the present study is mirrored by other studies [17,21,33]. This underscores the need for increased female education and empowerment in order to improve the level of knowledge and practice of the home management of diarrhoea among caregivers and therefore reduce morbidity and mortality from this common disease among under – five children.

## **5. CONCLUSION**

Majority of the caregivers were aware of the use of ORS and SSS for the home management of diarrhoea but there was a dearth of knowledge in preparation and preservation of these solutions. There was also poor practice of the actual use of these solutions for rehydration in the home management of diarrhoea. Hand washing and feeding practices were above average but the awareness and use of zinc for diarrhoea management were very low. Overall, there was a low level of knowledge and practice among the caregivers as regarding the home management of diarrhoea. The level of knowledge and practice were significantly associated with the socioeconomic class and level of education of the caregivers. We recommend more health campaigns and a wider dissemination of information in hospitals, via the media and in communities, on home management of diarrhoea so as to increase awareness among caregivers and ultimately reduce the morbidity and mortality rates from diarrhoeal diseases among children less than 5 years of age.

## **CONSENT**

All authors declare that written informed consent was obtained from respondents included in the study.

## **ETHICAL APPROVAL**

Ethical approval was obtained from the Ethics Committee of the University of Port Harcourt Teaching Hospital.

## **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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