

Utilization of Oral Rehydration Therapy in the Management of Diarrhea in Children among Nursing Mothers in Odukpani Local Government Area of Cross River State, Nigeria

Osonwa Kalu O.^{1,*}, Eko Jimmy E.^{2,*}, Ema S.²

¹Department of Sociology, Faculty of Social Sciences, University of Calabar, Calabar, Nigeria

³Department of Public Health, Faculty of Allied Medical Sciences, University of Calabar, Calabar, Nigeria

*Corresponding author: emekusi@yahoo.com, jimmyeko25@gmail.com

Abstract The purpose of this study was to determine the utilization of Oral Rehydration Therapy (ORT) in the management of diarrhea in children among nursing mothers in Odukpani Local Government Area of Cross River State, Nigeria. A structured questionnaire was designed to generate data from 200 respondents using multi-staged sampling technique. Data collected from the respondents were analysed using IBM SPSS version 20.0 and presented in tables and charts. The result obtained from this study showed that most respondents 65(32.5%) were aged 25-29 years followed by 45(22.5%) 30-34 years and 36(18.0%) 20-24 years. About 170(85.0%) respondents were married while 14(7.0%) were single. Respondents were predominantly Christians 181(90.5%) and had attained secondary education 51(25.5%). Major sources of livelihood as indicated by the respondents were farming 51(25.5%), trading 44(22.0%) and civil service 42(21.0%). Income level per month for 47(23.5%) were between N6,000-N15,000 and about 46(23.0%) earned N16,000-N30,000, 31(15.5%) N5,000 and less, 12(6.0%) N31,000-N50,000 and 11(5.5%) N50,000 and above. Most study participants had good knowledge of diarrhoea disease and 124(62.0%) were aware of ORS, but a knowledge gap was noticed in ORS composition and method of preparation. Out of 69(34.5%) respondents who reported that their children had suffered from diarrhea in the past two years, only 30(43.5%) had used ORS to manage diarrhea cases in children. Reasons for non-usage of ORS/SSS among nursing mothers were majorly lack of awareness of ORS/SSS (52.4%), lack of information on ORS/SSS composition and preparation (16.6%) and ORS not readily available (6.9%). Knowledge of diarrhea and ORS has a significant influence on utilization of ORS among nursing mothers ($P < 0.05$). Hence, health workers need to educate mothers on the benefits of using ORS in the management of diarrhea in children.

Keywords: oral rehydration salt, nursing mothers, diarrhoea, children, Odukpani LGA

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1. Introduction

Diarrheal disease has been globally recognized as the second leading cause of childhood morbidity and mortality [1]. Nearly 1.7 billion cases of diarrhea are reported yearly and approximately 760,000 children die annually from the disease [1]. In most third world countries, children below three years of age experience on average three episodes of diarrhoea annually. Each episode inhibits substantial childhood nutrition and growth. In Nigeria, diarrhea accounts for over 16% childhood mortality and an estimated 150,000 death annually among under-five children [2]. Diarrhoea is also a leading cause of malnutrition among under five children [1]. Higher death rate from diarrhea is often associated with severe dehydration and fluid loss. Children who are malnourished usually develop a compromised

immune system which makes them vulnerable to life-threatening infections including diarrhea.

The World Health Organization defines diarrhea as "the passage of three or more loose or liquid stools per day (or more frequent passage than is normal for the individual). Available reviews have shown that diarrhoea is communicable from one individual to another and is predominantly caused by poor access to potable water supply, poor personal hygiene practices and consumption of contaminated food. However, several intervention programmes have been initiated to help manage diarrhoea cases in children. One of which was the use of Oral Rehydration Salts (ORS) Solution which constitute the mixture of clean water, salt and sugar. The sole essence of ORS is for rehydration and replacement of water and electrolytes lost in the faeces. According to [3] the introduction of Oral Rehydration Therapy (ORT) in 1975 has significantly reduced the mortality from this disease

condition. This approach of diarrhea management is cost-effective, acceptable, easily accessible, safe and can be applied in virtually any environment [4].

Previous studies have reported that nursing mothers have high knowledge of causes, sign and symptoms of diarrhea but knowledge and use of ORS in the treatment of diarrhea cases was low. Paradoxically, practical users of ORS on the other hand, have confirmed the efficacy of ORT in ameliorating the rate of childhood morbidity and mortality from diarrhea. A cross-sectional study carried out in Enugu State, Nigeria, reported that 65.7% of mothers used ORS in the treating childhood diarrhea [5]. [6] also reported in their study that about 34.6% of nursing mothers utilized ORS at home. An intervention study carried out in Mexico showed that about 66% of mothers used Race-based gruel and 16% use ORS [7] A Gambian study also recorded a high knowledge score but only 4% of mothers used Oral Rehydration Solution in the management of diarrhoea in children [8]. A household survey in Guinea-Bissau also observed that mothers had good knowledge of ORS but only 58% of diarrhoea episodes were treated with ORS [9]. In Ibadan, Nigeria, most study participants were aware of ORT and knew the correct composition of SSS but half of the respondents 49.5% used ORT at home to treat diarrhea cases [10]. A cross-sectional study carried out in Edo state reported that only 39.2% of the mothers had knowledge of ORS [11]. [4] in their study found out that only 14.3% used UNICEF approved ORS in the management of diarrhoea in children.

Research have also shown that certain barriers such as lack of awareness on ORS, ORS expenses, and use of alternative/traditional treatments impedes the use of ORS among mothers in the treatment of childhood diarrhea [12,13]. Therefore, to achieve sustainable progress in combating diarrhea, assessing the knowledge and use of ORS among nursing mothers became very imperative in this study.

2. Objectives of the Study

The general objective of this study was to determine the utilization of Oral Rehydration Therapy (ORT) in the management of diarrhea in children among nursing mothers in Odukpani Local Government Area of Cross River State, Nigeria.

The specific objectives of the study were to;

1. determine the knowledge of causes, danger signs and symptoms and prevention of diarrheal disease among nursing mother in Odukpani Local Government Area.
2. determine the knowledge of the correct preparation and administration of ORT/ORS among nursing mothers in the study area
3. determine the proportion of mothers utilizing Oral Rehydration Salt (ORS) for diarrhea treatment in the study area.
4. identify barriers to ORS use among mothers in the study area

3. Methodology

3.1. Study Setting

The study area is Odukpani Local Government Area. It is situated in the Southern part of Cross River State with

an estimated population of 192,884 [14]. Odukpani Local Government Area has 13 political wards with its headquarters at New-Netem. It has a land mass of 2,624.6 square kilometer and lies between latitude 4°00N and 5° 00N and 8o00E and 8o30E longitude.

Odukpani Local Government Area is bounded in the North by Abia state and Biase Local Government Area of Cross River State, in the South by part of Calabar Municipality, Calabar South and the Atlantic ocean, in the East by Akamkpa Local Government Area and in the West by Itu and Oron Local Government Area of AkwaIbom State. There are two different climatic seasons in the area; the rainy season from March to October and the dry season from November to February. Most occupants of the area are petty traders, peasant farmers and fishermen. It is predominantly a Christian area with few traditional religious groups. Odukpani Local Government Area is host to virtually all the different tribes in Nigeria including the Igbo, Hausa, Yoruba, Efik and Ibibio. The indigenous ethnic groups are the Efiks and the language predominantly spoken is English and Efik. Basic infrastructure such as roads, markets, schools and health facilities are available across the area.

3.2. Study Design

The study design was a descriptive cross-sectional study.

3.3. Study Population

The study population comprised all nursing mothers with under five children in Odukpani Local Government Area of Cross River State, Nigeria.

3.4. Sample Size Determination

Sample size for this study was determined using [15] which is given as

$$n = \frac{Z^2 pq}{d^2}$$

Where n = Sample size
 Z= 1.96 (i.e. 95% confidence interval)
 d= 0.05 (acceptable margin of error)
 p = 14% = 0.14 (Proportion of mothers utilizing ORS) [4]
 q= 1-P = 0.86 (Proportion of mothers not utilizing ORS)

$$\text{Therefore, } N = \frac{(1.96)^2 \times 0.14 \times 0.86}{(0.05)^2} = 185$$

To account for non-response and attrition problem, the calculated sample size was increased by 8% to give **200** which became the actual sample size for the study.

3.5. Sampling Procedure

Multi-stage sampling technique was used to select wards, communities, households and respondents and the procedure is described as follows;

Stage 1: Selection of wards: Random sampling was employed to select 5 wards using the lottery method. Numbers were assigned to each ward, folded, put in a basket and shaken vigorously. Someone (research assistant) was asked to pick a piece of the folded paper after which it was

shaken until all that were considered for the study were picked.

Stage 2: Selection of communities/villages: In each selected ward, simple random sampling technique was employed to select 4 communities/villages from each ward using the lottery method. Numbers were assigned to each community, folded and put in a basket. It was shaken vigorously and picked by a research assistant giving a total of 20 communities/villages.

Stage 3: Selection of households: In each selected community, systematic sampling technique was employed to select 10 households with a nursing mother or mothers who had children less than five years of age. This procedure continued until 10 households were duly selected from 20 communities/villages (i.e. 10 households x 20 communities = 200 nursing mothers).

Stage 4: Selection of respondents: In each household, simple random sampling method was employed to select 200 respondents using lottery methods.

3.6. Instruments for Data Collection and Data Analysis

A structured questionnaire was designed by the researcher to generate data from the respondents. The questionnaires were interviewer-administered to 200 respondents that agreed to participate in the study. It comprised 20 items and was compartmentalized into 4 sections. Section A and B comprised socio-demographic characteristics and knowledge of causes, sign and symptoms and prevention of diarrhea respectively while Section C and D comprised knowledge of ORS preparation and composition and utilization of ORS among respondents respectively. The questionnaire was pre-tested among 20 nursing mothers in Akpabuyo Local Government Area. This was to ensure that questions asked were measurable, reliable and valid.

Data analysis was done using IBM Statistical Package for Social Sciences (SPSS version 20.0) and results were expressed in percentages and presented in tables and charts. Chi-square was used to test for association between variables at 0.05 level of significance.

3.7. Ethical Considerations

Verbal informed consent was duly sought and obtained from the respondents who gave their consent to participate in the study. Participation was strictly on voluntary basis and respondents were assured of confidentiality of information they provided. Participants were also told to withdraw from partaking in the study at any time if they desire to do so. Respondents were also told not to provide their names to maintain anonymity.

4. Results

4.1. Socio-demographic Characteristics of the Respondents

Two hundred questionnaires were filled and returned giving a response rate of 100%. The result of this study

showed that most respondents 65(32.5%) were aged 25-29 years, 45(22.5%) 30-34 years, 36(18.0%) 20-24 years, 21(10.5%) 35-39 years, 17(8.5%) 19 years and less, 12(6.0%) 40-44 years and 4(2.0%) 45 years and above. About 170(85.0%) respondents were married while 14(7.0%) were single, 11(5.5%) separated and 5(2.5%) co-habiting. Most respondents 181(90.5%) were Christians while 19(9.5%) were traditionalists. A larger proportion of the respondents 75(37.5%) said they had attained secondary education while 51(25.5%) had primary education, 41(20.5%) had tertiary education and 33(16.5%) had no formal education. About 51(25.5%) engaged in farming, 44(22.0%) trading, and 42(21.0%) civil service which constituted their major sources of livelihood, whereas 36(18.0%) were fulltime housewives and 17(8.5%) were unemployed (Table 1).

Table 1. Mothers' socio-demographic characteristics (n=200)

VARIABLES	NUMBER OF RESPONDENTS	PERCENTAGE (%)
Age (in years)		
< 19	17	8.5
20-24	36	18.0
25-29	65	32.5
30-34	45	22.5
35-39	21	10.5
40-44	12	6.0
45 and above	4	2.0
Total	200	100
Marital status		
Single	14	7.0
Married	170	85.0
Separated	11	5.5
Co-habiting	5	2.5
Total	200	100
Religion		
Christianity	181	90.5
Islam	0	0.0
Traditionalist	19	9.5
Total	200	100
Education status		
No formal education	33	16.5
Primary	51	25.5
Secondary	75	37.5
Tertiary	41	20.5
Total	200	100
Occupation		
Civil servant	42	21.0
Trader	44	22.0
Farmer	51	25.5
Housewife	36	18.0
Unemployed	17	8.5
Others	10	5.0
Total	200	100

Income level per month for 47(23.5%) were between N6,000-N15,000 and about 46(23.0%) earned N16,000-N30,000, 31(15.5%) N5,000 and less, 12(6.0%) N31,000-N50,000 and 11(5.5%) N50,000 and above. Most respondents 74(37.0%) reported that they had only one child whereas 57(28.5%) had two children, 36(18.0%) three children, 25(12.5%) four children and 8(4.0%) five children and above (Table 2).

Table 2. Distribution of respondents according to their level of income and number of children they have (n=200)

VARIABLES	NUMBER OF RESPONDENTS	PERCENTAGE (%)
Income level		
N5,000 and less	31	15.5
N6,000-N15,000	47	23.5
N16,000-N30,000	46	23.0
N31,000-N50,000	12	6.0
N50,000 and above	11	5.5
No response	53	26.5
Total	200	100
Number of children		
One	74	37.0
Two	57	28.5
Three	36	18.0
Four	25	12.5
Five and above	8	4.0
Total	200	100

4.1.1. Child Characteristics of the Respondents

Children of the respondents were aged 25-36 months 68(34.0%), 49-60 months 49(24.5%), 37-48 months 39(19.5%), 13-24 months 23(11.5%) and 0-12 months 12(10.5%). Most babies were females 115(57.5%) while 85(42.5%) were males (Table 3).

Table 3. Child characteristics of the respondents (n=200)

VARIABLES	NUMBER OF RESPONDENTS	PERCENTAGE (%)
Age (in months)		
0-12	21	10.5
13-24	23	11.5
25-36	68	34.0
37-48	39	19.5
49-60	49	24.5
Total	200	100
GENDER		
Male	85	42.5
Female	115	57.5
Total	200	100

4.2. Knowledge of Causes, Danger Signs and Symptoms of Diarrhoeal Disease among Respondents

Majority of the respondents 191(95.5%) claimed to have heard of diarrhea whereas 9(4.5%) said they had not heard of diarrhea before. Sources of information on diarrhea include; health worker 95(45.7%), television/radio 44(21.2%), books/magazine/newspaper 10(4.8%) and poster/handbills 9(4.3%). Most respondents 71(35.5%) knew that contaminated food and drinks can cause diarrhea in children while others indicated drinking of contaminated water 50(25.0%), micro-organisms 44(22.0%) and bad air 14(7.0%) as causes of diarrhea in children. About 21(10.5%) had no knowledge of the causes of diarrhea in children. Signs and symptoms of dehydration identified by respondents in this study were sunken eyes 74(35.1%), dry tongue 46(21.8%), dry lips/tongue 32(15.2%), body weakness 22(10.4%) and irritability 16(7.6%). Twenty-one (10.4%) had no knowledge of any sign and symptoms of dehydration (Table 4). Most respondents 71(34.5%) knew that practicing frequent hand washing before and after meal, 69(33.5%) hand washing

after using the toilet and 45(21.8%) proper preparation and storage of cooked food could prevent diarrhea. However, about 21(10.2%) respondents had no knowledge of ways to prevent diarrhea especially in children (Figure 1).

Table 4. Knowledge of causes, danger signs and symptoms of diarrheal disease among respondents (n=200)

VARIABLES	NUMBER OF RESPONDENTS	PERCENTAGE (%)
Ever heard of diarrhoea before		
Yes	191	95.5
No	9	4.5
Total	200	100
Sources of information *multiple responses*		
Television/Radio	44	21.2
Health worker	95	45.7
Friend	31	14.9
Mother	10	4.8
Books/magazine/newspaper	10	4.8
Poster/handbills	9	4.3
No response	9	4.3
Total	208	100
Causes of diarrhoea in children		
Micro-organisms	44	22.0
Contaminated food & drinks	71	35.5
Bad air	14	7.0
Drinking contaminated water	50	25.0
Does not know	21	10.5
Total	200	100
Signs and symptoms of dehydration *multiple responses*		
Dry lips/tongue	32	15.2
Dry tongue	46	21.8
Sunken eyes	74	35.1
Irritability	16	7.6
Body weakness	22	10.4
Does not know	21	9.9
Total	211	100

4.3. Knowledge of the Correct Preparation and Administration of ORT/ORS among Respondents

Out of 200 respondents, about 124(62.0%) claimed to have heard of ORT/ORS/SSS while 76(38.0%) stated otherwise. Sources of information on ORT/ORS/SSS were hospital/clinics 71(34.1%), chemist 26(12.5%), television/radio 22(10.6%) and friend 13(6.3%). The response to the question on the knowledge of the composition of ORS/SSS revealed that 40(20.0%) considered that ORS/SSS consisted of salt + water, 31(15.5%) salt + sugar + water, 27(13.5%) coconut water, 18(9.0%) water + sugar and 8(4.0%) sugar + salt. About 76(38.0%) had no knowledge of ORS/SSS composition (Table 5). About 165(82.5%) of the respondents were unable to describe the procedure for preparing ORS/SSS, 35(17.5%) on the other hand gave an acceptable description of how ORS/SSS is prepared (Figure 2).

4.4. Utilisation of ORS/SSS in the Management of Diarrhoea among Respondents

Out of 200 study participants only 69(34.5%) reported that their child had suffered from diarrhea in the past 2 years. Out of the 69(34.5%) respondents whose children had suffered from diarrhea, only 30(43.5%) respondents

had used ORS/SSS for managing diarrhea whereas 39(56.5%) did not use ORS/SSS (Figure 3). Among ORS/SSS users, about 14(20.3%) revealed that they commenced administration of ORS/SSS when they noticed that their children showed signs of body weakness,

11(15.9%) said they administered ORS/SSS a day after the diarrhea had started while 5(5.5%) administered ORS same day immediately the child passed watery stool (Table 6).

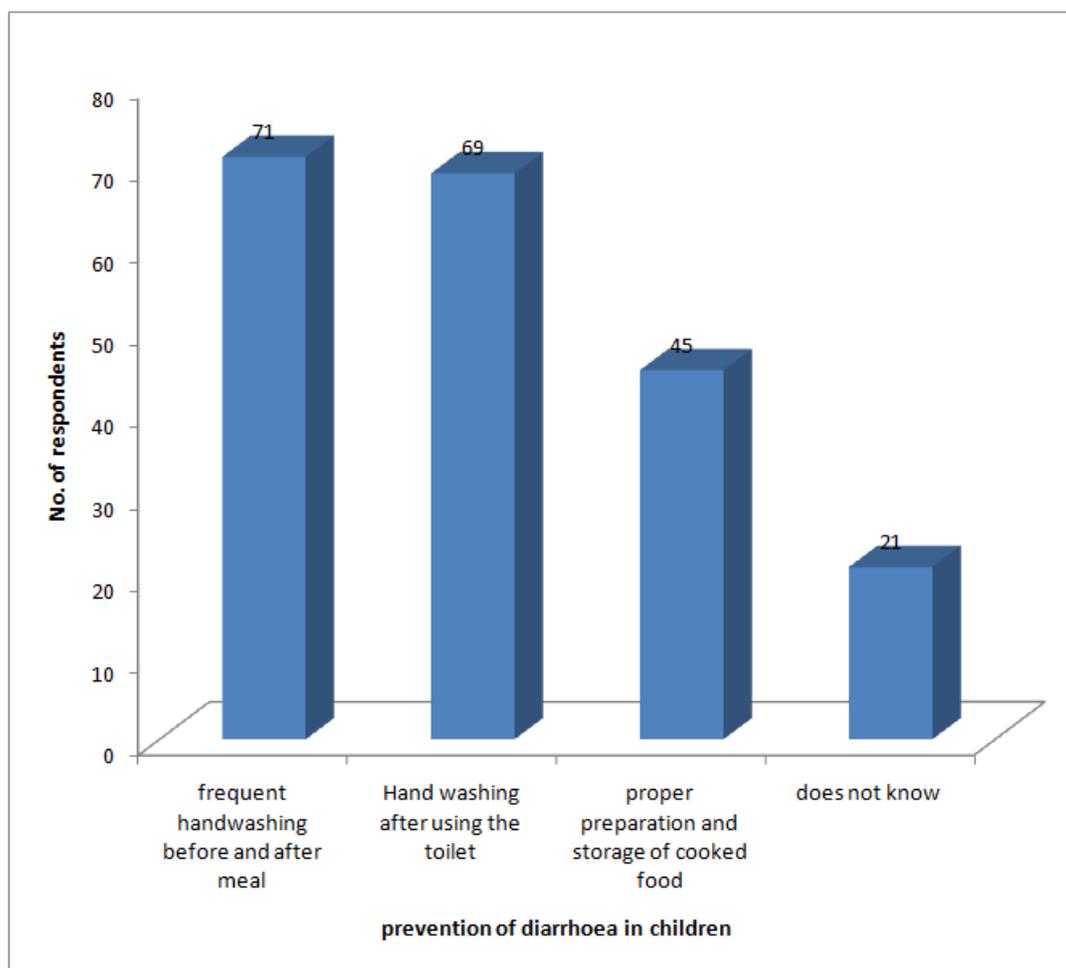


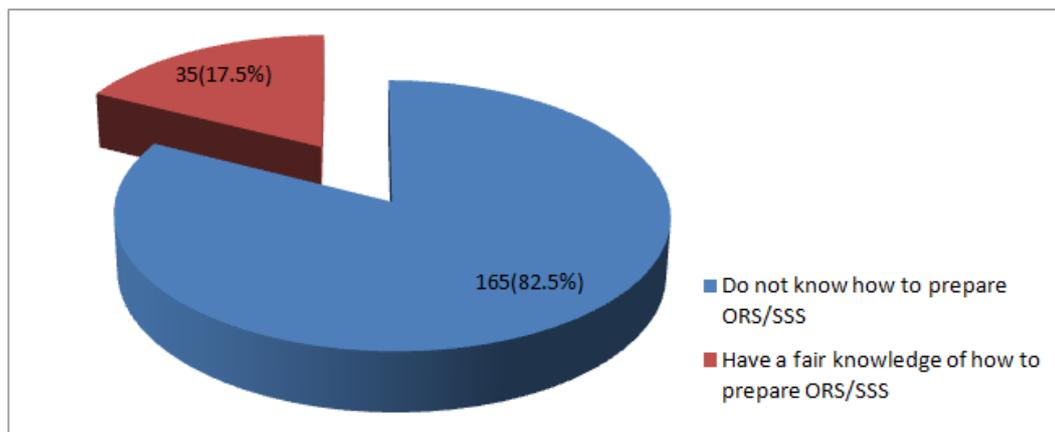
Figure 1. Respondents' knowledge of ways to prevent diarrhea

Table 5. Knowledge of the correct preparation and administration of ORT/ORS among respondents (n=200)

VARIABLES	NUMBER OF RESPONDENTS	PERCENTAGE (%)
Ever heard of ORT/ORS/SSS before		
Yes	124	62.0
No	76	38.0
Total	200	100
Source of information * multiple response*		
Television/radio	22	10.6
Hospital/clinic	71	34.1
Chemist	26	12.5
Friend	13	6.3
No response	76	36.5
Total	208	100
Composition of ORS/SSS		
Sugar + salt	8	4.0
Salt + sugar + water	31	15.5
Coconut water	27	13.5
Salt + water	40	20.0
Water + sugar	18	9.0
Does not know	76	38.0
Total	200	100

Table 6. Utilisation of ORS/SSS in the management of diarrhea among respondents (n=200)

VARIABLES	NUMBER OF RESPONDENTS	PERCENTAGE (%)
Has your child suffered from diarrhea in the past 2 years		
Yes	69	34.5
No	131	65.5
Total	200	100
Used ORS/SSS in the treatment of diarrhoea		
Yes	30	43.5
No	39	56.5
Total	69	100
Commence administration of ORS/SSS		
A day after the diarrhea started	11	15.9
Same day immediately the child passed watery stool	5	7.2
When I noticed the child was becoming weak	14	20.3
No response	39	56.5
Total	69	100
Frequency of ORS/SSS use		
Always	11	15.9
Occasionally	19	27.5
Never	39	56.5
Total	69	100
When did you discard the ORS/SSS after preparation		
After 6 hours	4	5.8
After 12 hours	8	11.6
After 24 hours	14	20.3
After 36 hours	4	5.8
No response	39	56.5
Total	69	100
Would encourage other mothers to use ORS/SSS in the management of diarrhea in children		
Yes	30	43.5
No	0	0.0
No response	39	56.5
Total	69	100

**Figure 2.** Respondents' knowledge of how ORS/SSS is prepared

Nineteen (27.5%) respondents reported that they use ORS/SSS occasionally while 11(15.9%) use ORS/SSS always especially when the need arises. About 14(20.3%) respondents reported that they discarded ORS/SSS after 24 hours while 8(11.6%) discarded after 12 hours, 4(5.8%) after 36 hours and 4(5.8%) after 6 hours. All respondents 30(43.5%) who had used ORS/SSS said they would recommend it to other mothers in the management of diarrhoea in children (Table 6).

4.5. Barriers to Utilization of ORT in the Management of Diarrhoea in Children

Barriers to ORT/ORS use as indicated by the respondents were lack of awareness on ORS/SSS

76(52.4%), lack of information on composition and preparation of ORS/SSS 24(16.6%), ORT not readily available 10(6.9%) and cultural belief 5(3.4%) (Table 7). About 45(22.5%) admitted that they use traditional medicine/herbs to manage diarrhea in children while 155(77.5%) had never used traditional medicine/herbs to manage diarrhea in children (Figure 4).

Data in Table 8 showed that a lesser proportion of the respondents were aware of ORS/SSS (43.5%), had knowledge of ORS/SSS composition (44.9%) and preparation (46.4%), whereas a greater proportion were not aware of ORS/SSS (56.5%), had no knowledge of ORS/SSS composition (55.1%) and preparation (53.6%). Hence, the above findings confirmed that lack of ORS/SSS awareness, lack of knowledge on ORS/SSS

composition and preparation methods were indicated as barriers to ORS/SSS used among respondents.

Table 7. Barriers to utilization of ORT in the management of diarrhea in children by respondents (n=200)

VARIABLES	NUMBER OF RESPONDENTS	PERCENTAGE (%)
Reasons for not using ORT		
Lack information on composition and preparation of ORS/SSS	24	16.6
Not readily available	10	6.9
Not heard of ORS/SSS	76	52.4
Culture does not support ORT use	5	3.4
No response	30	20.7
Total	145	100

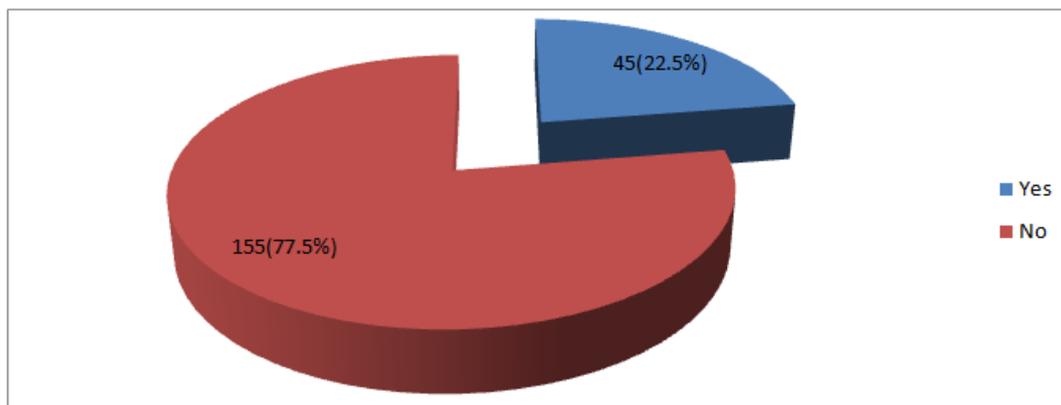


Figure 3. Proportion of respondents who use traditional medicine/herbs to manage diarrhea in children

Table 8. Relationship between knowledge of composition and preparation method of ORS/SSS and utilization of ORS/SSS among respondents

VARIABLES	NUMBER OF RESPONDENTS		TOTAL (%)
	Used ORS/SSS	Did not use ORS/SSS	
Awareness of ORS			
Aware of ORS	30	0	30 (43.5)
Not aware of ORS	0	39	39 (56.5)
Total	30	39	69 (100)
Knowledge of ORS composition			
Have knowledge	30	1	31 (44.9)
Do not have knowledge	0	38	38 (55.1)
Total	30	39	69 (100)
Knowledge of ORS preparation method			
Have knowledge	30	2	32 (46.4)
Do not have knowledge	0	37	37 (53.6)
Total	30	39	69 (100)

$\chi^2 = 12.33$; $P < 0.05$.

5. Discussion

Knowledge of causes, danger signs and symptoms of diarrhoeal disease among respondents

Most respondents (95.5%) claimed to have heard of diarrhea before, while 4.5% said they have not heard of diarrhea. This report corroborates with that of [16] where 93% respondents were aware of diarrhea, though the percentage of awareness is lower than that reported in this study. This may be attributed to effective dissemination of information on childhood diarrhea and government commitment to ameliorate childhood morbidity and mortality from preventable diseases. Nearly half of the respondents (45.7%) reported that they heard of diarrhea from a health worker. Other sources of information on diarrhea include; the media (television/radio) (21.2%), friend (14.9%), mother (4.8%), books/magazine/newspapers (4.8%) and poster/handbills (4.3%). This finding agrees with a cross-sectional study carried out in Kwara State, Nigeria where

the hospital/health center (37.0%) followed by the media (30.0%) were major sources of information on diarrhea [16]. Studies have shown that health workers are indisputably a major channel for easy, effective and reliable dissemination of health information to the populace. Findings from this study have shown that the role of health workers in disseminating information about the characteristics of diarrhea is very imperative in managing diarrhea in children especially when the need arises. The media can also be used as an alternative channel to effectively propagate messages on diarrhea and its management strategies to other nursing mothers who rarely visit the health care facilities for child care.

Knowledge of causes of diarrhea in children was fairly distributed as contaminated food and drinks (35.5%) and drinking of contaminated water (25.0%) were mostly indicated by the respondents as causes of childhood diarrhea. About 10.5% had no knowledge of the cause of diarrhea in children. This report disagrees with a study carried out in Pakistan where most mothers identified high food intake as the major cause of diarrhea [17], but

conforms to that of [18] where respondents identified unclean water (55.6%) and contaminated food (54.9%) as the major causes of diarrhea in children. In this study, about 60.5% respondents could identify at least one cause of diarrhea in children. The high knowledge of causes of childhood diarrhea may be due to personal experience in managing diarrhea cases, increase health seeking behaviour at the health facility and regular post-natal visits. Mothers who had lower educational status were least likely to identify any cause of diarrhea in children.

About one-third of the respondents (35.1%) identified sunken eyes as the major symptoms of dehydration. Other signs and symptoms of dehydration identified by the respondents include; dry tongue (21.8%), dry lips/tongue (15.2%), body weakness (10.4%) and irritability (7.6%). However, 9.9% respondents could not identify any sign and symptoms of dehydration. This result is comparable to that of [18] where most respondents mentioned excessive thirst and sunken eyes as danger signs and symptoms of dehydration. High literacy level and regular maternal education on childhood preventable diseases such as diarrhea could account for the high knowledge level of the signs and symptoms of dehydration. Mothers whose children had suffered from diarrhea were more likely to identify signs and symptoms of dehydration than mothers or caregivers who had not manage any diarrhea case.

Most respondents in this study also knew that frequent handwashing before and after meal (34.5%), handwashing after using the toilet (33.5%) and proper preparation and storage of cooked food (21.8%) were ways to prevent childhood diarrhea. This finding is similarly reported by [16] where mothers identified hygiene, provision of adequate health services and prompt treatment of infections as ways to prevent diarrhoeal in children. Improved hygiene standards and hand washing practices are feasible strategies in preventing childhood diarrhea thereby ameliorating childhood morbidity and mortality from infectious diseases. Hence, educational programmes on handwashing and personal hygiene practices should be prioritized in all ANC and postnatal care outlets.

Knowledge of the correct preparation and administration of ORT/ORS among respondents

A greater proportion of the respondents (62.0%) claimed to have heard of ORT/ORS/SSS while 76(38.0%) said they had not heard of ORT/ORS/SSS before. [16] similarly reported that 85% of nursing mothers were aware of ORS. This clearly suggests that advocacy and awareness of ORS/SSS has been very effective in the study area. Major sources of information about ORS/SSS among respondents were the hospital/clinic (34.1%), chemist (12.5%) and the media (10.6%). This report suggests that the health care facilities are effective outlets for dissemination of information on ORS/SSS to nursing mothers attending post-natal care. Only 31(15.5%) respondents knew the correct composition of ORS/SSS whereas 169(84.5%) lack knowledge of the correct composition of ORS/SSS. This finding disagrees with a study carried out in Enugu, Nigeria, where majority of the respondents knew the correct composition of ORS/SSS [5]. [11] in their study also found out that 83.3% respondents knew the correct composition of ORS/SSS. Non-usage of ORS/SSS could significantly influence lack of basic knowledge about ORS/SSS composition. Mother who had never heard of ORS and those who rarely consult the

health facilities for diarrhea cases were least likely to be knowledgeable about ORS/SSS composition.

A larger proportion of the respondents (82.5%) were unable to describe the correct method for preparing ORS/SSS whereas only 17.5% had a fair knowledge of how ORS/SSS is prepared. This report disagrees with that of [12] where 86.6% respondents could describe the correct preparation of ORS/SSS.[19] in their study also found out that only 29.8% of nursing mothers knew the correct method for preparing ORS/SSS. Practical education on ORS/SSS composition and preparation should be one of the core components of maternal educational programmes so as to increase the uptake of ORS among nursing mothers.

Utilisation of ORT/ORS in the management of diarrhea

Out of 200 respondents, about 69(34.5%) reported that their child had suffered from diarrhea in the past two years and only 30(43.5%) respondents said they had used ORS/SSS in the management of diarrhea. This percentage is lower than 65.7% reported in Enugu, 45.9% in Ethiopia and 74.6% in Enugu [5,20,21 respectively], but higher than 28.4% reported in Ghana and 0.5% in Northern Nigeria [12,22]. The difference in the rate of ORS/SSS utilization may be attributed to the study setting, knowledge level of mothers on ORS benefits, socio-economic status of mothers and knowledge level of the correct composition and preparation method of ORS/SSS in the management of childhood diarrhea. In this study, mothers who knew that correct composition and preparation method of ORS/SSS were more likely to use ORS/SSS to manage diarrhea cases at home (Table 8). Amongst ORS/SSS users, about 14(20.3%) respondents reported that they commenced administration of ORS/SSS when they noticed that their children showed signs of body weakness, 11(15.9%) said they administered ORS/SSS a day after the diarrhea had started while 5(5.5%) administered ORS same day immediately the child passed watery stool. Research has shown that delay in the treatment of diarrhea has significantly resulted in high rates of childhood morbidity and mortality. Hence, health workers should educate mothers on the early recognition of diarrhoea cases and the importance of initiating prompt treatment.

Out of 34.5% respondents who had used ORS/SSS, only 15.9% used ORS/SSS always while the remaining 27.5% occasionally used ORS/SSS in the management of diarrhea. This result indicated poor adherence to ORS use which may be influenced by the alternative use of herbal medicine in the management of diarrhea. Higher educational status and knowledge of ORS/SSS benefits are key factors that may influence adherence to ORS/SSS use among nursing mothers. A larger proportion of ORS/SSS users(20.3%) reported that they discarded ORS/SSS after 24 hours of preparation while 11.6% discarded ORS/SSS after 12 hours. This result indicates poor adherence to WHO guideline of discarding ORS/SSS 12 hours after preparation. In this study, mothers who knew when to discard ORS/SSS were those with higher educational and socio-economic status.

Barriers to ORS/SSS use in the management of diarrhea among respondents

Barriers to ORS/SSS use identified in this study include; lack of awareness of 76(52.4%), lack of information on ORS/SSS composition and preparation 24(16.6%), not

readily available 10(6.9%) and cultural belief 5(3.4%). This finding is contrary to that of [12] where ORS expenses and the use of alternative/traditional treatments were identified as barriers to ORS/SSS use among nursing mothers, but corroborates with a study carried out in West Java, Indonesia where mothers' lack of knowledge of the link between diarrhea, dehydration and the rehydrating function of ORS was identified as barrier to ORS use [13]. It is obvious from these studies that, increase awareness of ORS benefits would out-weigh any barrier inhibiting optimal use of ORS among rural nursing mothers. Hence, the role of health care providers and the media is indispensable in this regard.

A lesser proportion of the respondents (22.5%) admitted that they use traditional/herbal medicine to manage diarrhea in children. Use of traditional/herbal medicine was similarly reported in other studies [11,12,16]. Low socio-economic status, low literacy level, cultural belief system, Lack of confidence on orthodox approach of managing diarrhoea, lack of awareness of ORS/SSS, lack of information on ORS/SSS composition, preparation and where to obtain them could strongly influence the use of alternative/traditional medicine to treat diarrhea in children. Increase awareness of ORS benefits would substantially convince mothers to start using ORS in diarrhea management. Older mothers and those who had no formal educational were more likely to use traditional herbs to treat diarrhea cases at home.

6. Conclusion

Diarrhoea is a major cause of childhood-related morbidity and mortality in Nigeria especially in poor-resource settings. The World Health Organisation and UNICEF recommend that ORS be used successfully at home in the treatment of diarrhea in children. However, most studies recorded that the utilization and acceptance of ORS among nursing mothers in managing childhood diarrhea is sub-optimal. In this study, respondents had good knowledge of diarrhoeadisease, were awareness of ORS but lack knowledge of ORS composition and method of preparation. Utilization of ORS among nursing mothers was also poorly reported in this study. Hence, health workers need to educate mothers on the benefits of using ORS in the management of diarrhea in children.

7. Recommendations

Based on the findings from this study, the following recommendations are made;

1. Health care providers on pediatric care need to be trained on the management of diarrhea in children. This approach would guarantee effective dissemination of correct information to nursing mothers during post natal visits concerning diarrhoeal disease as well as the benefits of using ORS to manage childhood diarrhoea.
2. Handwashing practices before and after meal or after changing a child's soiled diaper should be encouraged through the use of effective visual aids to demonstrate the transmission of endemic pathogen into the mouth through contaminated hands.

3. The government at all levels in conjunction with relevant pharmaceutical agencies should ensure regular provision and prompt availability of ORS sachets in all health care settings. This would promote easy access and optimal use of ORS among nursing mothers.
4. The media and hospital posters can be used to effectively increase awareness on the management of childhood diarrhea with ORS among nursing mothers in the study area.
5. Community-based awareness campaigns on home management of childhood diarrhea with ORS should be carried out intermittently in rural areas especially areas where access to pediatric care is poorly reported.
6. Further research should be carried out to compare ORS use among nursing mothers in rural and urban settings.

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