

# Awareness and Utilisation of Low Osmolarity ORS and Zinc Supplements in the Management of Childhood Diarrhoea among Mothers in Nigeria

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## Abstract

Diarrheal disease is a common clinical illness and is a leading cause of morbidity and mortality among children in developing countries. This study determined the awareness and utilisation of low osmolarity oral rehydration salts (ORS) and zinc supplements in the management of childhood diarrhoea among mothers of under-five children in Oshodi-Isolo Local Government Area (LGA), Lagos State, Nigeria. This was a descriptive cross-sectional survey. It employed a multi-stage sampling technique to select 336 mothers of under-five children. Data was collected using a pretested, semi-structured interviewer administered questionnaire. Out of the 35(10.4%) respondents who were aware of low osmolarity ORS, only 8 (22.9%) had ever utilised it; of the 179 (53.3%) respondents aware of zinc supplements, only 151 (84.4%) had ever utilised it. While respondent's age ( $p=0.001$ ) and ethnicity ( $p=0.044$ ) showed significant association with the awareness of low osmolarity ORS; age ( $p=0.001$ ) and marital status ( $p=0.003$ ) with awareness of zinc supplements; and age ( $p=0.001$ ) with utilisation of zinc supplements. Compared to zinc supplements, awareness and utilisation of low osmolarity ORS was very poor among the mothers. Health education about this should be intensified among them in order to promote their utilisation and thus help to bridge the gap between policy change and effectiveness.

**Keywords:** awareness, low osmolarity ORS, zinc supplements, under-five mothers, diarrhoea

## Introduction

Diarrheal disease in children is a common clinical illness and is a leading cause of morbidity and mortality among children in developing countries 1. Globally, about 3.5 billion cases of acute diarrhoea, at about 3.2 episodes per child year 2 occur each year in children under 5 years of age 2. Diarrhoea accounts for about 18% of child deaths and 13% of disability adjusted life years 3. About 80% of deaths occur in children below 2 years [1,2].

The main causes of death from diarrhoea are dehydration and electrolyte imbalance. Children are at greater risk of life-threatening dehydration since water constitutes a greater proportion of their body-weight. They also utilise more water over the course of a day due to their higher metabolic rates, and

their kidneys are less able to conserve water compared to older children and adults. Apart from dehydration and electrolyte imbalance, prolonged and recurrent episodes of diarrhoea frequently lead to stunting and growth failure in early childhood. The consequent malnutrition further predisposes to recurrent diarrhoea and the cycle continues [4].

In order to combat dehydration due to diarrhoea among children under the age of five, the World Health Organisation (WHO) and United Nations Children's Fund (UNICEF) adopted the utilisation of oral rehydration salts (ORS) solutions in 1978. Though this has reduced the mortality rate among under-five children from 4.5 to 1.8 million annually, diarrhoea still remains the second leading cause of death in under five children [3,5,6].

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The WHO therefore introduced the low osmolarity ORS and zinc supplements in 2004, in order to further reduce the morbidity and mortality associated with diarrhoea. Low osmolarity ORS with reduced concentrations of sodium and glucose is associated with fewer unscheduled intravenous fluid infusions, lower stool volume and less acetone vomiting than the standard ORS and is recommended in treating adults and children [7]. Zinc significantly reduces the gravity and duration of diarrhoea in small children especially in developing countries [8,9].

It is estimated that more than three quarters of all diarrhoea deaths could be prevented with adequate coverage and proper utilization of zinc supplements and ORS and many developing countries have complied [10]. Despite the evidence of benefit however, there has been little progress in widespread introduction of low osmolarity ORS and zinc for diarrhoea treatment and as such, Nigeria still has a high prevalence of diarrhoea leading to deaths among under-five children. This study therefore seeks to assess the awareness and utilisation of low osmolarity ORS and zinc supplements in the management of diarrhoea among mothers of under-five children in Oshodi-Isolo LGA, Lagos.

This study will enable health educators and health system decision makers to assess the level of awareness of under-five caregivers about the utilisation of low osmolarity ORS and zinc supplements in diarrhoea management so that they can bridge the gap between policy making and implementation.

## Materials and Methods

### Study Setting

Oshodi-Isolo local government area (LGA), an urban local government is one of the 20 LGAs in Lagos State, South-western Nigeria. Located in Lagos West Senatorial District, it is made up of 11 wards and covers a land area of 45.0 km<sup>2</sup>. It is bounded by Ikeja LGA in the North, Surulere LGA in the South, Mushin LGA in the North-eastern part and Alimosho LGA in the West. It has an estimated population of 945,912 people estimated from the 2006 national census [11]. The people are predominantly Yorubas but other ethnic groups such as Igbos and Hausas also reside in the LGA. The LGA has at least one primary health centre (PHC) located in each ward and the major religions of the inhabitants are Islam and Christianity.

This was a descriptive cross-sectional survey conducted among women between the ages of 21 and 45. Assuming a 95% level of confidence, proportion of women who had good knowledge of ORS in diarrheal management of 28.8% (from a previous study) and a level of significance 5%, the formula for calculating single proportions by Abramson and Gahlinger was utilised to obtain a minimum sample size of 315 [12,13]. In order to compensate for improperly completed questionnaires, the calculated sample size was increased by 5% but a total of 336 respondents were eventually interviewed. Respondents were recruited into the study using multistage sampling technique. There were 11 wards in the LGA; simple random sampling was utilised to select four out of these. From each of the selected wards, 10 streets were

selected by balloting. From each of the selected streets, systematic random sampling was utilised to select 8 or 9 houses. From each selected house, an eligible respondent who consented was interviewed.

A pre-tested, semi-structured questionnaire, adapted from the USAID toolkit for the collection of survey data on the correct utilisation of paediatric zinc as a treatment for diarrhoea was utilised. The questionnaire was pre-tested in Mushin LGA which was not utilized for this study. It elicited information about the socio-demographic characteristics, awareness and utilisation of low osmolar ORS and zinc supplements in diarrhoeal management. Data were collected through guided self-administration by literate respondents and by interview of non-literate respondents by trained research assistants.

Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 20. The results obtained were presented in frequency tables. Associations between variables were determined using the chi-square test and presented as two-by-two tables. Level of significance was taken as  $p < 0.05$ .

Ethical clearance was obtained from Lagos University Teaching Hospital Ethics and Research Committee. Permission to conduct the survey was obtained from the LGA authorities. Written informed consent was obtained from the respondents, the questionnaires were filled anonymously and confidentiality of information collected was ensured by the researchers.

## Results

A total of 336 questionnaires were administered and all were properly filled and returned giving a response rate of 100%. Table 1 shows the socio-demographic characteristics of the respondents. Two hundred and eighty one (97.3%) of the mothers were aged between 26 and 40 years; 320(95.2%) were married; 148(44.0%) were Yorubas; 260(77.4%) were Christians and 233(69.9%) had 2 or 3 children. Two hundred and seventy one (80.6%) of the children were aged 2-4 years and 176 (52.4%) were females.

**Table 1:** Socio-demographic characteristics of the respondents.

Variables	Frequency (N=336)	Percentage
<b>Age of mother (in years)</b>		
21-25	31	9.2
26-30	122	50.0
31-35	110	32.7
36-40	49	14.6
41-45	24	7.2
<b>Marital status</b>		
Married	320	95.2

Separated	4	1.2
Single	12	3.6
<b>Ethnic group</b>		
Yoruba	148	44.0
Igbo	89	26.5
Hausa	13	3.9
Others	86	25.6
<b>Religion</b>		
Christian	260	77.4
Muslim	73	21.7
Others	3	0.9
<b>Number of children</b>		
1	43	12.9
2	124	37.2
3	109	32.7
4	38	11.4
≥5	19	5.7
<b>Age of child (in years)</b>		
1	65	19.4
2	113	33.6
3	82	24.4
4	76	22.6
<b>Sex of child</b>		
Female	176	52.4
Male	160	47.6

Table 2 shows the awareness and utilisation of low osmolarity ORS and zinc supplements. Only 35(10.4%) of the respondents were aware of low osmolarity ORS while 179 (53.3%) of respondents were aware of zinc supplements. In addition, only 8 (22.9%) of the 35 respondents who were aware of low osmolarity ORS had ever utilised it. Only 151 (84.4%) of the 179 respondents who were aware of zinc supplements had ever utilised it.

**Table 2:** Awareness and utilisation of low osmolarity ORS and zinc supplements in the management of diarrhoea among respondents.

Awareness	Frequency	Percentage
<b>Low osmolarity ORS</b>		
Aware	35	10.4
Not aware	301	89.6
Total	336	100.0
<b>Zinc supplements</b>		
Aware	179	53.3
Not aware	157	46.7
Total	336	100.0
<b>Utilization</b>		
<b>Low osmolarity ORS</b>		
Has ever used	8	22.9
Has never used	27	97.1
Total	35	100.0
<b>Zinc supplements</b>		
Has ever used	151	84.4
Has never used	28	15.6
Total	179	100.0

Table 3 shows the association between socio-demographic characteristics and awareness of low osmolar ORS among the respondents. Compared with respondents who were less than 30 years of age, those who were above 30 years had better awareness of low osmolar ORS ( $\chi^2=11.74$ ;  $p=0.001$ ). Compared with respondents from other ethnic groups, those who were Hausas had better awareness of low osmolar ORS ( $\chi^2=8.13$ ;  $p=0.044$ ).

**Table 3:** Association between socio-demographic factors and awareness of zinc supplements in the management of diarrhoea among respondents.

Variable	Aware (%) n	Not Aware n (%)	$\chi^2$	P-value
<b>Age (years)</b>				
≤ 30	10 (6.7)	140 (93.3)	11.74	*0.001
> 30	25 (13.4)	161 (86.6)		
Total	35 (10.4)	301 (89.6)		
<b>Marital status</b>				

Ever married	33 (10.1)	291 (89.8)	a0.52	0.470
Never married	2 (16.7)	10 (83.3)		
Total	35 (10.4)	301 (89.6)		
<b>Ethnic group</b>				
Yoruba	16 (10.8)	132(89.2)	8.13	*0.044
Igbo	5 (5.6)	84(94.4)		
Hausa	4 (30.8)	9(69.2)		
Other	10 (11.6)	76(88.4)		
Total	35 (10.4)	301 (89.6)		
<b>Number of children</b>				
0-4	30 (9.6)	284 (90.4)	3.82	0.050
5-6	5 (22.7)	17 (77.3)		
Total	35(10.4)	301(89.6)		
<b>Educational level</b>				
Educated	35 (10.7)	293 (89.3)	a0.15	0.697
Not educated	0 (0.0)	8 (100.0)		
Total	35 (10.4)	301 (89.6)		

Table 4 shows the association between socio-demographic characteristics and awareness of zinc supplements among the respondents. Compared with respondents who were less than 30 years of age, those who were above 30 years had better awareness of zinc supplements (2=10.30; p=0.001). Compared with respondents who were never married, those who were ever married had better awareness of zinc supplements (2=8.13; p=0.003).

**Table 4:** Association between socio-demographic factors and awareness of zinc supplements in the management of diarrhoea among respondents.

Variable	Aware n (%)	Not Aware n (%)	2	P-value
<b>Age</b>				
≤ 30	73 (48.7)	77(51.3)	10.30	*0.001
>30	106 (57.0)	80 (43.0)		

Total	179 (53.3)	157 (46.7)		
<b>Marital status</b>				
Ever married	178 (54.9)	146 (45.1)	a8.31	*0.003
Never married	1(8.3)	11(91.7)		
Total	179 (53.3)	157 (46.7)		
<b>Ethnic group</b>				
Yoruba	76(51.4)	72(48.7)	2.63	0.452
Igbo	47(52.8)	42(47.2)		
Hausa	5(38.5)	8(61.5)		
Other	51(59.3)	35(40.7)		
Total	179 (53.3)	157 (46.7)		
<b>Number of children</b>				
0-4	166 (52.9)	148 (47.1)	0.32	0.572
≥ 5	13 (59.0)	9 (41.0)		
Total	179 (53.3)	157 (46.7)		
<b>Educational level</b>				
Educated	176 (53.7)	152 (46.3)	a0.30	0.585
Not educated	3(37.5)	5(62.5)		
Total	179 (53.3)	157 (46.7)		

Table 5 shows the association between socio-demographic characteristics and utilisation of low osmolar ORS among the respondents. There was no significant association between any of the socio-demographic variables and utilisation of low osmolar ORS (p > 0.05).

**Table 5:** Association between socio-demographic factors and the utilisation of low osmolar ORS among respondents who were aware.

Variable	Ever utilized (%)	Never utilized n (%)	2	P-value
<b>Age</b>				
≤ 30	4 (40.0)	6 (60.0)	2.33	0.127

>30	4 (16.0)	21 (84.0)		
Total	8 (22.9)	27 (77.1)		
<b>Marital status</b>				
Ever married	7 (21.2)	26 (78.8)	a0.01	0.938
Never married	1 (50.0)	1 (50.0)		
Total	8 (22.9)	27 (77.1)		
<b>Ethnic group</b>				
Yoruba	5 (31.3)	11 (68.7)	a2.45	0.485
Igbo	2 (40.0)	3 (60.0)		
Hausa	1 (25.0)	3 (75.0)		
Other	0 (0.0)	10 (100.0)		
Total	8 (22.9)	27 (77.1)		
<b>Educational Level</b>				
Educated	8 (22.9)	27 (77.1)	a0.04	0.840
Not educated	0 (0.0)	0 (100.0)		
Total	8 (22.9)	27 (77.1)		

Table 6 shows the association between socio-demographic characteristics and utilisation of zinc supplements among respondents. Compared with respondents who were more than 30 years of age, those who were less than 30 years had better utilisation of zinc supplements (2=13.58; p=0.001).

**Table 6:** Association between the socio-demographic factors and the utilisation of zinc supplements in the management of diarrhoea among respondents who were aware.

Variable	Ever utilized (%)	Never utilized (%)	χ <sup>2</sup>	P-value
<b>Age</b>				
≤ 30	66 (90.4)	7(9.6)	13.58	*0.001
>30	85 (80.1)	21 (54.3)		
Total	151 (84.4)	28 (15.6)		
<b>Marital status</b>				

Ever married	150 (0)	28 (0.0)	a0.90	0.343
Never married	1 (100.0)	0 (0.0)		
Total	151 (84.4)	28 (15.6)		
<b>Ethnic group</b>				
Yoruba	62 (81.6)	14 (18.4)	a6.78	0.079
Igbo	35 (74.5)	12 (25.5)		
Hausa	5 (100.0)	0 (0.0)		
Other	47 (92.1)	4 (7.9)		
Total	151 (84.4)	28 (15.6)		
<b>Educational level</b>				
Educated	148 (84.1)	28 (7.4)	a0.002	0.064
Not educated	3 (100.0)	0 (0.0)		
Total	151 (84.4)	28 (15.6)		

## Discussion

The study was conducted to determine the awareness and utilisation of low osmolarity ORS and zinc supplements among mothers of under-fives in the management of diarrhoea. The respondents were within the age range of 21 to 45 years of age and majority (50.0%) of the respondents were between the ages of 26-30 years which is similar to a study that was carried out in Kashan, Iran in which most of the mothers were between the ages of 25-30 years

In this study, only a tenth of the respondents were aware of low osmolarity ORS and awareness of low osmolar ORS was significantly associated with age and educational status. There is paucity of studies about awareness of low osmolarity ORS both within and outside the country. The few studies available were done among health workers. They also showed that awareness and knowledge about low osmolarity ORS is still low among them. This underscores the need to intensify health education/ social marketing activities aimed at both health workers and care-givers of under-five children. Health workers are key personalities in providing vital information about diarrhoea and its management.

Zinc supplements reduce the severity, duration and occurrence of diarrhoea in children. However, only about half of the mothers in this study were aware of the utilisation of zinc supplement in the management of diarrhoea. There was significant association between educational level and awareness. With the exception of a study conducted in Ghana which reported about 70% awareness, others studies conducted in

Nigeria and other parts of the developing world reported much lower awareness of zinc supplement utilisation in the management of diarrhoea [14]. For example, while studies carried out in another part of Nigeria and Uganda reported 32.0 and 17.0% level of awareness, those conducted in Bangladesh and India reported 39.2 and 1.0% level of awareness [15,18]. In another study, No mother had ever heard of the utilisation of zinc tablets in the management of diarrhoea [19].

The utilisation of low osmolar ORS amongst mothers of under-fives in this study was very low. Only about one-fifth of the mothers who were aware of it had ever utilised it as opposed to about nine out of ten mothers who had utilised the regular ORS before. The low utilisation is not unexpected as only about one out of ten mothers were aware of it in the first place. People will only utilise a product that they are aware of and are convinced that works. This underscores the need for more work to be done in publicizing ORS and Zinc supplements first among health workers and then among mothers that are the end users. There was no significant factor associated with the utilisation of low osmolar ORS in this study unlike the previously utilised ORS, the utilisation of which many factors were associated with.

Among the respondents who were aware of zinc supplements in this study, about eight out of ten have actually utilised zinc in the management of diarrhoea before. This finding contrasts with that of a previous study conducted in Nigeria which reported that less than a tenth of the caregivers had utilised zinc in the management of diarrhoea [20]. It is however similar to that reported among mothers in Ghana where overall about four out of ten; 14 but lower than those in Mali and Ethiopia where three-quarters, and six out of ten of the respondents had utilised zinc supplements before [21,22].

The poor awareness and utilisation of low osmolarity ORS (especially) and zinc supplement in the management of diarrhoea observed in this study, thirteen years after they have been approved for utilisation by WHO, is alarming. This could have been as a result of lack of education about them when mothers come in contact with health care workers. Health care workers in health centres are usually responsible for disseminating such information to the mothers or caregivers whenever they come to access care. It is also possible that the health care workers on their own part are not knowledgeable enough about the products and as such, are not educating mothers about them. This underscores the need for health policy makers and managers to urgently organize trainings for health care workers about the two innovations and also ensure that these workers seize every opportunity during contacts with mothers to deliver health information about their utilisation and importance.

Further research is necessary to unearth the factors affecting the utilisation of low osmolarity ORS and zinc supplements among mothers in the LGA and why zinc supplements seem to be more popular and better utilized among them despite the fact that the two were introduced at the same time.

The study concludes that mothers of under-five children in Oshodi-Isolo LGA Lagos were largely unaware of low osmolarity ORS and most of them had never utilised it. However, about

half of the mothers were aware of zinc supplements and slightly less than half of them had actually utilised it in the management of diarrhoea. Urgent steps need to be taken to enlighten and educate mothers about the importance and utilisation of low osmolarity ORS and zinc supplements in the management of diarrhoea. This will go a long way to increase their awareness and utilisation among the mothers, and thereby assist in reducing the morbidity and mortality from diarrhoeal diseases among the children.

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