



ZINC AND LOW-OSMOLALITY ORT KNOWLEDGE AND UTILIZATION AMONG CAREGIVER IN NORTH WESTERN NIGERIA

Tukur Ismail^{*1}, Ahmed Abdulwahab², Emmanuel Sokpo³ and Mukhtar Salihu Anka⁴

¹Department of Social and Preventive Medicine, University of Malaya KL.

²Partnership for Reviving Routine Immunization in Northern Nigeria; Maternal Newborn and Child Health Initiative.

³Department of Public Health, Gusau Modern Abattoir Zamfara State.

***Corresponding Author: Dr. Tukur Ismail**

Department of Social and Preventive Medicine, University of Malaya KL.

Article Received on 20/06/2017

Article Revised on 10/07/2017

Article Accepted on 31/07/2017

ABSTRACT

Background: The new Low-Osmolality Oral Rehydration Salts (lo-ORS) formulation and zinc supplementation has been proven to be very effective in the management of diarrhea and also reduce the duration of loose stool and vomiting by about 30 per cent, thereby reducing the severity of the disease. **Objectives:** This study intend to assess the knowledge and utilization of lo-ORS among caregivers in the northwestern Nigeria the study was conducted among multiple target groups. The primary target population for the study was eligible caregivers of children that were aged 0-59 months at the time of conducting the survey. Other target groups were facility health service providers, MNCH Coordinators at Local Government and State levels and influential community members and opinion leaders. **Sampling:** The sampling frame included all the facilities providing ANC services and households in the corresponding catchment areas of the facilities. The sampling methodology is described in the section below. **Design:** The study employed a quasi-experimental design consisting of both quantitative and qualitative approaches. Quantitative methodology was employed to determine Zinc and lo-ORS supplementation coverage in the focus States and to measure adherence among the target population. **Setting Subject:** The survey was conducted in four northern Nigerian states namely: Jigawa, Katsina, Zamfara and Yobe States with Benue State as a comparison State. Jigawa state has an estimated population of 5,162,340 spread across 287 wards in 27 LGAs. The state has a total of 667 health facilities with primary, secondary and tertiary levels of care. About 20% of its total estimated population is children aged 0-5 years. Healthcare in Jigawa state receives tremendous support from the government and development partners. Katsina state is the most populated of the four selected states (estimated at 6,916,641 in 2012). **Result:** Awareness of Zinc and lo-ORS was observed to be high above 60% among frontline health workers in all states surveyed except Yobe where lowest proportion (30%) of frontline health workers who reported to be aware of the need to use zinc and lo-ORS for diarrhea treatment while Awareness of the need to use both Zinc and lo-ORS for diarrhea treatment among caregivers was found to be low below 45% across the focus states. **Conclusion:** The level of awareness among frontline health workers did not translate to good knowledge of the use of zinc and lo-ORS in the management of diarrhea with respect to knowing the full benefits of zinc and lo-ORS combination in treating diarrhea as well knowing how to prescribe it. Therefore, a substantial effort should be focus on education of caregivers and frontline health workers on prevention of diarrhea and treatment of diarrhea.

KEYWORDS: Zinc l-ORS, knowledge, utilization, caregivers Northwest Nigeria.

INTRODUCTION

Diarrhea is the passage of unusually loose or watery stools, at least three times in a 24-hour period, which results in dehydration and loss of nutrients from the body.^[1] Diarrhea-causing pathogens damage the intestines causing an excessive amount of water and electrolytes to be secreted rather than being absorbed.^[2] Diarrhea is a leading cause of childhood morbidity and mortality in developing countries, and an important cause of malnutrition.^[3,4]

Out of over two billion cases of diarrhea occurring among under-five children annually, more than half of these cases were in Africa and South Asia.^[5] In Nigeria like in many other low and middle-income countries, it is one of the leading causes of morbidity and mortality in under-five children.^[5,6] In 2008, it was estimated that 1.3 million children died globally from diarrhea with half of these deaths occurring in just five countries: India, Nigeria, Afghanistan, Pakistan and Ethiopia.^[5,7,8]

Although Oral rehydration Salts (ORS) has been available and used to reduce mortality for many years, it has not been known to appreciably reduce the duration of the diarrhea episode. This has in turn resulted in caregivers abusing antibiotics and other anti-diarrhea drugs.^[9] The United Nations Children's Fund (UNICEF) and World Health Organization (WHO) in 2004 made a joint recommendation after a scientific consensus that a new Low Osmolality Oral Rehydration Salts (lo-ORS) formulation and zinc supplementation is critical for diarrhea management. lo-ORS combined with Zinc has proven to reduce the duration of loose stool and vomiting by about 30 per cent, thereby reducing the severity of the disease.^[5,10] Large-scale programmes in Bangladesh and India have demonstrated that together lo-ORS and zinc can decrease unnecessary use of antibiotics, reinvigorate community management of diarrhea.

The new lo-ORS formula known as low-osmolality Oral Rehydration Salts is the 'gold standard' for treating childhood diarrhea, and its accompanying dehydration.^[11]

Zinc and lo-ORS have been documented to be inexpensive, safe and easy to use and have the potential to dramatically lower diarrhea morbidity and saved lives.^[12,13] Studies have even suggested that replenishing zinc with a 10 to 14 day course of treatment can reduce the duration and severity of diarrheal episodes and may also prevent future episodes for up to three months.^[12,14] Moreover, in a meta-analysis of nine trials for the primary outcome, reduced osmolality rehydration solution was associated with fewer unscheduled intravenous infusions compared with standard rehydration solution.^[15,16]

Since year 2000, there has been little or no progress in increasing the use of ORS among children with diarrhea. Only one third (33 per cent) of children with diarrhea in developing countries receive at least one ORS packet to treat their diarrhea.^[5] Africa has the lowest levels of ORS use, at 29 per cent, while East Asia and the Pacific (excluding China) has the highest level of 38 per cent. Also, only a very small proportion of children in need have access to zinc supplementation.^[17] Children in rural region are less likely to have access to ORS-Zinc supplementation.^[5]

Nigeria is one of the countries currently having explicit national policies that promote the use of zinc in treating childhood diarrhea^[5], but there are challenges of availability of well trained and knowledgeable health workers in implementing and promoting use of Zinc and lo-ORS. Health workers and caregivers need adequate knowledge and correct information on the management and treatment of diarrhea.

The introduction of zinc for the management of diarrhea requires the procurement of zinc, the development of training materials and the training of multiple cadres of

health-care professionals.^[5] The Government of Nigeria through the National Primary Health Care Development Agency (NPHCDA) with support from multi-lateral and bilateral donor agencies have been working to improve the scale-up and coverage of Zinc and lo-ORS therapy.

Therefore, the aim of this study is to understand the knowledge utilization of lo-ORS among caregivers in the northwestern Nigeria. This study will hopefully help the policy makers re-sensitization of health workers on the regiment base on the study outcome.

MATERIALS AND METHODS

Study setting

The survey was conducted in four northern Nigerian states namely: Jigawa, Katsina, Zamfara and Yobe States with Benue State as a comparison State. Jigawa state has an estimated population of 5,162,340 spread across 287 wards in 27 LGAs. The state has a total of 667 health facilities with primary, secondary and tertiary levels of care. About 20% of its total estimated population is children aged 0-5 years. Healthcare in Jigawa state receives tremendous support from the government and development partners. Katsina state is the most populated of the four selected states (estimated at 6,916,641 in 2012). There are 365 wards and 34 LGAs in the state. Healthcare in Katsina states requires significant attention as it has suffered severe infrastructural decay due to neglect. The adult populations are mostly farmers. Yobe is a relatively small state with an estimated 2012 population of 2,853,828 spread across 178 wards in 17 LGAs.

Benue was used as a comparison for the survey. Its geographical location, socio-cultural characteristics and economic environments are somewhat comparable but not identical to those of the four states selected for the survey.

Study design

The study employed a quasi-experimental design consisting of both quantitative and qualitative approaches. Quantitative methodology was employed to determine Zinc and lo-ORS supplementation coverage in the focus States and to measure adherence among the target population. Qualitative enquiry was used to gain insight into barriers militating against the use of Zinc and lo-ORS in the management of diarrheal in the same population.

Study population

The study was conducted among multiple target groups. The primary target population for the study was eligible caregivers of children that were aged 0-59 months at the time of conducting the survey. Other target groups were facility health service providers, MNCH Coordinators at Local Government and State levels and influential community members and opinion leaders.

Sampling

The sampling frame included all the facilities providing ANC services and households in the corresponding catchment areas of the facilities. The sampling methodology is described in the section below.

Sample size determination

In order to determine the sample size of caregivers, single proportion sample size calculation formula with correction for finite source population was used. Parameters for calculating the sample size were 95% confidence interval ($Z=1.96$), 5% margin of error (d), expected caregiver coverage of 25%¹ (P) and non-response rate of 10%.

$$n = \left(\frac{Z^2 P(1-P)}{d^2} \right)$$

$$n = \left(\frac{1.96^2 (0.25(1-0.25))}{0.05^2} \right) = 288$$

$$n = \left(\frac{Z^2 P(1-P)}{d^2} \right)$$

$$n = \left(\frac{1.96^2 (0.25(1-0.25))}{0.05^2} \right) = 288$$

$$288 + 10\% (288) = 316$$

The sample size for each state included in the study was corrected for finite source population correction assuming the calculated sample size for each state be 'n' and the number of caregivers in each state be N.

$$\text{Final sample size} = N \cdot n / ((N-1) + n)$$

The computed sample size per state was 316 caregivers and a total of 1580 caregivers across the five states.

The sample size for health care providers was determined from the number of facilities that were included in the survey. Total sampling was done for MNCH coordinators in the Selected States and LGAs, given their small size. Every state was expected to have one MNCH coordinator and each LGA was expected to have at least one MNCH coordinator. One State MNCH coordinator and 6 Local Government MNCH coordinators were selected per state corresponding to the number of Local Government Areas included in the study per state.

Sampling method

A list of all the public primary health facilities in the respective state was retrieved from the state primary health care board. The facilities were grouped according to their LGAs.

A multi-stage sampling method was employed in selecting Local Government Areas for the study. First, all Local Government Areas in the states were grouped on the basis of the senatorial districts. Local Government Areas were further categorized into urban and rural. The

final stage involved a random selection of urban and rural Local Government Area from each of the senatorial districts. The total numbers of Local Government Areas selected were determined on state-by-state bases.

In order to select health facilities for the survey, sampling frames, which consisted of all Health facilities providing ANC services ordered by location status (urban and rural) were developed for each state. In developing the frames, priority was given to Primary Health Care (PHC) facilities. Facilities that did not report ANC services statistics in 2012 were excluded from the sampling frame. A systematic sampling of Facilities was done from the list. Households from the corresponding catchment area were selected to participate in the household survey for caregivers of children under five years.

Data Collection

Quantitative study

Survey tool: The quantitative component of the survey employed a modular questionnaire for data collection from the target respondents. Separate modules were developed for caregivers of under-five children in households; facility based health care providers as well as State and Local Government Area MNCH Coordinators/Managers.

All questionnaires were first drafted in English and then translated into Hausa and Tiv languages using back-to-back translation before careful pretesting. Changes were made to all questionnaires as necessary. This was to improve understanding of interpretation of the data items. Pretesting of survey tools was done in sites not selected for the survey.

- **Household survey (Main survey):** This was done among eligible caregivers who had any child aged 0-5 years at the time of the survey. This component determined the utilization, barrier and adherence to Zinc and lo-ORS supplementation.
- **Facility-based survey:** This component of the survey assessed knowledge and competences (including training received) of healthcare workers involved in managing diarrhea on the use of Zinc and lo-ORS in diarrhea management.
- **State and LGA health personnel survey:** This component of the survey assessed the availability and the distribution coordination of Zinc and lo-ORS supplementation in the state and LGAs.

Data collection process: Household survey questionnaires were interviewer administered. Trained interviewers (enumerators) were directly involved in administering questions to eligible respondents in local languages. The major languages of administration were Hausa, TIV, Fulani and Kanuri.

Qualitative study

The main objective of the qualitative component of the survey was to identify the barriers and limiting factors that affects utilization of Zinc and lo-ORS supplementation from service delivery and recipient perspectives. Focus Group Discussions (FGD) was the main method of enquiry used in the survey. A total of 20 FGDs were planned for each state, however, this target was not reached across the states (table 2). Female focus group discussion facilitators and note-takers were trained to conduct the FGD sessions that involved different categories of informants across the five states. Group specific FGD guides were developed and pre-tested for the different categories. Pretesting was conducted in sites other than those targeted for the survey. The guides were further refined and improved upon, based on the findings of the pretests. FGD sessions were held for caregivers of under-five children with diarrhea attending health facilities; caregivers not attending health facilities; health practitioners including facility service providers and Local Government MNCH coordinators; and influential community members and opinion leaders.

Categories of FGD participants

FGD sessions were conducted for 4 categories of participants. These included:

- LGA MNCH coordinators and Health workers who treat diarrhea.
- Caregivers of children attending health facilities for diarrhea.
- Caregivers of under-five children not attending health facilities for diarrhea.
- Influential community members and opinion leaders.

Data analysis method

Quantitative

All questionnaires were checked by supervisors prior to leaving each community, to ensure that they were completed correctly, completed questionnaire data were then entered into SPSS version 16 and was used to carry out the analysis of the data.

Descriptive data analysis focused on generating frequencies and proportions that provided answers to populate the baseline data for the M&E framework. Tables and charts were used to present quantitative findings of the survey.

Qualitative

Thematic analysis was done based on facilitator notes, transcripts of audio-recordings, and recall. Transcribed verbatim data were coded by an analyst, to identify emerging patterns or themes according to the following process: close reading and interpretation of participants' narratives, reflecting on the study purpose, and using memos to keep track of ideas. Subsequently, significant statements were assigned codes and re-coded iteratively into categories. Emerging themes from the perspective of participants were integrated into respective domains. The concurrence and frequency of themes were noted, and

illustrative quotes were extracted to capture the essential comments (words, phrases, quotes).

Ethical considerations and approvals

Ethical approval for the study was obtained from the relevant research ethical committee in the respective states. Investigators were also granted permission to carry out the survey by the state and Local Government Areas Head of health department/Chief Medical Officers of health facilities.

Signed informed consents were obtained from all respondents and participation was voluntary. Data collections were done with considerations for protecting the privacy and confidentiality of survey participants.

To maintain confidentiality, each respondent was assigned a unique identification number. This eliminated the possibility of linking information to the sources. However, where interviews involved clearly identified office holder such as state or Local Government MNCH coordinators, the designation of the respondent is stated.

RESULTS

The Zinc and lo-ORS study covered 93 health facilities and 99 communities in 29 LGAs selected from five states in Northern Nigeria. Except for Katsina state, the numbers of health facilities targeted were reached in all the states. The lower number of health facilities reached in Katsina state was due to failure of clinics to hold in the selected health facilities within the data collection period. Planned household sample size for each state was 316. This target was reached across the states. Of the 24 healthcare providers targeted for interview in each state, only Zamfara state could not reach it target. The 6 LGA MNCH coordinators targeted in each state were all interviewed.

Table 1: Respondents' Socio demographic information

Socio Demographics		Benue 337	Jigawa 330	Katsina 316	Yobe 322	Zamfara 321
Religion	Christianity	83.1	0	0	4.6	0.3
	Islam	16.6	73.6	99.7	84.3	99.7
	Traditional	0	0	0	0	0
Marital status	Single	2.1	0	0	0	0
	Married	94.6	70	98.7	86.5	99.4
	Separated	0.6	0	0.3	0.3	0
	Divorced	0	0.6	0.6	1.1	0.3
	Widowed	2.4	0.9	0.3	0.3	0.3
Level of education completed	None	17.5	2.7	7.3	30.3	1.9
	Quranic	3.9	53.9	62.4	27.8	88.8
	Primary	36.9	10	15.5	14.6	5
	Secondary	30.9	5.2	12.3	9.7	4
	Post-Secondary	10.7	1.8	2.2	6.2	0.3
Occupation	Artisan	7.1	38.5	23.4	22.4	72.6
	Trader	28.8	27	37.3	28.1	25.2
	Farmer	45.4	3	0.9	4.3	0
	Civil Servant	8.3	1.5	4.4	8.9	0.3
	Unemployed	6.8	2.4	16.1	24.1	0.6
	Others	2.7	0.9	17.4	0.8	1.2

The information shown in Table 1 above refers mainly to socio-demographic characteristics of the respondents interviewed in the household module. Of the 5 states selected for the survey, Islam was the predominant religion except in Benue state. Respondents were predominantly married in all the targeted states including Benue the comparison state. About 2.4% and 0.6% were widow and singles respectively in Benue state, while very small proportion of widows and separated women also participated in the study in Jigawa, Katsina, Yobe and Zamfara states.

Respondents had varying educational background. Majority had Quranic education in Jigawa (53.9%),

Kastina (62.4%) and Zamfara (88.8%), while in contrast 36.9% and 30.9% respondents from the comparison state had primary and secondary education respectively. Farming was the predominant occupation in Benue state, where-as most respondents were artisans and traders in the targeted states.

Prevalence of diarrhea

Table 2 shows the prevalence of diarrhea across the survey states relative to the comparison state in the three months preceding the survey. Diarrhea prevalence was relatively lower in MI targeted states than in the comparison state.

Table 2: Diarrhea prevalence in the last three months MI targeted states

	Benue N=337	Jigawa N=330	Katsina N=313	Yobe N=322	Zamfara N=321
Diarrhea prevalence	332 (98.8%)	229 (69.3%)	262 (83.7%)	307 (93.9%)	314 (97.8%)

Care seeking behaviors among caregivers

As shown in table 5 below, the percentages of caregivers who sought any form of care for their children who had diarrhea in Jigawa, Katsina and Yobe states were lower

than that of the comparison state. This percentage in Zamfara (97.2%) on the hand is comparable to that of Benue State (97.3%).

Table 3: percentage of caregivers seeking any form f treatment for diarrhea in MI target states

	Benue N: 337	Jigawa N: 330	Katsina N: 316	Yobe N: 330	Zamfara N: 321
% of caregivers who seek ANY form of treatment for diarrhea	328 (97.3%)	220 (66.7%)	235 (74.4%)	276 (83.6%)	312 (97.2%)

Coverage and utilization of Zinc

Coverage of Zinc in under-five children in the focal states is shown in Figure 1. While there exist generally low rates for Zinc coverage across the targeted states,

Jigawa and Katsina states had higher coverage for Zinc among under-five boys and girls with diarrhea than the comparison state. More boys than girls took zinc when they had diarrhea in Jigawa, Katsina and Yobe states, a

similar pattern observed in the comparison state. Zinc was not in use in health facilities in Zamfara state while only 0.3% of boys who had diarrhea received treatment, which included zinc Yobe State.

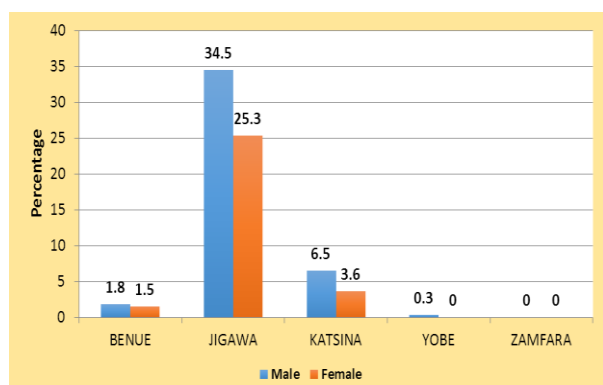


Figure 1: Percentage of boys and girls aged 6-59 months whose diarrheal treatment included zinc in focus States.

Participants at the FGD sessions for service providers' cited non-availability of zinc as the major reason for low coverage for zinc. A health worker explained that they: "...had access to zinc about 2 years back, but now we don't even see it again, so you have to make use of what you have.."

Health workers prescribe more of the use of ORS that is more readily available than prescribing a combination of zinc and ORS. Health worker explained that: "It is easier to get lo-ORS than zinc tablet".

This finding was similar for both MI targeted states and the comparison state.

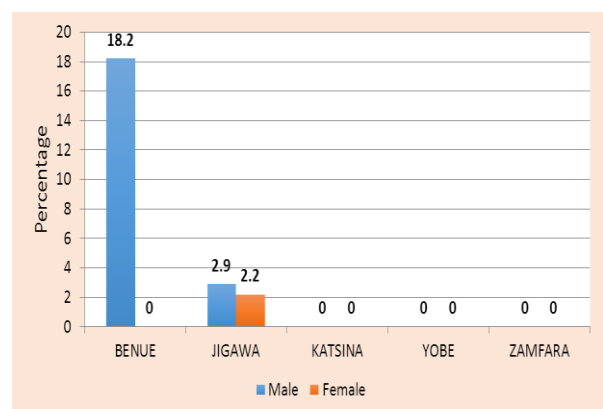


Figure 2: Percentage of girls and boys whose diarrhea treatment included zinc, who consumed the minimum recommended quantity (10 tabs) in focus States.

The proportions of boys and girls who completed the recommended dose are low across all the states targeted by MI. Jigawa states reported 2.9% and 2.2% of boys and girl whose treatment-included zinc consuming the recommended amount of zinc, while 18.2% for boys and 0% of girl's child used the recommended amount of zinc

in the comparison state. None of the children whose treatment included zinc adhered to the recommended amount in Katsina, Yobe and Zamfara States. Figure 3 shows the percentage of caregivers of under-5 diarrhea cases using recommended dose (amount) of lo-ORS/zinc at home.

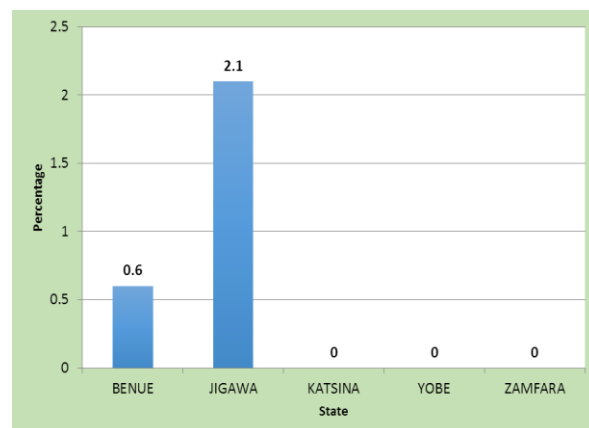


Figure 3: Percentage of caregivers of under-5 diarrhea cases using recommended dose (amount) of lo-ORS/zinc at home in focus States.

Compared to value (0.6%) obtained in Benue (comparison) state, the percentage of caregivers who gave the recommended amount of lo-ORS/zinc to their children who had diarrhea was higher in Jigawa (2%). Caregivers in Katsina, Yobe and Zamfara reported not giving the recommended doses to their children at home.

Participants in the FGDs were engaged in a free discussion to elicit information on the barriers and facilitating factors for utilization of Zinc and lo-ORS for diarrhea treatment in their communities. Information obtained during focus group discussions provided insight into possible barriers to utilization of zinc for barrier treatment in the targeted states. FGD participants viewed barriers as factors which either directly or indirectly impede the utilization of zinc and lo-ORS for management of diarrhea among under-five children in the focus state. Barriers identified emanated from personal experiences of participants. The discussions allowed for the personal view of participants, thus, the findings represent views from divergent groups of members of the community and inclusive of both demand and supply perspectives. Discussion with influential community members and opinion leaders further enriched the qualitative information obtained by providing insight into policy related factors that influence diarrhea management in the communities. They expressed the concern that Government policies do not contribute significantly to improving diarrhea control in their communities.

Perception of cost as barrier to either coverage or utilization was divergent among participants. For instance, while some participants in states like Benue believed that the cost of treating diarrhea is not

exorbitant, some participants Katsina and other northern states believe that there is a need to further reduce the cost of Zinc and lo-ORS to enable clients in the lowest socio-economic quintile have access to them. A caregiver from Benue stated:

"I believe that treating diarrhea is not costly. ORS both local and the ones we buy are not costly. It was N50 but now N100 Even though it is now N100 it is still cheap"

This view was also expressed by another caregiver and quoted as saying:

"My perception about the cost of treating diarrhea is that it is cheap. I treated my child at a minimal cost. It was N2, 200"

Other caregivers expressed contrary views and believed that cost of treating diarrhea is prohibitive. A caregiver stated:

"I treated my child at a high cost it was N6, 500"

Cost of diarrhea treatment, which includes the cost of drugs, depended on a number of factors. Health worker expressed the concern that caregivers delay in reporting to health facilities when their children have diarrhea. A health worker from Zamfara state explained:

"They [caregivers] don't bring them [children with diarrhea] on time, by the time they bring the children to the hospital, the diarrheal disease would have gone far"

Health workers believe that delay in seeking health care for children with diarrhea is a big challenge to successful management and greatly impact on the cost of treatment and the prognosis.

Conclusion about whether the cost of treating diarrhea with Zinc and lo-ORS is high or not depended on the socio-economic strength of the household. Medium to high-income earners afford the cost with ease and vice versa. A caregiver concluded:

"Sometimes it is hard to get money. Even if it is N500 and you do not have, you cannot afford the treatment"

In comparison with the Benue state, participants from MI targeted states considered the cost of treating diarrhea as high.

Preference for the herbal medicine was also identified as a barrier to utilization of orthodox medicines including zinc and lo-ORS in the treatment of diarrhea. Health worker stated that caregivers *"prefer giving herbs"* than using medicine including zinc and lo-ORS. In some sessions, participants strongly believe that there is a need to try traditional medicine before consulting health personnel. These practices further prolong the time of presentation at a health facility. In effect, most children with diarrhea present to health facilities when their condition has deteriorated.

Some participants alluded to children's dislike for ORS as a factor hindering them from giving it to their children when they have diarrhea. Other participants however

believe that this should not be a barrier as they often resort to forcing their children to drink it anytime they have diarrhea. A caregiver captured her own way of overcoming this barrier by saying:

"Another barrier is that children do not like taking ORS. So, you must force them before they will take it"

In the view of some participants, some mothers were either too busy or out rightly lazy to follow treatment instructions given by health workers. A participant explained that:

"Other caregivers do not have time to even give their child the ORS during diarrhea. So they are more interested in their businesses so they don't administer in the right manner as they should". Another participants added: *"People of nowadays are also lazy, so, they do not give ORS"*

None of the participants considered culture or religion as a barrier to utilization of zinc and lo-ORS in the surveyed states. Participants believed that religion is for the good of the people and as such should not prevent what is good for health of the practitioners of that religion.

Participants stated: *"Our practices do not negate the use of ORS. In fact, we even look for ways to treat diarrhea"...* *"Our custom agrees with the use of ORS in treating diarrhea"*.

Other factors identified by participants were more related to promoting occurrence of diarrhea rather than its treatment. They include the use feeding bottles, poor personal and environmental hygiene and none exclusive breastfeeding by mothers. Participants believed that mothers who use artificial milk (baby formula feeds) are not able to ensure good hygiene that prevent occurrence of diarrhea in their children.

Facilitating factors that affect utilization of Zinc and lo-ORS supplementation: Despite the challenges faced by both health workers and caregivers in utilizing zinc and lo-ORS in diarrhea, participants identified some facilitating factors for utilizing Zinc and lo-ORS in treating diarrhea.

Participants believe that, providing free treatment for diarrhea has been a motivating factor for caregiver to seek treatment for diarrhea in health facilities. A participant captured this view succinctly by saying:

"Treatment of children with diarrhea in health centers is free in our community and salt and sugar solution and zinc are given free...." Such support provided by government has motivated caregivers to seek treatment for diarrhea from health facilities.

Participants also agree that public education on the efficacy and health benefits of zinc will facilitate its utilization *"since the drug is not known to many people"*. Participants also identified support from family members

particularly the husband in terms of providing the logistics to get their children to a health facility facilitates caregiver's access to health care services.

Awareness/knowledge about Zinc and lo-ORS

Awareness about the use of Zinc and lo-ORS in treating diarrhea was assessed from the perspectives of service

providers and service users. Table 4 below shows the level of awareness among frontline health workers of the need to use Zinc and lo-ORS in diarrhea management in the survey states. Table 6 shows the awareness levels among frontline health workers.

Table 4: Awareness of Zinc and lo-ORS among frontline health workers in focus states

Percentage of frontline health workers who are aware of the need to use Zinc and lo-ORS for diarrhea treatment.	
Benue	78.6%
Jigawa	75.9%
Katsina	87.0%
Yobe	30.0%
Zamfara	60.0%

Awareness of Zinc and lo-ORS was observed to be high among frontline health workers in all states surveyed except Yobe where lowest proportion (30%) of frontline health workers who reported to be aware of the need to use zinc and lo-ORS for diarrhea treatment was reported. Frontline health workers in Katsina were particularly

highly aware (87%) of the need to use zinc and lo-ORS for diarrhea treatment. The level of awareness in Katsina was higher than that for the comparison state. However, compared with the comparison state, levels of awareness of the need to combine zinc and lo-ORS in treating diarrhea were lower in Jigawa, Yobe and Zamfara.

Table 5: Awareness of Zinc and lo-ORS among caregivers of children 0 to 59 months in focus states

Percentage of caregivers of children 0 to 5 years who are aware of the need to use Zinc and lo-ORS for diarrhea treatment.	
Benue	2.7%
Jigawa	44.5%
Katsina	14.9%
Yobe	0.3%
Zamfara	0.0%

Awareness of the need to use both Zinc and lo-ORS for diarrhea treatment among caregivers was found to be low across the focus states. Awareness among caregivers in Jigawa (44.5%) and Katsina (14.9%) states were higher than in Benue state (2.7%) while it was lower in Yobe (0.3%) and Zamfara states (0%).

There was a consensus among FGD participants that diarrhea among under-five children is a major problem in the surveyed state. A health worker stated:

"Yes, really diarrhea is a major problem in this community because our environmental hygiene is very poor so we have to enhance first of all our environmental hygiene; so as to reduce the diarrhea problem and diarrhea can easily kill our young children those are the problem we are now having in our community".

Caregivers also, were aware of the burden of diarrhea among children and could identify symptoms associated with diarrhea. A caregiver explained:

"In our community, some of our children experience diarrhea and vomiting. The diarrhea is sometimes accompanied by hotness of the body and as a result they become very weak and dehydrated".

Caregivers were able in many instances, to explain the causes of diarrhea in their own words. Participants generally agreed to the role of poor hygiene in the causation of diarrhea among under-five children. Caregiver expressed the view that:

"A child can experience diarrhea when the mother gives the child food without first of all washing her hands properly. When your hands are dirty or even when the plates that the child is using are dirty it can bring about diarrhea. Children are very sensitive to all these so when they are in a dirty environment diarrhea will arise".

Opinion leaders were concerned about poor environmental hygiene and lack of potable water in most communities in their state. They believe that such environments pose danger to children and can cause children to come down with diarrhea. A supervisory counselor for health who participated in an FGD session commented:

"some are constructing water wells nearest to toilets or graves and or drainages. So if the water wells constructed close to these places it can cause the outbreak of this diarrhea disease and vomiting especially if the water wells were not deep enough. About three years ago that type of incident had happened in this village when we realized that a water-well was

constructed close to three toilets. These and some other factors are causing cholera”.

Beyond being aware of the need to use Zinc and lo-ORS in the treatment of diarrhea amongst health worker and caregivers, knowledge of benefits of Zinc and lo-ORS in the treatment of diarrhea among caregivers was also assessed. This was intended to serve as a determinant for using them for diarrhea treatment. Figure 4 shows the proportion of caregivers who were able to identify the benefits of treating childhood diarrhea with zinc and ORS.

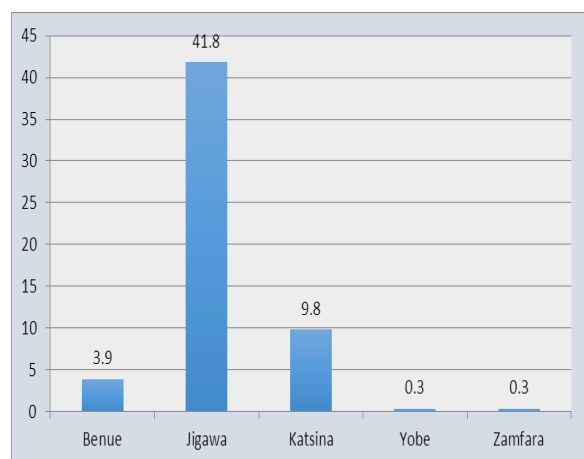


Figure 4: Percentage of caregivers who can identify benefits of treating childhood diarrhea with zinc and ORS in focus States.

Knowing the benefits of treating diarrhea with zinc and lo-ORS could impact positively on utilization of the commodities. The proportions of caregivers who correctly identified the benefits of treating childhood diarrhea with zinc and ORS were higher in Jigawa (41.8%) and Katsina (9.8%) state than in the comparison state but lower in Yobe and Zamfara states. Knowledge of caregivers was extremely low in Yobe state and Zamfara States.

The knowledge of the use of Zinc and lo-ORS among frontline health workers in terms of knowing the benefits, indications and how to prescribe was further assessed. This was intended to be a measure of quality of care for diarrheal patients. Figure 5 shows the percentage of trained frontline health workers who scored positively on knowledge/use of zinc and lo-ORS in the management of diarrhea.

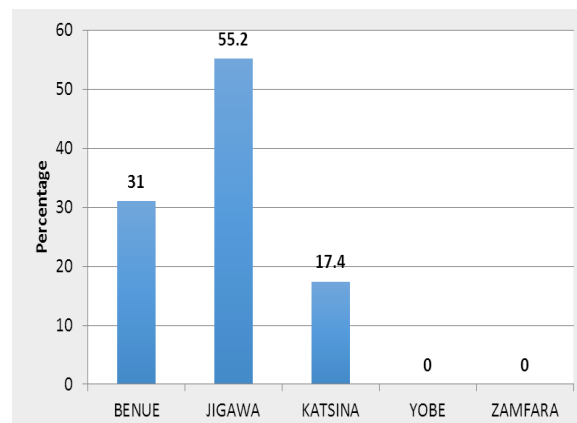


Figure 5: Percentage of frontline health workers who scored positively on knowledge of use zinc and lo-ORS in management of diarrhea in focus States.

Knowledge of health workers was found to be highest in Jigawa state, with 55.2% of respondents scoring positively on knowledge of use of zinc and lo-ORS in management of diarrhea. 17.4% of health workers surveyed in Katsina demonstrated good knowledge of the use of zinc and lo-ORS in diarrhea management, while 31% of health workers from the comparison state (Benue) have good knowledge. Knowledge of health workers about the use of zinc and lo-ORS in diarrhea management was very low in Yobe and Zamfara states.

DISCUSSIONS

As shown by this survey, prevalence of diarrhea among under-five children in the last three months is high across the state (Benue 98.8.0%, Jigawa 97.0%, Katsina 83.7%, Yobe 93.9%, and Zamfara 97.8%). Results obtained for diarrhea prevalence for the same states by the DHS were significantly lower than those obtained in the current survey (DHS results: Benue 7.3%, Jigawa 8.2%, Katsina 17.8%, Yobe 18.7%, and Zamfara 10.2%). The primary reason for the wide difference was the time reference for the measure. DHS results were base on a two weeks timeline preceding the survey while the current survey used three months preceding the survey.

High proportions of caregivers sought treatment for diarrhea in the both MI targeted states and the comparison state. This survey obtained result for caregivers who sought any form of treatment. This explains the higher result obtained compared to 2008 DHS findings in the two regions of Nigeria where the MI targeted states are located. NDHS, (2008) reported that only 17.6% in the North-East and 25.2% in the North-West of under-five children who had diarrhea in the last two weeks used ORS packet or pre-packaged liquid. Moreover in the Northeast, 38.1% of these children received no treatment at all while it was 30.1% in the Northwest.

This survey focused primarily on diarrhea treatment practices at primary healthcare level. The greater

proportion of diarrhea cases in developing countries and indeed Nigeria are found among the lowest socio-economic quintile whose larger concentration are found in rural areas where maternal education, sanitation and availability of potable water constitute challenges.^[18] For instance, according to the Nigerian Multiple Indicator Survey (MICS, 2011), 45.9% in the urban compared to 29.2% in the rural area of children under five who had diarrhea two week before used ORS or increased fluid while 15.4% of caregivers in the rural compared to 25.3% in urban did not use any treatment at all. In addition, the greater proportions of the Nigeria population live in rural areas where access to quality health care services and medical commodities has remained a big challenge.^[19]

The high levels of awareness among frontline health workers across the states surveyed are significant. However, the level of awareness among frontline health workers did not translate to good knowledge of the use of zinc and lo-ORS in the management of diarrhea with respect to knowing the full benefits of zinc and lo-ORS combination in treating diarrhea as well knowing how to prescribe it.

Secondly, significant gap exists between awareness among health workers and awareness among caregivers. This finding is particularly significant in Benue, Katsina, and Zamfara states. Health care workers have been considered as a major source of information on health for health services beneficiaries. Where large gaps exist between the level of awareness about health benefits of important healthcare commodities between health information providers (health workers) and health information users (service beneficiaries), the strategy and quality of health education delivered at the health facilities need to be improved. This did not mean total lack of health education activities in the states surveyed, it however points to the fact that the message contents, delivery strategies, channel used and tools could have played important roles in creating the observed gaps.

A focus on improving client education in health facility may help to shrink the existing knowledge gaps and motivate caregivers to use zinc and lo-ORS. Jigawa state appeared to have reduced the knowledge gaps between health care providers and caregivers on the use of zinc and lo-ORS in diarrhea treatment. It may be beneficial to further understand how this was achieved. Though anecdotal evidence suggests this might be a result of Jigawa state been a beneficiary of several donor supported MNCH interventions.

The overall coverage of zinc and lo-ORS is low. This is similar to 2008 DHS findings where 0.3% and 0.7% zinc supplementation was reported in the Northeastern and Northwestern region of Nigeria. Moreover according to MICS (2011), coverage for zinc was 1.6% in Katsina, 0.6% each for both Zamfara and Yobe and 0% for Jigawa while Benue has 2.4%. However, ORS coverage

was relatively higher. Adherence to treatment is equally low among children whose diarrhea treatments include zinc and lo-ORS across the states survey. Availability of zinc and lo-ORS is probably a major reason for these findings. As indicated by various FGD participants, zinc is not readily available even when health workers are aware of the need to include them in the treatment of their clients. ORS is more available to health workers than zinc in many health facilities surveyed. This influenced the prescription practices of health workers in diarrhea treatment. Health worker tend to prescribe what is available.

Antibiotics such as flagyl appeared to be the popular among health workers in the survey state and in most cases; health workers prescribe such antibiotics as first line medication in diarrhea treatment. This is probably due to the belief that it stops diarrhea. This understanding has also been conveyed to caregivers who, many times give flagyl to their children with diarrhea prior to consulting a health worker. It was reported in MICS (2011) that 11.6% caregivers in Katsina, 28.6% in Jigawa, 25.5% in Yobe and 14.9 in Zamfara used antibiotics of different types in treating their under-five children. While antibiotics may have role in treating gastrointestinal infections, employing antibiotics as first line treatment for diarrhea is not a WHO recommended standard practice.^[20]

Generally, culture and religion do not constitute significant barriers to the use of Zinc and lo-ORS in treating diarrhea in the surveyed states. However, preference for traditional treatment options in some communities prevents some community members from taking orthodox medicines including drugs for treating diarrhea. This is not unexpected particularly in remote communities where access to health facilities and commodities are difficult. Respondents often seek alternative treatments for their sick children. Such practices may be so much entrenched among community members that taking of conventional medicines becomes difficult. This is usually the practice in most rural community in Nigeria; preference for traditional medicine compared to orthodox.^[21-23]

Adherence to recommended amount of zinc was found to be low in the surveyed states. Highest adherence rate of 2.1% was found in Jigawa state. Feeling of wellness as indicated by reduced frequency and volume of diarrhea and in some cases stoppage of stooling was found to be the major reason for not consuming the recommended amount of zinc tablet. Respondents believe that medication should be discontinued once the symptoms have abated. However, this issue is not peculiar to this study, it has been reported elsewhere that non-adherence to appropriately prescribed medicines is a global health problem.^[24]

Drug side effects did not appear to prevent children from completing the required amount of zinc as the

supplement was well tolerated by children. While it clear that not all clients would be able to afford zinc, availability rather than cost of zinc was the primary reason for not prescribing or including zinc in diarrhea treatment by many health workers. Many of the health facilities surveyed indeed did not have zinc in stock. Some health facilities in the surveyed states have had previous supply of zinc but the supplies were not sustained. Ensuring that zinc is available in a sustainable manner will be an important focus of any intervention on diarrhea control.

Ordinarily, communities have different locally made fluids they administer to children who have diarrhea to minimize the complications of dehydration associated with diarrhea. The quality and thus safety of these locally made fluids is uncertain therefore there is a need to further educate caregivers on the need to use scientifically prepared solutions as the composition of some of such locally made fluid might be associated side effects. Adequate information on benefits and efficacy of Zinc and lo-ORS combination in diarrhea management need to be further disseminated among health workers and caregivers. This will improve the desire to use them for children with diarrhea.

Prevention of diarrheal diseases is evidently cheaper than treatment of diarrhea cases. Personal, environmental and food hygiene were important predisposing factors to diarrhea in the surveyed states. Lack of potable waters in most communities constitutes great danger for outbreak of diarrheal diseases. Behavioral change with respect to personal, environmental and food hygiene need to be actively communicated to community members in culturally acceptable using appropriate channels. Advocacy for improved water infrastructures for rural communities is also important in controlling diarrhea and this requires collaboration with other sectors outside health.

Policy support for healthcare service delivery is a major sustainability factor in healthcare.^[25] Appropriate policy can only be put in place when decision makers are aware and educated about pressing health need of the population.^[25] This survey highlights important issues requiring policy support. Issues around ensuring availability of new dispersible Zinc sulfate and lo-ORS (an effective intervention in diarrhea management) through high level policy decisions that make it possible to not only include such items in Government health plan and budgets but enhance the release of funds for procurement are of utmost importance.

Findings from this survey showed that policy/decision makers in different states have not performed these roles adequately. Possible reasons for this policy failure include inadequate information/knowledge. It may be important to consider system strengthening interventions that will ensure that policy/decision makers are adequately informed to enable them perform their roles.

Setting the bases and providing evidence for the above points is the need to have reliable data. Findings from this survey revealed that systems for data collection and monitoring of diarrhea management are poorly developed in most of the states surveyed. Only Katsina had records of cases of diarrhea treated in their health facilities. Diarrhea control interventions are likely to face challenges in measuring their impacts without reliable record keeping systems at health facility, LGAs and state levels. The ZIFAS project may need to focus part of its activities on supporting the states to develop/strengthen diarrhea management M&E system.

CONCLUSIONS

Respondents (eligible caregivers and health facility workers) acknowledged that diarrhea is indeed a major health challenge in their communities. Personal, environment and food hygiene including lack of potable water sources were risk factors, mentioned for diarrhea in the communities surveyed. Coverage and utilization of Zinc and lo-ORS for the treatment of diarrhea is low.

Recommendations

Interventions should focus on establishing systems for sustainability of supply of zinc and lo-ORS for diarrhea treatment. This may be partly achieved by advocacy to influence policies and health planning, including prioritizing diarrhea control in health planning and budgeting including advocacy for budget release in the state.

Support should be provided to the respective state government to make copies of relevant diarrhea treatment guidelines and essential medicine list available to health workers in health facilities, particularly PHCs.

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