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## Barriers to acute management of diarrhea in the home setting: An explorative study of under-five caregivers in southwestern Nigeria

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### ABSTRACT

**Objectives:** Diarrhea remains the second leading cause of morbidity and mortality among children under 5 years of age. Persistent mortality and poor outcomes despite available treatments such as oral rehydration salts (ORS) and zinc tablets are indicators of possible barriers to home management among under-five caregivers. This study was designed to explore the potential barriers encountered by under-five caregivers in providing home management for acute diarrhea within the first 24 hours of recognition.

**Materials and Methods:** This qualitative study was conducted among under-five caregivers attending Primary Health Centers in Ikorodu Local Government Area of Lagos State, Nigeria. Twelve under-five caregivers, who indicated in the larger cross-sectional study that they did not provide any form of home management for the child within the first 24 hours of recognizing diarrhea were interviewed. Interviews were recorded. Naturalized transcription, peer *in vivo* inductive coding, and debriefing were done. Thematic analysis was conducted and findings were presented as themes and subthemes.

**Findings:** Three themes emerged: (1) Waiting for natural stoppage of diarrhea, (2) perceived function of ORS/zinc, and (3) disconnect between potential consequences of diarrhea and action taken. Subthemes include perceived cause and seriousness of diarrhea, misdiagnosis, misinformation on the functions of ORS/zinc from health-care providers, and lack of awareness of potential consequences of untreated diarrhea.

**Conclusion:** The study showed that the main barriers to providing adequate home management were caregivers' perception of the cause and seriousness of diarrhea and the misinformation about the function of ORS and zinc therapy. Continuous and accurate education of under-five caregivers would improve the timely initiation of ORS/zinc and correct home management of acute diarrhea.

**Keywords:** Barriers, Diarrhea, Home management, Qualitative study, Under-five caregivers, Under-five children

### INTRODUCTION

The under-five mortality rate has remained high in Africa at 74/1000 live births, 14 times higher than that for Europe and America, with Nigeria having the highest mortality rate of 113.8/1000 live births in 2020.<sup>[1]</sup> Most of these deaths are caused by pneumonia, diarrhea, and malaria.<sup>[2,3]</sup> Although under-five global mortality due to diarrhea dropped remarkably from about 5 million in the early 1980s to <500,000 in 2018, some countries still experience high deaths with Nigeria being the second leading contributor of these deaths after India.<sup>[3-8]</sup> Diarrhea,

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which is defined as the frequent passage of loose/watery stools, 3 or more times in 24 hours, depletes body fluids and has the potential to cause life-threatening dehydration, especially in children.<sup>[9,10]</sup> Therefore, fluid replacement with oral rehydration salts (ORS) in combination with zinc supplementation (ORS/zinc), increased fluid intake, and continued feeding have been approved as evidence-based and gold-standard treatments for diarrhea in children.<sup>[11]</sup> In spite of this simple and relatively inexpensive therapy, the death rate among children under 5 years of age has remained high in some countries like Nigeria where an estimated 205 die every day from diarrhea.<sup>[12]</sup> ORS and zinc supplementation combination is easy to prepare and use at home; hence, the World Health Organization (WHO) recommends that ORS/zinc be initiated as soon as diarrhea is recognized.<sup>[11]</sup>

A Demographic and Health Survey data from 12 Sub-Saharan African countries with a high burden of childhood diarrhea showed that the availability of optimal diarrhea management in health facilities is low ranging from 11% in Cote d'Ivoire to 38% in Niger, with Nigeria at 37%.<sup>[13]</sup> Other studies conducted in Nigeria have also found suboptimal levels of adequate management of diarrhea at community pharmacies, primary, secondary, and tertiary health institutions.<sup>[14-17]</sup> Furthermore, studies done among caregivers have shown a good awareness level of ORS for diarrhea but poor knowledge of management and home management practices.<sup>[16,18-21]</sup> The WHO recommends that caregivers commence ORS/zinc as soon as a diarrheal episode is recognized.<sup>[10,11]</sup> Yet, some caregivers fail to seek medical care nor use ORS/zinc therapy for the child during diarrhea.<sup>[20,22-24]</sup> Some authors have identified constraints to the use of ORS and zinc for children during diarrhea such as the unpleasant taste of ORS and cost of zinc and even a lack of awareness of zinc.<sup>[25,26]</sup> While the already identified constraints are noted, studies on barriers to providing home care are scarce or yet to be explored. Ensuring that caregivers can articulate their reasons for not providing care regardless of the potential consequences of untreated diarrhea, is a critical necessity. The objective of our study was to explore barriers that mitigate early initiation of home management by under-five caregivers with a focus on the first 24 hours of diarrhea which is considered the critical period to prevent the onset of dehydration.

## MATERIALS AND METHODS

### Study design

The study was carried out as an explanatory sequential to results obtained in a quantitative cross-sectional study where a relatively high percentage (35.3%) of caregivers claimed to have provided no care for their child within the first 24 hours of diarrhea.<sup>[24]</sup> A phenomenological approach was applied to the study to allow focus on caregivers' experience during their child's diarrhea episodes and barriers to providing care.

### Participants selection

Twenty caregivers were recruited face-to-face during the cross-sectional survey where they indicated that they provided no care within the first 24 hours of recognizing diarrhea in a child under 5 years of age. They were later followed up by phone calls for interview scheduling. Twelve interviews were successfully conducted; three interviews were canceled by the researchers due to inconsistencies in information provided by caregivers in the cross-sectional survey; and five caregivers dropped out of the study. Among the participants who dropped out, one participant claimed that her husband asked her to discontinue, and the remaining four caregivers did not provide any reasons for not continuing with the study. Interviews also reached saturation at 12.

### Study setting

The study was conducted in Ikorodu Local Government Area (LGA) of Lagos State, Nigeria. Lagos State is the smallest state in Nigeria, although it is the commercial center of the country. Ikorodu LGA is a sub-urban community located approximately 36 km northeast of Lagos on 6.6194°N and 3.5105°E. The suburb had 23 functional Primary Health Centers, two secondary health facilities, and several private health institutions at the time of the study. Caregivers were interviewed in the places of their choice. Seven were interviewed in their homes, two were interviewed at their workplaces, and three were interviewed at the Primary Health Center where the cross-sectional survey was conducted.

### Data collection tool and procedure

An interview guide was developed from a pilot study done by interviewing six caregivers who individually provided no treatment for their child within the first 24 hours of recognizing diarrhea. The main questions were open-ended and intended to have an overview of the child's diarrhea episode. Prompts were introduced at appropriate junctures to elicit specific information that would provide clues to attaining the objective of the interview. Face and content validity of the interview guide were done by supervisors and other experts in the field of study. The interview was conducted by the first author (PhD), a female researcher who specialized in the rational use of medicines. There was no personal relationship with the participants before the interview apart from recruitment. Before the interview, the interviewer introduced herself and explained the purpose of the interview. Two research assistants accompanied the interviewer to ensure optimal benefits from the interviews. Caregivers sometimes had their children with them at the time of the interviews and one research assistant helped to engage the children to avoid distraction. A diary was kept during the interviews to record thoughts and observations

that could be relevant when interpreting data such as body language and events around the caregiver. There were no repeat interviews nor were transcripts taken back to the caregivers for vetting. This method was due to the initial hesitancy of the respondents to participate and the security issues in the study setting at the time. Therefore, the interviewer clarified their answers as much as possible during the interview.

### Data processing and analysis

Interviews were recorded and later transcribed verbatim (naturalized). This form of transcription was important due to the social system (sub-urban community), and to enhance better interpretation of their expression during the interviews. Inductive and *in vivo* (respondent actual words) coding was used to code the interview transcripts. The coding was done by the first author and another independent researcher. Coders later came together to synchronize the codes and debriefing was done by another person. Codes were reviewed and merged where necessary to produce themes and subthemes that answered the research question. The consolidated criteria for reporting qualitative research (COREQ) guidelines were adapted for the analysis.

### Ethical approval

Ethical approval was obtained from the Lagos University Teaching Hospital Health Research and Ethics Committee with reference number (ADM/DCST/HREC/APP/705).

## RESULTS

### Characteristics of caregivers

All respondents were married, age range from 25 to 41 (mean age 31.08 standard deviation 4.54) [Table 1].

### Themes

Three themes emerged: (1) Waiting for natural stoppage of diarrhea, (2) delayed initiation of ORS/zinc, and (3) disconnect between potential consequences of diarrhea and action taken. These themes had their specific subthemes. The verb “wait” was very prominent in the interviews and was a major part of the *in vivo* coding for the very first question: “Tell us about your experience when your child had diarrhea” [Table 2].

#### Theme 1: Waiting for natural stoppage of diarrhea

This theme was influenced by caregivers’ perception of the cause and seriousness of diarrhea as well as their preconceived diagnosis.

##### Perceived cause and seriousness of diarrhea

Caregivers firstly attributed their child’s diarrhea episode to food or “teething” (teeth eruption). The perception that food consumed by the child or the mother (for children still breastfeeding), was the reason for diarrhea, and made caregivers “wait and watch” to see if diarrhea would stop or progress. Health-care providers further validated this assumption, when they advised caregivers to just leave the child alone and watch what they eat. One caregiver said,

*“...The woman (health-care provider) now said I should not give her anything that will stop the purge (diarrhea), that I should watch what I’m eating”* (Caregiver 2).

A couple of caregivers mentioned that their child sometimes experienced diarrhea after eating beans (meal made from legume plant). One caregiver said:

*“I just felt ... this is the 1<sup>st</sup> day, let me wait. Initially, I was thinking, maybe it’s the food he has eaten because at times if, I in particular... the kind of food ..., it might affect him, it makes him stool for some time, especially beans, followed with vegetables...”* (Caregiver 1).

**Table 1:** Characteristics of Caregivers

Caregiver S/N	Age	Educational level	Marital status	Gender of child	Age of child (months)	Number of children being cared for
1.	38	Secondary	Married	M	6	1
2.	25	Secondary	Married	F	9	1
3.	30	Secondary	Married	F	9	2
4.	28	Tertiary	Married	M	7	1
5.	29	Secondary	Married	M	15	2
6.	29	Tertiary	Married	F	28	1
7.	28	Tertiary	Married	M	12	1
8.	30	Secondary	Married	M	9	3
9.	41	Primary	Married	M	9	3
10.	32	Secondary	Married	M	9	3
11.	34	Secondary	Married	M	17	2
12.	29	Secondary	Married	M	7	3

**Table 2:** Themes and Subthemes

Themes	Subthemes
Waiting for natural stoppage of diarrhoea	Perceived cause of diarrhoea Perceived severity of diarrhoea Misdiagnosis
Perceived function of ORS/ Zinc	Understanding the function of ORS and Zinc Information from healthcare provider
Disconnect between potential consequences of untreated diarrhoea and action taken	No awareness of the consequences of diarrhoea Awareness of the consequences of diarrhoea

Many caregivers related diarrhea to teething. They referred to it as “*igbe-eyin*” (diarrhea associated with teething) in the local language. *Igbe-eyin* is regarded as part of normal development and should be left alone, and that is the reason why caregivers did not take it as a serious condition, especially within the first 24 hours, and so they had to wait. Caregiver 5 said:

*“She’s stooling for like 5–6 times a day. For the 1<sup>st</sup> day, I thought it was teething or so, that’s why I did not take it seriously, I thought maybe it will stop before the next day”* (Caregiver 5).

Caregivers also had some other information that made them wait for diarrhea to resolve by itself. The theory of diarrhea being part of normal development came out quite strongly. Some respondents said that diarrhea helps to clean out the system and that using anything for its management will adversely affect the child; therefore, the child should be left untreated. Caregiver 10 said:

*“I don’t give my baby anything, somebody told me that if you try to stop the diarrhea that his stomach will become big”* (Caregiver 10).

Another caregiver said that she was told that if diarrhea is stopped, it will result in a distended stomach. Thus, caregivers just waited for diarrhea to take its course.

### Misdiagnosis

Many caregivers labeled the diarrhea episode as some other condition; therefore, they took no action to address it. Although some diarrhea episodes occurred for 6–10 times in 24 hours, these caregivers said they thought it was *jedi jedi*, which in the local context could describe different conditions related to the gastrointestinal tract. Others thought that it was hemorrhoids or dysentery (which also can be norms for *jedi jedi*) and some said they just did not know what it was, so they had to wait. A caregiver whose child had stoolled up to 10 times on the 1<sup>st</sup> day still said the stooling was not much; she thought it was “teething” and also thought it was *jedi jedi* so she had to wait.

## Theme 2: Perceived function of ORS/zinc

### Understanding the functions of ORS and zinc

Many of the caregivers interviewed were aware of the use of ORS for managing diarrhea but apparently did not understand its function and why it should be used for diarrhea. Some reported that ORS is only given to children when they are weak from diarrhea. One caregiver said,

*“I think ORS is for children when they are stooling, when they are weak. But now, the child is not weak, though the child is stooling, the child is not weak. She plays, and she eats. And I heard that ORS is to be used after 3 days of diarrhea, so that’s why I didn’t use ORS”* (Caregiver 3).

Another caregiver said,

*“I see that my baby is not weak, and the purge (diarrhea) is not much”* (Caregiver 2).

### Information from health-care providers

Information from health-care providers also influenced caregivers’ behaviors toward immediate response to diarrhea to some extent. A caregiver said:

*“When I was still nursing the other children, whenever they had diarrhea, I took them to the hospital and they prescribed ORS... “that whenever a child is stooling like that, and the child is going to be weak, then I should use ORS”*” (Caregiver 9).

Caregiver 9 only got ORS for her child on the 3<sup>rd</sup> day of diarrhea when she noticed that the child was on the verge of weakness (apparent sign of dehydration).

Another caregiver said,

*“In the hospital, the doctor said that we should use ORS only if the child stools continuously for 3 days and the child is weak. But if the child stools once for that day and the child is weak, we should use ORS, but this one is not weak, and she didn’t throw up and she’s eating as normal and she’s playing, that’s why I didn’t use ORS”* (Caregiver 3).

Weakness was the indicator for the use of ORS by these caregivers. The fact that ORS should be used for 1 day was a deterrent to its use as well. One caregiver said,

*“ORT is just for 1 day, if it remains you throw it away, so I had to wait for the morning of the next day, to take action”* (Caregiver 4).

## Theme 3: Disconnect between potential consequences of diarrhea and action taken

The possibility of death due to dehydration from diarrhea was not strong among caregivers. Some caregivers were not aware of the possible consequences of diarrhea even

though the conversations showed that their child could have been classified as having some or severe dehydration before they sought care. Some others expressed consequences of untreated diarrhea as weakness, weight loss, fainting, and death. Caregivers would rather not mention death as one consequence of diarrhea until probed further. Answers to the question relating to the consequence of diarrhea were started with phrases that were ambiguous. One caregiver said,

“...Anything can happen...” (Caregiver 6),

Another said,

“It can make the child weak and sometimes it will result to something else” (Caregiver 9).

Yet another said

“Ah! It’s God that is helping these children” (Caregiver 4).

When asked to elaborate further, Caregiver 9 said:

“Well, it can lead to death, but I didn’t want to say it.”

When probed on why they left the child untreated despite their awareness of the potential consequences, they simply stated that they did not know it would turn out that way. However, the reason why they decided to seek medical care on the consequential days was that their initial perception of diarrhea was obviously challenged by their experience; and they were beginning to see actual consequences. One caregiver said:

“But on the 3<sup>rd</sup> day, when I noticed that the boy was going to be weak, I went to buy ORS and prepared it for him” (Caregiver 9).

Another caregiver started ORS on the 3<sup>rd</sup> day; she said:

“He looked weak somehow, and I did not want him to lose strength, so I started that one (ORS) yesterday” (Caregiver 10).

When Caregiver 4 was asked to indicate why she did not take any action despite her awareness of the consequences, she said:

“I had to find out from elderly people and do my research before I take any action” (Caregiver 4).

Caregiver 12 said:

“Nobody prescribed ORS for me, so I had to wait.”

#### Other findings

Many of the caregivers who did not take diarrhea seriously on that 1<sup>st</sup> day later changed their minds with regard to the cause of diarrhea when it did not stop. One caregiver said:

“On the 2<sup>nd</sup> day when it continued, I said: “this is not a reaction to food,” that’s when I started ORS” (Caregiver 1).

Another caregiver whose mother had told her that the episode of diarrhea was that associated with teething said:

“Ah! This is not caused by teething; he has stooled 6–7 times. So, my mother said I should make ORT” (Caregiver 4).

During the discussions, caregivers related some signs that their children had experienced, without connecting it to the adverse consequences of diarrhea and dehydration. A caregiver described signs that could be interpreted as sunken eyes. Caregiver 11 said:

“He is not really weak, but you’ll know from his face that he’s purging. He’s playing but you will know that something is happening to this boy because he is lean” (Caregiver 11).

This caregiver’s child had stooled 10 times the 1<sup>st</sup> day and she left it untreated because she thought that it was “*igbe eyin*” (diarrhea associated with teething) or “*jedi jedi*.”

## DISCUSSION

This study explored the barriers to providing home management for diarrhea by under-five caregivers and identified additional constraints to the existing ones from the three themes.

### Theme 1: Waiting for natural stoppage of diarrhea

A major single-word code that permeated the interviews was “wait.” Caregivers waited due to their perception of the seriousness of diarrhea. These caregivers claimed they did not think it was serious so they did not provide any form of care. Studies have found varying degrees of caregivers’ perception of diarrhea as not a serious condition in different locations: Two communities in western Ethiopia (5.3% and 11.9%), Ibadan and Ikorodu in southwest Nigeria (9.4% and 30.0%), and Uyo, south-south Nigeria (10.3%).<sup>[15,20,27,28]</sup> Proper perception of diarrhea as a serious condition and understanding of the consequences of untreated diarrhea may facilitate early initiation of management by caregivers. Diarrhea is a serious condition because it depletes body fluids responsible for normal functioning.<sup>[9,10]</sup> Caregivers in our study waited for the resolution or progression of the disease before initiating care. While waiting for natural resolution of diarrhea which is often self-limiting, it was inappropriate not to initiate fluid replacement with ORS or other adequate fluids.<sup>[10,11]</sup> Until caregivers realize that diarrhea is serious and can cause death within 24 hours as experienced in the course of this study, not much progress will be made in home management.

Our study showed that caregivers’ perception of the cause of diarrhea desensitized them to the potential consequences of untreated diarrhea. Although the frequency of some diarrhea episodes was up to 10 times in 24 hours, caregivers’ preconceived idea of “teething, food, *jedi-jedi*,” or some other natural occurrence as cause of diarrhea, kept them from providing care. Nigeria comprises communities where

everyone has advice to give. Family and friends would be at hand to convey their idea of care in the form of advice, which are usually very convincing. Caregivers reported that they waited because family and friends had told them that diarrhea is part of a child's normal development, and it should be left to resolve on its own. Advice from health-care providers also contributed to why caregivers waited. It is possible that the self-limiting nature of diarrhea was the underlying factor for the advice to wait and not provide care. Other authors have found that many caregivers in their study settings have inadequate knowledge of the cause of diarrhea, therefore unable to respond appropriately.<sup>[19,21,22]</sup>

### Theme 2: Perceived function of ORS/zinc

Caregivers did not utilize ORS/zinc as soon as they recognized diarrhea, even though they were aware of its use for diarrhea. This delay to initiate ORS/zinc was basically due to their distorted understanding of its function. According to these caregivers, ORS is only used after 3 days from the onset of diarrhea, or when the child is weak; and zinc supplementation is used only when ORS fails. This theme ran through the course of interviewing the 12 caregivers. These constraints to the use of ORS/zinc are different from those found in other studies where the taste of ORS, lack of awareness, cultural belief, and availability were major constraints to the use of ORS.<sup>[25,26]</sup> Delayed initiation of fluid replacement using ORS is similar to findings in formative research of 14 caregivers in Lusaka where ORS was not initiated as soon as diarrhea was recognized although they still initiated ORS earlier than caregivers in our study.<sup>[29]</sup> This observation shows a lack of clarity in the message of ORS/zinc received by caregivers from health-care providers. The pitching of ORS as a medicine that gives strength could also be the reason for caregivers' response. Although not technically wrong, it apparently affected their outlook on the function of ORS. Seeking care only when signs of dehydration are recognized is unsafe because symptoms of mild and severe dehydration overlap and there is only a thin divide between the two.<sup>[30]</sup> Furthermore, these caregivers did not even recognize the signs of dehydration as the discourse revealed that almost all the children were dehydrated to some degree during their experience of diarrhea.

### Theme 3: Disconnect between potential consequences of diarrhea and action taken

A conversation about dehydration did not arise in the interviews except when prompted. In response to questions about the consequences of untreated diarrhea, caregivers gave ambiguous answers. They only gave rational answers when encouraged to explain their ambiguous statements. Although caregivers stated the potential consequences of untreated diarrhea as weakness,

fainting, and death, their lack of action showed dissonance between their espoused theory and theory-in-use.

### Other findings

In general, caregivers observed the children for danger signs. They waited until they saw that the child was at the point of weakness before administering ORS. Our study revealed that six out of the 12 children of caregivers interviewed experienced some dehydration symptoms, such as weakness, irritability, sunken eyes, and eagerness to drink, during their episode of diarrhea.

### Limitation of the study

The participants in this study were those who attended the Primary Health Centers in Ikorodu LGA for their child's care. It is possible that those who did not attend these health centers would have different experiences in initiating home management for their child's diarrhea.

### CONCLUSION

This study revealed that under-five caregivers delayed providing care for childhood diarrhea within the first 24 hours due to their distorted perception of the cause and seriousness of diarrhea. Although all caregivers were aware of the use of ORS for diarrhea, their lack of understanding and inaccurate information from their health-care providers on the use and function of ORS and zinc limited and delayed their utilization of ORS/zinc. Caregivers seemed desensitized to the potential consequences of childhood diarrhea due to the wrong concept of the condition. Continuous and accurate education of under-five caregivers in the community setting by well-informed health-care providers would improve the timely initiation of ORS/zinc and correct home management of acute diarrhea.

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### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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### Conflicts of interest

There are no conflicts of interest.

## Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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