KNOWLEDGE AND UTILIZATION OF ORAL REHYDRATION SOLUTION AMONG MOTHERS IN THE MANAGEMENT OF DIARRHOEA IN CHILDREN AGED 0–5 YEARS IN GUSAU, NORTHWESTERN NIGERIA

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[1] 0009-0007-2830-3774

Doi: https://doi.org/10.64450/njsh.v4i1.004

ABSTRACT

Diarrhoeal diseases remain a leading cause of morbidity and mortality among children under five years of age, particularly in low- and middle-income countries. Despite being largely preventable and treatable, diarrhoea continues to account for nearly half a million deaths annually among children in this age group worldwide. Oral Rehydration Solution (ORS) is recognized as a simple, effective, and low-cost intervention for preventing and treating dehydration associated with diarrhoeal diseases. This study aimed to assess mothers' knowledge and utilization of Oral Rehydration Solution (ORS) in the management of diarrhoea among children aged 0–5 years in Gusau, Northwestern Nigeria. A community-based descriptive cross-sectional study was conducted among 240 mothers of children under five years of age. Data were collected using a semi-structured interviewer-administered questionnaire covering socio-demographic characteristics, knowledge of ORS, and utilization of ORS in the management of childhood diarrhoea. Data were entered, cleaned, and analysed using Statistical Package for Social Sciences (SPSS) version 23. Descriptive statistics were summarized using frequencies and percentages, while chi-square tests were employed to determine associations between categorical variables. Statistical significance was set at $p < 0.05$. Good knowledge of ORS was observed among 86.3% of respondents. However, ORS utilization was moderate, with only 45.4% of respondents reporting its use during recent episodes of childhood diarrhoea. The majority of participants had heard about ORS (89.2%), and 85.8% reported knowing how to prepare it correctly. Nevertheless, only 26.7% correctly identified the recommended preparation ratio of one sachet of ORS dissolved in one litre of clean water. ORS utilization was found to be significantly associated with respondents' tribe and occupation ($p < 0.05$), while no significant associations were observed with other socio-demographic variables. Although maternal knowledge of ORS was high, its utilization during recent diarrhoeal episodes remained suboptimal, indicating a gap between knowledge and practice. Community-based demonstrations on the correct preparation and administration of ORS, improved access to zinc supplementation, engagement of traditional and religious leaders in health promotion activities, and strengthened counselling services at the primary healthcare level are recommended to improve the appropriate utilization of ORS and enhance the management of childhood diarrhoea.

Keywords: childhood diarrhoea, oral rehydration solution, mothers, under-five children, Northwestern Nigeria.

INTRODUCTION

Diarrhoeal diseases remain a leading cause of morbidity and mortality among children under five years globally, particularly in low- and middle-income countries. Although diarrhoea is largely preventable and treatable, it continues to account for nearly half a million deaths annually among children under five years of age worldwide. The burden is especially high in sub-Saharan Africa, where poverty, poor sanitation, unsafe drinking water, inadequate hygiene, and malnutrition remain prevalent and contribute significantly to childhood morbidity and mortality (World Health Organization [WHO], 2017; United Nations Children's Fund [UNICEF], 2019).

In Nigeria, diarrhoea remains a major public health concern and is among the leading causes of childhood illness and death. According to UNICEF (2024), Nigeria has one of the highest under-five mortality rates globally, estimated at 116 deaths per 1,000 live births. The Nigeria Demographic and Health Survey (NDHS) 2018 reported that approximately 12% of children under five years experienced diarrhoea in the two weeks preceding the survey, with a higher prevalence observed in the northern regions of the country (National Population Commission [NPC] & ICF, 2019). Northwestern Nigeria, including Zamfara State, continues to experience a substantial burden of diarrhoeal disease due to limited healthcare infrastructure, low literacy levels, inadequate access to safe drinking water, poor sanitation practices, and continued reliance on traditional treatment approaches (NPC & ICF, 2019).

The World Health Organization (WHO) and UNICEF recommend Oral Rehydration Solution (ORS) as the cornerstone of diarrhoea management. ORS is a simple, low-cost mixture of salts and glucose that effectively prevents and treats dehydration resulting from diarrhoea. However, its effectiveness depends on timely initiation, correct preparation, appropriate administration, and caregiver acceptance. Despite decades of public health promotion and advocacy, ORS utilization in Nigeria remains suboptimal. Data from the Nigeria Demographic and Health Survey 2018 indicate that only about 40% of children with diarrhoea received ORS, while fewer than one-quarter received the recommended combination of ORS and zinc supplementation (NPC & ICF, 2019). This finding suggests a persistent gap between awareness of ORS and its consistent and correct utilization in the home management of childhood diarrhoea.

Studies conducted in various parts of Nigeria, including Sokoto, Kebbi, Enugu, and Port Harcourt, have reported high levels of awareness of Oral Rehydration Solution among mothers and caregivers. However, correct knowledge of ORS preparation, consistent utilization, and practical acceptance often remain inadequate (Yakubu et al., 2018; Abdulraheem et al., 2018; Ugwu et al., 2019; Okechukwu et al., 2022). Reported barriers to optimal ORS utilization include low maternal educational attainment, poverty, cultural beliefs and misconceptions, inadequate health education, and limited access to healthcare services (Yakubu et al., 2018; Abdulraheem et al., 2018; Ugwu et al., 2019; Okechukwu et al., 2022). In Gusau, Zamfara State, where socioeconomic challenges and the burden of childhood diarrhoeal diseases remain considerable, there is limited published evidence regarding mothers' knowledge and utilization of ORS. Mothers are typically the primary caregivers and are often the first to respond when a child develops diarrhoea. Consequently, their knowledge, beliefs, and practices play a critical role in determining whether ORS is initiated promptly and prepared correctly.

Understanding maternal knowledge and utilization of ORS is essential for designing effective community-based interventions aimed at reducing dehydration, morbidity, and mortality associated with childhood diarrhoea. This study assessed mothers' knowledge and utilization of Oral Rehydration Solution among children aged 0–5 years in Gusau, Northwestern Nigeria. The findings are expected to provide baseline evidence for Zamfara State and contribute to the development of public health programmes, caregiver education strategies, and policy initiatives aimed at improving childhood diarrhoea management and enhancing child survival outcomes.

Research Questions

i. What is the level of knowledge and utilization of ORS among mothers of children aged 0-5 years in Gusau community?
ii. What is the relationship between maternal Socio-demographic and ORS knowledge?

Research Objectives

1. To determine the level of knowledge of Oral Rehydration Solution (ORS) among mothers of children aged 0–5 years in Gusau community.
2. To determine the level of utilization of Oral Rehydration Solution (ORS) among mothers of children aged 0–5 years in Gusau community.
3. To examine the relationship between maternal socio-demographic characteristics and knowledge of Oral Rehydration Solution (ORS) among mothers of under-five children in Gusau community.
4. To examine the relationship between maternal socio-demographic characteristics and utilization of Oral Rehydration Solution (ORS) among mothers of under-five children in Gusau community.

LITERATURE REVIEW

The literature reviewed indicates that diarrhoeal disease remains one of the leading causes of morbidity and mortality among children under five years globally, particularly in low- and middle-income countries. Despite significant reductions in childhood mortality over the years, diarrhoea continues to account for a substantial proportion of preventable deaths among young children, especially in sub-Saharan Africa, where poverty, poor sanitation, unsafe drinking water, malnutrition, and limited access to healthcare services remain prevalent (World Health Organization [WHO], 2023; United Nations Children's Fund [UNICEF], 2024). In Nigeria, diarrhoeal diseases continue to constitute a major public health concern and contribute significantly to under-five morbidity and mortality, particularly in northern regions such as Zamfara State (National Population Commission [NPC] & ICF, 2023).

The review further revealed that Oral Rehydration Therapy (ORT), particularly Oral Rehydration Solution (ORS), is a simple, cost-effective, and highly effective intervention for preventing and treating dehydration resulting from diarrhoea. Since its introduction, ORS has been credited with saving millions of lives and remains the cornerstone of diarrhoea management globally (WHO & UNICEF, 2023). Despite its proven effectiveness and widespread promotion, the utilization of ORS remains suboptimal in many developing countries due to knowledge gaps, misconceptions, cultural influences, and behavioural barriers.

Empirical studies reviewed showed that awareness of ORS among mothers and caregivers is generally high; however, comprehensive knowledge regarding its correct preparation and administration is often inadequate. In Port Harcourt, Okechukwu et al. (2022) reported that although 93.3% of mothers had heard of ORS, many were unable to correctly describe its preparation. Similar findings have been reported in Southwestern Nigeria and across sub-Saharan Africa, where awareness levels were high but correct utilization remained inadequate (Abolurin et al., 2021; Dessie et al., 2022).

The review also demonstrated that ORS utilization is influenced by several factors beyond awareness and knowledge. Maternal education has consistently been identified as one of the strongest predictors of ORS knowledge and utilization. Other important determinants include socioeconomic status, accessibility of healthcare services, exposure to health information through the media, and participation in health education programmes (Dessie et al., 2022; NPC & ICF, 2019). Cultural beliefs, misconceptions regarding childhood diarrhoea, preference for traditional remedies, family influence, and perceived effectiveness of ORS have also been identified as factors affecting its utilization among caregivers (Bello et al., 2024; Usman & Kareem, 2025).

Evidence from Northern and Northwestern Nigeria suggests that ORS utilization remains below recommended levels despite years of public health promotion and intervention programmes. Studies conducted in Sokoto, Kebbi, and neighbouring states reported high levels of awareness but persistent deficiencies in correct preparation and consistent utilization of ORS. Low maternal literacy, cultural practices, inadequate access to healthcare facilities, and reliance on traditional medicine continue to hinder optimal utilization in many communities (Abdulraheem et al., 2018). The conceptual review revealed that maternal knowledge and utilization of ORS are closely interrelated and influenced by socio-demographic characteristics, cultural beliefs, healthcare accessibility, and public health interventions. The review suggests that knowledge alone may not necessarily result in appropriate utilization unless accompanied by favourable attitudes, practical skills, access to ORS, and supportive environmental conditions.

The theoretical review identified the Health Belief Model (HBM) as the most appropriate framework for explaining maternal health-seeking behaviour regarding ORS utilization. The model emphasizes perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy as major determinants of health behaviour. Complementary theories such as the Theory of Planned Behavior and the Social Ecological Model further highlight the influence of social norms, family support systems, environmental factors, and healthcare structures on caregivers' decisions regarding ORS utilization (Ajzen, 1991; McLeroy et al., 1988; Rosenstock et al., 1988).

Overall, the reviewed literature indicates that while ORS is widely recognized as an effective intervention for childhood diarrhoea, substantial gaps remain between awareness, knowledge, and actual utilization. Existing studies have largely focused on awareness and utilization, with relatively few examining comprehensive knowledge and practical utilization simultaneously. Furthermore, there is limited empirical evidence specifically from Gusau, Zamfara State. This knowledge gap underscores the need for the present study to assess mothers' knowledge and utilization of ORS in the management of diarrhoea among children aged 0–5 years in Gusau community, thereby providing evidence to guide targeted public health nursing interventions, health education programmes, and policy development aimed at improving child survival outcomes.

THEORETICAL FRAMEWORK

Health Belief Model (HBM)

The Health Belief Model (HBM) was developed in the 1950s by social psychologists, including Godfrey Hochbaum, Stephen Kegels, and Irwin Rosenstock. The model was designed to explain and predict health-related behaviours by focusing on individuals' beliefs and attitudes toward health conditions and preventive actions. Since its development, the HBM has been widely applied in public health research to understand factors influencing health-seeking behaviour and the adoption of preventive health practices.

Major Constructs of the Health Belief Model

1. Perceived Susceptibility: This refers to a mother's belief regarding the likelihood that her child may develop severe diarrhoea and experience complications such as dehydration. Mothers who perceive their children to be vulnerable to the adverse effects of diarrhoea are more likely to seek appropriate treatment promptly.

2. Perceived Severity: Perceived severity refers to a mother's understanding of the seriousness of diarrhoea and its potential consequences, including dehydration, malnutrition, hospitalization, and death. A higher perception of severity may motivate caregivers to adopt recommended treatment practices.

3. Perceived Benefits: This construct refers to the belief that Oral Rehydration Solution (ORS) is effective in preventing dehydration, reducing complications, and improving recovery during episodes of childhood diarrhoea. Mothers who recognize these benefits are more likely to utilize ORS appropriately.

4. Perceived Barriers: Perceived barriers are factors that hinder the utilization of ORS. These may include misconceptions about ORS, cultural beliefs, lack of knowledge regarding preparation, poor accessibility, financial constraints, and reliance on traditional remedies.

5. Cues to Action: Cues to action are factors that stimulate or encourage mothers to use ORS. These may include health education sessions, media campaigns, advice from healthcare workers, previous experience with childhood diarrhoea, and recommendations from family members or community leaders.

6. Self-Efficacy: Self-efficacy refers to a mother's confidence in her ability to correctly prepare and administer ORS to a child with diarrhoea. Mothers with higher self-efficacy are more likely to use ORS effectively and consistently.

Application of the Health Belief Model to the Present Study

The Health Belief Model is highly relevant to this study because it provides a framework for understanding the factors that influence mothers' knowledge and utilization of Oral Rehydration Solution in the management of childhood diarrhoea. According to the model, mothers are more likely to utilize ORS when they perceive diarrhoea as a serious health condition, believe their children are susceptible to its complications, recognize the benefits of ORS, encounter fewer barriers to its use, receive appropriate cues to action, and possess adequate confidence in preparing and administering ORS correctly.

The model also suggests that increasing mothers' knowledge through health education and practical demonstrations can positively influence their perceptions and ultimately improve ORS utilization. Therefore, the Health Belief Model provides an appropriate theoretical basis for examining the

relationship between maternal characteristics, knowledge, and utilization of ORS among mothers of children aged 0–5 years in Gusau, Zamfara State, Northwestern Nigeria.

METHODS

This study was a community-based descriptive cross-sectional survey conducted among mothers of under-five children in Gusau, Zamfara State, Northwestern Nigeria. The study was carried out in Igala Quarters and Gida Dari communities which were selected through a multistage sampling procedure, located within Gusau metropolis, the capital city of Zamfara State. Gusau is a predominantly urban area with a growing population and mixed socioeconomic characteristics. The residents are mainly traders, civil servants, artisans, and homemakers. The study population comprised mothers and female caregivers of children aged 0–5 years residing in Igala Quarters and Gida Dari communities. Mothers or female caregivers were eligible if they were aged 18–49 years; had at least one child aged 0–5 years; had resided in the study communities for at least six months; and were willing to participate and provided informed consent. Mothers or caregivers who declined consent or were unavailable during the period of data collection were excluded from the study.

A sample size of 240 participants was determined using the single population proportion formula, assuming a 95% confidence level, 5% margin of error, and 10% allowance for non-response. A systematic random sampling technique was employed. A sampling interval of 1:2 was used. The first eligible respondent was selected randomly, after which every second eligible mother or caregiver was recruited until the required sample size was attained. Where a selected participant declined consent or was unavailable, replacement was done using the same sampling procedure. Data were collected using a semi-structured interviewer-administered questionnaire covering respondents' socio-demographic characteristics, knowledge of oral rehydration solution (ORS) and utilization of ORS.

The questionnaire was developed from previous validated studies and relevant literature. It was translated into Hausa language and back-translated into English to ensure consistency and accuracy. The questionnaire was reviewed for content validity by experts in public health and paediatrics. A pre-test was conducted among mothers in a similar community outside the study area, and necessary modifications were made before the main survey.

Trained research assistants administered the questionnaire through face-to-face interviews. Participants were informed about the purpose of the study, and confidentiality was maintained throughout the process. Data were entered, cleaned, and analysed using Statistical Package for Social Sciences (SPSS) version 23. Descriptive statistics were presented using frequencies and percentages. Associations between categorical variables were assessed using the chi-square test. Statistical significance was set at $p < 0.05$.

Ethical approval was obtained from the Zamfara State Health Research Ethics Committee (Approval No: ZSHREC22122025/346). Permission was also obtained from community leaders in Igala Quarters and Gida Dari. Informed verbal consent was obtained from all participants before data collection.

Participation was voluntary, and respondents were free to withdraw from the study at any stage without any consequences. Confidentiality and anonymity were strictly maintained.

FINDINGS

Table 4.1. Socio-demographic characteristics of respondents (N = 240)

Characteristic	Category	n (%)
Age of mother (years)	18–24	63 (26.3)
	25–34	114 (47.5)
	35–44	50 (20.8)
	>44	13 (5.4)
Age of child (years)	<1	60 (25.0)
	1–5 (under five)	180 (75.0)
Marital status	Married	230 (95.8)
	Divorced	7 (2.9)
	Widowed	2 (0.8)
	Single	1 (0.4)
Tribe	Hausa	225 (93.8)
	Igbo	3 (1.3)
	Yoruba	4 (1.7)
	Others	8 (3.3)
Religion	Islam	230 (95.8)
	Christianity	7 (2.9)
	Others	3 (1.3)
Education status	Primary	7 (2.9)
	Secondary	121 (50.4)
	Tertiary	63 (26.3)
	Islamic	18 (7.5)
	No formal education	31 (12.9)
Occupation	Housewife	175 (72.9)
	Trader	7 (2.9)
	Civil servant	47 (19.6)
	Farmer	4 (1.7)
	Student	7 (2.9)
Number of children under five	One	96 (40.0)
	Two	86 (35.8)
	Three	58 (24.2)
Age of youngest child (years)	<1	68 (28.3)
	1–5 (under five)	172 (71.7)

Table 4.1 **summarizes the socio-demographic characteristics of the respondents. Most respondents were married, Hausa, Muslim, and housewives (95.8%, 93.8%, 95.8%, and 72.9%, respectively). Nearly half were aged 25–34 years (47.5%), and 50.4% had secondary education. The majority of the respondents had children aged 1–5 years (75.0%), while 40.0% had one child under five years of age. Similarly, most of the youngest children were aged between 1 and 5 years (71.7%). Overall, the respondents were predominantly young, married mothers with at least secondary education, reflecting the typical demographic profile of caregivers responsible for the management of childhood illnesses in the study area.**

Table 4.2. Knowledge of ORS (N = 240)

Assessment of knowledge level of ORS among respondents (N = 240)	
Knowledge level	n (%)
Poor	26 (10.8)
Fair	7 (2.9)
Good	207 (86.3)

The table above shows the respondents' level of knowledge regarding Oral Rehydration Solution (ORS). The majority of the respondents, 207 (86.3%), demonstrated good knowledge of ORS, while 26 (10.8%) had poor knowledge and only 7 (2.9%) had fair knowledge. This finding indicates that most mothers possessed adequate knowledge of ORS and its use in the management of childhood diarrhea.

Item	Response	n (%)
Heard about ORS?	Yes	214 (89.2)
	No	26 (10.8)
Source of information about ORS	Healthcare centre	183 (85.4)
	Media	21 (10.0)
	Friends/neighbourhood	10 (4.6)
Use ORS in the management of childhood diarrhoea?	Yes	198 (92.5)
	No	16 (7.5)
Think ORS is effective?	Yes	175 (81.7)
	No	39 (18.3)
Danger signs of diarrhoea requiring a health facility visit	Lethargy or unable to drink	109 (50.8)
	Sunken eyes	99 (46.3)
	Small amount of urine or no urine at all	4 (2.1)
	Fast breathing	2 (0.8)
Know how to prepare ORS sachet correctly?	Yes	184 (85.8)
	No	30 (14.2)
How long after mixing should ORS be discarded?	Within 6 hours	36 (16.7)
	Within 12 hours	42 (19.6)
	Within 24 hours	116 (54.2)
	Within 48 hours	8 (3.8)
	I don't know	12 (5.8)
When should ORS be started for a child with diarrhoea?	As soon as diarrhoea starts	171 (80.0)
	Only if the child looks weak	37 (17.1)
	Only after visiting hospital	6 (2.9)
How often should ORS be given to a child with diarrhoea?	Small frequent sips continuously	45 (20.8)
	Only 3 times a day	54 (25.0)
	Give as much as possible in one sitting	93 (43.3)
	I don't know	23 (10.8)
Where would you obtain ORS if needed?	Health facility	43 (20.0)
	Pharmacy/chemist	165 (77.1)
	Community health workers	3 (1.3)

	Store/market	3 (1.3)
	Make sugar-salt solution (home recipe)	1 (0.4)

The majority of respondents had heard about ORS (89.2%), mainly from a healthcare centre (85.4%), used ORS in the management of diarrhoea (92.5%), thought it was effective (81.7%), and obtained ORS mostly from a chemist/pharmacy (77.1%). In addition, the majority believed ORS should be given as soon as diarrhoea started (80%).

Table 4.3. Use of ORS among respondents (N = 240)

Item	Response	n (%)
Under-five child had diarrhoea in the last 6 months	Yes	109 (45.4)
	No	131 (54.6)
For the most recent diarrhoea episode, what did you do first?	Gave ORS at home	58 (53.1)
	Gave home remedy (e.g., herbs, local concoction)	10 (9.1)
	Took child to health facility immediately	37 (34.1)
	Bought medicine from pharmacy	4 (3.7)
Gave ORS for the most recent episode?	Yes	98 (90.0)
	No	11 (10.0)
If yes, where did you get ORS?	Health facility	24 (22.2)
	Pharmacy/chemist	87 (74.0)
	Community health workers	3 (2.9)
	Made sugar-salt solution (SSS) at home	1 (0.9)
Gave zinc tablets for this episode?	Yes	72 (66.1)
	No	18 (16.5)
	I don't know	19 (17.4)
If the child was taken to a health facility, what treatment was given?	ORS	77 (70.4)
	Zinc	32 (29.6)
Willing to learn how to prepare ORS properly if taught in the community?	Yes	69 (63.3)
	No	23 (20.8)
	Maybe	17 (15.8)
Know any community programs that provide ORS/health education about ORS?	Yes	5 (5.0)
	No	104 (95.0)

The findings show that nearly half (**45.4%**) of the respondents reported that their under-five child had experienced diarrhoea within the last six months. More than half (**53.1%**) administered ORS at home as the first response to diarrhoea, and a large majority (**90.0%**) used ORS during the most recent diarrhoeal episode. Pharmacies were the main source of ORS (**74.0%**), while two-thirds (**66.1%**) also reported giving

zinc tablets. Most respondents (**63.3%**) were willing to learn proper ORS preparation; however, awareness of community ORS and health education programs was very low (**5.0%**). Overall, the findings indicate good ORS utilization but limited community-level awareness and education on diarrhoea management.

Table 4.4. ORS utilization (N = 240)

Used ORS	n (%)
Yes	109 (45.4)
No	131 (54.6)

Table 4.5. Respondent's Attitude towards the use of ORS (N = 240)

Attitude category	n (%)
Good (≥75%)	179 (74.6)
Poor (<75%)	61 (25.4)

Attitude toward ORS was assessed using a series of attitude statements measured on a **Likert scale**. Respondents were asked to indicate their level of agreement with statements regarding the effectiveness, safety, ease of preparation, and willingness to use ORS in the management of childhood diarrhoea. Responses were scored and summed to obtain an overall attitude score. Respondents who scored 75% or above of the maximum obtainable score were classified as having a good attitude, while those who scored below 75% were classified as having a poor attitude.

Table 4.6. Association between socio-demographic characteristics and knowledge level

Characteristic	Category	Poor knowledge (0–2)	Fair knowledge (3–5)	Good knowledge (6–8)	χ^2	Df	P value
Age of mother	Below 35 years	10	14	153	0.42	2	0.979
	Above 35 years	4	5	54			
Marital status	Married	13	17	200	2.555	2	0.279
	Unmarried	1	2	7			
Tribe	Hausa	12	17	196	2.445	2	0.294
	Others	2	2	11			
Religion	Islam	13	18	199	0.415	2	0.813
	Others	1	1	8			
Education status	Below tertiary	9	14	154	0.692	2	0.707
	Above tertiary	5	5	53			
Occupation	Employed	4	1	53	4.086	2	0.130
	Unemployed	10	18	154			

Note: Knowledge score was computed from eight knowledge questions. Correct responses were scored 1 and incorrect responses scored 0. Total scores were categorized as Poor (0–2), Fair (3–5), and Good (6–8).

Table 4.6 shows age of the mother, marital status, tribe, religion, educational status, and occupation were not significantly associated with respondents' ORS knowledge level (Table 4.7; $p > .05$ for all comparisons).

Table 4.7. Association between socio-demographic characteristics and ORS utilization

Characteristic	Category	Yes (ORS used)	No (ORS not used)	χ^2	df	P value
Age of mother	Below 35 years	81	96	0.033	1	0.857
	Above 35 years	28	35			
Marital status	Married	106	124	1.000	1	0.317
	Unmarried	3	7			
Tribe	Hausa	107	118	6.644	1	0.01*
	Others	2	13			
Religion	Islam	105	125	0.124	1	0.725
	Others	4	6			
Education status	Below tertiary	86	91	2.735	1	0.098
	Above tertiary	23	40			
Occupation	Employed	19	39	4.943	1	0.026*
	Unemployed	90	92			

Employed and Hausa respondents were more likely to use ORS than unemployed and non-Hausa respondents. Age of the mother, marital status, religion and educational status were found not to affect ORS utilization.

DISCUSSION

The findings show high maternal knowledge of ORS (86.3%) and generally positive attitudes towards ORS (74.6%) in the study community; however, reported ORS use during recent diarrhoeal episodes was suboptimal (45.4%), indicating a knowledge–practice gap. While most respondents had heard of ORS (89.2%) and reported knowing how to prepare it (85.8%), only 26.7% correctly identified the recommended ratio of one sachet per liter of water, suggesting that "awareness" does not necessarily translate into correct preparation and optimal use. In addition, zinc use was low: only 30.0% of mothers reported administering zinc during diarrhoeal episodes, despite WHO recommendations for combined ORS and zinc therapy. The low uptake of zinc may reflect limited caregiver knowledge about zinc benefits and recommended duration, inconsistent availability, or affordability barriers; similar gaps have been reported in multi-country analyses and programme reports (Reiner, R. C., Wiens, K. E., Fuhrmeister, J. S., Deshpande, A., Baumann, M. M., Blacker, B. F., et al. (2018); UNICEF, 2022). Overall, these findings suggest that interventions should complement health messaging with practical demonstrations, strengthened counselling, and measures that address contextual barriers to access and correct use.

Consistent with increased community exposure to child-health messaging, this study found high awareness and knowledge of ORS (89.2% had heard of ORS and 86.3% demonstrated good knowledge). These levels appear higher than those reported in Sokoto State by Abdulraheem et al. (2018) and in Kebbi State by Saka et al. (2019), where correct knowledge and use were comparatively lower, possibly reflecting differences in maternal education, intensity of health education activities, and access to health services. Compared with national evidence, the higher knowledge observed in Gusau may also

suggest stronger local dissemination of ORS information than that reflected in the Nigeria Demographic and Health Survey 2018, which documented persistent gaps in correct knowledge and optimal use, particularly in the North-West (NPC & ICF, 2019). Importantly, even with high awareness, the low proportion correctly identifying the one-sachet-per-liter preparation underscores the need for practical demonstrations and repeated counselling to improve correct preparation and administration.

ORS utilisation in this study was 45.4%, indicating that fewer than half of children with recent diarrhoea received ORS. This estimate is within the range reported in several sub-Saharan African settings (approximately 30%–50%), although substantial variation exists across countries and contexts (Mengistie et al., 2013; Reiner et al., 2018). Compared with national data, the observed utilisation is higher than the Nigeria Demographic and Health Survey 2018 estimate of 39.7%, which documented suboptimal ORS use nationwide and particularly in the North-West (NPC & ICF, 2019). Nonetheless, utilization remains below optimal levels given that ORS is recommended for virtually all episodes of acute watery diarrhea to prevent dehydration; the persistence of suboptimal use despite high awareness reinforces the need to address correct preparation, timely initiation, and practical barriers to obtaining ORS.

Across Nigeria, published estimates of ORS use vary by region. Studies from southern states, including Ogun and Enugu, have reported utilization rates around or above 50% in some settings, which are slightly higher than the 45.4% observed in Gusau (Adejumo et al., 2017; Onyiriuka et al., 2016). In northern Nigeria, studies have reported lower ORS utilization in some settings; for example, a study in Bauchi State reported rates ranging from 35% to 42% (Sule et al., 2015), which are lower than the estimate in the present study. These differences may reflect heterogeneity in caregiver education, access to commodities, and the intensity of health-promotion activities; however, direct comparisons should be interpreted cautiously because study designs, recall periods, and study populations differ.

Taken together, the findings indicate that ORS utilization in Gusau is higher than the NDHS 2018 national estimate and broadly consistent with patterns reported across sub-Saharan Africa, yet still below desired levels. The combination of high awareness with gaps in correct preparation and modest uptake of zinc underscores the importance of implementation-focused strategies, including repeated counselling, community demonstrations, and improved commodity availability—particularly in northern settings where structural constraints may be greater.

In this study, ORS utilization was significantly associated with tribe and occupation, but not with age, educational level, or religion. This finding partially concurs with previous studies, which reported that socioeconomic and cultural factors influence ORS utilization among mothers. However, it contradicts studies that found maternal age and educational level to be significant predictors of ORS use **(Abdulr**aheem et al., 2018). Although the underlying mechanisms cannot be established from a cross-sectional design, these associations may reflect differences in health-seeking behaviour, social networks through which health information is shared, and household constraints such as time and income that influence ability to obtain ORS and to provide frequent feeds during illness. The absence of an observed association with education should be interpreted cautiously, as education may still influence ORS use indirectly through knowledge quality, autonomy, and access to health services; residual confounding and limited variability within the sample may also contribute.

CONCLUSION

This study assessed mothers' knowledge, attitude, and utilization of Oral Rehydration Solution (ORS) in the management of childhood diarrhea among children aged 0–5 years in Gusau, Zamfara State. The

findings revealed that most respondents had good knowledge of ORS (86.3%) and a positive attitude toward its use (74.6%). However, despite the high level of awareness and knowledge, ORS utilization during recent diarrheal episodes was suboptimal (45.4%), indicating a gap between knowledge and actual practice. Although the majority of mothers reported knowing how to prepare ORS, only a small proportion correctly identified the recommended preparation ratio of one sachet per liter of water, suggesting deficiencies in practical knowledge and application.

The study also found low utilization of zinc supplementation alongside ORS, despite recommendations by the World Health Organization and UNICEF for combined ORS and zinc therapy in the management of childhood diarrhea (WHO & UNICEF, 2023). Furthermore, ORS utilization was significantly associated with tribe and occupation but not with age, educational level, religion, or marital status. These findings suggest that socio-cultural and economic factors may be associated with ORS utilization.

Overall, the study concludes that while awareness and knowledge of ORS are relatively high in the study area, challenges remain regarding correct preparation, consistent utilization, and zinc supplementation. Addressing these gaps is essential for improving the management of childhood diarrhea and reducing morbidity and mortality among under-five children in the study area.

RECOMMENDATIONS

i. Health workers should provide regular practical demonstrations on the correct preparation and administration of ORS during antenatal clinics, postnatal clinics, immunization sessions, and child welfare services to improve mothers' practical knowledge and skills (WHO, 2023).
ii. Community-based health education programmes should be strengthened to emphasize not only awareness of ORS but also correct preparation, timely initiation, continued feeding during diarrhea, and the importance of zinc supplementation (UNICEF, 2022).
iii. Government and healthcare authorities should ensure the continuous availability and affordability of ORS and zinc supplements in health facilities, pharmacies, patent medicine stores, and community distribution centres, particularly in underserved communities.
iv. Community health extension workers should conduct regular outreach activities and home visits to reinforce appropriate diarrhea management practices among mothers and caregivers.
v. Health promotion interventions should consider socio-cultural and occupational factors that influence ORS utilization and should be tailored to address barriers affecting specific population groups.
vi. Further research should employ qualitative or mixed-method approaches to explore the reasons for the observed knowledge–practice gap and identify factors influencing the low uptake of zinc supplementation among mothers of under-five children.

REFERENCES

Abdulraheem, I. S., et al. (2018). Knowledge and use of oral rehydration therapy among mothers in Sokoto State, Nigeria. *Journal of Community Medicine and Primary Health Care, 30*(1), 15–23.

Abolurin, O. O., Adebayo, A. M., & Olorunsogo, O. O. (2021). Knowledge and utilization of oral rehydration therapy among mothers of under-five children in Southwestern Nigeria. *African Journal of Primary Health Care & Family Medicine, 13*(1), 1–8.

Adedokun, S. T., & Bishwajit, G. (2017). The prevalence and correlates of diarrhea among young children in Nigeria: A multilevel analysis. *Journal of Infection and Public Health, 10*(6), 806–812. https://doi.org/10.1016/j.jiph.2016.08.006

Adejumo, A. O., et al. (2017). Knowledge and utilization of oral rehydration therapy among mothers of under-five children in Ogun State, Nigeria. *Journal of Community Medicine and Primary Health Care, 29*(1), 45–54.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Bello, M. A., Ibrahim, A. A., & Sani, U. M. (2024). Determinants of oral rehydration solution utilization among mothers of under-five children in Northern Nigeria. *Nigerian Journal of Community Medicine, 29*(1), 45–53.

Dessie, G., Ayele, T., & Hailu, A. (2022). Knowledge and utilization of oral rehydration solution among mothers of under-five children in sub-Saharan Africa: A systematic review. *BMC Public Health, 22*, 1456. https://doi.org/10.1186/s12889-022-1456-0

Iloh, G. U. P., et al. (2015). Caregivers' knowledge and use of ORS in Enugu State, Nigeria. *Nigerian Medical Journal, 56*(3), 214–218. McLeroy, K. R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. *Health Education Quarterly, 15*(4), 351–377. https://doi.org/10.1177/109019818801500401

Mengistie, B., Berhane, Y., & Worku, A. (2013). Predictors of oral rehydration therapy use among under-five children with diarrhea in Ethiopia. *BMC Public Health, 13*, 1. https://doi.org/10.1186/1471-2458-13-1

National Population Commission (NPC) [Nigeria], & ICF. (2019). *Nigeria demographic and health survey 2018*. NPC and ICF.

National Population Commission (NPC) [Nigeria], & ICF. (2023). *Nigeria demographic and health survey 2023: Key indicators report*. NPC and ICF.

Okechukwu, C., Alabi, A., & Yaguo-Ide, L. E. (2022). Knowledge and use of oral rehydration solution in the management of childhood diarrhoea among mothers in a tertiary health facility in Port Harcourt, Nigeria. *Journal of Advances in Medical and Pharmaceutical Sciences, 24*(2), 42–49.

Onyiriuka, A. N., et al. (2016). Caregivers' management of childhood diarrhea in Enugu, Nigeria. *Nigerian Journal of Paediatrics, 43*(2), 95–101.

Reiner, R. C., Wiens, K. E., Fuhrmeister, J. S., Deshpande, A., Baumann, M. M., Blacker, B. F., et al. (2018). Variation in oral rehydration solution and zinc use across low- and middle-income countries. *The Lancet Global Health, 6*(7), e798–e806. https://doi.org/10.1016/S2214-109X(18)30245-8

Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social learning theory and the Health Belief Model. *Health Education Quarterly, 15*(2), 175–183. https://doi.org/10.1177/109019818801500203

Sule, S. S., et al. (2015). Home management of diarrhea among mothers in Bauchi State, Nigeria. *Nigerian Medical Journal, 56*(1), 28–33.

Ugwu, J. I., Ezeagu, I. E., & Ibegbu, M. D. (2019). Awareness and practice of zinc therapy in diarrheal management among under-five caregivers in Enugu State, Nigeria. *International Journal of Medicine and Health Development, 24*(2), 63–69. https://doi.org/10.4103/1110-1067.271082

UNICEF. (2019). *Diarrhoea remains a leading killer of young children, despite the availability of a simple treatment solution*. https://data.unicef.org/topic/child-health/diarrhoeal-disease/

UNICEF. (2022). *Diarrhoea: Why children are still dying and what can be done*.

UNICEF. (2024). *The state of the world's children 2024*. United Nations Children's Fund.

Usman, H. A., & Kareem, A. O. (2025). Cultural beliefs and acceptance of oral rehydration solution among mothers of under-five children in Northwestern Nigeria. *African Journal of Health Sciences, 38*(1), 22–31.

World Health Organization. (2017). *Diarrhoeal disease*. https://www.who.int/news-room/fact-sheets/detail/diarrhoeal-disease

World Health Organization. (2023). *Diarrhoeal disease fact sheet*. World Health Organization.

World Health Organization, & UNICEF. (2023). *Ending preventable child deaths from pneumonia and diarrhoea: Progress report 2023*. World Health Organization and United Nations Children's Fund.

Yakubu, L., Muhammad, U. D., Fatima, M., & Sambo, S. U. (2018). Practices of mothers of under five years children regarding home management of diarrheal diseases in Sokoto South Local Government, Nigeria. *International Journal of Nursing and Medical Science, 2*(1), 1–8.