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Original Article

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Knowledge, Attitudes, and Practices Regarding Oral Rehydration Solution Use Among Mothers of Children Under Two Years in Jimma Town

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Abstract

Diarrhea remains a major cause of child mortality in sub-Saharan Africa. Although Oral Rehydration Solution is a highly effective intervention, its utilization in Ethiopia is low. This community-based study assessed the knowledge, attitudes, and practices of 301 mothers of children under two years in Jimma Town, Ethiopia during March-April 2024. Most mothers (86.7%) held positive attitudes, recognizing Oral Rehydration Solution's importance for diarrhea treatment (73.5%) and its life-saving potential (71.1%). However, significant knowledge gaps existed: only 46.5% demonstrated adequate understanding. While 87.4% had heard of Oral Rehydration Solution, just 53.2% knew its purpose (fluid replacement), 59.1% understood correct preparation, and 36.1% knew about homemade alternatives. Practice was suboptimal, with only 49.8% using Oral Rehydration Solution during their child's last diarrhea episode. Harmful practices included drug administration (20.6%) and feeding cessation (15.6%). Multivariate analysis identified maternal knowledge as the strongest predictor of Oral Rehydration Solution use (21 times higher odds), followed by literacy (6 times higher odds) and physical access (4 times higher odds). Despite favorable attitudes, critical knowledge deficiencies and inadequate practice persist. Interventions must prioritize targeted education addressing preparation and misconceptions, enhance maternal literacy, and ensure reliable access to Oral Rehydration Solution to reduce preventable child deaths.

Keywords: ***ORS utilization, Diarrhea management, Under-two children, Maternal health, Jimma Ethiopia.***

Introduction

Diarrheal diseases persist as a leading cause of childhood mortality in sub-Saharan Africa (SSA), accounting for the second highest number of deaths among children under five [1]. This burden reflects systemic challenges including inadequate sanitation, food insecurity, and limited healthcare access [1,2], with profound physical, emotional, and economic impacts on families and health systems [1]. Oral Rehydration Solution (ORS), recognized as one of modern medicine's most significant advances [3], remains the cornerstone of diarrheal dehydration management. When used correctly and promptly, ORS can prevent up to 93% of diarrheal deaths [4], and scaling coverage has averted tens of thousands of deaths globally [5].

Despite its proven efficacy, ORS utilization remains critically low across low- and middle-income countries (LMICs). Global mapping reveals coverage below 50% in 62.6% of regions, leaving an estimated 6.5 million children without ORT annually [5]. In Ethiopia, national utilization rates are suboptimal (30%), with significant geographical disparities [6,7]. While interventions like vaccines and community case management have reduced diarrheal mortality by 53% [8], persistent gaps in ORS use hinder further progress. Barriers are multifaceted, spanning supply chain weaknesses (e.g., stock-outs), knowledge dissemination failures, and sociocultural factors [9,10]. Critically, significant discrepancies exist between ORS awareness and correct practice: studies highlight widespread preparation errors, delayed initiation (often only at dehydration signs), and premature discontinuation [9]. Maternal knowledge gaps-driven by low literacy and misconceptions are key obstacles to appropriate use [11].

In Ethiopia, ORS utilization is influenced by maternal education, urban residence, media exposure, health insurance, health-seeking behavior, and prenatal care engagement-mothers with ≥4 prenatal visits are 87% more likely to use ORS [6]. Conversely, misconceptions linking diarrhea to teething or weaning reduce utilization [12]. Within Jimma Zone, diarrheal prevalence remains high (14.9%), especially among children under two [13]. While ORS availability is moderate (84.7% utilization when accessible), stock-outs persist (averaging 33 days/year), and non-priority medicines are often prescribed [10]. A prior study in Jimma Town found only 54.3% of caregivers demonstrated good diarrheal management practices [14], but focused KAP data on mothers of children under two years a group at heightened risk of rapid dehydration remains limited.

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Critically, a persistent gap exists between knowledge of ORT and its practical application, particularly in developing countries where information dissemination is often restricted to healthcare centers and professionals [15]. This is starkly evident in Ethiopia's high-risk regions, where ORS utilization remains critically low (28%) and heavily influenced by socioeconomic factors including residence, maternal education, health insurance coverage, and media exposure [16].

Consequently, this study assesses the Knowledge, Attitudes, and Practices (KAP) regarding ORS use among mothers of children under two years in Jimma Town, Ethiopia. By identifying localized barriers (e.g., knowledge gaps, supply chain issues, misconceptions) and facilitators (e.g., health system engagement, education), findings will inform targeted interventions to optimize ORS utilization and reduce preventable child mortality.

Methodology

Study Area and Period

The study was conducted in Jimma Town, Oromia Region, Ethiopia (7°40′N, 36°50′E; elevation: 1,780 m), during March-April 2024. Jimma is the largest city in southwestern Ethiopia, with a population of approximately 224,000, distributed across 17 kebeles and 42,742 households [10]. Health facilities in the town including hospitals, health centers, private clinics, and pharmacies offer access to oral rehydration salts (ORS) for the local population.

Study Design

A community-based cross-sectional study design was employed, in line with standard Knowledge, Attitude, and Practice (KAP) research methodologies.

Sample Size Calculation

The sample size was calculated using the single population proportion formula:

n = (Z^2 * p * (1 - p)) / d^2

Where:

- Z is the Z-value for a 95% confidence level
- p is the proportion of ORS knowledge based on a previous study in Wolaita Sodo [17]
- d is the margin of error

Substituting the values

n = (1.96)^2 * 0.744 * (1 - 0.744) / (0.05)^2
= 3.8416 * 0.744 * 0.256 / 0.0025
≈ 291.6

The calculated sample size was approximately 292.

After adding a 5% non-response rate:

n_final = 292 + (292 × 0.05) = 292 + 14.6 ≈ 306

Thus, the final sample size was 306 mothers.

Sampling Technique

A multistage cluster sampling approach was used to select study participants:

1. Stage 1 - Kebeles Selection:
Nine kebeles were selected systematically from Jimma's 17 administrative units.

Kebeles were listed in ascending numerical order (1-17).

Sampling interval: 2, with a random start at kebele 1.

Selected kebeles: 1, 3, 5, 7, 9, 11, 13, 15, 17 (boundary mapping ensured no overlap).

2. Stage 2 - Garee Enumeration:
All Garee clusters (neighborhood units of approximately 25–35 households) within the selected kebeles were enumerated in collaboration with local administrators.

3. Stage 3 - Household Selection:
A comprehensive household list was obtained from each kebele office.

Sampling interval () was calculated as:
k = \frac{\text{Total households in 9 kebeles}}{306}

4. Stage 4 - Participant Selection:
In households with more than one eligible mother, one was selected using the lottery method.

For non-response, the next eligible household was selected as a replacement.

Measurements

Data Collection: A structured questionnaire (translated into Amharic and Afan Oromo) was pretested on 31 participants (10% of sample size) to ensure clarity and effectiveness [12]. Four trained nurses conducted face-to-face interviews after obtaining oral consent.

Data Processing: Data were entered into EpiData (v3.1) and analyzed using SPSS (v23). Descriptive statistics (frequencies/percentages) were computed. Variables with in bivariate analysis were included in multivariable logistic regression. Results are reported with adjusted odds ratios (AOR) and 95% confidence intervals (significance at).

Quality Assurance

Daily checks ensured questionnaire completeness and accuracy. Double data entry minimized errors. Questionnaire clarity and reliability were confirmed during pretesting [12].

Operational Definitions [14]

ORS Awareness: A "Yes" response to having heard of ORS for diarrhea treatment.

Functional Knowledge: ≥50% correct responses on six key questions (purpose, preparation, duration, mechanism, alternatives).

Positive Attitude: ≥50% agreement on eight attitude statements.

ORS Practice: "Yes" to using ORS during the child's last diarrhea episode.

Literacy Status: Self-reported ability to read/write simple sentences in Amharic or Afan Oromo.

ORS Access: Physical access to ORS within one hour when needed.

Harmful Practices: Includes feeding cessation, unnecessary drug use, or no treatment.

Limitations

Cross-sectional design limits causal inferences. Self-reported practices may involve recall or social desirability bias. The urban setting restricts rural generalizability.

Information Dissemination

Findings will be shared with Jimma University Research Program, College of Public Health, and Jimma Town Health Bureau.

Results

Result Socio-Demographic Characteristics of Mothers with Children Under Two Years in Jimma Town

The study achieved a 98.4% response rate (301/306), minimizing non-response bias and enhancing the representativeness of the findings. Sociodemographic profile of the study participants, including traditional variables (literacy, health information sources, ORS access) and newly added critical indicators (age, marital status, occupation, and income). The cohort shows diverse representation across age groups, with the majority (42.19%) falling into the 25-34 age range, typical of primary child caregivers. Marital status reflects cultural norms, with 82.39% married, suggesting household decision-making dynamics may influence health behaviors. Occupational distribution reveals 61.46% were homemakers/unemployed, potentially affecting health-seeking autonomy, while 23.26% worked in agriculture/labor, indicating socioeconomic constraints. Income stratification shows 44.85% earned below the poverty line (< 3000/month), which may limit healthcare access. Literacy rates remain concerning (60.13% illiterate), and health information sourcing shows heavy reliance on formal channels (92.02% from health institutions). ORS procurement patterns confirm good physical access (98.48% from health centers) but reveal knowledge gaps (3.42% unaware of sources).

Table 1: Result Socio-Demographic Characteristics of Mothers with Children Under Two Years in Jimma Town

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	18–24	45	14.95
	25–34	127	42.19
	35–44	98	32.56
	≥45	31	10.30
Marital Status	Married	248	82.39
	Unmarried/Divorced/Widowed	53	17.61
Occupation	Homemaker/Unemployed	185	61.46
	Agriculture/Daily Labor	70	23.26
	Skilled/Professional	46	15.28
Monthly Income	< 3000 Etb	135	44.85
	3001---10,000Etb	112	37.21
	> 1000 Etb	54	17.94
Literacy Status	Can read/write	120	39.87
	Cannot read/write	181	60.13
Source of Health Information	Health institution	277	92.02
	Mass media	61	20.15
	Schools	15	4.94
	Others	15	4.94
Source of ORS	Health center	296	98.48
	Drug vendor shop	294	97.72
	Any shop	23	7.60
	Don’t know	10	3.42

Attitude of mothers toward the use of oral rehydration solution (ORS) for children under two years in Jimma Town.

The study assessed the attitudes of 301 participants toward the use of Oral Rehydration Salts (ORS) for managing diarrheal diseases. Most respondents demonstrated a favorable view of ORS, with 73.5% (combined “Agree” and “Strongly Agree”) recognizing that ORS is important for treating diarrhea. Similarly, a substantial proportion (68.1%) agreed that ORS should be given at the first sign of diarrhea, and 71.1% believed ORS prevents dehydration and can save lives. These findings suggest a generally positive perception of ORS's role in early intervention and life-saving potential. However, attitudes diverged concerning misconceptions, such as the belief that ORS requires a health worker's consultation (only 21.6% agreed or strongly agreed), or that it is only for severe diarrhea cases (11.6% agreed or strongly agreed), indicating that misinformation still exists among a minority of the population.

Interestingly, the study also found that negative or uncertain attitudes persist in certain areas. A notable proportion of respondents preferred using drugs over ORS (14.9% agreed or strongly agreed), revealing a potential barrier to ORS utilization. Moreover, misconceptions about ORS’s safety and ease of use remain-only a small fraction agreed that ORS has side effects (7.4%) or is difficult to prepare (10%). These insights highlight the need for targeted education to address lingering doubts and promote accurate understanding of ORS. Strengthening awareness campaigns and incorporating community health workers in education efforts could help reinforce ORS as a safe, effective, and accessible intervention for all diarrhea cases, not just the severe ones.

Table 2: Attitude of mothers toward the use of oral rehydration solution (ORS) for children under two years in Jimma Town.

Attitude Statement	Strongly Disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Strongly Agree n (%)
ORS is important for treating diarrhea	15 (5.0%)	35 (11.6%)	30 (10.0%)	101 (33.6%)	120 (39.9%)
ORS should be given at first sign of diarrhea	18 (6.0%)	43 (14.3%)	35 (11.6%)	96 (31.9%)	109 (36.2%)
ORS prevents dehydration/saves lives	16 (5.3%)	41 (13.6%)	30 (10.0%)	98 (32.6%)	116 (38.5%)

I prefer drugs over ORS	140 (46.5%)	91 (30.2%)	25 (8.3%)	28 (9.3%)	17 (5.6%)
ORS requires health worker consultation	115 (38.2%)	86 (28.6%)	35 (11.6%)	40 (13.3%)	25 (8.3%)
ORS is only for severe cases	142 (47.2%)	94 (31.2%)	30 (10.0%)	22 (7.3%)	13 (4.3%)
ORS has side effects	155 (51.5%)	104 (34.6%)	20 (6.6%)	14 (4.7%)	8 (2.7%)
ORS is difficult to prepare	148 (49.2%)	98 (32.6%)	25 (8.3%)	22 (7.3%)	8 (2.7%)

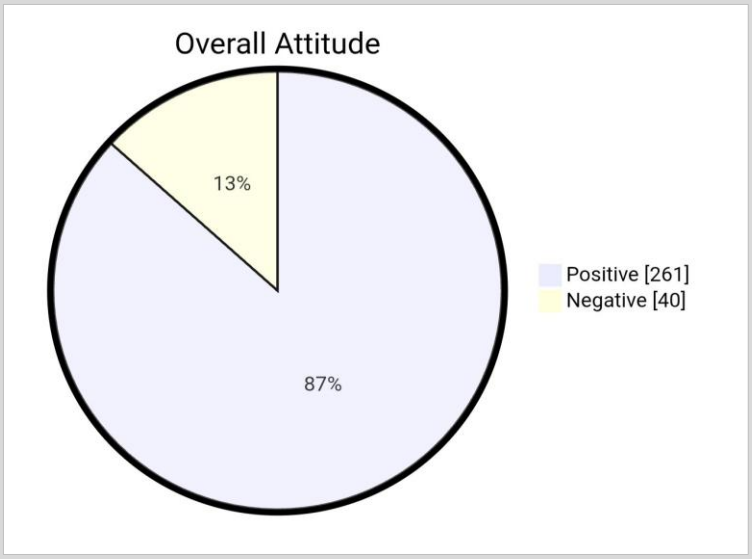

Figure 1: Overall attitude of mothers toward the use of Oral Rehydration Solution (ORS) for children under two years in Jimma Town.

The figure illustrates that the majority of mothers (86.71%) demonstrated a positive attitude toward the use of ORS, while a smaller proportion (13.29%) showed a negative attitude. This reflects a generally favorable perception of ORS use among the study participants.

Knowledge of mothers regarding the use of oral rehydration solution (ORS) for childhood diarrhea.

Critical knowledge dimensions regarding ORS understanding were identified. While basic awareness was high (87.38% familiarity), substantive knowledge showed significant deficits - only 53.23% correctly identified fluid replacement as ORS's primary purpose, and just 59.14% understood proper preparation protocols. Encouragingly, 76.05% recognized the 24-hour usage window, but deeper comprehension lagged, with only 42.59% understanding ORS's rehydration (versus antidiarrheal) mechanism and 36.12% aware of homemade alternatives. The knowledge classification reveals that less than half (46.51%) achieved satisfactory understanding, highlighting substantial gaps in comprehensive ORS education despite high nominal awareness.

Table 3: Knowledge of mothers regarding the use of oral rehydration solution (ORS) for childhood diarrhea.

Knowledge Component	Yes (n, %)	No (n, %)
Heard of ORS	263 (87.38%)	38 (12.62%)
Knows the purpose of ORS (fluid replacement)	140 (53.23%)	123 (46.77%)
Knows correct preparation steps	178 (59.14%)	123 (40.86%)
Knows ORS should be discarded after 24 hours	200 (76.05%)	63 (23.95%)
Knows ORS does not stop diarrhea but prevents dehydration	112 (42.59%)	151 (57.41%)
Knows ORS can be made at home (homemade solution with correct amount)	95 (36.12%)	168 (63.88%)
Knowledgeable	140	46.51 %
Not Knowledgeable	161	53.49 %

Note: Items 2-6 percentages derived from subset who reported ORS awareness (n=263).

Practice of mothers related to the use of oral rehydration solution (ORS) for managing diarrhea in children under two years.

Eight concrete practice indicators for diarrhea treatment were documented. ORS utilization (49.83%) and homemade fluid use (53.16%) showed moderate adoption, while concerning practices included pharmaceutical use (20.60%) and inappropriate feeding cessation (15.60%). Positive behaviors like increased fluid intake (61.46%) and continued breastfeeding (43.85%) coexisted with treatment inertia (2.00% inaction). Medical help-seeking for persistent cases (29.90%) suggests room for improved health literacy. These practice patterns reveal a complex landscape where appropriate and inappropriate behaviors simultaneously persist within the community.

Table 4: Practice of mothers related to the use of oral rehydration solution (ORS) for managing diarrhea in children under two years.

Practice	Yes (n, %)	No (n, %)
1. Ever used ORS for diarrhea management	150 (49.83%)	151 (50.17%)
2. Used homemade fluids (e.g., salt-sugar solution)	160 (53.16%)	141 (46.84%)
3. Used drugs (e.g., antibiotics, antidiarrheals)	62 (20.60%)	239 (79.40%)
4. Stopped feeding during diarrhea episodes	47 (15.60%)	254 (84.40%)

5. Increased fluid intake during diarrhea	185 (61.46%)	116 (38.54%)
6. Continued breastfeeding (if applicable)	132 (43.85%)	169 (56.15%)
7. Sought medical help when diarrhea persisted	90 (29.90%)	211 (70.10%)
Did nothing to manage diarrhea	6 (2.00%)	295 (98.00%)

Factors associated with oral rehydration solution (ORS) practice among mothers: Bivariate and multivariate analysis.
A rigorous bivariate and multivariate analysis was conducted to examine the association between various factors and ORS use. Literacy emerged as a powerful enabler, with literate respondents showing 6.43-fold greater odds of ORS use (CI:3.12-10.56). Knowledge demonstrated the strongest association (AOR=21.32, CI:9.23-42.15), underscoring education's pivotal role. Access availability nearly quadrupled utilization likelihood (AOR=3.98, CI:2.03-6.34). All associations were highly significant ($p<0.001$), establishing literacy, knowledge, and access as independent, compounding predictors that collectively explain much of the observed variance in ORS adoption rates within the study population.

Table 5: Factors associated with oral rehydration solution (ORS) practice among mothers: Bivariate and multivariate analysis.

Variable	Category	Used ORS (n=150)	Did Not Use (n=151)	COR (95% CI)	AOR (95% CI)
Literacy	Literate	100	20	7.05 (4.10–12.12)	6.43 (3.12–10.56)
	Illiterate	50	131	1.00	1.00
Knowledge	Knowledgeable	130	10	24.85 (11.54–53.50)	21.32 (9.23–42.15)
	Not Knowledgeable	20	141	1.00	1.00
Access to ORS	Accessible	143	45	4.85 (2.78–8.45)	3.98 (2.03–6.34)
	Not accessible	7	106	1.00	1.00 (Ref)

Note: COR = Crude Odds Ratio; AOR = Adjusted Odds Ratio

Discussion

The present study reveals a complex landscape regarding ORS utilization for childhood diarrhea management in Jimma Town. While demonstrating highly favorable maternal attitudes towards ORS – with the vast majority (86.71%) recognizing its importance, life-saving potential, and necessity at diarrhea onset this positive disposition starkly contrasts with substantial deficits in comprehensive knowledge and suboptimal practice rates. This attitude-knowledge-practice gap is a critical finding, echoing observations from other settings where high awareness does not necessarily translate into correct application [18-20]. Specifically, despite 87.38% of mothers having heard of ORS, only 46.51% were classified as knowledgeable, evidenced by low rates of understanding its fluid replacement purpose (53.23%), correct preparation (59.14%), mechanism of action (42.59%), and homemade alternatives (36.12%). This knowledge deficit directly impacts practice, as evidenced by only 49.83% ever using ORS and persistent harmful practices like pharmaceutical use (20.60%) and inappropriate feeding cessation (15.60%).

The multivariate analysis powerfully underscores that maternal knowledge is the single strongest predictor of ORS practice (AOR=21.32), aligning robustly with multiple studies across diverse contexts [21,12,22]. Literacy emerged as another potent enabling factor (AOR=6.43), consistent with findings that educational attainment significantly enhances ORS knowledge and utilization [16,6]. This highlights the critical role of basic education and targeted health literacy interventions. Furthermore, access to ORS was a significant independent predictor (AOR=3.98), corroborating research emphasizing that availability is a fundamental prerequisite for use [23,10]. The persistent stock-outs documented locally [10] likely contribute to the observed access barrier in Jimma. The compounding effect of literacy, knowledge, and access explains much of the variance in practice, emphasizing that interventions must address these interconnected factors simultaneously.

The coexistence of appropriate practices - such as increased fluid intake (61.46%) and continued breastfeeding (43.85%) - alongside inappropriate ones highlights the nuanced nature of caregiving behaviors. The low rate of seeking medical help for persistent diarrhea (29.90%) is concerning and suggests gaps in recognizing danger signs or accessing care, issues also noted elsewhere [13,24]. Specific misconceptions identified, such as beliefs that ORS is difficult to prepare, requires health worker consultation, or is only for severe cases, mirror challenges documented in Saudi Arabia and Malaysia regarding preparation errors and misunderstanding of urgency [25,20]. These persistent myths, often more prevalent among less educated mothers [18], require focused educational debunking.

The findings strongly support integrated interventions. Health education must move beyond basic awareness to deepen substantive knowledge on correct preparation (using safe water), administration (quantity, continuation during vomiting), mechanism of action (preventing dehydration, not stopping diarrhea), and recognition of danger signs requiring facility care, addressing the specific gaps and misconceptions identified here and in comparable studies [21,25,19]. Leveraging prenatal care contacts, identified as a significant enabler [6], and mass media [16] could effectively reach mothers. Crucially, improving reliable ORS access within the health system supply chain is paramount [10,23]. Finally, strengthening health worker capacity to counsel mothers effectively during facility visits, particularly those with no prior ORS experience or lower literacy, is essential, as health facility contact significantly promotes appropriate use [21,12].

Conclusion

In conclusion, Jimma's findings reinforce the universal architecture of ORS barriers (knowledge-access-myths) while revealing context-specific weightings: its extreme knowledge effect (AOR=21.32) highlights knowledge quality as paramount in urban Ethiopia, and compounding literacy-access barriers differentiate it from settings where provider behavior dominates. These nuances emphasize that standardized global strategies must be calibrated to local diagnostics particularly where linguistic diversity and supply-chain fragility intersect with entrenched misconceptions.

List of Abbreviations

AOR: Adjusted Odds Ratio
CI: Confidence Interval

COR: Crude Odds Ratio
Etb: Ethiopian Birr
KAP: Knowledge, Attitudes, and Practices
LMICs: Low- and Middle-Income Countries
ORS: Oral Rehydration Solution
SPSS: Statistical Package for the Social Sciences
SSA: Sub-Saharan Africa
WHO: World Health Organization

Declarations

Ethical Considerations

The study was approved by Jimma University School of Medicine (Ref: JU/IHRPGD/857/2024). Oral informed consent emphasized refusal and withdrawal rights. Data were collected anonymously.

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Data Availability

The datasets generated and analyzed during this study are not publicly available to protect participant confidentiality but may be made accessible by the corresponding author upon reasonable request, subject to approval from Jimma University's ethics committee.

Conflict of Interest

The authors declare no conflicts of interest.

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