

Original article

Awareness and Practices of Mothers on Home Management of Acute Diarrhea in Children Under Five at Benghazi Children's Hospital, Libya

Salma Elzwai^{1*} , Reema Salih² , Tahani Asnedel¹ , Somaa Atiaya³ , Mabrouka Bofarraj³ ¹Department of Pediatrics, Faculty of Medicine, University of Benghazi, Benghazi, Libya²Department of Pediatrics, Faculty of Medicine, University of Derna, Derna, Libya³Department of Pediatrics, Faculty of Medicine, University of Omar Al-Mukhtar, Al-Bayda, LibyaCorresponding email. drremasaleh2021@gmail.com**Abstract**

Diarrhea is a major contributor to mortality and morbidity among children under five years of age, particularly in developing countries. Despite the effectiveness of Oral Rehydration Solution (ORS) in avoiding dehydration, its proper use at the household level remains suboptimal due to limited maternal awareness and misconceptions. This study was carried out to assess the awareness, knowledge, and practices of mothers regarding home management of acute diarrhea among children under five years at Benghazi Children's Hospital, Libya. This cross-sectional descriptive research was performed in 2023 at the Gastroenterology Department of Benghazi Children's Hospital. A total of 100 mothers of under-five children with acute diarrhea were interviewed using a structured, pretested Arabic questionnaire covering socio-demographic data, knowledge, and home management practices. Information has been examined utilizing SPSS version 25, with $p \leq 0.05$ deemed significant. Only 51% of mothers demonstrated adequate knowledge and practice regarding diarrhea management. Most (92%) continued breastfeeding during diarrhea, yet misconceptions persisted—65% believed excessive ORS is harmful, and 53% stored it improperly. Knowledge about zinc use was low (39%). Maternal age and number of children showed a significant positive correlation with knowledge level ($p < 0.05$), while education, income, and residence showed no significant association. Although awareness of diarrhea management was moderate, gaps in ORS preparation, danger sign recognition, and zinc use persist. Targeted health education programs are essential to improve mothers' knowledge and home-based management practices.

Keywords. Acute Diarrhea, Mothers' Knowledge, Oral Rehydration Solution.**Introduction**

Diarrhea is a major public health challenge and remains one of the main etiologies of illness and death among children under five years of age globally. According to the World Health Organization (WHO), diarrhea accounts for significant morbidity and mortality, especially in developing countries, where access to clean water, sanitation, and adequate healthcare is often restricted [1]. Children under five are specifically vulnerable because their immune systems are not fully developed, and they can quickly become dehydrated due to fluid loss. The consequences of diarrheal diseases go beyond immediate health impacts, as they contribute to malnutrition, impaired growth, and delayed cognitive development, which may have long-lasting effects on a child's overall well-being [2].

Severe dehydration and fluid loss were always the main etiologies of mortality and morbidity related to diarrheal illnesses. Thus, fluid and electrolyte replacement were always essential in the treatment of diarrhea [3]. Effective management of diarrhea in young children is essential to reduce these risks. The cornerstone of treatment is the prompt administration of ORS, a simple, cost-effective, and lifesaving intervention recommended by the WHO [4]. ORS works by replacing lost fluids and electrolytes, preventing dehydration, and reducing the severity and duration of diarrhea. Despite its proven benefits, the utilization of ORS remains suboptimal in many regions due to a lack of awareness, misconceptions, and cultural beliefs. Mothers and primary caregivers play a crucial role in recognizing diarrhea symptoms early and ensuring proper management at home, including the use of ORS and seeking timely medical care when necessary [5]. Understanding the level of mothers' knowledge about the causes, complications, and management of diarrhea is vital for designing effective health education programs. Studies have shown that mothers' knowledge and practices are influenced by various factors like educational level, socioeconomic status, access to health information, and cultural practices [6]. This study aimed to evaluate mothers' knowledge about the causes and complications of diarrhea in children under five, and their awareness of using Oral Rehydration Solution (ORS) during acute diarrheal episodes. It also examines the association between mothers' knowledge and factors like education, income, and access to health information.

Methods

This cross-sectional survey was performed at the Gastroenterology Department in Benghazi Hospital, on 100 mothers of children under five years of age who had experienced acute diarrheal episodes.

Inclusion Criteria

Mothers of children under five years old, Children presenting with acute diarrhea (defined as passage of three or more loose or watery stools per day for less than 14 days), Mothers who agreed to participate in the

study and provided verbal consent, and Mothers who were available and able to communicate throughout the information collection period.

Exclusion Criteria

Mothers of children with chronic diarrhea (lasting more than 14 days), Children with known gastrointestinal disorders, congenital malformations, or chronic systemic diseases, Mothers who refused to participate or did not complete the questionnaire, and Healthcare professionals (to avoid bias from prior medical knowledge).

Data Collection Tool

Data were collected using a structured questionnaire, developed by the researchers based on a review of relevant literature and in consultation with pediatric specialists. The instrument was translated into Arabic and assessed for clarity and cultural appropriateness. It comprised three sections: the first collected socio-demographic characteristics, including maternal age, education, family income, residence, number of children, and family structure; the second assessed maternal knowledge regarding the causes, prevention, complications, and danger signs of diarrhea, as well as knowledge of Oral Rehydration Solution (ORS) and zinc supplementation; and the third evaluated maternal practices during diarrheal episodes, focusing on the preparation and use of ORS, feeding habits, and health-seeking behavior.

Data Collection Procedure

Each mother was interviewed face-to-face by trained researchers in a private and comfortable setting within the hospital. The objective of the research has been clarified, and verbal consent has been obtained. The average duration of each interview was approximately 15–20 minutes. Confidentiality and anonymity of the participants were strictly maintained.

Ethical Considerations

Ethical approval has been gained from the Research and Ethics Committee of Benghazi Hospital. Participation was voluntary, and informed consent was gained from all participants. Information confidentiality and anonymity have been ensured throughout the study.

Statistical Analysis

Data were entered, and the Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize the data. The Chi-square test was applied to examine associations between categorical parameters, and Pearson correlation was used to evaluate the association between continuous parameters (e.g., mothers' age, number of children, and knowledge levels). A p-value ≤ 0.05 has been deemed statistically significant.

Results

Table 1 shows that the mean mothers' age was 31.06 ± 6.8 years. Most of the children (79%) were ≤ 2 years, while 21% were older than 2 years. Regarding residency, 68% lived in urban areas and 32% in rural areas. Family income was >1000 DR in 60% of cases and ≤ 1000 DR in 40%. The majority (80%) belonged to nuclear families, 46% of mothers had 3–4 children, and 42% had a university education or higher.

Table 1. Demographic data in the examined group.

Demographic data	Examined group N=100
Mothers' age (years) Mean $\pm$ SD	31.06 $\pm$ 6.8
Children's age	
≤ 2 years	79 (79%)
>2 years	21 (21%)
Residency	
Urban	68 (68%)
Rural	32 (32%)
Income	
≤ 1000 DR	40 (40%)
> 1000 DR	60 (60%)
Nuclear family type	80%
Number of children (3–4)	46%
Mothers with a university education and above	42%

Table 2 shows that 53% had 3 episodes of diarrhea or more, 51% had adequate knowledge and practice regarding management of diarrhea, 13% not know the cause of diarrhea, 2% said teething, 2% change milk, 7% not know how to prevent diarrhea, 7% used only breast feeding for their children <6 months of age, 46% used filtered water supply, 49% used boiled water in preparing ORS, 66% used adequate amounts of water, 49% agree that prepared ORS must be used within 24 hours from preparation, 68% had good preparation of ORS, 70% gave good quantity of ORS, 65% believed excessive ORS intake is harmful, 53% said harm to keep ORS for longer period, 63% said ORS must be used till diarrhea stop, 63% no change in child diet during diarrhea, 92% agreed to continued breastfeeding during diarrhea, 59% used banana in their child diet, 30% said not stop ORS if diarrhea continued, 69% stop ORS if vomiting continued, 72% continued bottle feeding during diarrhea, 49% had adequate knowledge and practice regarding management of diarrhea, 71% ORS must be advised by Dr, 68% of mothers used ORS before, and 39% agree that Zinc used in diarrhea.

Table 2. Knowledge and practices of diarrhea and ORS in the studied group.

Variables	Examined group N=100
≥3 episodes of diarrhea	53 (53%)
Adequate knowledge & practice in diarrhea management	51 (51%)
Did not know the cause of diarrhea	13 (13%)
Believed teething is a cause	2 (2%)
Believed changing milk is a cause	2 (2%)
Did not know how to prevent diarrhea	7 (7%)
Exclusive breastfeeding (<6 months)	7 (7%)
Used filtered water supply	46 (46%)
Used boiled water to prepare ORS	49 (49%)
Used an adequate amount of water in ORS preparation	66 (66%)
Believed ORS must be used within 24 hours	49 (49%)
Good ORS preparation	68 (68%)
Gave a good quantity of ORS	70 (70%)
Believed excessive ORS intake is harmful	65 (65%)
Believed keeping ORS for long is harmful	53 (53%)
Believed ORS should be used until diarrhea stops	63 (63%)
No change in the child's diet during diarrhea	63 (63%)
Continued breastfeeding during diarrhea	92 (92%)
Used a banana in the child's diet	59 (59%)
Did not stop ORS if diarrhea continued	30 (30%)
Stopped ORS if vomiting occurred	69 (69%)
Continued bottle-feeding during diarrhea	72 (72%)
ORS must be advised by a doctor	71 (71%)
Used ORS before	68 (68%)
Believed that zinc should be used in diarrhea	39 (39%)

Table 3 shows that 41 mothers (41.0%) did not know any early dangerous signs of diarrhea, while 28 mothers (28.0%) recognized sunken eyes. In addition, 17 mothers (17.0%) reported sunken eyes and bloody diarrhea, and 9 mothers (9.0%) reported excessive thirst, sunken eyes, and bloody diarrhea. Very few mothers reported other signs, such as bloody diarrhea (3.0%), excessive thirst and sunken eyes (1.0%), or excessive thirst and bloody diarrhea (1.0%) (Table 1).

Table 3. Knowledge of early dangerous signs of diarrhea

Variables	Examined group N=100	
	Frequency	Percent
Sunken eyes	28	28%
Excessive thirst and sunken eyes	1	1%
Bloody diarrhea	3	3%
Excessive thirst and bloody diarrhea	1	1%
Sunken eyes and bloody diarrhea	17	17%
Excessive thirst, sunken eyes, and bloody diarrhea	9	9%
Did not know any signs	41	41%

Table 4 shows that good knowledge was highest among mothers aged 30–35 years (39.3%), while poor knowledge was more frequent among those aged 25–30 years (28.6%) and 20–25 years (31%). Only one mother under 20 years reported no information. The association between age and knowledge level was statistically significant ($p \leq 0.001$) (Table 2).

Table 4. Mothers' Knowledge about the Preparation of ORS According to Age Group.

Ages	Mother's knowledge about the preparation of ORS				P value
	Good N=56	No information N=1	Poor N=42	Yes N=1	
<20 years	0 (0%)	1 (100%)	0 (0%)	0 (0%)	≤ 0.001
20 to 25 years	12 (21.4%)	0 (0%)	13 (31%)	1 (100%)	
>25 to 30 years	11 (19.6%)	0 (0%)	12 (28.6%)	0 (0%)	
>30 to 35 years	22 (39.3%)	0 (0%)	9 (21.4%)	0 (0%)	
>35 years	11 (19.6%)	0 (0%)	8 (19%)	0 (0%)	

Table 5 shows that the majority of mothers with good knowledge were aged 30–35 years (32.8%) and >35 years (22.4%), while poor knowledge was most frequent among mothers aged 20–25 years (33.3%). Mothers aged <20 years represented only 3.3% with poor knowledge. The relation between age and knowledge level wasn't statistically significant ($p = 0.52$) (Table 3).

Table 5. The relation between mothers' age and their levels of knowledge about the role of ORS

Ages	Mother's knowledge about the role of ORS				P value
	Good N=67	No information N=2	Poor N=30	Yes N=1	
<20 years	0 (0%)	0 (0%)	1 (3.3%)	0 (0%)	0.52
20 to 25 years	15 (22.4%)	0 (0%)	10 (33.3%)	1 (100%)	
>25 to 30 years	15 (22.4%)	1 (50%)	7 (23.3%)	0 (0%)	
>30 to 35 years	22 (32.8%)	0 (0%)	9 (30%)	0 (0%)	
>35 years	15 (22.4%)	1 (50%)	3 (10%)	0 (0%)	

Table 6 shows that 39 mothers (39.0%) had knowledge about zinc administration, 8 mothers (8.0%) had incorrect knowledge, while the majority, 53 mothers (53.0%), did not know about zinc administration. Table (4).

Table 6. Distribution of mothers according to their knowledge about Zinc administration

Knowledge about Zinc administration	Examined group N=100	
	Frequency	Percent
Yes	39	39.0%
No	8	8.0%
Not know	53	53.0%
Total	100	100.0%

Table 7 shows that there was no statistically significant correlation between the frequency of diarrhea and the studied maternal factors, including level of education, number of children, mother's age, mother's illness, income, family type ($P > 0.05$), and education level.

Table 7. Correlation between Frequency of Diarrhea in the last 3 Months and Various Maternal Factors

Variable	Frequency of Diarrhea	
	r	P value
Level of education	-0.24	0.06
Number of children	0.08	0.55
Mother's age	0.15	0.12
Mother's illness	0.02	0.89
Income >1000 DR	-0.15	0.17
Family type (nuclear)	0.10	0.17

This table shows a significant positive correlation between mothers' age and several knowledge and practice variables related to diarrhea management. Older mothers showed better awareness regarding the initial dangerous signs of diarrhea ($r = 0.42$, $P = 0.002$), different aspects of ORS ($r = 0.44$, $P = 0.005$), role of ORS ($r = 0.40$, $P = 0.005$), quantity of ORS ($r = 0.38$, $P = 0.005$), and using ORS till diarrhea stops ($r = 0.39$, $P =$

0.005). whereas there was no significant correlation between mothers' age and other aspects such as using a good amount of water in ORS preparation, using ORS within 24 hours, or misconceptions regarding the harm of giving too much or keeping ORS for long periods ($P > 0.05$).

Table 8. Correlation between Mothers' Age and Knowledge about Diarrhea & ORS

Variables	Mothers' Age	
	r	P value
Knowing the initial dangerous signs of diarrhea	0.42	0.002
Knowledge about different aspects of ORS	0.44	0.005
Knowledge about the role of ORS	0.40	0.005
Knowledge about the quantity of ORS	0.38	0.005
Using ORS till diarrhea stops	0.39	0.005
Using a good amount of water in ORS preparation	0.10	0.45
Using ORS within 24 hours	0.12	0.38
Harm of giving too much ORS	0.08	0.56
Harm of using ORS for a long period	0.09	0.49
Stop ORS if diarrhea continues	0.03	0.85
Stop ORS if vomiting continues	0.06	0.55

Discussion

This research illustrated that the mean mothers' age was 31.06 ± 6.8 years, most of the children (79%) were ≤ 2 years, while 21% were older than 2 years. Regarding residency, 68% lived in urban areas and 32% in rural areas. Family income was >1000 DR in 60% of cases and ≤ 1000 DR in 40%. The majority (80%) belonged to nuclear families, 46% of mothers had 3–4 children, and 42% had a university education or higher. In agreement with Workie et al., (7) a cross-sectional survey performed in Dire Dawa, Eastern Ethiopia, assessed mothers' knowledge, attitudes, and practices related to diarrheal disease prevention and home-based management among children under five who had experienced diarrhea. They showed that the majority of participating mothers (51.5%) were between 25 and 34 years of age, a comprised both urban and rural populations, with a predominance of urban respondents. In terms of educational attainment, a substantial proportion of mothers (44.8%) were unable to read or write, while the remaining participants had varying levels of literacy and formal education. Also, Okafor et al., (8). The study found that among the 263 mothers who had previously managed a diarrheal episode, 61.2% were found to have good practical management skills. Furthermore, the study identified significant predictors of good knowledge and practice, including higher levels of maternal education and access to health-related information.

This study showed that 53% had 3 episodes of diarrhea or more, and only 51% demonstrated adequate knowledge and practices in managing it. A notable proportion lacked awareness about causes (13%) and prevention (7%) of diarrhea. Exclusive breastfeeding under six months was low (7%), while 46% used filtered water and 49% used boiled water for ORS preparation. In agreement with Alghadeer et al., (9) who found that approximately 62% of participating mothers were aware of Oral Rehydration Solution, only 23.5% reported using it during their child's diarrheal episodes, and many mothers preferred to rely on medical advice before administering ORS, indicating a dependence on healthcare professionals for guidance. Furthermore, low ORS usage was significantly associated with lower levels of maternal education and limited health awareness, highlighting the need for improved community-based education on diarrhea management. Also, Aluefua et al. (10) reported an extremely high level of awareness about Oral Rehydration Solution (ORS), with 98% of mothers acknowledging familiarity with it. However, actual usage during diarrheal episodes was considerably lower, with only around 37.2% of mothers administering ORS to their children. Despite 95% of participants demonstrating good knowledge of the causes of diarrhea, the study highlighted a significant gap among awareness and correct practice. This discrepancy underscores the need to strengthen practical health education and bridge the gap between knowledge and action in diarrhea management.

The present study demonstrated that 41 mothers (41.0%) did not know any early dangerous signs of diarrhea, while 28 mothers (28.0%) recognized sunken eyes. In addition, 17 mothers (17.0%) reported sunken eyes and bloody diarrhea, and 9 mothers (9.0%) reported excessive thirst, sunken eyes, and bloody diarrhea. Very few mothers reported other signs such as bloody diarrhea (3.0%), excessive thirst and sunken eyes (1.0%), or excessive thirst and bloody diarrhea (1.0%).

In accordance with Mumtaz et al. (11), who found that 40% of mothers provided only vague or nonspecific signs when asked about danger signs of dehydration in children, while just 26% identified sunken eyes as a specific indicator. Such results highlight a significant gap in maternal awareness regarding critical symptoms, which may delay timely management and increase the risk of complications in children with acute diarrhea. Also, Das et al. (12) assessed the knowledge of caregivers regarding childhood diarrhea and signs of dehydration and danger signs, and also assessed the mothers' approach towards their home-based management and health-seeking behavior. They demonstrated that 74.2 percent of caregivers recognized diarrhea correctly, i.e., raised frequency of watery stool or blood and mucus in stool or both. Diminished

urination or discolored urine (89.6%), thirsty or eagerly drinking (55.7%), dry mouth and tongue (37.7%), etc., have been identified by caregivers as major signs of dehydration.

This study revealed that good knowledge was highest among mothers aged 30–35 years (39.3%), while poor knowledge was more frequent among those aged 25–30 years (28.6%) and 20–25 years (31%). Only one mother under 20 years reported no information. The correlation between age and knowledge level was statistically significant ($p \leq 0.001$). In agreement with Workie et al., (7) who assessed mothers' knowledge, attitude & practice in prevention & home-based management of diarrheal disease between under-five children in Dire Dawa, Eastern Ethiopia. They reported that above half of the mothers (51.5%) were in the age of 25–34 years, with the mean age of 27. This suggests that maternal age may influence knowledge level regarding childhood diarrhea. Also, Okafor et al., (8) who assessed maternal knowledge, hygienic practices, and home management (HM) of diarrhea with oral rehydration therapy (ORT) study in Nigeria. They reported that 82.2% of mothers had good knowledge of diarrheal diseases, with a mean maternal age of 30.4 ± 5.02 years.

This study showed that 39 mothers (39.0%) had knowledge about zinc administration, 8 mothers (8.0%) had incorrect knowledge, while the majority, 53 mothers (53.0%), did not know about zinc administration. In accordance with Riaz et al., (13) who assessed the level of knowledge of mothers of under-five-year-old children according to diarrheal home management. They showed that 400 awareness about zinc use, daily administration, and duration (10–14 days) was low: 38.8% knew about zinc, 20.5% knew daily dosage, and 17.3% knew the correct duration. Only 41.8% of mothers who were aware of ORS were also aware of zinc use. In supporting with Khazaal et al., (14) who determined mothers' knowledge and practices according to diarrhea causes and principles of management. They showed that there was no significant association between mothers' age and their awareness of ORS, their knowledge regarding the signs of dehydration, and their initial action to treat diarrhea at home.

Conclusion

This study found that while most mothers had some experience managing diarrhea, only about half had adequate knowledge and correct practices regarding ORS use. Many lacked awareness of early danger signs and the role of zinc. Non-significant link has been observed between mothers' education, income, or residence and their knowledge. However, mothers with more children showed better understanding of ORS. These results highlight the need for improved health education to enhance home-based diarrhea management in children under five.

Acknowledgments

No financial support was received for this project.

Conflicts of Interest

The authors declare no conflicts of interest

References

1. Lanata CF, Fischer-Walker CL, Olascoaga AC, Torres CX, Aryee MJ, Black RE. Global causes of diarrheal disease mortality in children <5 years of age: a systematic review. *PLoS One*. 2013 Sep 4;8(9):e72788.
2. Morales F, Montserrat-De la Paz S, Leon MJ, Rivero-Pino F. Effects of Malnutrition on the Immune System and Infection and the Role of Nutritional Strategies Regarding Improvements in Children's Health Status: A Literature Review. *Nutrients*. 2023 Dec 19;16(1):1.
3. Khan IA. Integrative Approaches to Minimize Dehydration Due to Diarrheal Diseases. *AdvIntegr Med*. 2025 Sep 8;229-38.
4. Gicheha EW. Effect of Outpatient Diarrhoea Case Management Training on Prescription of Oral Rehydration Solution and Zinc Among Children Aged 2-59 Months in 3 Health Centres in Nairobi County-a Before and After Study (Doctoral dissertation, University of Nairobi).
5. Gathogo LW. Determinants of Home Management of Diarrhea among Care Givers of Children Below 5 Years in Ngandu Location, Nyeri County (Doctoral dissertation, JKUAT-COHES).
6. Abdulla ON, Badulla WF, Alshakka M, Al-Abd N, Ibrahim MI. Mothers Knowledge, Attitude and Practice Regarding Diarrhea and its Management in Aden-Yemen: A Cross-Sectional Study in Poor Resource Setting. *J Pharm Res Int*. 2021;33(45B):365-78.
7. Workie HM, Sharifabdilahi AS, Addis EM. Mothers' knowledge, attitude and practice towards the prevention and home-based management of diarrheal disease among under-five children in Dire Dawa, Eastern Ethiopia, 2016: a cross-sectional study. *BMC Pediatr*. 2018 Nov 19;18(1):358.
8. Okafor IP, Akinyemi OT, Wika-Kobani BN, Olubodun T. Childhood diarrhoea: a cross-sectional survey on maternal knowledge, hygienic practices and use of oral zinc for home management in a Nigerian community. *Pan Afr Med J*. 2022;42(1).
9. Alghadeer S, Syed W, Alhossan A, Alrabiah Z, Babelghaith SD, Al Arifi MN, et al. Assessment of Saudi Mother's Knowledge and Attitudes towards Childhood Diarrhea and Its Management. *Int J Environ Res Public Health*. 2021 Apr 9;18(8):3982.
10. Aluefua OF, Okufo EC, Abah SO. Oral rehydration solution usage by mothers in the management of diarrheal diseases in under-five children in a rural community in Nigeria.

11. Mumtaz Y, Zafar M, Mumtaz Z. Knowledge Attitude and Practices of Mothers About Diarrhea in Children Under 5 Years. J Dow Univ Health Sci. 2014 Apr 10;8(1):3-6.
12. Das R, Patel SP, Agarwal M, Singh OP, Singh VK. Perception of Caregivers Regarding Danger Signs of Childhood Diarrhea and Attitude Towards its Management in Rural Lucknow, UP, India. Indian J Community Health. 2016 Jun 30;28(2):196-201.
13. Riaz N, Muntaha ST, Qibtia M, Sohail S. Use of Zinc and ORS in Home Management of Diarrhea: Knowledge of Mothers Attending a Tertiary Care Hospital. J Islamabad Med Dental Coll. 2019 Sep 29;8(3):135-40.
14. Khazaal AA, Yousif MK, Mousa HA. Mother's Perception Toward Childhood Diarrhea: A Cross-sectional Study. Med J Babylon. 2022 Oct 1;19(4):635-9.