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Community Health Promoters' Knowledge and Practices on Case Management of Diarrhoeal Disease among Children Under 5 Years in Nomadic Communities of Northern Kenya

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Abstract

Purpose: The study aimed to identify current diarrhoeal management practices among Community Health Promoters (CHPs) in Turkana West and Turkana Central Sub-Counties, assess their understanding of community case management of diarrhoeal disease in children under five, and explore the acceptability of using mobile phone messages to improve knowledge of this approach.

Methodology: This cross-sectional study assessed knowledge and practices in diarrhoeal disease case management among 382 CHPs in Turkana County, Kenya. Functional Community Health Units (CHUs) linked to health facilities offering integrated Community Case Management (iCCM)were purposively selected. The study's sampling frame was from the Ministry of Health (MOH) Community Health Promoters (CHP) master list. Selected CHPs were randomly sampled using the study's inclusion criteria of CHPs who had served in the CHU for two or more years, owned a functional mobile phone, and consented to participate in the study. Data for the study was collected using researcher administered structured questionnaires, Focus Group Discussion (FGD) guides, and Key Informant Interview Guides. The data collection tools were pretested for clarity and reliability. Descriptive statistics and regression models were used in the analysis of the data, with a significance level of $\alpha = 0.05$.

Findings: 57.8% of the CHPs had moderate knowledge of the causes of diarrhoea. 49% correctly identified community and household practices that prevent diarrhoea in children under 5. 48.7% of CHPs poorly adhered to community case management guidelines of diarrhoea disease, including the use of Oral Rehydration Salts (ORS), referral of diarrhoea cases and Zinc supplementation. The study findings highlight the acceptance of mobile phone SMS messaging among CHPs, with 96% of CHPs considering it an appropriate method for acquiring knowledge of diarrhoeal disease management. Additionally, an average of 82% of study participants reported that SMS messages are convenient and reinforce health information, demonstrating their readiness to participate in SMS-supported interventions.

Unique Contribution to Theory, Practice and Policy: This study provides context specific evidence on the knowledge and practices of CHPs in managing diarrhoeal disease among nomadic populations in Turkana County, a population underrepresented in the mHealth literature. By grounding this study design in the Social Cognitive Theory and the Technology Acceptance Model, the study adds to the body of evidence on the acceptability of SMS supported training for reinforcing change in diarrhoeal management practice among populations with limited resources and low literacy levels. The study findings provide insights for designing CHP interventions aligned with Kenya's iCCM guidelines. For policy, the results of the study support the integration of mobile phone messaging into Kenya's Community Health Strategy.

Keywords: *Community Health Promoters, Nomadic Populations, Diarrhoeal Disease Management, Referral, Community Oral Rehydration Therapy, Zinc Supplementation Practices, Children Under 5 Years of Age*

JEL Classification: *I10, I12, I15, O33*

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INTRODUCTION

The United Nations Children's Fund (UNICEF) estimates diarrhoeal disease contributes to approximately 9% of deaths among children under five globally (UNICEF, 2021). To address this burden, governments have invested in Community Health Promoters (CHPs) programs that incorporate Oral Rehydration Salts (ORS) and zinc administration, the introduction of Community Led Total Sanitation (CLTS) and Integrated Management of Newborn and Childhood Illnesses, national and community level diarrhoea scale up plans, reclassification of zinc sulphate from prescription only to over the counter status, development of locally produced ORS/zinc co-packs, and the introduction of the rotavirus vaccine into Kenya's national routine immunisation schedule (KPHC, 2019). Despite these investments, gaps remain in community-level management of diarrhoea, indicating the need for context specific evidence for interventions.

The Kenya Demographic and Health Survey (2022) results show that 14% of children under five experienced an episode in the two weeks before the survey, and 58% of these cases received care (KNBS, 2023). Kenya's under five mortality rate stands at 41 deaths per 1,000 live births; this is approximately 59,000 deaths annually (UNICEF, 2021). In addition to this, the 2025 UN IGME Child and Adolescent Causes of Death Estimation (CA CODE) report (2025) reports that diarrheal diseases accounted for 7% of deaths among children under five in Kenya in 2021.

The KDHS reports a diarrhoea prevalence of 17.6% among children under five in Turkana County, which is 3.3% percent higher than the national prevalence of 14.3% (KDHS, 2022). Although 60% of children aged 12–23 months in Turkana County are fully vaccinated with basic antigens, including the rotavirus vaccine, the under five mortality rate is 55 deaths per 1,000 live births, exceeding the national rate of 41 per 1,000 live births (KDHS, 2022). Poor nutritional status further worsens the burden of diarrhoeal disease, 23% of children under five are wasted, which is 18% higher than the 5% national prevalence. In comparison, 32% are underweight compared to a national average of 10% (KDHS, 2022). 42% of households have access to basic drinking water services, and just 9% to basic sanitation, significantly increasing the risk of diarrhoea disease (KDHS, 2022).

Problem Statement

Kenya has made significant investments in the prevention and management of diarrhoeal disease among children under five. These investments include the inclusion of Oral Rehydration Salts (ORS) and zinc in CHP kits and the introduction of CLTS, ICCM and IMNCI (KPHC, 2019). Despite the investments by the Kenyan Government, Turkana County's prevalence of diarrhoea disease among children under five is 3.3 percentage higher than the national average (KDHS, 2022). As the first point of contact between caregivers in households and health facilities, Community Health Promoters (CHPs) are responsible for managing diarrhoeal cases at the community level. CHPs manage cases of diarrhoea disease through case identification, referral to the nearest health facility, and health education of households on its prevention and management. There is a contextual evidence gap in community case management of diarrhoeal disease; previous studies, such as Chi et al. (2023) and Bano et al. (2024), have focused on urban and peri-urban, non-nomadic populations. That contextual gap is addressed in this study, documenting baseline knowledge of community case management of diarrhoea among CHPs in Turkana County.

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Theoretical Framework and Research Gaps

This study draws on two theoretical frameworks, the Social Cognitive Theory (SCT) and the Technology Acceptance Model (TAM). Social Cognitive Theory (Bandura.,1986) guided the understanding of how CHPs acquire, reinforce, and apply health knowledge through observation, modelling, self-efficacy, and environmental reinforcement. SCT theory in this study explains why structured SMS-supported messages for training CHPs can increase CHPs' confidence in managing diarrhoeal disease over time. The Technology Acceptance Model (Davis, 1989) informed the assessment of factors influencing CHPs' willingness to adopt SMS on mobile phones as a learning tool, with a focus on the perceived usefulness and perceived ease of use of SMS in low-literacy, low-connectivity nomadic settings. The literature review identified gaps in community-level diarrhoea disease case management that this study addressed. The gaps included: limited evidence on CHPs knowledge in community case management (Chi et al., 2023; Kansiime et al, 2024); the acceptability and effectiveness of SMS supported mHealth among CHPs using feature phones in low-connectivity settings (Rego et al., 2020); and Context-specific knowledge from which SMS supported interventions can be designed. This study's baseline results informed a broader quasi-experimental intervention and addressed these gaps through its mixed-methods design and structured observation.

METHODOLOGY

This study focused on Turkana County, which is classified as a nomadic community. Nomadic communities are defined as populations that move seasonally in search of water and pasture for their livestock, and are characterised by sparse, shifting patterns and structural exclusion from formal health services. In the Turkana context, nomadic communities are predominantly Nga'Turkana-speaking agropastoralist households whose movement patterns disrupt the continuity of care and supervision within the formal health system. The study also focused on Community Health Promoters (CHPs) who are referred to as level one in Kenya's health system. CHPs have traditionally been referred to as Community Health Workers (CHWs) and, more recently, as Community Health Volunteers (CHVs) under the 2006 Community Health Strategy. The Kenya Community Health Policy 2020-2030 officially renamed CHVs to CHPs. In this study, CHP is used in line with the current policy, though earlier cited literature may use the term CHV or CHW.

This cross-sectional study was conducted in Turkana West and Turkana Central Sub-Counties. 382 CHPs were randomly selected from the CHPs master list using computer-generated random health units in the study area, ownership of a functional mobile phone, and informed consent. Functional Community Health Units (CHUs) linked to health facilities offering ICCM were purposively selected. After adjusting for a 10% nonresponse rate, the required sample size of 382 was determined using Charan and Biswas's (2013) approach, with an assumed 95% confidence level and 80% power. Qualitative data was gathered through six KIIs (n = 6), four FGDs with CHPs (n = 32), and two FGDs with caregivers of children under five (n = 16), and an interviewer-administered questionnaire deployed via Kobo Collect to all 382 CHPs. Trained research assistants conducted the interviews in the Nga' Turkana and Swahili languages, and the data collection instruments were pretested and reviewed prior to data collection. Qualitative data from FGDs and KIIs were transcribed, thematically categorised, and cross checked through daily debriefings. Quantitative data was analysed using SPSS version 21, with descriptive statistics and regression

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models with a significance level of $\alpha = 0.05$ (Agarwal et al., 2016; Kansiime et al., 2024; WHO, 2020). One point was awarded for each correctly identified item across the four iCCM domains: causes, symptoms, prevention, and management of diarrhoeal disease. All study participants gave informed consent. The study was approved by the Turkana County Government, the National Commission for Science, Technology and Innovation, and the Kenyatta University Ethics Review Committee.

RESULTS

Demographic Characteristics

The study included 382 CHPs in Turkana Central and Turkana West Sub-Counties in Turkana County, as shown in Table 1. Of the 382 CHPs, 143 CHPs (37%) were located in Turkana Central, and 63% (239) were located in Turkana West. 25.7% of the CHPs were in the 25–34 age group (98), and 41% in the 35-44 age group (156); those aged 45-54 years were 26% (100). CHPs aged 18–24 years accounted for 3% of the total number of CHPs (12), and those aged 55 years or older accounted for 4% of the total number of CHPs in the study. The majority of participants were married: 232 (60.7%) CHPs were in monogamous unions, 22.0% in polygamous marriages, 6.0% divorced or separated, 5.8% had never married, and 3.7% were widowed. On the level of education; 41.6% had incomplete primary education, and 22.0% had completed primary education. Only 12.6% finished secondary school, while 10.9% attained post-secondary education and 6.8% had never attended school. The findings highlight that three-quarters of the CHPs have been in the workforce for more than five years, indicating an experienced community health workforce capable of conducting health education visits and managing diarrhoea cases at the household level.

Table 1: CHPs' Demographic Information

Turkana County		
	Frequency	**Percent**
Turkana West	239	63%
Turkana Central	143	37%
Total	**382**	**100%**
Gender		
Male	185	48%
Female	197	52%
Total	**382**	**100%**
Age		
35-44 Years	156	41%
45-54 Years	100	26%
25 34 Years	98	26%
55-64 Years	14	4%
18-24 Years	12	3%
64-74 Years	2	0.5 %

Latrine Usage in Households

38.5% of households used latrines “rarely,” 27.7% “sometimes,” 13.4% “most times, and 14.7% consistently used latrines, as shown in Table 2. Disposal of child faeces also varied. With 52.1%

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of households disposing of faeces in latrines, 38.0% burying it, and 9.9% throwing it into open areas, as shown in Table 3.

Table 2: Results of Latrine Usage in Households

Latrine Usage							
		most times	**No**	**rarely**	**sometimes**	**yes**	**Total**
Total	**Frequencies**	51	22	147	106	56	382
	%	13.4%	5.8%	38.5%	27.7%	14.7%	100.0%

Table 3: Results of Households' Faecal Matter Disposal

Faecal Disposal	**Total**	
	Frequencies	**Percentages %**
Dispose of in the latrine	274	52.1%
Thrown away in open surroundings	52	9.9%
Bury	200	38.0%
Total		**100.0%**

Main Sources of Water

54.1% of the CHPs households relied on communal piped water, 24.1% relied on surface water sources such as rivers and streams, 20.5% relied on tube wells, and 0.4% on rainwater, as shown in Table 4. 92.4% of the CHPs perceived household water to be safe for drinking, 6% reported occasional or unsafe water use. 48.7% of households reported boiling water, while 45.3% used bleach or chlorine, either alone or in combination (Table 5).

Table 4: Households' Water Sources

Household water source	**Total**	
	Frequencies	**Percentages %**
Community Piped water/ Communal Borehole	253	54.1%
Tube well	96	20.5%
Water from the spring	1	0.2%
Rainwater collection	4	0.9%
Surface water (river, stream, dam, lake	113	24.1%
Bottle water	1	0.2%
Total		100.0%

Table 5: Households' Water Treatment Practices

Water treatment practices	**Frequencies**	**Percentages %**
Boil	292	48.7%
Add bleach/chlorine.	272	45.3%
Strain it through a cloth	3	0.5%
Solar disinfection	7	1.2%
Let it stand and settle.	20	3.3%
Others	6	1.0%
Total		**100.0%**

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Community-Level Diarrhoeal Disease Case Management Practices among CHPs

When children showed signs of diarrhoea, the most common action taken by CHPs was to refer them to a health facility linked to the community health unit they served. 79.7% of CHPs referred children to health facilities. Other methods were less common: 15.9% chose to treat children with signs of diarrhoea with medicines directly, which is not recommended, as cases of diarrhoea in children under 5 should be managed with ORS and Zinc as pre-referral treatment; 4.4% suggested that households use home remedies. These findings indicate that although referral is the main action taken by a CHP when he or she encounters a child with signs and symptoms of diarrhoeal disease, inappropriate management still occurs, including self-treatment and the use of home remedies. Qualitative data highlighted that caregivers with knowledge of hygiene, water treatment, and handwashing were better able to prevent diarrhoea:

> *"We advise them about hygiene, water, food hygiene, and personal hygiene… when you teach them, they will know, and the cases will reduce." From a CHP in a Focused Group Discussion.*

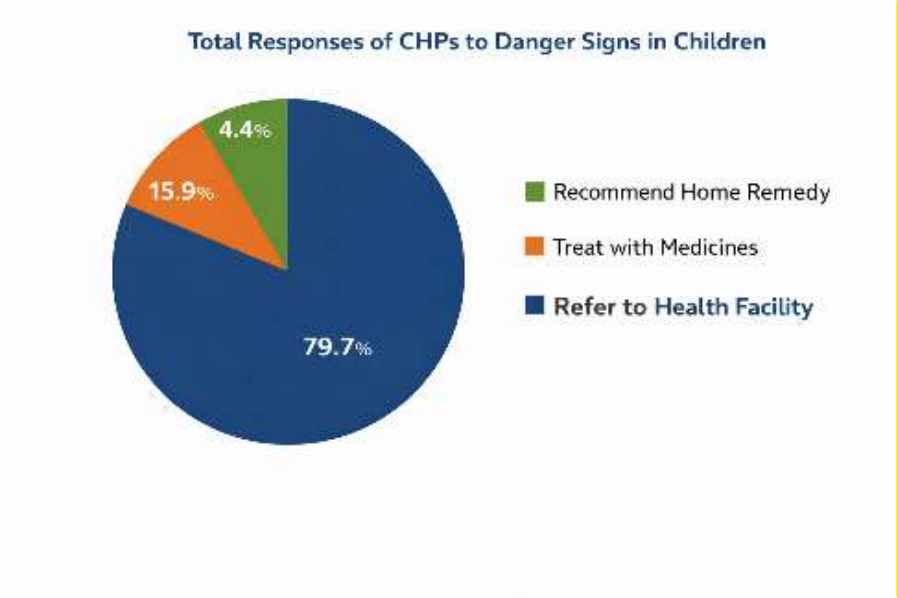

Figure 1: How CHPs deal with diarrhoea danger signs

Table 6: CHPs' Knowledge of Diarrhoea Causes Score

CHPs' Knowledge of Diarrhoea Causes Score						
		Diarrhoea Cause Score				Total
		1.00	2.00	3.00	4.00	
Total	**Frequencies**	214	138	9	20	381
	Percentages %	56.2%	36.2%	2.4%	5.2%	100.0%

The study assessed CHPs' knowledge of the main causes of diarrhoea. 63.1% of responses reported environmental and lifestyle factors as the main causes of diarrhoea (Table 7). These factors included contaminated water, poor hygiene practices, open defecation, and unsafe food handling.

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Table 7: Causes of Diarrheal Disease

Causes of diarrhea	Total	
	Frequencies	Column Responses %
Infections (Viral, parasitic, or Bacterial)	106	17.8%
Environmental and Lifestyle Causes (Contaminated Water: Poor Hygiene Practices, Open Defecation, Unsafe Food Handling)	377	63.1%
Malnutrition	90	15.1%
Medication-related, e.g., overuse of antibiotics, which can disrupt gut bacteria, leading to diarrhoea.	24	4.0%
Total		**100.0%**

Knowledge of Diarrhoeal Disease Signs, Symptoms, and Prevention

57.8% of participants demonstrated moderate knowledge of the signs and symptoms of diarrhoeal disease, 25.9% had poor knowledge, and 16.2% had adequate knowledge. As shown in Table 9, 48.7% of CHPs achieved the highest score for knowledge of diarrhoea prevention methods, while 26.4% scored two, and 17.3% scored one. However, 7.6% of CHPs reported no knowledge of diarrhoea prevention methods. The water, sanitation, and hygiene practices reported were drinking safe water (13.1%), regularly cleaning water containers (12.9%), storing water properly (11.3%), and avoiding contaminated water sources (10.6%). Other practices included proper disposal of human waste at 9.2%, handwashing with soap at 8.0%, keeping surroundings clean at 6.1%, and safe handling and disposal of child waste at 5.5%, along with food hygiene practices such as washing fruits and vegetables at 4.9% and cooking food thoroughly 4.6%.

Table 8: Knowledge of Signs and Symptoms of Diarrhoeal Disease at the Community-Level

Knowledge Level	Score Range	Frequency (n)	Percentage (%)
Poor	1–2	99	25.9
Moderate	3–4	221	57.8
Adequate	5–6	62	16.2
Total		**382**	**100.0**

Table 9: CHPs' Knowledge on Diarrheal Disease Prevention

CHPs' Knowledge on Diarrhoea Prevention						
		Diarrhoea Prevention Score				Total
		.00	1.00	2.00	3.00	
Total	**Frequencies**	29	66	101	186	382
	%	7.6%	17.3%	26.4%	48.7%	100.0%

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Table 10: Key Practices Related to Water and Sanitation that help Prevent Diarrhoea

Key Practices	Total	
	Frequency	Percentages %
Drinking Safe Water	274	13.1%
Proper Water Storage	237	11.3%
Regular Cleaning of Water Containers	271	12.9%
Avoiding Contaminated Water Sources	222	10.6%
Proper Disposal of Human Waste	193	9.2%
Hand Washing with Soap	167	8.0%
Keeping Surroundings Clean	127	6.1%
Handling and Disposing of Child Waste Safely	115	5.5%
Washing Fruits and Vegetables	103	4.9%
Cooking Food Thoroughly	97	4.6%
Covering Leftover Food	70	3.3%
Participating in Sanitation Campaigns	79	3.8%
Constructing and Using Latrines	70	3.3%
Educating Communities	71	3.4%
Total		100.0%

Recommended Practices when a Child has Diarrheal Disease

45.8% of CHPs indicated limited knowledge of recommended practices when a child has passed 3 or more watery stools, as shown in Tables 11 and 12. On practices during diarrhoea, 76.4% of the CHPs reported that caregivers should increase fluid intake, whereas 50.5% reported that caregivers should reduce food intake, indicating partial adherence to ICCM guidelines. Nearly all children were introduced to complementary feeding after six months, as shown in Table 13, and 99.2% of CHPs reported educating mothers on exclusive breastfeeding. 97.1% of CHPs correctly indicated that ORS should be stored for 24 hours (Table 15). 52.6% of the CHPs administered zinc for 10–14 days, with differing responses on the first dose and handling cases where the child spits out zinc, as shown in Table 14, reflecting inconsistent adherence to guidelines. CHPs identified key danger signs requiring immediate referral, including dehydration, sunken eyes, and low urine output at 25.5%, vomiting at 21.3%, prolonged diarrhoea of more than 14 days at 14.2%, blood in stool at 14.6%, fever at 14.4%, and loss of appetite at 10.0% (Table 23). Additionally, 99.7% of CHPs reported routine follow-up to ensure proper treatment.

Table 11: CHPs' Knowledge on Diarrhoea Recommended Practice

CHPs' Knowledge of Diarrhoea Recommended Practice						
		Diarrhoea recommended Practice Score				Total
		1.00	2.00	3.00	4.00	
Total	Frequencies	175	90	89	28	382
	%	45.8%	23.6%	23.3%	7.3%	100.0%

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Table 12: Management of Children under 5 Years with Diarrhoeal Disease

Management of children under 5 years with diarrhoeal disease	Total	
	Frequencies	Column Responses %
Zinc	344	41.2%
Ors	381	45.7%
SSS (Sugar-Salt solution)	68	8.2%
Soup (Maraq)	2	0.2%
Home remedies	3	0.4%
Anti-diarrhoeal medicines/antibiotics	36	4.3%
None	0	0.0%
Other	0	0.0%
Total		100.0%

Table 13: Introduction of Complementary Feeding

Month-old children introduced to complementary feeding	after_6_months	Frequencies	377
		%	98.7%
	before_6_months	Frequencies	5
		%	1.3%
Total		Frequencies	382
		%	100.0%

Table 14: What should a Caregiver do if the Child Spits out the Zinc Solution?

What should a caregiver do if the child spits out the zinc solution	Frequencies	Column Responses %
Stay Calm	132	19.5%
Wait a Few Minutes	158	23.3%
Prepare a Smaller Amount	96	14.2%
Offer the Dose Again	189	27.9%
Try a Different Method: e.g., Mix the zinc with a different food or liquid that the child likes, such as breast milk porridge, or mashed fruit	95	14.0%
Other	8	1.2%
Total		100.0%

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Table 15: How long can ORS be kept before it loses its effectiveness?

How long should ORS be kept before it loses its effectiveness	Total	
24hrs	Frequencies	**371**
	%	**97.1%**
3 days	Frequencies	**5**
	%	**1.3%**
48 hrs	Frequencies	**5**
	%	**1.3%**
one week	Frequencies	**1**
	%	**0.3%**
Total	**Frequencies**	**382**
	%	**100.0%**

97.1% of CHPs reported that caregivers should use ORS within 24 hours of preparation, indicating that CHPs are aware of the recommended timeframe for maintaining ORS effectiveness (Table 15). On zinc supplementation, 52.6% of the CHPs correctly indicated that zinc should be administered for 10–14 days, indicating the need for reinforced training on the recommended duration of zinc administration. For the first dose of zinc, CHPs reported various practices (Table 26). The most common practice that was reported by the participants was crushing the tablet, if necessary (31.1%), followed by mixing with a small amount of liquid or food (28.5%) and accurately measuring the dose (18.8%), as shown in Table 17. These findings suggest inconsistencies in zinc administration practices, particularly in preparation and initial dosing.

Table 16: How long should Zinc Supplements be given to a Child with Diarrhoea?

How long should zinc supplements be given to a child with diarrhoea?		Total
10_14 days	Frequencies	201
	%	52.6%
21_days	Frequencies	4
	%	1.0%
7_days	Frequencies	141
	%	36.9%
Other	Frequencies	36
	%	9.4%
Total	**Frequencies**	**382**
	%	**100.0%**

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Table 17: How should a caregiver administer the first dose of zinc to a child?

Steps for the administration of the first dose of zinc	Total	
	Frequencies	Percentages %
Determine the correct dosage	138	18.8%
Crush the tablet (if necessary)	228	31.1%
Mix with a small amount of liquid or food:	209	28.5%
Give the dose immediately	114	15.6%
Provide the supplement daily for 10–14 days	44	6.0%
Total		**100.0%**

Management of Danger Signs and Recommended Practices

The study assessed how Community Health Promoters (CHPs) identified danger signs of diarrhoea disease, their follow-up practices, and the feeding and hydration strategies they recommended. It also assessed factors that can improve health-seeking behaviour in children under five. The researcher asked CHPs how they respond when children show danger signs associated with diarrhoeal disease. 79.7% reported referring children to health facilities, while 15.9% treated them with medicines and 4.4% suggested home remedies (Table 18).

Table 18: Dealing with Danger Signs

Dealing with Danger Signs	Total
Refer to the health facility	377 (79.7%)
Treat with medicines	75 (15.9%)
Recommend a home remedy	21 (4.4%)
Total	**(100%)**

Following the referral, as shown in Table 19, nearly all CHPs (99.7%) reported conducting follow-up visits with caregivers to ensure continuity of care.

Table 19: Follow-up after referral

Follow-up after referral	Total (n=382)
Yes	381 (99.7%)
No	1 (0.3%)
Total	**382 (100%)**

Table 20: Hydration and Feeding Practices

Fluid Intake	Total (n=382)
About the same	11 (2.9%)
More	292 (76.4%)
Much less	71 (18.6%)
Somewhat less	8 (2.1%)
Total	382 (100%)

CHPs generally recommended giving more fluids than usual, including breastmilk, during episodes of diarrhoea (76.4%). A smaller proportion of the CHPs reported maintaining the same fluid intake (2.9%) or giving less (20.7% combined for much less or somewhat less), as shown in

Table 20.

Knowledge on feeding practices during diarrhoea episodes varied. About 50.5% of CHPs reported that caregivers should give children less food, while 24.3% indicated increased food intake, and 11.5% maintained usual levels (Table 21).

Table 21: Feeding Practices during Diarrhoea

Food Intake	Total (n=380)
More	93 (24.3%)
About the same	44 (11.5%)
Much less	193 (50.5%)

68.8% of CHPs correctly identified that three or more loose/watery stools in 24 hours indicate diarrhoea disease. Other key danger signs requiring immediate referral included dehydration (25.5%), Vomiting (21.3%), Blood in stool (14.6%), Fever (14.4%), prolonged diarrhoea (>14 days) (14.2%), and Loss of appetite (10.0%).

Table 22: Recognition of Diarrhoea and Danger Signs

Number of Loose Stools	Total
1	48 (12.6%)
2	71 (18.6%)
3 or more	263 (68.8%)
Total	382 (100%)

Table 23: Recognition of Diarrhoea and Danger Signs that Require Referral

Danger Sign Requiring Referral	Total
Vomiting	260 (21.3%)
Loss of appetite	122 (10.0%)
Fever	176 (14.4%)
Prolonged diarrhoea (>14 days)	174 (14.2%)
Dehydration	311 (25.5%)
Blood in stool	179 (14.6%)

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Acceptability of using Mobile Phone Messages in Gaining Knowledge on Community Case Management of Diarrhoeal Disease among CHPs

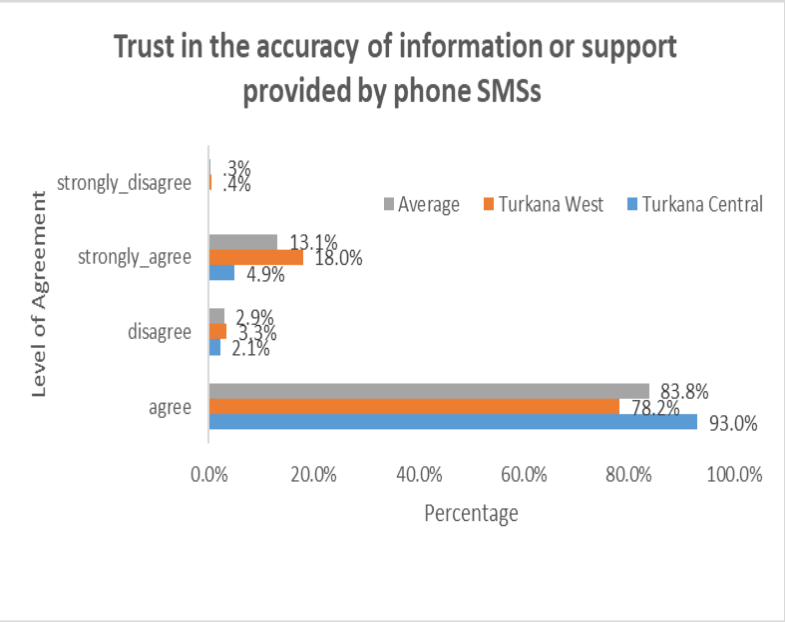

Figure 2: CHPs' SMS Trust

The study highlights a high level of trust in the accuracy of information or support provided via phone SMSs, thereby providing a basis for implementing SMSs to share information on best practices and knowledge materials for diarrhoea management.

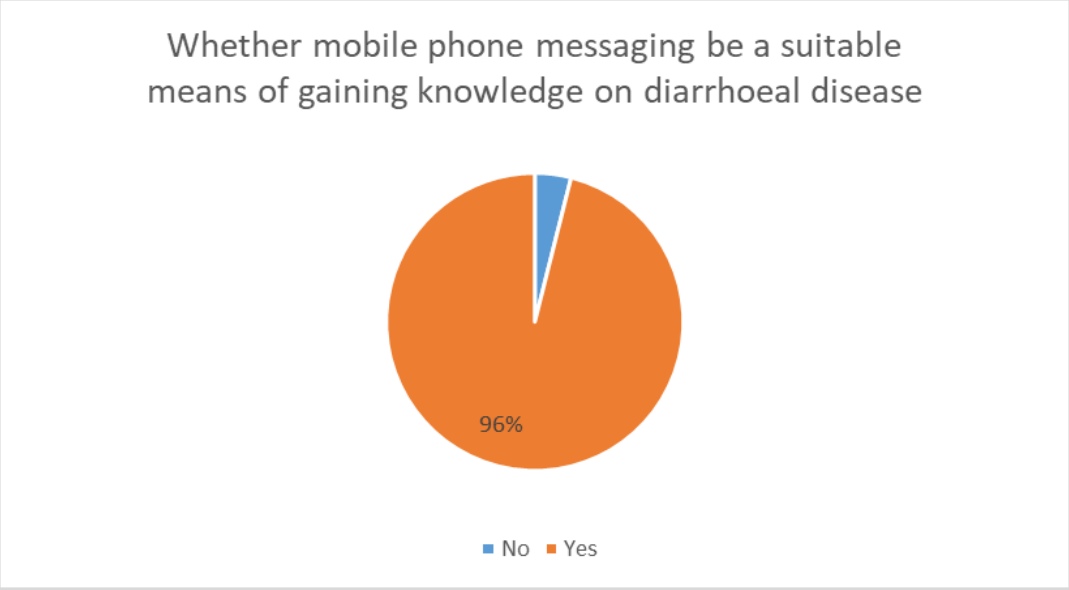

Figure 3: Suitability of using Mobile Phones in the Management of Diarrhoea Disease

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96% of the participants agreed that mobile phone messaging is a suitable means of gaining knowledge on diarrhoeal disease. From CHPs' perspective in Turkana County, several factors may limit the use of SMS for learning about diarrhoea case management. These factors include low literacy, language diversity, weak mobile network coverage, unreliable networks, and low smartphone ownership, which may further restrict usage. Through the KIIs, CHPs reported that training and health education improved practices, but low literacy and lack of formal education were barriers:

> *"Some people have not studied, even if they receive messages on their phone, they find it difficult to read." From a CHP in a focus group discussion.*

The study indicated a high level of trust in the accuracy of information or support provided via phone SMSs, thereby providing a basis for implementing SMSs to share information on best practices and knowledge materials for diarrhoea management.

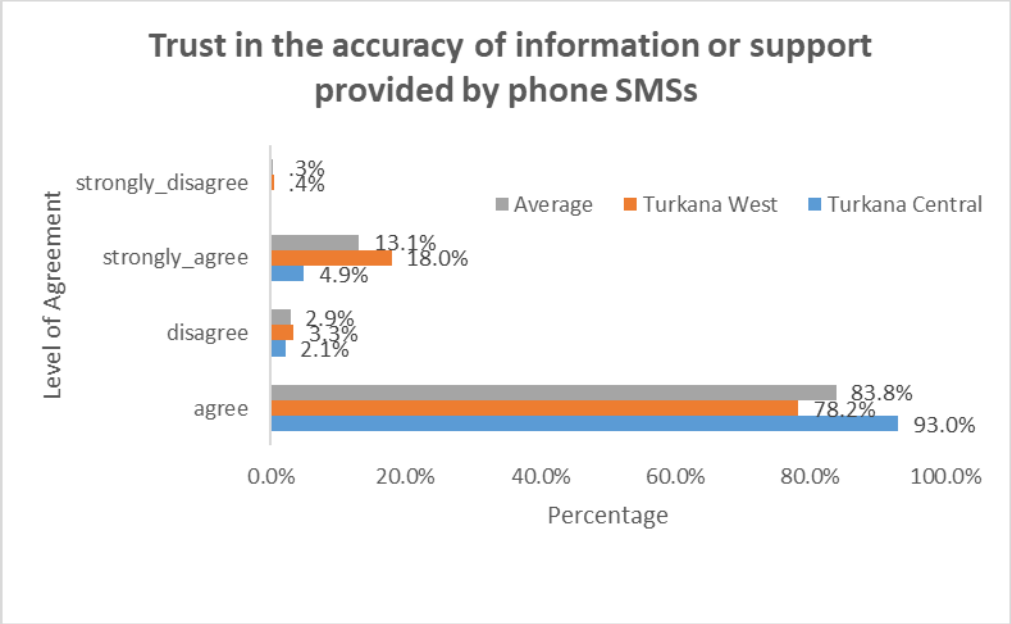

Figure 4: Accuracy of Information provided by Phone SMSs

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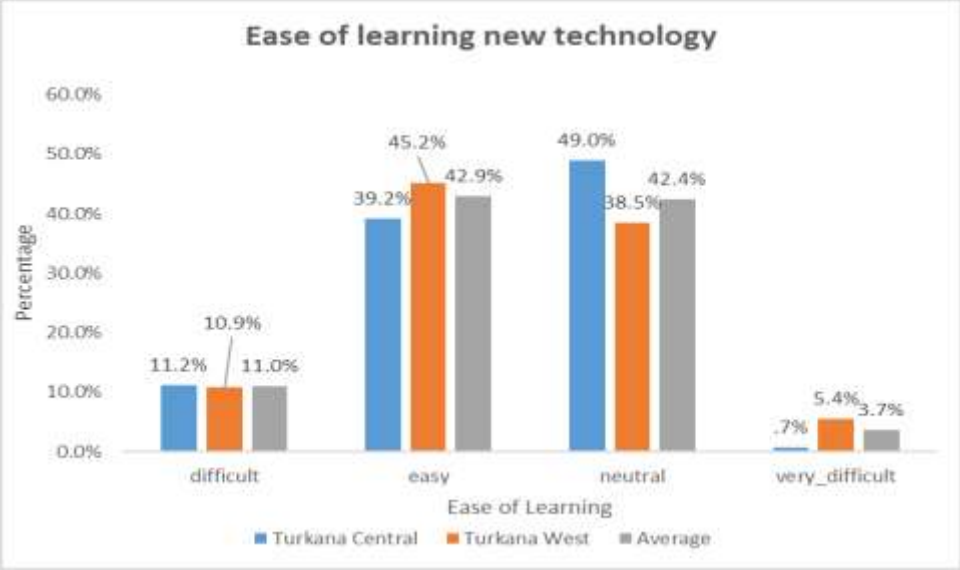

Figure 5: Ease of Learning New Technology

Discussion

This study assessed CHPs' knowledge and practices in community case management of diarrhoeal disease among nomadic populations. Comparing the present study findings with previous studies on CHW knowledge and practice reveals both shared barriers and challenges specific to nomadic settings in Turkana County.

In all four iCCM assessed domains, causes (χ^2=35.47, p<0.001), symptom recognition (χ^2=35.47, p<0.001), management practices (χ^2=108.95, p<0.001), and prevention, CHPs showed statistically significantly low knowledge levels. In iCCM, knowledge of diarrhoeal management guidelines, specifically in the classification of severity of dehydration using the colour codes pink, yellow, and green and age-appropriate zinc dosing of 20 mg/day for children over six months and 10 mg/day for children under six months, CHPs had low knowledge levels. This knowledge gap affects CHPs' decision making in assessing the severity of diarrhoea cases and advising caregivers on early referral, as they fail to recognise danger signs.

Chi et al. (2023) findings on the assessment of the knowledge, attitudes, and practices of community health workers (CHWs) in Cameroon, where over half of the participants in the study had an inadequate understanding of how to manage diarrhoeal diseases (57.55%), with 28.75% unable to identify zinc as a commodity for managing diarrhoeal disease. It was also common to rely on herbal medicines such as Ocimum gratissimum and guava leaves. These results are consistent with the current study findings, which indicate that more than half of Turkana's CHPs had an inadequate understanding of community case management of diarrhoeal disease. However, the comparison needs to be carefully contextualised because Turkana's knowledge challenges are increased by local disease explanation models that directly contradict accepted iCCM standards, rather than just gaps in understanding of diarrhoeal disease. In Turkana, diarrhoea is locally known as eremonu in Nga'turkana, a term applied to both human and livestock disease, which situates diarrhoeal disease within a shared human and animal disease framework. Parasitic diarrhoea is called lopelei, and cholera is called lolewa. These categorizations reflect an explanatory system

that attributes diarrhoea primarily to contaminated water and seasonal rainfall patterns rather than to caregiver hygiene behaviours. CHPs operating in communities where eremonu is understood as a livestock linked environmental condition may face significant resistance to administering zinc supplementation, as an intervention that is not recognised within the local disease model. The absence of a culturally embedded rationale is a knowledge barrier, in contrast with the reliance on herbal remedies observed in Cameroon, and one that requires a Turkana-specific, culturally anchored communication strategy.

The findings of this study and previous studies by Chi et al and Bano et al highlight the need to address diarrhoea management practices at the community level. The use of digital health tools, such as SMS, could help improve diarrhoea management practices by enhancing supervision, providing reminders, and supporting real time learning for CHPs. Studies show that SMS supported training strengthens community health interventions.

CONCLUSION AND RECOMMENDATIONS

Conclusion

CHPs serving the nomadic populations in Turkana West and Turkana Central Sub-counties have statistically significant knowledge gaps across all four iCCM assessment domains. CHPs in nomadic settings have limited regular contact with supervisors, refresher training and access to job aids. The seasonal mobility of the households CHPs serve disrupts continuity of care and the reinforcement of iCCM guidelines. The study findings highlight that CHPs are structurally isolated from the knowledge systems they need, and that this isolation is resulting in gaps in community case management of diarrhoeal disease. The study found high feature phone penetration and acceptance of bilingual Kiswahili/English SMS messages among CHPs. A targeted, context-specific SMS reinforcement programme is therefore recommended for CHPs serving nomadic populations in low-connectivity ASAL settings.

Recommendations

Recommendations based on the study findings were grouped into community and county levels of the health system.

1. At the county level, it is recommended to integrate contextual SMS knowledge reinforcement into the Turkana County Community Health Strategy, 96% of the CHPs in the study indicated that mobile phone SMSs are suitable for getting knowledge on diarrhoeal disease, and 82% confirmed that SMS reinforces health information. The content should be delivered in Kiswahili and Nga'Turkana. Messages should align with the four iCCM domains, with priority on zinc administration, where only 52.6% of CHPs correctly identified the 10 to 14 day treatment duration.
2. The county should also adapt the iCCM training materials to address local disease explanatory models. Diarrhoea in the Nga'Turkana community could be best understood through Eremonu, which attributes illness to environmental and livestock linked causes, and not hygiene practices.
3. At the community level, the recommendation is to establish remote supervision guidelines. CHP supervisors should implement monthly SMS or voice-call check-ins for CHPs who are unreachable for an in-person supervision.CHPs in nomadic settings have limited

contact with supervisors and inadequate access to job aids. 48.7% of the study participants showed poor adherence to community case management practices, indicating gaps in post-training reinforcement.

4. During dialogue and action days, CHUs should health educate caregivers on feeding and hydration counselling. 50.5% of CHPs advised reducing food intake during diarrhoea, combined with inconsistencies in zinc preparation, this gap points to a specific skills deficit, not a general knowledge gap.

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