Mothers'/caregivers' knowledge on aetiology, prevention and management of acute diarrhoea among children under 5 years in Engela District, Namibia

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Background. Childhood diarrhoea remains a public health problem and is among the leading killers globally of children under 5 years. Even though most childhood diarrhoea episodes are mild, episodes can result in severe loss of fluids and dehydration, leading to severe health-related consequences and death. Most diarrhoea episodes in children under 5 are treated at home by parents/caregivers; therefore, their knowledge about the nutrition and management of diarrhoea in children is critically important.
Objective. To assess mothers'/caregivers' knowledge of the aetiology, prevention and management of acute diarrhoea among children aged under 5 years with diarrhoea, in Ohangwena Region, Namibia.
Method. A cross-sectional, non-interventional study was carried out from 17 January 2019 to 9 March 2019. A structured questionnaire was administered through face-to-face interviews. *T*-tests and logistic regression were applied to determine the factors associated with knowledge.
Results. A total of 530 mothers/caregivers of children under 5 years responded to the study questionnaire. Of these, 29.4% were aged between 18 and 30 years, 79.8% were from rural areas, 46.4% had primary education and 16% were illiterate, 59.9% were single, 68.9% had access to information (owned a radio), and 93.2% had a low income of ~NAD200 - 2 000 per month. The majority, 64%, were categorised as having inadequate knowledge on the prevention and management of diarrhoea. In addition, significant associations were observed between knowledge and gender of mothers/caregivers, residential area, marital status, access to information and prevalence of diarrhoea ($p<0.05$).
Conclusion. This study identified the need to develop and intensify strategies that may improve mothers'/caregivers' knowledge, such as health education, improved literacy and women's empowerment for them to be able to prevent and manage diarrhoea among children under 5 years old.

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According to the World Health Organization (WHO), diarrhoea is defined as the passage of three or more loose or watery stools in 24 hours.[1] According to various reports, 12 million children die every year in developing countries before reaching their fifth birthday.[2] The most common causes of death are acute respiratory tract infection, diarrhoeal diseases and malnutrition. Diarrhoea remains one of the leading causes of child morbidity and mortality in developing countries.[3] The burden of diarrhoea deaths is disproportionately shared between low- and middle-income countries. However, almost 50% of these deaths are reported in sub-Saharan Africa. After establishing the United Nations Millennium Development Goal 4 in 2000, diarrhoea morbidity declined annually by 6.5%, but mortality due to diarrhoeal disease remains high. In 2015, 9% of all child deaths were due to diarrhoea.[4] The WHO[5] states that diarrhoea can be prevented through adequate sanitation and drinking safe water, and effectively treated at home with oral rehydration salts (ORS) or with a clear water, sugar and salt solution. Additionally, supplemental treatment with zinc 20 mg tablets improves the outcome.

If not appropriately managed, diarrhoea leads to dehydration, which can pose a severe threat to the affected child's wellbeing. During diarrhoeal episodes, electrolytes such as sodium chloride, potassium and bicarbonate are lost through liquid stools, vomit, sweat, urine and breathing, leading to dehydration, if fluids are not replaced.[5,6] ORS can adequately treat less severe dehydration in >90% of cases, and other fluids can be used at home to prevent dehydration. Adequate and appropriate knowledge, as well as a good understanding of the underlying aetiological factors and

dynamics involved in the occurrence of diarrhoeal disease and its progression to diverse severe outcomes, complications and mortalities, are essential to its prevention.[2]

In Namibia, according to the Namibian demographic health survey of 2013,[7] the infant mortality in the 5 years preceding the study was 39 deaths per 1 000 live births, and the under-5 mortality was 54 deaths per 1 000 live births. This result indicates that 1 in every 26 Namibian children die before reaching their fifth birthday. However, by comparing the figures with the data from previous surveys conducted from 1992 to 2012, under-5 mortality declined by 35%, from 83 death per 1 000 live births to 54 deaths per 1 000 live births in 2013.

In the Ohangwena region, diarrhoeal disease affects 19% of children under 5. During 2016/2017, 22 201 children under 5 years were diagnosed with diarrhoea, of which 11 507 (52%) were from Engela Health District in Ohangwena region, where the current study took place.[8,9] Child health and survival can be influenced by social factors such as the mother's knowledge of managing and preventing diarrhoea.[10] Less severe dehydration and most morbidity due to diarrhoea can be adequately treated at home. Improved mothers'/caregivers' knowledge on aetiology, prevention and management of diarrhoea will increase the capability of mothers/caregivers to recognise the danger signs of diarrhoea in children under 5 years of age and reassure early and appropriate care-seeking behaviours.[11] The knowledge of mothers/caregivers on aetiology, management and prevention of diarrhoeal disease has not been previously reported in the district. Hence such research would be beneficial for strategic interventions in the region. The objective of this study was therefore to assess mother-/caregiver-level knowledge on aetiology, prevention and management of diarrhoea among children under 5 years old, and associated factors.

Methods

Study design

A cross-sectional, non-interventional community-based study was conducted to capture information from participants in the Engela District in Ohangwena Region between 17 January 2019 and 9 March 2019.

Study site

Ohangwena extends east to west along the borders of the southern part of Angola, situated on a flat plain.[12,13] The region has the highest population density in Namibia, of which 62.3% reside in Engela district, where the study took place. The majority (90%) of the population in the region lives in rural areas. The region has a high unemployment rate of 36%. The primary sources of income are farming (52%), pension (20%), wages and salary (13%), non-farming business (8%) and cash remittance (5%). Educational achievement in the region is much lower than the national average. The region is prone to natural disasters such as flood and drought that displace communities and predispose them to waterborne diseases and famine.[14]

Study population

The study population included mothers/caregivers (women and men) who reside in a household with under-five children, aged between 0 and 59 months, and resident in the Engela district for at least 1 year.

Sample size

The researcher used the Cochran formula to determine the sample size of this study:[15]

$$n=z^{2*}\frac{p*q}{e^2}$$

where n is the sample size, z is the desired confidence level 95%, p is the expected prevalence, q is the expected non-prevalence (1−p) and is the relative desired precision. Here n=

$$\frac{1.96^{2*}0.5*0.5}{0.05^2} = 384.16\ HH{=}384\ \text{HH}$$

where HH = households.

The final sample size with 10% of the non-respondent rate is 38 + 384 = minimum 422 HH; however, we surveyed 530 households. Therefore, 530 mothers/caregivers participated in the study.

Sampling procedures

A multistage cluster sampling method was used, which considered the constituencies as clusters, and a simple random sampling technique in the first stage to select 5 out of 7 constituencies. A stratified proportionate sampling method was used to select the villages at the second stage. Finally, the required household with under-fives was selected by using a simple random sampling technique from the list provided by Health Extension Workers (HEWs) in selected villages. Only families with at least one or more child under 5 years were eligible for the study.

Data collection procedure

A structured questionnaire was developed in English by reviewing the literature. The questionnaire was then translated from English to the local language (Oshikwanyama) by a translator and translated back to English after data collection. During data collection, the researcher, student nurses and HEWs read the questions to the respondents and filled in the respondents' answers precisely as the respondent gave them, and kept the questionnaire when the interview was over.[16]

Measurements of the dependent variable

The primary outcome variable was the knowledge of the mothers/caregivers. In this study, knowledge of mothers/caregivers included: definition; causes; treatment; benefits of ORS; prevention; and danger signs of diarrhoeal disease. The levels of knowledge were determined using a series of 50 true and false and 'don't know' questions. The overall score was calculated for all 50 knowledge questions for each person. Correct answers were given a score of 1, and wrong answers 0. The grading for knowledge was done as follows: 0 - 59% was regarded as inadequate, while ≥60 was regarded as adequate knowledge.

Exposure variables were sociodemographic factors such as residential area, employment status, average monthly income, ownership of radio and television and mother's/caregiver's age, gender, and educational level.

Data quality control

The assessment of the reliability and validity of the data collection tool found a Cronbach's α of 0.810; this shows that the data collection items measured the same concept.

The questionnaire was adapted from the literature and modified to ensure validity based on the local context. Pretesting of the questionnaire was done before data collection on 5% of the sample size in a constituency that was not part of the study. The instrument was subsequently modified based on the pilot study outcomes. The student nurses and HEWs were trained before data collection to assist with data collection by the leading researcher. The principal researcher followed the data collection process daily, and the data were checked for completeness by the leading researcher.

Data analysis

Statistical Package for Social Science software version 24 (SPSS, USA) was used for data analysis. Descriptive statistics and inferential statistics were used to summarise the study results. Mean, range, standard deviation, frequency and percentages were calculated. The levels of knowledge were related to sociodemographic characteristics and analysed at the bivariate level. A χ^2 test was used to test for the statistical relationship between independent and dependent variables (knowledge). An independent *t*-test was conducted to compare the knowledge scores for male and female respondents, access to information and residential areas. In addition, demographic characteristics significant to a *p*-value <0.5 were further analysed using logistic regression to determine factors related to mother/caregiver level of knowledge.

Ethical consideration

Ethical clearance was provided by the University of Namibia Research Ethics Committee (ref. no. SON/554/2019). Approval to conduct the study was given by the Namibian Ministry of Health and Social Services (ref. no. 17/3/3 BF) and permission by the Regional Director for the Ohangwena Region. The Declaration of Helsinki was followed and adhered to when conducting the study. Mothers/caregivers were informed about the survey procedures, and consent was sought before interviews.

Results

Knowledge of mothers/caregivers of children under 5 regarding acute diarrhoea

Table 1 represents the aspects and distribution of scores related to knowledge of the mothers/caregivers regarding the definition, causes/contributing factors, treatment, danger signs and prevention of diarrhoeal disease in under-five children.

Definition of acute diarrhoeal disease. Multiple response questions were set to test the respondents' knowledge. More than half (56.6%) of the mothers/caregivers correctly defined acute diarrhoea as passing three or more loose stools each day for <5 - 7 days. However, 28% indicated that they did not know.

Causes/contributions to the development of diarrhoeal diseases. These were categorised as follows: infection, malnutrition and other causes. The majority (86.8%) indicated bacteria to be the source of infection, while 40% did not agree that a virus can cause diarrhoea. Equally, 40% of the respondents indicated that either the mother or father could be responsible (a common belief is that having a skin tag in the perineal area contributes to a child developing diarrhoea if it is not removed). Malnutrition is a contributing factor: most mothers/caregivers (66.4%) indicated that malnutrition makes children more susceptible to diarrhoea. However, some mothers/caregivers (24.3%) indicated that a child can develop malnutrition if the mother has multiple sexual partners (another common belief is that if a mother is still breastfeeding, she cannot have a sexual relationship with a man who is not the father of the child). Nonetheless, respondents agreed that the following factors contribute to diarrhoea infection: water contaminated with faeces (71.1%); unclean house environment (49.2%); inappropriately cooked food (74.3%); not washing hands before eating or breastfeeding (71.9%); and using infant feeding bottles (54.5%). However, 41.9% of respondents disagreed that diarrhoea can be transmitted at all.

Home treatment of diarrhoea. Respondents disagreed with giving extra fluids (36.4%), giving ORS to exclusively breastfed babies (28.7%) and giving food-based fluids if a child is not exclusively breastfed (48.9%). However, respondents agreed with giving fruit juice or sweetened tea or cool drink (63.6%), giving an antidiarrhoeal medication (54.0%) and stopping breastfeeding when a child has diarrhoea (24.5%). Furthermore, the majority (70.6%) agreed that the child should be given ORS. Also, 75.3% indicated that fluids should be given more frequently than usual, and 73% agreed that ORS treats diarrhoea.

Knowledge of diarrhoeal disease danger signs. Most respondents (72.1%) indicated fever to be one of the danger signs. On the other hand, 59.4% of respondents indicated simple diarrhoea within 1 day to be a danger sign, and 32.1% indicated that children becoming very thirsty when suffering from diarrhoeal disease is not a danger sign.

Nevertheless, it is worth highlighting that regarding the prevention of diarrhoeal disease, 49.6% of mothers/caregivers indicated that diarrhoea in under-five children could be prevented by parents going for perineal cutting (removal of the skin tag that is believed to contribute to diarrhoeal disease). Furthermore, 24% indicated that diarrhoea could be prevented through prayer, and 22.5% indicated that diarrhoea could be prevented if the mother of the child remains faithful to one partner.

Based on the knowledge score, the majority of 64% of mothers/caregivers were categorised as having inadequate knowledge-based definitions of the causes, prevention and management of diarrhoea. Only a few (36%) had adequate knowledge about diarrhoeal disease (Fig. 1).

The mean (standard deviation (SD)) score for total knowledge was 50.75 (19.95) (Table 2, Fig. 2), and the scores ranged from 0 to

Table 1. Questions on knowledge related to acute diarrhoeal disease (definition, causes, treatment and prevention)

	Frequency, *n* (%)		
Understanding of the concept of diarrhoea	**True**	**False**	**Don't know**
Definition of acute diarrhoea (multiple responses)			
Passing stools with blood	80 (15.1)	220 (41.5)	230 (43.4)
Passing of three or more loose or liquid stool per day for <5 - 7 days	300 (56.6)	93 (17.5)	137 (25 .8)
Passing of loose stools or liquid for >14 days	54 (10.2)	239 (45.1)	237 (44.7)
Passing of loose/liquid stools that lasts >7 days but <14 days	76 (14.3)	215 (40.6)	239 (45.1)
Causes/contributors to diarrhoea (multiple responses)			
Infection			
Bacterial	460 (86.8)	29 (5.5)	41 (7.7)
Viral and parasitic organisms	114 (21.5)	212 (40.0)	204 (38.5)
Mother or father could have a problem	212 (40.0)	153 (28.9)	165 (31.1)
Malnutrition			
Malnutrition makes children more vulnerable to diarrhoea	352 (66.4)	53 (10.0)	125 (23.6)
Diarrhoea is the leading cause of malnutrition	303 (57.2)	91 (17.2)	136 (25.6)
Mothers with multiple partners cause their children to develop malnutrition	129 (24.3)	219 (41.3)	182 (34.3)
Source			
Unhygienic faecal disposal	302 (57.0)	81 (15.3)	147 (27.7)
Flies	360 (67.9)	62 (11.7)	108 (20.4)
Water contaminated with faeces	377 (71.1)	56 (10.6)	97 (18.3)
Unclean house environment	261 (49.2)	105 (19.8)	164 (30.9)
Other causes			
From person to person	119 (22.4)	222 (41.9)	189 (35.7)
Inappropriate storage of cooked food	394 (74.3)	53 (10.0)	83 (15.7)
Not washing hands before eating or breastfeeding	381 (71.9)	49 (9.2)	100 (18.9)
Using infant feeding bottles	289 (54.5)	108 (20.4)	133 (25.1)
Home treatment of diarrhoea (multiple responses)			
Give extra fluids	205 (38.7)	193 (36.4)	132 (24.9)
Give antidiarrhoeal medicine	337 (63.6)	74 (14.0)	119 (22.4)
Stop breastfeeding	130 (24.5)	228 (43.0)	172 (32.5)
If the child is exclusively breastfed, give ORS or clean water in addition to breast milk	246 (46.4)	152 (28.7)	132 (24.9)
If a child is not exclusively breastfed, give food-based fluids such as soup, salted rice water or salted yoghurt, or clean water	105 (19.8)	259 (48.9)	166 (31.3)
Give salt and sugar water solution	351 (66.2)	59 (11.1)	120 (22.6)
Give fruit juice or sweetened tea or cool drink	57 (10.7)	286 (54.0)	187 (35.3)
How frequently should fluids be given to a child with diarrhoea? (multiple responses)			
More frequently than usual	399 (75.3)	67 (12.6)	64 (12.1)
About the same	78 (14.7)	241 (45.5)	211 (39.8)
Less frequent	72 (13.6)	266 (50.2)	192 (36.2)
Benefits of ORS (multiple responses)			
Treat diarrhoea	387 (73.0)	41 (7.7)	102 (19.2)
Prevent dryness of body caused by diarrhoea	375 (70.8)	69 (13.0)	86 (16.2)
Fluid replacement	232 (43.8)	142 (26.8)	156 (29.4)
Prevent further complications	162 (30.6)	169 (31.9)	199 (37.5)
Has no benefits	27 (5.1)	257 (48.5)	246 (46.4)
Signs that indicate that a child needs to be taken to the nearest health facility (multiple responses)			
Simple diarrhoea within 1 day	315 (59.4)	106 (20.0)	109 (20.6)
Eating or drinking poorly	330 (62.3)	92 (17.4)	108 (20.3)
Becomes very thirsty	215 (40.6)	170 (32.1)	145 (27.3)
Starts to pass many watery stools	291 (54.9)	117 (22.1)	122 (23.0)
Has repeated vomiting	367 (69.2)	57 (10.8)	106 (20.0)
Develops fever	382 (72.1)	38 (7.2)	110 (20.7)
Has blood in the stool	357 (67.4)	75 (14.2)	98 (18.4)
Not getting better in 3 days	330 (62.3)	79 (14.9)	121 (22.8)

...continued

Table 1. (continued) Questions on knowledge related to acute diarrhoeal disease (definition, causes, treatment and prevention)

Understanding of the concept of diarrhoea	Frequency, *n* (%) True	False	Don't know
How can diarrhoea be prevented in under-five children? (multiple responses)			
Remain faithful to your partner	120 (22.6)	242 45.7)	168 (31.7)
Immunisation	327 (61.7)	75 (14.2)	128 (24.1)
Handwashing with soap	447 (84.3)	36 (6.8)	47 (8.9)
Parents should go for perineal cutting	263 (49.6)	123 (23.2)	144 (27.2)
Food hygiene	436 (82.3)	30 (5.7)	64 (12.0)
Proper disposal of child faeces	346 (65.3)	59 (11.1)	125 (23.6)
Through prayers	128 (24.2)	241 (45.5)	161 (30.3)

ORS = oral rehydration salts.

Table 2. Diarrhoea knowledge mean scores

Mean (standard deviation)	*N*	Variance	Skewness	SE Skew	Range
50.75 (19.95)	530	398	–418	106	0 - 90

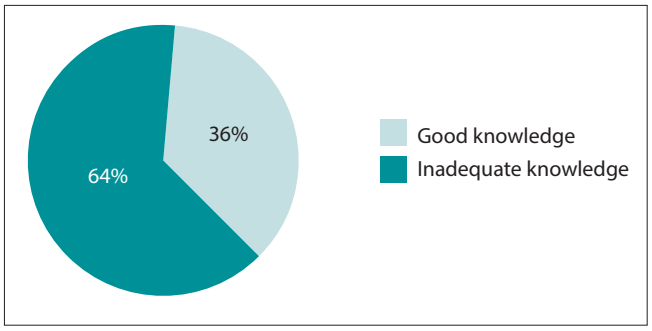

Fig. 1. Mother/caregiver level of knowledge about diarrhoeal disease.

90%. The distribution of the scores on this index was significantly skewed towards negative (skewness –418, standard error skew 0.11).

Determinants (factors) of caregivers'/mothers' knowledge about prevention and management of acute diarrhoea

Table 3 presents the sociodemographic characteristics of the mothers/caregivers in the study related to knowledge about acute diarrhoeal disease.

The mean (SD) age was 40 (8.38) years. To allow comparison between different age groups, the age of the mother/caregiver was categorised into groups of 18 - 30, 31 - 40, 41 - 50, 51 - 60 and >60 years. The greatest number of mothers/caregivers (29.4%) were within the age group 18 - 30 years, and very few were >60 years (8.7%). However, the highest proportion of adequate knowledge (47.8%) was observed among the age group >60 years compared with other age groups. Nevertheless, the observed difference was not statistically significant ($p \geq 0.05$). The majority (94.3%) of caregivers were females, and 36.8 % of the females had adequate knowledge. Males were the minority (5.7%), and the majority of male caregivers (83.3%) were categorised as having inadequate knowledge. The observed difference was statistically significant ($p \leq 0.05$).

Most of the mothers/caregivers (79.8%) were from rural areas, 19.2% were from informal settlements, and only a small portion was from urban areas (1%). However, the majority (91.2%) of mothers/caregivers from informal settlements were categorised as having inadequate knowledge, thus place of residence was significantly associated with knowledge of diarrhoeal disease ($p \leq 0.05$).

Furthermore, 16% of respondents did not have formal education, 46.4% had attended primary education, and only 1.9% had attended higher education. More than half of the respondents were single (58.9%), 23.6% were married, 12.3% were cohabiting, 4.7% were widowed, and a small percentage (0.6%) were separated/divorced. Marital status was significantly associated with knowledge about diarrhoeal disease, with the married and cohabiting categories more knowledgeable ($p \leq 0.05$).

The majority (89.1%) of the respondents did not own a television. Nevertheless, owning a television was not significantly associated with knowledge about acute diarrhoeal disease. On the other hand, respondents who owned a radio (57.5%) had adequate knowledge; furthermore, owning a radio was significantly associated with knowledge about diarrhoeal disease ($p \leq 0.05$).

Undernutrition was found to be high among children under 5 years old. Similarly, 66.8% were categorised as being underweight. However, the prevalence of underweight was not significantly associated with mothers'/caregivers' knowledge about diarrhoeal disease. Diarrhoea prevalence among children under 5 years old was reported to be 23.8% in the past 2 weeks before the survey. However, the prevalence of diarrhoeal disease was significantly associated with mothers'/caregivers' knowledge about diarrhoeal disease.

An independent sample *t*-test was conducted to compare the mean score for knowledge between the availability of radio (yes or no) (Table 4). The results show a significant difference in the mean scores of knowledge between respondents who possessed a radio ($M_Y = 53.37$, SD 19.30) and those who did not possess a radio ($M_N = 44.97$, SD 20.21); (t (528) = 4.57, p=0.001, two-tailed). The difference in the means (mean difference = 8.40 with a 95% confidence

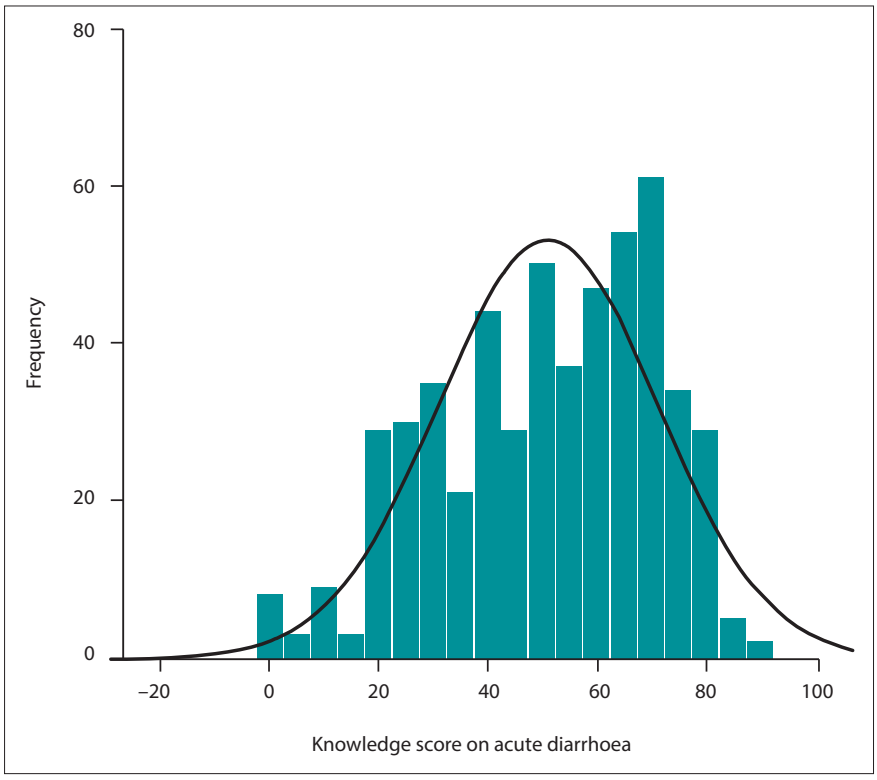

Fig. 2. Knowledge of acute diarrhoea mean scores. (N=530; mean = 50.75; standard deviation = 19.952.)

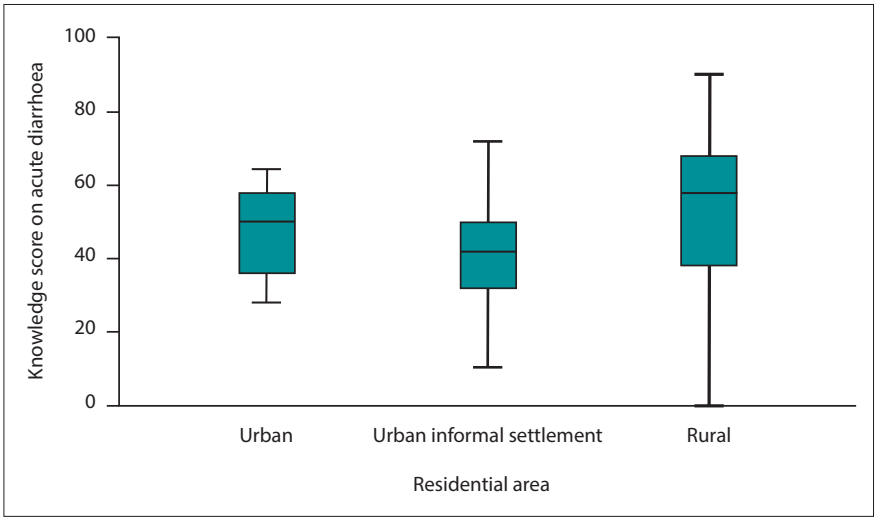

Fig. 3. Knowledge level of acute diarrhoea based on residential area.

interval varying between 4.79 and 12.01) was very large (Eta squared = 0.04). It can be concluded from the findings that those who own radios are more knowledgeable than those who do not own a radio. Equally, there is a significant difference in the level of knowledge about diarrhoea between respondents in the informal settlement and residents of rural areas (p=0.00; p<0.005). The mean (SD) score for mothers/caregivers from the informal settlement was 41.01 (13.10), while that of those from rural areas was 53.15 (20.66). In conclusion, mothers/caregivers from rural areas are more knowledgeable than those that reside in informal settlements.

Relationship between knowledge score and gender

Table 5 shows the results of an independent sample t-test to compare the mean score for knowledge with gender. The result shows that there was no significant difference in knowledge score for males (mean (SD) 44.43 (20.50)) and females (mean (SD) 51.13 (19.38); t (528) = 1.29, p=0.07 two-tailed).

Factors influencing mothers'/caregivers' knowledge

Table 6 presents logistic regression, which was performed to assess the impact of several factors that affected the knowledge of mothers/caregivers on the management and prevention of diarrhoeal disease in under-five children. The model contained four independent variables (residential area, gender, marital status and access to information (ownership of radio)). The full model containing all the predictors was statistically significant: χ^2 (N=530) = 69.76, p>0.001, indicating that the model was able to distinguish between respondents with inadequate knowledge and those with good knowledge. The model as a whole explained between 27.1% (Cox and Sell R-squared) and 36.3% (Nagelkerke R-squared) of the variance in knowledge, and correctly classified 64.3% of the cases. The results show that only two independent variables made a unique statistically significant contribution to the model (residential area and access to information such as radio ownership). The strongest predictor for knowledge was the place of residence, recording an odds ratio (OR) of 16.54. This indicates that mothers/caregivers from informal settlements were 16 times more likely to have inadequate knowledge than those from other residential areas. The OR of 0.51 for access to information or ownership of a radio was <1, indicating that respondents were 0.51 times less likely to be categorised as having inadequate knowledge, controlling for other factors in every increase of ownership of a radio in the model.

Discussion

The study aimed to determine the level of knowledge among mothers/caregivers of children under 5 years old on the management and prevention of acute diarrhoea in children. This includes knowledge about the concepts of diarrhoea, cause/contributing factors, treatment and prevention. The WHO/UN Children's Fund Integrated Management of Childhood Illness (IMCI) guideline was used as an

Table 3. Sociodemographic characteristics of the mothers'/caregivers' related knowledge scores

Variable	Inadequate knowledge, *n* (%)	Adequate knowledge, *n* (%)	Total, *n* (%)	*p*-value*
Mother/caregiver age, years				0.213
18 - 30	107 (68.6)	49 (31.4)	156 (29.4)	
31 - 40	92 (65.7)	48 (34.3)	140 (26.4)	
41 - 50	82 (56.6)	43 (34.4)	125 (23.6)	
51 - 60	36 (57.1)	27 (42.9)	63 (11.9)	
>60	24 (52.2)	22 (47.8)	46 (8.7)	
Mother/caregiver gender				0.025
Male	25 (83.3)	5 (16.7)	30 (5.7)	
Female	316 (63.2)	84 (36.8)	500 (94.3)	
Total	341 (64.3)	189 (35.7)	530 (100)	
Residential				0.001
Urban	5 (100.0)	0 (0.0)	5 (1.0)	
Informal settlement	93 (91.2)	9 (8.8)	102 (19.2)	
Rural areas	243 (57.4)	189 (42.6.7)	423 (79.8)	
Mother/caregiver education level				0.424
Not educated	59 (69.4)	26 (30.6)	85 (16.0)	
Primary education	147 (59.8)	99 (40.2)	246 (46.4)	
Secondary education	127 (67.2)	62 (32.8)	189 (35.7)	
Higher education	8 (80.0)	2 (20.0)	10 (1.9)	
Marital status				0.018
Single	203 (65.1)	109 (34.9)	312 (58.9)	
Married	70 (56.0)	55 (44.0)	125 (23.6)	
Co-habiting	51 (78.5)	14 (21.5)	65 (12.3)	
Divorced/separated	3 (100.0)	0 (0.0)	3 (0.3)	
Widow	14 (56.0)	11 (44.0)	25 (4.7)	
Ownership of television				0.501
Yes	35 (60.3)	23 (39.7)	58 (10.9)	
No	306 (64.8)	116 (35.2)	472 (89.1)	
Ownership of radio				0.001
Yes	210 (57.5)	155 (42.5)	365 (68.9)	
No	131 (79.4)	34 (20.6)	165 (31.1)	
Prevalence of malnutrition				0.230
Undernutrition	234 (68.6)	120 (63.5)	354 (66.8)	
No undernutrition	107 (60.8)	69 (39.2)	176 (33.2)	
Prevalence of diarrhoea				0.050
Yes	90 (71.4)	36 (28.6)	126 (23.8)	
No	251 (62.1)	153 (37.9)	404 (76.2)	
Monthly income				0.923
NAD190 - 2 000	313 (63.4)	181 (36.6)	494 (93.2)	
NAD2000 - 5 000	19 (73.1)	7 (26.9)	26 (4.9)	
NAD5 000 - 10 000	5 (100.0)	0 (0.0)	5 (0.9)	
>NAD10 000	4 (80.0)	1 (20.0)	5 (0.9)	

SD = standard deviation.
*p-value Pearson χ^2 statistically significant 0.05.

assessment guide. Childhood diarrhoea remains a public health problem and is among the leading killers of under-five children globally.[9,18] Although most childhood diarrhoea episodes are mild, acute episodes can result in severe loss of fluids and dehydration, leading to severe health-related consequences and death.[19] Diarrhoeal disease can be prevented simply by properly washing hands, feeding and immunisation. Acute diarrhoea can also be treated with oral rehydration and zinc.[5]

Nevertheless, mothers'/caregivers' knowledge of diarrhoea, and its management and prevention, is critical to child survival and development. Early recognition of diarrhoea by the mother/caregiver leads to early initiation of treatment and eventually to preventing complications such as dehydration and malnutrition.[20] Equally, the successes of health interventions such as the IMCI strategy require detailed knowledge of the community's perceived health problem.

Table 4. Knowledge mean score related to mother/caregiver ownership of radio and residential area

Characteristic, *n* (mean (SD))		t	*p*-value*	Lower	Upper
Ownership of radio		4.57	0.000	4.79	12.01
Yes	365 (53.37 (19.30))				
No	165 (44.97 (20.21))				
Residential area		−5.66	0.000	−16.35	−7.93
Informal settlement	102 (41.01 (13.10))				
Rural area	423 (53.15 (20.66))				

*p-value Pearson χ^2 statistically significant 0.05.

Table 5. Knowledge mean score related to gender of caregiver

Gender	Mean (SD)	t	95% CI	*p*-value*
Male	44.43 (20.503)	1.790	−0.652 - 14.053	0.658
Female	51.13 (19.876)			

SD = standard deviation; CI = confidence interval.
*p-value Pearson χ^2 statistically significant 0.05.

Table 6. Logistic regression – factors associated with mother/caregiver knowledge

Variable	Wald	df	Sig.	OR	95% CI for OR	
Residential area	19.65	2	0.00*			
Residential area (1)	0.00	1	0.01*	16.54	0.00	0.00
Residential area (2)	0.00	1	0.99	93.67	0.00	0.00
Gender (1)	2.59	1	0.11	0.431	0.15	1.20
Marital	0.89	4	0.93			
Marital (1)	0.15	1	0.70	1.09	0.70	1.70
Marital (2)	0.59	1	0.44	0.76	0.38	1.53
Marital (3)	0.00	1	0.99	0.00	0.00	0.00
Marital (4)	0.01	1	0.09	1.05	0.45	2.43
Access to information or ownership of radio (1)	8.22	1	0.00*	0.51	0.32	0.81

Variable(s) entered on step 1: residential area, gender, marital, availability of radio, children under 5 have suffered from diarrhoea in the past 2 weeks.
OR = odds ratio.
*p-value statistically significant at 0.05.

Table 7. Mother/caregiver level of education related to a place of residence

Mother/caregiver education level	Urban, *n* (%)	Informal settlement, *n* (%)	Rural, *n* (%)	Total, *n* (%)	*p*-value
Not educated	0 (0.0)	18 (21.2)	67 (78.8)	85(16.0)	0.011*
Primary education	3 (1.2)	39 (15.9)	204 (82.9)	246 (46.4)	
Secondary education	1 (0.5)	45 (23.8)	143 (75.7)	189 (35.7)	
Higher education	1 (10.0)	0 (0.0)	9 (90.0)	10 (1.9)	
Total	5 (0.9)	102 (19.2)	423 (79.8)	530 (100.0)	

*p-value statistically significant at 0.05.

Knowledge of caregivers regarding cause/contributing factors, treatment and prevention of diarrhoeal disease

The present study found that of mothers/caregivers, 64% had inadequate knowledge of prevention and management of acute diarrhoea, and only a minority (36%) had adequate knowledge. These findings are in line with those of other studies. According to a study conducted in Juba, South Sudan, most (62%) had low knowledge.[10,21] More than half of the respondents, (56.6%) in the present study knew the definition of diarrhoeal disease. In addition, >70% knew the causes of diarrhoeal disease. The findings were consistent with a study conducted in north-western Nigeria, where 89% of the respondents had the correct perception of the definition of diarrhoeal disease, and >60% of the respondents knew the causes of diarrhoeal disease.[11] However, in the current study, only a minority (21.5%) had the correct knowledge that viral infection causes diarrhoea. Nevertheless, 40% of the respondents indicated that the mother or father could be responsible for diarrhoea. Equally, 66.4% of the respondents had correct knowledge that

malnutrition makes children more vulnerable to diarrhoeal disease. However, some mothers (24.3%) agreed that a child could develop malnutrition if the mother has multiple sexual partners.

Regarding diarrhoeal disease management, only 38.7% agreed that it is necessary to give extra fluids. However, 75% agreed that fluids should be given more often than usual, and 73% agreed that ORS treats diarrhoea. Nevertheless, 24.5% indicated that if the child has diarrhoea, the mother should stop breastfeeding the baby; 10% agreed on giving fruit juice, sweetened tea or cool drink, and the majority (63.6%) agreed with giving antidiarrhoeal medications. The findings were consistent with those of a study conducted in an emergency paediatric hospital in Khartoum, Sudan. During diarrhoeal attacks, mothers did not increase the amount of fluid intake or breastfeeding, and they used antibiotics without medical advice.[22]

More than 60% of the respondents in the present study knew the danger signs that require a child with diarrhoea to be taken to the nearest health facility. The findings align with a study conducted in Southern Odisha, India, where 58% of the respondents knew the risk factors for diarrhoea.[21]

The majority of the respondents (84.3% and 82.3%, respectively) agreed that handwashing with soap, and food hygiene, prevent diarrhoea. However, 26.6%, 49.6% and 24.2%, respectively, agreed that remaining faithful to one's partner, perineal cutting and prayers can prevent diarrhoea.

The questionnaire was scored out of 50 points and converted into percentages. Related to the overall knowledge score, 43.6% of mothers/caregivers were categorised as having poor knowledge, and 46.4% as having moderate knowledge about diarrhoeal disease. Only a minority (10.0%) were categorised as having good knowledge. Similarly, in a study conducted in Juba, South Sudan, only 0.5% were categorised as having high knowledge.[10] Knowledge was found to be statistically significantly related to the age of the mother/caregiver ($p<0.05$). This study found that knowledge related to diarrhoeal disease was directly proportional to the mothers'/caregivers' age group. Similar findings were reported in a study conducted in Southern Odisha.[21] Equally, there was a strong association between respondents' knowledge and place of residence, where respondents from informal settlements tended to have less knowledge than those from rural areas ($p<0.05$). This could be a result of their level of education. Respondents from rural areas in the current study had the highest levels of education, and the results were significant ($p<0.05$). Marital status was equally found to be significantly associated with knowledge about diarrhoeal disease.

The majority (68.9%) of the respondents indicated ownership of a radio, compared with ownership of a television at 10.9%. Nevertheless, ownership of a radio was significantly associated with knowledge. The study showed that respondents who owned a radio had better knowledge about diarrhoeal disease than their counterparts because of access to information (Table 6). The results show a significant difference in the mean scores of knowledge between participants who possessed a radio ($M_Y = 53.37$, SD 19.30) and those who did not possess a radio ($M_N = 44.97$, SD 20.21); ($t(528) = 4.57$, $p=0.001$, two-tailed). According to a study conducted among children attending an under-five clinic in Fagita Lekoma, north-west Ethiopia, mothers/caregivers who owned a radio/television had good knowledge about diarrhoea and knew more about home management of diarrhoea.[23] Diarrhoea was found to be more prevalent (54.8%) among children with mothers/caregivers with poor knowledge compared with their counterparts (39.9%).

Conclusion

Overall, the level of knowledge among mothers/caregivers regarding the prevention and management of diarrhoeal disease was low. The level of knowledge was significantly associated with mothers'/caregivers' age category, residential area, marital status and ownership of a radio. Equally, the prevalence of diarrhoea in the past 2 weeks before the survey was significantly associated with poor knowledge. Therefore, many mothers/caregivers in the district need more knowledge to improve the prevention and management of diarrhoeal disease among their children. Much needs to be done to sensitise mothers/caregivers and improve their knowledge of the management and prevention of diarrhoea.

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