

Dehydration Knowledge and Dairrheal Perception are Predictors of Dairrheal Home Management: A Cross-Sectional Study of Caregivers in West Seme, Kisumu County, Kenya

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Abstract Background: With the increasing number of under-five diarrhea in Seme Sub-County; therefore, it is important to assess under-five caregivers' knowledge and perception on diarrheal home management. **Methodology:** A community-based survey involving 394 caregivers was done. Multistage sampling technique was used to identify caregivers. Interviewer administered questionnaires were used to collect data. Logistic regression was used to determine the link between knowledge/perception and diarrheal home management. **Results:** About 79.9% knew the causes of diarrhea while only 11% recognized danger signs of dehydration. About 39.2% had good diarrheal management practice. Those who identified causes of diarrhea were more likely to give water (OR=3.7, $p<0.05$) and continue feeding (OR=1.4, $p=0.04$) during diarrhea. Those who recognized dehydration signs were more likely to give ORS (OR=4.67, $p=0.022$), give water (OR=5.34, $p=0.001$), and continue feeding (OR=6.63, $p=0.038$). Those who perceived severe diarrhea were more likely to use ORS (OR=2.1, $p=0.008$) and give water (OR=4.2, $p=0.048$) during diarrheal episode. **Conclusion:** Causes of diarrhea were well known; however, few knew signs of dehydration. Knowing dehydration signs and perceiving diarrhea severity predict good diarrheal home management. It is important to educate caregivers on the signs of dehydration and diarrhea severity to enhance appropriate diarrheal home management.

Keywords: under-five diarrhea, caregivers, dehydration, home management

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1. Introduction

Despite the progress being made, diarrhea still remain the leading killer of children, accounting for approximately 8 per cent of all deaths among children under age 5 worldwide in 2017 [1]. This translates to over 1,300 young children dying each day, or about 480,000 children a year, despite the availability of simple effective treatment. Most deaths from diarrhea occur among children less than 2 years of age living in South Asia and sub-Saharan Africa [1]. Although Kenya has made significant progress in reducing newborn and child mortality [2]. Diarrhea is the third most common cause of child mortality in Kenya [3], it accounts for between 7%

and 13% of deaths in children under-five in Kenya. Besides, ranging between 7% and 13%. Besides, its prevalence in Kenya stands at 15%, while Kisumu county is at 15.5% [2].

In most developing countries including Kenya, hospital-based care is hardly accessible, especially within the first critical 24 hours of diarrheal onset [4,5]. Moreover, disparities in the quality, accessibility and affordability of healthcare remain a major challenge, hence most vulnerable children are denied their right to survive and thrive. In many instances the healthcare system in Kenya is faced with challenges including an insufficient and poorly distributed workforce; inadequate skills, practices and experience of healthcare staff; weak planning, management and financial systems within the context of a devolutionized health system [1]. A significant

number of Health facilities are not fully functional, with many lacking electricity, water, essential medical equipment and supplies. Poor quality of child health services remains a hindrance to Kenya preventable child deaths [1]. In addition, most of diarrheal cases in children are caused by virus, thus drug therapy is needless. Furthermore, most of diarrheal cases can be managed by mothers at home without drug [6].

Therefore, home based care of diarrhea remains one of the most effective interventions for reducing under-five diarrheal morbidity and mortality [7]. In line with this, most caregivers in developing countries use home-based care for managing under-five diarrheal episodes. Moreover, previous studies have also indicated that good home management practices complement diarrheal prevention and control interventions well [8,9,10]. Consequently, caregiver knowledge, perception, and management skills are important in limiting the effects of morbidity and mortality associated with diarrheal diseases [11]. However, previous study has shown that caregiver's diarrhea management practices are based on the advice of others, own observations or understanding of the efficacy of certain treatments for diarrhea, and traditionally held beliefs on the causes and cures for specific diarrheal diseases [12]. Therefore, it would be prudent to assess caregivers knowledge, perception, and practices on diarrheal home management.

Diarrheal home management in this study is defined in the action taken by caregivers when their children under-five years old have diarrhea. The recommended appropriate management of diarrhea at home is the restoration and maintenance of adequate hydration, electrolyte balance by use of ORS and maintenance of adequate nutritional requirements [13]. ORS has been proven to reduce diarrhea specific mortality by up to 93 % [14]. ORS is directed at preventing or treating dehydration that is a serious consequence of diarrhea. In African settings, diarrheal management is grossly inadequate, especially the method of preparation and administration of rehydration fluids [4]. A study in Ethiopia demonstrated that despite higher knowledge on diarrheal management, the practice is poor among caregivers of children [15]. Caregivers practices during diarrhea are significant components of home management and WHO's Community Driven Development (CDD) programme has given priority to prevention of diarrheal deaths rather than treatment of the cases by use of ORS [16].

According to the Kenyan policy guidelines on diarrhea, parents and other caregivers of children are supposed to be empowered to initiate early treatment at home to the children with diarrhea and to recognize danger symptoms and signs of dehydration that will enable caregivers to seek further treatment [17]. Appropriate management of diarrhea at home can alleviate the consequences of diarrhea including malnutrition, impaired development, growth faltering, and mortality. The recommended appropriate management of diarrhea is the restoration and maintenance of adequate hydration, electrolyte balance by use of ORS and maintenance of adequate nutritional requirements [13]. The safe and effective management of the household health environment is critical in addressing the problem of childhood diarrhea. Seme sub-county in Kisumu county has witnessed a steady increase in infant

diarrheal prevalence from 19.9 in 2012 to 32.9 in 2014 [18]; yet little is known about the caregivers' diarrheal home management practice, perception and knowledge. Therefore, this study focused on assessing caregivers' knowledge, perception, and practices on diarrheal home management.

2. Methods

2.1. Study Site

This study was done in West Seme location, Seme Sub-County in Kisumu County. The location had a population of 13,025 [19]. The location has experienced high poverty rates, high rates of unemployment, poor sanitation, and resource constrained health facilities which are drawbacks to the control of diarrhea.

2.2. Study Design

A community based cross-sectional study design was adopted for this study. Caregivers of children under-five years' old who were residents of West Seme location were involved in this study. For their inclusion, they must have stayed in the study area for the last three months, had a child passing diarrhea in the last two weeks and gave consent to participate.

2.3. Sample Size and Sampling Techniques

A total of 396 sample size was arrived at using Fishers' formula [20]. The study covered 396 households selected using multistage sampling technique. The households were selected from 30 randomly selected villages in line with population proportion to size (PPS) consistent with standard WHO EPI protocol [21]. Selection of the household was done by selecting the n th household of the number of households in each sub-location and this varied from one sub-location to another where n th was the sampling interval.

2.4. Data Collection

A pretested interviewer administered questionnaire adopted from KDHS 2014 [2] and modified was used. The questionnaire had three sections; caregivers' socio-demographic characteristics; perception and knowledge of caregivers on diarrhea; caregiver's practices/management of diarrhea at home. Pretest was done on 20 households in West Ruru Sub-location and necessary correction was made on the clarity of language, sequencing and work ability of questionnaires.

2.5. Data Management and Analysis

After the data collection, each questionnaire was coded on pre-arranged coding sheet by the principal investigators to minimize errors. Data were checked again for completeness before data entry. They were entered into SPSS software package version 20. Data were cleaned and checked for outlier. Caregivers characteristics, knowledge level, and perception were presented percentage. Logistic

regression was used to determine the influence of knowledge and perception influence on diarrheal home management practices. Statistical significance was assessed at p -value <0.05 .

2.6. Ethical Considerations

Ethical approval was obtained from the Ethical Review Committee of Maseno University. Prior approval was also taken from National Commission for Science, Technology and Innovation (NACOSTI). Authority was sought from the county director of health and local authorities. All the participants signed informed consent.

2.7. Operational Definitions

Children was defined as children under-five years of age.

Diarrhea was defined as the passage of loose watery stool for at least 3 times in 24 hours period.

Home management was defined as giving ORS, proper feeding and giving adequate fluid during diarrhea.

Correct home management of diarrhea was considered as giving at least two of the above intervention.

Poor home management of diarrhea was considered as giving one or none of the above interventions

3. Results

3.1. Caregivers and Characteristics

The mean age of caregivers was 29.8 ± 9.9 years and nearly half (47%) of them were aged between 26-35 years. About 59.4% of caregivers had a monthly income between 1-5,000 Kshs as well as primary education. More than half, 210 (53.35%) of the children were less than 1 year old as shown in Table 1.

Table 1. The socio-demographic characteristics of the caregivers

Age Distribution	n=394	%
15-25 yrs	119	30.2
26-35 yrs	185	47.0
36-45 yrs	56	14.2
>45 yrs	34	8.6
Total	394	100
Mean age = 29.8 SD = 9.88 Min age =16 Max age =67		
Income (Ksh.) - per month		
1-5,000	234	59.4
5,001-10,000	110	27.9
10,001-15,000	19	4.8
15,001-20,000	21	5.3
>20,000	10	2.5
Total	394	100
Caregivers / Level of Education/ Education.		
Primary	226	57.4
None	127	32
Secondary	37	9.4
Tertiary	4	1.0
Total	394	100

3.2. Knowledge and Perception

About 76.9 % of the caregivers had good knowledge on the causes of diarrhea. However, only 11% could mention at least two signs of dehydration. Majority (72.1%) of caregivers perceived frequent diarrhea as the most severe. On the practices, 84.5% of caregivers gave fluids during diarrhea episodes; but only 37.1% gave it as recommended by WHO. About 6.1% gave ORS during dehydration. Only 39.2% had good practices on diarrheal home management as shown in Table 2.

Table 2. Knowledge, perception, and practices of caregivers on diarrhea

	n =394	(%)
Knowledge		
Causes of diarrhea		
Contaminated water	183	46.4
Contaminated food	120	30.5
Teething	49	12.4
Taboo	30	7.5
Evil or cursing eyes	10	2.5
Witchcraft	2	0.6
Signs of Dehydration		
>= 2 signs	43	11
< 2 signs	351	89
Perception		
Perceived severity		
Frequent	284	72.1
Watery	84	21.2
Bloody	15	3.8
Painful	11	2.9
Practices		
Practices during diarrhea		
Giving fluids	333	84.5
Not giving fluids	61	15.5
Frequency of giving fluids		
Less than usual	40	12.0
Usual (a glass after a meal)	169	50.9
More than usual	124	37.1
Practices during dehydration		
Continued feeding	192	48.7
Gave water	132	33.5
Rushed to hospital	38	9.6
Gave ORS	24	6.1
Gave homemade fluid	8	2.0
Practices on home management		
Good	154	39.2
Poor	240	60.8

3.3. The Effect of Caregivers' Knowledge of Diarrheal Causes, and Perceived Diarrhea Severity on Diarrheal Management at Home

Table 3 shows that those who had the right knowledge on causes of diarrhea were more likely to give water and continue feeding their children who were passing diarrhea

than those with the wrong knowledge; continued feeding (AOR=1.66 (1.29-1.26)). Similarly, those who said that diarrhea is caused by teething were 3.4 (AOR=3.35, (1.32-8.42)) times more likely to continue feeding a child passing diarrhea at home than those who said diarrhea is caused by taboo. Knowledge on danger signs of dehydration, those who knew the signs of dehydration were more likely to use ORS (AOR = 2.77(1.18-8.37)), give water (AOR = 4.64 (1.78-9.67)), continue feeding

(AOR = 5.731 (1.21-9.76)). The perception of caregivers was significantly associated with both giving ORS and giving water during a diarrhea episode. Those who had right perception of diarrhea severity were 2 (AOR=1.86 (1.15-4.18)) times more likely to give ORS, and 4 (AOR = 4.02 (1.44-11.25)) times more likely to give water, and 2 (AOR=2.01 (1.24-2.58)) times more likely to continue feeding during child diarrhea than those who had wrong perception.

Table 3. The influence of knowledge on diarrheal causes and perceived diarrhea severity on diarrheal management at home

	N (%)	OR (95% CI)	AOR (95% CI)
Knowledge on diarrhea causes vs diarrheal management at home			
Used ORS	24 (6.1)		
Taboo	14 (58.4)	1	-
Germes	10 (41.6)	1.61 (0.03-2.62)	-
Giving water	132 (33.5)		
Taboo	45 (34.1)	1	1
Teething	13 (9.6)	0.73 (0.37-3.45)	0.54 (0.26-1.98)
Germes	74 (56.3)	3.77 (1.28-11.10) *	2.94 (1.64-8.46) *
Continued feeding	192 (48.7)		
Taboo	11 (5.8)	1	1
Teething	94 (49.0)	3.54 (1.46-8.62) **	3.35 (1.32-8.42) **
Germes	87 (45.2)	1.64 (1.20-3.96) *	1.84 (1.39-4.26) *
Knowledge on danger signs of dehydration vs diarrheal management at home			
Used ORS	24 (6.1)		
Don't know signs of dehydration	10 (41.7)	1	1
Knows signs of dehydration	14 (58.3)	4.67 (1.34-10.46) *	2.77 (1.18-8.37) *
Giving water	44 (11.2)		
Don't know signs of dehydration	12 (27.3)	1	1
Knows signs of dehydration	32 (72.7)	5.34 (1.68-10.86) **	4.64 (1.78-9.67) **
Continued feeding	30 (7.6)		
Don't know signs of dehydration	11 (36.7)	1	1
Knows signs of dehydration	19 (63.3)	6.63 (1.27-11.89) **	5.731 (1.21-9.76) **
Perceived diarrheal severity vs diarrheal management at home			
Used ORS	24 (6.1)		
Watery	10 (41.7)	1	1
Frequent	14 (58.3)	2.14 (1.27-4.33) **	1.86 (1.15-4.18) **
Giving water	132 (33.5)		
Watery	22 (16.7)	1	1
Frequent	110 (83.3)	4.20 (1.75-13.45) *	4.02 (1.44-11.25) *
Continued feeding	192 (48.7)		
Watery	52 (27.1)	1	1
Frequent	140 (72.9)	2.03 (1.33-2.63) **	2.01 (1.24-2.58) **

** p value < 0.01, * p value < 0.05.

4. Discussion

This study found that most caregivers had good knowledge on the causes of diarrhea, but poor knowledge on signs of dehydration. In addition, majority of caregivers are not practicing diarrheal home management as recommended by WHO. We further found that caregivers who had the right knowledge on causes of diarrhea were more likely to give water and continue feeding during diarrhea but not ORS. Interestingly, knowing signs of dehydration and perceiving diarrheal to be severe had influence on the use of ORS, giving water

and continued feeding during diarrhea; despite fewer caregivers having the right knowledge on signs of dehydration.

This study found that only 39.2% of caregivers had appropriate diarrheal management practice at home. Similarly, an earlier study showed high levels of poor diarrheal management, ranging from 38 % to 63 % with a median of 49 % in twelve sub-Saharan African countries [22]. Poor diarrheal quality care has been previously linked to low levels of ORS coverage [22]. Likewise, we found low (6.1%) usage of ORS among caregivers. Previous studies have also shown low (7.75% in Nakuru and 8% in Czech Republic) use of ORS in management of diarrhea

[23,24]. Some of the reasons behind the low ORS use is difficulty in preparing ORS among caregivers [25] and lack of knowledge among caregivers. The benefit of ORS is enormous and can be used to manage uncomplicated diarrhea successfully in addition to continuing to feed the child, offering more fluids to a child during diarrhea episode. This study established that 84.5% of caregivers continued giving fluids during diarrhea episode to replace the lost fluids; however, the frequency of giving fluids differed from one respondent to another. Interestingly, more than half of the respondents were not following WHO recommendation of increased fluid intake during diarrhea. It is imperative that a child's feeds be increased during diarrhea in order to aid the body in lowering the microorganisms. The improved home management includes four elements; first, prevention of dehydration through early administration of increased amounts of appropriate fluids at home. Secondly, administration of oral rehydration with ORS solution. Thirdly, continued feeding during and after diarrhea episode and finally administering drugs [26].

Adequate management of diarrhea at home has previously been associated with caregivers' knowledge on causes of diarrhea and danger signs of dehydration (Mengiste *et al.*, 2013). In addition, the right perception on diarrhea severity may also drive caregivers into good diarrheal management practices at home. This study reveals that majority (76.9%) of caregivers had high knowledge on the causes of diarrhea and (72.1%) right perception on its severity. However, only 11% of caregivers had good knowledge on danger signs of dehydration. Similarly, an earlier study also showed that 11.5% of the respondents knew early signs of dehydration (Mugo, 2012). Besides, the findings of this study demonstrating that good knowledge on danger signs of dehydration enhances diarrheal home management practice. Because, those who had adequate knowledge on the danger signs of dehydration were more likely to use ORS and continue feeding during diarrhea. Likewise, the caregivers who perceived more frequent diarrhea as the most severe were more likely to manage diarrhea at home by use of ORS and giving water. This means that caregivers' perception on severity of diarrhea influence the administration of appropriate diarrheal home management.

5. Limitation

One limitation of this study is that self-report of diarrhea over a two-week period could have underestimated true magnitude. Moreover, it is also impossible to know if some risk factors preceded the outcome or changed because of it. Thus, we have to be careful about interpreting the associations and direction of associations from this study. Another limitation is that this study may also exhibit recall bias, because disease may influence subjects' responses to questionnaires.

6. Conclusion and Recommendation

Majority of the caregiver had good knowledge on the causes of diarrhea and right perception on severity of diarrhea. However, few had good knowledge on signs of

dehydration. Moreover, fewer caregivers had good practices on diarrheal home management, since more than half of the respondents were not following WHO recommendation of increased fluid intake during diarrhea. The caregivers' knowledge on signs of dehydration and perception on severity of diarrhea influenced appropriate diarrheal home management practice.

It is important to create awareness on signs of dehydration among under-five children caregivers. Moreover, educating caregivers on good practices on diarrheal home management to enable them follow WHO recommended home based management of diarrhea, especially with regard to use of ORS. It is also important to create awareness on severity of diarrhea for prompt diarrheal home management care.

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Authors' contributions

BAO was responsible for the conception of the problem, design, collection, analysis and interpretation of data and drafting the final article. COA and JAO were responsible for collection, analysis and interpretation of data, and drafting the final article. JRA and COO had oversight of all the stages of the research and critically reviewed the final draft for academic content. All authors read and approved the manuscript.

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Availability of Data and Materials

Datasets generated from this study will be available from the corresponding author (COA) upon a reasonable request.

Ethics Approval and Consent to Participate

Prior informed written consent was obtained from the caregivers of under five children. Ethical approval was obtained from the Ethical Review Committee, Maseno University. Prior approval was also county director of health and local authorities.

Consent for Publication

Not applicable.

Competing Interests

The authors declare that they have no competing interests.

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