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Knowledge and Practices of Home Diarrhoea Management among Adolescent Mothers with under Five Children in Nyando Sub-County, Kisumu, Kenya

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Abstract

Background: Globally, diarrhea is the primary cause of death for children under the age of five. In Kenya, it continues to be a significant source of illness and mortality in this age range. Mothers play crucial roles in the prevention and control of diarrhea among these children by practicing easy home management.

Aim: This study aimed to assess adolescent mothers' knowledge, and practice in the prevention and home management of diarrhoeal diseases among children under five years old in Nyando sub-county, Kenya

Setting: This study was conducted in Nyando sub-county, Kisumu County, Kenya.

Methods: A mixed method descriptive cross-sectional study design was conducted using a Proportionate sampling technique. Data were collected using a structured interviewer-administered questionnaire and interview guides and analysed using STATA version 16 to generate the tables and bar graphs. NVivo version 12 was used to analyse the qualitative data adopting thematic analysis approach.

Results: Boiling of drinking water was a common practice as reported by majority (75.8%, n= 216) of the participants. A total of 94 mothers (33.0%) expressed knowledge of exclusive breastfeeding while 10.5% (n=30) indicated maintenance of cleanliness as methods. These adolescent mothers practiced continued feeding and breastfeeding during diarrhoea episodes. In addition, the use suboptimal diarrhoea management practices such as food restriction and use of traditional herbs was practiced among the study participants.

Conclusion: Continued feeding and breastfeeding during diarrhoea episodes were identified as appropriate management practices and were significant in preventing dehydration as well as increased vulnerability to malnutrition. There is also need of creating awareness of other diarrhoea management practices such as the use of banana and yoghurt as well as demystifying the use of traditional herbs in diarrhoea management.

Keywords: Knowledge; Practices; Diarrhoea Management; Adolescent Mothers

Abbreviations: WHO: World Health Organization; LMICs: Low- and Middle-Income Countries; SSS: Salt-Sugar-Solutions; ORT: Oral Rehydration Therapy; ORS: Oral Rehydration Solution; GPS: Geographical Positioning Satellite; CHVs: Community Health Volunteer; FGDs: Focus Group Discussions.

Introduction

Diarrhoea in childhood is a key public health problem in low- and middle-income countries (LMICs). The World Health Organization (WHO) has defined diarrhoeal disease as the passage of three or more loose or liquid stools per day [1]. This disease although preventable and treatable is the second leading cause of death in children under five. Annually, approximately 1.7 billion cases of childhood diarrhoeal diseases have been reported, leading to deaths of 525,000 under-five children, which accounts for 8% of all deaths worldwide [1]. It is estimated that 90% of diarrhoeal diseases happen in sub-Saharan and South Asian countries [2].

In Kenya, during the year 2018, 1,499,146 cases of diarrhoea were reported among children under five years. Among the cases of diarrhoea in 2018 in Kenya, Nairobi accounted for 136,028 cases [2,3]. Two-week diarrhoeal prevalence in Kisumu is 18%, higher than neighbouring areas [4]. There is an association between diarrhoeal diseases and an increase in the risk of malnutrition in children [1] since diarrhoeal diseases have a detrimental impact on child growth and cognitive development [5].

Home-based oral therapy in the management of diarrhoea has been recognised and advocated by the World Health Organization (WHO through the Integrated Management of Childhood Illness to lower the effect of diarrhoea, particularly on children [6]. The best and first-line recommendations for this purpose continue to be reduced (low)-osmolarity oral rehydration salt formulations. In its absence, home-made salt-sugar solutions (SSS) made from clean, boiled, and cooled water in certain ratios are also advised, along with appropriate food-based solutions like pap, gruel, soup, or rice water to replenish lost fluids, energy, and electrolytes [7]. Continued feeding, increased fluids intake, and use of zinc supplements for 10–14 days to prevent dehydration has been recommended by the WHO as the first line management of diarrhoea among under-five children. Together with this, the WHO guidelines indicate that children presenting non-severe dehydration ought to "receive oral rehydration therapy (ORT) with ORS solution in a health facility". Antimicrobials are only recommended for the treatment of suspected cholera or bloody diarrhea with severe dehydration [7].

Even though the knowledge and practices on early interventions for the management of diarrhoea is important in its prevention and the related complications Chiabi A, et al. [8], the caregivers' information about diarrhea management is influenced by various factors for example the level of education, other exposures in diarrhea management and also the caretakers background [9,10]. A study done by Masiha SA, et al. [11] indicates that there is prove showing that inappropriate practices such as food intake restriction, reduced breastfeeding and use of conventional medicine whose outcome is unknown in management of diarrhea at home.

Together with this, fewer programs have explicitly focused on the non-adherence to other recommended diarrhea management practices, such as the restriction of fluids, breast milk and/or food intake during diarrhea episodes, and incorrect use of modern medicines. These practices are linked with negative outcomes, and they conflict with the WHO treatment guidelines. Restriction of feeds and fluids curtailment during diarrhea episodes can lead to an increased risk in reduced nutritional intake, dehydration, which could potentially inhibit child growth and development [7,12].

In underdeveloped nations, there is a greater chance of getting diarrhea [13]. This is brought on by insufficient access to water, poor hygiene, inadequate nursing, and deficiencies in zinc and vitamin A Walker FCL, et al. [14] Due to a lack of availability to effective treatments like oral rehydration solution (ORS) and zinc, vulnerable children in underdeveloped and underprivileged areas also experience greater fatality rates than children in wealthy nations [15].

Diarrheal diseases among under 5-year children can be tackled in at both primary and secondary prevention levels. The primary prevention and management would involve environmental aspects such as improvement of sanitation and water quality [16]. Environmental mediations for the reduction of diarrhoea have traditionally focused on the improvement of the quality and distribution of drinking water, excreta management through sanitation systems as well as promotion of handwashing with soap at critical times Mumma J, et al. [17] as well as exclusive breastfeeding up to the age of 6 months, and continued breastfeeding through 24 months Black RE, et al. [18,19] In addition, maternal factors like mother's age and education level have been seen to be significant in explaining child health outcomes [20]. This study therefore aimed at determining the knowledge and practices of home diarrhoea m that affect diarrhoea management practices among adolescent mothers.

Methods

Study Design

This was cross sectional descriptive design study and it a utilized a. A mixed methods approach incorporating both qualitative and quantitative data collection methods was employed.

Study Area

The study was conducted in Nyando sub-county located within Kisumu County. Its geographical positioning is at geographical positioning satellite (GPS) coordinates: latitude -.2833, longitude 35.1167 with an approximate population of 299930, and it is approximately 163 KM^2. It consists of 5 wards, namely, Kobura ward, Ahero ward, Awasi/Onjiko ward, Kabonyo Kanyagwal and East Kano Wawidhi ward.

Study Population

The study targeted adolescent mothers aged 15-19 years and with children below five years.

Sample Size Determination

The Fischer's formula Fisher AA, et al. [21] below was used to calculate sample size of adolescent mothers to participate in the study.

$$n = z^2 PQ / I^2$$

Where n= Sample size [where population>10,000]
Z= Normal deviation at the desired confidence interval. In this case was taken at 95%,
Z value at 95% is 1.96
P= Proportion of the pregnancies that are attributed to adolescents (18%)

$$Q = (1 - P)$$

I= Degree of precision, was been taken to be 5%.

$$Substituting\ n = Z^2 PQ / I^2$$

$$n = 1.96^2 \times 0.18[1 - 0.18] / [0.05]^2 =$$

$$= 3.8416 * 0.18 * 0.82 / 0.0025 \ = \ 266.8 \ = 267$$

Since the adolescent mothers, target population is <10000, the sample adjustment was done using the following formula

$$nf\ n / (1 + n / N)$$

Where
nf= the desired sample size for population
n= the calculated sample size
N= the total population
nf= 267
Nonresponse rate 10% of 267 = 27

Therefore, the study population was **294** adolescent mothers

Sampling Procedure

The study purposively selected Nyando Sub-County in Kisumu County-Kenya. Kobura ward was selected purposively because its teenage pregnancy prevalence was at 18%. Proportionate sampling technique was used to get the study participants from each of the 9 community units with the help of the 2-community health volunteer (CHVs) per community unit.

Description of Quantitative Sampling Approaches

Systematic random sampling technique was used to select participants in the community within the community units. This is a probability sampling technique used where sampling interval was calculated using the formula *i=N/n*. from the sample each CU, an interview was done after each second household. This sampling technique was chosen because it gave each participant an equal chance to participate, and it posed minimal bias.

Description of Qualitative Sampling Approaches

Purposive sampling was used in selecting participants for the qualitative methods, which were focus group discussions (FGDs). For the focus group discussions, 10% of the respondents who had been interviewed were requested to participate. These were people who are group leaders, within the community or who had been deemed eloquent by the interviewer during the survey.

Data Processing and Analysis

All completed questionnaires were reviewed for accuracy. STATA version 17 was used to clean, code, enter, and analyzed. Tables and bar charts were used to display socio-demographic information (categorical variables) such education level, child's gender, marital status, and occupation. Triangulation of sources and analysts helped to assure the analytical rigor of the qualitative investigation. The researchers (JM and AW) matched the transcriptions to the notes they took during the focus groups. Additionally, preliminary codes and themes (by JM) were reviewed by a second researcher (AW), and any discrepancies were discussed before codes and themes were finalized.

Ethical Considerations

This study sought approval from the Board of Postgraduate Studies, JOOUST. Ethical clearance was obtained from Jaramogi Oginga Odinga Teaching and Referral Hospital Ethics Review committee (JOOTRH ERC (IRRC/JOOTRH/560/21)) and NACOSTI (NACOSTI/P/22/16717). Permission to conduct the study was sought from the Health Department of Kisumu County, (GN 133 VOL.XL (229)).

Results

A total of 285 adolescent mothers participated in the study for the quantitative section while 21 adolescent mothers participated in the qualitative arm of the study. These data were analysed and triangulated. The study revealed that 64 children (22.5%) had had diarrhoea in the past two weeks.

Demographic Characteristics

Majority of the participants had a minimum of basic secondary education – 33.0% (n=94) had secondary education, 22.5% (n=64) had partial secondary education, and 4.9% (n=14) had tertiary level education. More than half of the study participants 80.4% (n=229) were unemployed.

Almost half 46.7%, (n=133) of the children had been fully vaccinated while 10.5% (n=30) had not been vaccinated. A total of 120 children, accounting for 41.11% of the population had not received rotavirus vaccine. Table 1 below gives further information on demographic characteristics.

Variable	Frequency (n=285)	Percent (%)
Education		
None	1	0.4
Partial Primary	31	10.9
Primary	81	28.4
Partial Secondary	64	22.5
Secondary	94	33
Tertiary	14	4.9
Occupation		
Casual Laborer	44	15.4
Formal employment	4	1.4
Self employed	8	2.8
Unemployed	229	80.4
Vaccination status of the child		
Fully Vaccinated	133	46.7
Not fully vaccinated	122	42.8
Not vaccinated	30	10.5
Has the child received DPT Vaccine		
Yes	215	75.4
No	70	24.6
Has the child received Measles vaccine		
Yes	188	66
No	97	34
Has the child been vaccinated against typhoid		
Yes	93	32.63%
No	143	50.18%
Don't know	49	17.19%

Has the child received rotavirus vaccine		
Don't know	83	29.12%
No	120	42.11%
Yes	82	28.77%
Child had diarrhoea in the past two weeks		
Yes	64	22.5
No	221	77.5

Source: Primary Data, 2022

Table 1: Demographic characteristics of adolescent mothers, Nyando sub-county, Kenya.

Knowledge on Diarrhoea Prevention and Management

Majority of the participants (71.6% (n=204)) had knowledge about ORS as a method of diarrhoea management and out of the total 285 participants, 165 (57.9%) said that they used ORS in diarrhoea management. More than half of the respondents (67.0%, n=191) said that ORS is prepared by mixing ORS powder with water. This implies that a good number had knowledge on preparation of ORS. However, about a third of the mothers' population (32.6%, n=93) prepared ORS by mixing the ORS powder with milk/juice, a representation of misinformation in diarrhoea management practices (Figure 1).

Boiling of drinking water was a common practice as reported by majority (75.8%, n= 216) of the participants. Less than half of the participants (40.04%, n=115) reported that using latrines could help prevent diarrhoea. A total of 94 mothers (33.0%) expressed knowledge of exclusive breastfeeding while 10.5% (n=30) indicated maintenance of cleanliness as methods of diarrhoea prevention and management.

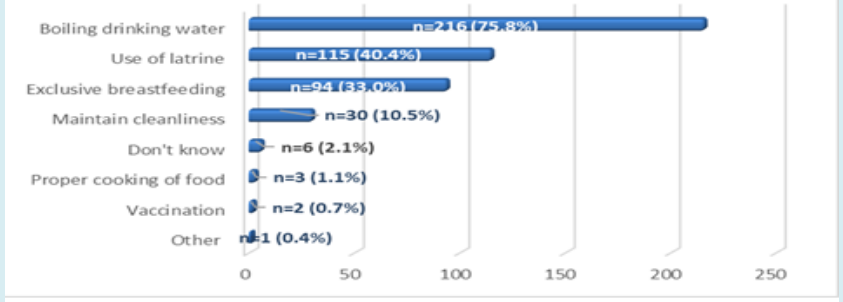

Figure 1: Ways of Preventing/managing diarrhoea.

Prevention and Management Practices of Diarrhoeal Disease

The commonly used diarrhoea management practices were; washing hands after visiting the latrine (98.9% (n=282), washing hands after changing diapers (92.3% n=263), reminding the children to handwash before meals (90.9% n=259), not using formula milk to feed the child (88.1%, n=251), washing hands after bathing children (n=215, 75.4%) and use of chemicals to kill water germs (n=201, 70.5%). Other practices used by some of the participants were; boiling drinking water (60.0%, n=171) not using a bottle feeder to feed the child (n=181, 63.5), filtering water by use of muslin cloth (51.9%, n=148) and boiling feeder before every meal (n=114, 40.0%).

Only a few participants (15.4%, n=44) reported the use of banana in diarrhoea management. This might imply that most of the participants did not believe that banana helps to reduce electrolyte imbalance in diarrhoea. Additionally, some participants (10.2%, n=29) used yoghurt in managing diarrhoea, although most (89.8%, n=256) did not think that yoghurt is a probiotic in diarrhoea and a few participants resorted to abstaining from food during diarrhoea (Table 2) (11.2%, n=32).

Management of Diarrhoea (Total n=285)	Yes		No	
	N=285	%	N=285	%
Knowledge about method of ORS (oral rehydration solution)	204	71.6	81	28.4
Wash hands after latrine	282	98.9	3	1.1
Do you breastfeed your child	219	76.8	66	23.2
Do you bottle feed your child	104	36.5	181	63.5
Use formula milk to feed your child	34	11.9	251	88.1
Boil drinking water	171	60	114	40
Boil bottle feeders	116	40.7	169	59.3
Boil feeder before every meal	114	40	171	60
Abstain from food during diarrhoea	32	11.2	253	88.8
Do you filter water by use of muslin cloth	148	51.9	137	48.1
Use chemicals for killing water germs	201	70.5	84	29.5
Use banana in diarrhoea management	44	15.4	241	84.6
Use yoghurt in managing diarrhoea	29	10.2	256	89.8
Handwash after passing stool	279	97.9	6	2.1
Use in ORS in diarrhoea management	165	57.9	120	42.1
Remind children to handwash before meals	259	90.9	26	9.1
Do you wash hands after changing diapers	263	92.3	22	7.7

Source: Primary Data, 2022.
Table 2: Management practices of diarrhoeal disease.

Findings from Focus Group Discussions (FGDs) with Adolescent Mothers

A total of 21adolescent mothers attended 3 focus group discussions (8,7, 6 participants (P) in group 1, 2, 3 respectively). These participants had been purposively selected from the household interviews, including those that were champions in groups such as adolescent mothers club and those who were vocal during the interviews.

Analysis of the FGDs data was done thematically where two themes relating to diarrhea management among the participants were identified; i) Knowledge on diarrhoea management, and ii) Practices in diarrhoea management. The FGDs suggested that there was insufficient Knowledge on diarrhoea management and that conventional methods of diarrhoea management were still being practiced among the study participants (Table 3).

Theme	Sub-theme
Knowledge of diarrhoea management	- Knowledge gap on diarrhoea management
	- Misinformation/misconceptions on diarrhoea management
Practices of diarrhoea prevention and management	- Appropriate diarrhea management practices
	- Suboptimal and inappropriate diarrhoea management practices
	- Approaches of diarrhoea prevention

Source: (*Participant – P).
Table 3: Thematic Analysis of the FGD data.

Knowledge Gap on Diarrhoea Management

Use of Banana and Yoghurt

The use of banana and yoghurt in diarrhoea management among the participants was not commonly practiced since it was not well known. The knowledge on the importance of using banana and yoghurt might need to be reinstated as the two play a key role in electrolyte balancing and as a source of probiotics respectively. *"I have just heard rumours though I personally I have not used the said method like yoghurt and*

banana when mixed and you give to the child can help in the mitigation against diarrhoea in children", P6_ FGD2O.

Approaches of Diarrhoea Prevention and Management

Handwashing and safe personal and environmental hygiene practices were reported as important strategies in the prevention and management of diarrhoea alongside boiling/treating drinking water.

"Diarrhoea can be managed by cleaning our environment, cutting long fingernails, cleaning their hands properly. We are supposed to wash our hands before feeding the baby if it is a child who is eating and if he is not yet eating, we are supposed to be very keen on what they put in their mouths, and we should not leave them in a dirty environment. We must clean our environment and we should have water in every place. When we are entering the house, we are supposed to wash our hands before feeding the baby. After changing the diapers, we must wash our hands with water and soap then dry it with a toilet". P4_FGD3K "When you want to use water because you know water also causes diarrhoea. So, you can add water treating chemicals or you can use boiled water" P7_FGD2O.

Appropriate Diarrhoea Management Practices

Findings from the focus group discussions illustrate that some adolescent mothers had appropriate diarrhoea management practices. These adolescent mothers practiced continued feeding and breastfeeding during the diarrhea episodes a practice that would reduce the risk of dehydration among the babies.

"Yeah, it (feeding) changes and when it does, I maintain the breastfeeding. No matter how you try, when a child starts to diarrhoea, he diarrhoeas. So, I just maintain… breastfeeding him plus giving him his food" P2_ FGD1K "And if it is a child that does not eat and it is only that breastmilk, then you maintain with that breastmilk because that is what contains everything when he is below the eating age. So, you will maintain the breastfeeding for him" P5_FGD1K

Suboptimal and Inappropriate Diarrhoea Management Practices

Restriction of Food during Diarrhoea

Restriction of oral feeding during diarrhoea episodes which is an inappropriate method of diarrhoea management was mentioned as a common practice among the participants in spite of the negative nutritional implications such as dehydration and malnutrition. Some mothers preferred breastfeeding the child during the diarrhoea episodes.

"You can reduce some of the foods that you give to the child. You can start by giving him rice soup, it can prevent diarrhea, but you continue giving him banana that has been boiled and mashed and diarrhoea is still persistent breast feeding is the best", P3_ FGD1K "The feeding habits definitely will change since the child will lack appetite will not eat anything be it food even if you force the child nothing will be eaten yeah" P5_ FGD2O "The feeding cannot change you just give him food like normal, the way you usually give him. Because he is the one who will eat it and if he has had enough, he will leave it" P4_ FGD2N

Use of Conventional Methods in Diarrhoea Management

The use of conventional methods in the management of diarrhoea was also mentioned to be practiced among the adolescent mothers. The utilization of these unconventional ways in diarrhoea could lead to increased vulnerability to other infections.

"There is a traditional medicine herb that you look for apart from the ORS, you pluck it, then you break it by crashing or blending it into small pieces, then you mix with water which you then sieve and then you take few medicinal herbs and place around the buttocks and anus of the child", FGD3O. "I have not tried that (cross talk) there is another method in the management of diarrhoea like the medicine used when one contacts measles and there is too much diarrhoea then that medicine can be used. The leaf herbs obtained are prepared with water and the rest are put in the anus and buttocks of the child which can lead to reduction in diarrhoea". FGD2N

Discussion

Diarrhoea is a prominent cause of illness and mortality in children under the age of five particularly in underdeveloped countries. Before dehydration sets in, diarrhoea must be properly treated. If parents were educated how to give their children ORS, zinc, and good home care, millions of children's lives might be saved [22]. However, this study indicates that there is a low level of knowledge in ORS preparation. This implies that there is a gap in the level of awareness on fluid replacement using oral rehydration therapy. According to the findings approximately 67% had good knowledge of ORS preparation, these findings are similar to those of a study conducted in Gondar, Ethiopia that found out that about 65% of the caregivers had good knowledge about ORS in home management of diarrhoea [23]. In addition to ORS, findings from this study indicated that continued feeding and breast feeding were practiced by the participants during diarrhoea episodes. This is an indication that participants practice the appropriate diarrhoea management, and this

would be helpful in impeding malnutrition and dehydration. The findings concur with a study conducted in Ethiopia whose findings showed that, findings showed that continued breastfeeding and increased food intake were practiced by participants [24].

However, several patterns of suboptimal diarrhoea management practices such as withholding of food was noted among the study participants. This is inappropriate but it is also discouraged as it increases the child's vulnerability to malnutrition. These findings concur with studies conducted in Nigeria in which participants mentioned withholding food during diarrhoea episodes [25,26].

The use of banana and yoghurt during diarrhoea was low among the study participants. Although these two have been noted to be of great importance, banana helping with electrolyte balancing and yoghurt helping with probiotics there was little knowledge about them among the study participants. As study conducted on traditional diarrhoea management practices in found out that the use of banana, and yoghurt was common [27,28].

This study also identified the use of conventional methods of diarrhoea management at home. There is a specific herb which is given to babies during diarrhoea episodes. This is not only a suboptimal practice in diarrhoea management but also inappropriate since it exposes the baby to sepsis and to other gastrointestinal infections. This has also been observed in other studies [11,29] which highlighted the use of herbs and other traditional medicines to be used in the management of diarrhoea.

Some of the diarrhoea prevention methods identified in this study were hygiene practices such as handwashing, environmental hygiene as well as drinking treated or boiled. These findings are supported by literature that demonstrated that the use of proper sanitation, hygiene, and water practices can reduce mortality by 65% and diarrhoea incidence by 26%. [30]. The WHO also recommends that sanitation and hygiene are some of the key elements in diarrhoea prevention methods [31].

The study findings showed that continued feeding and breastfeeding during the diarrhoea episodes were appropriate practices I diarrhoea management. These were practices that would help reduce the risk of dehydration among the babies with diarrhoea. Immunization against rotavirus was however not mentioned as a method of diarrhoea management. Literature indicates that some of the strategies such as promotion of early and exclusive breastfeeding, vitamin A supplementation, and soap-washing were recommended as a means of community-wide sanitation. Together with this, rotavirus vaccination was also recently recommended for global introduction into routine schedules for immunization procedures [15]. This study showed that only 28.77% had had their babies receive rotavirus vaccine, which was below the previous reports by WHO/UNICEF Wandera EA, et al. [32,33] report that only 38% of the national target Kenyan population received the rotavirus vaccine in 2014, and 66% in 2015. Such a gap in immunization might imply the lack health education on the vaccines that the child gets or the importance of immunization in the child's wellbeing. There is therefore need to educate mothers on the appropriate home diarrhoea management practices, since diarrhoea is common among under-fives and if well managed, many deaths could be averted [34].

Conclusion

Continued feeding and breastfeeding during diarrhoea episodes were identified as appropriate management practices and were significant in preventing dehydration as well as increased vulnerability to malnutrition. The use of banana and yoghurt for diarrhoea management was low, even though the two are known for their electrolyte balance and probiotic production during diarrhoea evidence. There is low coverage of immunization generally and that of rotavirus among the study participant and therefore the need for immunization campaigns to improve the vaccine uptake. The use of water and sanitation strategy as methods in prevention and management of diarrhoea have been advocated and these are approaches that could help in averting the occurrence of diarrhoea among children.

Recommendation

Explore the knowledge of ORS, zinc solution and other treatments of diarrhoea among under five children.

Conflict of Interest

The authors declare that they have no conflict of interest.

Author's Contribution

JM, DO, DO, Conceptualized the idea, JM wrote the original manuscript, DO and DO review and gave their comments during the manuscript development stages and participated in the drafting of the paper JM, MK, and AW participated in data collection, analysis. All the authors read and approved the final manuscript.

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Significance Statement

The findings from this study will be used in informing the department of health on the diarrhoea management practices among adolescent mothers. This would therefore inform the development of possible interventions to curb the improper/inappropriate diarrhoea management practices.

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