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Factors Contributing to the Occurrence of Diarrhea in Children under the Age of five Years at Jinja Regional Referral Hospital, Eastern Uganda

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ABSTRACT

Diarrhea is passing of three or more loose stools per day or more frequent passage than is normal for an individual. The study was done to assess factors contributing to the occurrence of diarrhea in children under the age of five attending Jinja Regional Referral Hospital. This study was a descriptive, cross sectional in nature. It used both qualitative and quantitative research methods of data collection and analysis. The design allowed for collection of data within a period of 6 months. The study was conducted in Jinja Regional Referral Hospital located in Industrial division, Jinja Municipality, Jinja district. The results showed that majority 192(79.7%) of the study participants' primary caregivers were fathers. Approximately 85.5% (206/241) came from families with < 5 members, many 44.0% of the children under five years were aged 1-3 years and majority 52.3% were females. The results showed that child's age was significantly associated with diarrhea that is children aged 1-3 years were found to be 7 times more likely to have diarrhea as compared to those aged less than year aOR=7.74, 95%CI 0.78-76.28. In conclusion, the occurrence of diarrhea in children under five attending Jinja regional referral Hospital is moderate high. The occurrence of diarrhea was seen to increase with age of 1-3 years, having unprotected spring/well as source of water and throwing household garbage in compound.

Keywords: diarrhea, children, age, 5 years, risk factors

INTRODUCTION

Diarrhea is passing of three or more loose stools per day or more frequent passage than is normal for an individual [1-3]. This does not apply in babies that pass semisolid stools when breastfed. Diarrhea is usually a symptom of infection in the intestinal tract which can be caused by a variety of bacterial, viral and parasitic organisms [4-7]. The most common pathogen causing diarrhea in infants and children is Rota virus. Infections are spread through contaminated food or drinking water or from person to person as a result of poor hygiene [8-12]. The three clinical types of diarrhea are acute watery diarrhea lasts several hours and days and including cholera, acute bloody diarrhea or dysentery and persistent or chronic diarrhea which lasts longer than 14 days [13-17]. Diarrhea diseases have been identified as causes of death as far as the times of Hippocrates. It was believed then that weather, weaning and teething were the causes of diarrhea but as years went by, different beliefs as to what the associated factors with diarrhea kept changing [18-21].Diarrhea causes dehydration in the shortest time possible and can have a detrimental impact on childhood growth and cognitive development [22]. Mortality resulting from diarrhea results from dehydration as children lose more water rapidly since they have a large surface area but can also cause long term effects like malnutrition [23]. In developing, there is high prevalence of diarrhea which is largely attributed to poor hygiene, lack of clean water and sanitation accounting for 88% of all the diarrheal diseases, yet worldwide an estimated 780 million people lack access to safe available clean water, 2.5 billion lack safely managed sanitation and 1 billion people still practice open defecation. A huge difference exists in coverage of improved sanitation between urban (80%) and rural areas (50%) and people without access to improved sanitation services are concentrated in sub-Saharan Africa and southeast Asia [22]. Children under the age of three in low income countries experience an episode of diarrhea on average three times a year. Each episode deprives the child of nutrients necessary for growth and as a result diarrhea is a major cause of malnutrition and malnourished children

are more likely to suffer from diarrhea. It causes death by depleting body fluids resulting in profound dehydration in a short period of time [24]. Policies to improve the statistics of under-five mortality including those targeted at diarrhea like ensuring children with diarrhea access oral rehydration salt or intravenous hydration in severe cases, zinc supplement, vitamin A supplementation and administration of antibiotics in bacterial diarrhea within 24hours of getting sick would tremendously improve the current statistics [25]. The recent introduction of Rota virus vaccine in January 2018 as part of UNEPI program seeks to reduce the incidence of infectious diarrhea in children under five and is promising considering that Rota virus is the most of common cause of infectious diarrhea in young children [26]. However, no studies have been published regarding prevalence of diarrhea in children under 5 attending Jinja Regional Referral Hospital. This study, therefore, will assess the factors contributing to diarrheal diseases in children below five years attending Jinja Regional Referral Hospital-Jinja Municipality.

RESEARCH METHODOLOGY

Study Design

This study was a descriptive, cross sectional in nature. It used both qualitative and quantitative research methods of data collection and analysis. The design allowed for collection of data within a period of 6 months.

Study Area

The study was conducted in Jinja Regional Referral Hospital located in Industrial division, Jinja Municipality, Jinja district.

Target Population

Children below 5 years and their care takers attending Jinja Regional Referral Hospital-Jinja Municipality.

Study Population

Children below five years that have or had diarrhea in the last 6 months before the survey and their care takers who have consented and are attending Jinja Regional Referral Hospital..

Inclusion Criteria

Children who are between 0 and 59 months have or had diarrhea in the last 6 months attending Jinja Regional Referral Hospital and whose caretakers have consented.
Care givers that are above 18 years of age and have consented.

Exclusion Criteria

Children below 5 years with diarrhea but whose mothers and caretakers haven't consented.
Caretakers that are mentally challenged and or below 18 years.

Sample Size Determination

Using Kish Leislie (1965) formula;
$n=Z^2P(1-P)/E^2$
Where n is the estimated minimum sample size required
P is the proportion of a characteristic in a sample (19.5%)
Z is a constant 1.96(for a confidence interval of 95%)
E is the margin of error at 5%

$$n=1.96^2 \times \frac{0.195(1-0.195)}{0.05^2}$$

n (sample size) =241

Sampling Procedure

Consecutive sampling method was used to enroll counseled and educated participants who met inclusion criteria and consent to join the study until the calculated sample size was achieved.

Data Collection

Questionnaires were used to collect data.
A questionnaire was used as the main tool.
The first section was used to collect data about socio-demographic data. The second explored general understanding of diarrhea, the third section was probe environmental factors, the fourth examined knowledge, and practice on prevention and management of diarrhea, and the fifth will be community based nutritional assessment.
Questionnaires was both open and close ended questions.
Information was collected using interview methods.
The information was quantitative and qualitative. 5 pre trained research assistants were used in each of the 5 villages and a minimum requirement of senior four were required of them. They were trained on communication skills, community engagements and interview techniques. Principle investigator checked the data daily.

ETHICAL CONSIDERATION

A letter of introduction was collected from KIU Western campus allowing me to carry out the research after approval by IRC (institutional research committee). Another letter of introduction from local council 3 was obtained to allow me go into the community. Informed consent was obtained from all respondents (care takers) and record of it taken inform of a signature or thumbprint. Confidentiality was maintained and participants were allowed to leave at any time during research study. No child or care taker was induced with money or presents.

RESULTS

Table 1. Shows that majority 192(79.7%) of the study participants' primary caregivers were fathers. Approximately 85.5% (206/241) came from families with < 5 members, many 44.0% of the children under five years were aged 1-3 years and majority 52.3% were females

Table 1: House hold information of families where children under five attending Jinja Regional Referral Hospital

Variable	Frequency (n)	Percentage (%)
Primary caregiver		
Father	192	79.7
Mother	10	4.1
Others	39	16.2
Number of households		
< 5 members	206	85.5
≥ 5 members	35	14.5
Age of children selected for interview		
< 1 year	49	20.3
1-3 years	106	44.0
4-5 years	86	35.7
Gender of children selected for interview		
Male	115	47.7
Female	126	52.3

Table 2. Table 1. Majority 190(78.8%) of the caregivers were aged 20-30 years and many 104(43.2%) of our caregivers had attained secondary level of education. Approximately 42.3% of the caregivers were farmers and Christians formed the majority, 61.4%. Over 80% of the caregivers were married and 87.6% of the study participants were earning less than 100,000 Uganda shillings a month.

Table 2: Caregivers of children under five attending Jinja Regional Referral Hospital

Variable	Frequency (n)	Percentage (%)
Age in years		
18-19	13	5.4
20-30	190	78.8
31-40	38	15.7
Education		
None	26	10.8
Primary	57	23.7
Secondary	104	43.2
Tertiary	54	22.4
Occupation		
Unemployed	7	2.9
Business	40	16.6
Civil servant	34	14.3
Farmer	102	42.3
House wife	56	23.2
Student	2	0.8
Religion		
Christian	148	61.4
Muslim	93	35.6
Marital status		
Married	195	80.9
Single	43	17.8
widow	3	1.3
Monthly income in Uganda shillings		
<100,000	211	87.6
≥100,000	30	12.4

Table 3 and figure 1 below. In our study, the rate of occurrence diarrhea in children under five attending Jinja Regional Referral Hospital was 17.4%.

Table 3: Rate of diarrhea in children under five attending Jinja Regional Referral Hospital

Diarrhea in children under five	Number (n)	Percent (%)
Have diarrhea (Passing watery stool ≥3 times a day)	42	17.4
Don't have diarrhea ((Passing watery stool < 3 times a day))	199	82.6

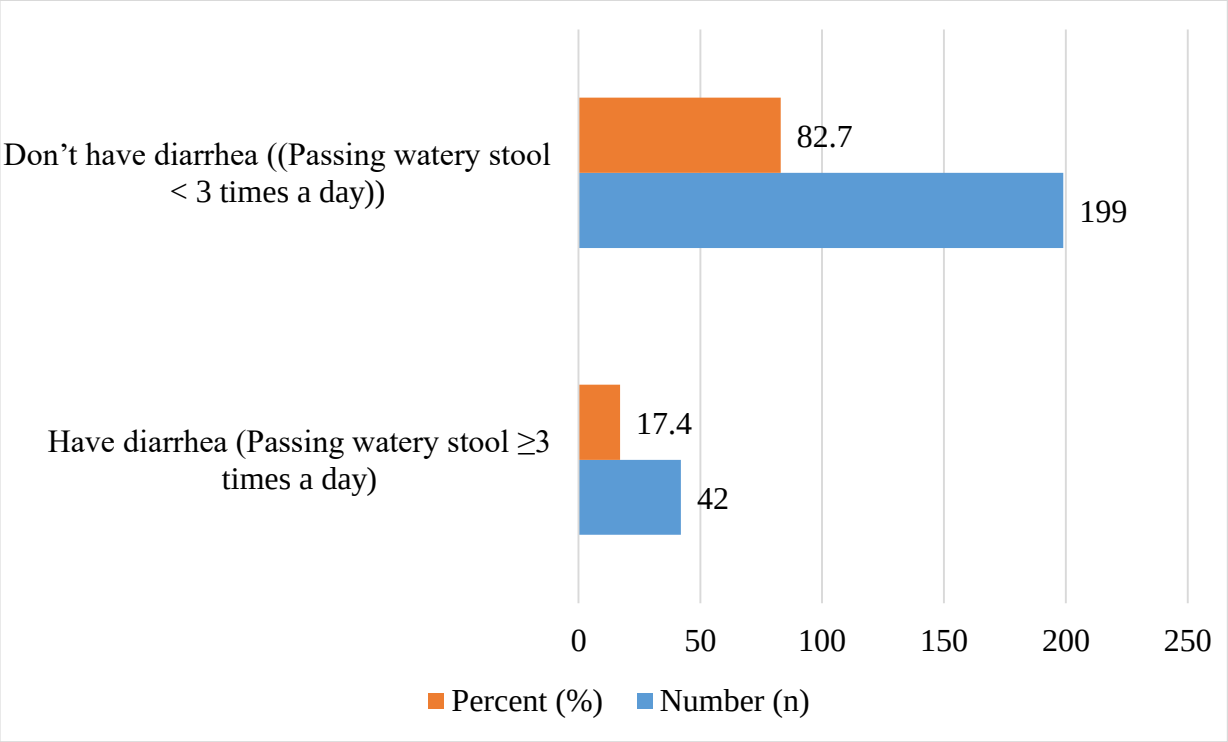

Figure 1: A graph showing rate of having diarrhea in 6 months among children under five attending Jinja Regional Referral Hospital

Table 4: Bivariate binary logistic regression: Socio-demographic and socio economic factors affecting occurrence of diarrhea in children under five attending Jinja regional referral Hospital

Variable	Rate of diarrhea		cOR(95%CI)	p-value
	Had diarrhea (42)	Never had diarrhea (199)		
Caregivers' Age in years				
18-19	3	10	1.00	
20-30	27	163	0.82(0.22-3.0)	0.76
31-40	12	26	0.31(0.06-1.56)	0.16
Caregivers' Education level				
None	5	21	1.00	
Primary	20	37	2.61(0.71-9.58)	0.15
Secondary	13	89	2.47(0.71-8.61)	0.16
Tertiary	4	50	2.18(0.58-8.20)	0.25
Caregivers' Occupation				
Unemployed	3	4	1.00	
Business	10	30	1.32(0.14-12.33)	0.81
Civil servant	5	29	2.74(0.29-25.54)	0.38
Farmer	17	80	1.59(0.19-13.17)	0.67
House wife	5	51	1.48(0.17-12.76)	0.72
Student	1	1	3.6(0.26-50.33)	0.34
Family income				
< 100000 Ugshs	33	178	1.00	
≥100000 Ugshs	8	23	0.23(0.04-1.37)	0.12
Child's sex				
Male	19	96	1.00	
Female	21	105	0.77(0.38-1.55)	0.46
Child's age				
< 1 year	14	35	1.00	
1-3 years	13	93	(0.01-0.96)	0.75
4-5 years	23	63	0.38(0.11-1.26)	0.11

According to table 4, education level, family income and child's age had P-value than 2 thus were proceeded for multivariate stage since they had P-values less than 0.2.

Table 5: Multivariate binary logistic regression: Socio-demographic and socio economic factors affecting occurrence of diarrhea in children under five attending Jinja regional referral Hospital

Variable	aOR	95%CI	p-value
Education level			
None	1.00		
Primary	4.38	0.73-26.34	0.11
Secondary	3.05	0.53-17.63	0.21
Tertiary	0.25	0.05-1.15	0.08
Family income			
< 100000 ug shs	1.00		
≥ 100000 ug shs	0.88	0.17-11.88	0.92
Child's age			
< 1 years	1.00		
1-3 years	7.74	0.78-76.28	0.03
4-5 years	0.08	0.005-1.20	0.07

Table 5. child's age was significantly associated with diarrhea that is children aged 1-3 years were found to be 7 times more likely to have diarrhea as compared to those aged less than year aOR=7.74, 95%CI 0.78-76.28.

Table 6. Shows that "source of drinking water" and "where garbage is thrown" had p-values less than 0.2 thus were proceeded for the multivariate analysis.

Table 6: Bivariate binary logistic regression: Environmental factors (water sanitation and hygiene factors) contributing to diarrhea in children under five attending Jinja regional referral hospital

Variable	Rate of diarrhea		cOR(95%CI)	p-value
	Had diarrhea (n=42)	Never had diarrhea (n=199)		
Source of water for drinking				
Public tap	16	165	1.00	
Protected dug well/spring	10	23	0.23(0.10-0.53)	0.001
Bole hole	7	10	0.54(0.25-1.16)	0.12
Unprotected dug well/spring	8	1	2.79(1.0-7.83)	0.05
Storage of drinking water				
Jerricans	30	184	1.00	
Tank	6	13	1.37(0.15-12.51)	0.78
Pots	5	2	1.67(0.42-6.65)	0.47
Storage of drinking water different from other domestic purpose				
Always	7	125	1.00	
Sometimes	28	56	2.3(0.61-8.74)	0.22
Never	7	18	1.37(0.42-4.43)	0.60
Is water always available all times				
No	20	81	1.00	
Yes	21	118	1.35(0.53-3.45)	0.53
Type of toilet used at your household				
Flush toilet	7	28	1.00	
VIP latrine	9	47	1.48(0.61-3.58)	0.39
Ordinary toilet	25	124	0.62(0.18-2.10)	0.44
What do you use hand wash after using toilet or after helping your child use a toilet				
Hand washing with water only	10	79	1.00	
Hand washing with water and soap	3	29	2.8(0.5-15.65)	0.24
Never wash hands	29	91	3.15(0.28-34.83)	0.35
Where do you throw you garbage for your household				
Open surrounding	10	50	1.00	
You burn it	7	33	0.57(0.23-1.40)	0.22
Taken away by your community utility service	25	116	0.51(0.27-0.94)	0.032

Table 7. In our study, the study participants who used unprotected dug well/spring as source of drinking water were 3.4 times more likely to have children with diarrhea as compared to mothers/care givers who used public taps as source of drinking water, aOR=3.4, 95%CI 1.0-11.4.

In this mothers/caregivers who threw household garbage in open were 9.7 times more likely to have children with diarrhea as compared to those who burnt their household garbage surrounding aOR=9.7, 95%CI 1.2-77.9. Similarly, mothers/caregivers whose threw their household garbage in open surrounding were 29 times more likely to have children with diarrhea compared to those garbage was taken away by a community utility services, aOR=29.3, 95%CI 1.4-624.5.

Table 7: Multivariate binary logistic regression: Environmental factors (water sanitation and hygiene factors) contributing to diarrhea in children under five attending Jinja regional referral Hospital

Variable	aOR	95%CI	p-value
Source of drinking water			
Public tap	1.00		
Protected dug well/spring	1.88	0.04-85.88	0.75
Bore hole	3.15	0.62-16.00	0.17
Unprotected dug well/spring	3.40	1.00-11.43	**0.048**
Where do you throw garbage from your house hold			
Open surrounding	1.00		
Burn it	9.70	1.21-77.90	**0.032**
Taken away by a community utility services	29.3	1.37-624.50	**0.03**

Table 8 below showed that 69.5% of the participants had appropriate answers regarding first signs of diarrhoea and the importance to give the child plenty of fluids than take her to the hospital, 89.7% had appropriate answers regarding breastfeeding a child during the first 6 months of life to help prevent diarrhoea, 79.3% had appropriate answers regarding vaccinating the child against other diseases to prevent diarrhoea, 68.9% had appropriate answers regarding statement ´main reason why you give a child oral rehydration solution is to replace what was lost in stools and vomiting´, 65.7% had appropriate answers regarding bottle-feeding your child as safe as using a cup and spoon and 82.9% had appropriate answers regarding a child having diarrhoea, and stopping breastfeeding.

Table 8: Distribution of appropriate answers on knowledge about on prevention and management of diarrhea in children under the age of 5 attending Jinja Regional Referral Hospital

Question or statement	**Appropriate answers**	**Percent (%)**
True statements		
At the first signs of diarrhoea, it is more important to give the child plenty of fluids than take her to the hospital.	167/241	69.5
Does breastfeeding a child during the first 6 months of life help prevent diarrhoea?	216/241	89.7
Should you vaccinate your child against rotavirus infection to prevent diarrhoea?	103/241	42.7
Should you vaccinate your child against other diseases to prevent diarrhoea?	191/241	79.3
The main reason why you give a child oral rehydration solution is to replace what was lost in stools and vomiting.	166/241	68.9
False statements		
Is bottle-feeding your child as safe as using a cup and spoon?	158/241	65.7
When your child has diarrhoea, you should give her medication to stop the diarrhoea.	77/241	31.9
When your child has diarrhoea, you should not offer solid food	87/241	36.3
Oral rehydration solution is supposed to stop diarrhoea/ vomiting.	52/241	21.6
When your child has diarrhoea, you should stop breastfeeding	200/241	82.9

DISCUSSION

In this study, the occurrence of diarrhea in children under five attending Jinja regional referral Hospital was 17.4%. This is high when compared with results by CDC [27-34] which showed that the global prevalence of diarrhea was 10.4% for children under the age of five. The reason from this high rate/occurrence in this is that this study was limited to one specific area, other than averaging rates from different parts/area like the way global rate are obtained. However, it was low when compared to the prevalence of diarrhea in Burundi which was 24.8%, 23.2% in Rwanda, 23.9% in Tanzania[28-34]. The reason for low rate can be related the fact this study was done in Uganda whose problem are quite different from those Rwanda, Burundi, and Tanzania. Nevertheless, DHS, [29] reflected that overall prevalence of diarrhea in children below 5 in Uganda was 19.5%, in south western region prevalence of diarrhea was 14.0%, northern regions it was 29.3% and eastern regions it was 26.9%. Therefore, geographical

differences play a great role in determining the rates of diarrhea. In conclusion, the occurrence of diarrhea in children under five attending Jinja regional referral Hospital is moderate high. In these mothers/caregivers who threw household garbage in open were 9.7 times more likely to have children with diarrhea as compared to those who burnt their household garbage surrounding. Similarly, mothers/caregivers whose threw their household garbage was taken away by your community utility service were 29 times more likely to have children with diarrhea compared to that garbage was taken away by a community utility service. Most caregivers reported the use of medications to stop diarrhoea, a practice also mentioned by caregivers in studies evaluating the treatment of diarrhoea in children aged under 5 years in other countries. However, anti-diarrhoeal drugs have no role in the management of diarrhoea in children, and antibiotics should not be given routinely. On the other hand, zinc supplementation has shown to be an effective treatment in that it reduces disease duration and severity, and may be an acceptable option in the community setting. If given as combination therapy, as an adjunct to ORT to reduce the use of inappropriate drugs such as antibiotics and anti-diarrhoeal agents by mothers.

CONCLUSION

In conclusion, the occurrence of diarrhea in children under five attending Jinja regional referral Hospital is moderate high. The occurrence of diarrhea was seen to increase with age of 1-3 years, having unprotected spring/well as source of water and throwing household garbage in compound. Although caregivers were able to provide correct information about prevention measures, they had limited knowledge of appropriate management of acute diarrhoea, especially in relation to dehydration.

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