

ORIGINAL ARTICLE

Prevalence and Factors Associated with Stunting Among Children 0-59 Months in Rubirizi District-A Cross Sectional Study

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ABSTRACT

Globally, 149 million children under five (21.9%) were stunted in 2018, with a higher burden in developing countries. In Uganda, 29% of children under five are stunted, but the prevalence in Rubirizi District is unknown. This study determined the prevalence and factors associated with stunting in Rubirizi District. A cross-sectional study involving quantitative and qualitative methods was conducted with 374 caregivers of children aged 0–59 months. Two focus group discussions were held with mothers and community leaders. Simple random sampling was used to select villages and caregivers. Data was collected using a structured questionnaire. Bivariate and multivariate logistic regression analyses were performed using Stata version 14. Variables with $p < 0.05$ were considered significant. Among the 374 children assessed, 85 (22.7%) were stunted. Significant factors associated with stunting included households with three children aged 0–59 months (aOR=3.78, 95%CI: 1.31-10.9, $p=0.014$), drinking water from unprotected well or spring (aOR=2.61, 95%CI: 1.20-5.68, $p=0.015$), children who never initiated breastfeeding within 1 hour (aOR=6.13, 95%CI: 2.78-13.5, $p=0.001$), children breastfed up to 6 months (aOR=21.2, 95%CI: 3.76-120.1, $p=0.014$). This study underscores the need for caregivers to be sensitized to breastfeed for more than 12 months and educated on the benefits of exclusive breastfeeding.

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1. Introduction

Worldwide, stunting remains a big public health problem among children under five leading to high morbidity and mortality (Habimana et al., 2019). A child is stunted if he/she has height-for-age less than 2 SD below the median height-for-age of the WHO reference population (height-for-age Z-score < -2) (WHO, 2024). Global statistics on stunting among children under five are alarming. In 2022, an estimated 148.1 million children under five were estimated to be stunted globally (WHO, 2022). Child stunting rates have surpassed 30% in five sub-regions: Western Africa (31.4%), Middle Africa (32.5%), Eastern Africa (37%), Southern Asia (34.1%), and Oceania (38.3%, excluding Australia and New Zealand) (WHO, 2018).

The prevalence of stunting in Africa declined from 38.3% in 2012 to 30.3% in 2017, despite an increase in the absolute number of stunted children due to population growth (Mrema et al., 2021). Currently, around 34% of children under five in sub-Saharan Africa are affected by stunting, with Eastern Africa showing the highest prevalence at 37% (Nshimyiryo et al., 2019). Stunting rates vary significantly by country, with prevalence at 34.4% in Tanzania, 36% in the DRC, 26% in Kenya, 41.1% in Uganda, 46.7% in Burundi, 14.4% in South Africa, 35.6% in Chad, 53.9% in Ethiopia, 25.6% in Cameroon, 24% in Benin, and 18.7% in Senegal (Adedokun et al., 2021). The prevalence of stunting in the southern districts ranged from 41.1% in Kabale (Kasajja et al., 2022) to as high as 89.3% in Bushenyi (Mugarura et al., 2021).

The root causes of stunting range from poor maternal health, improper ANC services, poor feeding practices, and poor infrastructure at healthcare facilities (WHO, 2017). Other major factors include sex and age of the child (Muhoozi et al., 2016), non-parental caregivers, having more than one under-five children, selling off all agriculture produce, untreated drinking water, poor hand washing practices before feeding the child, not attending ANC and attending mass campaign (Igihozo et al., 2024), area of residence (Richter et al., 2017), low level of education, maternal age group, low wealth index (Habimana et al., 2019), birth weight, and morbidity due to diarrheal (Ren et al., 2021).

Many studies have found long-term impact of stunting on early childhood development such as poor academic performance and low productivity (Black et al., 2017), high rate of morbidity and mortality, chronic diseases (McGovern et al., 2017), poor intelligent quotient (IQ) level and cognitive development (Ramachandran, 2022).

Promoting women's nutrition status and feeding practices plays a key role in lowering stunting in children (Vir, 2016). Different preventive measures for all forms of malnutrition including stunting were announced in the Rome Declaration during the International Conference on Nutrition that was organized by

WHO (WHO, 2014). While Uganda's health system has made significant efforts to reduce stunting through public health interventions, such as providing nutritional supplements, the risk factors contributing to stunting remain varied and may evolve over time. Therefore, it is crucial to evaluate the current nutritional status, identify gaps in risk factors, and develop effective intervention strategies, particularly in areas where research has been limited. This study aimed to examine the prevalence and risk factors of stunting among children aged 0 to 5 years in Rubirizi District.

2. Materials and Methods

2.1 Research design and study area

The researchers used a community-based, analytical cross-sectional study applying both quantitative and qualitative data collection methods. This study was carried out in Rubirizi District located in the Western Uganda which is one of the districts that were carved out of Bushenyi District in 2010. It covers an area of 1,109.45 sq KMs; and it borders with; Bushenyi district in the East, Mitooma District, Buhweju District, Kamwenge District, Kasese District and the Democratic Republic of Congo. It is about 370 km from Kampala, the capital of Uganda. The district has a population of 168,211 people, where 95,946 are females and 72,265 males with two counties, with two town councils, 9 sub counties, 53 parishes and 294 villages (UBOS, 2024). There is one health center IV, Nine Health Center IIIs and five Health Centre IIs. The major economic activities include farming, carpentry, construction, and trading. Other sources of livelihood are crafts and tourism are among other activities. The crops grown are Sorghum, Sweet Potatoes, Beans, Maize, Cassava, Bananas and Yams. There are low standards of living with poor sanitation.

2.2 Target population

All caregivers of children aged 0-59 months were our target population

2.3 Study population

Care takers and children 0-59 months were paired in their respective households. *Inclusion criteria:* All caretakers and children 0-59 month's pairs who were not sick or critically ill at the time of the study were included. *Exclusion criteria:* Caretakers and children 0-59 months pairs who were critically ill (bed ridden) at the time of the study were excluded since measurement to determine stunting was difficult.

2.4 Sample size and Sampling

Sample size

Kish Leslie (1965) formula was used to determine the sample size. The formula was applied to determine the number of care takers and children under five to be enrolled in the study. $Z=1.96$, critical value at 95% CI (two-sided), 5% margin of error, and 42% which was the proportion of women with children aged 0 to

59 months who are stunted in Southwestern Uganda. The total sample size was $n=374$

Sampling procedure

Purposive sampling was used in selecting two sub counties (Ryeru and Kyabakara) from a sample frame of 9 sub counties. Three parishes (Mugogo, Mushumba, and Kyabakara) were also randomly selected from a sample frame of 12 parishes. In the randomly selected parishes, 6 villages (nyamishekye, Mugogo III, Birehe, Kagando, Katabago, and Kyenjojo II) were also randomly selected from a sample frame of 14 villages. Within the selected villages, women/care givers with children 0-59 months were randomly selected. The researcher used random numbers during simple random sampling.

2.5 Data collection methods and tools

A structured questionnaire developed by the researcher was presented to caregivers with children 0-59 months in their place of residence (home). The questionnaire captured data on; child health factors, socioeconomic and demographic factors, feeding practices, child health, and caring practices.

Assessment for Stunting

Measurements were taken using a stadiometer (SECA®) and an infantometer (SECA®) and analyzed using WHO Z-scores. For children older than two years, height was measured by having the child stand on a pre-calibrated weighing scale, positioned with their back against the scale's vertical board, ensuring their heels, buttocks, shoulders, and head were in contact with the upright surface. The child was instructed to keep their feet, knees, and ankles together. The headpiece was gently lowered to rest on the highest point of the head, and height was recorded to the nearest 0.1 cm at the examiner's eye level. For children under two years, length was measured using an infantometer, with the child lying flat on the device while their length was recorded to the nearest 0.1 cm. Weight for all children was measured to the nearest 0.1 g.

Qualitative data collection

Two focus group discussions were held with a total of ten (10) purposively selected participants. Each group was composed of two (02) household heads who had not participated in the individual interviews, one (01) local leader, one (01) religious leader, one (01) community development officer (CDO), three (03) village health team members (VHTs) and two (02) health workers. The researcher obtained a list that included telephone contacts of all VHTs, local council leaders, household heads, and health workers from the Sub County Offices and the District Health Office, respectively. They were reached by phone, informed about the study, the willingness to participate, and the venue of the study. The focus group discussions were held at community halls, and they were chaired by the principal investigator assisted by a secretary who was taking notes. Each

participant was given the opportunity to express themselves. Each FGD lasted for about 40 minutes to an hour.

2.5 Ethical consideration

The ethical approval was obtained from the Mbarara University Research Ethics Committee with reference number MUST-2022-394 and the introductory letter was obtained from the Mbarara University of Science and Technology and presented to the relevant authorities in Rubirizi district local government seeking permission to carry out the study which was accepted. The study participants were informed about the purpose of the study, and a written informed consent form was signed by each participant. The participant's information was kept confidential by using personal identifiers instead of names and the data was kept safe to only the principal investigator.

2.6 Quality Control

The principal investigator pretested the questionnaire to 20 mothers with children aged 0-59 months in other related places which were not being included in the study. The questionnaire was corrected based on the findings and this ensured that it captured what it was intended to capture. Furthermore, close supervision and review of the completed questionnaires was done by the principal investigator to ensure that accurate data was collected by the team. The collected data was checked for completeness, accuracy, and clarity. Training the research assistants on the protocol, data collection tools and procedures by the principal investigator and the final errors identified were corrected in the original questionnaire.

2.7 Data Entry and analysis

Quantitative data

Data analysis was done using Stata version 14. Means and standard deviation were used in summarizing continuous variables while frequency and percentages were used in summarizing categorical variables. Chi square test was carried out to determine the relationship between the stunting (dependent variable) and the independent variables (Social, demographic, feeding practice, environmental, and child-related factors). All variables with a p value of less than 0.05 were considered statistically significant. Bivariate logistic regression analysis was conducted to identify the risk associated with stunting. Variables with $p \leq 0.05$ in the bivariate logistic regression analysis were entered into a multivariate logistic regression model that examined the factors associated with stunting, hence adjusting for confounding.

Qualitative data

The researcher employed a thematic approach in analyzing the data following several steps of Clarke & Braun (2018). The transcripts were read and reread several times by researchers to familiarize themselves with the data and make meaning of the caregiver's views. The researcher created an independent coding frame through line-by-line manual coding of transcripts focusing

on keywords and phrases. Finally, for data presentation, quotations from participants were selected and presented as examples of their responses.

3 Results and Discussion

3.1 Social demographic characteristics of care givers and children aged 0-59 months.

A total of 374 care takers of children under five participated, thus a response rate of 100%. Results are presented in tables and graphs. Out of 374, 92.0% were females, 86.6% were married, and 52.4% had primary education level (Table 1).

Table 1: Social demographic characteristics of caregivers

Variable	Frequency (n)	Percentages (%)
Sex of the household head		
Female	344	92.0
Male	30	8.0
Marital status		
Married	324	86.6
Single	4	1.1
Widowed	21	5.6
Divorced	11	2.9
Separated	14	3.7
Religion		
Catholics	212	56.7
Muslims	10	2.7
Protestants	149	39.8
SDA	3	0.8
Level of Education		
Uneducated	96	25.7
Primary	196	52.4
Secondary	58	15.5
Tertiary	24	6.4
Employment status		
Unemployed	357	95.5
Employed	17	4.6

Majority of the children were above 24 months (65%), 54.8% were males, 91.4% were immunized. Most of the households had at least two children aged 0-59 months (54%) (Table 2).

3.2 Environmental factors

Majority of households were using piped water (50.1%), mostly walked an estimated 1-2 kilometers (63.6%), and up to 75% were not practicing hand washing (Table 3).

3.3 Feeding practices practiced by the study participants

Majority of the children were fed twice a day (81.8%), 78.6% were initiated on breast feeding within one hour, 66.6% were breast fed for a duration of 7-12 month, 88.7% were not exclusively breast fed and 84.2% of the households were not storing food (Table 3).

Table 2: Characteristics of children aged 0-59 months.

Variable	Frequency (n)	Percentages (%)
Age of the child (months)		
Less than 6	8	2.1
6-12	22	5.9
12-24	101	27.0
Above 24	243	65.0
Sex of the child		
Female	169	45.2
Male	205	54.8
Immunization		
Yes	342	91.4
No	32	8.6

Table 3: Environmental factors

Variable	Frequency (n)	Percentages (%)
Source of drinking water		
Piped water	187	50.1
River	41	10.7
Protected water or spring	78	20.9
Unprotected well or spring	68	18.2
Distance to the water source		
Less than a Km	40	10.7
1-2 Km	238	63.6
More than 2 Km	83	22.2
Water within the premises	13	3.5
Hand washing		
No	284	75.9
Yes	90	24.1

3.4 Prevalence of stunting among children 0-59 months in Rubirizi district

As shown in figure 1, prevalence of stunting in the study was 85 (22.7%)

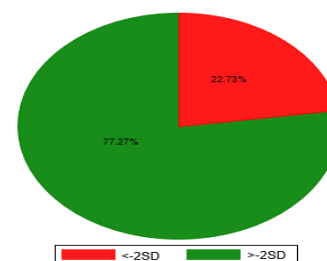


Fig.1 Figure showing Prevalence of stunting among children 0-59 months in Rubirizi district.

Table 4: Feeding practices practiced by care givers of children under five

Variable	Frequency (n)	Percentages (%)
Number of meals per day		
Once a day	28	7.5
Twice a day	322	86.1
Three times	22	5.9
More than four times	2	0.5
Eat Leftover food		
No	25	6.7
Yes	349	93.3
Initiated BF within 1 hour		
No	80	21.4
Yes	294	78.6
Duration of BF (Month)		
Up to 6 months	49	13.1
7-12 Month	249	66.6
13-24	76	20.3
Exclusive BF		
No	332	88.7
Yes	4	11.3
Food storage		
Yes	59	15.8
No	315	84.2
Staple food crop		
Cassava	9	2.4
Matooke	322	86.1
Millet	9	2.4
Posho	28	7.49
Potatoes	6	1.60
Latrine ownership		
No	311	83.2
Yes	63	16.8

Bivariate and multivariate analysis of the factors associated with stunting among children 0-59 months in Rubirizi District

In the bivariate analysis, children whose caregivers had gained secondary education levels a 4.79 ad a higher odd of stunting than those whose caregivers had gained tertiary education level years (cOR=4.79, 95% CI: 0.57-9.7, p=0.013). Having three children in the household was also a predictor of stunting with 4.38 higher odds as compared to those with one child (cOR=4.38, 95% CI: 2.01-9.56, p=0.001). Children not immunized had 7.10 higher odds of stunting compared to immunized children (cOR=7.10, 95% CI: 3.30–15.2, p = 0.001). Not washing hands increased odds of stunting by 3.28 times (cOR=3.28, 95% CI: 1.57–6.87, p = 0.002), delayed initiation of breastfeeding increased the odds of stunting by 11.32 times (cOR = 11.32, 95%

CI: 6.41–20.0, p = 0.000), higher odds of stunting was also found children who lacked exclusive breastfeeding (cOR = 6.67, 95% CI: 1.58–8.18, p = 0.010), improper food storage increased the odds of stunting by 5.35 times (cOR = 5.35, 95% CI: 2.96–6.44, p = 0.000). Higher odds of stunting were found in children breastfed for 6 months (cOR = 69.6, 95% CI: 15.2–319.3, p = 0.001) and those breastfed for 7–12 months (cOR = 9.53, 95% CI: 2.26–40.1, p = 0.002).

In the multivariate analysis, factors significantly associated with stunting among children aged 0-59 month included having three children aged 0-59 months (aOR=3.78, 95%CI: 1.31-10.9, p=0.014), getting water from unprotected well or spring (aOR=2.61, 95%CI: 1.20-5.68, p=0.015), children who never initiated breastfeeding within 1 hour (aOR=6.13, 95%CI: 2.78-13.5, p=0.001), children breastfed up to 6 month (aOR=21.2, 95%CI: 3.76-120.1, p=0.014).

3.5 Presentation of qualitative data from FGD

Eating one food crop

One mother from the FGD said that

“Here we only have matooke as our staple food, most of our children are just fed with matooke every day, and it's difficult to provide them with a balance diet or any other food. We don't have money to buy other food items, its only during big days (public holidays like Christmas) were we try buying some other food”.

Most of the households in this area have matooke as their staple food. Other crops are grown mainly by families with bigger pieces of land.

Not breast feeding within one hour

Interestingly, mothers who participated in the Focus Group discussion stated that

“Some babies refuse to breast immediately they are born, even if you have a lot of breast milk, they will not suckle. The midwife also tried they best to help but fail” Another participant also complemented by saying that *“some mothers on the other hand don't have breast milk by the time they give birth and so the baby has nothing to suckle”*

Lack of exclusively breast feeding

One participant said that

“Sometimes we don't have enough breast milk, and we feel our babies are not satisfied and therefore we try giving them some milk to make them satisfied”.

Other participants also said that

“Sometimes we go to very far places to buy merchandise where it's difficult to go with the baby, so we leave them with somebody to take care of and give them milk using bottles.

Breast feeding for less than one year

A participant from the FGD acknowledged that breastfeeding mothers stop breast feeding children early and said that

“We always stop breast feeding early and give them other liquids like milk and porridge. We do this because most times we leave our children at home with other siblings to take care and we go to the garden to look for what to eat”.

Discussion

The prevalence of stunting among children under five in this study was 22.37%. This is however lower than the prevalence in Kabale district 41.1% (Kasajja et al., 2022), Bushenyi district in south western Uganda 89.3% (Mugarura et al., 2021). Our study was carried out in the community where the likelihood of finding stunted children was low compared to the study carried out at the OPD in the health facility in Bushenyi district where children were are likely to have comorbid conditions that may hinder their growth. Other studies in Zambia (40%) (Mzumara et al., 2018), East Africa (48%), Niger (79%) (Isanaka et al., 2019) and 48.7%.(Odei Obeng-Amoako et al., 2020), Bangladesh (36.3%) (Akram et al., 2018) found relatively higher prevalence rates than what was reported in this study. However, our prevalence is higher than the prevalence in Kenya (21.5%) (Njenga, 2014), Busia Kenya (13.3%) (Jela, 2016), and China (8.1%) (Shan et al., 2019), Egypt (7.8%) (Metwally, 2020).

Households whose number of children aged 0-59 months were three (03) had a higher likelihood of having stunted children compared to those with one. In agreement with this study's findings, a study done among children aged 0-59 months in Ethiopia revealed that children born to mothers with many children under five were more likely to be stunted (Mengesha et al., 2021). This finding aligns with studies conducted in the, Somali Region (AHMED, 2020), and Kenya's Busia District (Jela, 2016). The likely explanation could be the inaccessibility of food and healthcare, particularly in low-income families with larger household sizes. Additionally, mothers in households with more family members, especially children, may struggle to devote adequate time to properly care for their children (Mengesha et al., 2021). Asfaw et al. (2015) also explained that families with many children under five face economic hardships and food scarcity hence they are more likely to suffer from stunting. In this study, the majority of the household heads are poor and hardly have enough money to care for many children and in addition mothers have no time to care for each one of these children.

Using water from unprotected wells or springs was associated with higher odds of stunting in children. Unprotected wells and springs are often contaminated with fecal pathogens due to proximity to latrines, open defecation, or agricultural runoff, leading to waterborne diseases like diarrhea (Gwimbi et al., 2019). These diseases are a leading cause of malnutrition in children under five years of age. The findings align with global

evidence suggesting that improving access to safe water can significantly reduce stunting rates (Cameron et al., 2021). Similar findings were reported in a study carried in Ethiopia (Kwami et al., 2019). Likewise, households relying on unsafe water sources significantly increase the likelihood of children being stunted compared to those with access to safe water in Ethiopia (Mengesha et al., 2021).

This finding aligns with studies conducted in the Somali Region (AHMED, 2020), Bule Hora District (South Ethiopia) (Diro et al., 2016), and Kenya's Busia District (Jela, 2016). The probable explanation is that children under five who consume water from unsafe sources are more prone to undernutrition due to infections such as diarrheal diseases and other related comorbidities. Children breast fed for less than one year had a higher likelihood of being stunted compared to those breastfed for more than one year. In contrast, studies done in Nigeria and Nepal found that breastfeeding children for more than one year contributes to stunting compared to those breastfed for less than one year (Akombi et al., 2017). In line with the findings, a study conducted in India revealed that stunting was more prevalent among children breast fed for less than 6 months as compared to those breastfed longer (Mohieldin, 2010). Children who were not exclusively breast fed had higher odds of stunting compared to those who were breast fed exclusively. This could be because most of the breastfeeding mothers may not have knowledge and awareness about the importance of exclusive breast feeding. In addition, the busy schedules of mothers imply less time and duration of breast feeding. Children who are not exclusively breastfed are often introduced to complementary foods or liquids prematurely, which may be nutritionally inadequate or contaminated (WHO, 2009). Our findings are similar to ha of a study carried out in Ethiopia where children who were not exclusive breastfed for 6 months were a higher at a risk factor of stunting (Alive and Hrive, 2010).

Limitations of the study

The limitation of this study is that they might have been potential of recall bias among respondents answering questions relating to events that happened in the past, especially to do with infant and young child feeding practices. Furthermore, the study might have overestimated the prevalence of stunting since odds ratios were used instead of prevalence ratios.

Conclusion

The prevalence of stunting in this study was 22.7%. Households who were not initiating breast feeding within one hour for their children, less than 12 months of breast feeding, not practicing exclusive breast and drinking water from unprotected sources were factors independently associated with stunting among children under five years in Rubirizi District. The government and other development partners should carry out sensitization encouraging mothers to exclusively breast feed their children for six months and further complementary feeding up to at least 24

Table 5: Bivariate and multivariate analysis of the factors associated with stunting among children under five in Rubirizi District

Variable	Stunting status		cOR (95%CI)	p-value	aOR (95%CI)	P- value
	Stunted n (%)	Normal n (%)				
Sex of the household head						
Male	6 (7.1)	24 (8.3)	Ref.			
Female	79 (92.9)	265 (91.7)	1.19 (0.47-3.01)	0.710		
Marital status						
Single	2 (2.4)	2 (0.7)	Ref.			
Married	66 (77.7)	258 (89.3)	0.25 (0.03-1.85)	0.177		
Widowed	10 (11.8)	11 (3.8)	0.90 (0.10-7.71)	0.930		
Divorced	1 (1.2)	10 (3.5)	0.10 (0.01-1.71)	0.122		
Separated	6 (7.1)	8 (2.8)	0.75 (0.08-6.95)	0.800		
Religion						
Muslims	3 (3.5)	7 (2.4)	Ref.			
Catholics	47 (55.3)	165 (57.7)	0.66 (0.16-2.67)	0.565		
Protestants	33 (38.8)	116 (40.1)	0.66 (0.16-2.70)	0.568		
SDA	2 (2.4)	1 (0.4)	4.66 (0.29-73.3)	0.273		
Education						
Tertiary	1 (1.2)	23 (8.0)	Ref.			
Uneducated	35 (41.2)	61 (21.1)	13.1 (1.70-101.9)	0.093	1.22 (0.10-14.2)	0.871
Primary	39 (45.9)	157 (54.3)	5.71 (0.74-43.6)	0.146	0.63 (0.05-7.18)	0.713
Secondary	10 (11.8)	48 (16.6)	4.79 (0.57-9.7)	0.013*	0.45 (0.03-5.35)	0.531
Employment status						
Unemployed	84 (98.8)	273 (94.5)	Ref.			
Employed	1 (1.2)	16 (5.5)	0.20 (0.02-1.55)	0.125		
Number of children under five						
One	27 (31.8)	106 (36.7)	Ref.			
Two	38 (44.7)	164 (56.8)	0.90 (0.52-1.57)	0.736	1.23 (0.59-2.55)	0.571
Three	19 (22.4)	17 (5.9)	4.38 (2.01-9.56)	0.000	3.78 (1.31-10.9)	0.014
Four	1 (1.2)	2 (0.7)	1.96 (0.17-22.46)	0.588	1.08 (0.05-22.3)	0.956
Sex of the child						
Female	43 (50.6)	126 (43.6)	Ref.			
Male	42 (49.4)	163 (56.4)	0.75 (0.46-1.22)	0.256		
Immunization						
Yes	65 (76.5)	277 (95.9)	Ref.			
No	20 (23.5)	12 (4.1)	7.10 (3.30-15.2)	0.000*	2.16 (0.72-6.44)	0.165
Source of drinking water						
Piped water	42 (49.4)	39 (13.5)	Ref.			
River	9 (10.6)	32 (10.8)	0.23 (0.09-0.62)	0.004*	0.64 (0.20-2.07)	0.466
Protected water or spring	5 (5.9)	73 (23.4)	1.00 (0.44-2.28)	0.982	2.05 (0.45-9.32)	0.350
Unprotected well or spring	29 (34.1)	39 (13.5)	2.58 (1.43-4.66)	0.002*	2.61 (1.20-5.68)	0.015
Hand washing						
Yes	9 (10.6)	81 (28.0)	Ref.			
No	76 (89.4)	208 (72.0)	3.28 (1.57-6.87)	0.002*	1.11 (0.31-.94)	0.870
Number of meals per day						
More than four times	1 (1.2)	2 (0.7)	Ref.			
Once a day	19 (22.4)	9 (3.1)	4.22 (0.33-52.9)	0.264		
Twice a day	64 (75.3)	257 (88.9)	0.61 (0.04-5.57)	0.572		

Three times	1 (1.2)	21 (7.3)	0.09 (0.004-2.17)	0.141		
Eat Leftover food						
Yes	83 (97.7)	266 (92.0)	Ref.			
No	2 (2.4)	23 (8.0)	0.27 (0.06-1.206)	0.088		
Initiated BF within 1 hour						
Yes	26 (42.3)	258 (89.3)	Ref.		Ref.	
No	49 (57.7)	21 (10.7)	11.32 (6.41-20.0)	0.000*	6.13 (2.78-13.5)	0.001**
Duration of BF (Month)						
Up to 6 months	32 (37.7)	17 (5.9)	69.6 (15.2-319.3)	0.000*	21.2 (3.76-120.1)	0.001**
7-12 Month	51 (60.0)	198 (68.5)	9.53 (2.26-40.1)	0.002*	7.10 (1.48-34.07)	0.014**
13-24	2 (2.3)	74 (25.6)	Ref.		Ref.	
Exclusive BF						
No	83 (97.7)	249 (86.2)	6.67 (1.58-8.18)	0.010*	13.4 (1.92-93.7)	0.009*
Yes	2 (2.3)	40 (13.8)	Ref.		Ref.	
Food storage						
Yes	31 (36.5)	28 (9.7)				
No	54 (63.5)	261 (90.3)	5.35 (2.96-.644)	0.000*	1.17 (0.48-2.86)	0.717

months. Health workers need to health, educate caregivers on the importance exclusive breastfeeding and initiation of breast feeding within one hour. Government and development partners should improve access to clean water.

Data availability statement

The data used in this study is available upon request from the author.

Conflict of interest

The authors declare no conflicts of interest.

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