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DETERMINING PREVALENCE OF DIARRHEA AND ASSOCIATED FACTORS AMONG UNDERFIVE CHILDRENATTENDING BYAHI HEALTHCENTRE, RUBAVU DISTRICT, RWANDA

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Abstract: **Diarrheal disease remains a significant public health challenge and a leading cause of mortality among children under five, contributing to approximately 9% of global child deaths in 2021.In Rwanda, despite the progress, diarrhea is a persistent major public health concern, contributing significantly to morbidity and mortality among children under five years old with the prevalence of 12-14% with higher rates in the Western Province .The main objective of this study was to determine prevalence and associated factors of diarrhea among under five children attending Byahi health center, Rubavu district, Western Province, Rwanda. A cross-sectional study was conducted among mothers of 432 children seeking diarrhea management services at Byahi health center. Data was collected using a structured questionnaire while data analysis was conducted by using IBM SPSS software version 25.The prevalence of diarrhea was determined using descriptive statistics while the independent factors associated diarrhea in children under five years old were identified using binary logistic regression analysis and chi square test . Statistical significance was determined using odds ratios (OR) with a 95% confidence interval (CI) and a p-value of ≤0.05. The results revealed that the prevalence of diarrhea in this study was 12.4% (n=52) .The factors that were associated with diarrhea among under five years old children were occupation status of mother as children of non-working mothers had significantly greater odds of experiencing diarrhea than children of mothers with occupation (OR = 8.57; 95% CI: 2.89–25.43; p < 0.001), child's age where by children between the ages of 6 and 24 months had significantly higher risks of getting diarrhea(OR = 9.10; 95% CI: 3.28–25.22; p < 0.001), the source of drinking water was , children who drink water from a borehole had a greater than 12-fold higher risk of diarrhea than children who use piped tap water (OR = 12.1; 95% CI: 3.56–41.13; p < 0.001), shared latrine use (OR = 4.10; 95% CI: 1.28–20.22; p < 0.004). The current study found that a sizable portion of the children under five who visited Byahi Health Center experienced diarrhea. The results of the study have significant policy implications for health intervention programs and demonstrate the potential value of assisting women in their work to generate cash in order to improve the health and survival of children in the study area and throughout Rwanda. One potential long-term strategy to lower the morbidity from diarrhea is the adoption of efficient health education initiatives that emphasize personal hygiene and eventually lead to complete sanitation.**

Keywords: **Diarrheal disease, public health, global child deaths, education initiatives, personal hygiene.**

1. INTRODUCTION

1.1 Background of the study

Diarrhea continues to be a major cause of death for children globally, contributing to almost 9% of all pediatric fatalities in 2021 (WHO, 2021). Nearly 1.7 billion cases of diarrheal sickness in children are reported to occur annually worldwide (WHO, 2024). Over 1,200 young children die from diarrhea every day, or over 444,000 children annually, making it a

leading cause of death for children under five worldwide (UNICEF, 2024). In developed countries, although the prevalence is noticeably lower than in low- and middle-income countries, diarrhea of children under five is still a serious health concern. Because to better sanitation, access to healthcare, and immunization initiatives, the prevalence of diarrhea has significantly decreased (WHO, 2020). For instance, it is estimated that between 15 and 20% of young children in the United States have an acute diarrhea episode annually as, the total mortality rate for children under five was 2.3 per 100,000 (Aliabadi et al., 2018).According to CDC, Acute gastroenteritis is a major cause of diarrhea, causes about 200,000 outpatient visits and 70,000 hospitalizations among children under five in the United States each year (CDC, 2024).

In developing countries diarrheal illnesses remain the leading cause of death for children under five in poor nations. An estimated 2 million people die from diarrhea every year, with children between the ages of 0 and 5 making up a significant share of these deaths (Hasan et al., 2025). In South Asian countries Pakistan had the highest rate of diarrhea-related mortality among children under five (8%), followed by Bangladesh (7%), India (7%), and the Maldives (1%), while Sri Lanka (1%), and the Maldives (2%), had the lowest rates (UNICEF, 2024). In Africa, according to a comprehensive review and meta-analysis, rotavirus killed 39,586 children under five while enter invasive Escherichia coli (EIEC) killed 70,108 (Cecilie Thystrup et al., 2024). In sub-Saharan African countries, according to the reports, 15.3% of the under five years old children had diarrhea diseases (Demissie et al., 2021). As the mortality rate exceeds 150 deaths per 100,000 children under five, the highest among all global regions (WHO, 2021). In some East African countries like Uganda according to reports, diarrhea prevalence was approximately 20% among children under five, meaning one in five children experiences diarrheal episodes, as highlighted in the Uganda Demographic and Health Survey (Uganda DHS 2022).

According to the 2016 Burundi Demographic and Health Survey (DHS), 23% of children under five experienced at least one episode of diarrhea in the two weeks prior to the survey (Burundi DHS 2016- 17).High rates are also present in Kenya, where the Kenyan Demographic and Health Surveys (KDHS) show a prevalence of about 15%, especially among children aged 6 to 23 months and in areas like Nairobi, Western Nyanza, and the Coast (Ken-ya DHS 2022). Tanzania reports a prevalence of approximately 12.1%, with regional variations ranging from 6% to 33% (Paul et al, 2019).

In Rwanda, despite progress, still records a prevalence of 12-14% among children under five, with higher rates in the Western Province and lower rates in the East Province and Kigali, according to the Rwanda Demographic and Health Survey (RDHS 2019-2020). Moreover, diarrheal diseases have far-reaching consequences on childhood development, extending beyond immediate morbidity and mortality. They disrupt nutritional status by reducing food intake, impairing nutrient absorption, and increasing the loss of essential micronutrients (Ferdous et al., 2013). This often leads to malnutrition, which weakens the immune system and increases susceptibility to recurrent infections, thereby impairing growth and cognitive development (Ngure et al., 2014).Repeated diarrheal infections can cause long-term immunological damage, further exacerbating vulnerability to other diseases and hindering overall development (WHO, 2023). Therefore, treating diarrheal illnesses is essential for promoting children's healthy growth and development as well as reducing acute health concerns. Additionally, the main causes of diarrheal illnesses in children under five are a variety of pathogens, such as bacteria (WHO, 2023). The fecal-oral pathway is the main way that these viruses are spread, and it is frequently brought on by tainted food or drink, inadequate sanitation, and poor hygiene habits. According to Van den Bold et al. (2012), water-borne diarrhea happens when sources of water or in-house water storage are tainted with pathogens that are spread by human-to-human contact, environmental exposure, or animal-to-human contact. In addition, governments and health organizations face significant challenges in implementing effective prevention and management strategies for diarrheal diseases.

Despite proven interventions such as oral rehydration therapy (ORT), zinc supplementation, and rotavirus vaccination programs, their consistent application remains uneven, particularly in low-resource settings (WHO, 2023). Researchers attribute approximately 90% of diarrheal cases in children under five to poor sanitation, unsafe drinking water, and inadequate hygiene practices, which facilitate the spread of infectious agents. Addressing the root causes requires a comprehensive understanding of the environmental, behavioral, and socio-economic factors contributing to diarrheal diseases, as focusing on a single cause may yield only minimal improvements (UNICEF, 2023). Furthermore, research conducted in Rwanda has discovered environmental, socioeconomic, and biological elements that foster the development of diarrheal illnesses (Ngabo et al., 2016). According to Mattioli et al. (2015), behavioral factors such open defecation, incorrect stool disposal, and insufficient hand washing frequently result in human interaction with fecal matter. Using bathrooms, washing hands properly, and having access to clean water and sanitary facilities are all necessary to break this cycle of transmission.

Rwanda is actively addressing diarrheal disease risk factors through targeted policies and interventions. The Ministry of Health has empowered Community Health Workers (CHWs) to identify and manage cases early, either treating them or

referring them to health facilities. Preventive measures have also been strengthened with the introduction of new diarrhea vaccines. Research indicates that rotavirus causes over one-third of diarrhea-related deaths in children under five globally, with sub-Saharan Africa bearing the highest burden (WHO, 2023).In Rwanda, the prevalence of diarrhea in children under five is 12.7%, which is considerably lower than a study conducted in Nyarugenge District that found 26% and slightly lower than the 2010 DHS data of 13.1%. Better sanitation, increased health insurance coverage, and easier access to clean water could all be responsible for this reduction. To identify high-risk populations and put effective preventative efforts into place, it is still crucial to ascertain the prevalence and contributing factors of diarrhea in children under five (UNICEF, 2023). The purpose of this study is to evaluate the prevalence of diarrhea and its contributing factors in children under five who visit the Byahi health center in the Rubavu area. In order to inform effective preventative and intervention strategies, it aims to uncover socioeconomic and environmental determinants as well as mothers' knowledge, attitudes, and practices about diarrhea in children.

1.2 Problem statement.

Globally, over 1,200 children die from diarrheal diseases every day, making it a major public health concern for children under five worldwide. Diarrhea contributes significantly to childhood mortality and morbidity, accounting for about 9% of under-five deaths globally (WHO, 2021). Although there has been progress, diarrhea remains a major public health concern in Rwanda, contributing significantly to morbidity and mortality among children under five. The prevalence of diarrhea is 12–14%, with lower rates in Kigali and the East Province and higher rates in the Western Province (RDHS 2019–2020).To lessen the prevalence of diarrheal illnesses, the Rwandan government has put in place a number of initiatives, such as expanding access to basic sanitary facilities, encouraging hygiene education, and launching rotavirus vaccination campaigns. According to the 2022 Population and Housing Census (PHC), 82% of households in Rwanda used water from improved drinking water sources, reflecting significant progress in water accessibility (National Institute of Statistics of Rwanda, 2022). Additionally, approximately 72% of households now have access to basic sanitation facilities (Rwanda Ministry of Health, 2022). Despite these efforts, diarrheal diseases remain a persistent challenge, particularly among children under five. Primary data collection is required to evaluate the current prevalence and contributing causes of diarrhea in children under five who attend the Byahi Health Center in the Rubavu district. In order to further lessen the burden of diarrheal illnesses in this susceptible population, such data will be used to identify high-risk groups, assess the effectiveness of current interventions, and guide focused measures.

1.3 Objectives of study.

i. To determine prevalence of diarrhea among under five children attending Byahi health center, Rubavu district.

ii. To assess the socio -economic factors associated with diarrhea among children under five years attending Byahi health centre in Rubavu district.

iii. To assess environmental factors associated with diarrhea among children under five years attending Byahi health centre in Rubavu district.

II. METHODOLOGY

2.1 Study design

A cross-sectional study using quantitative data collection approach was used. A structured questionnaire was used to collect quantitative data. This is the method was chosen because it is rapid, cost-effective, and enables the calculation of a condition's prevalence. Additionally, a unique period is being used to examine the association between the exposition and the consequence simultaneously (Cvetković et All, 2021).

2.2 Study Setting

Byahi health center is one of 14 health centers of Rubavu district in Western province of Rwanda. It is located in Gabiro village,Buhaza cell and Rubavu sector. It has population of 56009 in its catchment area with different services offer in different departments such as ,Maternity, outpatient department, laboratory department, nutrition ,Immunisation, minor surgery.It has got 78 community health workers that works hand in hand with community health officer at Byahi health center, this health center has 27 staffs including 5 clinical staffs.It is sarounded by Busigali health center in north,Gisenyi health center in south and Rugerero health center in east with Democratic republic of Congo in West(Byahi health center,2024).

2.3 Study Participants

The study population of this study included all mothers /care takers with children less than five years of age who will meet the inclusive criteria.

2.4 Sampling size

Sampling in research is the process of obtaining information about an entire population by examining only a part of it .It serves the purpose of saving time and other resources and yet produces the required results. This happens by the researcher drawing inferences based on samples about the parameters of population from which the samples are taken. In this research, we used Cochran formula to get 423 care givers as our sample size.

2.5 Research instrument and variables

Using a standardized questionnaire, data was gathered. The questionnaire was broken up into three sections: part A covered the sociodemographic traits of mothers and children, part B covered socioeconomic and personal traits, and part C covered environmental traits. The questionnaire was pre- tested through conducting a pilot study in a health facility outside the study area in order to establish its validity and reliability. The questionnaire was created using a variety of WASH resources, such as literature reviews from related research and UNHCR WASH evaluation tools. Sociodemographic, water variables, sanitation factors, and hygiene factors, including feeding patterns, were the sections of the instrument that were separated out. After that, a researcher translated the tool into Kinyarwanda. Under the researcher's supervision, five research assistants who were proficient in both English and Kinyarwanda were hired, trained, and utilized for data collection.

2.6 Data analysis Procedures

Microsoft Excel was used to enter and sanitize the data. After validation, the data was exported to IBM SPSS version 25 for analysis. The sociodemographic data was summarized and the prevalence of diarrheal illness was examined using descriptive statistics. The percentage of the caretakers' children who had three or more episodes of diarrheal illness out of the total number of cases examined was used to determine the prevalence of the disease. Descriptive statistics were used to ascertain the prevalence of diarrhea, and the chi square test and binary logistic regression analysis were used to identify the independent factors linked to diarrhea in children under five. Odds ratios (OR) with a 95% CI and a p-value of ≤ 0.05 were used to determine statistical significance.

III. RESEARCH FINDINGS AND DISCUSSIONS

3.1 Socio-demographic characteristics of Mothers.

This study revealed that in terms of educational level, 177 (41.9%) finished primary school, 60 (14.1%) finished secondary school, 58 (13.7%) finished university, and 128 (30.3%) have no formal education. Regarding occupation status, 218 (51.5%) of the respondents were employed, whereas 205 (48.5%) are not. According to the marital status distribution, 284 (67.2%) of mothers were married and 139 (32.8%) of them were single. 42 (10%) of the mothers were between the ages of 35 and 49, 305 (72.2%) were between the ages of 20 and 34, and 75 (17.8%) were between the ages of 0 and 19.Finally, the number of children under five in the home revealed that 339 (80.1%) families had two or less young children, while 84 (19.9%) families had three or more (table.1).

Table 1: Socio-demographic characteristics of mothers.

Variables		Freq (n=423)	Perc (%)
Education level	Non	128	30.3
	Primary	177	41.9
	Secondary	60	14.1
	University	58	13.7
Occupation status	Not working	205	48.5
	Working	218	51.5
Marital status	Single	139	32.8
	Married	284	67.2
Mother's age	0-19 years	75	17.8

	20-34 years	305	72.2
	35-49 years	42	10
Number of U5 in family	≤2	339	80.1
	≥3	84	19.9
Total		**423**	**100%**

Source :(Primary data, 2025).

3.2 Socio-demographic characteristics of children.

The study involved 423 children with age-based categories are as follows: 209 observations (13.7%) for children aged 6–11 months, 74 observations (33.6%) for children aged 12–23 months, and 140 observations (52.7%) for children aged 24–59 months. There are 190 boys (44.8%) and 233 girls (55.2%) in the child's sex variable. Regarding the place of birth, there were three categories for place of birth such as health center (n=102, 24.1%), hospital (n=192, 45.4%), and other places (n=129, 30.5%). A child's parity was divided into three categories like firstborn (n=110, 26%), second or other born (n=162 c, 38.3%), and lastborn (n=151, 35.7%).In terms of bottle feeding, 126 children (29.9%) were bottle feded, while 297 children (70.1%) are not. 127 children (29.9%) were not up to date on their vaccinations, whereas 296 children (70.1%) were up to dated, the history of deworming indicates that 296 children (70%) have been dewormed, while 127 children (30%) have not(table2).

Table 2: Socio-demo characteristics of children.

Variables		Freq (n=423)	Perc (%)
child's age	6-11 months	209	13.7
	12-23 months	74	33.6
	24-59 months	140	52.7
Child sex	Male	190	44.8
	Female	233	55.2
Place of birth	Hospital	192	45.4
	health center	102	24.1
	Other	129	30.5
	first born	110	26
Parity of child	second or other born	162	38.3
	last born	151	35.7
Bottle feeding	No	297	70.1
	Yes	126	29.9
Vaccination status	Not up to date	127	29.9
	Up to date	296	70.1
History of deworming	Yes	296	70
	No	127	30
Total		**423**	**100%**

Source :(Primary data, 2025).

3.3 Environmental characteristics of Respondents.

The table 3 shows the study's findings on frequency and percentage distributions of factors related to water, sanitation, and hygiene among the 423 respondents .Of those who utilize water, 129 (51.5%) use boreholes, while 294 (48.5%) use piped water. It took 82 respondents (20.3%) fewer than 15 minutes to get to the water source, 162 respondents (59.8%) between 16 and 30 minutes, and 179 respondents (19.9%) more than an hour. In terms of water treatment, 43 mothers (10.2%) do not report taking any action to clean the water, whereas 380 respondents (89.8%) do, boiling (40.2%), chlorine (40.2%), solar disinfection (26.1%), letting the water stand and settle (9%), and cloth filtering (4.5%) were the procedures used to prepare drinking water. Regarding, water storage, 254 (60%) always store water for drinking, 89(21%) occasionally store,

and 80(18.9%) never store. Among the containers used are jerry cans (80; 18.9%), buckets with lids (274; 64.8%), and buckets without lids (69; 16.3%).The study also reveals that 314 families (74.2%) have hand washing facilities, whereas 109 households (25.7%) do not. Only 353 (83.5%) of those with facilities reported having access to soap, compared to 70 (16.5%) and 230 respondents (39.8%) do not share latrines, whereas 193 (60.2%) do. 244 (69.7%) of the latrines are unimproved, while 179 (30.3%) are improved. Finally, 341 respondents (29.9%) dispose of their stool improperly, whereas 82 respondents (70.1%) dispose of their stool properly (table.3).

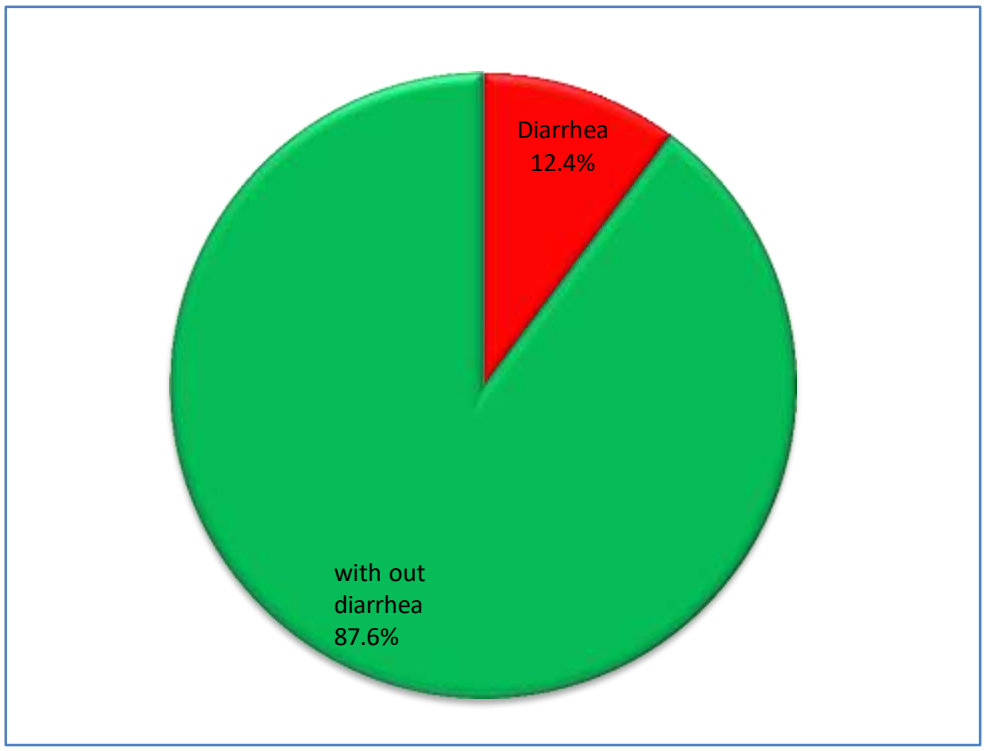
Table 3: Environmental characteristics of the Respondents.

Variables	Freq (n=423)		Perc (%)
Water source	Piped water	294	48.5
	Borehole	129	51.5
Time to reach water source	Less than 15 minutes	82	20.3
	16-30 minutes	162	59.8
	Above 1 hour	179	19.9
Anything done to clean water	Yes	380	89.8
	No	43	10.2
How to prepare for drinking	Boiling	170	40.2
	Use of chlorine	170	40.2
	Solar disinfection	26	6.1
	Let it stand and settle	38	9
	Filter with cloth	19	4.5
water for drinking is stored	Always	254	60
	Sometimes	89	21
	Never	80	18.9
Container used to store water	Bucket with lid	274	64.8
	Bucket without lid	69	16.3
	Jerry cans	80	18.9
Having hand washing facility	Yes	314	74.2
	No	109	25.8
Soap on hand washing facility	Yes	353	83.5
	Non	70	16.5
Shared Latrine	No	230	39.8
	Yes	193	60.2
Type of a Latrine	Un improved	244	69.7
	Improved	179	30.3
Stool disposal	Improper	341	29.9
	Proper	82	70.1
Total		423	100%

Source :(Primary data, 2025).

3.4 Prevalence of diarrhea among under five years old children.

Results showed that the prevalence of diarrhea in this study was 12.4% (n=52) while the majority (87.6%, n=371) had no diarrhea as shown in figure 2 below.



3.5 Bivariate analysis of Socio-economic factors associated with diarrhea.

Bivariate analysis was performed to evaluate socioeconomic factors linked to diarrhea in children under five. The results showed that the following factors were statistically associated with diarrhea in children under five: occupation status (X^2=19.933; P=0.001), mother's age (X^2=11.172; P=0.004), child's age (X^2=24.870; P=<0.001). There was no significant correlation found between childhood diarrhea and the mother's educational attainment (X^2=2.882; P=0.41), marital status (X^2=4.038, P=0.062), number of U5 in the household (X^2=0; P=1), or child's sex (Table 4).

Table 4

Variables	Prevalence of diarrhea		Chi-square(X2)	P-value
	No	Yes		
Mother's education level			2.882	0.41
Non	36 (28.4%)	92 (71.8%)		
Primary	120 (67.7%)	57 (33.3%)		
Secondary	52 (86.6%)	8 (13.3%)		
Tertiary	52 (89.6%)	6 (10.0%)		
Occupation status			19.933	<0.001
Not working	27 (13.2%)	178 (86.7%)		
Working	124 (56.9%)	94(43%)		
Marital status			4.038	0.062
Single	110(79.1%)	29(16.7%)		
Married	184 (64.9%)	100 (35%)		
Mother's age			11.172	0.004
0-19 years	57 (75.8%)	18 (24%)		
20-34 years	203 (66.6%)	102 (33.3%)		
35-49 years	34 (80.9%)	8(20.0%)		
Number of U5 in household			0	1
≤2	272 (80.1%)	67 (19.7%)		
≥3	17 (19.9%)	6 (79.8%)		

Child's sex			4.052	0.06
Male	80 (42.2%)	110 (57.8%)		
Female	135 (57.8%)	98 (42%)		
Child's age (months)		24.87		<0.001
<6 months	30 (14.2%)	176 (85.6%)		
6-24 months	21 (28.0%)	53 (71.6%)		
25-59 months	81 (57.8%)	59 (42%)		
Vaccination status		1.667		0.206
Not up-to-date	40 (31.4%)	87 (29.3%)		
Up-to-date	286 (96.6%)	10(3.4%)		
Bottle feeding		14.843		<0.001
No	197 (66.3%)	100 (33.6%)		
Yes	56 (44.4%)	82 (65%)		

Source :(Primary data, 2025).

3.6 Bivariate analysis of environmental factors associated with diarrhea.

Based on an analysis of environmental factors linked to diarrhea in children under five, the Byahi Health Center found that the type of latrine, the source of drinking water, and shared latrines were significantly associated with childhood diarrhea in children under five (X^2=23.571; P=<0.001, X^2=11.571; P=<0.002, X^2=13.262 ; P=<0.004)(table 5).

Table 5: Bivariate analysis of Environmental factors associated with diarrhea.

Variables	**Prevalence of diarrhea**		**Chi-square(X2)**	**P-value**
Source of drinking water	No	Yes	23.571	<0.001
Borehole	55 (42.7%)	74 (57%)		
Piped tape water	168 (57.3%)	126 (42.9%)		
Time to water source			0.002	0.999
≤ 15 minutes	17(20.4%)	65(79.3%)		
≤30 minutes	97 (59.7%)	65 (40.1%)		
> 30 minutes	36 (19.9%)	143(79.8%)		
Shared Latrine			13.262	0.004
No	121 (52.7%)	109 (47.4%)		
Yes	72 (37.3%)	121(62.7%)		
Type of latrine facility		11.53		0.002
Unimproved	173 (71.1%)	71 (29.1%)		
Improved	52 (28.9%)	127 (70.9%)		
Any hand washing facility		0.24		0.725
Yes	81(25.7%)	233(74.2%)		
No	30(27.4%)	79(72.5%)		
Soap on hand washing facility		0.35		0.615
Yes	80(22.7%)	273(77.3%)		
No	11(15.5%)	59(84.3%)		
Water for drinking is stored		0.23		0.94
Always	33(12.8%)	221(87%)		
Sometimes	19 (21.6%)	70 (78.7%)		
Never	26 (32.5%)	54(67.5%)		
Container used to store water		1.512		0.266
bucket with lid	159(58%)	115(41.9%)		
bucket without lid	18 (26.6%)	51 (73.9%)		
jerry cans	34 (42.5%)	46(57.5%)		

Source :(Primary data, 2025).

3.7 Binary logistic regression of factors associated with diarrhea.

To identify the independent factors linked to diarrhea in children under five, the researcher employed a binary logistic regression analysis on features that were significant at Chi-squared analysis. Table 7 presents the findings. The results indicate that a number of maternal and child variables are strongly linked to diarrhea in children under five. Remarkably, children of mothers who did not work were far more likely to have diarrhea than children of moms who did (OR = 8.57; 95% CI: 2.89–25.43; p < 0.001). Accordingly, the likelihood of diarrhea in children of non-working moms is about eight times higher than that of children of working mothers. Another significant factor was age of the child where by children between the ages of 6 and 24 months had significantly higher risks of getting diarrhea (OR = 9.10; 95% CI: 3.28–25.22; p < 0.001). Furthermore, the source of drinking water was very important, children who drink water from a borehole had a greater than 12-fold higher risk of diarrhea than children who use piped tap water (OR = 12.1; 95% CI: 3.56–41.13; p < 0.001). While unimproved sanitation surprisingly seems protective (OR = 0.14; 95% CI: 0.10–0.41; p < 0.002), shared latrine use is also problematic, with greater chances (OR = 4.10; 95% CI: 1.28–20.22; p < 0.004), probably reflecting contextual, potentially complicating factors. Young mothers (0–19 years old) seem to be protected against diarrhea (OR = 0.26; 95 % CI: 0.09–0.77; p = 0.004), whereas mothers aged 20–34 show little difference when compared to the older reference group. There is an elevated risk of diarrhea in children who are bottle-fed and have not received their recommended vaccines (table.6).

Table 6: Binary Logistic regression analysis of Factors associated with diarrhea.

Variables	Diarrhea		OR	95%CI		P- value
	No	Yes		Lower	Upper	
Occupation status						
Not working	27 (13.2%)	178 (86.7%)	8.571	2.889	25.426	<0.001
Working	124 (56.9%)	94(43%)	1			
Mother's age						
0-19 years	57 (75.8%)	18 (24%)	0.263	0.090	0.768	0.004
20-34 years	203 (66.6%)	102 (33.3%)	0.909	0.284	2.911	0.872
35-49 years	34 (80.9%)	8(20.0%)	1			
Child's age (months)						<0.001
<6 months	30 (14.2%)	176 (85.6%)	2.44	0.552	10.784	0.239
6-24 months	21 (28.0%)	53 (71.6%)	9.098	3.282	25.22	<0.001
25-59 months	81 (57.8%)	59 (42%)	1			
Vaccination status						
Not up-to-date	40 (31.4%)	87 (29.3%)	7.098	1.282	23.22	<0.003
Up-to-date	286 (96.6%)	10(3.4%)	1.44	1.552	11.784	1.239
Bottle feeding						
No	197 (66.3%)	100 (33.6%)	0.229	0.104	0.507	<0.001
Yes	56 (44.4%)	82 (65%)	1			
Source of drinking water						
Borehole	55 (42.7%)	74 (57%)	12.1	3.559	41.133	<0.001
Piped tape water	168 (57.3%)	126 (42.9%)	1			
Shared Latrine						
Yes	121 (52.7%)	109 (47.4%)	4.098	1.282	20.22	<0.004
No	72 (37.3%)	121(62.7%)	1			
Type of latrine facility						
Unimproved	173 (71.1%)	71 (29.1%)	0.139	0.102	0.407	<0.002
Improved	52 (28.9%)	127 (70.9%)	1			

Source :(Primary data, 2025).

3.8 Discussion of Findings

3.8.1 Prevalence of diarrhea among under five years of age-old children

The prevalence of diarrhea found in this study was to be 12.4% which is very closer to Rwanda national prevalence of 12-14% reported by the latest Rwanda demographic and health survey (RDHS, 2019-2020).Higher prevalence was also reported by studies in Kenya (15%)(Kenya DHS 2022), in Uganda (20%), (Uganda DHS, 2022) and In Burundi where prevalence of diarrhea was 23% among under five years old children(Burundi DHS 2016-17).However, the result from the current study is comparable with previous studies in Tanzania (12.1 %,) (Paul et al, 2019), and that of conducted in Kenya where the prevalence was 15% in under five years old children(Kenya DHS, 2022).The similarity in prevalence could be due to similar methods of data collection and study designs.

3.8.2 Factors Associated with Diarrhea among Children under Five Years Old

In this study, predictive variables for diarrhea in children under five years old were evaluated. Only working status, mother's age, child's age, drinking water source, and bottle feeding were found to be independently linked with diarrhea in children under five in binary logistic regression. Diarrhea and employment status were substantially correlated in this study. Diarrhea was nine times more common in children whose mothers were unemployed than in children whose mothers were employed (OR=8.571; CI=2.889-25.426; p<0.001). This may be due to the fact that mothers who have no formal job are more likely to be exposed to poor hygiene practices and may lack clean water. This finding is supported by studies done by (Agustina et al., 2013) in Indonesia, in Ethiopia (Gebru et al., 2014) and in Nigeria by (Oloruntoba et al., 2015). The similarity could have been due to similar study setting and methods of data collection. However, contradicting results were reported by studies in low and middle-income countries (Lamberti et al., 2012) and Burundi (Bwogi et al., 2016) which found no association between work status and diarrhea. Children aged 6–24 months had significantly higher risk (OR = 9.10, $p < 0.001$), consistent with multiple studies across sub-Saharan Africa showing peak diarrheal risk between 6–23 months(Claudine et al., 2021).Although our results indicate that mothers under 20 are protected (OR = 0.26, p = 0.004), the larger sub-Saharan multicounty analysis revealed that mothers aged 15–24 and 25–34 had higher risk of diarrhea (adjusted OR=1.15–1.26) than mothers aged 35+, indicating inconsistent effects of maternal age on risk(Demissie et al., 2021). Likewise, although our results indicate that children in the poorest wealth category (Cat 1) had greater chances (OR = 4.17, p = 0.002), this is consistent with the Rwanda DHS conclusion that diarrheal risk is increased by lower economic status (OR =1.64) (Claudine et al., 2021). Additionally, the results of this study both confirm and refute earlier research on vaccine and environmental factors. Not-up-to-date immunization was highly associated with greater risks of diarrhea (OR = 7.10, $p < 0.003$), which is consistent with findings from Rwanda that showing the introduction of the rota-virus vaccine considerably reduced the incidence and death of diarrhea. The study found that drinking water sources considerably increase the risk of diarrhea (Degebasa et al., 2018), and consumers of borehole water were significantly at higher risk (OR = 12.10, $p < 0.001$). In contrast to unimproved toilet usage, which seemed to be protective (OR = 0.14, $p < 0.002$), shared latrine use increased odds (OR = 4.10, $p < 0.004$). Most sanitation studies, like those conducted in Kenya and the Democratic Republic of the Congo, show that even an unimproved latrine is better than none at all, and that partially improved latrines with roofs, superstructures, and fly control provide superior protection (Cha et al., 2017).

3.9 Limitations.

The following drawbacks of this study were being pertaining to the methodological approach. Thus, there was a possibility that this study had certain limitations in terms of data collection and analysis, such missing data. Furthermore, a longitudinal analysis could reveal more significant trends and patterns because the data used in this study was cross-sectional. It may be possible to conduct future studies by including spatial information. There might be also a risk social desirability bias because some women attended for diarrhea management service in health centers may not want to disclose some practices and behaviors that are socially unacceptable e.g. eating half cooked food, drinking unsafe water, poor WASH practices at their home leading under reporting of those risk factors as attested by the researcher. In certain cases, mothers' self-reported data was used to collect data, which might have introduced bias into the data collection process, particularly when using the household wealth index data collection tool and misclassified the index. Consequently, all of these restrictions might make it difficult to extrapolate the study's findings to different contexts. In addition, the results of this study were not national in scope because it used data from only one health center from one district. The generalizability of the findings was therefore limited by the sampling strategy.

IV. CONCLUSION AND RECOMMENDATIONS

4.1 Conclusions

This study sought to ascertain the prevalence and contributing variables of diarrhea in children under five who were admitted to the Byahi Health Center in the Rubavu region of Rwanda's Western Province. According to the current study, a significant number of children under five who presented to Byahi Health Center had diarrhea (12.4%, n=30). There were a number of significant factors, such as socioeconomic and environmental factors, that have been associated with diarrhea among under five years old children and should be addressed. Mother's employment position, child age, drinking water source, mother age and bottle feeding were the independent factors that were found to be linked to diarrhea at Byahi health center.

4.2. Recommendations

The government of Rwanda through Ministry of Health should invest in integrated water, sanitation, and hygiene infrastructure (WASH), support longitudinal research on the trends of diarrheal diseases, and create policies that encourage women's income-generating activities. Simultaneously, caregivers and mothers in particular need to follow important hygiene practices, like washing their hands before feeding, cleaning bottles with hot water, using safe water sources, and keeping their homes sanitary. Strong policy support combined with sensible personal hygiene habits will help lower the prevalence of diarrheal illness and enhance the health of children. To get more understanding, a prospective cohort study should be conducted in the future to separate the causative associations between bottle-feeding, diarrhea episodes, child age, and maternal employment over time. It is also advised to conduct a microbiological evaluation of household water sources and storage procedures in order to elucidate the ways in which drinking water quality affects the risk of diarrhea. Lastly, stratified analysis by the age groups and work kinds of mothers may reveal vulnerable subgroups and assist in customizing focused preventive measures.

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