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Factors Influencing Diarrheal Diseases among Children Under Five Years in Kajiado County

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Abstract

Background: Diarrheal diseases are among the leading causes of morbidity and mortality in young children. Diarrhea is a preventable disease, but the inadequate knowledge of mother, approach towards the prevention could lead to the high likelihood of diarrhea among children. In Kajiado County, diarrhea is one of the leading causes of morbidity and mortality in children below five years.

Objectives: The study objectives of the study was; to ascertain the influence of maternal knowledge on diarrheal diseases; to identify the influence of hygiene practices on diarrheal diseases and to establish the influence of social economic factors on diarrheal diseases among children under five .

Methods: The study population comprised of caregivers of children under five-.The study used questionnaires and key interview guide to collect the data.

Results: Maternal knowledge significantly impacts the incidence of diarrheal diseases among children under five with caregivers holding polytechnic and university education showing lower odds of their children contracting these diseases (0.964 and 1.409 less odds, respectively). Hygiene practices, such as source of water, handwashing habits, and waste management, were also identified as key factors, with practices like using spring or river water, not washing hands before feeding children, and improper disposal of waste correlating with higher odds of diarrheal diseases (0.7662, 0.7577 less odds, and 0.1932 more odds, respectively). Socio-economic factors, including the child's age, household size, income, and type of housing, were found to influence the prevalence of diarrheal diseases, with older children, smaller households, higher incomes, and living in permanent houses associated with reduced odds of these diseases (0.4986 less odds for children aged 4-5 years, and 0.8993 less odds for those living in permanent houses).

Conclusion: The study concludes that maternal knowledge, hygiene practices, and socio-economic factors impact the incidence of diarrheal diseases.

Recommendations: The study recommends targeted health education programs.

Keywords: *Diarrheal Diseases, Children Under Five Years, Kajiado County*

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1. Introduction

Diarrheal diseases are among the leading causes of morbidity and mortality in young children in developing countries. Globally, diarrhea disease is the second leading cause of death in children under five years old, responsible for the deaths of 370,000 children in 2020 (WHO/UNICEF, 2020). Despite advances in medical science and improvements in sanitation and hygiene practices, these illnesses still contribute to a substantial burden on healthcare systems, especially in low and middle-income countries. The lack of access to clean water, proper sanitation, and healthcare infrastructure exacerbates the prevalence of these diseases, leading to preventable deaths and long-term health complications among children (Yüksel Kaçan, Palloş & Özkaya, 2022). Sub-Saharan Africa bears a disproportionate burden of diarrheal diseases (Merga & Alemayehu, 2015). Factors such as poor hygiene practices, inadequate waste management, lack of education about disease prevention, and limited access to clean water and proper sanitation facilities contribute to the high prevalence of these diseases among children in the region (Oloruntoba et al., 2021; Webale, 2020). In Kenya, diarrhea is the fourth most common illness seen in health facilities and accounts for one in five of all hospital admissions. It is the overall fourth most common cause of death among children under five years of age in Kenya, with a case fatality of up to 21% (Ministry of Health, 2020).

In Kajiado County, diarrheal diseases among children under five years of age remain a significant public health concern (Kajiado County Report, 2020). Children with poor nutritional status and overall health, as well as those exposed to poor environmental conditions including unsafe drinking water, are more susceptible to severe diarrhea and dehydration than healthy children (Lambisia et al., 2020). Mothers play a major role in taking care of children, and their knowledge on diarrhea might contribute to the occurrence of diarrhea among under-five children (Recha & Manetu, 2021; Karinja et al., 2020).

Studies have associated the high prevalence of diarrhea in developing countries with poor hygiene practices (Lyimo et al., 2016; Strunz, 2014). Factors such as unhygienic handling and storage of foods, poor handwashing practices, poor disposal of child feces, open defecation, lack of safe water sources for domestic purposes, and poor solid and liquid waste disposal continue to be major health threats among under-five children (Kumwenda, 2020). Interventions to improve water quality at the source, along with treatment of household water and safe storage systems, have been shown to reduce diarrhea incidence by as much as 47% (Mulatya & Mutuku, 2020). Socioeconomic and demographic factors, such as age and occupation of mothers (or caregivers), also influence diarrhea occurrence among under-fives by impacting family behavior and the environment (Webale, 2020; Rhee et al., 2020).

1.1 Statement of the Problem

Diarrhea was a leading killer of children, accounting for approximately 9% of all deaths among children under age 5 worldwide in 2020. This translates to over 1,300 young children dying each day, or about 484,000 children a year, despite the availability of a simple treatment solution. Despite much effort and successes in the management of diarrhea, the disease has remained among the top five causes of mortality and morbidity in Kenya, particularly among infants and children below five years (Ministry of Health, 2020). As children start crawling and teething from six months, this predisposes many infants to frequent infections as they wander into unhygienic environments. Unhygienic food preparation, food storage and feeding of infants may explain the increase in diarrhea in this age cohort as weaned foods are exposed to contamination.

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In Kajiado County, diarrhea is one of the leading causes of mortality and morbidity in children below five years (Kajiado County Report, 2020). In the year 2018, Kajiado County carried out a survey that revealed that 25% of the under-five-year old children suffered from watery diarrhea, and 1.9% from bloody diarrhea based on a two-week recall by the caregiver. According to WHO (2020), inadequate sanitation and hygiene cause 88% of diarrheal diseases. WHO (2020) further adds that improved water supply reduces diarrhea morbidity by between 6%-25%, hygiene interventions including maternal knowledge and promotion of hand washing can reduce diarrhea cases by up to 45% and improvement in drinking water quality through water treatment such as chlorination at point of use can reduce diarrhea by 35-39%. Overall, the current literature indicates that diarrheal diseases amongst children under five may be attributed to maternal knowledge, hygiene practices and social economic factors. There has not been a recent study in Kajiado County on these postulated determinants. The study conducted in 2018 does not provide a realistic solution on these factors due to the rapid change that has taken place over the last seven year. Therefore, this study sought to determine the factors influencing diarrheal diseases among children under five years in Kajiado County.

1.2 Broad Objective of the Study

The broad objective of this research was to determine the factors influencing diarrheal diseases among children under five years in Kajiado County.

The study was guided by the following research objectives;

i. To determine the influence of maternal knowledge on diarrheal diseases among children under five in Kajiado County
ii. To identify the influence of hygiene practices on diarrheal diseases among children under five in Kajiado County
iii. To establish the influence of social economic factors on diarrheal diseases among children under five in Kajiado County

1.3 Hypotheses

The study tested the following hypotheses;

H_{O1}: Maternal knowledge has no significant influence on diarrheal diseases among children under five in Kajiado County.

H_{O2}: Hygiene practices have no significant influence on diarrheal diseases among children under five in Kajiado County.

H_{O3}: Social economic factors have no significant influence on diarrheal diseases among children under five in Kajiado County.

2. Literature Review

2.1 Theoretical Review

The study was informed by three theoretical frameworks: the Health Belief Model (HBM), Theory of Change, and Hygiene Improvement Framework (HIF).

Health Belief Model (HBM)

The Health Belief Model (HBM) attempts to explain and predict health behaviors by focusing on the attitudes and beliefs that individuals hold about their health. In the context of diarrhea, the

HBM suggests that individuals are more likely to engage in preventive behaviors if they believe they are at risk of contracting diarrhea, believe that diarrhea can have serious consequences, believe that the benefits of preventing diarrhea outweigh the costs, and have the confidence to take preventive action (Croyle, 2005). The model postulates that health-seeking behavior is influenced by a person's perception of a threat posed by a health problem and the value associated with actions aimed at reducing the threat.

Theory of Change

The Theory of Change by Weiss (1990) outlines the logical sequence of steps that need to happen in order to achieve a specific goal. In the context of diarrhea, a theory of change might outline the various steps that need to be taken to reduce the incidence of diarrhea in a given population, such as improving access to clean water and sanitation facilities, promoting proper hand hygiene, providing education about the importance of proper nutrition and the prevention of diarrhea, and implementing strategies to control the spread of diarrhea-causing pathogens. By understanding the underlying factors that contribute to diarrhea and the steps that need to be taken to address these factors, organizations and policymakers can develop and implement effective strategies to reduce the incidence of diarrhea and improve the health and well-being of affected populations.

Hygiene Improvement Framework (HIF)

The Hygiene Improvement Framework (HIF) by Storti, Callier, Fry, Kleinau, and McGahey (2004) explains how to prevent diarrheal and other diseases using three key elements: access to the necessary hardware or technologies, promoting healthy behaviors, and support for long-term sustainability (WHO, 2004). The Framework has three core components: improving access to water and sanitation "hardware", promoting hygiene, and strengthening the enabling environment. These components are designed to encourage key household behaviors that reduce the incidence of childhood diarrhea, namely: safe disposal of feces, washing hands correctly at the right times, and storing and using safe water for drinking and cooking (Joshi & Amadi, 2013). In application, the hygiene improvement framework is key in identifying and addressing areas for improvement in hygiene practices within an organization or community that could prevent diarrhea by assessing current hygiene practices, identifying root causes, developing a plan, implementing the plan, and monitoring and evaluating progress.

2.2 Literature Review

The review of related literature is guided by the study objectives, which focus on maternal knowledge, hygiene practices, and socioeconomic factors influencing diarrheal diseases among children under five. Studies have shown that maternal education level is a significant variable that positively affects diarrhea knowledge levels (Yüksel Kaçan, Palloş & Özkaya, 2022; Ghasemi et al., 2017; Merga & Alemayehu, 2015; Hamuganyu, 2014). Low knowledge levels among caregivers have been found to be a predictor of diarrhea in children under five years (Guillaume, 2020; Mwaniki & Kimiywe, 2017; Othero et al., 2018).

Hygiene practices have been identified as a crucial factor in the prevalence of diarrheal diseases among children under five. Studies have shown that low hygiene practices, such as using untreated non-piped water, poor water handling, and lack of handwashing with soap, are associated with an increased incidence of diarrhea (Kamal et al., 2020; Oloruntoba et al., 2021; Mengistie et al., 2018; Sakala, Mbewe & Baboo, 2020; Kwasi et al., 2015). Improper refuse disposal practices, lack of

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handwashing facilities, living in rural areas, and the presence of multiple siblings in a household have also been identified as major risk factors for diarrhea (Mengistie et al., 2018; Chipeta, 2020).

Socioeconomic factors, such as household income, living conditions, and ethnicity, have been found to influence the incidence of diarrheal diseases among children under five. Studies have shown that children from households with lower monthly income and those living in rural areas have a higher incidence of diarrhea compared to those with higher income and living in urban areas (Amal, 2011; Wilunda, 2020; Agustina, 2018). Poverty, poor sanitary conditions, and household size have also been identified as factors that increase the probability of diarrhea among children under five (Wilunda, 2020).

While some studies have found that age and sex of the child are not significantly associated with the occurrence of diarrhea among children under five (Zaman, 2020), others have identified demographic features, feeding practices, immunization practices, and nutritional status as risk factors for diarrhea (Gupta, 2014). The marital status of mothers has also been found to influence their knowledge and practices in preventing diarrhea in children (Amare et al., 2018; Desta et al., 2017). In addition to the aforementioned factors, household characteristics such as the number of people in a household, the number of children under five years in a household, the relationship of the primary caregiver, level of education, renting, presence of flies, presence of open garbage, presence of feces, and immunization practices of the child have been found to be associated with diarrhea prevalence (Guillaume, 2020).

2.3 Conceptual Framework

The conceptual framework presents the independent and the dependent variables. The independent variables are maternal knowledge, hygiene practices and social economic factors. The dependent variable is the outcome that is the occurrence of diarrhea among under-five children. The conceptual framework is presented in Figure 1.

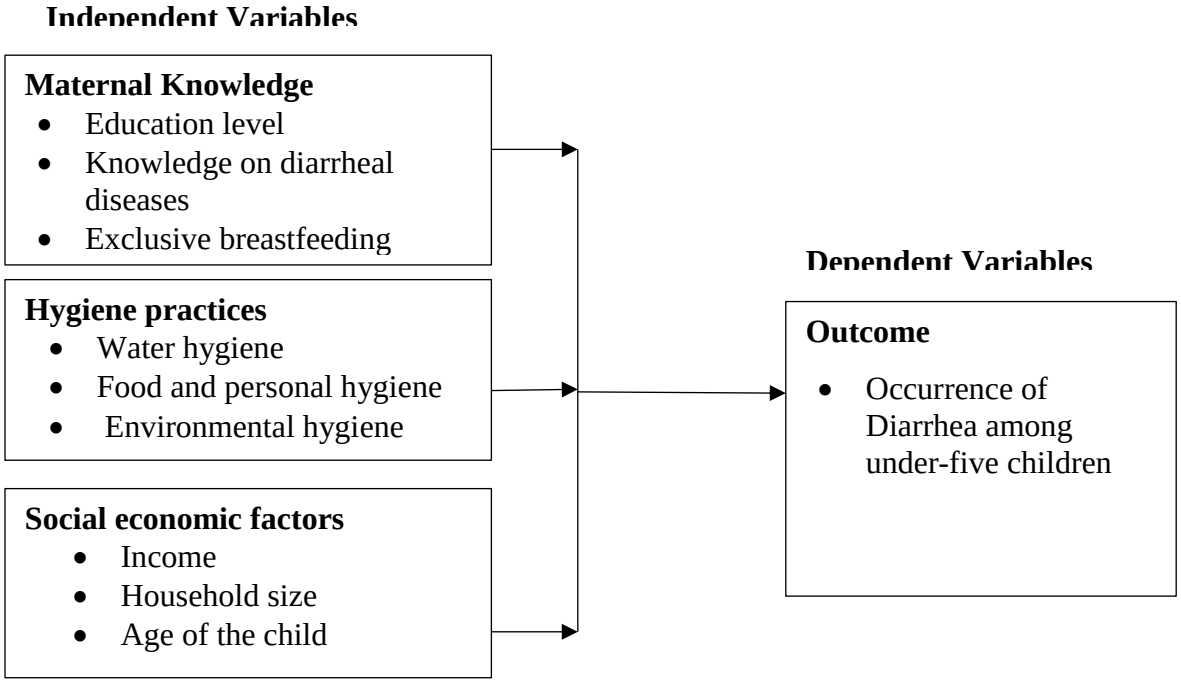

Figure 1: Conceptual Framework

3. Methodology

Cross-sectional study design was used in this study. This ensured proper description of the study subjects and bringing out the real situation of the community on the themes under study.

The study was conducted in Central Kajiado in Kajiado County. Kajiado County being an Arid and Semi-arid Land (ASAL) area, the primary felt need of the communities is access to sustainable safe water. The study population comprised of caregivers of children under five years in Kajiado Central. As reported by the MOH, there were 757 cases of diarrhea of children under 5 years in Kajiado Central Sub County (MOH, 2022). In addition, health workers in Kajiado Central was used in the study. The study adopted Fisher's et al., (1998) formula for the sample size and realizex a sample of 351. Ten percent was added to cater for non-response (35+ 351) giving a study sample size of 386.

The sample was equally distributed on the children with diarrhea (193) and those without diarrhea (193). Systematic random sampling technique was used to select the respondents. Given the study population of 757 (MOH, 2022) and the sample size of 385, the K^{th} value that aided in sampling is established at 2. This made it such that from the list of respondents during the study period, every 2^{nd} patient in the list obtained from the facility was selected as the study respondent. The first respondent was randomly picked among the first 2nd member in the list and the subsequent ones picked 2^{nd} after the first pick and is recruited in the study after giving her informed consent. The health workers were purposively sampled. 10 health workers were purposively sampled from 10 public community health services in Kajiado Central. This included the Level 1 hospital and the Kajiado Level 5 hospital.

The study used questionnaire and key interview guide for data collection. The questionnaires was administered to the caregivers of the children under 5 years. Logistic regression was used to test the hypotheses. A critical value of 0.05 was used to reject the hypotheses. The study obtained ethical approvals from various authorities, including AMREF Ethics and Scientific Review Committee and the National Commission of Science, Technology and Innovation (NACOSTI). The researcher ensured confidentiality of the collected information, obtained voluntary participation from respondents, and informed them of their right to withdraw at any time during data collection.

4. Results

The researcher distributed 386 questionnaires to the respondents and 329 respondents successfully filled and returned their questionnaires translating to an 85.23% response rate.

4.1 Influence of Maternal Knowledge on Diarrheal Diseases among Children under Five

The first objective focused on the influence of maternal knowledge in managing and preventing diarrheal diseases among children under five. This aspect of the study looked into how the caregivers education level and her understanding of various key areas such as the causes of infections, ways to prevent them, the importance of breastfeeding, and the available treatment options can affect the incidence of diarrheal diseases in young children. Logistic regression was conducted to determine the odds ratio for the maternal factors where the significance factors were highlighted. The results are as shown in Table 1.

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Table 1: Logistic Results for Maternal Knowledge on Diarrheal Diseases

Diarrheal Diseases among children under 5 years	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Education						
None (base reference)						
Primary	-0.718	0.440	-1.632	0.589	1.216	2.390
Secondary	-0.759	0.462	-1.643	0.651	1.230	2.505
Polytechnic	-0.964	0.156	-6.172	**0.010**	0.308	3.020
University	-1.409	0.286	-4.933	**0.006**	0.428	4.636
Causes of Infections						
Teething (base reference)						
Viral infections	-1.181	0.172	-6.878	**0.008**	0.360	3.879
Bacterial infections	-1.464	0.282	-5.190	**0.040**	0.487	4.396
Food allergies	-1.315	0.172	-7.654	**0.006**	0.451	3.834
Prevention						
Good hygiene (base reference)						
Rotary vaccination	-0.877	-0.1486	-5.9017	**0.026**	0.296	2.597
Exclusive breastfeeding	1.069	0.1634	6.5422	**0.011**	0.334	3.417
Hand washing with soap	1.125	-0.1624	-6.9273	**0.008**	0.379	3.338
Breastfeeding						
None (base reference)						
Up to 1 month	0.894	0.570	1.568	0.861	1.257	3.118
Upto 3 months	0.363	0.285	1.274	0.197	1.078	1.693
Upto 6 months	-0.905	0.154	-5.888	**0.026**	0.283	2.895
Upto 12 months	-1.573	0.197	-7.981	**0.046**	0.469	5.275
More than 12 months	-0.952	0.163	-5.826	**0.041**	0.258	3.515
Treatment						
Over-the-counter anti-diarrheal medications (base reference)						
Oral rehydration solution (ORS)	-1.334	0.270	-4.941	**0.043**	0.477	3.730
Drinking large amounts of water	1.514	0.855	1.771	0.406	1.569	4.026

Under maternal knowledge, the caregivers with polytechnic level of education had 0.964 less odds of diarrheal diseases among children under five as compared to those with no education (P=0.010<0.05). The caregivers with university level education had 1.409 less odds of diarrheal diseases among children under five as compared to those with no education (P=0.006<0.05).

Under the causes of infections, the caregivers who understood that viral infections is a major causes diarrhea infection had 1.181 less odds of diarrheal diseases among children under five as compared

to those who mentioned that teething is a major cause of diarrheal diseases among children under five (P=0.008<0.05). In addition, the caregivers that understood that bacterial infections is a major causes diarrhea infection had 1.464 less odds of diarrheal diseases among children under five as compared to those who mentioned that teething is a major cause of diarrheal diseases among children under five (P=0.040<0.05). Lastly, the caregivers who understood that food allergies is a major causes diarrhea infection had 1.315 less odds of diarrheal diseases among children under five as compared to those who mentioned that teething is a major cause of diarrheal diseases among children under five (P=0.006<0.05)

Under prevention of diarrheal diseases, the caregivers who understood that rotary vaccination is key to prevention for diarrhea infection had 0.877 less odds of diarrheal diseases among children under five as compared to those who mentioned that good hygiene is the key to prevention for diarrhea infection (P=0.026<0.05). The caregivers who understood that exclusive breastfeeding is key to prevention for diarrhea infection had 1.069 less odds of diarrheal diseases among children under five as compared to those who mentioned that good hygiene is the key to prevention for diarrhea infection (P=0.011<0.05). Lastly, the caregivers who understood that hand washing with soap is key to prevention for diarrhea infection had 1.125 less odds of diarrheal diseases among children under five as compared to those who mentioned that good hygiene is the key to prevention for diarrhea infection (P=0.008<0.05).

Under breastfeeding, the mothers who breastfed their children up to 6 months had 0.905 less odds of diarrheal diseases among children under five as compared to those who did not breastfeed at all (P=0.026<0.05). The mothers who breastfed their children up to 12 months had 1.573 less odds of diarrheal diseases among children under five as compared to those who did not breastfeed at all (P=0.046<0.05). Lastly, the mothers who breastfed their children for more than 12 months had 0.952 less odds of diarrheal diseases among children under five as compared to those who did not breastfeed at all (P=0.041<0.05).

Under treatment, the caregivers who understood that administering of oral rehydration solution (ORS) as treatment for mild to moderate diarrhea in children under five had -1.334 less odds of diarrheal diseases among children under five as compared to those who relied on over-the-counter anti-diarrheal medications (P=0.043<0.05).

The influence of maternal knowledge in childhood diarrhea episodes was further confirmed by health workers in the county. Most expressed that caregivers with high levels of knowledge were likely to have their children under five experiencing fewer episodes of diarrhea compared with those with low education level. For this reason, the health workers use antenatal visits to educate mothers on prevention of diarrheal diseases. As was reported by one health worker,

> "The level of maternal knowledge about diarrheal diseases and their prevention is alarmingly low, which has a direct and significant impact on the high prevalence of these diseases among children under five. Mothers often engage in practices that put their children at risk. This lack of knowledge also leads to delayed care-seeking behavior, as mothers may not recognize the signs of severe dehydration or the need for medical attention." (Health officer (HO1).

Another health officer noted,

> "We've observed that mothers with a better understanding of the causes, symptoms, and prevention methods of diarrheal diseases are more likely to adopt practices that reduce the risk of their children contracting these illnesses. However, there is still need for improvement in terms of educating mothers about the importance of proper hygiene, sanitation, and timely medical intervention when necessary." (Health officer (HO2).

The health officers also highlighted common misconceptions and knowledge gaps among mothers in Kajiado County regarding diarrheal diseases and their prevention. These misconceptions and gaps in knowledge can have serious consequences for the health of children under five. As one health officer explained;

> "We have encountered several alarming misconceptions and knowledge gaps among mothers in Kajiado County regarding diarrheal diseases and their prevention. For instance, some mothers believe that diarrhea is caused by supernatural forces or curses, leading them to seek traditional remedies rather than medical care. Others may not understand the importance of exclusive breastfeeding in protecting infants from diarrheal diseases or may believe that giving water to infants is necessary, even though it can introduce pathogens. Furthermore, many mothers are unaware of the critical role that proper sanitation and hygiene practices play in preventing the spread of these diseases." (Health officer (HO3).

Another health officer added,

> "One of the most common misconceptions among mothers in Kajiado County is that diarrhea is a normal part of childhood and does not require special attention. This belief often leads to delayed care-seeking behavior and inadequate management of the illness at home. Additionally, some mothers may not fully understand the importance of proper handwashing techniques, safe water storage, and food hygiene in preventing the spread of diarrheal diseases." (Health officer (HO4).

4.2 Influence of Hygiene Practices on Diarrheal Diseases among Children under Five

The second objective aimed to identify the influence of hygiene practices on the incidence of diarrheal diseases among children under five years old in Kajiado County. A logistic regression analysis was conducted, focusing on key hygiene-related variables within households. These variables included the main source of water, the practice of handwashing before feeding children, the type of material used for the house floor, methods for disposing of child and adult fecal matter, the frequency and method of handwashing after defecation, the materials used for washing, domestic waste disposal practices, and wastewater management strategies. The results are as shown in Table 2.

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Table 2. Logistic Results for Hygiene Practices on Diarrheal Diseases

Diarrheal Diseases among children under 5 years	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Source of Water						
Tap (base reference)						
Well	0.5332	4.2100	0.1266	0.0710	1.8829	2.0457
Borehole	0.3103	2.8540	0.1087	0.3850	1.7891	3.9122
Spring/Rivers	0.7662	0.3406	2.2450	**0.0030**	0.2616	4.1314
Washing of hands before feeding child						
No (Base reference)						
Yes	-0.7577	0.1751	-4.3272	**0.0322**	0.6436	2.9389
House Floor						
Cement (base reference)						
Mud	0.5239	0.2021	2.5922	**0.0196**	0.4751	2.1186
Child fecal matter disposal						
Latrine/toilet (base reference)						
In the open	0.1932	0.0910	2.1228	**0.0272**	0.3800	4.2246
Where do the household adults defecate						
Latrine/toilet (base reference)						
Open defecation	0.9875	0.1792	5.5104	**0.0046**	0.2045	3.1238
Do you practice handwashing after defecation						
No (Base reference)						
Yes	-0.4577	0.1788	-2.5597	**0.0413**	0.6755	1.1397
How often do you was hands after defection						
Always (base reference)	0.1918	3.2850	0.0584	0.0824	1.6396	1.8958
Most of the times	0.3740	2.9990	0.1247	0.0954	1.2045	1.7235
Sometimes	0.8448	0.6790	1.7196	0.0084	1.6222	2.8462
Rarely	0.3226	0.0920	3.5065	**0.0174**	0.6895	2.9264
What do you wash with						
Soap (base reference)						
Plain water	0.6456	3.8280	0.1686	0.0966	1.9193	4.5758
Ash	0.8476	1.7380	0.4877	0.0738	1.1236	1.9972
Where do you dispose of your domestic waste?						
Store and transfer to pit (base reference)						
In the compound	0.6184	0.0707	8.7461	**0.0244**	0.9469	4.0827
In the field	0.4496	0.2478	1.4078	0.0541	1.3477	4.2342
How do you manage waste water?						
In a drainage (base reference)						
Pour outside	0.5302	0.1465	3.6191	**0.0212**	0.3553	3.7794
_cons	0.5771	0.1943	2.9700	0.0393	0.5363	1.8221

Under source of water, the caregivers who relied on spring/rivers had 0.7662 more odds of diarrheal diseases among children under five as compared to those with those who used tap water. (P=0.0030<0.05). The caregivers who practiced washing of hands before feeding child had 0.7577

less odds of diarrheal diseases among children under five as compared to those who did not practice washing of hands before feeding child (P=0.0322<0.05). The family that lived in a house with mud floor had 0.5239 more odds of diarrheal diseases among children under five as compared to those who lived in a house with cement floor (P=0.0322<0.05).

In addition, the family household that disposed child fecal matter in the open had 0.1932 more odds of diarrheal diseases among children under five as compared to those who disposed in a latrine (P=0.0272<0.05). The family that whose household adults defecated in the open had 0.9875 more odds of diarrheal diseases among children under five as compared to those who disposed in a latrine (P=0.046<0.05). The family whose household practice handwashing after defecation had 0.4577 less odds of diarrheal diseases among children under five as compared to those who did not practice handwashing after defecation (P=0.0413<0.05).

Further, the family whose household rarely washed their hands after defection had 0.3226 more odds of diarrheal diseases among children under five as compared to those who always washed their after defecation (P=0.0174<0.05). The family whose household disposed domestic waste in the compound had 0.6184 more odds of diarrheal diseases among children under five as compared to those who stored and transferred to pit (P=0.0174<0.05). Lastly, the family whose household managed waste water by pouring outside in the compound had 0.5302 more odds of diarrheal diseases among children under five as compared to those who used a drainage (P=0.0212<0.05).

The health officers confirmed several common hygiene practices that contribute to the spread of diarrheal diseases among children under five in Kajiado County. These practices range from inadequate personal hygiene to poor sanitation and food safety measures. As one health officer noted,

> "Some of the most common hygiene practices that contribute to the spread of diarrheal diseases among children under five in Kajiado County include inadequate handwashing, especially after using the toilet or changing diapers, and before preparing or eating food. Additionally, improper storage and handling of drinking water, such as using unsanitary containers or failing to treat water from unsafe sources, can also lead to the transmission of diarrheal diseases." (Health officer (HO5).

Another health officer highlighted more severe hygiene issues, stating,

> "We have observed several hygiene practices that significantly contribute to the spread of diarrheal diseases among children under five in Kajiado County. Open defecation is still a common practice in some areas, which can contaminate water sources and living environments. Moreover, many households lack proper sanitation facilities, such as latrines or toilets, making it difficult to maintain good hygiene. Poor food hygiene practices, such as inadequate cooking temperatures or storing food in unsanitary conditions, also play a role in the transmission of diarrheal diseases." (Health officer (HO6).

When asked about the effectiveness of hygiene promotion interventions in reducing the incidence of diarrheal diseases among children under five in Kajiado County, health officers reported moderate success, while others pointed out limitations and challenges. One health officer stated,

> "Hygiene promotion interventions have been moderately effective in reducing the incidence of diarrheal diseases among children under five in Kajiado County. We have seen some improvements in handwashing practices and water treatment methods following educational campaigns and the provision of resources like soap and water treatment kits. However, there is still a need for more comprehensive and sustained interventions to address the various factors contributing to the spread of diarrheal diseases." (Health officer (HO7).

Another health officer highlighted the limitations of current interventions, saying,

> "While hygiene promotion interventions have been implemented in Kajiado County, their effectiveness in reducing the incidence of diarrheal diseases among children under five has been limited. Many of these interventions have been sporadic and short-lived, failing to create lasting behavior change. Additionally, the lack of infrastructure, such as reliable water sources and sanitation facilities, makes it challenging for families to maintain good hygiene practices, even when they are aware of their importance. Addressing these structural barriers is crucial for the success of hygiene promotion interventions." (Health officer (HO8).

4.3 Influence of Social Economic Factors on Diarrheal Diseases among Children under Five

The third objective of the study sought to determine the impact of socio-economic factors on the prevalence of diarrheal diseases among children under five years in Kajiado County. Utilizing logistic regression analysis, the research delved into various socio-economic determinants, including the age of the child, the size of the household, the monthly household income in Kenyan Shillings (Ksh), and the characteristics of the housing lived in. These factors were selected to provide insights into how economic and social conditions influence the health outcomes of young children in the area, particularly their susceptibility to diarrheal diseases. The results are as shown in Table 3.

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Table 3: Logistic results for Social Economic Factors on Diarrheal Diseases

Diarrheal Diseases among children under 5 years	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Age of the child						
Less than 6 months (base reference)						
7 months – 1year	0.8279	0.8338	0.9928	0.2128	1.2618	3.4285
2 – 3 years	0.0411	0.1235	0.3328	0.0760	4.3355	3.6782
4 – 5 years	-0.4986	0.1852	-2.6921	**0.0469**	0.3401	3.0983
Household Size						
1-2 (Base reference)						
3 to 5	0.0244	0.3981	0.0613	0.1962	4.0973	3.9770
5 to 7	0.9336	0.6445	1.4485	0.0528	2.8444	1.5709
Above 7	0.8307	0.2503	3.3188	**0.0069**	0.1132	4.2599
Household income a month in Ksh						
Less than 2,500 (base reference)						
2,500-5,000	0.9236	0.7490	1.2331	0.3299	2.8459	1.9030
5,001-10,000	0.4991	0.8231	0.6064	0.6262	1.0860	2.5812
10,001-20000	0.7371	0.4990	1.4772	0.6056	3.9406	2.3273
20001-30000	-0.6936	0.1420	-4.8835	**0.0269**	0.4336	3.9393
Above 30000	-0.7306	0.1404	-5.2038	**0.0368**	0.6172	4.7969
House lived						
Thatched (base reference)						
Semi-permanent	0.3970	0.4586	0.8657	0.3701	2.4212	2.0063
Permanent	-0.8993	0.1073	-8.3815	**0.0158**	0.1590	4.1247
_cons	0.7046	0.2210	3.1882	0.0132	0.4428	2.8841

Under age of the child, the children of 4 – 5 years had 0.4986 less odds of diarrheal diseases among children under five as compared to those with less than 6 months (P=0.0469<0.05). Households with a size of above 7 had 0.8307 more odds of diarrheal diseases among children under five as compared to those with size of 1-2 members (P=0.0069<0.05). Households with an income of Ksh 20,001-30,000 had 0.6936 less odds of diarrheal diseases among children under five as compared to those with less than Ksh 2,500 (P=0.0069<0.05). Lastly, households living in a permanent house had 0.8993 less odds of diarrheal diseases among children under five as compared to those who lived in thatched houses (P=0.0158<0.05).

Health officers in Kajiado County observed that socioeconomic factors significantly influence the occurrence of diarrheal diseases among children under five. These factors range from limited access to essential resources to poor living conditions and inadequate education. As one health officer explained,

> "Socioeconomic factors play a significant role in the occurrence of diarrheal diseases among children under five in Kajiado County. Families with lower income levels often struggle to access clean water, proper sanitation facilities, and adequate nutrition, which can increase the risk of diarrheal diseases. Additionally, lower levels of education may limit a family's knowledge about proper hygiene practices and the importance of seeking timely medical care for their children." (Health officer (HO9)).

Another health officer highlighted the severe impact of poverty on the occurrence of diarrheal diseases, stating,

> "In Kajiado County, socioeconomic factors have a profound influence on the occurrence of diarrheal diseases among children under five. Poverty is a major driver, as it limits access to essential resources like clean water, sanitation facilities, and healthcare services. Many families live in overcrowded conditions with poor ventilation, which can facilitate the spread of diarrheal pathogens. Moreover, the lack of financial resources often forces caregivers to make difficult choices between purchasing food, water, or medical care, leading to delayed treatment and increased risk of complications." (Health officer (HO10).

When asked about the most significant socioeconomic barriers preventing families in Kajiado County from accessing the necessary resources and healthcare services to prevent and treat diarrheal diseases in children under five, health officers identified several critical issues. One health officer pointed out the financial barriers, saying,

> "One of the most significant socioeconomic barriers that prevent families in Kajiado County from accessing the necessary resources and healthcare services is the cost. Many families cannot afford to purchase clean water, soap, or other hygiene products consistently. Transportation costs and fees for healthcare services can also be prohibitive, especially for those living in remote areas. Additionally, the time required to access healthcare facilities can be a barrier for caregivers who cannot afford to take time away from work or other responsibilities." (Health officer (HO1).

Another health officer elaborated on the multifaceted nature of the socioeconomic barriers, stating,

> "Families in Kajiado County face numerous socioeconomic barriers that prevent them from accessing the resources and healthcare services necessary to prevent and treat diarrheal diseases in children under five. Extreme poverty is the most significant barrier, as it limits access to clean water, sanitation facilities, and nutritious food. Many families also lack access to reliable transportation, which can make it difficult to reach healthcare facilities, particularly in emergency situations. Furthermore, the low levels of education and limited access to information about available services can prevent caregivers from seeking appropriate care for their children. These barriers are compounded by the inadequate infrastructure and understaffed healthcare facilities in many parts of the county." (Health officer (HO2).

5. Discussion of findings

The study's first objective focused on the influence of maternal knowledge in managing and preventing diarrheal diseases among children under five in Kajiado County. The findings revealed a significant relationship between maternal knowledge and the incidence of diarrheal diseases, with caregivers' education level, particularly those with polytechnic and university education, substantially reducing the odds of their children contracting diarrheal diseases. A deeper understanding of the causes of infections, preventative measures, and appropriate treatment options, such as the use of oral rehydration solutions (ORS), were associated with lower incidences of the disease. These findings align with studies by Yüksel Kaçan, Palloş, and Özkaya (2022), Ghasemi et al. (2017), Merga and Alemayehu (2015), Hamuganyu (2014), Guillaume (2020), Mwaniki and Kimiywe (2017), and Othero et al. (2018), which underscore the critical role of maternal education and knowledge in preventing and managing diarrheal diseases in young children.

The second objective's findings revealed that various hygiene practices significantly influence the incidence of diarrheal diseases among children under five in Kajiado County. The main water source, handwashing practices, house flooring, disposal methods for fecal matter and waste, and wastewater management were found to be crucial factors. The findings show evidence that basic hygiene practices and infrastructure play a critical role in preventing diarrheal diseases in young children, highlighting the need for integrated public health interventions focusing on improving water quality, sanitation, and promoting hygiene practices. These findings align with existing literature, including studies by Kamal et al. (2020), Oloruntoba et al. (2021), Mengistie et al. (2018), Sakala, Mbewe, and Baboo (2020), Kwasi et al. (2015), and Chipeta (2020), which emphasize the importance of safe water sources, proper sanitation, and good hygiene practices in reducing the prevalence of diarrheal diseases.

The third objective assessed the impact of socio-economic factors on the prevalence of diarrheal diseases among children under five years in Kajiado County. The study highlighted the influence of the child's age, household size, monthly income, and housing conditions on the likelihood of experiencing diarrheal diseases. Older children, smaller households, higher monthly income, and living in permanent houses were associated with a reduced risk of diarrheal diseases. These findings are consistent with the work of Fewtrell et al. (2005), Checkley et al. (2008), Ruel et al. (1997), VanDerslice and Briscoe (1995), Günther and Harttgen (2012), Spears et al. (2013), Esrey et al. (1991), and Cairncross et al. (2010), which highlight the importance of age, household size, economic well-being, and housing quality in determining children's susceptibility to diarrheal diseases. The findings suggest that addressing socio-economic disparities and improving living conditions could play a significant role in reducing the burden of diarrheal diseases among children under five in Kajiado County.

6. Conclusions

The study concludes that maternal knowledge plays a critical role in the management and prevention of diarrheal diseases among children under five in Kajiado County. Higher levels of education among caregivers, particularly at the polytechnic and university levels, are significantly associated with reduced odds of diarrheal diseases in children, underscoring the importance of maternal understanding of disease causes, prevention methods, and appropriate treatment options. This finding highlights the need for educational programs aimed at enhancing maternal knowledge to effectively reduce the incidence of diarrheal diseases in young children.

The study concludes that hygiene practices within households have a substantial impact on the occurrence of diarrheal diseases among children under five in Kajiado County. Key hygiene practices, such as the source of water, handwashing before feeding children, sanitation of living spaces, and proper disposal of waste, are crucial in mitigating the risk of these diseases. The significant associations found between specific hygiene practices and the reduced likelihood of diarrheal diseases emphasize the importance of promoting and implementing effective hygiene and sanitation interventions to safeguard the health of young children in the region.

The study concludes that socio-economic factors significantly influence the prevalence of diarrheal diseases among children under five in Kajiado County. Factors such as the age of the child, household size, monthly income, and housing conditions are pivotal in determining the risk of diarrheal diseases. The findings indicate that older children, smaller household sizes, higher household incomes, and better housing conditions are associated with lower odds of these diseases. These insights underscore the need for comprehensive strategies that address socio-economic disparities to improve child health outcomes and reduce the burden of diarrheal diseases in the community.

6.3 Recommendations

The study recommends that health education programs be tailored specifically for caregivers in Kajiado County, focusing on increasing awareness about the causes, prevention, and treatment of diarrheal diseases in children under five. These programs should particularly target caregivers with lower educational backgrounds, providing them with practical knowledge and skills to effectively manage and prevent diarrheal diseases. Collaborations with local schools, community centers, and healthcare facilities could facilitate workshops and training sessions, ensuring widespread dissemination of critical health information that can empower caregivers to adopt healthier practices for their children.

The study recommends the implementation of community-wide hygiene and sanitation initiatives in Kajiado County to improve hygiene practices within households. These initiatives should include the provision of clean water sources, promotion of regular handwashing with soap, improvement of waste disposal systems, and construction of adequate sanitation facilities. Local government and non-governmental organizations should work together to provide resources and infrastructure that support these hygiene improvements. Additionally, public health campaigns can be conducted to raise awareness about the importance of good hygiene practices in preventing diarrheal diseases, encouraging community participation and ownership of these health-promoting behaviors.

The study recommends that policies and programs aimed at improving the socio-economic conditions of families in Kajiado County be prioritized to reduce the prevalence of diarrheal diseases among children under five. Efforts should focus on enhancing household income through economic empowerment programs, improving living conditions by ensuring access to permanent and safe housing, and supporting family planning to manage household sizes. These interventions should be integrated with broader public health strategies, ensuring that families have the necessary resources and environment to protect their children from health risks associated with socio-economic disadvantages.

References

Agustina, R., Sari, T. P., Satroamidjojo, S., Bovee-Oudenhoven, I. M., Feskens, E. J., & Kok, F. J. (2018). Association of food-hygiene practices and diarrhea prevalence among Indonesian young children from low socioeconomic urban areas. *BMC public health*, 13(1), 1-12.

Cairncross, S., Hunt, C., Boisson, S., Bostoen, K., Curtis, V., Fung, I. C. H., & Schmidt, W. P. (2010). Water, sanitation and hygiene for the prevention of diarrhoea. *International Journal of Epidemiology*, *39*(Supplement 1), i193-i205

Checkley, W., Buckley, G., Gilman, R. H., Assis, A. M., Guerrant, R. L., Morris, S. S., ... & Black, R. E. (2008). Multi-country analysis of the effects of diarrhoea on childhood stunting. *International Journal of Epidemiology*, *37*(4), 816-830.

Croyle, R. T., Arora, N. K., Rimer, B. K., & Viswanath, K. (2005). Trust and sources of health information: the impact of the Internet and its implications for health care providers: findings from the first Health Information National Trends Survey. *Archives of internal medicine*, 165(22), 2618-2624.

Esrey, S. A., Potash, J. B., Roberts, L., & Shiff, C. (1991). Effects of improved water supply and sanitation on ascariasis, diarrhoea, dracunculiasis, hookworm infection, schistosomiasis, and trachoma. *Bulletin of the World Health Organization*, *69*(5), 609-621.

Fewtrell, L., Kaufmann, R. B., Kay, D., Enanoria, W., Haller, L., & Colford, J. M., Jr. (2005). Water, sanitation, and hygiene interventions to reduce diarrhoea in less developed countries: A systematic review and meta-analysis. *Lancet Infectious Diseases*, *5*(1), 42-52.

Oloruntoba, E. O., & Ayede, A. L. (2021). Water quality and risk of diarrheal infections among children under five in Ibadan, Nigeria. *African Journal of Biomedical Research*, 16(2), 67-77.

Ghasemi, A. A., Talebian, A., Masoudi Alavi, N., & Moosavi, G. A. (2017). Knowledge of mothers in management of diarrhea in under-five children, in kashan, Iran. *Nurse midwifery stud*, 1(3), and 158-62.

Guillaume, D. A., Justus, O. O., & Ephantus, K. W. (2020). Factors influencing diarrheal prevalence among children under five years in Mathare Informal Settlement, Nairobi, Kenya. *Journal of Public Health in Africa*, 11(1).

Günther, I., & Harttgen, K. (2012). Deadly cities? Spatial inequalities in mortality in sub-Saharan Africa. *Population and Development Review*, *38*(3), 469-486.

Hamuganyu, I. (2015). Correlates of diarrhea among the underfives in Namwala District, Zambia (Doctoral dissertation).

Kajiado County (2020), Health Services and Public Health. https://www.kajiado.go.ke/ministries/health-services/

Kamal, M. M., Hasan, M. M., & Davey, R. (2020). Determinants of childhood morbidity in Bangladesh: evidence from the demographic and health survey 2011. *BMJ open*, 5(10), e007538.

Karinja, M., Schlienger, R., Pillai, G. C., Esterhuizen, T., Onyango, E., Gitau, A., & Ogutu, B. (2020). Risk reduction of diarrhea and respiratory infections following a community health education program-a facility-based case-control study in rural parts of Kenya. *BMC public health*, 20(1), 1-9.

Kumwenda, S. (2020). Challenges to hygiene improvement in developing countries (Vol. 1, pp. 1-19). London, UK: IntechOpen.

Lambisia, A. W., Onchaga, S., Murunga, N., Lewa, C. S., Nyanjom, S. G., & Agoti, C. N. (2020). Epidemiological trends of five common diarrhea-associated enteric viruses' pre-and post-rotavirus vaccine introduction in Coastal Kenya. *Pathogens*, 9(8), 660.

Lyimo, B., Buza, J., Woutrina, S., Subbiah, M., & Call, D. (2016). Surface waters in northern Tanzania harbor fecal coliform and antibiotic resistant Salmonella spp. capable of horizontal gene transfer.

Mengistie, B., Berhane, Y., & Worku, A. (2018). Prevalence of diarrhea and associated risk factors among children under-five years of age in Eastern Ethiopia: A cross-sectional study. Open *Journal of Preventive Medicine*, 3(07), 446.

Merga, N., & Alemayehu, T. (2015). Knowledge, perception, and management skills of mothers with under-five children about diarrheal disease in indigenous and resettlement communities in Assosa District, Western Ethiopia. *Journal of health, population, and nutrition*, 33(1), 20.

Ministry of Health (2020). Retrieved from https://www.health.go.ke/

Mulatya, D. M., & Mutuku, F. W. (2020). Assessing comorbidity of diarrhea and acute respiratory infections in children under 5 years: evidence from Kenya's demographic health survey 2014. Journal of primary care & community health, 11, 2150132720925190.

Mwaniki, G. N., Kimiywe, J. O., Waudo, J. N., & Mbithe, D. (2017). Effects of nutrition education on nutrition knowledge and iron status in primary school pupils of Gatanga District, Muranga County, Kenya. *Current Research in Nutrition and Food Science Journal*, 1(2), 115-123.

Othero, D. M., Orago, A. S., Groenewegen, T., Kaseje, D. O., & Otengah, P. A. (2018). Home management of diarrhea among underfives in a rural community in Kenya: household perceptions and practices.

Recha, C. W., & Manetu, W. M. (2021). Diarrhea disease among children under 5 years of age: a global systematic review.

Rhee, C., Aol, G., Ouma, A., Audi, A., Muema, S., Auko, J., & Verani, J. R. (2020). Inappropriate use of antibiotics for childhood diarrhea case management—Kenya, 2009–2016. BMC Public Health, 19(3), 1-12.

Ruel, M. T., Habicht, J. P., Pinstrup-Andersen, P., & Gröhn, Y. (1997). The mediating effect of maternal nutrition knowledge on the association between maternal schooling and child nutritional status in Lesotho. *American Journal of Epidemiology*, *145*(10), 899-909.

Sakala, I., Mbewe, A. R., & Baboo, K. S. (20202014). Comparing incidences of diarrhea between WASHE-serviced and non--WASHE rural areas of Monze district from 2010 to 2018. *International Journal of Environmental Science and Toxicology Research*, 2(11), 229-235.

Spears, D., Ghosh, A., & Cumming, O. (2013). Open defecation and childhood stunting in India: An ecological analysis of new data from 112 districts. *PLoS ONE, 8*(9), e73784.

Storti, C., Callier, S., Fry, S., Kleinau, E., & McGahey, C. (2004). The hygiene improvement framework: a comprehensive approach for preventing childhood diarrhea. Environmental Health Project Joint Publication, 8.

Strunz, E. C., Addiss, D. G., Stocks, M. E., Ogden, S., Utzinger, J., & Freeman, M. C. (2014). Water, sanitation, hygiene, and soil-transmitted helminth infection: a systematic review and meta-analysis. *PLoS medicine*, 11(3), e1001620.

UNICEF (2021). Retrieved from https://www.unicef.org/wash

VanDerslice, J., & Briscoe, J. (1995). Environmental interventions in developing countries: Interactions and their implications. *American Journal of Epidemiology, 141*(2), 135-144.

Webale, M. K., Wanjala, C., Guyah, B., Shaviya, N., Munyekenye, G. O., Nyanga, P. L., & Kitungulu, N. (2020). Epidemiological patterns and antimicrobial resistance of bacterial diarrhea among children in Nairobi City, Kenya. Gastroenterology and Hepatology from Bed to Bench, 13(3), 238.

Weiss, R. S. (1995). Learning from strangers: The art and method of qualitative interview studies. Simon and Schuster.

WHO (2020). Guidelines for Drinking-Water Quality, Fourth Edition.

WHO/UNICEF (2020). Progress on household drinking water, sanitation and hygiene 2000-2017: Special focus on inequalities.

WHO/UNICEF (2020). Water, sanitation, and hygiene in health care facilities: Practical steps to achieve universal access for quality care.

WHO/UNICEF (2021). JMP Progress on household drinking water, sanitation and hygiene 2000 – 2020.

Yüksel Kaçan, C., Palloş, A., & Özkaya, G. (2022). Examining knowledge and traditional practices of mothers with children under five in Turkey on diarrhea according to education levels. *Annals of Medicine*, 54(1), 674-682.