FACTORS ASSOCIATED WITH DIARRHEAL DISEASES AMONG CHILDREN UNDER FIVE YEARS OF AGE IN MJINI UNGUJA, ZANZIBAR, 2024

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FACTORS ASSOCIATED WITH DIARRHEAL DISEASES AMONG CHILDREN UNDER FIVE YEARS OF AGE IN MJINI UNGUJA, ZANZIBAR, 2024

By

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A Dissertation Submitted in (Partial) Fulfillment of the Requirement for the Degree of Master of Science (Applied Epidemiology) of

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CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled; **‘‘Factors associated with diarrheal diseases among children under five years of age in Mjini Unguja, Zanzibar, 2024’’,** in |(partial) fulfillment of requirement for the degree of Master of Science (Applied Epidemiology) of Muhimbili University of Health and Allied Sciences.

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Dr. Candida Moshiro

(Supervisor)

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Date

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Dr. Azma Simba

Co- Supervisor

_____

Date

DECLARATION AND COPYRIGHT

I, **Rukia Mohamed Mashauri**, declare that this **dissertation** is my original work and that it has not been presented and will not be presented to any other University for a similar or any degree award.

Signature……. **Date**……..

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DEDICATION

This work is dedicated to my family, especially my father Mr Mohamed and my Mother Misses Zuwena who supported me and created a cozy setting for me to be able to accomplish it. Their contribution to my career has been exceptional and very much appreciated. As I move up the academic ladder, I wish them the very best and happiest of lives. May the Almighty God bless them for their patience during my absence during data collecting and field research.

ABSTRACT

Background: Diarrhea, characterized by passing three or more loose stools daily, is a major cause of child deaths, especially in developing countries, due to inadequate sanitation and unsafe water. WHO and UNICEF report that about 525,000 children under five years die each year from diarrheal diseases, often worsened by malnutrition and weak immune systems. Preventive strategies include better sanitation, access to clean water, and good hygiene practices. In Zanzibar, despite health interventions, diarrhea continues to be a leading cause of child illness and death, particularly during the rainy season.

Objective: To determine the factors associated with diarrhea among children below five years of age in Mjini Unguja, in May 2024

Methods: A cross-sectional household survey was conducted in 2024. Caregivers of children aged 6 to 59 months were selected using a multistage cluster sampling technique. Data was collected using a structured questionnaire focusing on demographics, household characteristics, hygiene practices, and health behaviors. Ethical considerations were maintained. Modified Poisson regression was fitted in the final statistical model.

Results: A total of 561 children with their caregivers were included. Most of the children were male (53.6%) and the majority of the caregivers were mothers (85.4%). Overall, 16.7% of the children experienced diarrhea within two weeks (95% CI 13.8%-20.1%). Improper disposal of feces increased the risk of diarrhea by 89% [Adjusted Prevalence Ratio (APR)= 1.89, (95% CI: 1.23-2.59)]. Those children cared for by the grandmother [APR= 0.37,(95% CI: 0.54-0.98)], children whose guardians performed moderate hand hygiene [APR= 0.22, (95% CI: 0.14-0.35)] and those who performed good hand hygiene [APR= 0.19, (95% CI: 0.09-0.37)] had less risk of developing diarrhea.

Conclusion and recommendations: Childhood diarrhea is a major health concern in Zanzibar. The occurrence of diarrhea is associated with improper waste disposal and poor hygienic practices. To combat this problem, the government should emphasize educating parents and guardians on good hygiene practices, and sanitation.

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LIST OF ABBREVIATIONS

CHV	Community health volunteers
MoHZ	Ministry of Health Zanzibar
ORS	Oral Rehydration Solution
PCG	Parent Caregiver or Guardian
UNICEF	United Nations Children's Fund
WASH	Water Sanitation and Hygiene
WHO	World Health Organization
ZACCEP	Zanzibar Comprehensive Cholera Elimination Plan
ZNHB	Zanzibar National Health Bulletin

DEFINITION OF TERMS

Diarrhea: defined as having three or more loose or watery stools in 24 hours in the household within the two weeks before the survey is administered, as reported by the mothers/caregivers of the child (1)

Mothers/caregivers: a person responsible for taking care of a child thus the person can be a relative of the child or a non-relative.

Shehia: The lowest level of the government's administrative structure in Zanzibar.

Food hygiene: is a set of food manufacturing practices that aim to minimize biological food hazards through safe and clean operations to protect people from foodborne diseases.

Personal hygiene: is the principle of keeping the external body clean and properly groomed.

Improved WASH: refers to better supplies of drinking water for households, better sanitation facilities, and practices for safely disposing of kid feces.

Safe disposal of stool: Putting a child's stool into a latrine or toilet, or rinsing the child in a toilet or latrine, or a situation where the child used a toilet or latrine

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Diarrhea is defined as the passage of three or more loose or liquid stools per day (or more frequent passage than is normal for the individual beyond what is typical for the person (2,3) Regularly passing formed feces is not diarrhea, and neither is a breastfed baby passing loose, "pasty" stools (2). Diarrhea is usually a symptom of an intestinal infection and can be caused by various bacteria, viruses, and parasites (4). Infection is spread from person to person through contaminated food and drinking water, or poor hygiene (5).

According to the World Health Organization and UNICEF in 2022, a staggering number of children in developing countries, and is the second leading killer of children under five 5 years, accounting for approximately 9 percent of all deaths among children under age 5 worldwide in 2021. This translates to over 1,200 young children dying each day, or about 444,000 children a year, despite the availability of a simple treatment solution (6). When diarrhea persists, the human body can endure days without the necessary salts and water it requires to survive. In the past, deaths caused by diarrhea were primarily due to acute dehydration and fluid loss (7). However, it is now evident that an increasing number of deaths related to this illness are being attributed to other factors, such as septic bacterial infections (8). Among all age groups, children, particularly those who are underweight or have weakened immune systems, are the most vulnerable to developing life-threatening diarrhea (2).

Children under the age of three in low-income countries typically experience five episodes of diarrhea annually (9). Each bout of diarrhea deprives them of essential nutrients needed for growth and development, contributing to malnutrition (2). Malnourished children are more vulnerable to contracting diarrheal diseases (7). Diarrheal disease is mostly caused by consuming contaminated food and water, making it a leading cause of death and illness among children globally (10). Approximately 2.5 billion people worldwide do not have proper

sanitation facilities, and 780 million people lack access to clean drinking water (11).In underdeveloped countries, infection-induced diarrhea is a common occurrence (11,12).

An estimated 1.4 million deaths per year are attributed to unsafe Water, Sanitation, and hygiene (WASH) (5). The majority of this load is due to diarrheal diseases, particularly cholera, which is increasing at an alarming rate and is mostly made worse by conflict and climate change (12). Rotavirus and Escherichia coli are the primary causes of severe diarrhea in low-income countries (8). Other pathogens like cryptosporidium and Shigella species could also play a role. It is important to consider the specific patterns of these pathogens in each location (13).Access to clean and uncontaminated drinking water, utilizing improved sanitation facilities, practicing regular hand washing with soap, adhering to exclusive breastfeeding for the initial six months, maintaining proper personal and food hygiene, receiving education on the prevention and transmission of infectious diseases, and ensuring rotavirus vaccination are all effective measures decrease the occurrence of diarrhea cases (14).

The Revolutionary Government of Zanzibar has been fighting cholera and diarrheal outbreaks since the 1990s, but most efforts have been reactive. Despite improvements in access to facilities, public health threats persist. The government is analyzing sustainable health financing strategies, including the Zanzibar Comprehensive Cholera Elimination Plan (ZACCEP), to eliminate outbreaks by 2027 (15). The multi-sector elimination plan (ZACCEP) aims to combat communicable diseases like cholera and diarrheal diseases, reducing morbidity, mortality, and economic losses through preparedness, early detection, and control measures.

1.2 Problem Statement

The prevalence of diarrhea is still very high throughout Africa (16). It is still the third most common cause of illness and mortality in children under the age of five. An estimated 30 million cases of severe diarrhea and 330,000 fatalities were attributed to diarrheal disease in Africa in 2015 (10). While there have been reductions in some areas, the burden remains notably high in regions with limited access to safe water and sanitation, such as parts of sub-Saharan Africa.

The prevalence of diarrhea in Tanzania in 2022 showed that 9% of children under age 5 had diarrhea in the 2 weeks before the survey (17). In Zanzibar, diarrhea (including dysentery and cholera) is also one of the leading causes that is it is ranked third among causes of child morbidity and fourth in mortality (Zanzibar National Health Bulletin 2017-2021) (15,18). From 2019 to 2021 there were a total of 169,711 cases (making 44.35 percent of all hospital admissions) and 4.5% of deaths in children less than 5 years (15,18)

There is significant variation in the prevalence of childhood diarrhea between different regions and places of residence. A higher prevalence of childhood diarrhea occurred in urban areas compared to rural areas (19). Other factors include lack of access to safe drinking water, use of unimproved sanitation, lack of hand washing with soap, unexclusive breastfeeding for the first six months, bad/good personal hygiene, food hygiene, lack of health education on the spread of infection and lack of rotavirus vaccination can increase diarrheal cases (5).

Zanzibar has been taking various steps to address diarrhea, including investing in case management, improving access to clean water and sanitation, researching new prevention strategies, training health workers, sanitation improvements, water treatment, and rotavirus immunization.

Despite these interventions being implemented, there is still a significant number of diarrheal cases being reported throughout the year mostly during rainy seasons, especially in the urban areas. It is unclear what are the factors driving the persistent high number of diarrhea cases. This information is useful for supporting the ZACCEP intervention programs and projects, and to

create information for measuring advancement towards its targets (15). Therefore, this study aims to determine the factors associated with diarrhea amongst children below five years of age in Mjini Unguja Zanzibar in 2024.

1.3 Conceptual framework

Figure 1 shows the conceptual framework for factors related to diarrheal disease. Several factors have been linked to diarrheal diseases in children under five.

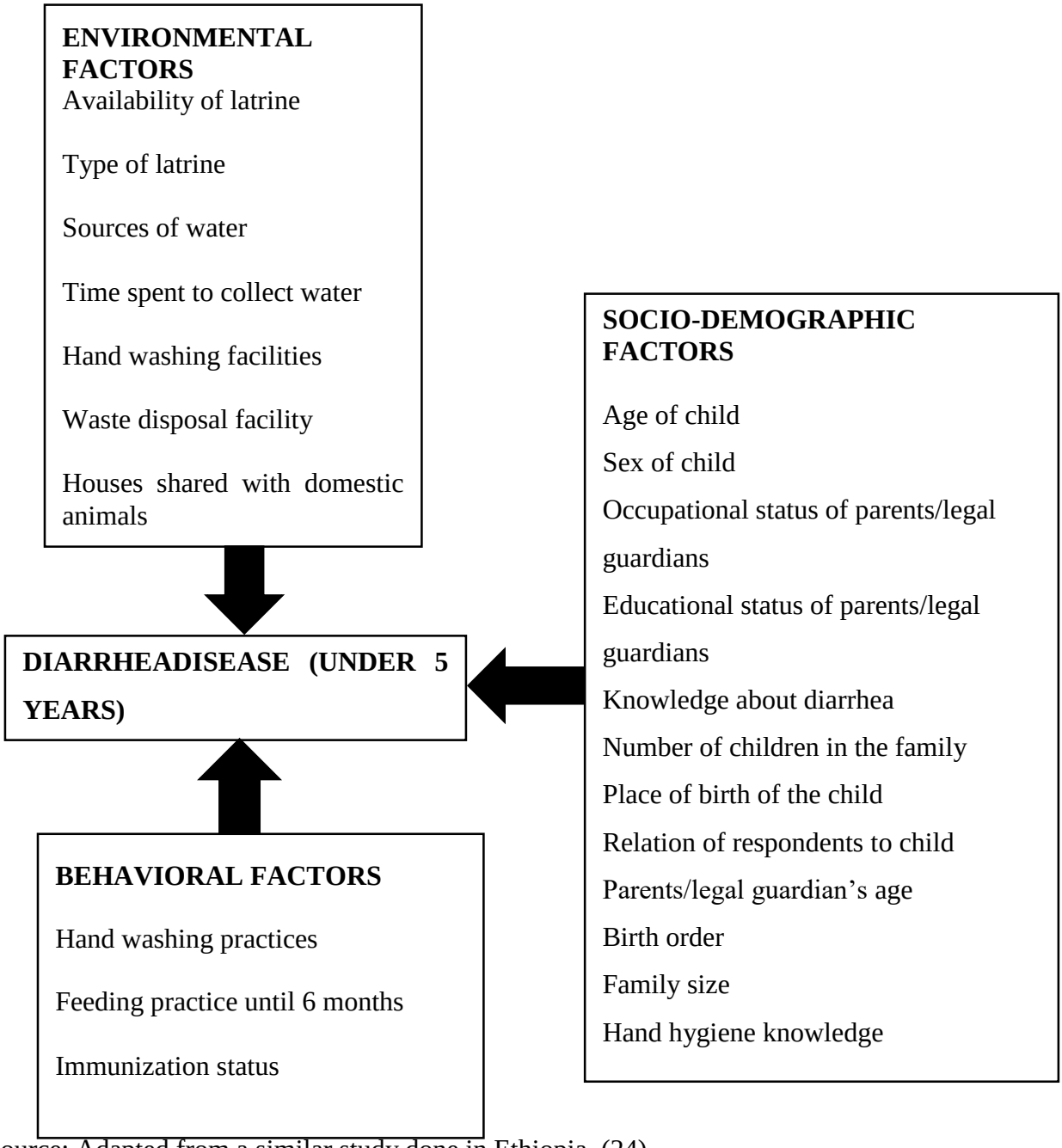
The dependent variable used in the study was diarrheal disease occurrence. The independent variables were the child's age, child's sex, child's birth order, mother's age, mother's education level, mother's occupation, Shehia of residence, type of toilet facility used by household members and type of water source used by household members (20). Studies also show there is a correlation between a child's age, the presence of more than one under-five children in the home, unimproved water sources, and the occurrence of feces near the pit hole/slab/floor of the latrine (21).

Features relating to parenting Mother's age, as well as her educational background and general practices of the guardian of the child. And living conditions, household income, can influence the risk of diarrhea in children (22). These variables can provide insight into the social determinants of health that impact diarrhea prevalence.

Regarding environmental factors, literature shows that how stools were disposed of, were important predictors of the occurrence of childhood diarrhea. Factors such as poor sanitation, inadequate hand-washing facilities, knowledge about diarrhea, lack of awareness about cases of diarrhea, and the absence of improved restrooms (23).

Child-related variables controlled as confounding variables including the child's age which might have a significant impact on the likelihood that they will experience diarrhea as infants and young children are typically more susceptible to diarrhea than older kids, gender, whether or not breastfeeding is going on, whether or not diarrhea or cholera vaccination was received

helps to reduce the likelihood and severity of diarrhea rotavirus and cholera, birth interval from one child and another (21).



Source: Adapted from a similar study done in Ethiopia (24).

Figure 1: Conceptual framework for factors associated with diarrhea among <5 childrendi

1.4 Rationale

Diarrhea is a significant health issue in low-income and middle-income countries, despite progress in management. Additional studies will improve understanding of causes and will enable more effective diagnosis and treatment, including immunization and breastfeeding practices. Diarrheal disease burden is underreported due to inadequate patient data, underrepresented in districts, and followed by reactive outbreak response. Results from the study can improve collaborations and management protocols in the country by highlighting or filling the knowledge gap on factors associated with diarrhea to raise awareness in the community about preventing and controlling diarrhea in children under five. This will be done through communicating the risks, engaging with the community, promoting behavioral changes, and educating on proper sanitation and hygiene practices (WASH) thus supporting ZACCEP. It will also provide suggestions on proper measures to control the disease.

1.5 Research questions

1.5.1 Broad research question

What are the factors associated with diarrhea among children under five in Mjini Unguja, during May 2024?

1.5.2 Specific research questions

1. What is the prevalence of diarrheal disease among children below five years of age in Mjini Unguja, in May 2024?
2. What are the social demographic factors associated with diarrheal disease in children below five years of age in Mjini Unguja, in May 2024?
3. What are the behavioral factors associated with diarrheal disease in children below five years of age in Mjini Unguja, in May 2024?
4. What are the environmental factors associated with diarrheal disease among children below five years of age in Mjini Unguja, in May 2024?

1.6 Objectives

1.6.1 Broad objective

To determine the factors associated with diarrhea among children below five years of age in Mjini Unguja, in May 2024.

1.6.2 Specific objectives

1. To determine the prevalence of diarrhea among children below five years of age in Mjini Unguja, in May 2024.
2. To determine the social demographic factors associated with diarrhea disease in children below five years of age in Mjini Unguja, in May 2024.
3. To determine behavioral factors associated with diarrhea disease in children below five years of age in Mjini Unguja, in May 2024.
4. To determine environmental factors associated with diarrhea disease in children below five years of age in Mjini Unguja, in May 2024.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Prevalence of diarrhea among children below five years of age

According to the study conducted in World System Review, 2% of diarrhea episodes result in serious illness. The findings point to a global case-fatality ratio from severe diarrhea of 20% (interquartile range: 14%–44%). 197 million people died from diseases in 2011, of which 71 million were related to diarrhea. While there are no significant regional differences in the incidence of diarrhea, low-income nations have much greater incidence and case-fatality ratios than middle- and high-income countries. The European region saw the lowest level and the African and Southeast Asian regions saw the highest level (2).

The regions of Southeast Asia and Africa had the highest percentages of severe episodes of diarrhea. Sub-Saharan Africa had the greatest rates of infant and child fatalities in 2011, accounting for 50% of all diarrhea-related deaths (2).

Fifty-three percent of all cases of diarrhea and fifty-six percent of severe episodes are attributed to 15 countries, including Afghanistan, Angola, Burkina Faso, China, the Democratic Republic of the Congo, Ethiopia, India, Indonesia, Kenya, Mali, Niger, Nigeria, Pakistan, Tanzania, and Uganda. These 15 nations accounted for seventy-four of the global burden of diarrhea mortality in children under the age of five in 2011. As a result, the countries with the largest load share a greater proportion of the global burden (2).

A study in Ethiopia also showed mothers stated that a total of 184 kids had diarrheal disease as a result. As a result, the prevalence of diarrhea over two weeks among the population was determined to be 26.1%. The report also evaluated the prevalence of diarrhea at the time of the survey and found that 81 kids had it at the time the data was collected. As a result, the point prevalence of diarrhea was 11.5% (16). Another study done in a similar context shows the prevalence of diarrheal disease among under-five children to be 18.6% (3). In Tanzania, however, a recent demographic health survey showed the prevalence of diarrhea to be 9% (17).

2.2 Social demographic factors associated with diarrhea in children below five years of age

Another study reviewed showed that almost all of the respondents were biological moms, were married, and were housewives. There were children under the age of five who had diarrheal disease overall, which was 22.1%, 7.7% of these were infants under the age of one are the ones who frequently contracted diarrheal diseases (25).

Another study showed that under the model's control, children under the age of five had a lower risk of diarrhea as their mother's age grew; children whose mothers were between the ages of 23 and 30 had a higher risk than those whose mothers were between the ages of 31 and 38 and 39 to 49. Although the final model did not statistically substantially link residence location to diarrhea in children under the age of five, it did show that the risk of diarrhea was higher in urban (reference category) than in rural settings. The research also discovered that the risk of diarrhea dropped as age increased, with the risk being highest at 6 to 11 months, followed by 12 to 23 months, and then 48 to 59 months (1).

The demographic and economic characteristics of a study population were also assessed in a similar study conducted in Ethiopia where accounted total of 634 households were included in a study with a response rate of 100%. Most caregivers were married, illiterate, and farmers by their occupational status. The mean age of the child was 2.26 (26).

Another study showed almost all respondents were biological mothers, married, and housewives 86%. The main risk factors for diarrhea were children less than or equal to one year, guardians, and children who did not breastfeed. In the research area, childhood diarrhea was still a major health concern. In comparison to children aged 48–59 months, children in the 6–11 month age group had diarrhea chances that were 7.35 times higher. The incidence of diarrhea in children under the age of five dropped as the mother's age rose, however, it was shown that the two wealthy income brackets richer, and richest had the highest risk (27). Another study where there were children under the age of five who had diarrheal illness overall, which was 22.1%. 7.7% of these were infants under the age of one who had frequently contracted diarrheal diseases (23).

Childhood diarrheal disease was statistically associated with the educational status of mothers/caretakers. The likelihood of diarrheal occurrence was higher among children whose mothers/guardians were unable to read compared with educational status of grade >12 and above (28). This may be because education is likely to enhance household health and sanitation practices. Education can increase awareness about the transmission and prevention methods of diarrhea. It also encourages changes in behavior at the household level.(20)

Also, studies have highlighted, the majority of childhood diarrheal disease causes might be avoided. In light of the significance of sanitation, personal and environmental cleanliness, and drinking water handling techniques, health extension workers should provide mothers or caregivers with individualized health information (30).

Overall Diarrhea is statistically linked to breastfeeding, mother/guardian education level, and child age less than or equal to one year. Several planning and executing techniques, including health education, child care, breastfeeding, and weaning practices, combined with the current national health extension, are extremely essential to reduce the severity of childhood diarrhea (23).

2.3 Environmental factors associated with diarrhea disease in children below five years of age

Worldwide specific water and sanitation risk factors, such as dirty hands and poor water quality, have been demonstrated to increase the risk of diarrhea morbidity and death; however, for some outcomes, such as improper excreta disposal, the lack of evidence only allows for imprecise risk estimations (4).

Another study showed that the majority of the homes had access to a better water source. The majority of homes had to travel 16–30 minutes to acquire water. And half of the individuals that were surveyed reported not consuming purified water. The majority of respondents have latrines in their homes, and most of them were functional during the survey. The majority of respondents used the latrine constantly. But feces were found in the compound of households and around the

holes of toilet facilities throughout the data collecting period. The majority of respondents lacked an appropriate mechanism for disposing of both liquid and solid waste (26).

The findings of the current analysis suggested a link between childhood diarrhea and drinking water sources. Compared to their peers who suffer diarrheal sickness, children whose households had obtained water from risky water sources had mortality rates that were many times higher. This community-based cross-sectional analysis also revealed a link between the condition of the sources used to get drinking water and childhood diarrhea. For instance, diarrheal disease is quite common if the water sources are shared with cattle (25)

Furthermore, the amount of water collected each day is statistically linked to childhood diarrheal disease. Chances of getting diarrhea compared to children whose families collected water above 15 L/C/d, were 1.5 times more likely to be greater among children whose families collected water below 15 L/C/d. The management of human excreta was linked to childhood diarrhea. The diarrheal disease was 2.3 times more likely to impact children whose households had no form of latrine than a diarrheal disease to affect children whose families had any type of latrine, the amount of water collected each day was statistically linked to childhood diarrheal illness (16).

Another study compared several households doing safe and unsafe stool disposal, households using unsafe kid stool disposal had a greater risk of diarrhea. The study also found a correlation between diarrhea and household wealth in the final model after correcting for other explanatory factors, as opposed to the lowest rates in the poorest income bracket, which has been used as the reference category, the highest risk was seen in the two rich income brackets, namely the richer and richest, followed by middle and lowest to the poorer (1).

Children whose caregivers had access to hand-washing facilities had a lower incidence of experiencing diarrhea than their peers. Children whose caregivers did not have access to latrines had two times the likelihood of developing diarrhea as those who did. There was a strong correlation between the presence of feces near the pit hole and the housing complex and

diarrheal illness. Children whose caregivers had a high sanitary risk of contamination of household storage had a five-fold higher risk of having diarrheal disease than those who had a low sanitary risk of contamination of household storage. Additionally, there was a strong statistically significant link between diarrhea disease and children who had a very high hygienic risk of contamination of domestic storage (23).

2.4 Behavioral factors associated with diarrhea disease in children below five years of age

Worldwide undernutrition, zinc deficiency, and not exclusively breastfeeding infants under 6 months old are only a few of the various causes of diarrhea. Although vitamin A deficiency is not a significant risk factor for the incidence of diarrhea or death, it does raise the risk of severe diarrhea and consequently diarrhea mortality (2).

Before preparing food, hand washing was also seen to be the most common practice in the research area, occurring times an average of 83% of the time, followed by using the restroom times and feeding the infant times, and in that sequence and earlier food consumption (67.4%). Additionally, above seventy percent of children under the age of five received measles vaccinations and supplements (took vitamin A was 475) (26).

Children with unsafe versus safe feces disposal had chances of diarrhea that were 1.25 times higher (27). After disposing of the child's waste, respondents did not wash their hands. Poverty was to blame for both the Parental, Caregiver, and Guardians (PCGs) whose children defecated in an open area and the PCGs who disposed of the child's waste in the garbage. In addition to the PCGs whose child defecated directly in a latrine, people who disposed of their child's waste in a toilet said they wanted to keep the environment clean (29).

A similar study conducted in Tanzania showed that although initial bivariate analysis showed a correlation between diarrhea and the number of children under five and the use of household sanitation facilities, these variables were no longer statistically significant in the final model Child stool disposal and diarrhea in children under the age of five were statistically related (1).

Likewise, another study conducted in Ethiopia showed the presence of two or more young siblings, living in a rural area, having an unimproved water source, not washing hands frequently enough, and using a deepening method to get water from water storage contained had significant association with the development of childhood diarrhea (30)

Studies overall showed the magnitude of acute under-five diarrhea over two weeks is comparatively high, and factors such as the number of under-five children living in the home, the cleanliness of the bathroom, the amount of time spent away from the water source, the use of home water purification systems, the presence of animals at the residence, the type of food consumed by the children, and hand washing before food preparation all significantly contributed to its occurrence.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study design

This was a cross-sectional household survey, conducted in Zanzibar in 2024.

3.2 Study Area

Two main islands, Unguja (population: 1,346,332) and Pemba (population: 543,451) make up Zanzibar, which is located 40 and 60 kilometers off the Tanzanian mainland. The majority of the government buildings, the major ports, and civil transportation are all located in Unguja. Zanzibar has one of the highest population densities in sub-Saharan Africa at 489 people/km2 (555 in Unguja and 387 in Pemba).

The study was conducted in the Mjini Magharibi Region where a large number of diarrhea under 5 years cases and deaths have been occurring in the region. Urban/West Region is a first-order administrative entity. It is 66 meters above sea level. As of 2010 Zanzibar Urban/West (Mjini Mgharibi) had nineteen constituencies (Jimbo) which are Amani, Bububu, Chumbuni, Dimani, Dole, Jang'ombe Constituency, Kiembesamaki, Kikwajuni, Kwahani, Kwamtipura, Magogoni, Magomeni, Mfenesini, Mji Mkongwe, Mpendae, Mtoni, Mwanakwerekwe and Rahaleo. From these Jimbos there are about 46 Wards and more than 120 Shehias.

The Ministry of Health tracks WASH indicators, which show that even though nearly every home has access to water services, problems with cleanliness and water quality still exist. 80% of households indeed have access to better water sources, 55% have access to on-site water sources, 24% have access to facilities for handwashing, and 14.7% have access to drinking water services that are carefully managed. About sanitation, just 60% of homes have basic sanitation, 69% utilize upgraded toilets, and 41% have an appropriate drainage system. Nonetheless, 17% of homes continue to share a toilet with five more households (31).

3.3 Study population

The study focused on children who are below the age of five years, involving interviews with their caregivers. These caregivers could be the child's father, mother, or any other relative who possesses enough knowledge about the child and the household.

3.3.1 Inclusion and exclusion criteria

Inclusion Criteria:

1. The age range for inclusion was 6-59 months.
2. A child who lived in, or was a permanent resident of Mjini Unguja only.
3. Children whose parents or guardians provided informed consent for participation in the study.

Exclusion Criteria:

1. Other Gastrointestinal Conditions or Chronic Illnesses: children who had underlying gastrointestinal disorders or conditions and children with chronic illnesses or conditions that could influence diarrhea.
2. Mothers, guardians, or caregivers of children under five years who were mentally ill, seriously ill, or who had speaking or hearing issues

3.4 Sample size and selection techniques

3.4.1 Sample Size

The formula provided below was utilized to determine the minimum sample size required. Epi info version 3.5.3 was used to calculate the sample size (23).

$N= DE*z*p*q/d^2$

Where: N= Sample size,

DE=Design effect=2

p= The prevalence of under-five diarrhea in Zanzibar is 6.9% (Demographic Health Survey 2022 (17),

z = Standard Normal deviate corresponding to 95% confidence level =1.96,

d=margin of error = 3 %.

Therefore, the minimum required number of children under 5 was =549.

3.4.2 Sampling technique

A multistage cluster sampling technique was used where sampling was done at the "Jimbo", "Ward", "Shehia", and household levels. In the first stage, 4 out of 19 "Jimbo" were randomly selected from which 4 Wards were selected (out of the 43 wards locally known as "wadi"). Out of these 4 wards, 4 "Shehias" were randomly selected. Then, each selected "Shehia", households were selected using the sampling technique of the 30*7 survey method by WHO for the determination of the households under-fives to be included in the study. The proportion of individuals recruited was almost the same in almost all selected Districts and Shehias whereby, from Chumbuni ward Chumbuni Shehia was selected, from Jangombe ward Kwaalinato Shehia was selected, from Kwahani ward Kwamtumajeni was selected, and from Magomeni ward Muungano Shehia was selected. From each Shehia, 140 participants were selected. In case there was more than one child below the age of five years in a household, all were selected to be included in the study.

3.5 Variables

3.5.1 Dependent Variable

In this study, diarrheal disease was the dependent variable, defined as experiencing at least three instances of loose, watery diarrhea per day over the previous two weeks.

3.5.2 Independent Variables

Independent variables included availability of a latrine, type of latrine, sources of water, time spent collecting water, hand washing facilities, waste disposal facilities, houses shared with domestic animals, age of the child, sex of the child, occupational status of parents/legal guardians, educational status of parents/legal guardians, number of children in the family, parents/legal guardian's response to the history of diarrhea, place of birth of a child, the relation of respondents to the child, parents/legal guardian's age, birth order, family size, hand washing practices, hand hygiene knowledge, feeding practice until 6 months and immunization status (24).

A new variable was created for waste disposal creating options one and two which were proper waste disposal and improper waste disposal. The options "Children used toilet/latrine and put/rinsed into toilet or latrine were combined and regarded as safe feces disposal practices (proper disposal) while the options "put/rinsed into drain or ditch, thrown into the garbage, buried, left in the open, other and don't know were considered as unsafe hence improper disposal.

As for hand hygiene knowledge the question please state all of the occasions when you should wash your hands; participants were given the options, before eating after eating, before praying, before breastfeeding or feeding a child, before cooking or preparing food, after defection/ urination, after cleaning a child that has defecated or changing a child's nappy, when my hands are dirty, after cleaning the toilet or potty, does not know and other (specify). All the responses were counted and scored based on the assumptions that those who scored 1 to 4, 5 to 8, and 9 > were considered as poor, moderate, and good knowledge respectively.

3.6 Data collection tool

A questionnaire was used to collect data. The questionnaire was adopted from the UNICEF/LSTM (32). This questionnaire was structured into six sections, the first section had guardians' characteristics such as age, marital status, education level, and economic status of the respondents. The second section delved into the child's characteristics including age sex while

the third section addressed the prevalence of diarrhea. The fourth, fifth and last section addressed hygiene and sanitation issues such as hand hygiene, toilet usage, source and treatment of drinking water, waste disposal of child feaces , and sanitation facilities. Additionally, information on the nutritional and immunization status of children was extracted from Maternal and Child Health cards which are color-coded to indicate the nutritional of children.

3.7 Data collection method

House-to-house visits were conducted with the help of assistant researchers (CHWs). Eligibile household members who consented were interviewed and the data was collected using the Kobo collect tool. The method for household selection was the WHO 30*7 method of household selection for surveys.

3.8 Validity and Reliability of the Research Instruments

A standardized questionnaire was adopted to ensure the validity and reliability of the data collection instrument. Tools for the measurement of diarrhea were developed by UNICEF (32). Also, there was a questionnaire pretest to make sure that the instrument produces consistent results when used again under the same circumstances. The instruments pre-test was done at Magharibi B Zanzibar. Following the pretest, the necessary adjustments were performed, and the actual data collection was done. There were instructions on how to use the tool and 8 CHWs were trained on how to conduct the interview maintaining the data's integrity, ethical issues, and other subjects. The acquired data was cleaned up and checked for errors every day.

3.9 Data Analysis

Kobo and later Excel were used to enter the data into the computer and exported to STATA version 15.1 for analysis of data. The socio-demographic characteristics were presented in a frequency table to present the results. Categorical variables were presented using numbers and percentages while quantitative variables were presented using means and standard deviation as appropriate. For the first specific objective, the prevalence of diarrhea was presented using numbers and percentages. For specific objectives 2 to 4, multivariable modified Poisson

regression adjusted for clustering (Shehia) was used. First, modified Poisson with a robust standard error was used to conduct bivariate analyses and to determine the relationships between diarrhea and each factor. The final multivariable modified Poisson regression models with a robust error included factors with p-values less than 0.2 in bivariable analysis (18). The age of thechild, sex, birth order, and family size were fitted in the final models as confounding variables (2). In the final model, a p-value lower than 0.05 was regarded as significant. Adjusted prevalence ratios (APRs) with 95% confidence intervals (CIs) and P-values were used to describe the associations (20).

3.10 Ethical issues

MUHAS Ethical Review Board gave ethical approval. After ethical approval, this proposal was sent to the Second Vice President's office of Zanzibar for a second approval. Also, the proposal was sent to Zanzibar Health Research Institution (ZAHRI), the Ministry of Health of Zanzibar, and Shehia leaders of the corresponding study areas for data collection permits.

The study required household caregivers/mothers to sign a written informed consent form after the study's goal was well explained. To ensure confidentiality the research participant’s names were not included in the data collection tool, instead, the tool was coded using the participant ID. Confidentiality was also preserved by ensuring the information collected remained only to the data collection team and was used only for the purpose intended by the study. All study participants were allowed to ask questions related to the study, and appropriate answers were given to their satisfaction. Study participants were free to withdraw or decline to participate in the study.

CHAPTER FOUR

4.0 RESULTS

4.1 Social demographic characteristics of study participants in Mjini Unguja Zanzibar.

A total of 561 children between 6 months to 59 months were studied. Out of the 561 participants, 85.3% were biological mothers, with a mean age of 33 years (SD of 9.8 years), 415 (73.9%) were married, and only 6.9% (39) had never attended school. According to the findings, 301 (53.6%) children in the research population were male, while the remaining 260 people (46.3%) were female. The study population's mean age was two years, with a standard deviation of 1.5 years. Additionally, only 6 (1.1%) children were malnourished as seen in (Table 1)

Table 1: Socio-demographic related characteristics of study participants in Mjini Unguja Zanzibar, May 2024 (N=561)

Characteristic	Frequency	Percentage
Child sex		
Female	260	46.4
Male	301	53.6
Child's age (months)		
1-11	54	9.6
12 – 36	195	34.8
≥37	311	55.5
Child's nutritional status		
Mal-nourished	6	1.1
Well-nourished	545	98.9
The education level of the caregiver		
None	39	6.9
Primary	85	15.2
Secondary and higher	437	77.8
Marital status of caregiver		
Divorced/separated	22	3.9
Married	423	75.4
Single	21	3.7
Widowed	95	16.9

Relationship to the child		
Mother	479	85.4
Grandmother	66	11.8
Sibling	16	2.9
Age of the caregiver (years)		
≤ 24	86	15.3
25 – 34	277	49.4
≥35	198	35.3
Occupation of caregiver		
Governmental employee	70	12.5
Housewife	345	61.5
Merchant	146	26.0
Family size (number of people)		
<5	231	41.2
5- 9	291	51.9
≥10	39	6.9
Number of children in the family		
1 – 3	346	61.6
4 – 6	125	22.2
>6	91	16.2
Birth order		
< 4	346	61.68
≥ 4	215	38.32
Hand hygiene knowledge		
Poo	23	4.1
Moderate	483	86.1
Good	55	9.8

4.2 Behavioral characteristics of study participants

More than 514 (91.6%) household caregivers reported breastfeeding children up to six months. 521 (92.8%) of the group's under-five children had already received the rotavirus vaccination (Table 2).

Table 2: Behavioral-related characteristics of study participants in Mjini Unguja Zanzibar, May 2024 (N=561)

Variable	Frequency	Percentage
Breast-feeding until 6 months		
No	47	8.4
Yes	514	91.6
Immunization status (rotavirus)		
Yes	521	92.9
No	40	7.1
Hand washing facility		
Yes	106	18.9
No	455	81.1

4.3 Environmental related characteristics of study participants in Mjini Unguja, Zanzibar.

About 138(24.6%) respondents traveled more than 5 minutes to the sources of water outside their households. Water was unavailable on the premises in 489 households (87.2%). Type of Water Treatment was also assessed where caregivers said they: let it stand still in 85 households (22.4%), 83 households said they boiled their water (21.8%), 283 households (74.4%) put bleach, and the rest said they did not know. Of the number of households observed 378 households (67.4%) had soap available in their hand washing facilities. A majority of caregivers 444 (83.2%) said they do not share a household with animals (Table 3).

Table 3: Environmental-related factors of diarrhea in Mjini Unguja Zanzibar, May 2024 (N=561)

Variable	Frequency	Percentage
Water availability		
On-premises	72	12.8
Not on premises	489	87.2
Water treatment practice		
No	181	32.3
Yes	380	67.7
Type of water treatment (n=380)*		
Let it stand still	85	22.4
Don't know	84	22.1
Boil	83	21.8
Put bleach	283	74.4
Soap availability		
Yes	378	67.4
No	183	32.6
Household sharing with animal		
Yes	117	16.8
No	444	83.2
Time spent collecting water (minutes)		
<5	423	75.4
≥ 5	138	24.6
Toilet facility		
Flash with pit latrine	208	37.1
Flash with septic tank	353	62.9

*Multiple responses

4.4 Reported prevalence of diarrhea in Mjini Unguja District

The findings indicated that around 94 (16.7%) caregivers (95% CI 13.8%-20.1%) stated their children had experienced diarrhea in the two weeks preceding data collection.

4.5 Socio-demographic factors associated with diarrhea in Mjini Unguja District

Diarrhea cases varied among Shehia. The prevalence of childhood diarrhea is lower in Kwaalinatu (10.8%) and Muungano (15.6%) compared to Chumbuni (17.8%), and Kwamtumwajeni (22.5%). However, the differences were not statistically significant (p-value= 0.07).

Results in Table 4 show that under-five males had a slightly higher prevalence (18.3%) than females (15.0%). That is, the male child had a 22% higher risk of having diarrhea [CPR: 1.22 (95% CI: 0.72 -2.06)], compared to females, but this difference is not statistically significant. Although not significant, the prevalence of childhood diarrhea was higher among children of 12 to 36 years (18.9%) and above 36 months (17.3%) compared to those of <12 months (5.6%). Hence there's a noticeable trend with higher diarrhea rates in older children.

The prevalence of diarrhea was lowest among children with guardians with secondary education and above. Children with guardians who finished primary school were 0.85 less likely to develop diarrhea, [CPR 0.85 (95% CI: 0.62-1.17)] whereas for secondary education and higher, they had 0.58 less likelihood of developing diarrhea compared to those who had no education at all [CPR: 0.58 (95% CI: 0.21-1.87)]. However, the results were not statistically significant.

Occupation status was also another factor assessed. Diarrhea prevalence was much higher in children whose guardians were merchants (20.6%) compared to government employees (17.1%) and housewives (15.1%). After controlling for other variables, children cared for by caregivers who were merchants had a 1.34 higher likelihood of developing diarrhea [APR: 1.34 (95% CI:1.05-1.72)] compared to those who were taken care of by guardians who were housewives.

Children whose guardians were siblings (28.6%) had a much higher prevalence compared to grandmothers (12.1%) and mothers (17.1%). After adjusting for other variables, those cared for by their grandmother had 0.37 times less likelihood of developing diarrhea compared to those who were taken care of by siblings [APR: 0.37 (95% CI: 0.21-0.63)].

After adjusting for other factors, children whose guardians had moderate hand hygiene knowledge had a 0.22 times less risk of developing diarrhea [APR: 0.22 (95% CI: 0.14-0.35)] compared to those who had poor hand hygiene knowledge. Those whose guardians had good hand hygiene knowledge had 0.19 times less risk of developing diarrhea [APR: 0.19 (95% CI: 0.09-0.37)], compared to those with poor hand hygiene knowledge. Both moderate and good hand hygiene knowledge are significantly linked with a lower risk of diarrhea.

Table 4: Socio-demographic Factors associated with diarrhea under five years of age at Mjini Unguja District, May 2024 (N=561)

Variable	Total	Diarrhea cases No. (%)	Crude prevalence ratio (CPR)	P-value	Adjusted prevalence ratio (APR)*	P-value
The education level of the guardian						
None	39	10(25.6)	1			
Primary	85	18(21.2)	0.83 (0.31-2.15)	0.69		
Secondary +	437	66(15.4)	0.58 (0.21-1.58)	0.29		
Marital status of the guardian						
Married	423	68(16.1)	0.85 (0.62-1.17)	0.33		
Single	21	4(19.1)	1.01 (0.43-2.35)	0.98		
Widowed	117	22(18.8)	1			
Occupation						
Government employee	70	12(17.1)	1.13(0.75 - 1.71)	0.54	1.13(0.72-1.77)	0.57
Housewife	345	52(15.1)	1			
Merchant	146	30(20.6)	1.36 (1.05-1.77)	**0.02**	1.34(1.05-1.72)	**0.01**
Guardians age (Years)						
≤ 24	86	14(16.3)	1			
25-34	277	45(16.3)	1.00 (0.84 -1.18)	0.98		
≥35	198	35(17.7)	1.09 (0.54-2.16)	0.82		
Relationship status						
Sibling	14	4(28.6)	1			
Mother	481	82(17.1)	0.59 (0.20-1.70)	0.33	0.61(0.20- 1.78)	0.36
Grandmother	66	8(12.1)	0.42 (0.22 -0.79)	<**0.008**	0.37(0.21- 0.63)	<**0.000**
Hand hygiene knowledge						
Poor	23	10 (43.5)	1			
Moderate	55	10 (18.2)	0.41 (0.19- 0.43)	<**0.0001**	0.22 (0.14 -0.35)	<**0.0001**
Good	483	74 (15.3)	0.35 (0.13 -0.44)	<**0.0001**	0.19(0.09- 0.37)	<**0.0001**

*Each variable adjusted for the age group of the child, gender, birth order, and family size

4.6 Environmental Factors associated with diarrhea under five Unguja Unguja District

Results from bivariable analysis show that children whose guardians spent collecting water greater than 5 Minutes had a 0.93 less likelihood of developing diarrhea [CPR: 0.93 (95% CI: 0.62-1.40)] compared to those who spent less than 5 minutes, indicating a slightly lower risk of getting diarrhea but not statistically significant.

Those children who are sharing a house with animals had a 1.30 more risk of developing diarrhea [CPR; 1.30 (95% CI: 0.87-1.93)], indicating a higher risk of diarrhea compared to those not sharing a house with animals. Children whose guardians treated their water were 0.84 less likely to develop diarrhea [CPR: 0.84 (95% CI: 0.41-1.71)]. While the crude prevalence ratio suggests that treating water is associated with a lower risk of diarrhea, this association is not statistically significant even after adjustment.

Children whose households had soap availability for hand washing were 0.79 less likely to develop diarrhea with an adjusted prevalence ratio (APR: 0.79, 95% CI: 0.60-1.05). This indicates that the presence of soap is associated with a 21% lower risk of diarrhea, suggesting that soap availability is a protective factor against diarrhea though not statistically significant.

After controlling for other variables, children whose guardians did improper disposal of feces had a 1.89 higher likelihood of developing diarrhea [APR: 1.89 (95% CI: 1.23-2.59)], indicating that proper waste disposal lowered the risk of diarrhea compared to improper disposal, the association was statistically significant.

Children whose guardians do water treatment had a 0.81 times less likelihood of developing diarrhea [APR 0.86: 95% (0.32- 2.31)] compared to those who do not. These crude associations show a protective effect but this effect is not significant.

No statistically significant association was found between diarrhea and waste disposal, hand wash water availability, time spent collecting water, water treatment, sharing a household with animals, and water availability, as seen in Table 5.

Table 5: Environmental Factors associated with diarrhea under five years of age at Mjini Unguja District, 2024 (N=561)

Variable	Total	Diarrhea cases No. (%)	Crude prevalence ratio (CPR)	P value	Adjusted prevalence ratio (APR)*	P value
Soap availability						
Yes	378	58(15.3)	0.77(0.58- 1.03)	**0.09**	0.79(0.60 -1.05)	0.10
No	183	36(19.6)	1			
Sharing a house with an animal						
Yes	117	24(20.5)	1.30(0.87- 1.93)	**0.19**	1.27(0.88- 1.84)	0.19
No	444	70(15.7)	1			
Water treatment						
Yes	380	60(15.7)	0.84(0.41- 1.71)	0.63		
No	181	34(18.7)	1			
Time spent collecting water						
<5 Minutes	423	72(17.0)	1			
≥5 minutes	138	22(15.9)	0.93 (0.62-1.40)	0.75		
Waste disposal (Feces)						
Improper disposal	334	23(24.7)	1.78(1.31- 2.03)	**<0.001**	1.89(1.23- 2.59)	**<0.003**
Proper disposal	89	71(15.1)	1			

* Each variable adjusted for the age group of the child, gender, birth order, and family size

4.7 Behavioral factors associated with diarrhea under five in Mjini Unguja, May 2024.

In **Table 6** surprisingly it has been demonstrated that compared to children who had a rotavirus vaccination, vaccinated under-five children had a higher risk of developing diarrhea. Unvaccinated children had a 0.14 times less risk of developing diarrhea [CPR;0.14 (95% CI: 0.01-1.38)], compared to vaccinated children. However, these results were not statistically significant.

Table 6: Behavioral Factors associated with diarrhea under five years of age at Mjini Unguja District, 2024 (N=561)

Variable	Total	Diarrhea cases No. (%)	Crude prevalence ratio (CPR)	P value	Adjusted prevalence ratio (APR)*	P value
Vaccination status						
Yes	521	93 (17.8)	1			
No	40	1 (2.5)	0.14 (0.01- 1.11)	**0.06**	0.14(0.01- 1.37)	0.09

*Adjusted for the age group of the child, gender, birth order, and family size

CHAPTER FIVE

5.0 DISCUSSION

The overall objective of the study was to assess the factors associated with diarrhea among children under five in Mjini Unguja. The prevalence of diarrhea was found to be higher than the national level. For social demographic factors, occupation and relationship to the child were statistically significant other variables such as gender, age, education level, marital status guardian's age, and birth order show trends but do not reach statistical significance. For environmental factors, however, waste disposal stands out as a variable that showed significant association but variables such as sharing a house with animals, water availability, time spent collecting water, hand-washing, and water availability, show trends but do not reach statistical significance. As for behavioral factors, the findings underline the significance of proper hand-washing hygiene knowledge in reducing the prevalence of diarrhea among children however vaccination status was not statistically significant.

5.1 Prevalence of diarrhea in children under five years of age in Mjini Unguja Zanzibar

The prevalence of reported diarrhea in children under five was found to be 16.7% which is much higher than the 9.5% for Tanzania and 6.5% for Zanzibar as reported in the Tanzania Demographic Health Survey (17). The current findings however are in agreement with research done in Debre Berhan town in Ethiopia where the prevalence was 16.4% (69/351) (28). The present discovery, however, was less prevalent in the Gaza Strip which was 9.9%, and the prevalence was 25.5 % which is higher in the Hadaleala district, Ethiopia respectively (16,33). That might be due to sociocultural disparities, different study designs, and a lack of awareness regarding the importance of hand washing during crucial moments. The findings might also be because of seasonal variations of diarrhea disease in general where data was collected in May which is characterized by rainy seasons in Zanzibar that come with a large number of cases of diarrhea-like illness (34).

5.2 Socio-demographic factors associated with diarrhea under five years of age in Mjini Unguja Zanzibar

Compared to children whose guardians are housewives, children whose guardians are merchants were at a higher risk of experiencing diarrhea. These findings were consistent with research done in Ethiopia however these findings are different from a study conducted in under-five children in Benishangul Gumuz Regional State, North West Ethiopia (5,22) however this is different from under-five children in Welkite Town (21). The occurrence of diarrhea may rise as a result of guardians especially mothers not being home most of the time, leading to children being introduced to foods that increase the possibility of consuming food that is contaminated paired with the loss of inborn immunity. The child's introduction to supplemental feedings may increase their exposure to contaminated foods and water.

The risks of diarrhea were much greater in children with grandmothers (older caregivers) than in those with siblings as caregivers (younger caregivers). This result is expected because earlier research had linked younger moms/caregivers to greater risks of diarrhea than older mothers/caregivers (1). This could be because older caregivers such as grandmothers often have more childcare experience than their younger counterparts, which lowers the prevalence of diarrhea in children. However, the majority of moms were not in their adolescent years, which might account for our findings. This result differs from the study conducted in a similar setting in Tanzania and Laelay-Maychew district, Tigray region, Ethiopia (5,27).

The study's findings on hand hygiene knowledge align with other research, which discovered that children whose moms neglected to wash their hands during crucial periods had increased chances of developing diarrhea (35). The result is consistent with previous research that revealed diarrhea risk was higher among respondents who knew less about hand hygiene practices (36). The most economical way to lessen the risk of diarrhea in children under five is to wash your hands with soap and water. When this is done with water and soap after using the restroom or washing a kid, before touching or consuming food, and before feeding a child, it works best.

Though not statistically significant, it is not surprising that children whose mothers or caregivers are illiterate have a higher risk of developing diarrheal disease than children whose moms or caregivers have completed secondary school or above. These results are similar with research conducted in Tanzania (27) and Laelay-Maychew District, Ethiopia (25). According to the literature the higher the education level the mom/guardian has the greater the likelihood of preventing their child from having diarrhea than less-educated mothers. This is most likely because education provides crucial knowledge on environmental and personal cleanliness and hygienic feeding techniques. Mothers' educational level and awareness may facilitate their access to healthcare information and raise their understanding of the prevention and management of diarrhea.

5.3 Behavioral factors associated with diarrhea under five years of age in Mjini Unguja Zanzibar

Another unusual finding was that compared to children who had the rotavirus vaccine, those who were not vaccinated were less likely to develop diarrhea compared to those who were vaccinated. Although these findings were not statistically significant, they are similar to a study done in Ethiopia which showed that the vaccine was not a protective factor against the development of diarrhea (26). The current findings are different from research conducted in Jimma Geneti District, Oromia region, Ethiopia, and Debre in Ethiopia (9,28). The possible reason for this could be that vaccination has biological protection against rotavirus and its infection however without having proper WASH the vaccine alone would not be effective.

5.4 Environmental factors associated with diarrhea under five years of age

Children living in households with soap for hand washing were less likely to experience diarrhea than their counterparts. This is while improper hand washing by mothers was associated with less likelihood/risk when compared to those who practiced proper hand washing. This outcome was consistent with research conducted in Simada Woreda, South Gondar Zone, Northwest Ethiopia, 2021 (37). This suggests that without addressing broader determinants of health, the effectiveness of hygiene behaviors alone may be limited (38). All of these results point to the

importance of hygiene practices but also show that other related factors like education, access to sanitary facilities, and environmental factors can have a substantial impact on how effective these practices are at reducing diarrhea in children under five.

Despite water treatment being known as a significant factor in reducing diarrhea, this study found no link between improved drinking water and sanitation in households and the occurrence of diarrhea. Scholars provide mixed results on whether enhanced water and sanitation reduce diarrhea. Some studies identified a connection between diarrhea and the type of drinking water source, while others did not (27,39). Furthermore, other literature indicates that treated drinking water might not always be microbiologically clean and can potentially be contaminated with fecal germs during collection, transportation, and storage in homes (27).

Proper waste disposal and the management of human excreta have been connected to diarrheal disease in children. In this research, the diarrheal risk was almost twice as high in children whose homes used improper means of human excreta management than in those whose families used proper waste management (16,26). This might be because human excreta includes millions of harmful microbes that cause illnesses. Unmanaged human waste contaminates the home and puts kids at risk of contracting diseases from harmful microbes as they crawl, walk, and play. In addition, improperly handled human waste can contaminate food and drink supplies, foster the growth of vectors that transmit diarrhea across the community, and contaminate drinking water sources.

5.5 Study limitations and mitigation

Here are some common limitations associated with this study:

1. Recall Bias: Diarrhea data collection can be affected by recall bias, leading to underestimation or overestimation of prevalence. To mitigate this, the standard 2-week recall period was used.

2. Seasonal Variation: Seasonal variations in diarrhea prevalence may affect the generalizability of findings, as some pathogens are more prevalent during specific seasons. This is addressed as a shortcoming of this study.
3. Being a cross-sectional study it is not possible to establish temporal relationships among the independent variables and the dependent variable.

5.6 Conclusion

The prevalence of childhood diarrhea is high. According to this study, childhood diarrhea is still a significant health issue in the targeted area, and children above the age of one year had the greatest prevalence of diarrheal disease. The occurrence of diarrhea was linked to the mother/guardian's occupation status and hygienic practices.

5.7 Recommendations

1. The Ministry of Health through the Health Promotion Unit (HPU) in Zanzibar should emphasize parental care and proper hygiene practices and educate the community on diarrhea preventive and control measures such as hand hygiene.
2. Caregivers in households should be educated on proper sanitation and hygiene practices and continue promoting water treatment practices such as boiling or using water purification tablets. Education on proper water treatment methods should be enhanced to ensure effectiveness.
3. Various developing and executing techniques, such as health education, child care, and good hygienic practices, combined with the current follow-up in ZACCEP action plans are highly important to limit the amount of childhood diarrhea.
4. While water availability in this study may not directly affect diarrhea prevalence, it is still essential for overall hygiene and health. Efforts should continue to ensure all households have reliable access to water.

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APPENDICES

Appendix I: Research Informed Consent (English)

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

WRITTEN INFORMED CONSENT

TITTLE: FACTORS ASSOCIATED WITH DIARRHEAL DISEASES AMONG CHILDREN UNDER FIVE YEARS OF AGE IN MJINI UNGUJA

NAME OF INVESTIGATOR: RUKIA MOHAMED MASHAURI

FUNDER: MINISTRY OF HEALTH ZANZIBAR

ADDRESS: MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

P.O BOX 65001,

DAR-ES SALAAM.

Identification number: _____

The Investigator

Greeting. The proposed study will be conducted by RUKIA MOHAMED MASHAURI, a student of Masters of Science in Applied Epidemiology at Muhimbili University of Health and Allied Sciences (MUHAS)

Purpose of study

This study aims to understand the risk factors for diarrhea under five cases in Mjini Unguja. We invite you to participate in this study because you are a parent/caregiver of an under five child.

Who will be in the study

All children under five years of age who live in Mjini Unguja within the selected Shehias will be eligible to participate in the study.

What participation involves

The caregiver or guardian will be interviewed about the history of diarrhea of the child, include some of the other questions. Observation will also be done on the surrounding environment of the household.

Benefits of the study

The results from this study will help to raise awareness of diarrhea among children. The study will also identify the possible factors associated with diarrhea among under-five children and provide recommendations for addressing them. Your participation will help the Zanzibar Ministry of Health achieve the goals they set for reducing cases of diarrhea in children under 5 years of age in the Urban District.

Potential risks of the study

Through your participation in the study, we do not expect any harm or risk to face you or your child directly or indirectly. The investigators will only take a few minutes of your time to ask you questions.

Freedom to participate in the study

Your participation in this study is voluntary. You can choose not to participate in this study and refusal will not involve any penalty or loss of any benefits.

Payment to participate in the study

No payment will be provided to any participant in the study.

Confidentiality

No names will be included during the study and Identification numbers will be used. All individual information will remain confidential within the data collection team and will not be used outside this study. Any information you provide will only be assessed by the primary investigator and somebody authorized.

In case of any questions

At this time, do you want to ask me anything about the survey?

If you have questions about the study or you want further information you should feel free to contact Rukia Mohamed Mashauri, the principal investigator, MUHAS, P.O. Box 911, Zanzibar. Tel: +255-778414570

If you ever have questions about your rights as a participant, you may call Dr. Nahya Masoud who is the chairman of MUHAS Senate Research and Publications Committee, P. O. Box 65001. Tel: 2150302 or the chairman of the National Health Research Ethics Committee (NatHREC), P.O. Box 9653, Dar es Salaam, Tanzania. Tel.: +255 22 2121400 Mobile: +255 758 587885Hotline: +255 22 2130770 or Email: ethics@nimr.or.tz.

Informed consent for participants.

I have read the information regarding the proposed study with the title above. Have also understood the aim of this study, was able to ask questions and I'm satisfied and willing to participate in this study.

Participant's Signature/ Thumb signature ……..

Date ……..

Interviewer's Name …… Signature …… Date……

We sincerely appreciate you taking the time to complete this survey.

Appendix II: Research Informed Consent (Kiswahili)

CHUO KIKUU CHA TAIFA MUHIMBILI
FOMU YA IDHINI YA USHIRIKI UTAFITI

SABABU ZINAZOHUSIANA NA MAGONJWA YA KUHARA MIONGONI MWA WATOTO CHINI YA UMRI WA MIAKA MITANO MJINI UNGUJA

JINA LA MTAFITI: RUKIA MOHAMED MASHAURI
MFADHILI: WIZARA YA AFYA ZANZIBAR
ANUANI: CHUO KIKUU CHA TAIFA MUHIMBILI
S.L.P: 65001,

DAR-ES-SALAAM.

Nambari ya kitambulisho: _____

Mtafiti

Habari. Utafiti huu uliopendekezwa utafanywa na RUKIA MOHAMED MASHAURI, mwanafunzi wa Shahada ya Uzamili ya Sayansi ya Epidemiolojia Katika Chuo Kikuu Cha Afya na Sayansi Shirikishi Muhimbili (MUHAS)

Kusudi la utafiti

Utafiti huu unalenga kuelewa sababu za hatari zizochochea kuhara kwa watoto chini ya miaka mitano katika eneo la Mjini Unguja. Tunakualika kushiriki katika utafiti huu kwa sababu wewe ni mzazi/mlezi wa mtoto chini ya miaka mitano.

Nani atakuwa katika utafiti

Watoto wote walio chini ya umri wa miaka mitano wanaoishi Mjini Unguja ndani ya Shehia zilizochaguliwa watastahiki kushiriki katika utafiti huo.

Utafiti utahusisha nini

Mzazi au mlezi atahojiwa kuhusu historia ya kuhara kwa mtoto, pamoja na baadhi ya maswali mengine. Uchunguzi pia utafanywa juu ya mazingira ya karibu ya kaya.

Faida za utafiti

Matokeo kutokana na utafiti huu yatasaidia kuongeza ufahamu juu ya kuhara kwa watoto. Utafiti huu pia utagundua sababu zinazowezekana kuhusiana na kuhara kati ya watoto chini ya miaka mitano na kutoa mapendekezo ya kushughulikia. Ushiriki wako utasaidia Wizara Ya Afya Zanzibar kufikia malengo waliyoweka ya kupunguza kesi za kuhara kwa watoto chini ya umri wa miaka 5 katika Wilaya Ya Mjini.

Madhara ya utafiti

Kupitia ushiriki wako katika utafiti, hatutarajii madhara au hatari yoyote kukukabili wewe au mtoto wako moja kwa moja au kwa njia isiyo ya moja kwa moja. Wachunguzi watachukua dakika chache tu za wakati wako kukuuliza maswali.

Uhuru wa kushiriki katika utafiti

Ushiriki wako katika utafiti huu ni wa hiari. Unaweza kuchagua kutoshiriki katika utafiti huu na kukataa hakutahusisha adhabu yoyote au kupoteza faida yoyote.

Malipo ya kushiriki katika utafiti

Hakuna malipo yatakayotolewa kwa mshiriki yoyote katika utafiti.

Usiri

Hakuna majina yatakayojumuishwa wakati wa utafiti na nambari za Kitambulisho zitatumika. Taarifa zote za kibinafsi zitabaki siri ndani ya timu ya ukusanyaji wa taarifa na hazitatumika nje

ya utafiti huu. Habari yoyote unayotoa itatathminiwa tu na mpelelezi wa msingi au mtu aliyeidhinishwa.

Kwa maswali yoyote

Kwa wakati huu, unataka kuniuliza chochote kuhusu utafiti?

Ikiwa una maswali juu ya utafiti au unataka habari zaidi unapaswa kujisikia huru kuwasiliana Na Rukia Mohamed Mashauri, mtafiti mkuu, MUHAS, P. O. Box 911, Zanzibar. Simu: +255-778414570

Ikiwa umewahi kuwa na maswali kuhusu haki zako kama mshiriki, unaweza kumwita Dk Nahya Masoud ambaye ni mwenyekiti wa Kamati Ya Utafiti Na Machapisho Ya Seneti Ya MUHAS**, P. O. Box 65001. Tel: 2150302** au mwenyekiti wa Kamati Ya Kitaifa Ya Maadili Ya Utafiti Wa Afya (NatHREC), **P. O. Box 9653**, Dar Es Salaam, Tanzania. Simu.: +255-222121400 Simu: **+255758587885** Hotline: **+255-222130770** au Barua pepe: **ethics@nimr.or.tz.**

Idhini ya habari kwa washiriki.

Nimesoma habari kuhusu utafiti uliopendekezwa na kichwa hapo juu. Pia wameelewa lengo la utafiti huu, alikuwa na uwezo wa kuuliza maswali na mimi nina kuridhika na tayari kushiriki katika utafiti huu.

Saini ya mshiriki/ saini Ya Kidole gumba.....

Tarehe.....

Jina la anaehoji..... Saini..... Tarehe……

Tunakushukuru kwa dhati kuchukua muda kukamilisha utafiti huu.

ASANTE

Appendix III: Research Questionnaire (English)

MUHIMBILI INSTITUTE OF HEALTH AND ALLIED SCIENCES

DIARRHEA UNDER FIVE SURVEY QUESTIONNAIRE

HOUSEHOLD SURVEY 2024 QUESTIONNAIRE FOR MOTHERS OF CHILDREN 0-59 MONTHS WITH DIARRHOEA IN THE LAST TWO WEEKS

IDENTIFICATION NUMBER OUT OF CHILD _____

HOUSEHOLD NUMBER_____

DISTRICT_____

SHEHIA_____

SYSTEM ID _____

INTERVIEWERS NAME: _____

DATE OF INTERVIEW DAY _____ MONTH _____ YEAR _____

CHECKED BY (SURVEY SUPERVISOR) _____

Record the time the interview BEGINS ___ ___: ___ ___ HOUR: MINUTE

QUESTIONNAIRE

Section 1: Mother's/Caregiver's Background

1. In what month and year were you born?

DATE. (day/month/year)...../...../.....

2. How old are you? (AGE IN COMPLETED YEARS) …….
3. Have you ever attended school?

□ YES

□ NO

4. What is the highest level of school you attended?

□ NONE

□ PRIMARY

□ SECONDARY

□ HIGHER EDUCATION LEVEL

5. What is your current marital status?

□ SINGLE

□ MARRIED

□ COHABITING

□ WIDOWED

□ DIVORCED/SEPARATED

6. What is your occupation?

□ GOVERNMENTAL EMPLOYEE

□ PRIVATE EMPLOYEE

□ HOUSEWIFE

□ MERCHANT

7. Relation of caregiver to child?

□ MOTHER

□ SIBLING

□ GRANDMOTHER

8. What is the family size? ……. Household members

Section 2: Child's Background

1. The selected child/ID: _____
2. What is the sex of the child?

□ MALE

□ FEMALE

3. In what month and year was the child born?
4. DATE. (day/month/year)...../...../.....
5. How old is the child?

……..…….

6. What is the childbirth order (Household members)?

……

7. How many children under five years of age are in the household?

……

8. Did the child breastfeed until 6 months?

□ Yes

□ No

Section 3: Diarrhea Case Management

1. Nutrition status (Observe MCH card)

□ MALNOURISHED

□ WELL-NOURISHED

2. Has the child had diarrhea in the last 2 weeks that is three or more loose or watery stools in a day?

□ YES

- NO
- DON'T KNOW

3. How many days ago did the diarrhea start?

…….

Section 4: Water Supply

1. What is the main source of drinking water for members of this household? (Circle only one response)

- PIPED WATER PIPED INTO DWELLING
- PIPED INTO COMPOUND, YARD, OR PLOT
- PIPED TO NEIGHBOR
- PUBLIC TAP / STANDPIPE
- TUBE WELL, BOREHOLE
- DUG WELL PROTECTED WELL
- UNPROTECTED WELL
- WATER FROM SPRING PROTECTED SPRING
- UNPROTECTED SPRING
- RAINWATER COLLECTION
- TANKER-TRUCK
- CART WITH SMALL TANK / DRUM
- SURFACE WATER (RIVER, STREAM, DAM, LAKE, POND, CANAL, IRRIGATION CHANNEL)
- BOTTLED WATER
- OTHER (SPECIFY)

2. Who usually goes to this source to fetch the water for your household? Probe: Is this person under age 15 years? What sex?

- ADULT WOMAN

- ADULT MAN
- FEMALE CHILD (UNDER 15 YEARS)
- MALE CHILD (UNDER 15 YEARS)

3. How long does it take to go there, get water, and come back?

- NUMBER OF MINUTES
- WATER ON PREMISES
- DON'T KNOW

4. Do you treat your water in any way to make it safer for drinking?
   - YES
   - NO
5. What do you usually do to the water to make drinking safer? (CIRCLE ALL RESPONSES MENTIONED)

- BOIL
- ADD BLEACH / CHLORINE
- STRAIN IT THROUGH A CLOTH
- USE WATER FILTER (CERAMIC, SAND, COMPOSITE, ETC.)
- SOLAR DISINFECTION
- LET IT STAND AND SETTLE
- OTHER (SPECIFY)
- DON'T KNOW

Section 5: Hand Washing.

1. Please state all of the occasions when you should wash your hands.

- BEFORE EATING
- AFTER EATING
- BEFORE PRAYING
- BEFORE BREASTFEEDING OR FEEDING A CHILD
- BEFORE COOKING OR PREPARING FOOD

- AFTER DEFECATION/URINATION
- AFTER CLEANING A CHILD THAT HAS DEFECATED OR CHANGING A CHILD'S NAPPY
- WHEN MY HANDS ARE DIRTY
- AFTER CLEANING THE TOILET OR POTTY
- DOES NOT KNOW
- OTHER (SPECIFY)

2. Is there a special place to wash your hands?

- YES
- NO

3. Can you show me where you usually wash your hands and what you use to wash your hands?

- WITHIN 10 PACES OF THE TOILET FACILITY
- WITHIN 10 PACES OF THE KITCHEN/COOKING PLACE
- ELSEWHERE IN HOME OR YARD
- OUTSIDE YARD
- NO SPECIFIC PLACE
- NOT GIVEN PERMISSION TO SEE

4. OBSERVE: Is there soap or detergent available?

- YES
- NO

5. OBSERVE: Is there water available?

- YES
- NO

Section 6: Waste disposal

1. What kind of toilet facility do yo use?
   - FLUSH TO PIPED SEWER SYSTEM

- FLUSH TO SEPTIC TANK
- FLUSH TO PIT (LATRINE)
- FLUSH TO SOMEWHERE ELSE
- FLUSH TO UNKNOWN PLACE / NOT SURE / VENTILATED IMPROVED PIT LATRINE (VIP)
- PIT LATRINE WITH SLAB
- PIT LATRINE WITHOUT SLAB / OPEN PIT
- NO FACILITY, BUSH, FIELD
- OTHER

2. The last time [name of youngest child] passed stools, what was done to dispose of the stools?

- CHILD USED TOILET/LATRINE
- PUT/RINSED INTO TOILET OR LATRINE
- PUT/RINSED INTO DRAIN OR DITCH
- THROWN INTO GARBAGE
- BURIED
- LEFT IN THE OPEN OTHER (SPECIFY)
- DON'T KNOW

3. Do you share your house with animals?

- YES
- NO

2 Record the time of the interview

ENDS ___ ___ : ___ ___ HOUR: MINUTE THANK YOU

Appendix IV: Research Questionnaire (Kiswahili)

CHUO **KIKUU CHA TAIFA MUHIMBILI**

FOMU YA UTAFITI

UCHUNGUZI WA KAYA 2024: DODOSO KWA MAMA WA WATOTO MIEZI 0-59 NA KUHARA KATIKA WIKI MBILI ZILIZOPITA

NAMBARI YA KITAMBULISHO _____

JINA LA MTOTO _____

NAMBARI YA KAYA _____

WILAYA_____

SHEHIA_____

KITAMBULISHO CHA MFUMO _____

MHOJIWA: _____

TAREHE YA SIKU YA MAHOJIANO _____ MWEZI _ _ _ _ _ MWAKA _____

KUCHUNGUZWA NA (MSIMAMIZI WA UTAFITI) _____

Rekodi wakati mahojiano

YANAANZA ___ ___: ___ ___ SAA: DAKIKA

DODOSO LA KUHARA

SEHEMU YA 1: HISTORIA YA MAMA

1. Ulizaliwa mwezi gani na mwaka gani?

- TAREHE.....
- MWEZI.....
- MWAKA.....

2. Una umri gani? (umri katika miaka kukamilika).....

3. Umewahi kwenda shule?

- NDIYO
- HAPANA

4. Je, ni kiwango gani cha juu zaidi cha shule ulichohudhuria?

- MSINGI WA MSINGI
- SEKONDARI
- KIWANGO CHA ELIMU YA JUU

5. Hali yako ya sasa ya ndoa ni ipi?

- SIJAOLEWA
- NIPO KWENYE NDOA
- KUISHI PAMOJA
- MJANE
- TALAKA/KUTENGWA

6. Kazi yako ni nini?

- MFANYAKAZI WA SERIKALI
- MFANYAKAZI BINAFSI
- MAMA WA NYUMBANI
- MFANYABIASHARA

7. Uhusiano wa mlezi na mtoto?

- MAMA
- NDUGU
- BIBI

8. Ukubwa wa familia ni nini (idadi ya watu)?

- CHINI YA AU SAWA NA NNE
- JUU YA TANO

SEHEMU YA 2: HISTORIA YA MTOTO

1. ID ya mtoto aliyechaguliwa : _____

2. Jinsia ya mtoto ni ipi?

- KIUME
- MWANAMKE

3. Ni mwezi gani na mwaka gani alizaliwa ?

- SIKU YA KUZALIWA.....
- MWEZI WA MWEZI.....

- MWAKA WA .....…

4. Mtoto ana umri gani?

…….

5. Mtoto ana umri gani?

……..…….

6. Ni mtoto wa ngapi kwenye familia?

…….

7. Je, ni watoto wangapi walio chini ya umri wa miaka mitano wapo katika kaya?

…….

8. Je mtoto alinyonya mpaka miezi sita

- NDIO
- HAPANA

SEHEMU YA 3: USIMAMIZI WA KESI YA KUHARA

1. Hali ya lishe (angalia kadi ya kliniki)

- ANA UTAPIAMLO
- HANA UTAPIAMLO

2. Je, mtoto amekuwa akiharisha katika wiki 2 zilizopita (ambazo ni vinyesi vitatu au zaidi vilivyo huru au vyenye maji kwa siku)?

- NDIYO

- HAPANA

3. Kuhara kulianza siku ngapi zilizopita?

…….

SEHEMU YA 4: UGAVI WA MAJI

1. Je, ni chanzo gani kikuu cha maji cha kunywa kwa wanafamilia hawa? (Duara jibu moja tu)
   - MAJI YA BOMBA (MFEREJI) YA BOMBA NDANI YA MAKAAZI
   - BOMBA (MFEREJI) KWENYE KIWANJA, YADI AU NJAMA
   - KWA JIRANI
   - BOMBA (MFEREJI) LA UMMA / BOMBA(MFEREJI) LA KUSIMAMA
   - BOMBA(MFEREJI) LA KISIMA
   - KUCHIMBA VIZURI NA KULINDWA VIZURI
   - KISIMA KISICHO NA KINGA
   - MAJI KUTOKA CHEMCHEM
   - CHEMCHEMI ISIYOLINDWA
   - MKUSANYIKO WA MAJI YA MVUA
   - GARI LA MAJI-LORI
   - GARI LA MARI NA TANK NDOGO / NGOMA
   - MAJI YA USO (MTO, MKONDO, BWAWA, ZIWA, BWAWA, MFEREJI MFEREJI WA UMWAGILIAJI)
   - MAJI YA CHUPA
   - NYINGINE (TAJA)
2. Ni nani kwa kawaida huenda kwenye chanzo hiki kuchota maji kwa ajili ya kaya yako? Uchunguzi: je, mtu huyu ana umri wa chini ya miaka 15? Jinsia gani?
   - MWANAMKE MTU MZIMA
   - MWANAMME MTU MZIMA

- MTOTO WA KIKE (CHINI YA MIAKA 15)
- MTOTO WA KIUME (CHINI YA MIAKA 15)

3. Inachukua muda gani kwenda huko, kupata maji, na kurudi?

- IDADI YA DAKIKA
- MAJI KWENYE MAJENGO
- SIJUI

4. Unatibu maji yako kwa njia yoyote ili kuyafanya yawe salama kwa kunywa?

- NDIYO
- HAPANA

5. Kawaida huyafanya nini maji ili yawe salama kunywa? (mzunguko majibu yote yaliyotajwa)

- KUCHEMSHA
- ONGEZA BLEACH / KLORINI
- CHUJA KUPITIA KITAMBAA
- TUMIA KICHUJIO CHA MAJI (KAURI, MCHANGA, MCHANGANYIKO, NK)
- DISINFECTION YA JJUS
- ACHA YASIMAME NA YATULIE
- NYINGINE (SPECIFY)
- SIJUI

SEHEMU YA 5: KUNAWA MIKONO.

1. Tafadhali sema muda wote unaopaswa kuosha mikono yako?

- KABLA YA KULA
- BAADA YA KULA
- KABLA YA KUOMBA
- KABLA YA KUNYONYESHA AU KULISHA MTOTO
- KABLA YA KUPIKA AU KUANDAA CHAKULA

- BAADA YA HAJA KUBWA/KUKOJOA
- BAADA YA KUSAFISHA MTOTO AMBAYE AMEJISAIDIA HAJA KUBWA AU KUBADILISHA NEPI YA MTOTO
- WAKATI MIKONO YANGU NI MICHAFU
- BAADA YA KUSAFISHA CHOO AU POTI LA MTOTO
- SIJUI
- NYINGINE (TAJA)

3. Je kuna sehemu maalum ya kunawia mikono?
   - NDIO
   - HAPANA

4. Unaweza kunionyesha mahali unapoosha mikono yako na kile unachotumia kunawia mikono?

- NDANI YA HATUA 10 ZA KITUO CHA CHOO
- NDANI YA HATUA 10 ZA JIKONI/MAHALI PA KUPIKIA
- MAHALI PENGINE KATIKA NYUMBA AU YADI
- NJE YA UWANJA
- HAKUNA MAHALI MAALUM
- SI KUPEWA RUHUSA YA KUONA

5. Kuna sabuni inayopatikana?

- NDIYO
- HAPANA

6. Je, kuna maji yanayopatikana?

- NDIYO
- HAPANA

SEHEMU YA 6: UTUPAJI TAKA

1. Je, ni aina gani ya choo ambayo hutumia?

- FLASHI KWA MFUMO WA MAJI TAKA YA BOMBA
- FLASHI KWA TENKI YA SEPTIC
- FLASHI KWENDA KWENYE SHIMO LA CHOO
- FLASHI KWENDA MAHALI PENGINE
- FLASHI INAYOPELEKA KINYESI MAHALI PASIPOJULIKANA / BILA UHAKIKA / VENTILATED KUBORESHWA SHIMO LATRINE (VIP)
- CHOO CHA SHIMO CHENYE UFUNIKO
- CHOO CHA SHIMO KISICHO MFUNIKO / SHIMO WAZI
- HAKUNA KITUO, KICHAKANI, SHAMBANI
- NYINGINE

2. Mara ya mwisho [jina la mtoto mdogo] kupita kinyesi, ni nini kilifanywa ili kuondoa kinyesi?

- MTOTO ALITUMIA CHOO/CHOO
- KUWEKA / KUSAFISHWA NDANI YA CHOO AU CHOO
- KUWEKA / KUSAFISHWA NDANI YA MTARO
- KUTUPWA KWENYE TAKATAKA
- YALIZIKWA
- KUSHOTO KATIKA WAZI NYINGINE (TAJA)
- SIJUI

3. Unashiriki nyumba yako na wanyama?

- NDIYO
- HAPANA

Rekodi wakati wa mahojiano

MWISHO ___ ___: ___ ___ SAA:DAKIKA

Appendix V: Research Permit

REVOLUTIONARY GOVERNMENT OF ZANZIBAR

SECRETARY
ZANZIBAR RESEARCH COMMITEE
P. O. Box 2321 - MAZIZINI, ZANZIBAR
Tel: 024 2231869
Fax: 024 2231742



RESEARCH/FILMING PERMIT

(This Permit is only Applicable in Zanzibar for duration specified)

Ref: 20017141302457413115129

SECTION

Name	RUKIA MOHAMED MASHAURI
Gender	F
Date and Place of Birth	01-04-1994 - BEIT EL RAS, ZANZIBAR
Nationality	TANZANIAN
Data Collection Duration	03 Month(s)
Research Title	FACTORS ASSOCIATED WITH DIARRHEAL DESEASE AMONG CHILDREN UNDER FIVE YEARS OF AGE IN MJINI UNGUJA, ZANZIBAR, 2024
Date of Issue	10-05-2024
Valid until	09-08-2024
FULL ADDRESS OF SPONSOR	
Name of the Authorizing Officer	BAKARI K. MAKAME
Signature and Seal	
Institution	Office of the Chief Government Statistician
Address	P. O. Box 2321, Zanzibar
Printed Date	10-05-2024

Appendix VI: Research data collection Permit

SERIKALI YA MAPINDUZI YA ZANZIBAR
AFISI YA MAKAMU WA PILI WA RAIS,

22279 Barabara ya Vuga,
Vuga, S.L.P. 239,
70460 Mjini Magharibi, Zanzibar

Tovuti : www.ompr.go.tz
Barua pepe : Info@ompr.go.tz
Faksi : 0242231826

CA.33/411/01L/43 **13/05/2024.**

MHESHIMIWA,
MKUU WA WILAYA,
WILAYA YA MJINI,
UNGUJA.

KUH: RUHUSA YA KUFANYA UTAFITI

Kwa heshima, naomba uhusike na mada ya hapo juu.

Serikali ya Mapinduzi ya Zanzibar imemruhusu **Ndg. Rukia Mohammed Mashauri** mwanafunzi kutoka **Muhimbili Institute of Health and Allied Sciences** anaesomea **Shahada ya Uzamili** katika fani ya ***Master in Applied Epidemiology*** kufanya utafiti katika mada inayohusiana na **"Factors Associated With Diarrheal Diseases Among Children Under Five Years of Age in Mjini Unguja, Zanzibar, 2024".** Utafiti huo utafanyika ndani ya Wilaya yako katika maeneo ya Chumbuni, Muungano, Magomeni na Kwaalinatu kuanzia tarehe **10/05/2024** mpaka **09/08/2024.** Tunaomba asaidiwe ili aweze kukamilisha utafiti huo.

Kwa nakala ya barua hii mara baada ya kumaliza utafiti, mtafiti anatakiwa kuwasilisha nakala (copy) 3 za ripoti ya utafiti huo, Afisi ya Makamu wa Pili wa Rais - Zanzibar.

Naambatanisha na kivuli cha kibali cha kufanyia utafiti.

Wako mtiifu,
Gharib H. Kombo
GHARIB H. KOMBO,
/KATIBU MKUU,
AFISI YA MAKAMU WA PILI WA RAIS,
ZANZIBAR.

NAKALA: 1. Ndg. Rukia Mohammed Mashauri (0778 414570).
2. Mratibu wa Shughuli za Serikali, Wilaya ya Mjini, Unguja.

Appendix VII: Researcher Introduction Letter

UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR – POSTGRADUATE STUDIES

In reply quote;
Ref. No. HD/MUHAS/T.825/2022 07TH May, 2024

Second Vice Presedent's Office Zanzibar,
P.O.Box 2273,
ZANZIBAR

Re: INTRODUCTION LETTER OF RUKIA MOHAMED MASHAURI

The bearer of this letter is Rukia Mohamed Mashauri (HD/MUH/T.825/2022), a student at Muhimbili University of Health and Allied Sciences (MUHAS) pursuing Masters in Applied Epidemiology

As part of her studies she intends to do a study titled: **"Factors Associated With Diarrheal Diseases Among Children Under Five Years Of Age In Mjini Unguja,Zanzibar,2024.**The research has been approved by the Chairman of University Senate.

Kindly provide her the necessary assistance to facilitate the conduct of her research.

We thank you for your cooperation.

Ms. Victoria Mwaluiwa
For: DIRECTOR, POSTGRADUATE STUDIES

c.c. Rukia Mohamed Mashauri

9 United Nations Road, Upanga West, P.O. Box 65001, Dar Es Salaam. Tel. G/Line: +255-22-2150302/6, Ext. 1015, Direct Line +255-22-2151379,Telefax: +255-22-2150465,E-mail dpgs@muhas.ac.tz,Web: https://www.muhas.ac.tz

Appendix VIII: Research Ethical Clearance

UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR – RESEARCH, PUBLICATIONS
AND INNOVATIONS

Ref. No.DA.282/298/01.C/2203 Date: 29/04/2024

MUHAS-REC-04-2024-2203
RUKIA MOHAMED MASHAURI
SHOOL OF PUBLIC HEALTH AND SOCIAL SCIENCES
MUHAS

RE: APPROVAL FOR ETHICAL CLEARANCE FOR A STUDY TITLED: FACTORS ASSOCIATED WITH DIARRHEAL DISEASES AMONG CHILDREN UNDER FIVE YEARS OF AGE IN MJINI UNGUJA, ZANZIBAR, 2024

Reference is made to the above heading,

I am pleased to inform you that the Chairperson has on behalf of the University Senate, approved ethical clearance of the above-mentioned study, on recommendations of the Senate Research and Publications Committee meeting accordance with MUHAS research policy and Tanzania regulations governing human and animal subjects research.

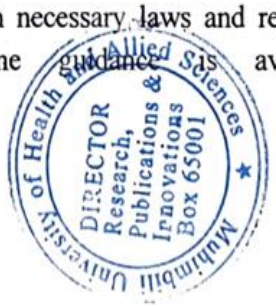
APPROVAL DATE: 29/04/2024
EXPIRATION DATE OF APPROVAL: 29/04/2025

STUDY DESCRIPTION:
Purpose:
The purpose of this cross-sectional household survey is to determine factors associated with diarrhea among children below five years of age in Mjini Unguja Zanzibar, 2024.

The approved protocol and procedures for this study is attached and stamped with this letter, and can be found in the link provided: https://irb.muhas.ac.tz/storage/Certificates/Certificate%20-%2015461.pdf and in the MUHAS archives.

The PI is required to:

1. Submit bi-annual progress reports and final report upon completion of the study.
2. Report to the IRB any unanticipated problem involving risks to subjects or others including adverse events where applicable.
3. Apply for renewal of approval of ethical clearance one (1) month prior its expiration if the study is not completed at the end of this ethical approval. You may not continue with any research activity beyond the expiration date without the approval of the IRB. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.
4. Obtain IRB amendment (s) approval for any changes to any aspect of this study before they can be implemented.
5. Data security is ultimately the responsibility of the investigator.
6. Apply for and obtain Data Transfer Agreement (DTA) from NIMR if data will be transferred to a foreign country.
7. Apply for and obtain Material Transfer Agreement (MTA) from NIMR, if research materials (samples) will be shipped to a foreign country.
8. Apply for and obtain permission to publish the results from National Institute for Medical Research. The application should be before submitting to a publisher and not concurrently through the email publications@nimr.or.tz.
9. Any researcher, who contravenes or fail to comply with these conditions, shall be guilty of an offence and shall be liable on conviction to a fine as per NIMR Act No. 23 of 1979, PART III section 10 (2)
10. The PI is required to ensure that the findings of the study are disseminated to relevant stake holders.
11. PI is required to be versed with necessary laws and regulatory policies that govern research in Tanzania. Some guidance is available on our website https://drp.muhas.ac.tz/.



Dr. Nahya Salim Masoud,

Chairperson, MUHAS Research and Ethics Committee