

Addis Ababa University

College of Natural and Computational Sciences

Department of Zoological Sciences



Prevalence of Acute Diarrhoea and its Causative agents at Debay Tilatgin
Woreda, East Gojjam, Amhara Reginal State, Ethiopia

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A Thesis Submitted to the Department of Zoological Sciences of Addis Ababa
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Declaration

This is to certify that this thesis was prepared by Seleshi Dagne and the title was prevalence of acute diarrhoea and its causative agent at Debay Tilatgin Woreda, East Gojjam, Ethiopia and submitted to the Department of Zoological Science in Partial Fulfillment of Degree Masters of Biology complies with the regulation of the University and meets the accepted standards with respect to originality and quality.

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Advisor signature

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List of Abbreviation

AOR	Adjusted Odds Ratio
DALYS	Disability Adjusted Life Years
CBO	Community Based Organization
CDC	US-Centre for disease Control and Prevention
DHS	Demographic Health Surveys
<i>E. coli</i>	<i>Escherichia coli</i>
F. O-BON	Faith Based Organization
FIB	Fecal Indicator Bacteria
FS	Fecal streptococcus
HWT	Household water treatment
HWTS	Household water treatment and Safe Storage
RIDS	Integrated Disease Surveillance and Response
MoHSW	Ministry of Health and Social Welfare
NIM R	National Institute of Medical Research
POU	Point of use water
S.D	Standard deviation
SPSS	Statistical Package for Social Sciences
WHO	World Health Organization

Abstract

Acute-diarrhea is loose, watery and possibly more-frequent passage of stool is a common problem. Sometimes, it's the only symptom of a condition. At other times, it may be associated with other symptoms, such as nausea, vomiting, abdominal pain or weight loss. Luckily, diarrhea is usually short-lived, lasting no more than a few days. In 2004, diarrhea illness claimed 2.16 million lives globally. Acute diarrhea disease is a major cause of mortality among children in many developing countries, including Ethiopia. Since there was no any research conducted around Debay Tiltatgin woreda about acute diarrhea. Therefore the aim of this study was to assess the prevalence of acute diarrhea and its causative agents at Debay Tiltatgin Woreda, from July 2018 to June 2023 G.C. A five year retrospective cross-sectional study was conducted in Debay Tiltatgin Woreda, Northwest Ethiopia. A five year retrospective data were reviewed. The findings of this study showed that the overall prevalence of diarrhoea indicates variation in age categories. According to our finding the causative agents of acute diarrhea were bacteria, food poisoning, gardenia and amoeba considering Kuy health center from July 2018 to June 2023 G.C a total of 6180 individuals were recorded Diarrhea patients. Among these 3061 (49.5%) were males and 3119 (50.5%) were females. Among the causative agents of acute diarrhea, bacteria(44%) was the prominent where as amoeba (6.4%) was the lowest. It can be concluded that the prevalence of acute diarrhea was fluctuating though age, year and sex groups. Thus we recommend the health centers to create an awareness for the community to reduce acute diarrhea and should focus mainly on water sanitation and hygiene interventions.

Keywords/ Phrases: Acute diarrhea, Causative Agents, Prevalence

1. Introduction

1.1. Background of the study

Acute-diarrhea is loose, watery and possibly more-frequent passage of stool is a common problem. Sometimes, it's the only symptom of a condition. At other times, it may be associated with other symptoms, such as nausea, vomiting, abdominal pain or weight loss. Luckily, diarrhea is usually short-lived, lasting no more than a few days. In 2004, diarrhea illness claimed 2.16 million lives globally, with over half of those deaths occurring in low-income nations. Diarrhea was one of the two main causes of disease burden in Africa in 2021; it affected 32,203,037 people every day, the bulk of whom were children under the age of five. Furthermore, a meta-analysis of 60 research on the morbidity and mortality of diarrhea between 1990 and 2000 found that diarrhea was responsible for 21% of all yearly deaths, the majority of which were in developing nations (WHO 2023). Tanzania was one of the 15 countries that accounted for 75% of all deaths. Africa and South East Asian countries accounted for 75% of all deaths (Ahmed *et al.*, 2018). According to estimates from the World Health Organization, poor hygiene practices, inadequate sanitation, and unsafe water supplies are to blame for 88% of all diarrhea illnesses (WHO 2022). An estimated 1.1 billion people did not have access to better water sources in 2021 alone (Moe and Rheingans, 2023). It was shown that the majority of the oral routes linked to diarrhea are caused by the infectious organisms that cause diarrhea, which include viruses, bacteria, and protozoa discharged in human feces. Additionally, the majority of bacteria that cause diarrhea are spread by drinking tainted water. Numerous interventions for water treatment have been developed by experts in water quality and safety. These include heat and ultraviolet UV radiation, chemical treatment (assisted Let it stand and settle, chemical disinfection, and ion exchange), and physical removal of pathogens through filtration, adsorption, and let it settle (Barzilay *et al.*, 1999). Keeping residual disinfection and enhancing storage were also part of these measures to improve the water quality, supporting the UN mission to cut the number of people without access to safe water to half. A meta-analysis of 67 research revealed that a median decrease of 16% in diarrhea morbidity might be attained with better water quality (Wolf *et al.*, 2018).

Another study shown that during collection, transportation, and drawing into the house, even safe water might get contaminated (Mintz *et al.*, 2023).

It is recommended to implement the low-cost intervention of maintaining and enhancing the quality of household water ⁶⁴. An international network for the promotion of safe home water treatment and storage has been developed by WHO and is being sponsored. In comparison to the control group, there was a median 42% decrease in endemic diarrhea illnesses, according to a brief study of 21 controlled field trials conducted over the last 20 years that focused primarily on treatments intended to improve the microbiological quality of drinking water at the home level (Figueras and Borrego, 2010)

Typically Children who are not as healthy overall or who have inadequate nutrition are more vulnerable to severe diarrhea and dehydration than children who are in good health or who are exposed to unsanitary environments, such as contaminated drinking water (Ferdous *et al.*, 2013). Since water makes up a larger amount of a child's body weight than it does for an adult, children are also more susceptible to potentially fatal dehydration than adults. Due to their greater metabolic rates, young children consume more water during the day and have less capacity for water conservation than adults (Colegrove, 2021) It has been demonstrated that source-level improvements in water quality, in addition to home water treatment and safe storage methods, can lower the prevalence of diarrhea by up to 47%. ⁶¹ Target 10 of the Millennium Development Goals states that by 2015, the percentage of the population without sustainable access to clean drinking water must be cut in half (Moe and Rheingans, 2021). In order to meet this goal, we must address drinking water supply from both the quantity (access) and quality (safety) perspectives. A virus that enters your digestive tract is the primary cause of diarrhea (gastroenteritis). Some call it the “stomach flu” or a “stomach bug.” But diarrhea can have lots of causes (Glass *et al.*, 2023).

Diarrhea can be caused by pathogens, which include bacteria, viruses, and parasites. The gastroenteritis-causing norovirus is the most frequent cause of diarrhea in adults. Rotavirus is the most common cause of acute diarrhea in children (Radlović *et al.*, 2015). Contaminated foods and beverages have the potential to contain hazardous poisons and microorganisms. Diarrhea can be caused by poisons or bacteria after they enter your stomach. “Traveler’s diarrhea” is when you get diarrhea while traveling in a new environment with poor hygiene or sanitation. Usually, it’s exposure to bacteria that give diarrhea Foods that upset your digestive system. If you’re lactose intolerant, you get diarrhea because your body struggles to digest lactose, the sugar in dairy. Fructose is a sugar found in honey and fruits that is added to various dishes as a sweetener, although it can be difficult for some people to digest. With celiac disease, get diarrhea because body has trouble breaking down gluten, a protein in

wheat (Benardout *et al.*, 2022). There was no any research conducted around Debay Tilatgin woreda about acute diarrhea. Thus, the aim of this study was to assess the prevalence of acute diarrhea and its causative agents at Debay Tilatgin Woreda, from July 2018 to June 2023 G.C.

1.2. Statement of the problem

Acute diarrhea is defined as stool with increased water content, volume, or frequency that last less than 14 days. So the initial points for conducting this study to show the prevalence & causative agents acute diarrhea patients those are visited kuy health center in year of 2019 to 2023 G.C recorded documents of patient history Knowledge of risk factors has important implications for developing appropriate strategies to reduce the burden of the diseases. Even if, there were different control and prevention strategies were implemented in KUY surrounding.

1.3. Objectives of the study

1.3.1 General Objective

The overall objective of this study was to assess prevalence of acute diarrhea and its causative agents at Debay Tilatgin Woreda, from July 2018 to June 2023 G.C

1.3.2 Specific objectives

- ✓ To assess the prevalence of acute diarrhea at Debay Tilatgin, from July 2018 to June 2023 G.C
- ✓ To assess associated factors that can affect acute diarrhoea and its causative agent at Debay Tilatgin, from July 2018 to June 2023 G.C
- ✓ To determine misconceptions of prevalence of acute diarrhea and at Debay Tilatgin, from July 2018 to June 2023 G.C

1.4. Significance of the study

This study was important since it helped to determine the prevalence of acute diarrhea and its contributing factors. In order to understand the various local water treatment solutions and how much they lower the bacterial load in drinking water, it is also important to generate information about what people do to make their water safe to drink. Therefore, armed with this knowledge, communities and the government can expand upon widely used and approved water treatment and storage solutions.

1.5. Research questions

- ✓ Why people do not treat their drinking water as the measure of reducing diarrhoea in the community ?
- ✓ What are the association factors acute diarrhoea ?
- ✓ What are the causative agents of acute diarrhoea ?
- ✓ What are other risk factors which are associated with microbial contamination of drinking water?

1.6. Scope of the study

The study was concerned to the Prevalence of Acute Diarrhea and its causative agents Debay Tilatgin Woreda, East Gojjam, Ethiopia in 2023 with a total estimated population of the study area 33,410 among this 13,809 are male and 19,601 are female (www.wikipedia/debaytilatgin) Hence the study was limited to Kuy towns' health centers and it was carried out from February to June, 2023 G.C.

2. Literature Review

2.1 Global overview of acute diarrhea

According to estimates from the World Health Organization, 2.5 billion people do not have access to clean drinking water, and many more consume water that is seriously contaminated (WHO2024). Additionally, 1.8 million people the great majority of them are children under five die from diarrhea illness each year (Singh & Singh, 2023). Research on water pollution indicates that safe storage can act as a powerful barrier to stop the spread of diarrhea illness (Mishra, 2023). But a different study discovered that it was insufficient to stop sporadic, severe drinking water contamination. Four trials of coagulants a disinfectant that measures compliance through product consumption reported the largest impact on diarrhea in relation to Point of Use (POU) water quality measurement (Crider, 2023). Diarrhoea disease is the third leading cause of death in children under 5 years old and is responsible for killing around 443832 children every year (WHO2019). Diarrhoea can last several days and can leave the body without the water and salts that are necessary for survival. In the past, for most people, severe dehydration and fluid loss were the main causes of diarrhoea-associated deaths. Now, other causes such as septic bacterial infections are likely to account for an increasing proportion of all diarrhoea-associated deaths (Khalil *et al.*, 2023). Children who are malnourished or have impaired immunity, as well as people living with HIV, are most at risk of life-threatening diarrhoea. Diarrhoea is defined as the passage of 3 or more loose or liquid stools per day or more frequent passage than is normal for the individual (Ali, 2024). Frequent passing of formed stools is not diarrhoea, nor is the passing of loose, pasty stools by breastfed babies. Diarrhoea disease is a leading cause of child mortality and morbidity in the world, and mostly results from contaminated food and water sources (Mishra and Sheth, 2023). Diarrhoea due to infection is widespread throughout developing countries. In low-income countries, children under 3 years old experience on average three episodes of diarrhoea every year. Each episode deprives the child of the nutrition necessary for growth. As a result, diarrhoea is a major cause of malnutrition, and malnourished children are more likely to fall ill from diarrhoea

2.2. Prevalence of Diarrhea in Sub Saharan Africa

According to the report of Global Burden of Diseases (GBD) in 2022, in sub-Saharan Africa total Disability-adjusted life years (DALYs) estimate due to diarrhea was 13.01% (Troeger *et al.*, (2017). As poor access to sanitary materials is the main cause of diarrhea diseases In sub-

saran Africa, access to water, sanitation, and hygiene (WASH) are very scanty (Zerbo *et al.*, 2021) and the burden of diarrhea diseases is countless relative to the rest of the world. As claimed by the Global Burden of Diseases visual hub, total DALYS among under five years children in the Eastern sub-saran region contributed by diarrhea diseases was 10.21% (global burden of diseases visual hub, 2019). Different studies showed that the prevalence of diarrhea diseases among children under five years is high in East African countries(WHO report2023). Based on meta-analysis conducted in Ethiopia the prevalence of diarrhea ranges from 19% to 25% (Alebel *et al.*, 2018). Other studies conducted in Uganda, Rwanda, and Malawi uncovered that the prevalence of diarrhea diseases was 32% (Bbaale *et al.*, 2011) 26.7% and 20% respectively. Additionally, the culture of open defecation in East African countries is common. For example, a systematic review done in Ethiopia showed a low level of open defecation free areas(i.e. 16%) (Abebe *et al.*, 2020). Other studies also showed a low level of open defecation free communities like Kenya (14%)(Health *et al.*, 2016). In general, in East African countries, access to basic sanitation and hygiene services is very low.Prior studies disclosed that many factors are associated with diarrhea among under five years children. Among those; child's age (Bbaale *et al.*, 2011) mother/caregiver's educational status place of residency (Bbaale *et al.*, 2011) not vaccinated to Rota (Jean, 2017). maternal/caregiver's age travel time to the water sources wealth index (Bbaale *et al.*, 2011) birth interval (Tampah-Naah, 2019) unimproved sources of drinking water exclusive breast feeding, timing of breast feeding initiation regional location (Bbaale *et al.*, 2011) mother's working status (Bbaale *et al.*, 2011) and unimproved toilet facilities(Moon *et al.*, 2019). So far, many studies have been done in East Africa about diarrheal diseases among under five years children. However, those individual studies vary in design and sample size, which is difficult to perform the regional comparison. Making a regional comparison is important to meet current global initiatives agendas like Sustainable Development Goal (SDG). Combining datasets that are studied on similar people and having common variable identifiers enhances statistical power due to the large sample size, advances the ability to compare outcomes and paves the way to develop new indicators. To date, in East Africa, studies conducted to describe diarrhea diseases among under five years children by merging cross-national datasets are limited. Hence, this study aimed to assess the prevalence and associated factors of diarrhea among under five years children using the most recent (2008–2019) nationally representative Demographic and Health Surveys (DHS) from 12 East African countries. The Information generated from this pooled data will give a good insight into the sub-regional prevalence of diarrhea. This study might also help policy makers, global organizations, NGOs, and researchers to identify the

most vulnerable East African region to diarrhea, to give urgent intentional measures and resource allocation. This study found that the conjoined prevalence of diarrhea diseases in east Africa high and modifiable factors like wealth status of households, time of breast feeding initiation and educational status were the main determinants of diarrhea episodes among under-five children.

2.3. Prevalence of Diarrhea in Ethiopia

The stated analysis is a component of the GBD-2019 study, a collaborative effort between the Ethiopian Public Health Institute (EPHI) and the Institute for Health Metrics and Evaluation (IHME). It aims to evaluate the extent of diarrhea disease burden in Ethiopia, along with its regional states and chartered cities, by examining specific locations and age groups. This study provides comprehensive data on the incidence and mortality trends of diarrhea diseases at national and regional levels, standardized for age, from 1990 to 2019. The results are presented along with 95% uncertainty intervals (UI) to account for the inherent uncertainty in the findings. Nationally, it was declined by an annual rate of 74.99% between 1990 and 2019. The findings indicate that the national age-standardized life years lost due to diarrhea disease declined by 76.30 % between 1990 and 2019. Diarrhea disease has remained a public health problem by affecting a large number of the population in Ethiopia. The youngest and elder populations were disproportionately affected by diarrhea disease incidence and associated mortality. This result may call the attention of Primary Public Health Services to revisit universal health coverage in Ethiopia. Moreover, prevention and management modalities need the community's and other stakeholders' engagement and participation. Equal attention needs to be given to older adults as of under-five children. The high compliance rate of approximately 85% among refugees was the reason for this decrease (El Arab *et al.*, 2023). An analysis of the bias present in POU water treatment trials, Finding no effect in five placebo-controlled experiments, three of which took place in underdeveloped nations, they came to the conclusion that there is insufficient data to support the broad promotion of home water treatment (Connor, 2015). There is evidence that the duration of trials is associated with a lower efficacy of the water chlorination intervention. When assessing the technologies in this report, it is important to take sustainability into account when assessing their efficacy. As a result, there is a great deal of debate on the scalability of water quality interventions as well as the necessity of improving our knowledge of the factors that affect usage and effectiveness over the long run. Another study found a significant

amount of contamination in household water compared to source water, arguing that the recontamination is caused by both household collection of water from multiple water sources and partial recontamination of water in transport and storage (Rufener, 2010). Low contamination in water measured at source but significantly higher contamination levels (Plummer, 2007). A meta analysis of 32 studies conclusion that water treatment at the point of use (POU), specifically disinfection, is more beneficial than changes to the water source in lowering the incidence of diarrhea (Pooi, 2018). according to three meta analyses Hand washing cleanliness lowers the risk of diarrhea by 50%, that looked at the relationship between hand washing and the incidence of diarrhea. Although there is evidence of improved health outcomes from hand washing, sanitation, and point-of-use water treatment, the World Bank Independent Evaluation Group (IEG 2008:17). A major source of death and morbidity in underdeveloped nations, endemic diarrhea diseases can be effectively prevented by implementing interventions to enhance the quality of the water, especially when implemented at the household level (Clasen, 2007). Also had 0.53 times the odds of diarrhoea disease compared to control households, suggesting a protective effect against water-borne diarrhoea disease (Matheka, 2022). Point-of-use water treatment (HWTS) has been promoted as a way to significantly reduce the worldwide burden of diarrhea and to help achieve the Millennium Development Goals, but there is little data to determine whether the techniques are acceptable and have no positive effects on health 53. The claim that there is insufficient data to support a larger scale-up of home water treatment (HWT) among the impoverished population made by was premature (Chrisnahutama, & Sukartini 2024),. As per the 2009 report by the Tanzania Ministry of Health and Social Welfare, diarrhea accounted for the fourth reason of outpatient visits and the fifth cause of mortality for children under five years of age. There is a dearth of information on the factors that contribute to diarrhea in relation to locally used household water treatment techniques and how those techniques affect the bacterial quality of the water (Zin, 2013). My original design approach, the conceptual framework, was inspired by established causes and contributing variables for diarrhea in children under five. Four possible determinants of diarrhea in children under five have been discovered using this model. These include inadequate methods for treating and storing water in the home, inadequate breastfeeding habits, malnutrition, and inadequate sanitation and hygiene.

2.4. Prevalence of Diarrhea in Amhara Region

In Ethiopia, including Amhara Region, provision of water supply and improvement in sanitation and hygiene have shown a progress in the past 10 years. According to WHO, the availability of improved drinking water supply in Ethiopia increased from 13 % in 1990 to 57 % in 2015 (UNICEF and World Health Organization. Progress on sanitation and drinking-water - 2015 update and MDG assessment. 20 Avenue Appia, 1211 Geneva 27, Switzerland: WHO Press, World Health Organization; 2015). Improved and shared latrine facility availability in Amhara Region raised from 2% in 2000 to 46 % in 2012 (Baker and Ensink, 2012) The promotion of hygiene and sanitation through the health extension program has been active since 2003 (Ministry of Health. Health Sector Development Plan, 2005). Rotavirus vaccine was launched in Ethiopia at the end of 2013. However, a facility-based report in Amhara Region showed that morbidity of childhood diarrhea was one of the top five leading cause of childhood morbidity in the past decade. protected each year against leading cause of severe diarrhoea(**Chrisnahutam & Sukartini 2024**),.There is no recent information about childhood diarrhea at community level after implementation of the above mentioned interventions, particularly in the study area. Moreover, studies conducted in Ethiopia identified the determinants of childhood diarrhea using a standard logistic regression model, which has less power or increased type one error. Analyzing all factors at one level is likely to present a very incomplete picture on the evaluation of determinants of childhood diarrhea. The standard regression model assumes the presence of random variation between households, while neglecting the non-random variation of communities at different levels. An appropriate methodology is required for a more comprehensive and sound analysis. Thus, a multilevel regression model, which controls the nesting effect of clusters at different levels, was used to account for the shortcomings of a standard logistic regression. The method was chosen for two reasons: First, it systematically analyzes the explanatory variables (co variate) at various levels of hierarchies that affect the outcome variable, or this model measures the interactions among excoariates at different levels that affect the outcome variable. Second, it corrects the biases in parameter estimates resulting from clustering and provides correct standard errors (Amhara Regional State Health Bureau. Annual Report, Bahir Dar, Ethiopia. Amhara Regional State Health Bureau, 2011).

2.5. Causative Agents of Acute Diarrhea

Diarrhoea is a symptom of infections caused by a host of bacterial, viral and parasitic organisms, most of which are spread by faeces-contaminated water(Ledwaba, L. M., 2024). The Infection is more common when there is a shortage of adequate sanitation and hygiene and safe water for drinking, cooking and cleaning. Among children under 5 years of age, the most common viral pathogens are *rotavirus*, *norovirus*, *adenovirus* and *astrovirus*. Bacterial pathogens include *Escherichia coli*, *Salmonella spp*, *Shigella spp*, and *Campylobacter spp*. while parasitic pathogens include *Cryptosporidium*, *Guardian*, and *Entamoeba spp*. *Rotavirus* and *E. coli* are the most common pathogens among children across all age groups, while parasitic pathogens, are prevalent in children aged 3–5 years. Bacterial pathogens, including *E. coli*, *Salmonella*, and *Shigella* were common in the children age 6 to 10-year age group, as were rota-virus, rhinovirus, and *sapovirus*. Location-specific etiologic patterns also need to be considered(WHO2021).

2.6. Factors of Acute Diarrhea

Children who die from diarrhoea often suffer from underlying malnutrition, which makes them more vulnerable to diarrhoea. Each diarrhoea episode, in turn, makes their malnutrition even worse. Diarrhoea is a leading cause of malnutrition in children under 5 years old. Water contaminated with human faeces, for example from sewage, septic tanks and latrines, is of particular concern. Animal faeces also contain microorganisms that can cause diarrhoea. Diarrhoea disease can also spread from person-to-person, aggravated by poor personal hygiene. Food is another major cause of diarrhoea when it is prepared or stored in unhygienic conditions. Unsafe domestic water storage and handling is also an important risk factor. Fish and seafood from polluted water may also contribute to the disease.

2.7. Prevention and Managements of Acute Diarrhea

Key measures to prevent diarrhoea include access to safe drinking-water use of improved sanitation hand washing with soap exclusive breastfeeding for the first 6 months of life good personal and food hygiene health education about how infections spread retrovirus vaccination. Key measures to treat diarrhoea include the following Re-hydration with oral re-hydration salts (ORS) solution. ORS is a mixture of clean water, salt and sugar. It costs a few cents per treatment. ORS is absorbed in the small intestine and replaces the water and

electrolytes lost in the faeces. Zinc supplements reduce the duration of a diarrhoea episode by 25% and are associated with a 30% reduction in stool volume. Rehydration with intravenous fluids in case of severe dehydration or shock. Nutrient-rich foods. The vicious circle of malnutrition and diarrhoea can be broken by continuing to give nutrient-rich foods – including breast milk during an episode, and by giving a nutritious diet including exclusive breastfeeding for the first 6 months of life to children when they are well. Consulting a health professional, in particular for management of persistent diarrhoea or when there is blood in stool or if there are signs of dehydration. WHO works with Member States and other partners to: promote national policies and investments that support case management of diarrhoea and its complications as well as increasing access to safe drinking-water and sanitation in developing countries; conduct research to develop and test new diarrhoea prevention and control strategies in this area; build capacity in implementing preventive interventions, including sanitation, source water improvements, and household water treatment and safe storage; develop new health interventions, such as the rotavirus immunization; and help to train health workers, especially at community level (WHO 2022).

2.8. Diagnosis of Acute Diarrhea

Most patients do not require laboratory workup, and routine stool cultures are not recommended. Treatment focuses on preventing and treating dehydration. Diagnostic investigation should be reserved for patients with severe dehydration or illness, persistent fever, bloody stool, or immunosuppression, and for cases of suspected nonsocial infection or outbreak. Oral rehydration therapy with early refeeding is the preferred treatment for dehydration. Anti-motility agents should be avoided in patients with bloody diarrhea, but loperamide/methicillin may improve symptoms in patients with watery diarrhea. Probiotic use may shorten the duration of illness. When used appropriately, antibiotics are effective in the treatment of *Shigellosis*, *Campylobacteriosis*, *Clostridium difficile*, traveler's diarrhea, and protozoan infections. Prevention of acute diarrhea is promoted through adequate hand washing, safe food preparation, access to clean water, and vaccinations. Most cases of diarrhea don't require a diagnosis or treatment. In more severe cases, your provider will work to determine the cause. They'll ask about your medical history, family medical history, travel history and any sick contacts you may have. They may order tests, including: Blood tests to rule out certain conditions that cause diarrhea. A stool test to check for blood, bacterial infections and parasites. A hydrogen breath test to check for lactose or fructose intolerance

and bacterial overgrowth. An endoscopy of your upper and lower digestive tract to rule out growths or other structural issues that can cause diarrhea, like ulcers or tumor(WHO2019).

3. Materials and Methods

3.1 Study area and study period

The study was conducted in Debay Tilatgin town kuy town. DebayTilatgin Woreda is located in East Gojjam zone and its capital is city of Kuy. Kuy town is located in East Gojjam with a total population of 33,410. The city is approximately 284 km far from Addis Ababa to the north-west direction. It is also 285 km far from Bahir Dar which is the capital city of Amhara National Regional State. Kuy is 60 km far from Debre Markos which is the administrative town of East Gojjam zone (Figure 2).Kuy covers 565 hectares. It is characterized by a rainfall rate of 1,100 - 1,189 ml and a temperature range of 12 - 20 degree centigrade. It has also an average altitude range of 1,700 – 2,315 meter above sea level and all the community speak Amharic language. The town has governmental and private health institutions. There is one health center. There are also 2 private clinics and two private drug stores. Concerning educational institutions, there is one TVET college, one preparatory school, one secondary school, two governmental primary schools and one private kindergarten school. Also there are one bank and two micro banks in the town (www.wikipedia/debaytilatgin).

Kuy Health center provides many services for its clients, about transmission, prevention and treatments of diarrhea.

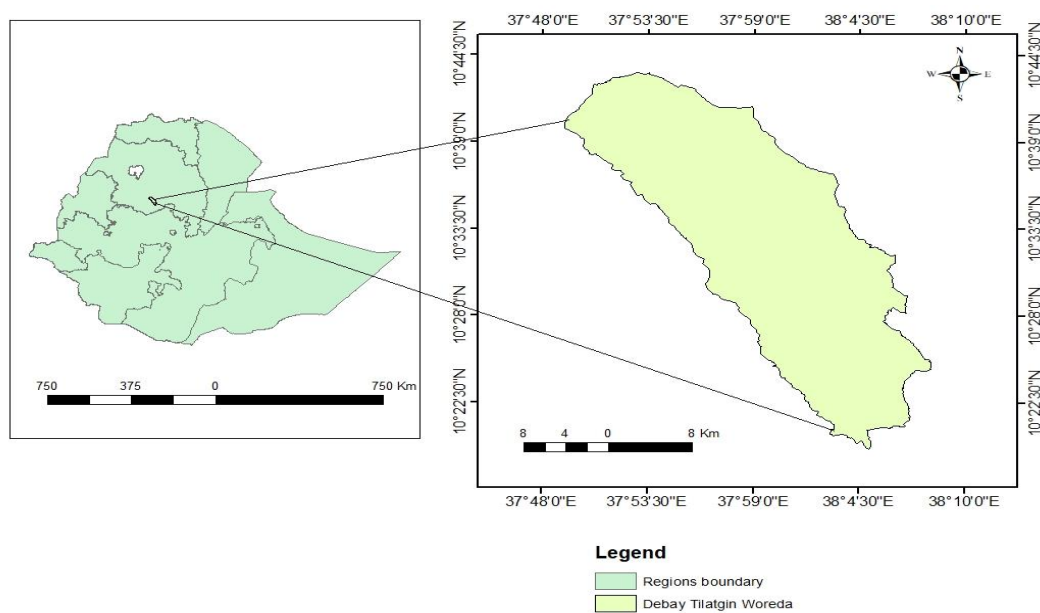


Figure 1: Maps of the study area

3.2. Study design and Study Population

Retrospective cross-sectional study was conducted on acute diarrhea patients at Kuy Health center. The study population included all diarrhea patients visiting Kuy Health center from July 2018 to June 2023 G.C.

3.3. Sample Size and Sampling Technique

Kuy health center 6180 patients recorded from July 2018 to June 2023G.C having diarrhea and all 6180 data were used for retrospective data that helps to compare the primary data.

3.4. Inclusion and Exclusion Criteria

3.4.1 Inclusion criteria

All acute diarrhea patients recorded data were during July2018toJune2023 G.C.

3.4.2 Exclusion criteria

The data does not include those that come after the data of collection&improper recorded patient document data.

3.5. Study Variables

3.5.1. Dependent variables: - Prevalence of acute diarrhea and its causative agents.

3.5.2. Independent variables: Sociology-demographic variables such as age and sex.

3.6. Data Collection

Both quantitative and qualitative secondary data were collected. The secondary data was obtained from document analysis. The data was gathered from the beginning of June2018 until the end of July 2023G.C. It was gathered from 6180 patient history documents that were recorded through purposive sampling techniques.

3.7. Data Quality Control

The collected data were checked for completeness, accuracy, clarity, and consistency. Before analysis was carried out the data were checked by reading 6180 individuals were included in the study by systematic random sampling technique. The study was conducted from July 2018 to June 2023G.C.

3.8 Ethical consideration

In order to carry out this study, a supported letter from the department of Zoological science was submitted to kuy health center Administrative body and permission letters was obtained from the kuy health center administrative office Ref number 9345\1\96 in addition to this, the administration bodies were informed regarding the objective and purpose of the study to encourage them to provide relevant data for this study

3.9. Data Analysis methods

The Data was collected from secondary source was analyzed by using Exile program software in the form of descriptive statistical analysis method, which would include table and chart the researcher also present the data quantitatively by using percentage

4. Result

4.1. Socio- demographic features of retrospective data

According to Kuy health center from July 2018 to June 2023 G.C a total of 6180 individuals were recorded Diarrhea patients. Among these 3061 (49.5 %) were males and 3119 (50.5%) were females. There was variation in age categories between recorded patients; thus, 660 (10.7%) were less than 1 year, 4019 (65%) were among 1 to 5 years, (6.4%) were from 6 to 14 years, 367 (8.1%) were from 15 to 29 years, 318 (7%) were from 30 to 64 years and 82 (2%) were greater than 65 years (Table 1). Age wise differences in acute diarrhea incidence were found to be statistically the highest incidence recorded being in the age group of 1 to 5 years (65%) and the lowest incidence was in the age group which is greater than 65 (8.1%) years old. According to the data from the table below taken from Kuy health center acute diarrhea were more prevalence (25.4%) since 2021 G.C, where as the least acute diarrhea data were recorded (8.9%) since 2023 G.C. Generally the prevalence of acute diarrhea in Kuy town were not consistent (table 1)

Table 1: Age and sex categories of the recorded data through years

Years	sex	<1years	1-5years	6-14years	15-29years	30-64years	>65years	total
2019	M	103, 64.4%	497, 48.8%	62, 56.8%	55, 43.3%	51, 43.6%	19, 59.3%	1562, 25.3%
	F	57, 35.6 %	520, 55.2%	47, 43.2%	72, 56.7%	66, 56.4%	13, 41.7%	
2020	M	81, 53.6%	419, 44.9%	35, 40.6%	52, 45.6%	49, 59.7%	17, 4.7%	1403, 22.7%
	F	70, 46.4%	513, 55.1%	51, 59.4%	62, 54.4%	33, 40.3%	21, 55.3%	
2021	M	99, 60.7%	511, 48.6%	53, 55.2%	49, 38.8%	58, 48.7%	7, 58.3	1566, 25.4%
	F	64, 39.3%	539, 51.4%	43, 44.8%	77, 61.2%	61, 51.3%	5, 41.7	
2022	M	55, 47.8%	315, 43.8%	65, 44.2%	35, 61.4%	40, 42.7%	No data	1094, 17.7%
	F	60, 52.2%	405, 56.2%	82, %	22, 38.6%	15, 27.3%	No data	
2023	M	30, 42.2%	205, 51.2%	28, 43.1%	41, 57.7%	27, 61.3%	3, 75%	555, 8.9%
	F	41, 57.8%	95, 48.8%	37, 56.9%	30, 42.6%	17, 38.7%	1, 25%	
total		660, 10.7%	4019, 65%	503, 8.1%	495, 8%	417, 6.7%	86, 1.5%	6180, 100%

4.2. Total prevalence acute diarrhea from 2019-2023

According to figure 2 high prevalence acute diarrhea was seen in 2019,2020 and 2021 but low prevalence of acute diarrhea was observed in2023.

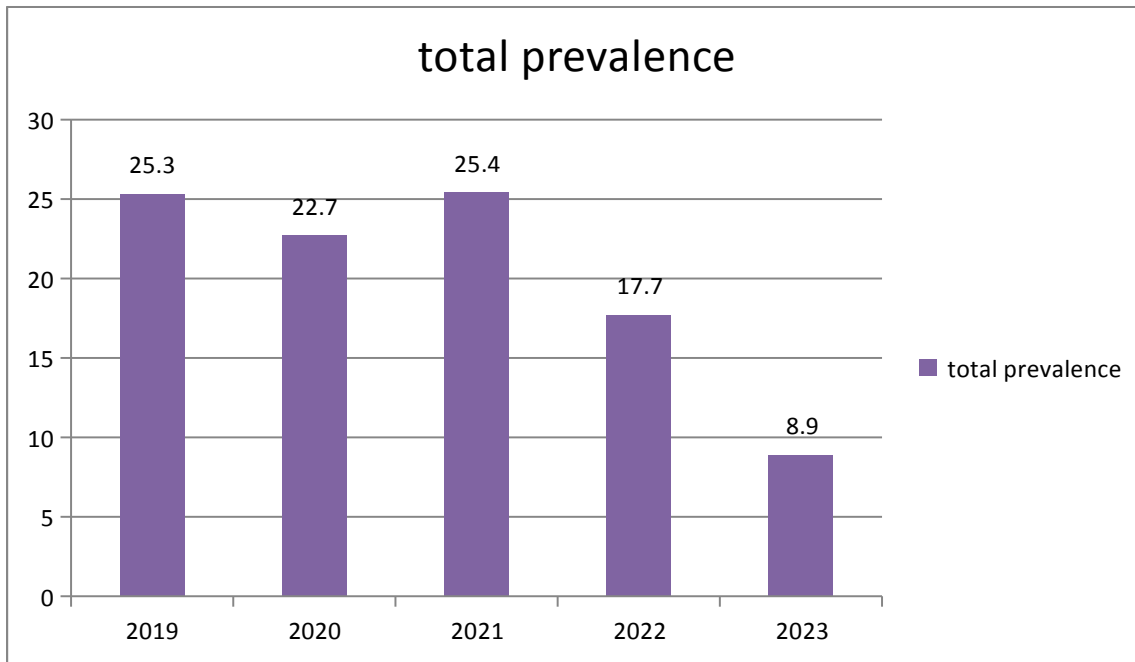


Figure 2.Total prevalence acute diarrhea from 2019-2023

According to Kuy health center from July 2018 to June 2015E.C a total of 6180 individuals were recorded Diarrhea patients. Among these 3061 (49.5%) were males and 3119(50.5%) were females. From the table female were more affected than male except the first and the last years of the study periods (Table 2).

Table 1: Frequency and sex of acute diarrhea through year

Year	Sex		Total
	Male; N (%)	Female; N (%)	Frequency
2019	787(50.3)	775(49.7)	1562
2020	653(46.5)	750(53.5)	1403
2021	777(49.6)	789(50.4)	1566
2022	510(46.7)	584(53.3)	1094
2023	334(60.2)	221(39.8)	555
Total	3061(49.5)	3119(50.5)	6180

N.B

N Represents number and percent

According to Kuy health center from July 2018 to June 2015E.C a total of 6180 individuals were recorded Diarrhea patients. Among these 3061 (49.5%) were males and 3119(50.5%) were females. From the table female were more affected than male except the first and the last years of the study periods (Table 2).

4.3. Causes of acute diarrhea within age

Among factors that causes acute diarrhea, bacteria is the prominent factors of acute diarrhea where as amoeba is the less causes of acute diarrhea. Table 3 indicates the prevalence of Amoeba (6.4%), giardia(10.8%), bacterial infection(44%) and food poisoning (29%).

Table:3 Causes of acute diarrhea within age

Causes		Age in year						Total
		<1	1 to 5	6 to 14	15 to 29	30 to 64	>65	
Amoeba	m	37	81	22	29	15		184
	f	21	102	15	37	31	7	213
Total		58 (14.6%)	183 (46%)	37 (9.3%)	66 (16.6%)	46 (11.6%)	7 (1.9%)	397 (6.4%)
Giardia	m	15	206	11	17	20	5	274
	f	17	318	23		33	3	394
Total		32(5%)	524(78.4%)	34(5.1%)	17(2.5%)	53(8%)	8(1%)	668 (10.8%)
Food poisoning	m	118	579	35	65	38	35	870
	f	105	617	57	82	41	20	922
Total		223 (12.4%)	1196 (66.7%)	92 (5.1%)	147 (8.2%)	79 (4.4%)	55 (3.2%)	1792 (29%)
Bacterial infection	m	371	507	331	342	327	53	1931
	f	224	469	213	221	206	59	1392
Total		595 (18.2%)	976 (32.1%)	544 (16.3%)	563 (17%)	533 (16%)	112 (0.4%)	3323 (44%)
Total		908 (14.7%)	2879 (46.6%)	707 (11.4%)	793 (13%)	711 (11.3%)	182 (3%)	6180 (100%)
								6180

5. Discussions

This study assessed the prevalence of acute diarrhea and its causative agents in Debay Tilatgin woreda kuy town, northwast Ethiopia in 2023G.C. In this study the prevalence of acute diarrrehea within 1 to five years children was the highest (65%) which was higher than other study which were conducted in Jabithennan northwest Ethiopia 20.8%().We also found that diarrhoea was reported slightly more often among girls compared to boys. In contrast, diarrhoea was more frequent among boys in a study conducted in Sudan (Badawi *et al.*, 2024). Many cases of diarrhea are due to an infection in the gastrointestinal tract For diarrhea infection the microbes are responsible. Trusted Source for this infection indicates bacteria, and parasitic organisms The most commonly identified causes of acute diarrhea in the United States were the *bacteria Salmonella, Campylobacter, Shigella, and Escherichia coli* (Paul, 2024), that was similar with our study results. Inflammatory bowel disease (IBD) is another cause of chronic diarrhea. IBD describes either ulcerative colitis or Crohn's disease (Aliu *et al.*, 2024). But in my study around no data available Other finding explained in Senegal, showed that there was an overt preference for boys over girls that might also affect how mothers or caregivers take care of children. For example, the 2014 Senegalese DHS indicates that care for diarrhoea concerns was sought more frequently for boys (36%) than for girls (29%) (Marbaniang, 2023). This suggests that boys suffer more frequently from diarrhoea compared to girls, unless there is a tendency to take girls to the doctor less often, But According to my finding girls (50.5%) were femals more affected by diarrhea than boys (49.5%).The study showed that majority of the patients and the society today has more suffer to acute diarrhea that the incidence is not consistent from year to year as recorded in the health center. A total of 6180 individuals were recorded as Diarrhea patients. There was variation in age categories between recorded patients; thus, 660, (10.7%) were less than 1 year, 4019, (65%) were among 1 to 5 years, 503 (8.1%) were from 6 to 14 years, 367, 8.1(8%) were from 15 to 29 years, 318, (7%) were from 30 to 64 years and 82, (2%) were greater than 65 years. From the study acute diarrhea is increase since 2021G.C and decrease since 2023G.C. except since 2020G.C acute in kuy town is decrease as the time increase. The age group between 1 to 5 years-were mostly infected with acute diarrhea 4019(65%) table (1). that is greater than another study of Diarrhea-related diseases rank high among the top ten diseases and about 54% of diseases diagnosed and treated in health facilities are water, sanitation and hygiene related (Mazengia & Worku, 2009). Another study shown that females are less aware than males because of this they are more affected than a male that is the data survey was 39% of males and 24% of females aware of acute diarrhea (CSA, and ICF, 2016) and the research conducted in Ghana about awareness of acute diarrhea related knowledge is

that females were 98% aware and males were 99% aware (GAC, 2004). Most of the respondents (73.7%) were living in unsafe way and 26.3% were living in standard. The incidence of acute diarrhea has increased from year to year. In this study acute diarrhea incidence is 55.7% that is 4.5% in 2014 and it has increased to 38.5% in 2018 it is greater than similar study conducted in Latin America has increased by 27% from 2004 to 2007 (UNAIDS, 2008) and also conducted study on assessment of acute diarrhea incidence in Uganda has increased by 22.4% from 2013 to 2014 (UAC, 2014). Acute diarrhea incidence is higher in less educated than in more educated that was about 157 (40.9%) were infected and 67 (17.4%) were infected by acute diarrhea respectively. That was much higher as compared with another finding done in Ghana 3.6% less educated and 2.7% more educated were infected with acute diarrhea (GAC, 2004). They are often highly mobile and play unsupervised within the community environment, where there is a high level of contamination. This finding was consistent with other reports, which found that parental occupation was associated with diarrhea occurrence (Akinyemi, 2022).. A study in southwest Ethiopia did not find a significant association between drinking water sources and the risk of diarrhoea either (Fentie *et al.*, 2024). In contrast, two different studies from Ethiopia found that water sources are an important environmental predictor of diarrhoea morbidity (Geremew *et al.*, 2024). Different researchers found that the lack of treatment of stored drinking water was positively associated with the prevalence of diarrhoea. Even if all the respondents were not aware as reported in another study (Zenebu *et al.*, 2015), the percentage response of respondent (96.9 %) in the other study suggested a considerable awareness was already present among them. This was comparable to similar study done in Gonder secondary school students in northern part of Ethiopia (Yitayal *et al.*, 2011). As expected, the decreasing level of awareness was found to be closely associated with their knowledge of acute diarrhea of the society. As a limitations we have, because of natural and artificial disaster were occurred; I could not incorporate all available source which was done in Ethiopia in last years. Connection was also another problem that made me going back. Documentation of the health center was not good.

6. Conclusion and Recommendation

6.1 Conclusion

The study has some of important issues about the assessment of acute diarrhea incidence in Kuy. Even though there are some misconceptions of the knowledge of the societies on the basic concept of acute diarrhea transmission and prevention is high. In this cross sectional study, some of the major misconceptions towards acute diarrheas. Therefore, a continued awareness creation programs are required to bring the desired behavioral change and correct misconceptions. The study concluded that acute diarrhea incidence is increasing from year to year as well as it is time or season dependent. According this finding the number of diarrhea patients at Kuy health center from July 2018 to June 2015E.C was 6180 . Among these 3061 (49.5%) were males and 3119(50.5%) were females. In this finding female were more affected than male except the first and the last years of the study periods. Among factors that causes acute diarrhea, bacteria was the prominent factors of acute diarrhea where as amoeba was the lowest causes of acute diarrhea.

6.2. Recommendations

According to the finding of this study, additional efforts should be desired to scale up the assessment of acute diarrhea incidence and to correct misconceptions among people on acute diarrhea preventive measures by the concerned bodies.

- The Woreda health center principals should be given attention to better implementation of prevention using at the existing programs to reduce diarrhea transmission, misconceptions, and to develop positive attitude towards patients.
- They have to aware the town community on the importance of prevention and practiced them to develop the skill to use it correctly.
- Creat programme and aware the community about acute diarrhea
 - Since some misconceptions on the way of diarrhea transmission and prevention and negative attitudes, all the concerned stakeholders should be integrated to modify these situations.
 - Along with new action strategies, attention should be given to better coordination and follow up the implementation of Hygiene related services at the community level.
 - Further researches are needed to explore acute diarrhea and other determinant factors. This is because of the dynamic nature of diarrhea as it could be changed as a function of time.

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