



**COLLEGE OF NATURAL AND COMPUTATIONAL
SCIENCES**

DEPARTMENT OF ZOOLOGICAL

**DIARRHEA PREVALENCE IN CHILDREN UNDER FIVE YEARS OF
AGE IN ADDIS KETEMA SUB CITY: THE CASE OF MILLENNIUM
HEALTH CENTER**

BY:

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**A thesis submitted to Addis Ababa University College of Natural and
Computational Sciences Department of Zoological in partial fulfilment of the
requirements for the degree of master of Science in Biology**

AUGUST 2024

ADDIS ABABA; ETHIOPIA

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Approval Sheet

Prevalence of diarrhea in children under five years of age in Addis Ketema Sub City: the case of Millennium Health Center" submitted to the Department of Zoological Sciences, College of Natural and Computational Sciences, Addis Ababa University, as partial fulfillment of the requirements for the M.Sc. degree in biology.

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DEPARTMENT OF ZOOLOGICAL

This is to certify that the thesis entitled "prevalence of diarrhea in children under five years of age in Addis Ketema Sub city: the case of Millennium Health Center" submitted by Melese Bayu in partial fulfillment of the requirements for the degree of MSc in biology is an original work carried out by the candidate under advisor Asnake Desalegn (Ph.D.)

Declaration

I, the undersigned, declare that this research study titled "diarrhea prevalence in children under five years of age in addis ketema sub city: the case of Millennium Health Center" prepared under the guidance of Asnake Desalegn (Ph.D.). All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for earning any degree.

Name

Signature and Date

Acknowledgment

First and foremost, I am very grateful to the almighty god for giving us priceless health, wellbeing and support throughout our life. I would like to send sincere gratitude and invaluable acknowledgments to my advisor **Asnake Desalegn** (Ph.D.) for his scientific guidance, encouragement, comments and suggestions and Addis Ababa University for sponsoring this research. Most importantly, I would like to thanks Millennium Health Center administrator Miss Tinsae Firew for her great support during collecting data.

Acronyms and Abbreviations

E.coli	Escherichia coli
EPEC	Enteropathogenic E. coli
ETEC	Enterotoxigenic E. coli
MCEE	Maternal and Child Epidemiology Estimation
ORS	Oral Rehydrated Salt
PLOS	Public Library of Science
UNICEF	United Nations International Children's Fund
WHO	World Health Organization

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Abstract

Diarrheal diseases remain a major public health issue globally, particularly affecting children under five years old in low-income regions like Sub-Saharan Africa and Ethiopia. In Addis Ababa, the Millennium Health Center in Addis Ketema Sub City serves as a crucial facility for addressing this problem. This study aims to assess the prevalence of diarrhea among children under five years of age attending care at the Millennium Health Center from 2011 to 2015 E.C. A retrospective cross-sectional study was conducted using secondary data from medical records at the Millennium Health Center. The study revealed gender-related similarities in diarrhea prevalence, with no significant differences observed between male and female children. The study included 45,970 children under five years old admitted between 2011 and 2015 E.C. Data on diarrhea cases, treatment types, and seasonal variations were analyzed to determine prevalence rates and trends. Out of 45,970 admitted, 2,249 cases of diarrhea were recorded, resulting in an overall prevalence rate of 4.89%. The prevalence varied annually, with rates ranging from 3.58% to 6.81%. Notably, there was a decline in prevalence from 2011 to 2014, followed by a significant increase in 2015. Treatment for diarrhea consistently included Zinc and Oral Rehydration solution (ORS), with a minor addition of ORS-only treatment in 2014. The study revealed significant fluctuations in diarrhea prevalence among children under five at the Millennium Health Center. Despite improvements in the initial years, the rise in prevalence in 2015 highlights ongoing challenges. The consistent use of Zinc and ORS underscores effective management strategies, but the increase in cases suggests a need for enhanced preventive measures. The increase in prevalence in 2015 E.C. warrants further investigation to address potential gaps in healthcare delivery and environmental factors.

Keywords: Diarrhea, Children under Five, Prevalence, Millennium Health Center, Addis Ketema, Urban Health, Water Quality, Sanitation.

1 INTRODUCTION

1.1 Background of the Study

Insufficient access to clean drinking water, inadequate sanitation facilities, and poor hygiene result in the deaths of millions of people, particularly children. Enhancing the quality of drinking water has been shown to lead to significant health improvements, while increasing the availability of water supports better hygiene practices. Enhancing the quality of drinking water has been shown to provide significant health benefits. Providing more water enables better hygiene practices, and improving water quality helps minimize the intake of harmful pathogens. Health experts widely acknowledge that ensuring microbiologically safe water is crucial in preventing the spread of waterborne diseases (WHO, 2002). When children experience fewer illnesses, they can consume and absorb more nutrients, leading to better overall nutrition. Additionally, a healthier adult population tends to be more productive, and enhancements in water and sanitation can boost income and the ability to obtain food. Improved water access also saves time for primary caregivers, allowing them to prepare more or higher-quality meals for children (Esrey, 1993).

Diarrhea is characterized by the passage of loose stools three or more times a day or more frequently than is typical for the individual. It typically indicates a gastrointestinal infection, which can be brought on by a variety of viruses, bacteria, and parasites (WHO, 2013). Each year, approximately 2.5 billion cases of diarrhea occur among children under five years old, with estimates indicating that the overall incidence has remained relatively stable over the past two decades (WHO U. /., 2009). In the world, diarrheal illnesses account for 9% of child fatalities, making them the second most common cause of death for children under five (CDC, 2013). Acute diarrhea leads to significant loss of water and salts from the body, which can cause severe dehydration and even death within a short period. It can also lead to malnutrition, making children more vulnerable to related infections. Infectious diarrhea is transmitted through the fecal-oral route, either via person-to-person contact, contaminated water and food, or direct contact with the mouth. Conditions such as inadequate water supply, unsanitary environments, and the presence of flies create ideal situations for the spread of diarrheal diseases. These diseases remain a major public health challenge in low-income countries, contributing to high rates of illness and death among children under five (WHO, 2015)

Globally, nearly 1.7 billion cases of diarrheal infections occur in children each year (WHO, 2017). Diarrheal diseases are one of the leading causes of morbidity and mortality and accounts for more deaths in early childhood after the neonatal period. 525,000 children of under-5 years old die due to diarrhea every year, roughly 2195 every day (UNISEF, 2016). Diarrheal infections are linked to approximately 1.3 million deaths annually, with the majority of these occurring in resource-limited countries (Taha, 2018). In Africa, diarrhea is the leading cause of disease and death among young children, with nearly 50% of all childhood deaths from diarrhea occurring in this region (Walker CLF, 2012).

Sub-Saharan Africa has the highest rates of child mortality under the age of five, with 1 in 9 children dying before their fifth birthday over 16 times the average rate for developed regions (1 in 152) and more than 4 times that of Southern Asia (1 in 16). While under-five mortality rates have significantly decreased worldwide, from 31% in 1990 to 17% in 2011, these rates remain concentrated in Sub-Saharan Africa and Southern Asia. In Sub-Saharan Africa, approximately 11% of under-five mortality is attributed to diarrhea (Liu, 2017).

In Ethiopia, diarrheal disease remains a significant public health issue. According to the 2010 report by the Ministry of Finance and Economic Development (MOFED), 20% of childhood deaths in the country were due to diarrhea. The 2011 Demographic and Health Survey (EDHS) also revealed that 13% of children had experienced diarrhea in the two weeks prior to the survey. The incidence of diarrheal diseases leading to avoidable deaths is higher in Ethiopia compared to other Sub-Saharan African countries. This is partly due to poor living conditions, high rates of illness, inadequate access to safe drinking water, poor sanitation and hygiene, as well as overall poorer health and nutritional status (Bikes, 2017).

In Ethiopia, both morbidity reports and community-based studies indicate that diarrhea is a major public health issue, leading to significant morbidity and mortality. A recent World Health Organization report highlighted that approximately 80% of diseases in Ethiopia are linked to infectious diseases associated with personal and environmental hygiene and malnutrition. Many of these infections are caused by waterborne and foodborne pathogens and parasites. Additionally, the report ranks Ethiopia 35th out of 172 countries globally in terms of diarrheal disease death rates, with 49.54 deaths per 100,000 people (WHO, 2014).

Malnutrition and diarrheal mortality are bidirectional linked (Ogayo, 2023), Malnutrition weakens the immune system, making individuals more susceptible to infections like diarrhea. Conversely, diarrhea exacerbates malnutrition by reducing appetite, decreasing energy intake, causing nutrient loss, and impairing nutrient absorption (Neumann CG, 2004).

In Ethiopia, various studies have aimed to estimate the prevalence of diarrheal diseases in children under five and identify modifiable risk factors. However, the findings from these small and fragmented studies have shown considerable variability and remain inconclusive. While understanding prevalence is important, identifying modifiable risk factors is crucial for developing effective interventions. The absence of a comprehensive nationwide study to determine both the prevalence and determinants of diarrhea among under-five children represents a significant gap in the research.

Therefore, the current study aims to assess the prevalence of diarrheal cases and their associated factors among children under five years old in Addis Ababa city administration millennium Health Center.

1.2 Statement of the Problem

Over half of the estimated 2.5 billion cases of diarrhea among children under five that are recorded each year occur in Africa and South Asia (Boschi, 2009). According to estimates from the World Health Organization (WHO), diarrhea causes 1.4 fatalities out of every 100 children under the age of five every year.

Diarrheal illnesses account for more than 90% of fatalities in children under five in Africa, especially in sub-Saharan Africa (WHO, 2002). Lack of access to clean drinking water, inadequate sanitation and hygiene, and inadequate nutrition have all been blamed for this high death rate (WHO, 2002). Five episodes of diarrhea are experienced by children on the continent on average each year, and dehydration brought on by diarrhea results in the deaths of almost 800,000 youngsters (Gebrehiwot, 2001).

Diarrheal disease is a serious public health concern in Ethiopia, as evidenced by morbidity data and community-based studies. It causes significant morbidity and mortality among children (WHO, 2002). According to Morbidity-Mortality-and Treatment (MMT) surveys carried out in Ethiopia over a period of time, children get diarrhea five times a year on average. The incidence

rate of diarrhea during a two-week period is roughly 26%. Approximately 10 deaths per 1,000 children under the age of five are linked to diarrhea (WHO, 2002).

A comparative study examining child health in urban areas of Brazil, Egypt, Ghana, and Thailand found that environmental factors; including sources of safe drinking water, Water accessibility and quality, access to restrooms, and housing conditions—are strongly associated with the prevalence of diarrhea in children (Lush, 1995).

According to the Federal Ministry of Health's 2005 health and health-related indicators report, all forms of diarrheal diseases account for nearly 20% of the total morbidity among children under five. Addis Ababa, which experiences significant in-migration, faces severe overcrowding, a shortage of housing, inadequate water and sanitation services, and high unemployment rates. The city's water supply authority is capable of providing 350,000 cubic meters of water per day, while the total demand is 670,000 cubic meters, as reported in a special bulletin from December 2007 E.C (Getachew, 2023).

The health centers in Addis Ketema Sub City play an important contribution in providing healthcare services to the community. However, they often operate under resource constraints and face challenges in effectively managing and preventing diarrheal diseases among children. By focusing on the prevalence and contributing factors of diarrhea in this specific context, this study aims to provide valuable insights that can inform policy decisions, improve healthcare delivery, and ultimately reduce the burden of diarrheal diseases in children under five in Addis Ketema Sub City (Getachew, 2023).

Therefore, this study aims to fill the gap by examining the prevalence and potential solutions to mitigate the impact of diarrheal diseases in the vulnerable population among under five children in Addis Ababa city administration Addis ketema sub city millennium Health Center.

1.3 Research Questions

1. What percentage of children under five years old at Millennium Health Center are affected by diarrhea?
2. Are there differences in the rates of diarrhea throughout different year in the study population?
3. How can manage to reduce diarrhea prevalence in children under five years in Addis Ketema Sub City?

1.4 Objective of the Study

1.4.1 General Objective

This study aimed to determine the rate of diarrhea among children under five who are treated at Millennium Health Center in Addis Ketema Sub City, Addis Ababa City Administration.

1.4.2 Specific Objectives

- To evaluate the frequency of diarrhea in children under five years old attending Millennium Health Center.
- To examine the annual variations in the incidence of diarrhea among children under the age of five.
- To manage the diarrhea prevention and control based on the findings.

1.5 Significance of the Study

This study on the prevalence of diarrhea among children under five years old at Millennium Health Center provides valuable insights into the public health in Addis Ketema Sub-City, Addis Ababa city administration. The significance of the study is:

- The study provides a foundation for future research on diarrheal diseases in urban Ethiopian contexts. It identifies gaps in current knowledge and suggests areas for further investigation.
- The findings provide valuable insights into the prevalence of diarrhea in an urban setting, which is essential for developing targeted public health interventions.
- The study contribute to the evidence base needed for informed decision-making at both regional and national levels.

1.6 Scope of the Study

The scope of the study was confined in terms of geography, concept, methodology, and time. Geographically, the research will be limited to Addis Ketema Sub City in Addis Ababa, Ethiopia, with a specific focus on Millennium Health Center.

Conceptually, based on prior studies the researcher was assessed Diarrhea Prevalence in Children under Five Years of Age in Addis Ketema Sub City: The of Millennium Health Center. The study utilizes secondary data from the recorded history of children under five who have visited the health centers. This includes medical records and health center databases.

Methodologically, a retrospective cross-sectional study design was employed, using secondary data obtained from Millennium Health Center that recorded.

1.7 Limitation of the Study

The study focuses on children under five years of age attending the Millennium Health Center. It does not extend to other age groups, other health centers, or children not attending the health center. The study is limited to data collected during a specific period. The scope of analysis is confined to this timeframe, which impacts the relevance of the findings to other periods. The study is geographically limited to the Millennium Health Center in Addis Ketema Sub City, Addis Ababa. Findings may not be generalizable to other regions or health centers

2 LITERATURE REVIEW

2.1 Over view of Diarrheal Definition

Diarrhea refers to the occurrence of three or more loose or liquid stools each day, or frequency that exceeds the individual's normal pattern (WHO, 2013). It typically serves as a sign of gastrointestinal infection, which can result from various bacterial, viral, or parasitic agents such as infections are transmitted through contaminated food or drinking, or through person-to-person contact due to inadequate hygiene practices. Severe diarrhea can lead to significant fluid loss and poses a serious risk to life, especially for young children and individuals who are malnourished or have weakened immune systems (WHO, 2013). These illnesses are defined by disturbances in intestinal function, leading to abnormal stool consistency and frequency (Afroza Khatun, 2013). Diarrheal diseases are categorized by their clinical presentation into two types: persistent diarrhea, which lasts 14 days or more, and acute watery diarrhea, characterized by the absence of blood and lasting less than 14 days (UNISEF, 2009).

Acute diarrhea is marked by a sudden onset of frequent, watery stools that lack visible blood, lasting less than two weeks, while acute bloody diarrhea involves blood and also lasts under 14 days. Typically, episodes of acute watery diarrhea resolve within 72 hours after they begin. The primary cause of mortality associated with acute diarrhea is dehydration, which may be accompanied by symptoms such as flatulence, malaise, and abdominal discomfort. Nausea, vomiting, and fever may also be present. The most common sources of acute watery diarrhea are infections from viruses, bacteria, or parasites. Bacterial infections can also result in rapid food poisoning. While enteric pathogens responsible for diarrhea in developing nations are largely similar to those found in developed countries, their relative prevalence varies (Jay, 2013).

On the other hand, persistent diarrhea is described as a diarrheal episode of presumed infectious origin that endures for an unusually extended period, lasting at least 14 days (Jay, 2013). It is often linked to malnutrition, stunted growth and development, vitamin A deficiency, and systemic infections such as respiratory and urinary tract infections, complicating treatment (Desalegn M. S., 2017)

2.2 Prevalence of Diarrheal Diseases among the Under-Fives

Diarrhea is one of the primary causes of mortality among children, responsible for around 9 percent of all deaths in children under the age of five globally in 2019. This amounts to more than 1, young

lives lost daily equating to roughly 484, 000 fatalities each year, despite the availability of a straightforward treatment method (UNISEF, 2020)

The majority of diarrheal deaths occur in children under five years old, particularly in South Asia and sub-Saharan Africa. Even with this serious impact, progress is being made. From 2000 to 2019, the annual number of diarrheal deaths among this age group fell by 61 percent. Many additional lives could be saved through basic preventive measures (UNISEF, 2020).

Pneumonia, diarrhea, and malaria continue to be major causes of death for children under five, accounting for approximately 1.3 million, or about 40 percent, of under-five mortality in sub-Saharan Africa, and around half a million, or 25 percent, in Southern Asia. In 2013, diarrhea led to the deaths of about 2 million children, representing almost one-third of the total global deaths in this age group (UNICEF, 2014)

The youngest children are especially at risk, as the incidence of severe gastroenteritis is highest during the first two years of life (Oloruntoba EO, 2014). The impact of diarrhea is particularly pronounced in marginalized communities across resource-scarce countries (Bulled N, 2014). Despite improvements in living conditions, advancements in sanitation, water treatment, and food safety awareness, diarrheal diseases continue to inflict significant economic and social burdens (Reddington K, 2014).

2.2.1 Epidemiology of Diarrheal Diseases in Under Five Children

Diarrheal diseases rank as the second leading cause of death among children under of the five, resulting approximately 525,000 fatalities each year (WHO, 2017). Diarrhea can persist for several days, causing the body to lose vital water and salts essential for survival. Historically, severe dehydration and loss of fluids were the main reasons behind deaths due to diarrhea. However, currently, other factors, such as septic bacterial infections, are likely increasingly contributing to the total number of deaths associated with diarrhea. Children who are malnourished or have compromised immune systems, along with individuals living with HIV, are particularly vulnerable to life-threatening forms of diarrhea (WHO, 2017).

Sub-Saharan Africa continues to have the highest rates of child mortality for those under five, with 1 in 9 children not reaching this age, which is more than 16 times higher than the average risk in developed regions (1 in 152) and Southern Asia (1 in 16). The majority of under-five mortality

cases are concentrated in Sub-Saharan Africa and Southern Asia, whereas the global rate for these deaths declined from 31 percent in 1990 to 17 percent in 2011. In Sub-Saharan Africa, approximately 11% of under-five fatalities are attributed to diarrhea (Liu L, 2017).

2.2.2 Prevalence of Diarrhea in Under Five Children in Ethiopia

The 2016 Demographic Health Survey conducted in Ethiopia revealed that 12% of children experienced diarrhea in the two weeks prior to the survey across the nation (Woldu, 2016). In 2017, the same country indicated that the prevalence of diarrhea among children under five was 20% during a two-week period. Research in Ethiopia has demonstrated that the incidence of diarrhea in both urban and rural settings stands at 13%. The rate of diarrhea was notably higher among children aged between 6 to 23 months. In southern Ethiopia, 25.5% of children faced episodes of diarrhea, with three-quarters of these cases occurring in rural areas (Macro, 2011)

Furthermore, a community-based cross-sectional study in the Jabitehnan district within the West Gojjam Zone of the Amhara Region reported a 21.5% prevalence of diarrhea over a two-week period (Desalegn M. a., 2017) In more isolated and pastoralist regions, the prevalence is anticipated to be greater due to limited access to drinking water, inadequate sanitation, and lower levels of education and awareness. For instance, a study conducted in the Somali Region of Eastern Ethiopia, an area primarily inhabited by pastoralists, found that the two-week prevalence of diarrhea among children under five was more than twice the national average (Hashi, 2017).

Benna Tsemaye District is identified as one of the pastoralist districts within the South Omo Zone of Southern Ethiopia. According to the District Health Office report for 2016/17, 28.5% of outpatient visits for children under five in the district were attributed to diarrheal diseases, making it the leading cause of morbidity in the area. Similarly, Laelay Michew District in the Tigray Region of Northern Ethiopia reported a prevalence of 17.7% (17.7%) (Angesom Teklit, 2015).

2.2.3 Factors Predisposing To Diarrheal Disease among Under Fives

Diarrheal illness in children under five is linked to a plethora of risk factors. As seen in appendix five, there are numerous routes for the causing organisms to enter the body. The two most important causes that have been mentioned are increased exposure to enteropathogens and environmental pollution. Malnutrition, immunodeficiency, measles, early age, and not having breastfed exclusively or predominantly are additional concerns. Moderate to severe stunting raises the likelihood of diarrhea-related death by 1.6 to 4.6 times, while malnutrition increases the risk of diarrhea and its associated mortality. The proportion of infectious diarrhea deaths that may be

attributed to nutritional deficiencies varies depending on the incidence of deficiencies; sub-Saharan Africa, south Asia, and Andean Latin America have the greatest proportions of attributed deaths. Micronutrient malnutrition carries very significant risks; children deficient in vitamin A had a 20–24% higher chance of dying from malaria, measles, and diarrhea. According to estimates, a zinc shortage increases the probability of dying from pneumonia, malaria, and diarrhea by 13–21% (Kliegman, 2014).

2.3 The Main Causative Agents of Diarrhea

Infectious diarrhea can be caused by a variety of pathogens, including bacteria, viruses, and parasites. While rotavirus is the most prevalent cause of death for children under five, norovirus is the most common cause of viral diarrhea in adults. Numerous illnesses are caused by Astroviruses and Adenovirus types 40 and 41. Although infections by the *Salmonella*, *Shigellae*, and certain strains of *Escherichia coli* (*E.coli*) genera are widespread, *Campylobacter* is the most common cause of bacterial diarrhea. Indicator organisms are those that belong to all coliform groupings. Because of its presence in water, an examination of all water system operations and facilities is necessary to ascertain how these organisms got into the water system (Curtis C. a., 2004).

2.4 Transmission Routes

The primary oral channel for the transmission of the infectious pathogens linked to diarrheal illness is feces (WHO, 2008). It is well recognized that a broad range of bacteria, viruses, and protozoa pathogens can induce diarrhea when they are expelled in human and animal feces. *Escherichia coli* (*E.coli*), *Salmonella* spp., *Shigella* spp., *Campylobacter jejuni*, *Vibrio cholera*, Rotavirus, *Giardia lamblia*, *Cryptosporidium* spp., and *Entamoeba histolytica* are a few of the most significant of these (WHO/UNICEF, 2010). According to Hunter (1997), the bulk of diarrheal illnesses in developing nations are thought to be caused by bacteria agents, whereas viral and protozoa agents often cause more cases in industrialized nations.

2.5 Types of Diarrhea

Based on clinical syndromes, diarrhea can be categorized into four groups, each of which represents a distinct pathophysiology (Banerjee B., 2003). These groups include acute watery diarrhea, dysentery, persistent or extended diarrhea, and chronic diarrhea.

2.5.1 Acute Watery Diarrhea

This medical word describes diarrhea that appears suddenly and lasts for less than two weeks. The diarrhea is watery, loose, and frequent, with no visible blood. In most cases, episodes of acute,

watery diarrhea resolve 72 hours after they begin. Discomforting, sluggishness, and stomach ache could accompany it. There may be a possibility of vomiting, nausea, and fever. Viral, bacterial, and parasitic diseases are the usual causes of acute diarrhea with water. Intense food sickness can also be brought on by bacteria. Although the amounts of the enteric microorganisms that cause diarrhea differ, they are generally the same in developing and developed nations. In nations with inadequate sanitation, bacterial diseases tend to be more significant. In underdeveloped nations, the most common causes of diarrhea include *Campylobacter jejuni*, *Cryptosporidium*, *Shigellae*, *Vibrio cholerae*, Rotavirus, and enterotoxigenic *E. coli* (ETEC) (Ademola, 2018).

Dehydration, which happens when the body loses too many fluids and minerals (electrolytes), is the most serious consequence. Dehydration worsens when vomiting occurs. Due to their relatively higher body surface area, high body water content, and quick body water turnover, newborns and young children are particularly vulnerable to dehydration (Molbak, 2000). Just dry mouth and thirst may be experienced by patients with modest dehydration. Orthostatic hypotension with syncope (fainting while standing due to a decreased blood volume, which causes a drop in blood pressure upon standing), a diminished urine output, severe weakness, shock, kidney failure, confusion, acidosis (too much acid in the blood), and coma are all possible consequences of moderate to severe dehydration.

2.5.2 Persistent Diarrhea

Persistent diarrhea, defined as diarrhea lasting for more than 14 days, is a significant health concern, particularly in young children. It is often associated with various factors, including nutritional deficiencies, infections, and chronic conditions. (Ademola, 2018). Ten percent of diarrheas in children from poor nations continue longer than three months, with babies experiencing this condition at a higher rate. Dysentery or watery diarrhea may be the acute form of the episode. Most people who get this diarrhea lose a significant amount of weight. Approximately one-third to half of all deaths related to diarrhea may be caused by it. Even milder episodes that don't result in death add to the high mortality rates that are often linked to malnutrition in underdeveloped nations, where persistent diarrhea is a primary cause of malnutrition (UNICEF, 2021).

2.5.3 Chronic Diarrhea

Chronic diarrhea is defined as diarrhea lasting for more than four weeks. It is characterized by frequent, loose, and watery stools, which persist over an extended period, leading to potential complications such as dehydration, malnutrition, and electrolyte imbalances (Ademola, 2018). Pathophysiologically, chronic diarrhea can be divided into several categories: inflammatory diarrhea (resulting from regional enteritis, ulcerative colitis); osmotic or malabsorptive diarrhea (resulting from lactose intolerance, tropical spruce, celiac disease, Whipple's disease, chronic pancreatitis, bile duct obstruction); dysmotility diarrhea (resulting from conditions like diabetic neuropathy or irritable bowel syndrome); and factitious diarrhea (self-induced, e.g., from laxative abuse) diarrhea (Armon, 2001).

2.6 Determinants of Diarrheal Prevalence

2.6.1 Socio-Economic Factors

A study by Victora et al. (2003) in the Lancet found that children from lower-income households are more likely to suffer from preventable diseases such as diarrhea and pneumonia, leading to higher mortality rates. The research emphasizes that socioeconomic inequalities are a significant determinant of child mortality in developing countries.

According to Pelly (2005); the majority of instances of diarrhea were found in communities with low living standards, poor sanitation, no latrine, and insufficient water supplies. Moms with higher levels of education reported fewer cases of diarrhea in a cross-sectional survey carried out in the Republic of Congo (Mock, 1993). A further study conducted in Zaire revealed a substantial correlation between the occurrence of diarrhea and the educational attainment of both parents (Marjatta, 2004)

A key determinant of diarrhea is family affluence or income, through which variables such as parental education and occupation work. Children from the medium- and high-socioeconomic groups had a 33–38% lower risk of experiencing diarrhea than children from the low-socioeconomic group, according to a study on the predictors of diarrhea among children under five (Gebrehiwot, 2001). According to a different study, there was a strong correlation between diarrheal morbidity and the occupation of both parents. Children of housewives have a higher risk of diarrhea than children of government employees and those who work in other private sectors (Teklu, 2003).

2.6.2 Environmental and Behavioral factors

According to Curtis, Cairncross and Yonli (2004), infectious pathogens, which include bacteria, viruses, protozoa, and parasites, are the main cause of diarrhea and are expelled in the feces of infected persons. Human waste can spread disease through direct contact or through contact with animals if it is not contained. Therefore, in order to stop the transmission of illness, it is crucial to dispose of children's feces properly (EDHS, 2005). According to (Cornville, 2003), it is evident that human excreta needs to be handled like a potentially hazardous item.

In the Amhara region, just 12.4% of households reported having children under five who used latrines, according to a research conducted in the Hulet Bjuu Enessie District. At three years old, about one-third of them started using the restroom, and by four years old, about two-thirds. A total of 108 households (or 38.9%) threw their children's excrement outside of their homes, into the garden or the jungle (Andualem, 2007).

Young children are actually a major source of illness for others, as their stools are often contaminated with enteric bacteria. According to studies, there is a 30–40% lower incidence of diarrhea when children's feces are disposed of hygienically (WHO, 2000). Therefore, proper disposal of the feces of all young children is an important aspect of diarrhea prevention.

As a result, a crucial component of diarrhea prevention is the appropriate disposal of all young children's excrement. Health gains do not always follow improvements in access to clean water and sanitation. For the effects on health to become apparent, hygiene education is frequently added. The three most crucial hygiene lessons to teach are how to properly dispose of waste, wash your hands, and preserve drinking water (Daane J., 1997). Numerous global, daycare, and community studies have shown that frequent hand washing—both with and without soap—as well as the use of locally available alternatives (such as ash, leaves, and soil) reduce diarrhea. According to Hunter (1997); the sum of these studies shows that hand washing alone reduces diarrhea by 33 percent. Reviewing further data indicates that hand washing with soap could save lives by reducing the frequency of diarrhea by 47%. (Bank, 2003).

Diarrheal illness in children under five is positively impacted by improved eating practices. In order to reduce the chance of bacterial contamination, moms should be aware that feeding their baby should be done with a clean spoon, from a cup, or with a specific feeding spoon. At any age, it is not recommended to bottle feed. It is typically linked to a higher chance of getting sick, particularly diarrheal sickness. This is due to the challenge of adequately sanitizing the nipples.

Additionally, breastfeeding shortens the duration of postpartum amenorrhea and raises the chance of becoming pregnant (Markka, 2023).

2.7 Impact of Diarrheal Disease on Children

Diarrhea is a major cause of death, accounting for 2.5 million fatalities per year. Furthermore, this number frequently has enduring consequences on growth, cognition, physical fitness, nutritional condition, and academic achievement (Kosek, 2003). The effect of diarrhea on growth has been documented in several investigations (Molbak, 2000). According to Molbak (2000), infants who experienced diarrhea for more than 20% of the time had a weight deficit of about 370 grams at the time of the follow-up, which occurred after a year of age. Additionally, there was a variation in the impact on height according on age and gender. For instance, during infancy, boys who experienced diarrhea for 20% to less than 40% of the time were 5.1 mm shorter than those who did not, but girls showed no discernible difference in length. Between the ages of 1-4 years, when diarrhea was experienced for the same amount of time, boys and girls experienced a 2.1 mm and 3.0 mm height deficit, respectively (Molbak, 2000).

As to Checkley et al. (2003), infants who experienced diarrhea 10% of the time in their first 24 months of life were 1.5 cm shorter than those who never experienced it. Furthermore, diarrhea's detrimental effects on height differed according to age. There was a long-term, probably permanent, height disadvantage associated with diarrhea throughout the first six months of life. According to Gracey (1996), diarrhea has the biggest effects on a child's development during the first three years of life, especially in the second half of infancy (6–12 months) and the second year of life.

2.8 Treatment of Diarrhea

After being established in 1979, oral rehydration therapy (ORT) quickly emerged as the mainstay of the CDD program (Control of Diarrheal Diseases). ORT, which involved giving water, a carbohydrate, and sodium orally, was arguably the biggest medical breakthrough of the 20th century (Curtis V. C., 2000). Its remarkable efficacy in treating acute watery diarrhea has made a significant contribution to the reduction of diarrheal disease-related fatalities in children (EHP, 1997).

Though it's not always the best option, ORS-WHO (oral rehydration salts) can be seen of as a general-purpose, all-purpose treatment. But having one workable recipe that can be endorsed and

promoted globally is crucial. The therapeutic tool ORS-WHO is incredibly safe. There have been over two billion ORS doses given without any major side effects. As to Vesikari (1994), the use of antimicrobial medications for treating uncomplicated acute diarrhea is discouraged due to their lack of effectiveness. Symptomatic anti-diarrheal treatments are generally not indicated for treating acute diarrhea in children (Ademola, 2018).

Dietary principles are a general aspect of acute diarrhea case management. It states that nursing should not be stopped; feeding should be resumed based on age as soon as clinical signs of dehydration go away and should continue even if the child continues to have severe diarrhea. Ensuring proper dietary management both during and after diarrheal disease is critical to minimizing the harm that food withholding causes to the intestines, preventing or reducing nutritional damage brought on by the illness, reducing the length of the illness, and facilitating catch-up growth and a return to optimal nutritional status during the convalescent phase (Ademola, 2018)

2.9 Management Control and Prevention of Diarrhea

There are several ways to stop diarrheal illnesses from developing. Among these is breastfeeding, which gives babies the antibodies they need to fend against illnesses. Enhanced weaning techniques, appropriate use of enhanced weaning techniques, appropriate use of water for drinking and hygiene, hand washing, appropriate feces disposal, immunizations, and adequate diet (Nakagomi, 2010). The community health workers and village health workers must be used, and the populace must be educated about appropriate behaviors in order to put these methods into action. Oral rehydration therapy, or ORT for case management, is the oral delivery of electrolytes and water to replenish lost fluids. This is usually achieved by administering oral rehydration salts (ORS solutions).

Research suggests that ORT was a long-standing custom, according (WHO, 1999); The 1990s saw research show that adding glucose to a salt solution caused the intestines to; both salt and water (WHO, 2003). No absorption of water or salt was seen in the absence of glucose. According to the same study, the use of ORT in refugee camps during Bangladesh's liberation struggle resulted in a sharp drop in death rates from diarrhea (30%) to less than 3%. Aside from ORT, it's advised to eat appropriately when experiencing diarrhea.

Studies conducted in laboratories and clinical settings demonstrate that feeding during episodes of diarrhea improves the prognosis for diarrheal illnesses. These include a reduction in the amount of

stool produced, a shorter length of illness, a notable increase in weight, and better nutritional status (WHO, 2008). The age and diet of the kid determine what nutritional therapy is appropriate (Negga, 2010). The value of nursing is emphasized for newborns. For the first few months, the World Health Organization (WHO) advises exclusively breastfeeding.

3 METHODOLOGY

3.1 Study Area

The study was conducted at Millennium Health Center, situated in Addis Ketema Sub City, part of the Addis Ababa City Administration. Addis Ketema Sub City is one of the 11 sub cities of Addis Ababa, Ethiopia, covering an area of 742 hectares. It is located in the northwestern part of the city, not far from the center, with a population density of 343.79 persons per hectare, making it one of the most densely populated sub cities in Addis Ababa. Addis Ketema borders Gullele to the north, Arada to the east, Lideta and Kolfe Keraniyo to the south, and the Oromia region to the west.

The sub city is administratively divided into 14 woredas, with Woreda 8 selected as the focus of this research study due to its population density and public health challenges. As a highly populated sub city, Addis Ketema faces significant public health issues, particularly related to sanitation, overcrowding, and limited access to clean water, which are critical factors influencing the prevalence of diarrheal diseases in children under five.

A total of 87 staff members, including 32 males and 55 females. Among them, there are 2 doctors, 13 health officers, 25 clinical nurses, and 10 midwives and the remain are coworkers

Millennium Health Center provides a wide range of essential healthcare services to the community, with a focus on both preventive and curative care. The services offered include:

Nutrition Services; Psychiatric Services; Outpatient Services: General outpatient services for diagnosis and treatment of various health conditions. Immunization Programs: Prenatal and Postnatal Care: Comprehensive maternal health services, including care for pregnant women and support after childbirth. Family Planning: Non-Communicable Disease (NCD) Care: Managing chronic conditions such as hypertension, diabetes, and other non-communicable diseases. Delivery and Postnatal Care: Simple Surgical Operations:

These services make Millennium Health Center a vital healthcare facility for the residents of Addis Ketema, providing both preventive measures and treatments for conditions that significantly affect children under five, such as diarrhea. The center's focus on child health, maternal care, and community wellness aligns well with the objectives of this research study.

3.2 Variables

3.2.1 Dependent Variable

Prevalence of Diarrhea: The primary outcome variable is the number of diarrhea cases among children under five years of age, expressed as a percentage of the total admitted.

3.2.2 Independent Variables

Gender; the gender of the children (male or female) to assess if there is any difference in diarrhea prevalence between genders. Year of admission; the year (2011 to 2015 E.C.) to analyze trends and changes in diarrhea prevalence over time. Treatment type; the type of treatment administered (Zinc and ORS, ORS only) to evaluate the treatment protocols and their effectiveness.

3.3 Study Design

A retrospective cross-sectional study design was employed. This approach involved analyzing existing records from millennium health center to observe data collected at a single point in time while examining past events or exposures. By focusing on historical data, the study aimed to determine the prevalence of diarrhea among children under five years of age. This design is particularly useful for assessing outcomes based on past records without the need for longitudinal tracking of participants.

3.4 Study Population

The study population comprised children under five years old who were admitted to millennium health center in Addis Ketema Sub City from 2011 to 2015 E.C. This age group was selected to align with the focus of the study on early childhood health issues, specifically diarrhea, and to provide a clear picture of the prevalence and trends in this demographic.

3.5 Data Source

The data for this study was obtained from secondary sources, specifically the outpatient department (OPD) registration books at Millennium Health Center. These records provided detailed information on the admissions and cases of diarrhea among children under five years old during the study period. The OPD books are routinely used to log patient visits, diagnoses, and treatments, making them a reliable source of data for analyzing the prevalence of diarrheal diseases in the selected population.

3.6 Data Collection

Data was collected from history of children under five who visited Millennium health centers in Addis Ketema Sub City Millennium Health Center. The data collection period was cover the past five years to provide a comprehensive overview.

3.7 Inclusion criteria

The study included all children under five years old who attended Millennium Health Center during the specified period. This inclusive approach ensured that the study encompassed the entire target population within the health center, providing a complete overview of diarrhea cases and related trends.

3.8 Exclusion criteria

Children over five years of age and those presenting with emergency medical conditions were excluded from the study. This exclusion criteria was set to maintain a focused analysis on the under-five age group and to ensure that the data was relevant to the study's primary objective of assessing diarrheal disease prevalence among young children.

3.9 Data Analysis

Collect data from medical records of children under five who attended Millennium Health Center from 2011 to 2015 E.C. Use descriptive statistics; frequency distribution:

Calculate the number of diarrhea cases and total admissions for each year to determine the overall prevalence.

$$(Prevalence\ Rate = \left(\frac{Number\ of\ Diarrhea\ Cases}{Total\ Admissions} \right) \times 100\%)$$

Trend Analysis: Analyze the yearly prevalence rates to identify trends over the study period.

3.10 Ethical Consideration

Ethical approval and clearance was obtained from the research review committee of Addis Ababa University College of Natural And Computational Science Department Of Zoological Science then, data have been collected after necessary approval is obtained from Millennium Health Center prior to the commencement of the research. The data were only used for the purpose of academic research

3.11 Operational Definition

Diarrhea: diarrhea is defined as the passage of three or more loose or liquid stools per day, or more frequent bowel movements than usual, lasting for at least 24 hours. This definition is based on common clinical criteria and aligns with standard definitions us

Dehydration: occurs when you use or lose more fluid than you take in, and your body doesn't have enough water and other fluids to carry out its normal functioned in epidemiological research.

Prevalence: prevalence refers to the proportion of children under five years of age who experience diarrhea within a specified time period (e.g., in the past month) out of the total number of children under five years of age within the study area. It is typically expressed as a percentage.

Children Under Five Years Of Age: this category includes all individuals who are between 0 and 59 months old. This age range is chosen to align with common public health and clinical classifications.

Addis Ketema Sub City: this is a designated administrative region within addis Ababa, Ethiopia, where the study is conducted. The term refers specifically to the area covered by millennium health center.

Millennium Health Center: a healthcare facility located in addis ketema sub city, which provides medical services to the local population, including children under five years of age. The center serves as the focal point for data collection in this study.

4 RESULTS

4.1 Information

As shown figure -1; during the study period from 2011 to 2015 E.C., a total of 45,970 children under five years of age were admitted to the Millennium Health Center. The gender distribution was nearly equal, with 22,810 male and 23,160 female admitted. This balanced demographic provides a comprehensive view of the population attending the health center, allowing for a thorough analysis of the prevalence of diarrhea among both male and female children during these years.

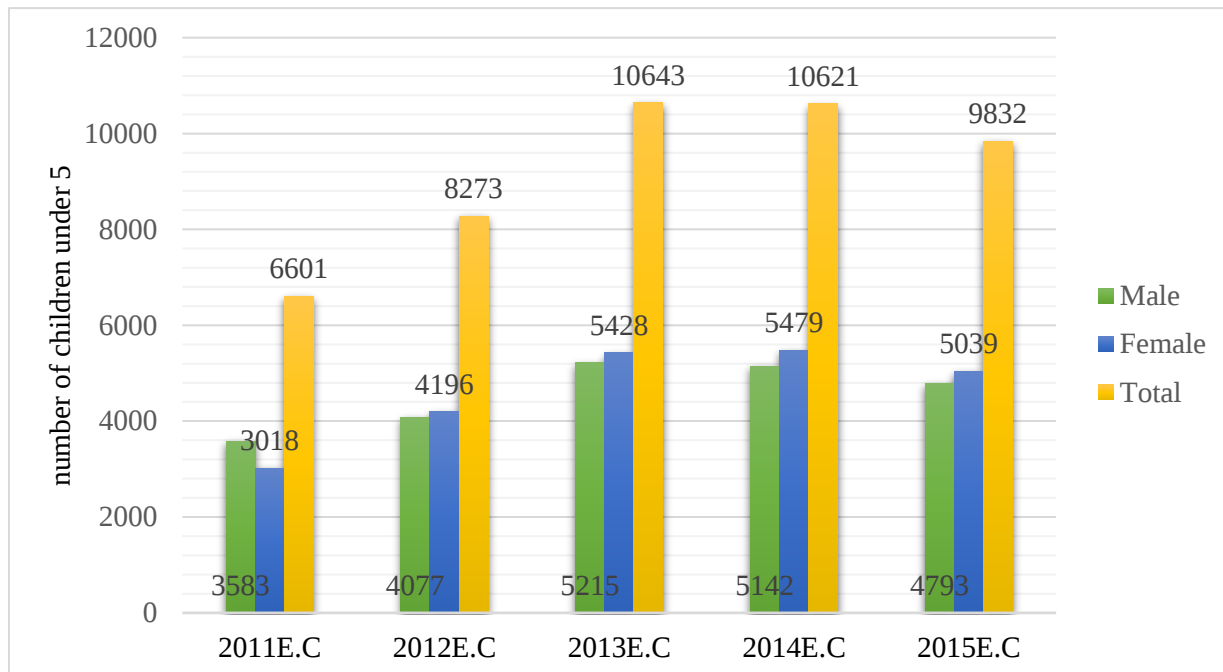


Figure 1: number of children admitted during period of study.

As shown figure 2, during the study period from 2011 to 2015 E.C., out of the 45,970 children under five years of age admitted to the Millennium Health Center, 2,249 total cases of diarrhea were reported. This indicates that approximately 4.89% of all admitted children were treated for diarrhea during these years. This prevalence highlights the significant impact of diarrheal diseases on the health of young children in this community, underscoring the need for targeted public health interventions.

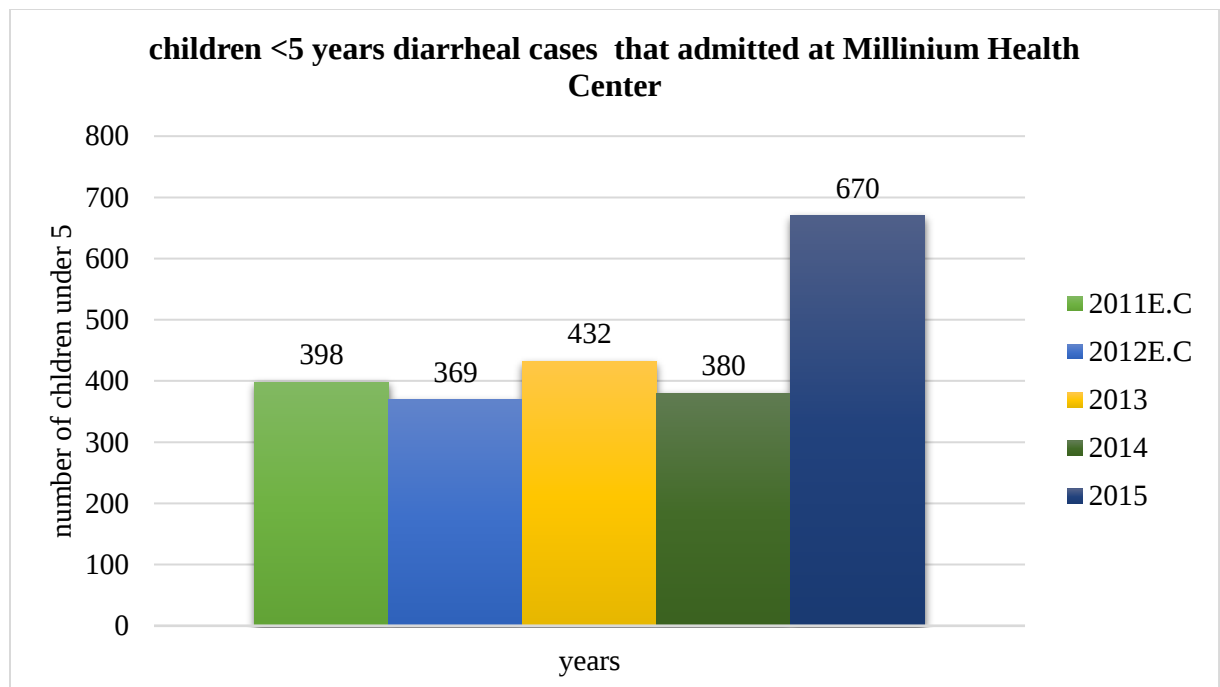


Figure 2: diarrheal cases during periods

4.2 Prevalence of Diarrhea among Under-Fives

According to the World Health Organization (WHO), Diarrhea is a major cause of illness and death among children under five worldwide, with prevalence rates differing markedly across various regions and contexts.

Look for studies conducted in similar urban settings or in Addis Ababa itself. Studies from other health centers in Addis Ababa or similar sub-cities can provide a comparative perspective.

(Mengistie, 2013), Prevalence of diarrhea and associated risk factors among children under-five years of age in Eastern Ethiopia: A cross-sectional study. Open Journal of Preventive Medicine, 3(7), 446-453.

According to Andarge (2013) Prevalence and determinants of acute diarrhea among children younger than five years old in Jabithennan district, northwest Ethiopia.

As shown figure -3; in 2011 E.C., Millennium Health Center recorded 398 cases of diarrhea out of 6,601 admitted among children under five years of age. This resulted in a diarrhea prevalence of 6% for that year. This relatively high prevalence rate highlights the burden of diarrheal diseases on young children during this period, indicating that one in every 17 children admitted was treated for diarrhea.

This data serves as an important indicator of the health challenges faced by this population and the need for effective interventions.

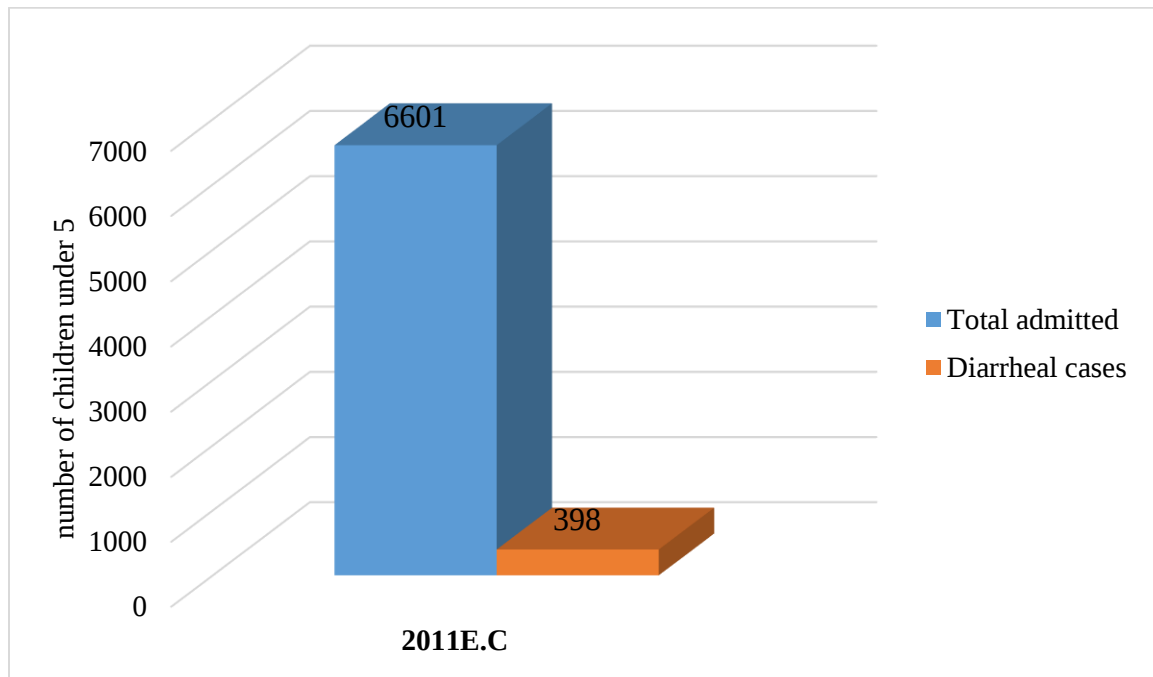


Figure 3: prevalence of 2011E.C

As shown figure -4, in 2012 E.C., the Millennium Health Center documented 369 cases of diarrhea among 8,273 admitted of children under five years of age. This resulted in a diarrhea prevalence of 4.46% for that year.

Studies in Ethiopia have reported varying prevalence rates. According to, Bayou (2012), A study published in the Ethiopian Journal of Health Sciences *in 2012* reported a prevalence rate of about 7.4% for diarrhea among under-fives in urban settings.

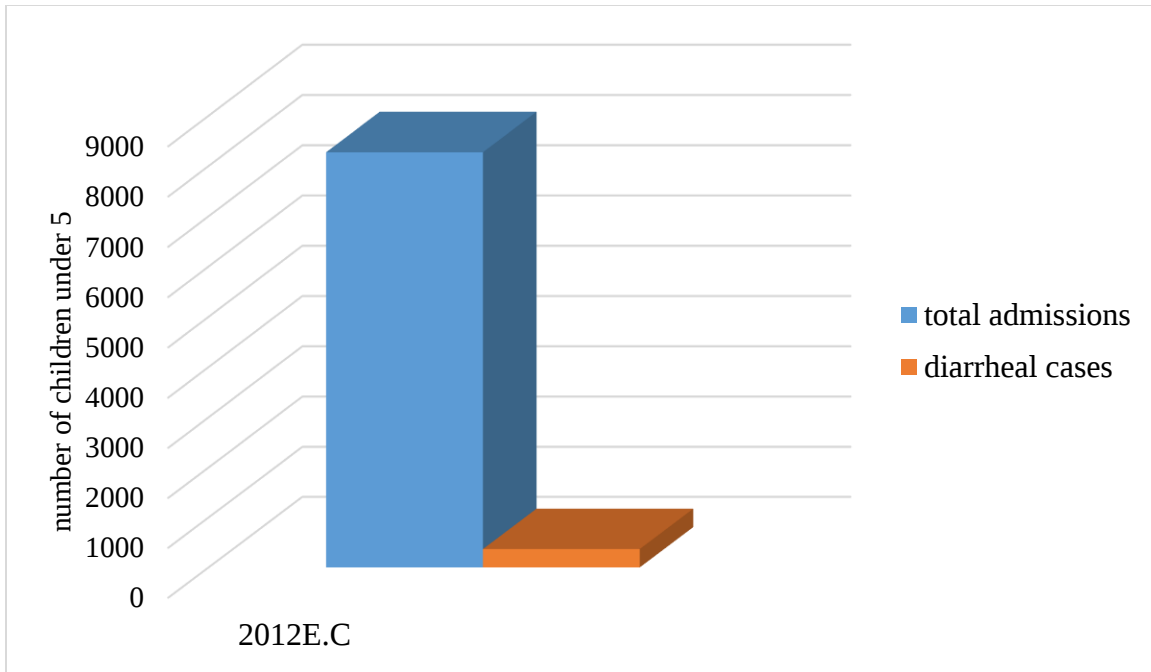


Figure 4: prevalence of 2012E.C

As shown figure -5; in 2013 E.C., the Millennium Health Center recorded 398 cases of diarrhea among 10,643 admissions of children under five years old. This results in a diarrhea prevalence of approximately 3.75% for that year.

According to Ali (2017) it was reported that the prevalence of diarrhea among children under five in urban areas of Ethiopia was approximately 4.8%. This finding aligns with the result, indicating consistency with similar studies conducted in urban settings across Ethiopia

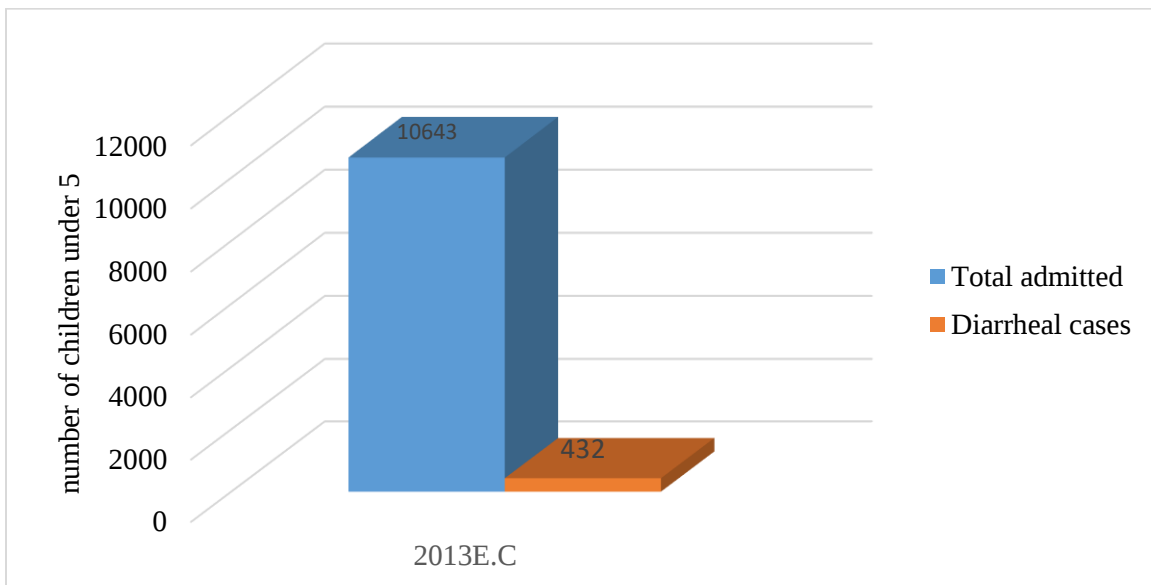


Figure 5: prevalence of 2013E

As shown figure -6; in 2014 E.C., the Millennium Health Center reported 380 cases of diarrhea among 10,621 admissions of children under five years old. This results in a diarrhea prevalence of approximately 3.58% for that year. Examining the trend from 2011 to 2014 E.C., the prevalence rates are:

Stable decrease the prevalence of diarrhea continues to decrease, with a slight drop from 3.75% in 2013 to 3.58% in 2014. The consistent decrease over the years suggests a trend of improving conditions or effective health interventions.

This trend highlights ongoing progress in managing diarrheal diseases among children under five years of age. It may reflect improvements in sanitation, healthcare services, or preventive measures. Monitoring these trends helps evaluate the effectiveness of health programs and identify areas for continued focus.

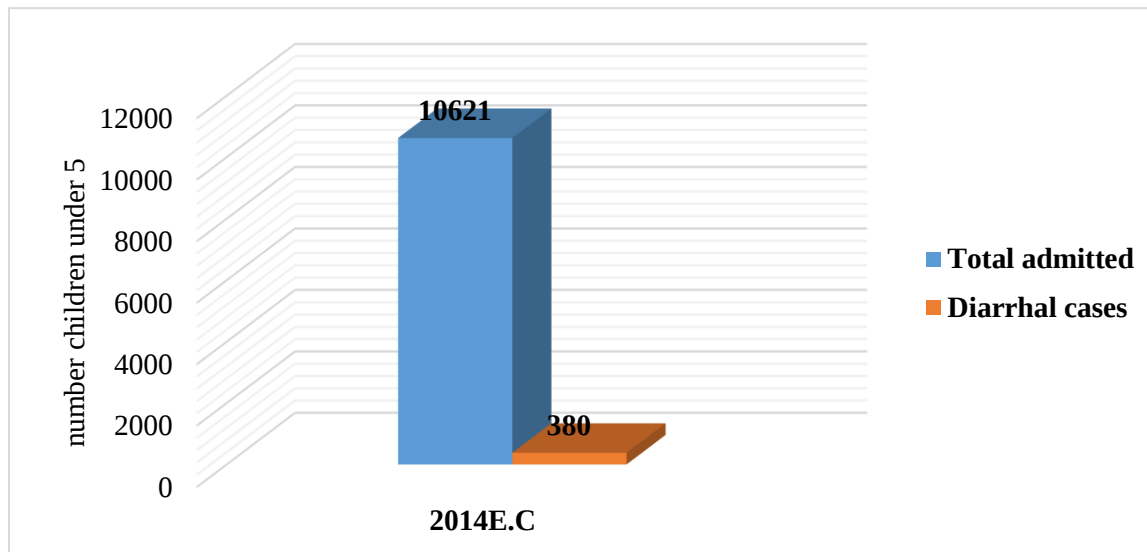


Figure 6: rate of prevalence in 2014E.C

As shown figure -7; in 2015 E.C., the Millennium Health Center recorded 670 cases of diarrhea among 9,832 admitted of children under five years old, resulting in a diarrhea prevalence rate of 6.81% for that year.

The increase in prevalence in 2015 might indicate various factors, such as changes in environmental conditions, healthcare access, or possibly outbreaks of diarrheal diseases. Further investigation into the reasons for this rise is essential for understanding the underlying causes and for improving future health interventions.

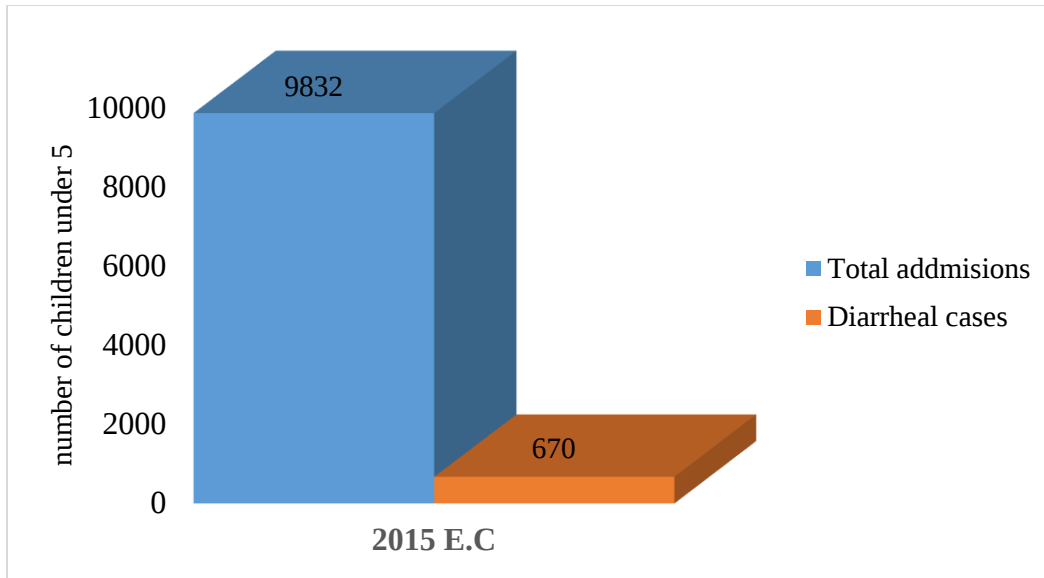


Figure 7: Rate prevalence of 2015E.C

As shown in figure -8; the analyze of diarrhea prevalence among children under five years old using a line graph from 2011 to 2012; The prevalence rate decreases from 6% to 4.46%, from 2012 to 2013; The rate continues to decrease slightly to 4.05%, from 2013 to 2014; The prevalence rate decreases further to 3.57%, from 2014 to 2015 and There is a noticeable increase to 6.81%.

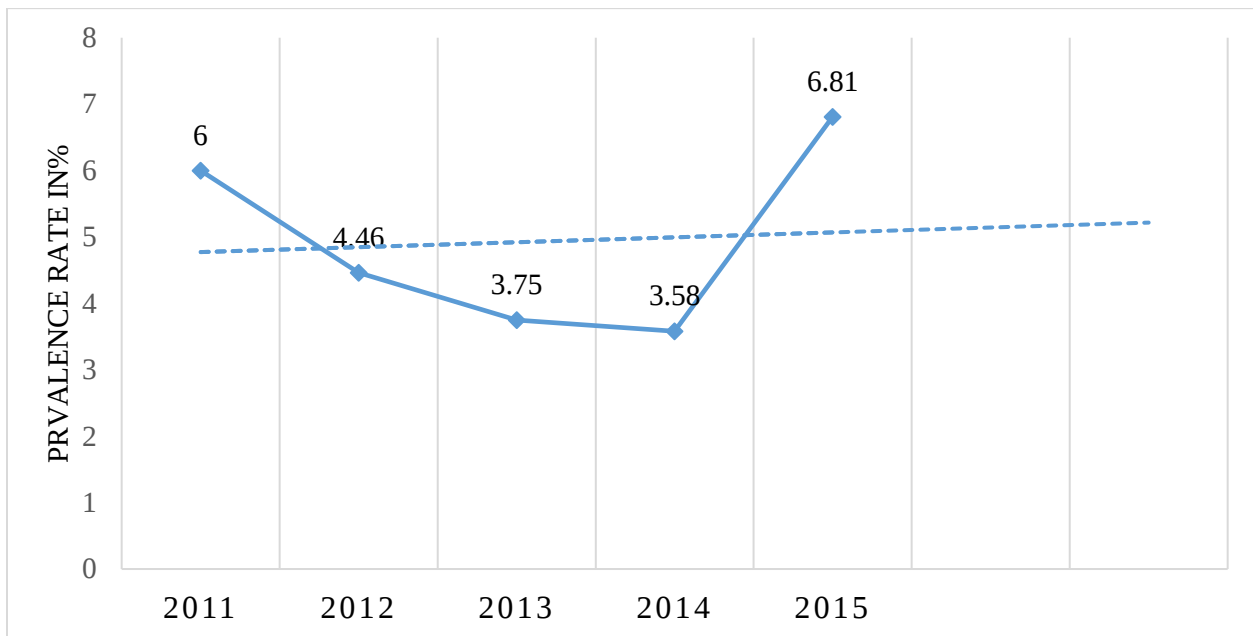


Figure 8: line graph showing the diarrhea prevalence among children under five years old from 2011 to 2015 E.C.

As show in figure -9 the analysis in diarrhea cases that treated with Zinc and ORS over the years, trend analysis of diarrhea cases and treated Zinc and ORS:

The number of diarrhea cases treated with Zinc and ORS shows a general increasing trend, especially noticeable in the years 2013 and 2015. This indicates an increase in the total number of diarrhea cases treated and a consistent use of Zinc and ORS as a treatment. In 2014, a small number of cases were treated with ORS only, but this practice did not continue into 2015. The use of Zinc and ORS was predominant in all years.

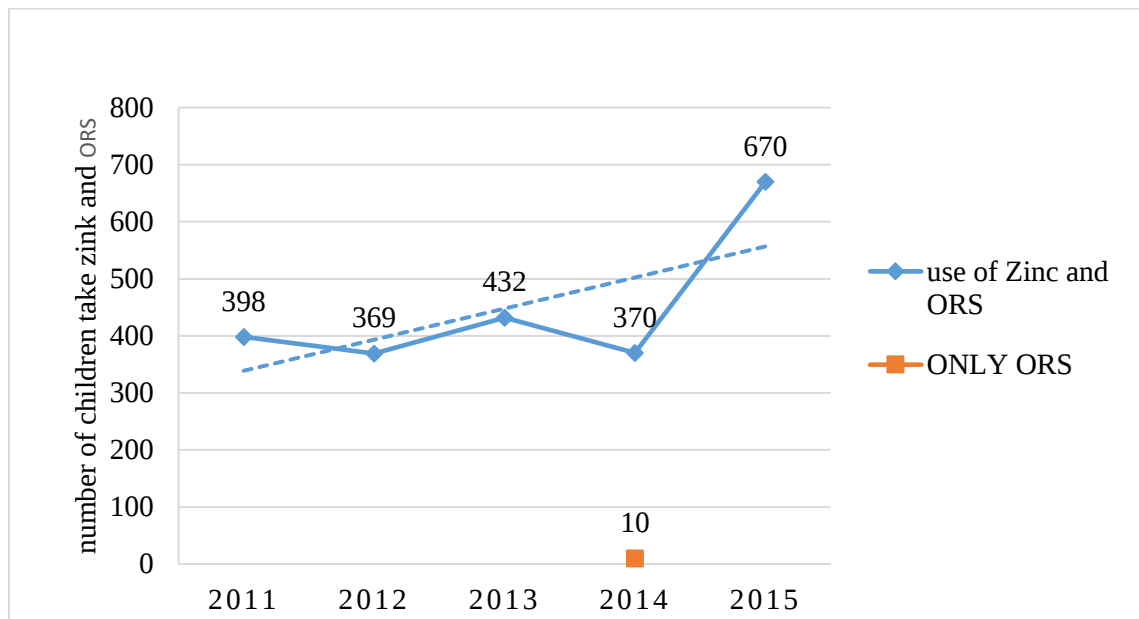


Figure 9: line graph showing the diarrheal cases treated with Zinc and ORS1

As shown in table -1 below describe the number of children that admitted Millennium Health Center in each month of during study period

Years	Months												
	December	January	February	March	April	May	June	July	August	September	October	November	Total
2011	429	516	551	625	561	504	565	576	629	493	613	543	6601
2012	581	636	723	693	772	706	650	781	835	629	565	702	8273
2013	858	877	909	1147	1050	1031	842	873	920	787	737	613	10643
2014	831	910	1033	983	1093	998	747	764	792	820	737	914	10621
2015	762	748	789	1074	1037	1018	644	632	667	816	786	859	9832

Table 1: number children under five years admitted MHC

As shown in table -2 below describe the number of children with case of diarrhea in each month of study period

Years	Months												
	December	January	February	March	April	May	June	July	August	September	October	November	Total
2011	29	33	30	32	28	33	41	47	34	31	33	28	398
2012	31	32	29	30	28	30	34	35	33	31	32	26	369
2013	34	36	34	37	31	36	44	42	37	34	36	31	432
2014	30	31	30	33	27	32	39	37	34	32	28	27	380
2015	53	55	54	58	48	57	64	69	58	51	55	48	670

Table 2: number of children under 5 years infected in months

4.3 A Trend Analysis of the Seasonal Prevalence

As shown in figure -10, trend analysis of the monthly prevalence across the five years (2011–2015), the changes and general patterns over time for each month.

December to May; in 2011; December to May the prevalence rates gradually decrease from 6.76% in December to 4.99% in April. In 2012-2014; there is a near similar trend of gradual reduction in these months. 2015: A noticeable spike in diarrhea cases in early months (December: 6.95%, January: 7.35%) and a general rise in prevalence compared to previous years.

June to September; in 2011 an increase is seen in June (7.26%) and peaks in July (8.16%), which is the highest monthly rate across all years. This could indicate seasonal factors, possibly linked to water contamination with rainy water or environmental changes. From 2012 to 2014; Prevalence fluctuates but generally remains moderate, with July showing a slight increase. In 2012, the rate spikes in July (4.48%) compared to the previous months. In 2015; Sharp increases in June (9.94%) and July (10.92%), indicating a pattern of higher cases during these months.

Generally high prevalence in 2011, especially from June to July. From 2012 to 2014, there is Consistent reduction in diarrhea prevalence across most months, particularly from March to April. Higher prevalence in 2015; almost every month, particularly in June (9.94%), July (10.92%), and August (8.70%), reflecting a potential outbreak or worsening conditions in those months.

Seasonality seems to play a role, with the months of June to August showing higher diarrhea prevalence, likely due to environmental and behavioral factors during the period due to rainy seasons, food contamination, and water quality

2015 saw a notable rise in cases, possibly indicating an event or change in public health conditions that year. The consistency of lower prevalence in 2012 to 2014

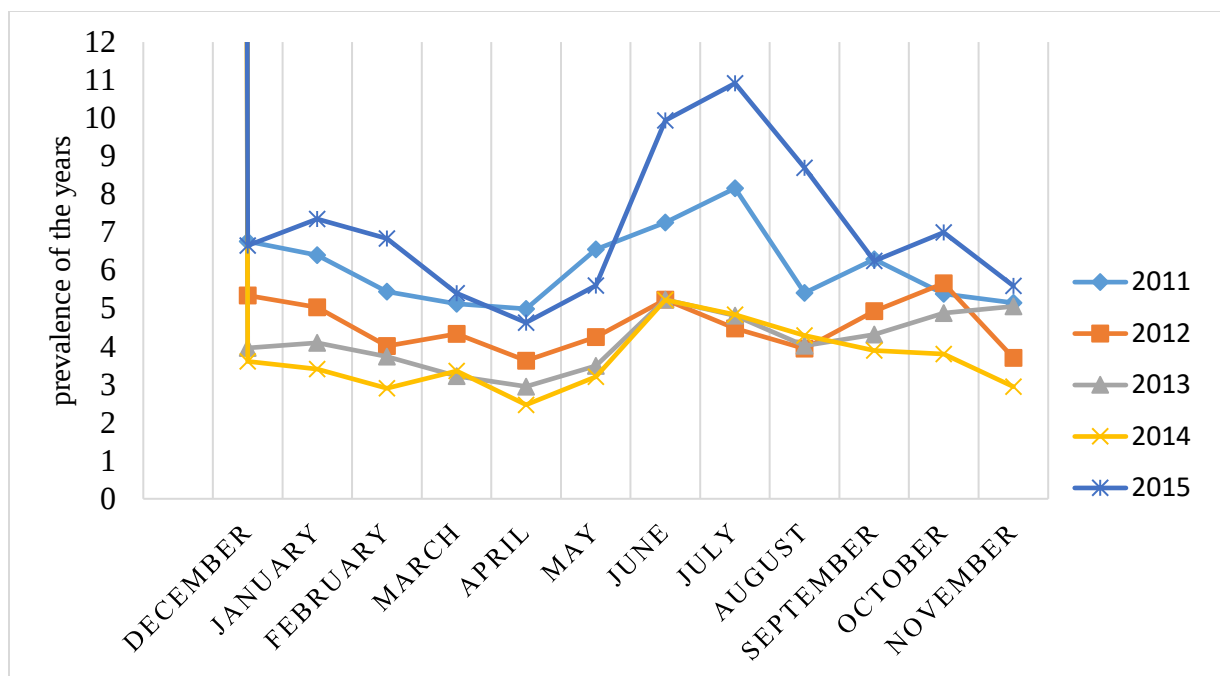


Figure 10: trend analysis diarrheal prevalence

5 DISCUSSION

The analysis of diarrhea prevalence among children under five years of age in Addis Ketema Sub City over a five-year period reveals significant trends and patterns. This section discusses these findings in relation to existing literature and public health implications.

The findings of this study on the prevalence of diarrhea among children under five years old at Millennium Health Center align with the broader global and regional literature on diarrheal diseases. Diarrhea remains a significant public health issue, particularly in low-resource settings, where access to clean water, sanitation, and proper hygiene practices are limited. This study, conducted in Addis Ketema Sub-City, Addis Ababa, revealed a fluctuating prevalence of diarrhea among children under five over the study period from 2011 to 2015 E.C., with rates ranging from 3.57% to 6.81%. These findings are consistent with national data from Ethiopia, where the prevalence of diarrhea among under-five children has been reported to range from 12% to 28.5% in different regions (Woldu, 2016; Hashi Abdiwahab, 2017).

The study's prevalence rates are somewhat lower than those reported in rural areas of Ethiopia, such as in the Somali Region, where the prevalence reached over 25% (Desalegn Tesfa M. G. 2017). This disparity may be attributed to the urban setting of Addis Ababa, where access to healthcare and awareness about hygiene practices might be comparatively better. However, the significant prevalence observed in this study underscores the ongoing challenges related to diarrheal diseases even in urban areas, emphasizing the need for continued public health interventions.

The literature suggests that diarrhea is one of the leading causes of mortality among children under five, accounting for a substantial number of deaths globally (WHO, 2017). The high mortality rate is often associated with factors such as malnutrition, poor sanitation, and limited access to clean water—issues that are prevalent in many parts of Ethiopia, including urban slums and informal settlements (UNICEF, 2020). This study's findings, therefore, contribute to the existing body of knowledge by highlighting the persistent burden of diarrheal diseases in Addis Ababa, despite global and national efforts to reduce child mortality.

The study indicates a clear seasonal pattern, with diarrhea cases peaking in the rainy season (June to August), consistent with numerous studies that show the rainy season as a high-risk period for diarrheal diseases. Research from similar urban areas (Esrey et al., 1996, and Getachew 2018) has

linked rainy seasons to increased contamination of water sources due to runoff and overflow from sanitation systems, further exacerbating diarrheal cases.

Studies in Ethiopia and other African countries demonstrating that environmental factors, such as poor drainage systems, flooding, and compromised drinking water sources during the rainy season, contribute to increased diarrhea prevalence (Tadesse et al., 2018). The higher rates in 2015 might reflect an exceptional public health challenges not seen in earlier years, aligning with reports of seasonal outbreaks caused by waterborne pathogens.

Decreased prevalence in 2012-2014 suggest that public health interventions were likely effective during these years. According to Wolf et al. (2018), emphasize that interventions targeting sanitation, handwashing, and access to clean drinking water can significantly reduce diarrheal disease prevalence, particularly in urban areas. Studies in Ethiopia (Mengistie et al., 2013; Central Statistical Agency, 2016) have similarly shown the positive impact of interventions like water, sanitation, and hygiene (WASH) programs in reducing diarrhea cases. The findings in 2012-2014 suggesting that such programs may have contributed to the reduction in cases.

However, the increase in prevalence in 2015 might indicate gaps or lapses in these interventions. Studies that report periodic outbreaks or challenges in sustaining public health measures (Alemayehu et al., 2019), suggest that the rise in 2015 could be due to lapses in health interventions or other environmental changes. The sharp rise in 2015 suggests a possible localized outbreak or other external factors such as changes in public health conditions, disruptions in water supply, or overcrowding. Similar trends have been reported in studies on diarrheal outbreaks in urban areas (Debes et al., 2016), where breakdowns in water supply systems or sanitation services contributed to disease spikes. The need for continuous monitoring and preparedness, especially in high-density urban areas like Addis Ketema. The findings highlight the importance of strengthening preventive measures, particularly during high-risk seasons, and ensuring that infrastructure improvements, like drainage and waste disposal, are sustained to prevent future outbreaks.

6 CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The study aimed to assess the prevalence of diarrhea among children under five years of age attending Millennium Health Center in Addis Ketema Sub City, Addis Ababa, over a five-year period from 2011 to 2015 E.C. The analysis revealed that out of a total of 45,970 admissions of children under five years of age, 2,249 cases were diagnosed with diarrhea, resulting in a prevalence rate of 4.89%. This finding highlights that diarrhea remains a significant public health concern among children under five in this setting. Despite ongoing efforts to reduce the incidence of diarrhea through improved sanitation, better access to clean water, and health education, the prevalence rate observed suggests that further interventions are needed. The study found fluctuations in the annual prevalence rates, ranging from 3.57% to 6.81%, indicating that diarrhea remains a significant health issue among this population. Factors contributing to this prevalence include limited access to clean water, inadequate sanitation, and poor hygiene practices in the community. The fluctuating prevalence rates suggest that while there have been periods of improvement, the rise in 2015 highlights ongoing challenges and potential issues such as environmental factors, healthcare access, or disease outbreaks. The consistent use of Zinc and ORS underscores the reliance on these treatments to manage diarrhea, although the increase in cases in 2015 indicates a need for further investigation and intervention. The seasonal patterns and risk factors for diarrhea among children under five in urban settings. The similarities with other Ethiopian and sub-Saharan African studies strengthen the reliability of your findings. However, the sharp rise in cases in 2015 may represent a unique event or challenge that requires further investigation. The finding underscores the importance of ongoing public health interventions, particularly in densely populated urban areas with vulnerable populations.

6.2 Recommendation

- The observed fluctuations in diarrhea prevalence, especially the spike in 2015 E.C., it is crucial to improve access to clean water, proper sanitation, and hygiene education. This includes installing or repairing water sources, improving sanitation facilities, and conducting community-wide hygiene promotion campaigns.
- Considering the seasonal pattern observed in the study, it is important to implement targeted interventions during the rainy season when the risk of diarrhea increases.

- Increase the availability and distribution of Oral Rehydration Salts (ORS) and zinc supplements at the Millennium Health Center to manage and prevent diarrhea-related complications.
- Implement preventive measures during high-risk periods, such as distributing clean water supplies or promoting temporary sanitation solutions.

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