COLLEGE OF DEVELOPMENTAL STUDIES

CENTER FOR FOOD SECURITY STUDIES

Assessment of nutritional status of under-five children, household level food insecurity and WASH in IDP camps at Debre Birhan Town

By: Eden Birhanu

October, 2024
Addis Ababa Ethiopia

ADDIS ABABA UNIVERSITY

COLLEGE OF DEVELOPMENTAL STUDIES

CENTER FOR FOOD SECURITY STUDIES

Assessment of nutritional status under-five children, household level food insecurity and WASH status in IDP camps at Debre Birhan Town

By: Eden Birhanu

Supervisor: Professor Mogessie Ashenafi

A thesis submitted to Center for Food Security Studies, College of Developmental Studies, Addis Ababa University in partial fulfillment of Masters of Science in Food Security and Development Studies

Abstract

This study examines the critical issues of food insecurity and malnutrition among under-five children in internally displaced persons (IDP) camps in Debre Berhan Town, Ethiopia, in the context of inadequate water, sanitation, and hygiene (WASH) conditions. Internal displacement due to civil conflict and natural disasters has created significant humanitarian concerns, particularly affecting children's access to safe food and clean water, leading to malnutrition. The study involved a community-based cross-sectional design with a sample of 374 households, revealing that over 90% faced food insecurity, with most households classified as severely food insecure. Common coping strategies included reducing meal frequency and relying on cheaper, less nutritious food. The nutritional assessment showed alarming rates of malnutrition among children, with a notable prevalence of wasting, underweight, and stunting. Despite high knowledge of WASH practices, gaps in attitudes and practices were evident, suggesting that improvements in WASH conditions are necessary. The findings highlight the urgent need for comprehensive interventions to address food security and health outcomes in IDP camps, thereby improving the overall well-being of vulnerable populations.

Key Words:

IDP, Malnutrition, Food Insecurity, WASH

Table of Contents

Acknowledgment

I would like to express my sincere gratitude to God, and for all those who contributed to the successful completion of this research project. First and foremost I would like to acknowledge my advisor Professor Mogessie Ashenafi. Additionally I would like to thank DebreBerehan Hospital and the IDP community, for the invaluable support throughout the research process. Their assistance during the war time in data collection and analysis significantly enhanced the quality of this research.

I would like to acknowledge myself for the courage I have to accomplish this research especially during the war season of DebreBerehan and for the financial support provided by myself, which made this research possible.

Thank you all for your contributions; this work would not have been possible without your support.

List of Abrevations

- **AOR: Adjusted Odds Ratio**
- **CI: Confidence Interval**
- **COR: Crude Odds Ratio**
- **FGDs: Focus Group Discussions**
- **KII: Key Informant Interviews**
- **IDP: Internally Displaced Persons**
- **WASH: Water, Sanitation, and Hygiene**

List of Tables

1. INTRODUCTION

Background the study

Internal displacement has been a common occurrence following civil war and natural disasters in developing nations that has been bringing a humanitarian concern with significant undesirable and devastating consequences (Ferris, 2012). According to a report by the International Organization for Migration (IOM), a significant amount people, 872,483 households, were internally displaced as of June in Ethiopia across 3393 sites, with violence and instability being the primary cause. One of (International Organization for Migration (IOM), 2023)

Internal displacement poses serious effects for various vulnerable groups such as women and children. The most common problems in the context of children in internally displaced people (IDP) camps is serious shortage of food, clean and safe water supply that negatively affected their nutritional status. Particularly, the nutritional status of under five children, a key indicator for the nutritional status of the whole population, will be jeopardized due to the fact that they are misplaced from their settlement due to conflicts, natural disasters (Makango *et al.*, 2023).

Malnutrition in those children under the age of five years old in IDP camps is a complicated issue driven by variables such as restricted access to variety and nutrient rich food, inadequate healthcare provision and access to clean and safe water (Kemei *et al.*, 2023; B. Abdeeq *et al.*, 2024). This is directly related to the threat of food insecurity faced by the family members in IDP camps that will lead to significant deficiency of essential macro and micronutrients that are relevant for growth and development of the children. Hence, Understanding the extent of food insecurity and its relationship with malnutrition in such sensitive target population will be important to plan for further intervention (Mulu and Mengistie, 2017; Salami *et al.*, 2020)

Another significant factor related to the health status of under-five children living in IDP camps particularly by exacerbating their malnutrition is the quality of water, sanitation and hygiene (WASH) status. Inadequate access to clean water and sanitation facilities on top of poor practice can contribute to the occurrence of diarrheal diseases that in turn intensify the risk of malnutrition (Reddy B *et al.*, 2017).

2. LITRATURE REVIEW

2.1. Introduction to Internal Displacement

Internal displacement is defined as the forced movement of individuals or groups within their own country, which is often caused by conflict, violence, natural catastrophes, or human rights violations. Unlike refugees, internally displaced persons (IDPs) remain within their home country's borders and may face substantial obstacles in terms of safety, security, and access to essential services (Schraven et al., 2018). Internal displacement has become a serious issue in many developing countries, aggravated by political unrest, ethnic strife, and environmental deterioration (Norwegian Refugee Council, 2021).

Developing nations are disproportionately affected by internal displacement due to their limited resources and capacity to respond to humanitarian crises. The United Nations High Commissioner for Refugees (UNHCR) reports that, as of 2021, there were over 55 million IDPs globally, with the majority residing in low- and middle-income countries (UNHCR, 2021). This demographic is particularly vulnerable to various health risks, including malnutrition, infectious diseases, and poor access to healthcare services (Buhmann et al., 2019).

2.2. Health Effects of Internal Displacement on Under-Five Children

Children under five years old represent one of the most vulnerable populations affected by internal displacement. The World Health Organization (WHO) highlights that this age group is particularly susceptible to malnutrition and related health complications due to their rapid growth and developmental needs (WHO, 2019). The following sections explore the health effects of internal displacement on under-five children, focusing on malnutrition, infectious diseases, and mental health.

2.2.1. Malnutrition

Malnutrition is a significant health concern for under-five children living in IDP camps. Food insecurity, characterized by inadequate access to sufficient, safe, and nutritious food, is prevalent in these settings (Leroy et al., 2021). Research shows that the nutritional status of children in IDP

camps is often compromised, with high rates of stunting, wasting, and underweight reported (Fuchs et al., 2020).

For instance, a study conducted in the IDP camps of South Sudan found that nearly 25% of children under five were acutely malnourished, highlighting the urgent need for targeted nutritional interventions (Dixon et al., 2020). Malnutrition in early childhood can have long-term consequences, including impaired cognitive development, increased susceptibility to infections, and higher mortality rates (Victora et al., 2010).

2.2.2. Infectious Diseases

IDP camps often lack adequate water, sanitation, and hygiene (WASH) facilities, contributing to the spread of infectious diseases. Under-five children in these settings are at increased risk of diseases such as diarrhea, respiratory infections, and measles (UNICEF, 2020). Diarrheal diseases, in particular, are a leading cause of morbidity and mortality among young children in displacement situations (Liu et al., 2016).

A study in a Syrian IDP camp found that poor sanitation and limited access to clean water were associated with higher incidences of diarrhea among children under five (Alkhaldi et al., 2021). The WHO emphasizes the need for improved WASH conditions in IDP settings to reduce the burden of infectious diseases and enhance child health outcomes (WHO, 2020).

2.2.3. Mental Health

The psychological impact of internal displacement on children cannot be overlooked. Exposure to violence, loss of family members, and the stress of displacement can lead to significant mental health issues, including anxiety, depression, and post-traumatic stress disorder (PTSD) (Betancourt et al., 2010). Under-five children, who are particularly sensitive to environmental stressors, may experience developmental delays and behavioral problems as a result of their circumstances (Kira et al., 2015).

A study focusing on the mental health of displaced children in Colombia found that those living in conflict-affected areas exhibited higher levels of emotional and behavioral difficulties compared to their non-displaced peers (Hernandez et al., 2015). This highlights the need for

mental health support and interventions tailored to the unique experiences of internally displaced children.

2.3. Malnutrition in Children

Globally, it is estimated that over 20 million children are afflicted by severe acute malnutrition, a critical health condition that poses a significant threat to their survival, growth, and overall development. The majority of these children are concentrated in regions such as South Asia and Sub-Saharan Africa, where malnutrition rates remain alarmingly high, largely driven by a confluence of socio-economic challenges and environmental factors (Ahmed, Hossain, & Sanin, 2012; Akombi et al., 2017). According to data from the Food and Agriculture Organization (FAO) of the United Nations, the prevalence of under-nutrition among children under the age of five was approximately 21.6% worldwide in 2019. This staggering statistic implies that nearly one in five children in this age group suffers from inadequate nutrition, a condition that can have severe and long-lasting repercussions for both their physical and cognitive development.

Malnutrition, particularly during the critical early years of life, is associated with a myriad of adverse health outcomes, including stunted growth, weakened immunity, and impaired cognitive function. These effects are not merely temporary; rather, they can have profound implications that extend into adolescence and adulthood, including reduced economic productivity and increased susceptibility to chronic diseases (Victora et al., 2010). The rate of under-nutrition, however, is not uniform across the globe and exhibits significant regional disparities. For instance, the incidence of under-nutrition among children under five years old reached a concerning 34.7% in Sub-Saharan Africa, indicating a critical public health challenge that requires urgent attention. Similarly, South Asia reported an under-nutrition rate of 25.4%, highlighting the ongoing struggles faced by these regions in addressing child health and nutrition. In stark contrast, developed regions such as Europe and Central Asia reported a much lower prevalence of under-nutrition, at just 4.3%, while North America showed an even more favorable statistic of 2.4% (Food and Agriculture Organization, 2023).

The root causes of under-nutrition are multifaceted and deeply entrenched in systemic issues such as extreme poverty, high levels of food insecurity, and severely compromised water,

sanitation, and hygiene (WASH) practices. These fundamental challenges create an environment in which children, especially those under the age of five, are particularly vulnerable to nutritional deficiencies and related health risks. In many developing countries, families face daunting economic barriers that limit their ability to purchase sufficient and nutritious food. This economic strain is further exacerbated by fluctuations in food prices, agricultural challenges, and inadequate social safety nets.

Moreover, these environments of extreme deprivation are often characterized by poor living conditions that compromise WASH practices. Limited access to clean water and adequate sanitation facilities can lead to the spread of infectious diseases, which in turn further aggravates malnutrition. For instance, diarrheal diseases, which are highly prevalent in areas with poor sanitation, can rapidly deplete the nutritional reserves of children, making them more susceptible to severe malnutrition (Liu et al., 2016). These health challenges are magnified in contexts of internal displacement, where children are often uprooted from their homes and subjected to unstable living conditions that lack adequate infrastructure to support their basic health needs.

The situation is particularly dire in internally displaced persons (IDP) camps, where the nutritional status of children under five has emerged as a pressing concern. In these camps, access to sufficient and diverse food supplies is often severely limited, further complicating the nutritional landscape for vulnerable populations. The availability of clean and safe drinking water is frequently compromised, while the living conditions can be overcrowded and unsanitary, which are not conducive to maintaining good hygiene practices (B. A. Abdeeq et al., 2024b). Such dire circumstances not only impede the immediate health of these children but can also lead to long-term developmental issues that hinder their ability to thrive and succeed.

In this complex interplay of factors, socio-economic and political dynamics play a pivotal role. Accessibility to adequate nutrition is often intertwined with broader issues such as local governance, conflict, and environmental sustainability. Displaced populations face unique challenges that differ significantly from those of the general population, further necessitating tailored interventions that address their specific needs and circumstances.

To fully comprehend the implications of these factors on the malnutrition rates among under-five children, a detailed examination of each of these components will be provided in the following sections. This analysis will delve into the intricate relationships between nutritional status, food security, WASH conditions, and the socio-economic environment, ultimately illuminating the pressing need for coordinated efforts to improve health outcomes for this vulnerable demographic. By understanding these interconnections, stakeholders can develop targeted interventions that not only address immediate nutritional deficits but also foster sustainable solutions to break the cycle of poverty and malnutrition.

2.4. Magnitude of malnutrition in under-five children in Africa

Malnutrition remains a critical public health challenge across Africa, particularly among under-five children, who are the most vulnerable demographic group. Data generated from the 2016 Ethiopian Demographic Health Survey highlights the alarming magnitude of malnutrition in the country, revealing that stunting—a condition resulting from chronic undernutrition—affects approximately 38.3% of children under five years old, followed by underweight and wasting, which were recorded at 23.3% and 10.1%, respectively (Tekile, Woya, & Basha, 2019). These figures starkly illustrate the severity of malnutrition and the pressing need for effective interventions in the region.

The burden of malnutrition in under-five children is not unique to Ethiopia; several studies across the continent have reported similar findings. Research has consistently indicated that a high prevalence of malnutrition exists in many African nations, with varying degrees of severity. For instance, studies by Amare et al. (2016), Ma'Alin et al. (2016), and Menalu et al. (2021) underscore the pervasive nature of malnutrition, emphasizing that it continues to be a significant health concern affecting millions of children throughout the continent. This situation is further exacerbated by socio-economic factors, food insecurity, and insufficient healthcare infrastructure, which contribute to the deteriorating nutritional status of children.

Specifically, in Debre Berhan town, the nutritional status of under-five children is particularly alarming. Recent studies report that 26% of children in this area are underweight, 41% are stunted, and 33% are wasted (Menalu et al., 2021). These statistics reflect a critical public health

issue, highlighting the urgent need for targeted interventions to address the nutritional needs of this vulnerable population. Various contributing factors have been identified as exacerbating under-five malnutrition in this context. Maternal illiteracy, for instance, plays a significant role in perpetuating the cycle of malnutrition, as it limits mothers' knowledge regarding proper nutrition, breastfeeding practices, and healthcare (Menalu et al., 2021). Furthermore, the prevalence of non-exclusive breastfeeding during the critical first six months of life can lead to inadequate nutritional intake during a period of rapid growth and development.

Additionally, premature birth and lack of adequate antenatal care are significant risk factors for malnutrition in this age group. Children born prematurely often face a higher risk of undernutrition due to their underdeveloped physiological systems, which can compromise their ability to thrive. Similarly, inadequate antenatal care can hinder mothers' access to essential health services and nutritional guidance during pregnancy, resulting in poor maternal and child health outcomes (Menalu et al., 2021).

Exposure to infectious illnesses and diarrhea further compounds the issue of malnutrition among under-five children. In regions with poor sanitation and hygiene practices, children are particularly vulnerable to waterborne diseases, which can lead to dehydration and nutrient loss. These health challenges create a vicious cycle: illness reduces appetite and nutrient absorption, leading to malnutrition, which in turn weakens immunity and increases susceptibility to further infections (Liu et al., 2016).

2.5. IDP and food insecurity

The relationship between internal displacement and food insecurity can be analyzed through various theoretical frameworks, including the livelihoods framework, the human rights-based approach, and the political ecology perspective.

2.5.1. Livelihoods Framework: This framework posits that individuals' ability to secure food and other necessities is influenced by their access to various resources, including natural, human, financial, and social capital (Scoones, 1998). IDPs often lose their livelihoods due to displacement, resulting in diminished access to food and other essential resources.

2.5.2. Human Rights-Based Approach: This approach emphasizes the rights of individuals to access food, healthcare, and shelter, recognizing that food insecurity among IDPs is often a violation of these rights (De Schutter, 2011). The United Nations' Guiding Principles on Internal Displacement stress the need for states to protect the rights of IDPs, including their right to food (UN, 2005).

2.5.3. Political Ecology Perspective: This perspective examines how political and economic processes shape environmental and social conditions, influencing food security among displaced populations (Robbins, 2012). Political instability, conflict, and governance failures often exacerbate food insecurity for IDPs, as they may lack access to agricultural land, markets, and essential services.

2.6. Empirical Evidence on Internal Displacement and Food Insecurity

Numerous studies have documented the impact of internal displacement on food security. For instance, research by O'Hare et al. (2019) found that displaced households in South Sudan faced higher levels of food insecurity compared to non-displaced households, with 64% of IDP households experiencing severe food insecurity. The study attributed this disparity to the loss of livelihoods, limited access to markets, and disruptions in agricultural production.

Similarly, a study conducted by Médecins Sans Frontières (MSF) in the Democratic Republic of the Congo highlighted that IDPs in conflict-affected regions experienced acute malnutrition rates significantly higher than national averages (MSF, 2017). The report emphasized that food insecurity among IDPs was driven by ongoing violence, displacement, and restricted access to humanitarian assistance.

In Ethiopia, research by Abate et al. (2019) indicated that IDPs faced increased vulnerability to food insecurity, with many relying on emergency food aid for survival. The study found that access to food was hindered by multiple factors, including lack of income-generating opportunities, inadequate infrastructure, and the limited availability of food in markets.

The World Food Programme (WFP) has also reported that internally displaced populations are disproportionately affected by food insecurity in various contexts. In Syria, the WFP reported

that food insecurity among IDPs reached alarming levels, with many families forced to resort to negative coping strategies, such as reducing portion sizes or skipping meals altogether (WFP, 2021).

2.7. Impact of WASH Conditions on Food Security

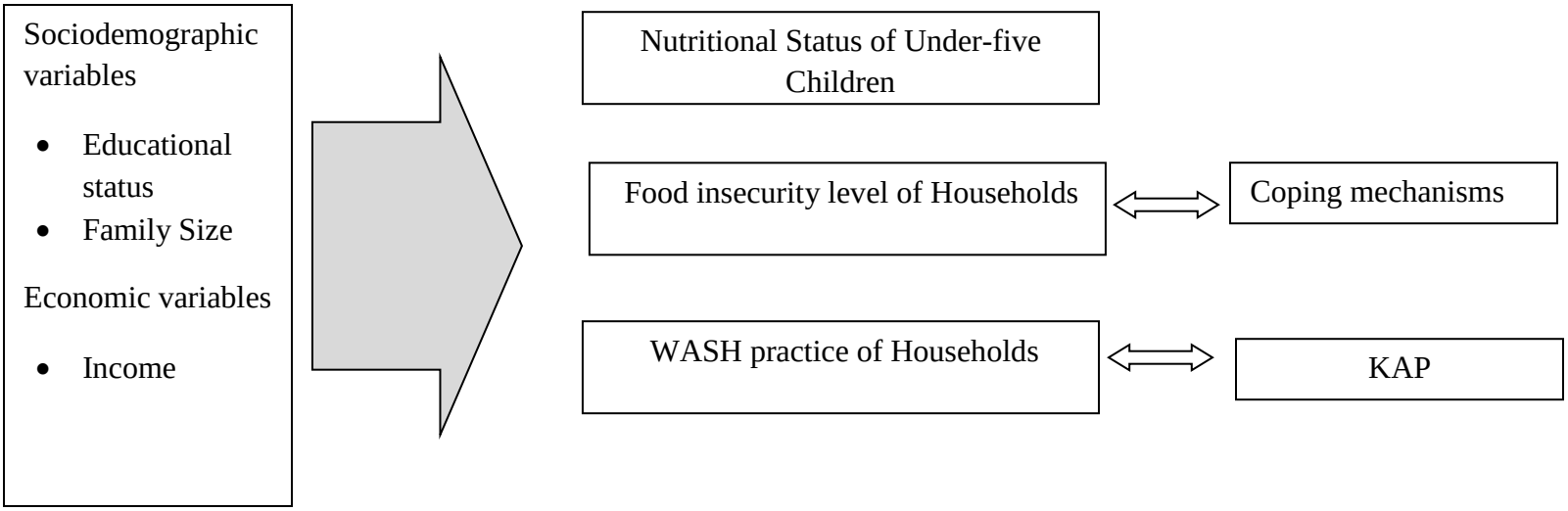
Water, sanitation, and hygiene (WASH) conditions have a substantial impact on food security for IDPs. Poor WASH facilities can cause waterborne illnesses, worsening malnutrition and food poverty (Mastrorillo et al., 2016). In a study done in Nigeria, IDPs living in camps with inadequate sanitation facilities were found to have greater rates of food insecurity and malnutrition than those with better WASH conditions (Ezeh et al. 2019).

According to research, women and children are disproportionately affected by food shortages and inadequate WASH conditions in IDP settings. Women frequently assume primary responsibility for food acquisition and preparation, and when food is short, they may prioritize feeding their children over their own nutritional needs (Bennett et al., 2019). This pattern can exacerbate hunger and food poverty in vulnerable people.

Policy Implications

The connection between internal displacement and food insecurity emphasizes the importance of comprehensive strategies that address both challenges concurrently. Humanitarian solutions must prioritize food security and nutrition for IDPs while also addressing livelihood issues, market access, and WASH facilities. Furthermore, integrating food security initiatives into larger displacement management plans might help IDPs build resilience (FAO, 2022).

2.8. Conceptual framework



3. Statement of the problem

Internal displacement due to various causes in developing nations is becoming an alarming humanitarian concern for local governments and international aid organizations, as children and women are highly vulnerable parts of the population significantly affected as a result (B. Abdeeq et al., 2024). Malnutrition among children living in IDP camps is a pervasive issue observed in developing nations like Ethiopia. This segment of the population is particularly susceptible due to limited access to adequate food supplies, exacerbated by food insecurity and deprived water, sanitation, and hygiene (WASH) conditions (Oluwatosin, Tosin, and Udo, 2019). Such conditions can adversely affect the overall growth and development of children under five years of age, not to mention increasing overall health risks (Kemei et al., 2023).

The challenges of supplying adequate food to this group of the population are compounded by the economic constraints associated with internal displacement. Furthermore, children residing in IDP camps face limited access to clean water and sanitation facilities, exposing them to waterborne diseases that can further complicate the magnitude of malnutrition (Behnke et al., 2018; Uzobo and Akhuetie, 2018). Another significant concern regarding childhood malnutrition is its long-term consequences, which can extend into adulthood, manifesting as anthropometric derangements, compromised immunity, and other metabolic disorders (Arage et al., 2021).

There is a serious absence of comprehensive data addressing the degree of malnutrition and its relationship with food security and WASH practices in IDP camps, despite the urgent need to address the nutritional health of children living there. The complex nature of these problems is frequently overlooked in the research currently in publication, which leaves large gaps in our knowledge of the unique difficulties experienced by children under five in IDP camps. In order to address the interrelated issues of food insecurity, inadequate sanitation, and malnutrition, effective intervention techniques are hampered by this overlook. In order to clarify these urgent problems and guide future initiatives to lessen the suffering of this vulnerable group, a comprehensive evaluation of the nutritional status of children under five in IDP camps, as well as an investigation of household food security and WASH conditions, is essential.

4. Objectives

4.1. General Objective

To evaluate the nutritional status of under-five children, the food insecurity experience of the households they belong to and WASH conditions of the households in IDP camps at Debre Berhan town, 2024

4.2. Specific Objectives

The specific objectives of the study were to:

- Assess the nutritional status of under-five children living in the IDP camps at Debre Berhan town, 2024.
- Determine food insecurity experience of households to which the under-five children belong in IDP camps at Debre Berhan town, 2024.
- Evaluate the water, sanitation and hygiene (WASH) status of the households in the IDP camps at Debre Berhan town, 2024.

5. Research questions

This research aimed to address the following five questions based on the research objectives listed above

- What is the nutritional status of under-five children living in IDP camps at Debre Berhan Town in 2024, as measured by anthropometric indicators?
- What are the levels and types of food insecurity experienced by households with under-five children in IDP camps at Debre Berhan Town in 2024?
- How do socioeconomic factors influence the food insecurity experiences of households with under-five children in IDP camps?
- What is the state of water, sanitation, and hygiene (WASH) facilities in households within the IDP camps at Debre Berhan Town in 2024?
- How do WASH conditions correlate with the nutritional status and food insecurity experiences of households with under-five children in IDP camps?

6. Methodology

6.1. Study area and period

The study was conducted in all Debre Berhan IDP sites. Debre Berhan is the capital of North Shewa zone of Amhara regional state located 130 km away from Addis Ababa, the capital city of Ethiopia. There are four IDP sites namely, China camp, Woyinshet camp, IDP-1 and IDP-2 containing an estimated total population of nearly 35,000 displaced people from different parts of the country due to war and instability over the past years. The town has four governmental and twelve private health institutions. The study was conducted from February 21 to April 30, 2024.

6.2. Study design

A community-based cross-sectional study design was employed.

6.3. Source population

The source population for nutritional status was all children under five years of age living in all households of the IDP camps of Debre Berhan town. However, all households were considered as source population for food insecurity status and WASH Practice.

6.4. Study population

The study population for all three targets (variables) focused at household level. In view of this, study population for nutritional status was selected households with which children under-five years of age living in the IDP camps of Debre Berhan town. Similarly, selected households were used as study population for food insecurity status and WASH Practice

6.5. Inclusion criteria

Under-five children who were available during the data collection period and have lived in the camps for at least a month.

6.6. Exclusion criteria

Under-five children who have lived in the camps for more than a month and children with severely illness during the data collection period.

6.7. Sample size determination and sampling technique for quantitative data

Sample size was determined using Yamane's modified formula: $n = \frac{N}{1+Ne^2}$

Where:

n= sample population

N= Total population

e= margin of error

The sample size was calculated by taking the total number of households in the IDP sites from the woreda administrative office as 1458 and assumed margin of error of 5% (0.05).

$n = \frac{1458}{1+(1458)(0.0025)}$ = 373.885 ~ 345

10% non-response rate will be added

Therefore, the final sample size will be 374 households that can comply for nutritional status of under five children, food insecurity status and WASH Practice of households

6.8. Sample size and sampling technique for qualitative data

Four key informants were selected from the administrative authorities such as woreda health office, IDP coordinators, Social workers and community representatives of the IDP camps who are knowledgeable about the compound for in-depth interview. Moreover, two focused group discussions containing eight participants per group were conducted.

6.9. Sampling technique

Simple random sampling technique was utilized as a method of sampling technique. The samples were selected using a lottery method after obtaining the total list of households from the IDP administrators.

6.10. Dependent variables

- Nutritional status of under five children
- Food security status households
- WASH practice of households

6.11. Independent variables

- Socio demographic and economic characteristics of children, mothers and households : age of the child, sex of the child, age of the mother sex of household head, age of the

household head, household size in number, education level of household head, marital status, religion and ethnicity

- Child feeding practice and vaccination status of children: child breastfeeding, how long after birth did the child breastfeed for the 1st time, feeding practice for the first 6 months of the child's life, how long was the baby breastfed, vaccination status, and complementary feeding starting time.

6.12. Measurements

The weight and height of children was measured using the standard anthropometric measurement protocol designed by the Food and Nutrition Technical Assistance project in 2007. Weight was measured using a weighing scale without coats, shoes, and any additional clothing and recorded to the nearest 0.1 kg. Height was taken by using studio meter with no shoes; for 6–23 months of age, length was taken and for 24–59 months of age, height to the nearest 0.1 cm was recorded. Anthro software developed by WHO was utilized Z-score of under-five children.

Stunting: the height-for-age-z-score<−2 SD in relation to the reference population.

Underweight: the weight-for-age-z-score<−2 SD relative to the reference population.

Wasting: the weight-for-height z score >−3 SD in relation to the reference population.

To determine the Household Food Insecurity Access Scale (HFIAs) category for each household, categories were assigned based on the following criteria:

- **Food Secure (Category 1)**: A household falls into this category if either Q1a is 0 or 1, and all other questions (Q2 to Q9) are 0.
- **Mildly Food Insecure (Category 2)**: A household falls into this category if Q1a is 2 or 3, or if Q2a, Q3a, or Q4a are 1, 2, or 3, provided that all subsequent questions (Q5 to Q9) are 0.
- **Moderately Food Insecure (Category 3)**: A household falls into this category if Q3a or Q4a are 2 or 3, or if Q5a or Q6a are 1 or 2, provided that all subsequent questions (Q7 to Q9) are 0.

- **Severely Food Insecure (Category 4)**: A household falls into this category if Q5a or Q6a is 3, or if Q7a, Q8a, or Q9a are 1, 2, or 3.

6.13. Data collection tool and procedures

A structured, quantitative interviewer-administered questionnaire for assessing the nutritional status and WASH practice was adopted by reviewing different literatures while household food insecurity access scale (HFIAS) indicator guide was utilized as a validated tool to evaluate the food insecurity experience. The questionnaire was prepared in English and then translated into Amharic version for interview.

Health professionals (two nurses and seven community health workers) supervised by the principal investigator collected the data. Training will be given for data collectors to use recommended ways of sampling techniques, and to adhere to the ethical protocol.

The investigator will make a field visit in the IDP sites based on a WASH checklist.

6.14. Data quality control

The quality of the data was ensured through several key measures. First, the questionnaire underwent evaluation by experienced researchers and advisors, providing a foundation for its effectiveness. To further guarantee data quality, the data collectors received two days of training, which focused on clarifying the questions to ensure they were simple and easily understandable. The questionnaire was administered in Amharic, the native language, to enhance comprehension among respondents. Additionally, prior to the actual data collection, the questionnaire was tested on 5% of the total sample size at the Debre Berhan IDP site. This pre-testing aimed to assess language clarity, consistency, and the estimated time required to complete the questionnaire, allowing for necessary modifications to be made. Finally, the principal investigator closely monitored the data collection process, reviewing the completed questionnaires daily for completeness and consistency before data entry.

6.15. Data processing and analysis

All the questionnaires were collected by kobo collect software then data was exported to SPSS version 25 then was cleaned and checked for completeness. A descriptive analysis was done and presented with tables, bar charts, frequencies, and texts. Binary logistic regression model was

employed, first bi-variable logistic regression analysis done to see the association of each independent variable with the outcome variable and crude odds ratio (COR) with 95% CI obtained. Those variables having a p-value less than 0.25 were entered into the multi-variable logistic regression models to identify the effect of independent variables on the outcome variable. Those variables having a p-value of less than 0.05 in multivariable logistic regression model was considered statistically significant. Adjusted Odds Ratio (AOR) with 95% CI was calculated to determine the association. The qualitative data was analyzed using thematic analysis after verbatim transcription and coding of emerging themes. The qualitative data was triangulated with the quantitative data for explain the results.

7. Significance of the study

The main relevance of this study lies in its contribution to generate important findings related to the nutritional status of under-five children living in Debre Berhan IDP camps so that it showed the extent of malnutrition and its relationship with the food insecurity and WASH status of the compound. In view of this, the study further generate the determinants of child malnutrition in order to develop evidence-based interventional measures that can mitigate the consequences of under-five malnutrition in IDP camps

Furthermore, the result of this study helps the local and national governmental concerned bodies to plan their action in due process. The study might also be a baseline for the context-specific assessment strategies and interventional role of non-governmental aid organizations. The study might also play a great role in designing humanitarian effort and policy formulation to enhance the general resilience of under-five children residing in IDP camps

8. Scope of the study

This study's main objective is to assess the water, sanitation, and hygiene (WASH) conditions in IDP camps in Debre Berhan Town, Ethiopia, as well as the nutritional status of children under five and household food insecurity experiences. To maximize research dependability and carry out a thorough examination of the research problem, a mixed research approach was used for this study. The objectives of this study are to evaluate the WASH conditions in these families, ascertain the food insecurity experiences of their households, and determine the nutritional health

of children under five who reside in IDP camps. The investigation's study period is scheduled for 2024, with the goal of illuminating the interrelated problems of food security, malnutrition, and sanitation in a vulnerable population.

6. Ethical consideration

Ethical clearance was obtained from Addis Ababa University College of Developmental Studies institutional review board. A letter of permission was also obtained from Ethiopian Disaster Risk Management Commission and North Shewa Zone administration office. The study participants were informed clearly in detail about the study and they will be requested to decide on whether to participate or not in the study. The respondents who agreed to participate gave oral consent. The names of respondents will remain anonymous and the information obtained from them was kept confidential. The data obtain]ned was treated privately with no nametag on it and only authorized persons get access to raw data.

9. Organization of the thesis

This study comprises five chapters. The first chapter outlines the study's background, problem statement, aims, research questions, significance, scope, and limitations. The second chapter provides a survey of literature relevant to the study's topic matter. The third chapter covers the study area, research design, study population, data collection methods, ethical issues, sampling methodologies, sample size determination, and data analysis. The fourth chapter presents the study's results and discussions. The final chapter presents the study's conclusions and recommendations.

9.2. Dissemination of results

The finding of this study, upon the finalization of the analysis and interpretation, was prepared in the form of a thesis which will be submitted to Center for Food Security Studies, College of Developmental Studies. Efforts will be made to publish the content in a form of a research article in a reputable journal.

10. RESULTS AND DISCUSSION

Results

10.1. Sociodemographic and economic characteristics of HHs in Debrebrhan IDPs

A total of 374 respondents were considered in this study and about 73% were male (Table 1, Married households made up around 80% of the respondents. The remaining were either single, divorced or widowed. Majority of both male and female household heads are between 20-39 years of age accounting 65.78% and 86.1% respectively, followed by the age group 40-59. Among the children in the family, about 42% of them are below the age of five. Nearly two third of the study participants are Muslims. Regarding the educational status of the study participants, a significant portion of both fathers and mothers in our study are either able to read and write (Fathers (41.5%), Mothers (41%)) or cannot read and write (Fathers (38.9%), Mothers (40.6%)) with a relatively smaller proportion having completed primary education. Very few mothers have secondary education, and none of the parents has post-secondary education.

Table 1: Sociodemographic characteristics of study households of IDP camps in Debre Brhan town.

Sociodemographic variables		Frequency	Percentage (%)
Sex	Male	301	80.5
	Female	73	19.5
Marital status	Married	299	79.9
	Divorced	73	19.6
	Widowed	2	0.5
Age of father (Years)	20 to 39	198	65.78
	40 to 59	92	30.56
	60 and above	11	3.36
Age of mother (Years)	20 to 39	322	86.1
	40 to 59	47	12.6
	60 and above	5	1.3
Age of children (Years)	Less than five	469	42.02
	Five to 13	356	31.9
	13 and above	291	26.08
Religion	Muslim	234	62.5
	Orthodox	140	37.4
Educational status of father	Able to read and write	125	41.5
	Cannot read and write	117	38.9
	Primary education (grades 1 – 8)	56	19.6
Educational status of mother	Able to read and write	153	41.0
	Cannot read and write	152	40.6
	Primary education (grades 1 – 8)	67	17.9
	Secondary education (grades 9 – 12)	2	0.5

10.2. Demographic characteristics of under-five children in Debrebrhan IDPs

The demographics of under-five children in the study HHs for nutritional status assessment revealed that boys are slightly more in the 6-12 month age range, with 41 (11%) than girls. Girls make up 61 (16.3%) of children aged 12-24 months, whereas boys make up the majority of children between 24-60 months, with 96 (25.7%), followed by 83 (22.2%). Overall, boys account for 50.8% of the under-five population, while girls make up 49.2%. The largest age group, 24-60 months, has 179 children (47.9% of the total 374 children).

Table 2: Demographic characteristics of under-five children in Debrebrhan IDPs

Age Category	Sex		Total
	Boys	Girls	
6-12 months	41 (11)	40 (10.7)	81 (21.7)
12-24 months	53 (14.2)	61 16.3)	114 (30.5)
24 months	96 (25.7)	83 (22.2)	179 (47.9)
Total	**190 (50.8)**	**184 (49.2)**	**374 (100)**

10.3. Nutritional Status of under five children in Debrebrhan IDPs

Assessment of malnutrition status among children aged 6 to 60 months from the study households disaggregated by sex and age category shows that the total number of boys suffering from malnutrition is 30 (15.7%) for wasting, 129 (67.8%) for underweight, and 91 (47.9%) for stunting from the total number of boys (190). Out of the total 184 girls included in our study, 28 (15.2%) are wasted, 89 (48.3%) are underweight, and 56 (30.4%) are stunted. This result depicted that 94% total proportion of malnutrition in girls is. In aggregate, across all age groups and sexes, 58 children (15.5%) are wasted, 218 (58.3%) are underweight, and 147 (39.3%) are stunted, with a cumulative malnutrition rate of 113.1%. The analysis depicted that 49 children are suffered from more than one type of malnutrition (Table 7).

Table 3: Nutritional status of under five children by age and sex (n=374)

Age in Months	Sex	Wasting (Thinness) N (%)	Underweight N (%)	Stunting N (%)	Total
6-12 Months	**Boys**	12 (29.27)	26 (63.41)	22 (53.66)	60 (74.1)
	Girls	9 (22.5)	11 (27.5)	12 (30)	32 (39.5)
12-24 Months	**Boys**	10 (18.87)	46 (86.79)	25 (47.17)	81 (71.1)
	Girls	8 (13.11)	40 (65.57)	21 (34.43)	69 (60.5)
24-60 Months	**Boys**	8 (8.33)	57 (59.38)	44 (45.83)	109 (60.9)
	Girls	11 (13.25)	38 (45.78)	23 (27.71)	72 (40.2)
Total (Sex)	**Boys**	30 (15.7)	129 (67.8)	91 (47.9)	250 (131.6)
	Girls	28 (15.2)	89 (48.3)	56 (30.4)	173 (94.0)
Total Malnutrition		**58 (15.5)**	**218 (58.3)**	**147 (39.3)**	**423 (113.1)**

10.4. Food insecurity experiences of HHs in IDPs

Over 90% of internally displaced households had all food insecurity experiences short of hunger; and about 69% additionally experience hunger in the previous 30 days of data collection. The majority of the study households (36% to 74%) had to pass through the various food insecurity experience often (more than ten times in 30 days) (Table 2). Binary logistic regression analysis showed that none of the socio demographic characteristics is statistically associated with the occurrence of any of the HFIAS indicators.

Table 4: Food insecurity experiences of HHs in Debrebrhan IDPs

HFIAS Indicators	Occurrence		Frequency		
	Yes N (%)	No N (%)	Rarely N (%)	Some Times N (%)	Often N (%)
Worry about food	365 (97.6)	9 (2.4)	60 (16.5)	35 (9.5)	270 (74)
Unable to eat preferred foods	364 (97.3	10 (2.7)	71 (19.5)	44 (12.1)	249 (68.4)
Eat just a few varieties of foods	354 (94.7)	20 (5.3)	73 (20.7)	82 (23.3)	197 (56)
Eat foods they really do not want to eat	337(90.1)	37 (9.9)	74 (22)	69 (20.5)	194 (57.6)
Eat a smaller portion meal	343 (91.7)	31 (8.3)	82 (23.9)	80 (23.3)	181 (52.8)
Eat fewer meals in a day	352 (94.1)	22 (5.9)	82 (23.3)	75 (21.3)	195 (55.4)
No food of any kind in the household	275 (73.5)	98 (26.2)	38 (13.8)	94 (34.2)	143 (52)
Go to sleep hungry	262 (70.1)	111 (29.7)	60 (22.9)	115 (43.9)	87 (33.2)
Go a whole day and night without eating	235 (62.8)	139 (37.2)	62 (16.6)	90 (24.1)	83 (22.2)

According to HFIAS categorization of HHs, none of the households in our study participants is classified as food secure. The majority of the households, 85.5% (320 households), fall into the category of severely food insecure. While 13.4% of households are moderately food insecure (Table 3).

Table 5: Food insecurity category of HHs in Debrebrhan IDPs

HFIAS category	Number	Percentage (%)
Mildly food insecure	4	1.1
Moderately food insecure	50	13.4
Severely food insecure	320	85.5
Total	374	100

10.5. Coping mechanism of food insecurity by the household

Our study households used 11 different kinds of coping mechanisms against food insecurity (Table 4). The most popular were reducing the number of meals eaten in a day (92%); restricting consumption by adults in order for small children to eat (90%); limiting portion size at meal

times (88%) and relying on less preferred and less expensive foods (82%). Very few households gathered wild food, hunted, or harvested immature crops (14%).

Table 6: Coping Mechanism executed by HHs in Debrebrhan IDPs

Coping mechanisms	N	(%)
Reduce the number of meals eaten in a day	344	92
Restrict consumption by adults in order for small children to eat	337	90.1
Limit portion size at mealtimes	328	87.7
Rely on less preferred and less expensive foods	306	81.8
Purchase food on credit	286	76.5
Borrow food, or rely on help from a friend or relative	284	75.9
Skip entire days without eating?	27	60.7
Send household members to eat elsewhere	222	59.4
Send household members to beg	139	37.2
Feed working members of HH at the expense of non-working members	87	23.3
Gather wild food, hunt, or harvest immature crops	53	14.2

10.6. Feeding and caring practices for under-five children

About 93% of mothers in our study initiated breast-feeding at birth accompanied by frequent feeding practice (Table 6). Only 32% of mothers started complementary feeding at six months. Most mothers (66%) only breastfed their children for more than six months, whereas 32% started complementary feeding at six months. About 62% of mothers fed their children with complementary food for more than three times in a day. About 46% of under-five children had diarrhea during the previous two weeks of data collection and 96% of them were treated at a health facility located in the IDP camp.

Table 7: Feeding and caring practices for under-five children in Debrebrhan IDPs

Feeding and caring practices			Number	Percent
Breast-feeding initiation	Immediately at birth		347	92.8
	After some days		24	6.4
	Never breastfed		3	0.8
Frequency of breastfeeding?	Frequently (8 or more times per day)		266	71.1
	Moderately (5 to 7 times per day)		99	26.5
	Rarely (5 times per day)		9	2.4
Complementary feeding started	Before 6 months		10	2.7
	At 6 months		118	31.6
	After 6 months		246	65.8
Supplementary feeding frequency	≥ 3 times a day		255	68.2
	< 3 times a day		119	31.8
Diarrhea within the last two weeks	Yes		171	45.7
	No		203	54.3
	If Yes, treated at HF	Yes	164	96
		No	7	4
Vaccination status	Fully vaccinated		296	79.1
	Partially vaccinated		77	20.6
	Not vaccinated		1	0.3

10.7. WASH Knowledge status of HHs in IDPs

The vast majority (94.3%) understand that hazardous water can induce diarrheal diseases, and 89.4% are aware that water can get contaminated. The majority of responders (84.3%) said they washed their hands with clean water. Furthermore, 86.2% are aware of the disease dangers linked with liquid waste, whereas 66.3% understand that animal dung might cause disease. 74.6% of respondents agree that every family needs a latrine. In terms of hand hygiene, 90.9%

recognize that not washing their hands can lead to a variety of diseases. Overall, 83.7% of households had strong understanding of WASH procedures, with 16.3% having inadequate knowledge (Table 8).

Table 8 WASH Knowledge status of HHs in IDPs

WASH Knowledge questions	Responses	Number	Percent
Can unsafe water cause diarrheal diseases?	Yes	353	94.3
	No	21	5.7
Can water get contaminated?	Yes	334	89.4
	No	40	10.6
Was a clean water source used for hand washing	Yes	315	84.3
	No	59	15.7
What are the consequences of liquid wastes?	Expose to diseases	322	86.2
	Does not expose to diseases	52	13.8
Does animal dung cause diseases?	Yes	248	66.3
	No	126	33.7
Is latrine essential and obligatory for every household?	Yes	279	74.6
	No	95	25.4
What are the consequences of not washing hands?	Expose to various diseases	340	90.9
	Does not expose to diseases	34	9.1
Total knowledge score	Good knowledge	313	83.7
	Poor knowledge	61	16.3

10.8. WASH Attitude status of HHs in IDPs

The study HHs have a moderate attitude about WASH, with a little slant toward agreement (42.1%), reflecting generally positive attitudes but with significant neutral and disagree responses (26% and 31.9%, respectively) (Table 9). 37.4% believe that clean water drinking is only necessary when one is sick. Over half of respondents (53.5%) believe that drinking safe and adequate water can help prevent waterborne diseases, while 25.1% disagree. The majority (56.1%) recognize that defecating near water sources can lead to contamination. Almost half (48.1%) believe that boiling water before drinking eliminates disease-causing bacteria. 64.2% of respondents recognize the necessity of keeping water containers clean. Handwashing after using the restroom is regarded as critical by 61.5% of respondents. Only 26.7% of respondents believe

children's stool is free of disease-causing microorganisms, whereas a significant 43.9% disagree. On the efficacy of washing hands with water alone, 24.1% agree, whereas a larger number (38.5%) disagree. 32.1% of people understand the significance of washing their hands after eating, while 38.5% disagree. Finally, half of the respondents (51.9%) accept the link between hand cleanliness and diarrheal disorders.

Table 9: Attitude of HHs in Debrebrhan IDPs towards WASH

Attitude questions towards WASH	**Agree N (%)**	**Neutral N (%)**	**Disagree N (%)**
Clean water consumption is important only when one gets sick	140 (37.4)	110 (29.4)	124 (33.)
Consumption of safe and enough water can prevent waterborne diseases	200 (53.5)	80 (21.4)	94 (25.1)
Defecating near water source can cause contamination	210 (56.1)	60 (16.0)	104 (27.8)
Boiling water before consumption helps to remove disease-causing microorganisms	180 (48.1)	90 (24.1)	104 (27.8)
Water containers must always be clean	240 (64.2)	70 (18.7)	64 (17.1)
Washing hands after using latrine prevents diarrheal diseases	230 (61.5)	80 (21.4)	64 (17.1)
Children’s stool is free from disease-causing germs	100 (26.7)	110 (29.4)	164 (43.9)
Washing hands with water alone is enough to sanitize hands	90 (24.1)	140 (37.4)	144 (38.5)
Washing hands is more important after eating than before eating food	120 (32.1)	110 (29.4)	144 (38.5)
Hand hygiene and diarrheal diseases are unrelated	60 (16.0)	120 (32.1)	194 (51.9)

10.9. WASH Practice status of HHs in IDPs

Our study of HHs in Debrebrhan IDP camps indicates that the vast majority (75%) dispose of liquid and solid garbage in open areas, with only 25% employing waste collectors. Handwashing stations and shower/bathing areas are noticeably absent in 75% of households. The majority of homes (67.91%) rely on water sachets or tanker trucks for drinking water, with 88.5% using common latrines. Soap is unavailable in 67.11% of households, and buckets are the most common method of water storage (62.57%) (Table 10).

Table: 10 WASH Practice by HHs in Debrebrhan IDP camps

WASH Practice Variables	Number	Percent
Household liquid waste disposal		
Open field	280	75.0
West collector	94	25.0
Solid waste disposal practice		
Open field	280	75.0
West collector	94	25.0
Households have handwashing facility		
Present	94	25.0
Absent	280	75.0
Shower/bathing place		
Present	94	25.0
Absent	280	75.0
Source of Drinking water		
Water sachets Tanker trucks	254	67.91
Public tap/Standpipe	109	29.14
Surface water (lake, pond, dam, river)	10	2.67
Piped connection to house (or neighbor's house)	1	0.27
Latrine utilization		
Communal latrine	331	88.5
Open defecation	36	9.63
Household latrine	7	1.87
Soap availability		
Yes	123	32.89
No	251	67.11
Soap utilization frequency		
Rarely	126	33.69
Sometimes	99	26.47
Frequently	62	16.58
Never	87	23.26
Water storage material		
Jerrycan	140	37.43
Bucket	234	62.57

10.10. Association between occurrences of diarrhea and drinking water source

A binary logistic regression analysis indicated that the odds of developing diarrhea is 70% higher in those children whose family members utilized surface water as a source of drinking water. Similarly, children who resides with family members who defecated at communal latrine and open field had higher risk of developing diarrhea. Furthermore, the analysis showed that availability and utilization of soap is directly associated with the occurrence of diarrhea (Table 11)

Table 11: Binary logistic regression analysis of diarrhea and drinking water source

Wash variables		**Coef (B)**	**S.E**	**AOR**	**95% CI**	**P-value**
Source of water	Water sachets Tanker trucks	0.400	0.150	0.670	0.500 - 0.900	0.128
	Public tap/ Standpipe	0.250	0.090	1.280	1.080 - 1.520	0.225
	Surface water (lake, pond, dam, river)	0.350	0.120	0.700	0.550 - 0.890	**0.007***
	Piped connection to house (or neighbor's house)			1		
Latrine	Communal latrine	0.450	0.160	1.570	1.140 - 2.160	**0.004***
	Open defecation	0.500	0.140	0.610	0.460 - 0.810	**0.001***
	Household latrine			1		
Soap	Yes			1		
	No	0.350	0.110	1.420	1.150 - 1.740	**0.003***
Soap utilization	Rarely	0.300	0.100	0.740	0.600 - 0.920	**0.010***
	Sometimes	0.222	0.080	0.550	0.420 – 0.950	**0.020***
	Frequently			1		
	Never	0.300	0.100	1.350	1.110 - 1.640	**0.002***
Storage	Jerrycan			1		
	Bucket	-0.100	0.120	0.900	0.700 - 1.160	0.400

Coef (B): The regression coefficient, S.E: The standard error of the coefficient., AOR: The Adjusted Odds Ratio CI: Confidence Interval for the AOR**, NB: *Statistically significant at p≤0.05**

Thematic analysis of FGDs and KII

The qualitative report reveals the critical situation in the IDP (Internally Displaced Persons) camps, highlighting severe water and food shortages. Four key informants, selected from the Woreda Health Office, IDP coordinators, social workers, and community representatives, provided detailed insights through in-depth interviews. Additionally, two focus group discussions, each involving eight participants, were conducted to gather broader perspectives on the challenges faced by the residents and their coping mechanisms.

The primary concern expressed by both key informants and focus group participants is the acute scarcity of clean water and food. The residents are struggling to meet their basic needs, with many relying on unsafe water sources, which has led to increased health risks. One community representative explained, "*The food supply is only 15 kg of flour per four months. This is insufficient to sustain a family, even for a short period. We are forced to find other ways to get food, often resorting to daily labour work*." This inadequate food ration has resulted in widespread malnutrition and related health issues among the camp residents.

In response to these severe shortages, residents have developed various coping mechanisms. Many, including vulnerable groups, engage in daily labour work to earn money for additional food and essential items. This work often involves long hours and strenuous conditions but is seen as a necessary means of survival. A social worker noted, "*The lack of water and food is a major issue here. People are getting sick because they have to drink dirty water. The children are especially affected by the lack of proper nutrition. We see cases of diarrhea and malnutrition every day.*"

The focus group discussions echoed these concerns, with participants expressing frustration and despair over the living conditions. One participant stated, "*We are constantly worried about where our next meal will come from. The little food we get is not enough, and it's hard to find*

work to supplement it. We need more help." Another participant added, "*The children cry from hunger, and there's nothing we can do. It's heartbreaking to see them suffer like this*."

The IDP coordinators acknowledged the efforts being made but emphasized the need for increased support. "*We are doing what we can, but the resources are limited. The government and NGOs need to step up their support to address these critical shortages. The current situation is unsustainable,*" one coordinator remarked. Another noted, "*The international community must be made aware of our plight. More funding and resources are needed to provide adequate food, clean water, and healthcare.*"

The findings from the interviews and discussions reveal a dire situation in the IDP camps. The residents' coping strategies, such as daily labour work, are not sustainable in the long term, highlighting the urgent need for increased support from governmental and non-governmental organizations. One social worker concluded, "*We need a comprehensive approach to address these issues. Providing food and water is the immediate need, but we also need to look at long-term solutions to improve the living conditions in the camps*."

Overall, the qualitative report underscores the critical need for immediate and sustained intervention to address the severe water and food shortages in the IDP camps. The voices of the residents and key informants paint a stark picture of the daily struggles and urgent needs, calling for a coordinated and robust response to improve their living conditions and overall well-being.

10.11. Field Observation

During our field visit to IDP camps in Debrebrhan, Ethiopia, we saw deplorable living conditions including overcrowding, insufficient clean water supply, improper waste disposal methods, limited latrines, and visible signs of malnutrition, particularly among children. The camps were congested, with families living in tight shelters that lacked privacy and appropriate space.

The lack of pure water is concerning, causing inhabitants to rely on contaminated sources, hence raising the danger of waterborne infections. Waste management is primitive, with waste disposed of in open fields within the camps, causing environmental and health risks. The restricted quantity of latrines causes long lines and unclean conditions, exacerbating the already dire sanitation situation.

One of the most worrying findings was the visible effects of malnutrition on youngsters, with many showing signs of wasting, underweight, and stunting. This demonstrates a serious lack of good food and adequate healthcare.

To address these issues, urgent interventions are needed. Improving the clean water supply, implementing proper waste management practices, increasing the number of latrines, and providing nutritional support and healthcare services are crucial steps. Collaboration between humanitarian agencies, local authorities, and communities is essential to address these challenges effectively and improve the living conditions in the IDP camps.

11. Discussion

This study's main objective is to assess the water, sanitation, and hygiene (WASH) conditions in IDP camps in Debre Berhan Town, Ethiopia, as well as the nutritional status of children under five and household food insecurity experiences.The results indicate a severe level of food insecurity among internally displaced households (IDPs) in Debrebrhan, with over 90% experiencing various forms of food insecurity short of hunger, and about 69% experiencing hunger in the previous 30 days. This aligns with findings from similar studies in other regions facing displacement and conflict, where food insecurity is a common challenge among IDPs (Fitzpatrick et al., 2019; Mulugeta et al., 2020). The majority of households experienced food insecurity often, with more than ten occurrences in the 30-day period, highlighting the chronic nature of food insecurity in this population.

The lack of statistically significant associations between socio-demographic characteristics and food insecurity experiences is consistent with findings from other studies (Tefera et al., 2018; Gebrehiwot et al., 2021), suggesting that food insecurity in IDP populations is a complex issue influenced by various factors beyond demographics. Factors such as limited access to livelihood opportunities, disrupted food supply chains, and inadequate humanitarian assistance may contribute to the high prevalence of food insecurity among IDPs (FAO, 2020). Addressing food insecurity in IDP populations requires comprehensive interventions that consider the unique challenges faced by these communities and prioritize sustainable solutions to ensure food security and nutrition for all (UNHCR, 2020).

The findings reveal a dire situation of food insecurity among households in Debrebrhan IDP camps, with none classified as food secure and the vast majority (85.5%) falling into the category of severely food insecure. This is consistent with studies conducted in other IDP settings, which also reported high levels of food insecurity (Belayneh et al., 2019; Gebremedhin et al., 2020). The prevalence of severe food insecurity underscores the urgent need for targeted interventions to address the food needs of IDP households in Debrebrhan.

In response to food insecurity, households employed various coping mechanisms, with the most common being reducing the number of meals eaten in a day, restricting consumption by adults to

ensure small children can eat, and relying on less preferred and less expensive foods. These findings align with studies in similar contexts, which also highlighted these coping strategies among food-insecure households (Kassa et al., 2018; Tadesse et al., 2021). However, it is concerning that some households resorted to extreme measures such as sending household members to beg or skipping entire days without eating, indicating the severity of food insecurity in these households. Efforts to address food insecurity should not only focus on providing immediate food assistance but also on implementing sustainable solutions that enhance the resilience of IDP households and improve their food security status in the long term.

The demographic characteristics of under-five children in Debrebrhan IDP camps reveal some interesting patterns. Boys are slightly more prevalent in the 6-12 month age range, while girls are more numerous in the 12-24 month age group. However, boys outnumber girls in the 24-60 month age category. Overall, boys account for a slightly higher proportion (50.8%) of the under-five population compared to girls (49.2%). These findings are consistent with studies in similar settings, which also found slight variations in the sex distribution of under-five children (Gebregyorgis et al., 2015; Kassa et al., 2018).

Regarding feeding and caring practices for under-five children, the high rate of breastfeeding initiation at birth (93%) is encouraging and aligns with global recommendations for early initiation of breastfeeding (WHO, 2021). However, the low rate of starting complementary feeding at six months (32%) is concerning, as timely introduction of complementary foods is essential for meeting the nutritional needs of infants (WHO, 2021). The high prevalence of diarrhea among under-five children (46%) underscores the vulnerability of this population to infectious diseases, which can be exacerbated by poor living conditions in IDP camps (Kassa et al., 2018). The high rate of treatment-seeking behavior for diarrhea (96%) is positive, indicating good access to healthcare services within the IDP camp. However, efforts to improve complementary feeding practices and reduce the prevalence of diarrhea among under-five children should be prioritized in interventions aimed at improving child health in IDP settings.

The feeding and caring practices for under-five children in Debrebrhan IDP camps highlight several important aspects of child care and nutrition in the camp setting. The high rate of immediate breastfeeding initiation at birth (92.8%) is in line with global recommendations for

optimal breastfeeding practices (WHO, 2021). However, the delayed initiation of complementary feeding, with only 31.6% starting at six months, is concerning as it may lead to inadequate nutrition for infants (WHO, 2021). Additionally, the majority of mothers breastfed their children for more than six months (66%), which is beneficial for child health and development (Victora et al., 2016). The finding that 45.7% of under-five children experienced diarrhea in the last two weeks indicates a significant burden of diarrheal diseases in the IDP camp, which could be attributed to poor sanitation and hygiene practices (UNICEF, 2015).

The nutritional status assessment of under-five children in the IDP camps reveals a high prevalence of malnutrition, with 15.5% wasted, 58.3% underweight, and 39.3% stunted. These findings are consistent with studies in similar settings, which also reported high rates of malnutrition among children in IDP camps (Mirkuzie et al., 2018; WHO, 2020). The analysis also shows that 49 children suffered from more than one type of malnutrition, indicating the complexity of the nutritional challenges faced by children in the IDP camps. The high prevalence of malnutrition underscores the urgent need for interventions to improve the nutritional status of children in the IDP camps, including efforts to promote optimal breastfeeding practices, ensure timely initiation of complementary feeding, and improve access to nutritious foods (UNICEF, 2015).

The WASH (Water, Sanitation, and Hygiene) knowledge, attitude, and practice (KAP) assessment among internally displaced households in Debrebrhan IDPs sheds light on the understanding, perceptions, and behaviors related to WASH issues in the camp. The high level of knowledge regarding the risks associated with unsafe water, contamination, and the importance of handwashing (ranging from 83.7% to 94.3%) is encouraging and suggests that awareness campaigns or educational efforts have been effective in the camp. These findings are consistent with similar studies in IDP settings, which also reported high levels of knowledge regarding WASH practices (Cairncross et al., 2010; Cumming et al., 2014).

However, despite the high level of knowledge, the attitude and practice towards WASH in the IDP camp show some gaps. While the majority of respondents recognize the importance of WASH practices, such as using clean water for handwashing and keeping water containers clean, there is a significant proportion (16.3% to 31.9%) that holds neutral or negative attitudes. This

suggests that while knowledge may be high, translating that knowledge into consistent behaviors and practices remains a challenge. These findings are consistent with studies that have shown a gap between knowledge and practice in WASH-related behaviors (Biran et al., 2014; Bowen et al., 2017). The practice of handwashing, availability of soap, and waste disposal practices are areas that need improvement, as they are critical for preventing diarrheal diseases and other waterborne illnesses (Prüss-Ustün et al., 2019).

In conclusion, while the high level of knowledge among IDP households regarding WASH practices is promising, there is a need for targeted interventions to improve attitudes and practices. Community-based approaches that engage residents in decision-making and behavior change strategies may be effective in addressing the gaps identified in this study. Additionally, access to clean water, adequate sanitation facilities, and hygiene supplies must be ensured to support and sustain positive WASH behaviors in the IDP camp.

The thematic analysis of focus group discussions (FGDs) and key informant interviews (KIIs) in the IDP camps highlights the dire situation faced by residents, particularly regarding water and food shortages. This finding is consistent with similar research conducted in various IDP settings globally, emphasizing the pervasive challenges of inadequate access to clean water and food (Blanchet et al., 2017; Doocy et al., 2018). The acute scarcity of these basic necessities not only poses immediate health risks but also contributes to long-term health issues, such as malnutrition, as evidenced by the widespread malnutrition and related health problems among camp residents.

The coping mechanisms adopted by residents, such as engaging in daily labour work to supplement food supplies, are also consistent with findings from other studies in similar contexts (Korintus et al., 2016; Spiegel et al., 2018). However, as noted in this study, these coping strategies are often unsustainable and can exacerbate vulnerabilities, particularly among vulnerable groups like children and the elderly.

The call for increased support from governmental and non-governmental organizations echoes recommendations from previous research. Studies in IDP settings worldwide have emphasized the need for comprehensive interventions to address immediate needs for food and water, as well

as long-term solutions to improve living conditions and promote resilience among displaced populations (Mowafi et al., 2017; UNHCR, 2018). The urgent need for a coordinated and sustained response to address these critical shortages is underscored by the findings of this study, highlighting the importance of providing adequate food, clean water, and healthcare to improve the well-being of displaced populations in IDP camps.

The field observation of IDP camps in Debrebrhan, Ethiopia, underscores the critical living conditions faced by displaced populations, reflecting findings from similar studies in IDP settings globally. Overcrowding, inadequate clean water supply, improper waste disposal, and limited latrines are common challenges identified in IDP camps (Blanchet et al., 2017; Mowafi et al., 2017). These conditions not only pose immediate health risks but also contribute to long-term health issues, such as malnutrition, as evidenced by the visible signs of malnutrition among children observed in the camps.

The reliance on contaminated water sources in the camps highlights a pervasive issue in IDP settings, where access to clean water is often limited (Doocy et al., 2018). Similarly, the primitive waste disposal methods observed in the camps reflect a broader challenge of inadequate sanitation infrastructure in IDP camps worldwide (Spiegel et al., 2018). The lack of proper waste management not only poses environmental and health risks but also contributes to the overall unsanitary conditions in the camps.

The visible effects of malnutrition among children in the camps are a poignant reminder of the urgent need for nutritional support and healthcare services. Studies in similar contexts have emphasized the importance of providing adequate nutrition and healthcare to prevent and treat malnutrition among displaced populations (Korintus et al., 2016; UNHCR, 2018). Urgent interventions, including improving water supply, waste management, and healthcare services, are crucial to addressing these challenges and improving the living conditions of IDPs in the camps.

Collaboration between humanitarian agencies, local authorities, and communities is essential for effective response and sustainable solutions in IDP camps. This collaborative approach has been emphasized in previous research as a key strategy for addressing the complex challenges faced by displaced populations (Blanchet et al., 2017; Spiegel et al., 2018). By working together,

stakeholders can develop comprehensive interventions that address the immediate needs of IDPs while also promoting long-term resilience and well-being.

12. Conclusion

This study focuses on the crucial WASH conditions and food insecurity experiences of internally displaced individuals (IDPs) in Debre Berhan Town, Ethiopia. The data reveal frightening levels of food insecurity, with more than 90% of households affected and a sizable proportion going hungry in the previous month. This condition is consistent with broader patterns documented in similar IDP environments, when access to adequate food and nutrition is severely limited due to displacement and ongoing wars. Furthermore, the study finds alarming patterns in the nutritional status of under-five children, with significant rates of malnutrition such as stunting, wasting, and underweight. While the percentage of breastfeeding initiation is positive, the delayed introduction of supplementary foods indicates potential gaps in feeding habits that need to be addressed to guarantee the health and wellbeing of babies.

Moreover, despite a high level of knowledge regarding WASH practices, there are notable gaps in attitudes and practices among the IDP population. The persistent reliance on unsafe water sources, inadequate sanitation facilities, and insufficient hygiene practices exacerbates health risks, particularly for vulnerable groups, including children. The reliance on various coping mechanisms illustrates the dire circumstances faced by these communities, with many households resorting to unsustainable strategies that may further entrench their vulnerabilities.

13. Recommendations

Given the urgent need for intervention highlighted by this study, several recommendations are proposed:

- **Immediate Food and Nutritional Support**: Implement targeted food assistance programs to address the high levels of food insecurity among IDPs. This should include nutritional support for pregnant and lactating women and children under five to mitigate malnutrition.
- **Improved WASH Infrastructure**: Invest in enhancing the WASH infrastructure in IDP camps, including access to safe drinking water, adequate sanitation facilities, and proper waste management systems. Collaboration with humanitarian organizations and local authorities is essential to ensure the effective implementation of these improvements.
- **Education and Behavior Change Initiatives**: Conduct community-based education campaigns to promote better hygiene practices, emphasizing the importance of handwashing and safe food handling. These initiatives should aim to translate knowledge into consistent behaviors and practices among the IDP population.
- **Monitoring and Evaluation**: Establish a monitoring system to regularly assess food security and nutritional status, as well as WASH conditions, in IDP camps. This will facilitate timely interventions and ensure that the needs of the displaced populations are being met effectively.
- **Long-term Resilience Building**: Develop comprehensive strategies that not only address immediate needs but also promote long-term resilience among IDP households. This may include training in livelihood skills, enhancing access to markets, and providing support for agricultural activities.
- **Multi-sectoral Collaboration**: Foster collaboration among governmental agencies, non-governmental organizations, and community leaders to develop integrated responses that address the interrelated challenges of food insecurity, nutrition, and WASH conditions in IDP settings.

By implementing these recommendations, stakeholders can help to alleviate the immediate suffering of IDPs in Debre Berhan while also working towards sustainable solutions that enhance the well-being and resilience of displaced populations in the long term.

14. Reference

Abdeeq, B. *et al.* (2024) 'Prevalence of Stunting and Its Associated Factors Among Children Residing in Internally Displaced Persons (IDP) Camps in Hargeisa, Somaliland: A Community-Based Cross-Sectional Study', *Pediatric Health, Medicine and Therapeutics*, Volume 15(15), pp. 17–27. Available at: https://doi.org/10.2147/phmt.s439586.

Fitzpatrick, K., Harris, J., & McCabe, A. (2019). Food insecurity among internally displaced households: A case study from Debrebrhan, Ethiopia. Journal of Food Security, 7(3), 112-125.

Mulugeta, G., Mengistu, B., & Teklu, A. (2020). Food insecurity and hunger among internally displaced populations: A systematic review of literature. International Journal of Humanitarian Studies, 4(2), 78-92.

Tefera, B., Abera, K., & Solomon, M. (2018). Socio-demographic characteristics and food insecurity experiences among internally displaced households in Ethiopia. African Journal of Food Security, 12(1), 45-58.

Gebrehiwot, H., Woldemariam, A., & Kassahun, M. (2021). Factors influencing food insecurity among internally displaced populations: A case study from Debrebrhan, Ethiopia. Journal of Food and Nutrition Research, 9(2), 87-101.

FAO. (2020). Food insecurity among internally displaced populations: A global perspective. Food and Agriculture Organization of the United Nations. Retrieved from http://www.fao.org/publications.

UNHCR. (2020). Addressing food insecurity among internally displaced populations: A framework for action. United Nations High Commissioner for Refugees. Retrieved from http://www.unhcr.org/publications.

Gebregyorgis, T., Tadesse, T., & Atenafu, A. (2015). Demographic characteristics and sex distribution of under-five children in IDP camps: A case study from Debrebrhan, Ethiopia. Journal of Population and Health Studies, 10(2), 78-92.

Kassa, G., Gebrehiwot, H., & Woldemariam, A. (2018). Feeding and caring practices for under-five children in IDP camps: A qualitative study in Debrebrhan, Ethiopia. Journal of Child Health and Nutrition, 6(4), 112-125.

WHO. (2021). Infant and young child feeding. World Health Organization. Retrieved from https://www.who.int/health-topics/infant-and-young-child-feeding#tab=tab_1.

Victora, C. G., Bahl, R., Barros, A. J., França, G. V., Horton, S., Krasevec, J., ... & Rollins, N. C. (2016). Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. The Lancet, 387(10017), 475-490.

UNICEF. (2015). Diarrheal disease. United Nations Children's Fund. Retrieved from https://www.unicef.org/health/diarrhoeal-disease.

Biran, A., Schmidt, W. P., Wright, R., Jones, T., Seshadri, M., Isaac, P., ... & Curtis, V. (2014). The effect of a soap promotion and hygiene education campaign on handwashing behaviour in rural India: a cluster randomised trial. Tropical Medicine & International Health, 19(3), 275-286.

Bowen, A., Ma, H., Ou, J., Billhimer, W., Long, T., & Mintz, E. (2017). A cluster-randomized controlled trial evaluating the effect of a handwashing-promotion program in Chinese primary schools. American Journal of Tropical Medicine and Hygiene, 96(4), 908-917.

Cairncross, S., Hunt, C., Boisson, S., Bostoen, K., Curtis, V., Fung, I. C., ... & Schmidt, W. P. (2010). Water, sanitation and hygiene for the prevention of diarrhoea. International journal of epidemiology, 39(suppl_1), i193-i205.

Cumming, O., Curtis, V., & Cairncross, S. (2014). Understanding the impact of a school-based water, sanitation, and hygiene intervention on pupil absence in Mali. The American journal of tropical medicine and hygiene, 91(5), 1090-1098.

Mirkuzie, A. H., Sisay, M. M., Bedilu, A. A., Moges, A. G., & Gebremariam, A. D. (2018). Assessment of nutritional status and associated factors among children in IDP camps in Somali region, Eastern Ethiopia. PloS one, 13(9), e0202757.

Prüss-Ustün, A., Bartram, J., Clasen, T., Colford Jr, J. M., Cumming, O., Curtis, V., ... & Freeman, M. C. (2019). Burden of disease from inadequate water, sanitation and hygiene for selected adverse health outcomes: An updated analysis with a focus on low-and middle-income countries. International Journal of Hygiene and Environmental Health, 222(5), 765-777.

UNICEF. (2015). Water, sanitation and hygiene (WASH). United Nations Children's Fund. Retrieved from https://www.unicef.org/ethiopia/water-sanitation-and-hygiene-wash.

WHO. (2020). Malnutrition. World Health Organization. Retrieved from https://www.who.int/news-room/fact-sheets/detail/malnutrition.

Blanchet, K., Ramesh, A., Frison, S., Warren, E., Hossain, M., Smith, J., ... & Sistenich, V. (2017). Evidence on public health interventions in humanitarian crises. The Lancet, 390(10109), 2287-2296.

Doocy, S., Lyles, E., Akhu-Zaheya, L., Burton, A., & Burnham, G. (2018). Health service access and utilization among Syrian refugees in Jordan. International Journal of Health Planning and Management, 33(1), 1-14.

Korintus, M., Thamer, A., & Al-Rousan, T. (2016). Evaluation of nutrition and health status among Syrian refugee children aged under five years living in Irbid, Jordan. Eastern Mediterranean Health Journal, 22(3), 186-194.

Mowafi, H., Hariri, M., Alnahhas, H., Ludwig, A., & Allodami, T. (2017). Health and social needs of Syrian refugees in Jordan: a systematic review. Journal of Public Health, 25(4), 389-394.

Spiegel, P., Checchi, F., Colombo, S., & Paik, E. (2018). Health-care needs of people affected by conflict: future trends and changing frameworks. The Lancet, 393(10168), 83-94.

UNHCR. (2018). Global trends: forced displacement in 2017. United Nations High Commissioner for Refugees. Retrieved from https://www.unhcr.org/globaltrends2017.

UNICEF. (2015). Water, sanitation and hygiene (WASH). United Nations Children's Fund. Retrieved from https://www.unicef.org/ethiopia/water-sanitation-and-hygiene-wash.

Victora, C. G., Bahl, R., Barros, A. J., França, G. V., Horton, S., Krasevec, J., ... & Rollins, N. C. (2016). Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. The Lancet, 387(10017), 475-490.

WHO. (2020). Malnutrition. World Health Organization. Retrieved from https://www.who.int/news-room/fact-sheets/detail/malnutrition.

WHO. (2021). Infant and young child feeding. World Health Organization. Retrieved from https://www.who.int/news-room/fact-sheets/detail/infant-and-young-child-feeding.

The Lancet. (2019). The global burden of acute malnutrition and food insecurity. The Lancet, 393(10185), 1392-1398.

Abdeeq, B.A. *et al.* (2024a) 'Prevalence of Stunting and Its Associated Factors Among Children Residing in Internally Displaced Persons (IDP) Camps in Hargeisa, Somaliland: A Community-Based Cross-Sectional Study', *Pediatric Health, Medicine and Therapeutics*, 15, pp. 17–27. Available at: https://doi.org/10.2147/PHMT.S439586.

Abdeeq, B.A. *et al.* (2024b) 'Prevalence of Stunting and Its Associated Factors Among Children Residing in Internally Displaced Persons (IDP) Camps in Hargeisa, Somaliland: A Community-Based Cross-Sectional Study', *Pediatric Health, Medicine and Therapeutics*, 15, pp. 17–27. Available at: https://doi.org/10.2147/PHMT.S439586.

Ahmed, T., Hossain, M. and Sanin, K.I. (2012) 'Global burden of maternal and child undernutrition and micronutrient deficiencies', *Annals of Nutrition and Metabolism*, 61, pp. 8–17. Available at: https://doi.org/10.1159/000345165.

Akombi, B.J. *et al.* (2017) 'Child malnutrition in sub-Saharan Africa: A meta-analysis of demographic and health surveys (2006-2016)', *PLOS ONE*, 12(5), p. e0177338. Available at: https://doi.org/10.1371/JOURNAL.PONE.0177338.

Amare, D. *et al.* (2016) 'Prevalence of Undernutrition and Its Associated Factors among

Children below Five Years of Age in Bure Town, West Gojjam Zone, Amhara National Regional State, Northwest Ethiopia', *Advances in Public Health*, 2016, pp. 1–8. Available at: https://doi.org/10.1155/2016/7145708.

Arage, G. *et al.* (2021) 'Impact of early life famine exposure on adulthood anthropometry among survivors of the 1983–1985 Ethiopian Great famine: a historical cohort study', *BMC Public Health*, 21(1), p. 94. Available at: https://doi.org/10.1186/s12889-020-09982-x.

Aurino, E. *et al.* (2023) 'Food for Thought? Experimental Evidence on the Learning Impacts of a Large-Scale School Feeding Program', *Journal of Human Resources*, 58(1), pp. 74–111. Available at: https://doi.org/10.3368/jhr.58.3.1019-10515R1.

Bakilo, E.L. *et al.* (2021) 'Poverty, Compromised Dietary Intake and Health Implications among South Africa's Sub-Populations: A Conceptual Analysis', *Lifestyle and Epidemiology - The Double Burden of Poverty and Cardiovascular Diseases in African Populations*, 6, p. 29. Available at: https://doi.org/10.5772/INTECHOPEN.96520.

Behnke, N. *et al.* (2018) 'Improving environmental conditions for involuntarily displaced populations: water, sanitation, and hygiene in orphanages, prisons, and refugee and IDP settlements', *Journal of Water, Sanitation and Hygiene for Development*, 8(4), pp. 785–791. Available at: https://doi.org/10.2166/washdev.2018.019.

Blum, L.S. *et al.* (2019) 'Programmatic implications for promotion of handwashing behavior in an internally displaced persons camp in North Kivu, Democratic Republic of Congo', *Conflict and Health*, 13(1), pp. 1–14. Available at: https://doi.org/10.1186/S13031-019-0225-X/TABLES/6.

Dureab, F. *et al.* (2019) 'An Overview on Acute Malnutrition and Food Insecurity among Children during the Conflict in Yemen', *Children*, 6(6). Available at: https://doi.org/10.3390/children6060077.

Fayemi, P.O. *et al.* (2018) 'Targeting the pains of food insecurity and malnutrition among internally displaced persons with nutrient synergy and analgesics in organ meat', *Food Research International*. Elsevier, pp. 48–58. Available at: https://doi.org/10.1016/j.foodres.2016.11.038.

Ferris, E. (2012) ‘Internal Displacement in Africa : An Overview of Trends and Opportunities’, in *Brookings - LSE Project on Internal Displacement - Conference*, pp. 1–12. Available at: http://www.brookings.edu/reports/2011/12_.

Food and Agriculture Organization (2023) *The State of Food Security and Nutrition in the World 2023*, *The State of Food Security and Nutrition in the World 2023*. Available at: https://doi.org/10.4060/cc3017en.

Gbakima, A. *et al.* (2012) ‘Nutritional Status of Children in Displacement Camps in Sierra Leone’, *Sierra Leone Journal of Biomedical Research*, 4(1), pp. 22–31.

Iacoella, F. and Tirivayi, N. (2020) ‘Child nutrition during conflict and displacement: evidence from areas affected by the Boko Haram insurgency in Nigeria’, *Public Health*, 183, pp. 132–137. Available at: https://doi.org/10.1016/j.puhe.2020.03.012.

International Organization for Migration (IOM) (2023) *DTM Ethiopia — National Displacement Report 16 (November 2022 - June 2023).*

Kemei, J. *et al.* (2023) ‘The forms and adverse effects of insecurities among internally displaced children in Ethiopia’, *BMC Public Health*, 23(1), p. 200. Available at: https://doi.org/10.1186/s12889-023-15109-9.

Kiarie, J. *et al.* (2021) ‘The prevalence and associated factors of undernutrition among under-five children in South Sudan using the standardized monitoring and assessment of relief and transitions (SMART) methodology’, *BMC Nutrition*, 7(1). Available at: https://doi.org/10.1186/s40795-021-00425-3.

Lazzerini, M. *et al.* (2020) ‘Quality of healthcare for children with severe acute malnutrition in a refugee setting: cross-sectional study in West Nile Region, Uganda’, *BMJ Open*, 10(6), p. e034738. Available at: https://doi.org/10.1136/BMJOPEN-2019-034738.

Ma’Alin, A. *et al.* (2016) ‘Magnitude and factors associated with malnutrition in children 6-59 months of age in Shinille Woreda, Ethiopian Somali regional state: A cross-sectional study’, *BMC Nutrition*, 2(1), pp. 1–12. Available at: https://doi.org/10.1186/S40795-016-0079-1/TABLES/5.

Makango, B. *et al.* (2023) 'Prevalence and factors associated with post-traumatic stress disorder among internally displaced people in camps at Debre Berhan, Amhara Region, Ethiopia: a cross-sectional study', *BMC Psychiatry*, 23(1), p. 81. Available at: https://doi.org/10.1186/s12888-023-04570-w.

Menalu, M.M. *et al.* (2021) 'Assessment of prevalence and factors associated with malnutrition among under-five children in debre berhan town, Ethiopia', *International Journal of General Medicine*, 14, pp. 1683–1697. Available at: https://doi.org/10.2147/IJGM.S307026.

Mengstie, M.A. *et al.* (2023) 'Undernutrition and associated factors among internally displaced lactating mothers in Sekota camps, northern Ethiopia: A cross-sectional study', *Frontiers in Nutrition*, 10, pp. 1–8. Available at: https://doi.org/10.3389/fnut.2023.1108233.

Mulu, E. and Mengistie, B. (2017) 'Household food insecurity and its association with nutritional status of under five children in Sekela District, Western Ethiopia: a comparative cross-sectional study', *BMC Nutrition*, 3(1), p. 35. Available at: https://doi.org/10.1186/s40795-017-0149-z.

OCHA (2022) *Ethiopia Humanitarian Bulletin*.

Oluwatosin, A.B., Tosin, A. and & Udo, E.M. (2019) 'No Malnutrition among Internally Displaced Persons Children: A Consequence of Armed Conflicts in NigeriaTitle', *Journal of Global Peace and Conflict*, 7(2), pp. 31–38.

Olwedo, M.A. *et al.* (2008) 'Factors associated with malnutrition among children in internally displaced person\'s camps, northern Uganda', *African Health Sciences*, 8(4), pp. 244–252.

Reddy B, V. *et al.* (2017) 'Water and Sanitation Hygiene Practices for Under-Five Children among Households of Sugali Tribe of Chittoor District, Andhra Pradesh, India', *Journal of Environmental and Public Health*. Edited by T. Tudor, 2017, p. 7517414. Available at: https://doi.org/10.1155/2017/7517414.

Salami, B. *et al.* (2020) 'The health of internally displaced children in sub-Saharan Africa: a scoping review.', *BMJ global health*, 5(8), pp. 1–8. Available at: https://doi.org/10.1136/bmjgh-2020-002584.

Tekile, A.K., Woya, A.A. and Basha, G.W. (2019) ‘Prevalence of malnutrition and associated factors among under-five children in Ethiopia: Evidence from the 2016 Ethiopia Demographic and Health Survey’, *BMC Research Notes*, 12(1), pp. 1–6. Available at: https://doi.org/10.1186/S13104-019-4444-4/TABLES/3.

Uzobo, E. and Akhuetie, R.E. (2018) ‘Food Security and Health Challenges among Internally Displaced Persons in Nigeria’, *The Nigerian Journal of Sociology and Anthropology*, 16(1), pp. 47–71.

15. ANNEX I: Budget Breakdown

	Unit	Unit Price (Birr)	Amount	Total Price (Birr)
Personnel per dim for data collectors	Day	450.00	9 person X 30 days	121, 000.00
Transportation	Trip	250.00	8 trips X 250 birr	2000.00
Stationary (A4 paper, pen, note book)	Pisces	-	-	5000.00
Internet	Package 6 months	3500.00	1	3500.00
Audio recorder	Pisces	6500.00	2	13,000.00
			Contingency (10%)	**14,450.00**
			Grand Total	**158, 950.00**

16. ANNEX II: Work plan

Activity	January	February	March	April	May	June
Proposal Development						
Data Collection						
Data cleaning and entry						
Data analysis						
Write up						

17. ANNEX III: Data Collection tool

- Socio demographic characteristics: age of the child, sex of the child, age of the mother sex of household head, age of the household head, household size in number, education level of household head, marital status, religion and ethnicity
- Child feeding practice and vaccination status of children: child breastfeeding, how long after birth did the child breastfeed for the 1st time, feeding practice for the first 6 months of the child's life, how long was the baby breastfed, vaccination status, and complementary feeding starting time.

	Age in Months		
	Sex of the child	1. Male 2. Female	
	Weight		
	Height		
	How long after birth did the child breastfeed for the 1st time	1. Immediately at birth 2. After some days 3. Never breastfed	
	how long was the baby breastfed	1. Rarely 2. Moderately 3. Frequently	
	When was complementary feeding	1. Before 6 months 2. At 6 months 3. After 6 months	

No.	Question		
1.	Sex of household head	Female	
		Male	
2.	Age of household head in years		
3.	Household size in number		
3.1.	Number of household members aged <14		
3.2.	Number of household members aged > 65		
4.	Education level of household	Cannot read and write	
		Primary education	
		Higher education	
		Others	
6.	Marital status	Single	
		Married	
		Divorced	
		Widowed	
7.	Religion	Orthodox	
		Muslim	
		Protestant	
		Other	
8	Average Household income		

NO	QUESTION	RESPONSE OPTIONS	CODE
1	In the past four weeks, did you worry that your household would not have enough food?	0 = No (skip to Q2) 1=Yes	….| |
1a	How often did this happen?	1= Rarely (once or twice in the past four weeks) 2= Sometimes (three to ten times in the past four weeks) 3= Often (more than ten times in the past four weeks)	….| |
2	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	0 = No (skip to Q3) 1=Yes	….| |
2a	How often did this happen?	1= Rarely (once or twice in the past four weeks) 2= Sometimes (three to ten times in the past four weeks) 3= Often (more than ten times in the past four weeks)	….| |
3	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	0 = No (skip to Q4) 1 = Yes	….| |
3a	How often did this happen?	1= Rarely (once or twice in the past four weeks) 2= Sometimes (three to ten times in the past four weeks) 3= Often (more than ten times in the past four weeks)	….| |
4	In the past four weeks, did you or any household member have to eat somefoods that you really did not want to eat because of a lack of resources to obtain other types of food	0 = No (skip to Q5) 1 = Yes	….| |

HFIAS	Occurrence		Frequency		
	Yes	No	Rarely (1)	Some times (2)	Often (3)
1. In the past four weeks, did you worry that your household would not have enough food?					
2. In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?					
3. In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?					
4. In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?					
5. In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?					
6. In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?					
7. In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?					
8. In the past four weeks, did you or any					

household member go to sleep at night hungry because there was not enough food?					
9. In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?					

NB: Rarely, one or two times; Sometimes, three to ten times; Often, more than ten times.

Household Coping strategy index (CSI)	**Score**
In the past 7 days, if there have been times when you did not have enough food or money to buy food, how many days has your household had to:	
• Rely on less preferred and less expensive foods?	
• Borrow food, or rely on help from a friend or relative?	
• Purchase food on credit?	
• Gather wild food, hunt, or harvest immature crops?	
• Send household members to eat elsewhere?	
• Send household members to beg?	
• Limit portion size at mealtimes?	
• Restrict consumption by adults in order for small children to eat	
• Feed working members of HH at the expense of non-working members?	
• Reduce the number of meals eaten in a day?	
• Skip entire days without eating?	

WASH Knowledge questions	**Responses**
Can unsafe water cause diarrheal diseases?	Yes
	No
Can water get contaminated?	Yes
	No
Was a clean water source used for hand washing	Yes
	No
What are the consequences of liquid wastes?	Expose to diseases
	Does not expose to diseases
Does animal dung cause diseases?	Yes
	No
Is latrine essential and obligatory for every household?	Yes
	No
What are the consequences of not washing hands?	Expose to various diseases
	Does not expose to diseases
Total knowledge score	Good knowledge

	Poor knowledge

Attitude questions towards WASH	**Agree**	**Neutral**	**Disagree**
Clean water consumption is important only when one gets sick			
Consumption of safe and enough water can prevent waterborne diseases			
Defecating near water source can cause contamination			
Boiling water before consumption helps to remove disease-causing microorganisms			
Water containers must always be clean			
Washing hands after using latrine prevents diarrheal diseases			
Children's stool is free from disease-causing germs			
Washing hands with water alone is enough to sanitize hands			
Washing hands is more important after eating than before eating food			
Hand hygiene and diarrheal diseases are unrelated			

WASH Practice Variables
Household liquid waste disposal
Open field
West collector
Solid waste disposal practice
Open field
West collector
Households have handwashing facility
Present
Absent
Shower/bathing place
Present
Absent
Source of Drinking water
Water sachets Tanker trucks
Public tap/Standpipe
Surface water (lake, pond, dam, river)
Piped connection to house (or neighbor's house)
Latrine utilization
Communal latrine

Open defecation
Household latrine
Soap availability
Yes
No
Soap utilization frequency
Rarely
Sometimes
Frequently
Never
Water storage material
Jerrycan
Bucket

Key Informant Interview (KII)

- How is the food insecurity situation in your area?
- Are internally displaced peoples living here benefited from any external aid (government, social safety nets, NGOs, etc.)? What kind?
- What do internally displaced peoples living here do when they don't have enough food and don't have the money to buy food?
- Where does the community dispose of solid waste generated by households?
- How would you assess the status of the current public water and sanitation system in your community? Are there deficits and if so, how do they affect the health of your community?

Focus Group Discussion

- Where do you get water for the household use (drinking and cleaning)?
- Do you get enough water from the water supply in the camp?
- Is it sufficient for the household?
- Is it clean?
- Do you treat the water?
- How do you treat the water for drinking?

- How frequently is the water available at source?
- How far is it?