HAWASSA UNIVERSITY

COLLEGE OF LAW AND GOVERNANCE SCHOOL OF GOVERNANCE AND DEVELOPMENT STUDIES

ASSESSING CONSEQUENCES OF INFORMAL SETTLEMENTS ON THE HEALTH OF RESIDENTS IN HAWASSA CITY ADMINISTRATION, SIDAMA, ETHIOPIA

BY

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HAWASSA, ETHIOPIA

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We, the undersigned, members of the Board of Examiners of the final open defense by **Nebiyou Mathewos** have read and evaluated his/her thesis entitled "**Assessing Consequences of Informal Settlements on the Health of Residents in Hawassa City Administration, Sidama, Ethiopia"** and examined the candidate. This is, therefore, to certify that the thesis has been accepted in partial fulfillment of the requirements for the degree.

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I hereby declare that "**Assessing Consequences of Informal Settlements on the Health of Residents in Hawassa City Administration, Sidama, Ethiopia"** is my original work and has not been presented for a degree in any other university, and all sources of material used for this thesis have been duly acknowledged.

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This M. A thesis has been submitted for examination with my approval as thesis advisor.

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ACRONYMS AND ABBREVIATIONS

BA	Bachelor of Art
COVID	Corona Virus Disease
FGD	Focus Group Discussion
IRB	Institutional Review Board
GSG	Global Strategy Group
KII	Key Informant Interview
NGO	Non-Governmental Organizations
ORS	Oral Rehydration Salt
ORAAMP	Office of the Revision of Addis Ababa Master plan
PHC	Primary Health Care
SARS	Severe Acute Respiratory Syndrome
SDG	Sustainable Development Goals
TB	Tuberculosis
UN	United Nations
UNEP	United Nations Environment Program
VIP	Ventilated Pit Latrine
WHO	World Health Organization

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ABSTRACT

The study investigated the health consequences of informal settlements in Hawassa City Administration, Ethiopia, addressing the pressing challenge of rapid urbanization and its implications on public health. The overall objective was to assess the status of informal settlements and their effects on residents' health, mainly focusing on environmental health conditions and access to essential services. A descriptive cross-sectional design using mixed-methods was used to conduct the study. The quantitative data was collected from 380 randomly selected households through a structured questionnaire. The qualitative data was collected using focus group discussions with residents and key informant interviews with health officials and other government officials. A descriptive analysis was conducted for quantitative data, and thematic analysis was used for qualitative data. The findings revealed significant health challenges linked to poor infrastructure and environmental conditions. While homeownership was high (89.2%), most houses were constructed with vulnerable materials (73.9% wood with mud walls). Although 69.5% had piped water access, irregular supply and low treatment, rates (78.4% did not treat water) created health risks. Shared sanitation facilities were common (67.6%), predominantly using pit latrines (47.1% with slabs). Diarrheal diseases were most prevalent (35.5%), particularly affecting children under five (65.8% of cases), followed by respiratory diseases (24.7%). Despite 56.1% living within 30 minutes of health facilities, economic barriers limited healthcare utilization. The study concluded that while high home ownership provides security, poor construction materials, unreliable water supply, and inadequate sanitation create significant health vulnerabilities, particularly for children. Recommendations include implementing a comprehensive settlement upgrading strategy focusing on infrastructure improvement, strengthening community health programs, enhancing swater supply reliability, establishing community-led health initiatives, and developing financing mechanisms for housing improvements. These findings contribute to understanding the complex relationship between informal settlements and public health, suggesting the need for integrated interventions that address infrastructure and social health determinants.

***Key words**: Informal Settlement, Health of Residents, Hawassa City, Sidama.*

CHAPTER ONE

INTRODUCTION

1.1. BACKGROUND OF THE STUDY

The health implications of living in informal settlements are severe and multifaceted, creating complex challenges that affect residents' physical, mental, and social well-being. Recent studies have documented significantly higher disease burdens in these areas, with respiratory infections more prevalent due to overcrowding and poor ventilation (WHO, 2023). Environmental health assessments have found that water contamination levels often exceed WHO standards by 300- 400%, primarily due to inadequate sanitation infrastructure and improper waste disposal practices (Environmental Health Perspectives, 2023). Additionally, less than 25% of solid waste is properly collected in these settlements (World Bank, 2023), leading to groundwater contamination and disease vector proliferation

The rapid pace of urbanization, while offering potential economic opportunities and improved access to services, has also given rise to significant challenges, particularly in developing countries where urban growth often outpaces infrastructure development and institutional capacity. This mismatch between urban growth and urban planning has led to the proliferation of informal settlements characterized by inadequate housing, limited access to basic services, and precarious living conditions. According to UN-Habitat (2023), more than 1.1 billion people, approximately one in seven people globally, currently live in informal settlements or slums, representing a significant increase from 923 million in 2018. This growing challenge is particularly acute in three regions: Eastern and South-Eastern Asia (370 million), Sub-Saharan Africa (238 million), and Central and Southern Asia (227 million) (Adams, 2021).

Urbanization represents one of the most transformative socioeconomic forces of the modern era, fundamentally reshaping human settlements, economic systems, and social structures across the globe. The scale and pace of urban growth in the 21st century are unprecedented, with profound implications for sustainable development, public health, and social equity. According to the United

Nations (2023), the world's urban population has grown exponentially from 751 million in 1950 to 4.4 billion in 2020, representing 56.2% of the global population. This dramatic shift towards urban living is projected to continue, with estimates suggesting that by 2050; nearly 70% of humanity will reside in urban areas, with developing nations accounting for 90% of this urban growth (World Bank, 2023).

People residing in informal settlements face challenges of service delivery. This is mainly due to the fact that land was occupied illegally, thus negatively affecting the environment. A lack of basic needs and services leads to informal settlements that affect the environment. This includes inadequate sanitation that leads occupants to pollution, the use of coal and biomass fuel for lighting, causing air pollution and contributing to greenhouse gas emission. Waste removal is an issue with which informal settlers struggle, and which causes land pollution and emerging and re- emerging infectious disease hazards (Ziningi, 2017).

The socioeconomic landscape of informal settlements perpetuates and exacerbates health vulnerabilities through various mechanisms. Poverty remains a defining characteristic of these settlements, with the World Bank reported that 72% of informal settlement residents live below the poverty line. This economic hardship is further complicated by the high cost of healthcare, with medical expenses constituting 25-30% of household expenditure, often pushing families deeper into poverty. The infrastructure deficit in these areas is equally concerning, with only 35% of residents having access to improved sanitation facilities and less than 50% having reliable electricity connections. These infrastructure gaps affect daily living conditions and have significant implications for economic productivity and social mobility.

Ethiopia presents particular challenges in this context, with an annual urban population growth rate of 4.63% (World Bank, 2023) and 62% of urban residents living in informal settlements. Recent research in Ethiopian informal settlements has revealed that 78% of residents report chronic health conditions (Tadesse et al., 2023), while 65% of children are affected by waterborne diseases (Bekele, 2023). Mental health has emerged as a significant concern, with 45% of adult residents reporting symptoms of mental health disorders (Alemayehu, 2023). The maternal health situation is equally concerning, with mortality rates 2.5 times higher than in formal urban areas (Kebede, 2023).
Socio-economic determinants of health in Ethiopian informal settlements were complex

interconnections between poverty, education, employment, and health outcomes. A study revealed that 82% of informal settlement residents work in the informal sector, leading to irregular income and limited access to health insurance or social protection. This economic vulnerability directly affects healthcare-seeking behavior (Lirebo, 2006).

1.2 STATEMENT OF THE PROBLEM

Globally, an estimated 1.81 billion people (1 in 4 people) live in informal settlements. This problem gets even higher in the densely populated and rapidly urbanizing river plains and coastlines in developing countries (World Bank, 2022). The challenge of informal settlements highlights the severe poverty, inadequate living conditions, and lack of secure land tenure that characterizes these areas. Additionally, it underscores the exclusion of slum residents from the formal economy and essential services, including basic healthcare (Abagissa, 2019).

The absolute number of people living in slums or informal settlements grew to over 1 billion, with 80 per cent attributed to three regions: Eastern and South-Eastern Asia (370 million), sub- Saharan Africa (238 million) and Central and Southern Asia (227 million). An estimated 3 billion people will require adequate and affordable housing by 2030 (UN report, 2021).In particular, 95 percent of urban expansion in the next decades will take place in the developing world. Worldwide, the total slum population increased from 723 million in 1990 to 817 million in 2000 to 928 in 2014. A similar worrisome development is the recent increase of both absolute (from 928 to 1.034 million) and relative slum occurrence (from 23% to 24%) between 2014 and 2018 (Boanada-Fuchs, 2021). The impact of COVID-19 and its recovery still needs to unfold fully.

Living in informal settlements can have severe consequences for residents, including displacement and landslides. For instance, in Freetown, Sierra Leone, up to 60% of the population lives in in formal settlements constructed on precarious land prone to flooding, fires, and landslides. In 2017, a devastating landslide resulted in over 1,000 deaths due to the lack of urban planning and affordable housing. These settlements often lack secure land tenure, making residents vulnerable to eviction and displacement. Additionally, insufficient infrastructure and services exacerbates health risks and environmental hazards (Jonathan, 2023).

Poor water quality is a leading cause of morbidity and mortality worldwide and a defining danger of living in slums. Many life-threatening infectious diseases are associated with contaminated water in slums, such as cholera and hepatitis. Lack of access to water also restricts water intake and sources for infant formula or cooking, bathing, and personal hygiene. Infrequent bathing is associated with scabies and bacterial skin infections (Kanungo, 2021).

A community-based cross-sectional study conducted by Biniyam and his colleagues on Sanitation practice and associated factors among slum dwellers residing in urban slums of Addis Ababa, Ethiopia, showed that 64.5% of the households use unimproved sanitation facilities and 78.3% of the sanitation facilities were in poor condition. Less than half, 46.9% of the slum dwellers had good sanitation practices (Biniyam, 2018).

The health implications of informal settlements in Ethiopia represent a significant public health crisis that intersects with multiple Sustainable Development Goals (SDGs). SDG 3 (Good Health and Well-being) is directly compromised by the conditions in informal settlements, as evidenced by the high prevalence of both communicable and non-communicable diseases. SDG 6 (Clean Water and Sanitation) remains unmet for most informal settlement residents, with recent data indicating that only 28% have access to improved water sources and 22% to adequate sanitation facilities. SDG 11 (Sustainable Cities and Communities) is particularly relevant, as it directly addresses the need for sustainable urban development and the upgrading of informal settlements (UN-Habitat, 2023).

The determinants of slum health are too complex to define by any single parameter. Yet, they arise from a common physical and legal pedigree that concentrates on the ill effects of poverty, unhealthy environments, and marginalization from the formal sector. The promotion of urban health in the 21st century must take neighborhood centered as well as person-centered approaches. The researcher recognizes that broad economic, social, and political forces play an important role in creating and growing slums, and addressing these forces will take time (Admasu 2020).

Solving the urban and social problems prompted by informal settlements is gaining importance in the development agenda of most large cities worldwide. This is to optimize the city's economic, physical, and environmental improvement. In addition, it ensures social justice and equity, as they have evolved from demolition strategy to resettlement and rehabilitation programs (Andre H, 2020).

The policy landscape addressing informal settlements in Ethiopia reveals significant gaps and implementation challenges. While the national urban development policy acknowledges the need for informal settlement upgrading, limited resources, institutional capacity constraints, have hampered practical implementation and coordination challenges between different government levels. The Policy sets ambitious targets for improving housing conditions, but progress in informal settlements has been particularly slow, with only 15% of planned interventions being successfully implemented (Matsumoto et al, 2021).

Ongoing interventions in Ethiopian informal settlements have shown mixed results. Community- led upgrading programs, while promising in concept, have faced challenges in scaling and sustainability. Public-private partnerships for infrastructure development have been initiated in several cities, but their impact on informal settlements remains limited (Abagissa, 2019). Health outreach programs have shown some success in improving access to basic healthcare services, but their coverage remains insufficient to address the scale of the problem (Hailu et al, 2024).

While national and regional studies provide broad insights into informal settlements in Ethiopia, there is a critical knowledge gap regarding the specific context of the Hawassa City Administration. Current research lacks comprehensive empirical data on the prevalence and distribution of health conditions, environmental health risks, and the effectiveness of interventions in Hawassa's informal settlements. Additionally, there is limited understanding of the complex interplay between environmental, social, and economic factors in determining health outcomes in this context. This study addresses these gaps by providing empirical evidence to inform targeted policy and intervention strategies.

1.3 OBJECTIVES OF THE STUDY

1.3.1 General objective

- To assess the consequences of informal settlement on the health of residents in Hawassa city administration, Sidama, Ethiopia

1.3.2 Specific objectives

1. To assess the status of informal settlements in Hawassa City administration
2. To investigate the health consequences of informal settlement in the city
3. To assess the relationship between environmental, social, and economic factors in determining health outcomes in informal settlements in Hawassa city.

1.4 RESEARCH QUESTIONS

Based on the stated specific objectives, the following research questions have been raised to undertake the study.

1. What is the status of informal settlements in Hawassa city administration?
2. What are the health consequences of living in informal settlements?
3. To assess the relationship between environmental, social, and economic factors in determining health outcomes in informal settlements in Hawassa city?

1.5 SIGNIFICANCE OF THE STUDY

The health of slum populations is a critical concern for multiple reasons. Firstly, nearly 1 billion people live in slums, which continues to grow, highlighting the urgency and scale of the issue. Secondly, significant health disparities exist slum populations consistently experience poorer health outcomes compared to other urban residents. Thirdly, as economies in developing countries expand, the visible inequities within urban health have far-reaching social and political implications, including risks to political stability and increased youth radicalization. Fourthly, slum populations offer unique opportunities for public health impact due to their high population density, younger demographics, and relatively high education levels, which can enhance the reach and effectiveness of public health interventions. Lastly, health challenges in slums pose substantial public health risks; outbreaks in these densely populated areas are difficult to contain and can rapidly escalate to international crises, as seen with SARS and Ebola (Blessing et al, 2016).

There is limited literature about informal settlements and their impact in public health. These problems is even pronounced in Africa urban informal settlements as the proportion of people in these areas keeps increasing. The impact informal settlements in public health depends mainly on the proportion of the exposed people and the increasing risks associated with it.

Urban informal settlements are only identifiable physically in African urban areas but are invisible in many data system that drives research and policy in public health. The other hindrance is that the illegal status of urban informal settlements which makes them hide themselves from scientific study in fear legal action

The inclusion of urban informal settlements as spatial entities in different surveys will encourage more investigations and studies about these poor and "illegal" urban areas. These studies will help to differentiate health indicators for these areas and the other urban areas. Above all, this could help optimize local public health intervention.

Previous studies on the health impacts of informal settlements were limited and typically qualitative, lacking comprehensive analysis. This study seeks to bridge that gap by investigating the overall health status and consequences of informal settlements on residents through a mixed- methods approach.

The findings and recommendations from this research support policymakers and intervention planners in developing targeted strategies to address the health and living conditions in informal settlements in the Hawassa City Administration. This will ultimately aid in improving urban health and advancing the city's development. Academically, the study provides insights into the health-related impacts of informal settlements, potentially prompting further research in this critical area.

1.6 SCOPE OF THE STUDY

The scope of this study is confined to Hawassa City, explicitly targeting three selected kebeles: Dato Odahe, Chefe, and Kotijebesa, within the city's administration, each representing areas where informal settlements are prevalent. In terms of subject matter, the study focused on examining the conditions of these informal settlements, with a particular emphasis on their impact on the health and well-being of residents. Methodologically, the study adopted a descriptive approach to systematically document and analyze current conditions, utilizing both qualitative and quantitative data collection methods. This approach allowed for a comprehensive understanding of the socio-economic and health-related challenges residents face in these informal settlements. The temporal scope of the study is cross-sectional, capturing data during a specified period, which provides a snapshot of the current status and challenges in the targeted areas.

1.7 LIMITATIONS OF THE STUDY

Methodologically, as the research is cross-sectional, it does not establish a causal relationship between variables. Social desirability bias is respondents' tendency to respond in socially appropriate or acceptable ways, even if untruthful. This was minimized through a detailed explanation of the objectives of the study and the implications of the study findings to participants and the community at large.

1.8 ORGANIZATION OF THE THESIS

This proposal is organized into three chapters. The first chapter is the introductory part, which comprises the background of the study, statement of the problem, objectives of the study, significance of the study, scope and limitations. The second chapter comprises of review of related literatures about the study topic. The third chapter discusses the study's detailed methodology, including the sampling techniques, types and sources of data and plan for analysis.

1.9 DEFINITION OF KEY TERMS

- **Informal Settlements**: Unauthorized urban residential areas typically in developing cities, often lacking essential services and developed without following land and building regulations (Abbot, 2001).
- **Communicable Disease:** is a disease that spreads from one person to another through a variety of ways that include contact with blood and bodily fluids; breathing in an airborne virus; or by being bitten by insects (WHO, 2011).
- **Malnutrition:** refers to deficiencies in nutrient intake, imbalance of essential nutrients or impaired nutrient utilization. Under nutrition manifests in four broad forms: wasting, stunting, underweight, and micronutrient deficiencies (WHO, 2019).
- **Mental health:** is a state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community (WHO, 2019).
- **Non-Communicable Diseases:** refers to a group of conditions that are not mainly caused by an acute infection, result in long-term health consequences and often create a need for long-term treatment and care. These conditions include cancers, cardiovascular disease, diabetes and chronic lung illnesses (WHO, 2019).
- **Slums**: are urban households lacking durable housing, sufficient living space, safe water access, adequate sanitation, or security of tenure (William; 1985)..
- **Squatters**: Individuals who settle on public or unoccupied land without legal rights or title, sometimes regulated by the government to gain eventual title (The World Bank, 2002).
- **Squatting**: Occupying land or premises without permission to gain ownership or title, often on public land (Habitat, 1983).
- **Squatter Settlement**: Areas where people build homes without legal rights, disregarding property laws, zoning, and building standards; tenure is often illegal (Seymour, 1976)

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CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter summarizes international and national practices and literatures related to the topic under study. The literatures and practices are reviewed and organized based on the statement of the problem and research objectives in the manner that it contributes to the study.

2.1 INFORMAL SETTLEMENTS

Globally, an estimated 1.81 billion people live in informal settlements. This problem gets even higher in the densely populated and rapidly urbanizing river plains and coastlines in developing countries. These numbers are projected to increase, while Sub-Saharan Africa is the region with the highest rate of informal settlements due to rapid urbanization. The urban informal settlements of Sub-Saharan Africa pause everyday health risks. Despite the public health consequences of urbanization and the increase of informal settlements number in African cities, there is a paucity in data about the risks at small scale and the vulnerability in poor urban areas (World Bank, 2022).

However, there is limited literature about informal settlements and their impact in public health. These problem is even pronounced in Africa urban informal settlements as the proportion of people in this areas keeps increasing. The impact informal settlements in public health depends mainly on the proportion of the exposed people and the increasing risks associated with it.

Urban informal settlements are only identifiable physically in African urban areas but are invisible in many data system that drives research and policy in public health. The other hindrance is that the illegal status of urban informal settlements which makes them hide themselves from scientific study in fear legal action

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The inclusion of urban informal settlements as spatial entities in different surveys will encourage more investigations and studies about these poor and “illegal” urban areas. These studies will help to differentiate health indicators for these areas and the other urban areas. Above all, this could help optimize local public health intervention. Research on informal settlements and health has identified

several gaps that need to be addressed to improve the well-being of residents. Here are some key areas where more research is needed:

Informal settlements can be defined in various ways. Thus, according three defining features of Informal settlement are the physical, the social and the legal with the reasons behind them being interrelated. Due to its inherent "non-legal" status, a Squatter settlement has services and infrastructure below the "adequate" or minimum levels. Such services are network and social infrastructure, like water supply, sanitation, electricity, roads and drainage, schools, health centers, market places etc. In general, the physical characteristics describe the settlement based on its inadequacy and lack of basic services required by the settlers (Srinivas, 2022).

Most households in squatters' settlements belong to the lower income group, working either as wage or in various informal sector enterprises. On average, most earn wages at or near the minimum wage level. However, household income levels can also be high due to many income earners and part-time jobs. Squatters are predominantly migrants, either rural-urban or urban- urban. However, many are also second or third-generation squatters.

The key characteristic delineating an Informal settlement is its lack of ownership of the land parcel on which they have built their house. Thus, settlers are people who do not have ownership to the land on which they have constructed their homes without any legal permit from the concerned government body. The legal characteristics of Informal settlement or their lacks oflegal ground differentiate Informal settlement from other type of informal settlement/like slums/ which may have full or partial legal rights to the land.

In addition to the above three characteristics, Squatters' settlements in Ethiopia have unique Spatial Characteristics, which differentiate them from squatters' settlements of other countries' cities. Spatial characteristics, most squatter settlements in Addis Ababa are located at normally planned expansion areas for different urban functions. This is different from some cities in developing countries located in environmentally sensitive areas (Lirebo, 2006),

In the Ethiopian context, these types of settlements are known as "Chereka Bet". The term Chereka bet in its Literal Translation, means " house of the moon" implying the illegal construction of houses

ove r-night using moonlight. Thus, they are defined as a settlement built on land occupied or used without the consent of the city council and without having any construction permit grantee by the city council. Informality is generally considered as the characteristic of low-income settlements, both caused by poor and beneficiaries: illegal appropriation of land, illegal subdivision, and building with inappropriate materials or unserviced land (Lirebo, 2006).

2.2 THE EXTENT OF INFORMAL SETTLEMENT

2.2.1 The extent of informal settlement in the world

Nearly a third (32%) of the world's population and more than three-fourths (78%) of the least developed countries' urban population live in slums. They represent a fundamental transformation of urban life's physical and social environment and human health.

Slum dwellings have high occupancy rates in all-purpose rooms. Cooking, sleeping, and living with 13.4 people per 45-meter square room, as in the slums of Kolkata, India, places residents at risk of respiratory infections, meningitis, and asthma. In Manila, the Philippines, children living in squatter settlements are nine times more likely than other children to have tuberculosis (TB) (Blessing et al, 2016).

According to the UN-Habitat report, about 55% of Bangladesh's urban population, an equivalent of about 29 million people, lived in slum areas in 2014. Urban slums deserve special attention in Bangladesh as they host a significant proportion of the country's total population. Although the proportion of the urban population in Bangladesh living in slums has declined from 87% in 1990 to 55% in 2014, the absolute number of slum dwellers in the country has increased by almost 50% (by about 10 million people) between the two-time point (Banu , 2013).

Slum housing is densely packed and poorly built with substandard or flammable materials. Houses built against hillsides are subject to landslides during heavy rain, and inferior building standards cause many thousands of deaths from earthquakes, especially where urbanization and poverty collide. In Bam, Iran, poor structural quality of housing played a significant factor in the earthquake-related deaths of 32,000 people in 2003 (Alon, 2007).

The high numbers of people living in informal settlements is largely the result of rapid and often unplanned and uncontrolled urbanization. By 1950, 30% of the world's population lived in cities; in 2018, that figure had risen to 55%. Indeed, the UN estimates that, by 2050, 3 billion people will live in informal settlements, a figure that may rise further because of the pandemic's effects (GSG,2022).

At any given point in time, across cities, regions and countries, older, more consolidated slums co-exist with others of relatively more recent formation. Newer slums are often the result of negative socio-economic shocks or sudden, unplanned mass-migration into urban areas. For example, in Argentina 55% of all registered slums existed before the year 2000, whilst 26% of the current stock was created in the 2001-2010 decade - a period of dramatic economic collapse in the country..

2.2.2 The Extent of Informal Settlement in Africa

Housing stands as a fundamental aspect of human life, significantly influencing social, physical, and mental well-being across diverse socioeconomic backgrounds (Matarira et al, 2022). Informal settlements, characterized by residential structures constructed in both planned and unplanned areas without formal planning approval, represent a complex housing phenomenon prevalent in many developing countries. These settlements often exhibit low-quality housing and inadequate infrastructure and social services, posing significant challenges to urban development (Mudau et al, 2022). In Africa, the persistent failure to address housing issues has led to the proliferation of slums and poorly serviced informal settlements on the urban periphery. Alarmingly, between 75% and 99% of urban residents in many African cities endure the harsh living conditions of these squalid settlements (Carrington, 2015). The continent hosts nearly 200 million slum dwellers, accounting for approximately 20% of slum populations globally. Moreover, Africa's rapid population growth, expected to soar from 1 billion in 2015 to between 3.5 billion and 5 billion by 2100, presents a monumental urbanization challenge (Carrington, 2015) 2030, African cities will need to accommodate over 300 million new residents, exacerbating the strain on already inadequate housing infrastructure (Matarira, 2023).

When it comes to Africa, currently, 40% of the population lives in urban areas. This figure is expected to reach 54% by 2030, meaning that the urban population of the continent would likely triple over the next 40 years (UN, 2014). A marked phenomenon of rapid urbanization in Africa

has been the proliferation and uncontrolled spread of spontaneous or informal settlements, and currently, around 90% of the residents are live in an informal settlement category (UN 2014; López et al. 2019; Matamanda et al. 2020). Found that almost half of the urban communities in the Sub-Saharan region live in the areas that are categorized as informal settlements. The rate of urbanization in East Africa is very high (more than 4.5% on average) and at the same time it is accompanied by high rate of urban informality as well (Masselière, 2018)

The manifestation of slums is also regionally very different. The largest concentration can be found in Sub-Saharan Africa (56.2%), while the rest of the Global South ranges between 20.9 and 31.2%. Two out of three slum dwellers reside in Asia (ibid). There are more than 40 countries (of 122) where slums comprise more than half of the urban residents, and six countries (all in Sub-Saharan Africa) have more than 80% slum dwellers. In South Sudan (96.5%), the Central African Republic (95.4%), and Sudan (92.6%), there is almost no alternative to substandard housing in the country (UN, 2015).

Freetown, Sierra Leone, one of the most crowded cities in the world. Up to 60% of the more than 1.2 million residents live in a patchwork of informal settlements constructed on precarious land prone to flooding, fires and landslides. This level of unplanned development led to tragedy in 2017, when more than 1,000 people lost their lives in a devastating landslide. Due to a lack of urban planning, the absence of governmental oversight and a chronic lack of affordable housing, it's estimated that nearly 40% of housing developments in Freetown have been built in medium- or high-risk areas (World Economic Forum, 2023).

2.2.3 The extent of informal settlement in Ethiopia

Informal settlements have been expanding at an alarming rate in the expansion areas of Addis Ababa. For instance, from 1984 to 1994, such settlements had been growing by 15.7%, which rose to about 30% in 2001 (Abagissa, 2019). The same source reveals that the total informal housing units in the expansion areas alone are estimated to be 60,000 and house a total population of 300,000. Similarly, the total area supposed to be occupied by informal settlements is about 2000 hectares with the plot size generally varying from 200-2000 meter square.

Health impacts experienced by slum dwellers included young insects in children. Water-borne ailments, cholera, and diarrhea were an everlasting issue, generally because of the need for a

sufficient potable water supply. The other common complaints resulting from overcrowded and poor environmental living conditions and low cleanliness measures included tuberculosis. Open lodging bequests were, to begin with, created in and around the borders of the central range. These issues increased the separation of families that were being relocated. They hindered the need for the free housing specialist to supply a thorough list of bequest offices to meet the daily necessities of the relocated individuals. Several relocation plans have fizzled due to low-income families' simulated expulsion to removed areas regularly outside of the city altogether.

Moreover, one of the fundamental problems faced by the informal residents of Addis Ababa Sub-city is the lack of a proper system to swage Solid waste products. This problem is more prevalent and severe. However, due to improper collection points and garbage piles, people who live in the slum and squatter areas are highly affected by health and environmental problems. Besides, this disposal practice pollutes the groundwater and marine environments and is a significant cause of water-borne diseases (Obi, 2007).

2.3 HEALTH CONSEQUENCES OF INFORMAL SETTLEMENT

Living conditions in informal settlements contrast sharply with those prevalent in the formal city. Infants and children living in slums have a greater incidence of communicable diseases and higher death rates than their urban peers, according to evidence from more than 190 demographic and health surveys across 73 developing countries. Further, issues such as poor air quality or earthen floors cause a high prevalence of respiratory infections among slum-dwellers. Besides, there is recognition that those living close to dumping grounds or drinking unsafe water are prone to contracting infectious diseases(GSG,2022).

Many life-threatening infectious diseases are associated with contaminated water in slums, such as cholera and hepatitis. Lack of access to water also restricts water intake and sources for infant formula or cooking, bathing, and personal hygiene. Infrequent bathing is associated with scabies and bacterial skin infections, a subset of which (i.e., group A streptococcus) can lead to acute glomerulonephritis (Unger et al, 2007).

According to a UN report, a large proportion of urban residents lack access to good sanitation which threatens their health and the environment. River pollution is very acute where rivers pass through cities, and the most common is contamination from human excreta, sewage, and solid waste. The unhealthy environment and overcrowded housing in the slums expose the slum dwellers to high rates of infectious diseases such as malaria, pneumonia, tuberculosis and diarrhoea (UNEP annua, 2002).

A survey of more than 250 Dhaka slum dwellers analyzed the incidence and severity of diarrhea, age, nutritional status and access to basic services. Just one-third of households had a municipal water source and only 26 % of children used improved latrines.(36) Younger children were at greater risk: respondents aged two to three averaged 2.5 diarrheal episodes yearly, but those aged four to five had a yearly rate of 1.38. Children who were malnourished and stunted had elevated rates of diarrhea, as expected, averaging more than two episodes per year as against 1.6 episodes in better-nourished children (Banu, 2013).

Concerning the consequences of informal settlements, there are related studies that are corresponding with the findings of this study. In this regard, (Onyekachi, 2014) explained the consequences of informal settlements in a vicious circle. Accordingly, poor income leads to poor

health, which is attributed to poor education and poor housing, then these further results in poor employment opportunities, and such problems are revolving around a circle.

The escalation of informal settlements will have manifold legal, economic, social, environmental, and political implications. Some of these as summarized by (Abagissa, 2019) include health problems, environmental deterioration, social distress, crime, and urban violence. (Adams, 2014) and(Adegun 2019) also noted that the sprawl of informal settlements will have adverse effects on the environment, and the socioeconomic well-being of urban dwellers more than the destitute image of the town under development. (Hoelt et al, 2020) stated that the increasing trend of informal settlements in Ethiopian cities has resulted in poor infrastructure. In addition, most importantly, the rapid urbanization process in Ethiopia is taking place at the expense of farmland and forests (Admasu etal, 2020).

CHAPTER THREE

METHODOLOGY OF THE STUDY

3.1. DESCRIPTION OF THE STUDY AREA

Hawassa known historically as Adare**,** is a city in Ethiopia on the shores of Lake Hawassa in the Great Rift Valley. It is 273 km south of Addis Ababa via Bishoftu, 130 km east of Sodo, and 75 km north of Dilla. The town serves as the capital of the Sidama Region. It lies on the Trans-African Highway 4 Cairo-Cape Town and has a latitude and longitude of 7°3′N 38°28′E Coordinates 7°3′N 38°28′E and an elevation of 1,708 meters (5,604 ft.) above sea level (Hawassa City Administration, 2022).

The population is estimated to be 493 483 in 2014 E.C. The City's population gender breakdown will be relatively evenly split between male (253899 /51.5 %/) and female (239584 /48.5% /). Out of the total Population of the city administration, 322,525 people live in urban areas, while the remaining 170,958 people live in the administration's rural area (Hawassa City Administration, 2022).

Hawassa has a tropical savanna, which borders on a subtropical highland climate. There are two seasons: a lengthy, though not intense, wet season from March to October and a short dry season from November to February. The extra cloudiness of the wet season is sufficient to make it substantially cooler than the dry season despite a higher sun angle; however, the coolest morning temperatures, often close to freezing, occur during the dry season (National Meteorological Agency, 2022).

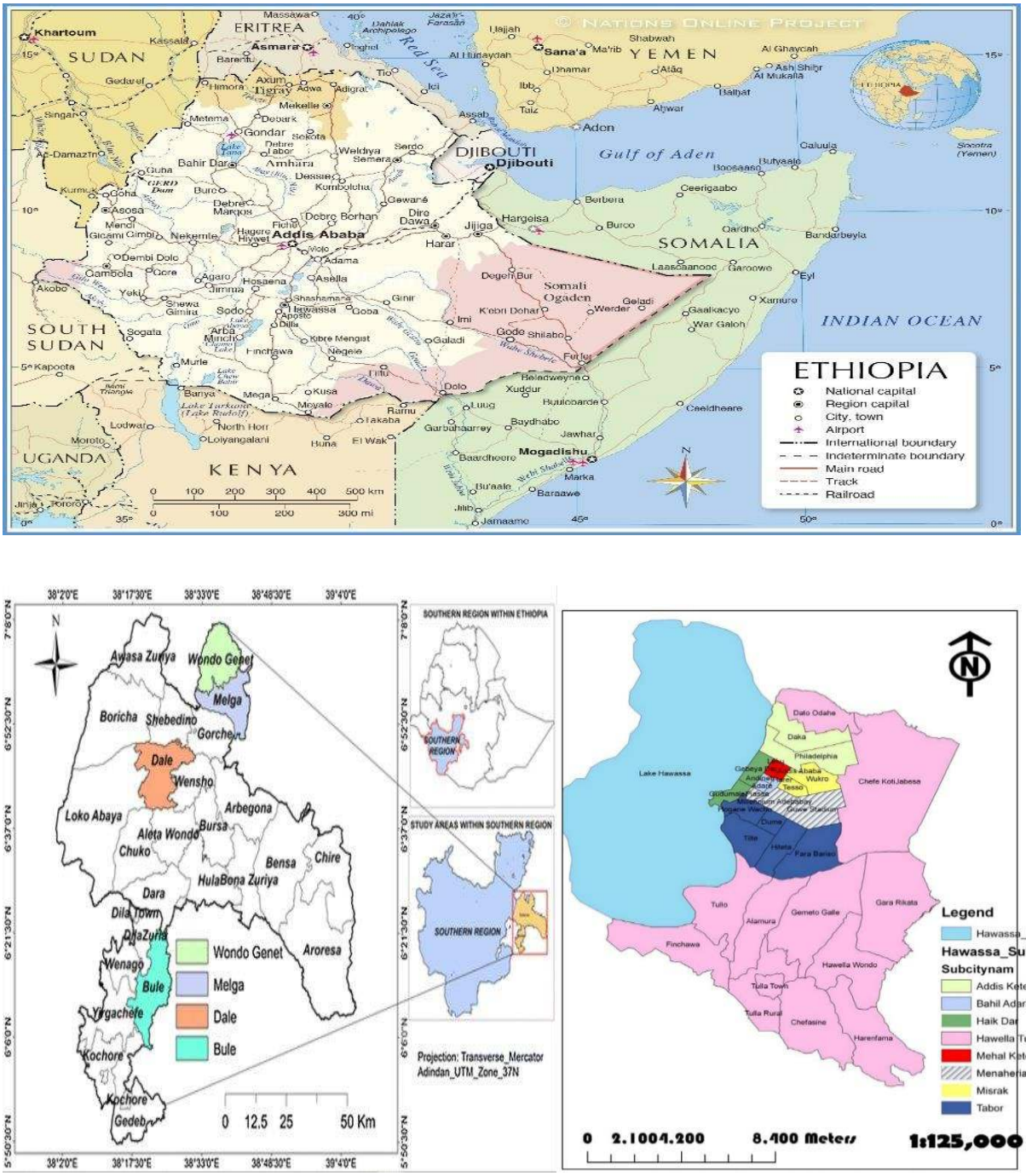

Figure 1: Political map of Ethiopia.

Source: Nations online project, 2023 and Hawassa city administration, 2022

3.2 RESEARCH DESIGN AND APPROACH

The study employed a mixed-method approach that involved both qualitative and quantitative approaches. In terms of research design, the study applied a cross-sectional descriptive research design that helped the researcher to describe the existing trends of the specific situation and narrate facts. Besides, the mixed approaches helped the researcher to carry out the integration of both qualitative and quantitative data collection and analysis rigorously and intends to minimize the limitations of these approaches (Creswell, 2009).

3.3 POPULATION OF THE STUDY

All households found in informal settlements in Hawassa city administration were the source population. The study population consisted of all households found in informal settlements in Chefe, Dato, and Tilte Kebeles. The sample population consisted of all households that were sampled and included in the study.

3.4 SAMPLING PROCEDURE AND TECHNIQUES

Both random and non-random sampling techniques were employed. For qualitative study three kebeles, namely Dato Odahe, Chefe and kotijebesa were purposively selected since the informal settlement is common in these areas and can adequately represent the condition of informal settlements in other areas. Then, the sample was proportionally allocated to each kebele using probability proportional to size sampling (PPS). Finally, a systematic sampling method was employed to determine the households to be included in the study.

Individuals above 18 years old (household head/spouse) and who lived in the area for six or more months were included. The following household was included if the randomly selected household was a public or a private organization.

FGD and KII participants were purposively selected for the qualitative data based on their relevance to the topic under study.

The sample size was determined using Yamane's formula. This formula is apposite when one has no information about the target population (Yamane, 1967).

$$n = \frac{N}{1+N.e2}$$

Where, n= sample size

N= Source population (58345)

e= Margin of error (0.05) with 95% confidence level

n=58345/1+58345*(0.05*0.05)

n=58345/1+145.9

n=58345/146.9

Hence, n=397

To allocate the final sample size proportionally, we divided the total number of households in each kebele by the total number of households in all the sampled kebeles and multiplied it by the final sample size. A systematic random sampling method was employed to select the actual participants. The sampling interval (K) for each kebele was determined by dividing the total households in each kebele (N) by the sample size for the respective kebele (n).

i.e. k=N/n

Table 1 the proportional allocation of the final sample size to each kebele.(Sampling Frame)

Sampled kebeles	**No. of households(N)**	**Sample size in each kebele(n)**	**Sampling interval(k)**
Dato-Odahe	10714	155	69
Chefe-kotijebesa	13452	195	69
Tilte	3213	47	69
Total	27379	397	69

3.5 TYPES AND SOURCES OF DATA

Both primary and secondary data were collected to assess the health impacts of informal settlements. The primary data sources were a structured questionnaire, focus group discussion (FGD), key informant interviews (KII), and non-participant/naturalistic observation. The secondary data was obtained through a review of literatures, policy documents and reports.

3.6 TOOLS AND TECHNIQUES OF DATA COLLECTION

Validated/pre-tested structured interviewer-administered questionnaires adapted from different literature based on the objective of the study and the local context of the study area were used. A pre-test was done on 10% of the total sample (40 households), and modifications were made accordingly.

Focus group discussion (FGD) was conducted with household members who were not part of the quantitative study's sample size. The number of FGD was determined based on data saturation.
Key informant interview (KII) was carried out with key stakeholders related to informal settlement. These were urban development and construction office heads (2), health office officials (2), Water and sewerage service department heads (2) and kebele administrators (3). An observation checklist was prepared, and data was collected by witnessing the status and condition of the informal settlement in the study area.

Trained BA degree holders collected the data, and the principal investigator supervised the overall process.

3.7 METHOD OF DATA ANALYSIS AND PRESENTATION

Each questionnaire was checked for consistency and completeness during the data collection period. Incomplete questionnaires were returned and filled out again. A template was prepared, and each coded questionnaire was entered and analyzed using SPSS version 27.

The quantitative data was presented through tables and graphs using frequencies and percentages. The qualitative data was analyzed using thematic framework analysis by establishing themes and triangulating the results with the quantitative data findings.

3.8 ETHICAL CONSIDERATIONS

Written approval was obtained from the Institution Review Board (IRB) of Hawassa University. Individual informed verbal consent was obtained from the study participants during data collection. Each respondent was informed about the study's objective, selection procedures, and confidentiality assurance; their names were not registered to minimize social desirability bias. Individuals are free to end the interview at any time.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 INTRODUCTION

In this chapter, the data collected using the survey, key informant interview and focus group discussion from study participants is presented and discussed in detail. The data gathered from study participants is presented using narrations, tables, and graphs. Additionally, this chapter presents a discussion of the study, and an attempt is made to compare the results of this study with other studies conducted on the topic. The chapter contains the following sections: socio- demographic characteristics, the status of informal settlements, the health status of members of the informal settlements, discussion on the consequences of the informal settlements and appropriate solutions to improve the health status of informal settlers.

4.2 SOCIO-DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS

Among the 397 households sampled, 380 participated in the study, with a response rate of 95.7%. The respondents represented a diverse age distribution, with the majority (23.4%) between 30–34 years, followed by those aged 25–29 years (22.9%). Additionally, most respondents were wives (41.6%) or husbands (31.8%) within their households. Marital status was predominantly married or in union, accounting for 78.7% of participants, while only 12.6% were single. Religious affiliation was varied, with nearly half identifying as Protestant (47.1%), followed by Orthodox Christians (31.3%). In terms of ethnicity, Sidama represented the largest group (49.2%), while Amhara (16.1%) and Wolayita (12.1%) were also notable. Educational attainment was varied, with 23.7% having completed college or higher education, while 26.6% had primary education, and 11.1% were illiterate. Occupations among respondents showed that more than a quarter (26.8%) were housewives, while a substantial portion engaged in private business (21.8%) and daily labor (18.7%).

Table 2: Socio-demographic characteristics of the respondents, 2024.

Variables	Categories	Frequency	Percent (%)
Age of the respondent	≤ 24 years	59	15.5
	25 – 29 years	87	22.9
	30 – 34 years	89	23.4
	35 – 39 years	66	17.4
	40 - 44 years	44	11.6
	≥ 45 years	35	9.2
Relationship to household Hea	Husband	121	31.8
	Wife	158	41.6
	Son	22	5.8
	Daughter	38	10.0
	Relative	23	6.1
	Other	18	4.7
Marital status	Single	48	12.6
	Married/in union	260	78.7
	Widowed	13	3.4
	Divorced	20	5.3
Religion	Orthodox	119	31.3
	Catholic	19	5.0
	Protestant	179	47.1
	Muslim	51	13.4
	Other	12	3.2
Ethnicity	Sidama	187	49.2
	Amhara	61	16.1
	Wolayita	46	12.1

	Oromo	32	8.4
	Gurage	21	5.5
	Other	33	8.7
Educational status	Illiterate	42	11.1
	Read and write	68	17.9
	Primary education (1-8)	101	26.6
	Secondary education (9-12)	79	20.8
	College or above	90	23.7
Occupation	Housewife	102	26.8
	Daily laborer	71	18.7
	Govt. employee	62	16.3
	Private employee	38	10.0
	Private business	83	21.8
	Other	24	6.3

Source: Researcher's survey, 2024

Partner's (Marital Pair) characteristics In terms of age, more than three-fourths of respondents' partners were aged 30–34 (27.7%), while 26.5% were aged 25–29. A significant portion had completed primary school (30.0%), while 22.3% had secondary education, and 21.2% were illiterate. Occupationally, daily labor was the most common (26.2%), followed closely by private business (24.2%) and private employment (21.2%) (Table 2).

Table 3: Partners' characteristics of the respondents, 2024.

Variables	**Categories**	**Frequency**	**Percent (%)**
Partner's Age	≤ 24 years	35	13.5
	25 – 29 years	69	26.5
	30 – 34 years	72	27.7
	35 – 39 years	46	17.7

	40 - 44 years	22	8.5
	≥ 45 years	16	6.1
Partner's Educational Status	Illiterate	55	21.2
	Read & write	37	14.2
	Primary education (1-8)	78	30.0
	Secondary education (9-12)	58	22.3
	College or above	32	12.3
Partner's Occupation	Govt. employee	49	18.8
	Private employee	55	21.2
	Private business	63	24.2
	Daily laborer	68	26.2
	Other	25	9.6

Source: Researcher's survey

- **Monthly income of the households**

Household income levels varied considerably, with the majority (33.4%) earning between 2501–5000 Ethiopian Birr per month, while 28.7% had incomes below 2500 Birr. A smaller portion of households reported monthly incomes between 5001–7500 Birr (19.5%) and over 10,000 Birr (6.3%) (Figure 1).

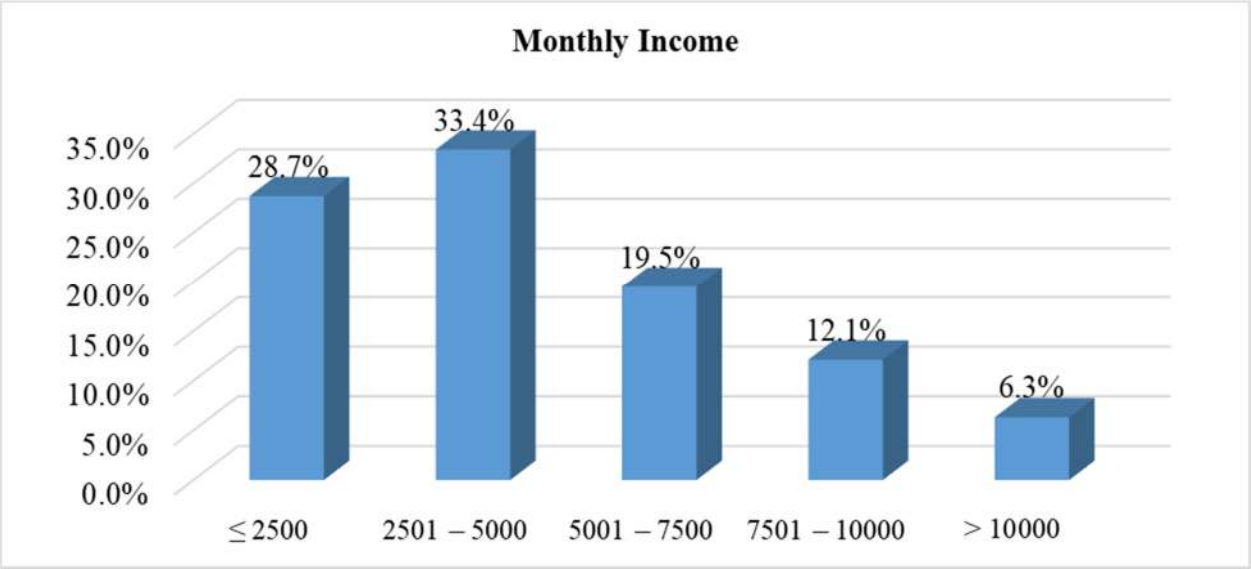

Figure 2: Monthly income of the respondents.
Source: Researcher's survey

- **Household size and composition**

Most households (62.6%) comprised four to six members, while 22.6% had seven or more. Among households with children under five, a significant portion (78.9%) reported having one child, while only 21.1% had two or more children under five (Table 3).

Table 4: Household size and composition of the respondents, 2024.

Variables	Categories	Frequency	Percent (%)
Family size	≤ 3	56	14.7
	4 – 6	238	62.6
	≥ 7	86	22.6
Children (under 5)	1	86	78.9
	≥ 2	23	21.1

Source: Researcher's survey, 2024

The focus group discussions with residents revealed that extended family living arrangements are common in these settlements. Multiple participants described hosting relatives who migrate from rural areas seeking urban opportunities.

As one female resident explained,

> *"Our house has become more crowded because we must help relatives from the countryside looking for work. Sometimes three or four families share the same compound."*

Another participant noted,

"We cannot refuse when family members need shelter, even though our houses are small."

Key informant interviews with officials with the health department highlighted concerns about household density. Health workers consistently reported that overcrowded living conditions contribute to health challenges, particularly for children.

One health extension worker stated,

> *"In these settlements, we often find multiple families sharing small spaces. This makes it difficult to maintain proper hygiene and prevent disease transmission, especially during illness outbreaks."*

4.3 STATUS OF INFORMAL SETTLEMENTS

Informal settlements in Dato Odahe, Chefe Kotijebesa, and Tilte Kebeles are characterized by unplanned housing structures, limited access to infrastructure, and environmental risks that directly impact the health of their residents. These informal settlements lack adequate drainage systems, which increases the risk of flooding. Flooding is especially problematic during heavy rainfall, as there is minimal infrastructure to manage excess water, leading to standing water and

poor sanitation conditions. This situation can contribute to waterborne diseases and other health issues for residents. Additionally, the informal settlements are often established on land prone to erosion and other environmental hazards.

4.3.1 Housing condition

Most (89.2%) of respondents owned their houses, while 8.5% rented. Nearly all households (95.5%) had access to electricity. Regarding building materials, most roofs were constructed from corrugated iron (86.3%), and walls were predominantly made from wood and mud (73.9%). Regarding flooring, two-thirds (66.1%) had concrete floors. Houses typically had two to three rooms, with 36.8% having three rooms and 30.3% having two rooms. Cooking energy sources showed a preference for electricity (52.1%), followed by firewood (20.3%) and charcoal (11.3%) (Table 4).

Table 5: Housing conditions of the informal settlements.

Variable	Category	Frequency	Percent (%)
House ownership	Private	339	89.2
	Rented	32	8.5
	Other	9	2.3
Household access electricity	Yes	363	95.5
	No	17	4.5
Type of roof	Corrugated iron	328	86.3
	Plastic	29	7.6
	Other	23	6.1
Type of wall	Cinder block, cement	85	22.4
	Wood with mud	281	73.9
	Other	14	3.7
Type of floor	Concrete	251	66.1
	Earth	87	22.9

	Plastic cover	30	7.9
	Other	12	3.2
Number of rooms in the house	One	38	10.0
	Two	115	30.3
	Three	140	36.8
	Four	68	17.9
	Five	16	4.2
	Six or more	3	0.8
Source of energy for cooking	Charcoal	43	11.3
	Electricity	198	52.1
	Solar system/biogas	25	6.6
	Gas cylinder	21	5.5
	Firewood	77	20.3
	Other	16	4.2

Source: Researcher's survey, 2024

The FGD revealed complex feelings about their housing situations. Participants frequently mentioned the trade-off between homeownership and construction quality.

One resident described their situation:

> *"Having our own house gives us security, but the walls need constant maintenance, especially after heavy rains. We repair them twice a year, but it's expensive."*

Another resident explained,

> *"We started with a simple structure and slowly improved it. First the roof, then the floor, but the walls are still challenging."*

Key informant interviews with urban development officials indicated that housing quality varies

significantly across the settlements. Officials described observing a pattern of incremental improvements as residents' economic situations improve.

The official noted,

> *"Most residents begin with basic structures and gradually upgrade them. The main challenge is that traditional construction materials like wood and mud require frequent maintenance."*

Another official stated,

> *"We see many houses with good roofs but problematic walls and foundations. This creates health risks during wet seasons."*

The study found that 89.2% of respondents owned their houses, mostly constructed using traditional materials - wood with mud walls (73.9%) and corrugated iron roofs (86.3%). This high ownership rate aligns with Lirebo's (2006) characterization of Ethiopian informal settlements, which differ from other developing countries in their spatial characteristics and ownership patterns. However, the construction materials and methods create vulnerability to environmental hazards and health risks. Ezeh et al. (2017) noted that such housing conditions often contribute to respiratory infections due to poor ventilation and dampness.

The qualitative data provides insight into the challenges of maintaining these structures, as evidenced by one resident's statement:

> *"Having our own house gives us security, but the walls need constant maintenance, especially after heavy rains. We repair them twice a year, but it's expensive."*

This finding corresponds with global patterns noted by Lilford et al. (2019), who identified poor structural quality of housing as a significant risk factor in informal settlements.

4.3.2 Water Access

Regarding water supply, more than half of households (57.4%) had access to piped water within their yard, with 12.1% having piped water directly into their dwelling. The time required to fetch water was under 30 minutes for 90.8% of respondents. Water treatment practices were limited, with 78.4% of households reporting that they did not treat their water, while others used various methods like filtration (8.7%) or adding bleach/chlorine (7.4%) (Table 5).

Table 6: Water access of the households in the informal settlements.

Variables	**Categories**	**Frequency**	**Percent (%)**
Main source of drinking water	Piped water into the Dwelling	46	12.1
	Piped water to yard/plot	218	57.4
	Public tap/standpipe	79	20.8
	Bottled water	20	5.3
	Other	17	4.5
Main source of water for household use	Piped water into the Dwelling	33	8.7
	Piped water to yard/plot	223	58.7
	Public tap/standpipe	76	20.0
	Protected dug well	28	7.4
	Other	20	5.3
Time to fetch water	< 30 minutes	345	90.8
	≥ 30 minutes	23	6.1
	Don't know	12	3.2
Treat water to make it safer	No	298	78.4

	Boil	21	5.5
	Add bleach/chlorine	28	7.4
	Use a water filter	33	8.7

Source: Researcher's survey, 2024

The residents highlighted significant challenges with water service reliability. Participants consistently reported that piped water connections don't guarantee a regular water supply.

One resident explained,

> *"We have the pipe, but water comes only three days a week. Sometimes, we wake up at midnight to store water when available."*

Another participant shared,

> *"During dry seasons, we can go without water in our taps for days. We then buy from vendors at high prices."*

Key informant interviews with water utility officials revealed infrastructure and management challenges. Officials described difficulties maintaining consistent water pressure in these settlements due to their location and rapid expansion.

One utility manager stated,

> *"The informal nature of these settlements makes planning and maintaining proper water infrastructure difficult. We face challenges with pipe layouts and pressure management."*

Health workers, during key informant interviews, expressed particular concern about water storage practices.

As one health extension worker noted,

> *"Many households store water in unsuitable containers, and few treat it before drinking."*

Water access remains a critical challenge, with 57.4% of households having piped water within their yard but facing significant reliability issues. The finding that 78.4% of households do not treat their drinking water raises serious health concerns, especially when considered alongside the qualitative data indicating irregular supply:

> *"We have the pipe, but water comes only three days a week. Sometimes, we wake up at midnight to store water when available."*

This situation mirrors challenges documented by Adams et al. (2021) in their systematic review of water access in informal settlements across Sub-Saharan Africa.

4.3.3 Sanitation

Most households (47.1%) used pit latrines with slabs, while 18.9% had pit latrines without slabs. Shared toilet facilities were common, with 67.6% sharing their sanitation facilities with other households. Village disposal sites (34.5%) and private carts (19.7%) often managed waste disposal. Additionally, 28.7% reported a water source located 10-15 meters from their toilet, while a significant portion (25.3%) reported having no water source within the compound.

Table 7: Sanitation condition of the households in the informal settlements, 2024

Variables	Categories	Frequency	Percent (%)
Toilet facility used by household	Flush/pour flush	31	8.2
	Ventilated pit latrine (VIP)	84	22.1
	Pit latrine with slab	179	47.1
	Pit latrine without slab	72	18.9
	No facilities	14	3.7
Share the toilet facility	Yes	257	67.6
	No	123	32.4
Household waste disposal	Buried in the yard	59	15.5
	Burned	43	11.3
	Village disposal site	131	34.5
	Private cart	75	19.7

	Municipal car	67	17.6
	Other	5	1.3
Distance between the water source and toilet	Less than 3 meters	33	8.7
	3-10 meters	78	20.5
	10-15 meters	109	28.7
	Above 15 meters	64	16.8
	No water source	96	25.3

Source: Researcher's survey, 2024

The FGD with residents revealed complex social arrangements around shared sanitation facilities. Participants described informal systems for managing shared toilets, including cleaning schedules and maintenance responsibilities.

One resident explained,

> *"Five families share our toilet. We created a weekly cleaning schedule, but it's difficult when some families don't follow it."*

Another participant noted,

> "We contribute money monthly for maintenance, but disagreements often arise about repairs."

Key informant interviews with environmental health officials indicated that shared sanitation facilities pose significant health risks. Officials consistently reported challenges with monitoring and maintaining these facilities.

One environmental health officer stated,

> *"The high number of users per toilet facility makes maintenance difficult and increases disease transmission risks."*

During key informant interviews, water and Sewerage Department officials expressed concerns about groundwater contamination.

As one official noted,

> *"The proximity of pit latrines to water sources is worrying, but residents have limited space to relocate these facilities."*

Sanitation infrastructure presents particular concerns, with 47.1% of households using pit latrines with slabs and a high rate of shared facilities (67.6%). These conditions align with patterns Corburn and Karanja (2016) identified in their informal settlement infrastructure analysis across multiple African cities. The social dynamics of shared sanitation facilities create additional challenges, as revealed through FGDs:

> *"Five families share our toilet. We created a weekly cleaning schedule, but it's difficult when some families don't follow it."*

4.4 HEALTH STATUS OF MEMBERS OF HOUSEHOLD

Among surveyed households, various health issues were reported, with diarrhoea being the most common, affecting 35.5% of respondents, followed by respiratory diseases (24.7%) and skin diseases (18.9%). Additionally, 31.6% of households reported at least one case of diarrhea two weeks before the survey. When specifying who was most affected by diarrhoea, children under five were disproportionately impacted, comprising 65.8% of cases, while 20.8% were among children aged 5–17 years. In terms of treatment, half of the affected households (50.8%) sought care at a health facility. In comparison, 19.2% opted for medication at home, and smaller portions used oral rehydration solutions (13.3%) or traditional herbs (9.2%).

Access to healthcare was generally adequate, with most households (56.1%) located within a 30-minute journey to the nearest health facility. However, 31.8% reported distances of 30–60 minutes, and 10.8% were over an hour away. Regarding health education, 68.7% of households had received hygiene promotion, primarily from health facilities (46.4%) and health workers (22.2%). Media outlets such as television or radio were also sources of information (16.5%), along with a smaller portion who received education through social networks, including friends and relatives (5.0%) or places of worship (2.3%) (Table 7).

Table 8: Health status of members of households in the informal settlements.

Variables	Categories	Frequency	Per cent
Major diseases affecting household Members	Diarrhea	135	35.5
	Eye disease	45	11.8
	Skin disease	72	18.9
	Malaria	63	16.5
	Respiratory disease	94	24.7
	Peptic ulcer disease	51	13.4
	Other	24	6.3
Household member affected by diarrhea (past 2 weeks)	Yes	120	31.6
	No	260	68.4
If Yes, who had diarrhea?	Adult (18 and above)	16	13.3
	Children (5-17)	25	20.8
	Under 5 children	79	65.8
How did you treat the diarrhea	Give medicine	23	19.2
	Give ORS	16	13.3
	Give traditional herb	11	9.2
	Visit health facility	61	50.8
	Traditional healer	5	4.2
	Nothing done	4	3.3
Distance to the health facility	< 30 minutes	213	56.1
	30 – 60 minutes	121	31.8
	> 60 minutes	41	10.8
	Don't know	5	1.3
Received hygiene promotion awareness	Yes	261	68.7
	No	98	25.8

	Don’t remember	21	5.5
Where did you get the awareness	Health facility	121	46.4
	Health worker	58	22.2
	Media (TV/Radio)	43	16.5
	School	9	3.4
	Relatives/friends	13	5.0
	Church/Mosque	6	2.3
	Other	11	4.2

Source: Researcher’s survey, 2024

The discussions with residents revealed complex patterns of health-seeking behavior and barriers to healthcare access. Participants frequently described using a combination of home remedies and formal healthcare services.

One mother explained,

> *"When my child has diarrhoea, I first try oral rehydration at home. If it doesn't improve after two days, I take them to the health center."*

Another resident shared,

> *"Transport costs to health facilities are sometimes more expensive than the treatment itself."*

Key informant interviews with health department officials highlighted gaps between health knowledge and practice in the settlements. Health workers observed that while residents understand basic health principles, infrastructure and economic constraints often prevent proper implementation.

One health officer stated,

> *"We provide regular health education, but behaviour change is difficult without proper water and sanitation infrastructure."*

Another health worker noted,

> *"Many residents know about disease prevention, but poverty forces them to prioritize daily survival over health investments."*

The health impacts of informal settlement conditions in Hawassa City are substantial and multifaceted, affecting residents across different age groups, particularly children under five years. The study reveals a complex interplay between environmental conditions, socioeconomic factors, and health outcomes, creating significant public health challenges.

Diarrheal diseases emerged as the most prevalent health issue (35.5%), with children under five accounting for 65.8% of cases. This high prevalence aligns with findings from Mukoru et al. (2020), who documented similar patterns in informal settlements across East Africa. The relationship between water access and diarrheal disease is particularly concerning, as interrupted water supply often leads to unsafe storage practices. As one health extension worker noted:

> *"Many households store water in unsuitable containers, and few treat it before drinking."*

This observation is supported by recent research by Thompson et al. (2023), which found that intermittent water supply in informal settlements increases the risk of water contamination during storage.

Respiratory diseases, affecting 24.7% of residents, represent the second most common health challenge. The prevalence of respiratory conditions can be attributed to multiple factors identified in the study, including overcrowded living conditions and poor ventilation. These findings parallel research by Kumar et al. (2022), who found that respiratory infections in informal settlements are exacerbated by indoor air pollution from cooking fuels and inadequate ventilation. The study's finding that 52.1% of households use electricity for cooking while 20.3% still rely on firewood suggests varying levels of exposure to indoor air pollutants.

Skin diseases, affecting 18.9% of residents, represent another significant health challenge. This prevalence can be linked to water scarcity and shared sanitation facilities, as Satterth waite et al. (2019) documented in their comprehensive review of health in informal settlements. The impact

is particularly severe during water shortages, as described by one resident:

> *"During dry seasons, we can go without water in our taps for days. We then buy from vendors at high prices."*

The study also revealed important patterns in healthcare access and utilization. While 56.1% of households are located within 30 minutes of health facilities, only 50.8% sought care at health facilities for diarrheal diseases. This gap between accessibility and utilization reflects broader systemic challenges documented by Yaya et al. (2021) in their analysis of healthcare-seeking behavior in informal settlements. Economic barriers play a crucial role, as evidenced by one resident's statement:

> *"During emergencies, transport costs to health facilities are sometimes more expensive than the treatment itself."*

Though not directly measured in the study, mental health impacts emerged as a theme in qualitative discussions. Residents described stress related to housing insecurity and environmental hazards, reflecting patterns Subbaraman et al. (2020) identified in their research on psychological well-being in informal settlements. The cumulative impact of multiple health stressors creates what Ezeh et al. (2021) describe as a "syndemic" effect, where various health challenges interact and compound each other.

4.5 SOLUTIONS TO IMPROVE THE HEALTH STATUS OF INFORMAL SETTLERS

Through both survey responses and qualitative discussions, the study participants proposed various solutions to address the health challenges in their communities. These community-generated solutions, supported by existing literature and successful interventions in similar contexts, provide a framework for improving health outcomes in Hawassa's informal settlements.

Residents consistently emphasized the need for improved water infrastructure as a primary solution. As articulated by community members during focus group discussions, regular water supply would enable better hygiene practices and reduce the health risks associated with water storage. This aligns with successful interventions documented by (Howard et al,2020), who found that consistent water supply significantly reduced diarrheal disease incidence in informal

settlements. Participants suggested implementing community-managed water points and establishing local water committees to ensure equitable distribution and maintenance.

Sanitation improvements emerged as another key priority, with residents proposing innovative community-managed solutions. Focus group participants described potential systems for maintaining shared facilities, including cost-sharing arrangements for improvements and cleaning schedules. These community-based approaches reflect successful models documented by Tidwell et al. (2019) in their analysis of sanitation interventions in informal settlements. Health workers in key informant interviews supported these suggestions, emphasizing the need for both infrastructure improvements and community ownership:

> *"We must combine physical improvements with community management systems to ensure sustainability."*

Participants also highlighted the importance of economic support mechanisms to enable health-promoting behaviors. Suggestions included establishing community savings groups for health emergencies and developing micro-insurance schemes. These proposals align with successful interventions documented by Chigudu et al, 2021) in similar settings. As one resident noted:

> *"If we had a local community health fund, we could help each other during emergencies instead of waiting until conditions become severe."*

Housing improvement initiatives were frequently mentioned, with participants suggesting incremental upgrading approaches, allowing residents to improve their homes while maintaining ownership. This approach is supported by research from(Mitlin and Walnycki 2021), who found that participatory upgrading programs achieved better outcomes than top-down interventions. Community members emphasized the need for technical support and access to better building materials:

> *"We need guidance on how to make our houses healthier, even with limited resources."*

Health education and community mobilization were identified as essential complementary interventions. Participants suggested establishing community health committees and training local health advocates, reflecting successful models documented by Kyobutungi et al. (2019). The emphasis on community-led initiatives was particularly strong, with residents noting the

importance of building on existing social networks and knowledge systems.

The role of governmental policy interventions emerges as a critical factor in addressing the health challenges of informal settlements. In similar contexts, local government subsidies for construction materials, particularly for improving roofing and flooring, have shown promising results. This need is clearly articulated in the study findings, as one resident explained:

> *"Having our own house gives us security, but the houses and the fense need constant maintenance, especially after heavy rains. We repair them every year, but it's expensive."*

For instance, in Addis Ababa, a municipal program providing subsidized cement and corrugated iron sheets significantly improved housing quality among informal settlers (Bekele et al., 2021). Such initiatives could be replicated in Hawassa, focusing on materials that enhance structural integrity and promote better ventilation. Additionally, policy frameworks that recognize and formalize incremental housing improvements, as implemented successfully in Rwanda (Uwayezu et al, 2020), could provide residents with the security needed to invest in health-promoting housing upgrades. As noted by Parker and Maree (2023), government- supported material banks that provide quality construction materials at subsidized rates can significantly improve housing standards while ensuring safety and durability.

The coordination role of local government in scaling up community-driven initiatives represents a third critical area for policy intervention. NGOs and community-based organizations often operate in isolation, leading to duplication of efforts and inefficient resource utilization. Municipal authorities can coordinate by establishing platforms for collaboration and knowledge sharing among various stakeholders. Evidence from successful interventions in Kenya suggests that local government-led coordination mechanisms can significantly enhance the effectiveness of community health initiatives in informal settlements (Ndugwa et al, 2023). Furthermore, policy frameworks that institutionalize community participation in urban planning and health service delivery, as documented by Ahmed et al. (2022), can help ensure the sustainability of health interventions. This could include establishing formal channels for community input in municipal health planning and creating mechanisms for regular dialogue between health authorities and settlement representatives.

4.6 The Link between socio demographic and economic factors and health problems in informal settlements

Informal settlements, often characterized by inadequate infrastructure, overcrowding, and poverty, face significant health challenges. These health problems are strongly influenced by economic and socio-demographic factors, creating a cycle of poor living conditions and deteriorating health (Brown, 2015). Poverty and Low Income is a major feature of informal settlements residents often have unstable incomes, limiting their ability to afford healthcare, nutritious food, and proper housing. Malnutrition is common due to financial constraints, leading to weakened immune systems and increased susceptibility to infections. Lack of financial resources leads to untreated chronic illnesses such as diabetes and hypertension (Sverdlik, et al, 2018).

Overcrowding leads to the rapid spread of infectious diseases like tuberculosis, respiratory infections, and skin diseases. Lack of sanitation and waste disposal contributes to waterborne diseases such as cholera, dysentery, and typhoid. Inadequate access to clean water results in dehydration, malnutrition, and hygiene-related illnesses (Aboulnaga et al, 2021).

Many people in informal settlements work in low-paying, informal jobs without job security, health insurance, or sick leave. The often present exposure to hazardous working conditions increases the risk of occupational diseases and injuries. Economic stress contributes to mental health issues such as anxiety and depression. Most residents cannot afford medical care or transportation to health facilities, leading to delayed treatments. Overburdened public health systems result in long waiting times and inadequate healthcare services. Many rely on unregulated informal healthcare providers, leading to misdiagnoses and improper treatments (Salami et al, 2022).

4.7 Major health problems and their contributing factors in informal settlements

Often located in low-lying, flood-prone areas, hilly regions or near polluting facilities and landfills, informal settlements are disproportionately exposed to environmental pollution and health risks from natural disasters. Since cities do not legally recognize most settlements, they frequently do not have good access to water, sanitation and electricity, which creates a breeding ground for water-borne diseases like cholera, hepatitis, bacterial infections from poor personal hygiene and health risks from heat stress (Admassu, 2020).

Many informal settlements are also overcrowded, making them susceptible to the spread of both infectious diseases from contagion and noninfectious diseases from poor living conditions. Lack of resources and services like public transportation, schools or healthcare centers limits opportunities for residents. Reflecting their inadequate shelter and service provision, residents of informal settlements often experience markedly worse health outcomes than their fellow city residents. Children are especially vulnerable, as the combination of malnutrition and recurrent diarrhea leads to stunted growth and longer-term effects on cognitive development (Aboulnaga et al, 2021).

Women with precarious informal livelihoods, limited access to infrastructure, and gendered care burdens also face acute risks to their health and wellbeing. Beginning at birth, these urban health inequalities are often reproduced over a lifetime and may be exacerbated by vulnerability to climate change – which increases loss of life and injury from extreme events – and now also COVID-19 (Sahiledengle, et al. (2018).

The major health issues that affect informal settlements are Infectious Diseases (TB, HIV/AIDS, Malaria, Cholera and water borne diseases) are more prevalent in informal settlements than the other urban populace. The contributing underlying factors are overcrowding, poor sanitation, and lack of healthcare access (Kebede, 2023).

Tuberculosis remains a major public health challenge in informal settlements due to overcrowding, poor sanitation, limited healthcare access, and socioeconomic vulnerabilities. The disease, which spreads through airborne droplets, thrives in environments with poor ventilation and high population density—both common conditions in informal settlements (Kumar,et al, 2022).

A study in south Africa found that the rate of individuals diseased with tuberculosis in informal settlements, is reported to be double that of the country. Tuberculosis (TB) prevalence is notably higher in informal settlements across Africa compared to national averages. Several studies have highlighted this disparity(Baron, 2018). Research in Kenyan informal settlements revealed that males had 2.5 times higher TB cases compared to females, and urban areas exhibited a 1.7 times higher TB prevalence than rural areas. These findings underscore the urgent need for targeted TB

control strategies in informal settlements across Africa to address the heightened disease burden in these communities (Ndugwa, 2023).

HIV/AIDS remains a significant public health challenge in informal settlements due to a combination of economic, social, and environmental factors that increase vulnerability and limit access to healthcare. The high prevalence of HIV in these areas is linked to poverty, limited education, inadequate healthcare services, and high-risk behaviors (Satterthwaite et al, 2019).

Poverty and Economic Vulnerability of residents many individuals, especially women, into transactional sex for survival, increasing HIV exposure. Limited economic opportunities make it difficult for residents to afford healthcare and antiretroviral therapy (ART). Many informal settlements lack adequate healthcare infrastructure, leading to delays in HIV testing and treatment. Stigma and discrimination in healthcare settings discourage individuals from seeking HIV-related services. High population density and social instability contribute to increased rates of unprotected sex, multiple sexual partners, and sexual violence. Low condom use and limited access to sexual health education increase HIV transmission risks (Ndugwa, 2023).

Infections and Health Complications also remains high rates of tuberculosis (TB) in informal settlements worsen health outcomes for people living with HIV. Malnutrition and poor sanitation weaken immune systems, making HIV-positive individuals more susceptible to opportunistic infections. Cultural beliefs and misinformation prevent many individuals from getting tested or adhering to treatment (Tadesse et al, 2023).

Studies have consistently shown that HIV prevalence is notably higher in informal settlements compared to formal urban and rural areas. Urban informal settlements exhibit the highest HIV prevalence among men aged 15–49, with rates almost double those in urban formal areas. Notably, HIV prevalence in rural informal settlements has been increasing over time. PMC in Nairobi, HIV prevalence in slum areas is 12%, significantly higher than the 5% observed among non-slum urban residents and the 6% in rural regions. Systematic review and meta-analysis revealed that individuals residing in slum settlements face a 69% higher risk of contracting HIV compared to those in non-slum areas (Behzadifar et al, 2024).

Malaria prevalence is notably higher in informal settlements compared to formal urban areas,

primarily due to factors such as inadequate housing, poor sanitation, and limited access to healthcare. Findings from various studies include: Despite Nairobi's classification as a low-risk area for malaria, a study in a slum revealed that over a five-year period, more than 20% of febrile patients tested positive for malaria parasites. Children under 15 years old accounted for two-thirds of these cases. Research indicates a higher malaria burden in informal and peri-urban settlements compared to formal ones, highlighting the vulnerability of residents in these areas. Urban Areas in Sub-Saharan Africa: A study demonstrated that malaria prevalence can be significantly higher in informal settlements than in other urban landscapes, attributed to poor housing infrastructure, lack of bed nets, and inadequate financial resources to purchase antimalarial drugs (Ndugwa, 2023).

Kibera, one of Africa's largest informal settlements in Nairobi, has repeatedly suffered cholera outbreaks due to contaminated water sources and poor sanitation. In 2017, a cholera outbreak affected over 3,000 people in Nairobi, with many cases reported in Kibera (CDC, 2018). A survey by the Nigerian Ministry of Water Resources found that only 30% of households in informal areas of North Central Nigeria have access to piped water, compared to 70% in formal urban areas. This disparity increases the risk of waterborne diseases like cholera, typhoid fever, and diarrhoea (Olusunle et al., 2017).

Malnutrition is a significant concern in informal settlements, where factors such as poverty, inadequate healthcare, and poor living conditions contribute to compromised nutritional status, particularly among children under five.A nutritional assessment among displaced populations in informal settlements revealed alarming rates of malnutrition among children under five and pregnant women in Ethiopia. Limited access to affordable, nutritious food leads to inadequate dietary intake. Unsanitary living conditions increase susceptibility to infections, exacerbating malnutrition. Inadequate healthcare services hinder early detection and treatment of malnutrition (Tadesse et al, 2023).

Residents of informal settlements face heightened risks for respiratory conditions such as asthma, pneumonia, and COVID-19, primarily due to factors like overcrowding, poor air quality, and limited access to healthcare services. A study in asthma prevalence in Nairobi, Kenya, found that children attending schools in informal settlements had a higher prevalence of 'current wheeze' compared to those in more affluent areas, indicating increased asthma symptoms

Children in informal settlements are more susceptible to pneumonia due to exposure to indoor air pollution from cooking fuels, inadequate ventilation, and malnutrition. Research indicates a correlation between ambient levels and increased cases of pneumonia among children in urban settings, including informal settlements.

The dense living conditions in informal settlements, characterized by closely spaced dwellings, facilitate rapid transmission of COVID-19. A study in Cape Town's informal settlements highlighted the minimal distance between homes, underscoring the challenge of implementing effective social distancing measures. Individuals with chronic respiratory conditions like asthma may face increased risks if infected with COVID-19. However, studies have shown that asthma does not necessarily lead to higher mortality in COVID-19 patients (Soors, et al, 2020).

Mental Health Issues (Depression, Anxiety and Substance Abuse**)** Residents of informal settlements face heightened risks of mental health problems due to a confluence of adverse conditions, including economic hardships, exposure to violence, environmental stressors, and limited access to healthcare services (Crooks, 2021). A study highlighted exceedingly high levels of poor mental health among young men in these areas, with depression and post-traumatic stress being driven by economic and social conditions. Research indicates that more than two-thirds of women in Kenya's informal settlements report intimate partner violence and elevated psychological distress, underscoring the intersection of gender-based violence and mental health. Studies have shown high prevalence and comorbidity of mental health problems among Syrian refugee children living in settlements in Lebanon, reflecting the compounded stressors in such environments.

Non-Communicable Diseases (Diabetes, Hypertension, and Stroke) Residents of informal settlements in low- and middle-income countries are increasingly affected by non-communicable diseases , including hypertension, diabetes mellitus, cardiovascular diseases, and respiratory disorders. These areas face unique challenges that heighten the risk and impact of NCDs. Studies in Sierra Leone's informal settlements report hypertension prevalence around 35.3% and diabetes at 8.3%. Contributing factors include economic instability, challenging living conditions, and limited access to healthcare services. Residents often encounter increased exposure to risk factors such as tobacco use, poor diets, excessive alcohol consumption, and environmental pollution, all of which elevate NCD risks (Ziraba, 2023)

Living in overcrowded conditions with inadequate sanitation and clean water access exacerbates health risks. Chronic stress from economic and social challenges further contributes to the development of NCDs. The scarcity of quality healthcare services in informal settlements leads to under diagnosis and inadequate management of NCDs, resulting in higher case-fatality rates. There's a notable presence of both infectious and non-communicable diseases. For instance, studies have found high rates of respiratory infections among children and hypertension among adults in these communities (Sulyman, 2025).

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

The previous chapter presented and discussed detailed findings regarding the status of informal settlements in the Hawassa City Administration and their health implications. This chapter synthesizes the key findings, draws conclusions, and provides recommendations based on the study results. It begins with a summary of major findings aligned with the study objectives, followed by conclusions drawn from the analysis. The chapter then presents actionable recommendations for various stakeholders and suggests directions for future research.

5.2 SUMMARY OF MAJOR FINDINGS

The study revealed significant insights into the socio-demographic characteristics of informal settlement residents in the Hawassa City Administration. The population was predominantly young to middle-aged, with 46.3% between 25-34 years, and most respondents (78.7%) were married or in union. Educational attainment showed considerable variation, with 23.7% having a college education while 11.1% were illiterate. Household income levels were generally low, with 62.1% earning 5000 ETB or less monthly, and family sizes were moderately large, with 62.6% having 4-6 members.

The informal settlements' status demonstrated complex housing, water access, and sanitation patterns. Housing conditions showed high home ownership (89.2%) but poor construction quality, with the predominant use of wood and mud walls (73.9%) and corrugated iron roofs (86.3%). Despite large family sizes, most houses (67.1%) had 2-3 rooms. Water access revealed that 69.5% had piped water access in their dwelling or yard but faced significant reliability issues. Notably, 78.4% did not treat their water, though most households (90.8%) spent less than 30 minutes fetching water. Sanitation status showed that 47.1% used pit latrines with slabs, with a high prevalence of shared facilities (67.6%). Various waste disposal methods were employed, with 34.5% using village disposal sites.

Health impacts were substantial, with diarrhea being the most common (35.5%) and respiratory diseases (24.7%). Children under five were disproportionately affected by diarrhea, accounting for 65.8% of cases, and 31.6% of households reported diarrheal disease within two weeks of the survey. Healthcare access showed that 56.1% lived within 30 minutes of health facilities, and 50.8% sought formal healthcare for diarrheal diseases. While 68.7% received hygiene promotion education, multiple barriers to healthcare utilization were identified through qualitative investigations.

5.3 CONCLUSION

The study findings paint a complex picture of life in Hawassa's informal settlements, where high home ownership rates provide security but are offset by significant environmental health challenges. The prevalent use of traditional construction materials, while economically accessible, creates ongoing maintenance challenges and contributes to respiratory health issues. This situation is compounded by the paradoxical nature of water access, where high connection rates mask serious reliability issues that force residents into potentially risky water storage and management practices.

The sanitation infrastructure presents particular concerns, as the widespread use of shared facilities and basic pit latrines creates environmental health risks exacerbated by inadequate waste management systems. These environmental conditions have clear health implications, particularly for children under five who bear a disproportionate burden of diarrheal diseases. While basic healthcare services are generally within geographical reach, the study revealed important gaps between health knowledge and practice, often driven by economic constraints and infrastructure limitations.

The findings largely aligned with expectations based on previous research, though the high rate of home ownership was somewhat surprising and suggests unique characteristics of Ethiopian informal settlements. The study's mixed-methods approach provided rich insights into the quantitative scope and qualitative experience of health challenges in these communities. However, the study's cross-sectional nature limited our understanding of seasonal variations in health impacts and coping strategies.

5.4 RECOMMENDATIONS

For Municipal Government:

- Implement an informal settlement upgrade strategy that improves infrastructure and supports social development, addressing health risks and boosting community resilience.
- Establish a unit to coordinate across departments and engage with communities to align interventions with local needs.
- Develop flexible building regulations that support housing improvements while maintaining safety standards, with technical support for residents.

For Health Department:

- Design a child health program targeting informal settlements, including health monitoring, vaccinations, and nutrition support.
- Train community health workers within settlements as frontline responders and educators.
- Launch mobile health services for preventive care and health education in these areas.

For Water and Sanitation Authority:

- Create a water supply improvement plan integrating infrastructure upgrades, management, and community feedback.
- Set up a dedicated maintenance system with rapid response for settlement water service issues.
- Form community water committees to oversee local distribution and water quality.
-

For Community Organizations:

- Support savings groups focused on health and housing improvements with strong governance.
- Establish sanitation committees to maintain shared facilities and promote community-led

sanitation.

- Develop community monitoring systems for health indicators, coordinating interventions with municipal authorities.

For NGOs and Development Partners:

- Support innovative financing for housing improvements accessible to settlement residents with technical assistance.
- Build capacity for community organizations and local government in informal settlements.
- Facilitate knowledge exchange between cities to share effective strategies and lessons learned.

5.5 FUTURE RESEARCH

Future research directions should build upon the findings of this study while addressing its limitations and exploring emerging challenges. Longitudinal studies are particularly needed to examine seasonal variations in health impacts and community coping strategies, providing insights into how environmental health risks change throughout the year and how communities adapt. These studies should incorporate both quantitative health indicators and qualitative assessments of community responses.

Cost-benefit analyses of different intervention strategies would provide valuable information for resource allocation decisions, helping policymakers and community leaders identify the most effective approaches for improving health outcomes. This research should examine innovative financing mechanisms for housing improvements and infrastructure development, mainly focusing on approaches that can be scaled and replicated across different informal settlements.

Comparative studies of successful informal settlement upgrading programs in similar contexts would provide valuable lessons for Hawassa. At the same time, research on climate change impacts would help communities prepare for emerging environmental health challenges. Additionally, investigation of mental health impacts and the effectiveness of community-led health initiatives would provide a more complete understanding of health challenges in informal settlements. This research agenda would support evidence-based interventions while building capacity for community-led improvements in informal settlement health conditions.

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APPENDIXES

APPENDIX I: SURVEY QUESTIONNAIRE

Consent Form

Good morning/afternoon. My name is _____(Interviewer

I temporarily represent Hawassa University, College of Law and Governance, School of Governance and development studies. This is a study to be conducted to assess the consequences of informal settlement on the health of residents in Hawassa city administration. As the study is directly related to the residents of Hawassa city administration, you are the one who have been randomly selected to participate in this study. Therefore, you are kindly requested to participate in this study and provide the information required from you. If I may, I would like to ask you a few questions, but you can refuse to answer any question I ask. You may end the interview at any time. You can also refuse to participate in the study entirely. Your refusal will not restrict you from obtaining any service when you need. The interview will last approximately 20 minutes.

Your responses will be kept confidential and there will be no way of linking your individual responses to the results of the study findings.

We would like to inform you that the responses that you provide to the questions are very essential, not only, for the successful accomplishment of the study, but also for producing relevant information which will be helpful in the planning and implementation of intervention activities to prevent delays and improve the health condition of residents of Hawassa city.

Are you voluntary to respond to the questions? Yes, proceed with the interview.
No _____; thank her/him and End.

Name of interviewer who sought the consent _____

Date _____ Signature _____

Name of supervisor _____

Date _____Signature _____

Household ID No. _____

Interviewer visits

No. Of visits			
	1	2	3
Result			

Result codes:

1 = Completed

2 = Women absent (specify the reason

3 = Time and date set for later

4 = Incomplete interview

5 = Refused

6 = other (specify)

Section 1: Socio-demographic Information

Q .No.	Question	Codes	Skip (go to)
101	Age of the respondent in completed years	_____ _____	
102	Relationship of the respondent to the household head	1. Husband 2. Wife 3. Son 4. Daughter 5. Other specify	
103	Marital status of the respondent	1. Single 2. Married/in union 3. Widowed 4. Divorced	
104	Religion of the respondent	1. Orthodox 2. Catholic 3. Protestant	
		4. Muslim 99.Other(specify)	
105	Ethnicity of the respondent	1. Sidama 2. Amhara 3. Wolaita 4. Oromo 5. Gurage 99.other(specify)	

106	Occupation of the respondent	1. Housewife 2. Daily labourer 2. Govt. employee 3. Private employee (NGO) 4. Private business 5. Other (Specify)	
107	Educational status of the respondent	1. Illiterate 2. Read & write 3. Primary education (1-8) 4. Secondary education 5. college or above	
108	Monthly income in Eth. Birr	_____	

Question no.108 – 111 will be asked for respondents who married/in union are.			
109	Partner's age in completed years		
110	Partner's occupation	1. Govt. employee 2. Private employee 3. Private business	
		4. Other (Specify)	

111	Partner's educational status	1. Illiterate 2. Read & write 3. 1-6 4. 7-8 5. Secondary&10+1 6. Diploma & above	
112	Partner's monthly income in Eth. Birr	_____	
113	How many people usually live in your household?	1. Adult men (age 18 and above) _____ 2. Adult women (age 18 and above) _____ 3. Boys (age 5-17) _____ 4. Girls (age 5-17) _____ 5. under 5 children(boys)____ 6. under 5 children(girls)____	

SECTION 2: STATUS OF INFORMAL SETTLEMENTS

201	What is the main source of drinking water for members of your household?	1. piped water into dwelling 2. Piped water to yard/plot 3. Public tap/standpipe 4. Tube well/borehole 5. Protected dug well 6. Unprotected dug well 7. Rainwater collection 8. Bottled water 9. Surface water (river, dam, lake, pond, stream, canal, irrigation channels) 10. Other (specify)	
202	What is the main source of water used by your household for other purposes, such as cooking and hand washing?	1. piped water into dwelling 2. Piped water to yard/plot 3. Public tap/standpipe 4. Tube well/borehole 5. Protected dug well 6. Unprotected dug well 7. Rainwater collection 8. Bottled water 9. Surface water (river, dam, lake, pond, stream, canal, irrigation channels) 10. Other (specify)	
203	How long does it take to go there, get water, and come back?	1. No. of minutes _____ 2. Water on premises 3. Don't know (DK)	

204	Do you treat your water in any way to make it safer to drink?	1. Boil 2. Add bleach/chlorine 3. Strain it through a cloth 4. Use a water filter (ceramic, sand, composite, etc.) 5. Solar disinfection 6. Let it stand and settle 7. Other (specify) 8. DK	
205	What kind of toilet facility do members of your household usually use?	1. Flush/pour flush to: A. piped sewer system B. septic tank C. pit latrine D. elsewhere	

		E. unknown F. place/not sure/DK where 2. Ventilated improved pit latrine (VIP) 3. Pit latrine with slab 4. Pit latrine without slab/open pit 5. Composting toilet 6. Bucket 7. Hanging toilet/hanging latrine 8. No facilities or bush or field 9. Other (specify	
206	Do you share this facility with other households?	1. Yes 2. No	
207	Where does your household dispose rubbish?	1. Buried in the yard 2. Burned 3. Collection point in the village/compound 4. River 5. Other specify	
208	What is the distance between the water source and the toilet?	1. Less than 3 meters 2. 3-10 meter 3. 10-15 meter 4. Above 15 meters 5. No water source in the compound	

209	Does the household have electricity supply?	1. Yes 2. No	
210	Type of roof	1. Sheet metal 2. Terrace. 3. Tile. 4. Wood shingles. 5. Plant materials 6. Other	
211	Type of Wall	1. Durable: cinderblock, cement. 2. Durable: wood. With mud Plywood, pinex etc. 3. Building lime, cob. 4. Plant materials. 5. Other (sheet metal)	
212	Type of floor	1. Concrete 2. Wood 3. Dirt, coral	
213	How many rooms does your house have?	1. One 2. Two 3. Three 4. Four 5. Five	

		6. Six	
214	Source of energy in the household	1. Axe 2. Kerosene lamp 3. Dry cell 4. Solar lamp 5. Solar system/biogas system 6. Generator 7. Firewood or charcoal efficient stove 8. Other	

SECTION 3: HEALTH STATUS OF MEMBERS OF HOUSEHOLD

301	What are the major diseases affecting members of your household?	1. Diarrhoea 2. Eye disease 3. Skin disease 4. Malaria 5. Respiratory disease 6. Other

302	During the past two weeks, did any member of your household affected by diarrhoea?	1. Yes 2. No 3. Unknown
303	If Yes to Q. no.302, who had diarrhoea?	Adult men (age 18 and above) _____ 2. Adult women (age 18 and above) _____ 3. Boys (age 5-17) _____ 4. Girls (age 5-17) _____ 5. under 5 children(boys)____ 6. under 5 children(girls)____
304	If Yes to Q.no.302, how was he/she treated? (Multiple answer possible)	1. Give medicine 2. Give ORS 3. Give traditional herb 4. take to PHC/clinic
		5. Take to traditional healer 6. other specify
305	How long does it take to walk from your house to the health facility that you usually use?	_____in minutes
307	Have you or your household members ever received a program for hygiene promotion by any organization?	1. Yes 2. No

308	If yes, where did you receive the program?	1. At clinic/health facility 2. From a health worker 3. From radio 4. From TV 5. At school 6. From family member 7. From church/mosque 8. Other specify____

APPENDIX II: FGD GUIDELINES

Participants: Household heads who are not part of the sample in the quantitative study

Ensure all participants know their participation is voluntary; they are free to skip any questions and withdraw at any time.

Introducing yourself:

Hello, my name is (name of interviewer), and I am from Hawassa University, College of law and Governance. We are conducting a study titled 'Assessment of Consequences of informal Settlement on the health of residents in Hawassa city administration.'

Obtaining informed consent/assent:

Whatever you share will be kept confidential; if you do not want to answer questions, there is no need to answer them. You are also welcome to leave at any time. Participation is voluntary; please can you let me know whether you are happy to participate in the discussion for the next 90 minutes?

Please can you confirm that you are comfortable in this space and with the language, we are using? Do you have any questions before we start?

Interview Date:	
Facilitator Name:	
Facilitator Sex:	
Interpreter Sex:	
Location:	
Sex of Participants:	
Number of Participants:	
Age range of Participants (from youngest to oldest):	

1. What is your experience of living in this area? How long have you lived here?
2. Do you think that this area is suitable for residential purposes? If not, please state your reasons.
3. What are your concerns living in this area?
4. What are the challenges of living in this area? (Service-related barriers, health related barriers…)Do you know of any health problems associated with pollution (smoke, stagnant water, accumulation of wastes)? If yes, what are they?
5. What do you think should be done to improve the status of this area? What should be done to make this area a better place for living? What do you think the community should do about it?

APPENDIX III: KEY INFORMANT INTERVIEW SCHEDULE

Introducing yourself:

Hello, my name is (name of interviewer). I am here on behalf of Hawassa University, College of Law and Governance, school of Governance and development studies.

Explaining the purpose of the KII:

We are conducting a study titled "'Assessment of consequences of informal settlement on the health of residents in Hawassa city administration. The purpose of this study is to know the status of informal settlers, identify health consequences of informal settlement and devise solution for the betterment of the health status of residents of Hawassa city administration. ''We are hoping to ask you a few questions and hear your perspectives about the existing barriers, as well as your solutions and suggestions for making this area a better place to live. The recommendations of this study will help improve the status of residents of the city.

Obtaining informed consent:

Participation is voluntary; please can you let me know whether you are happy to participate in the interview for the next 20 minutes? Do you have any questions before we start?

Complete this form: (whilst the interpreter hands out drinks at the start so that participants can remain hydrated).

Interview Date:	
Interviewer Name:	
Interviewee position	
Interviewee Sex:	
Location:	
Sex of Participant:	
Age range of Participant	

Urban development and construction office

1. What is your experience related to informal settlement in this area? How many people live in this area? How long do they reside in this area?
2. What are the needs and concerns of the residents in this area?
3. How do you address their concerns?
4. What are the service-related challenges of the residents? (Water, sanitation, hygiene, infrastructure…)
5. What has been planned to improve the status of this area? What do you think should be done?

Kebele Administration

1. What is your experience related to informal settlement in this area? How long do they reside in this area?
2. What are the needs and concerns of the residents in this area?
3. How do you address their concerns?
4. What are the service-related challenges of the residents? (Water, sanitation, hygiene, infrastructure…) What are the special challenges in your kebele?
5. What has been planned to improve the status of this area? What do you think should be done?

Water and sewerage service department

1. What is your experience related to informal settlement in this area?
2. What are the needs and concerns of the residents in this area?

3. How do you address their concerns? What has been done so far?

4. What are the service-related challenges of the residents? (Water, sanitation, hygiene, infrastructure…)
5. What has been planned to improve the status of this area? What do you think should be done?

Health department

1. What are the challenges of residents of informal settlement in this area?(health service delivery, infrastructure, health seeking behavior…)
2. What are the most common health problems in this area?

3. What are their health-related concerns? Do they have near-by health facility in the area? If no, why?
4. How do you address their concerns? What have been so far to address their concerns?

What has been planned to improve the health status of this area? What do you think should be done?