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Impact Of Waste Management Practices On Public Health: A Case Study In Budiriro 5b Dumping Sites, Harare

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APPROVAL FORM

The undersigned strongly certify that they have read and made recommendations to Bindura University of Science Educations for acceptance for a research project entitled: The impact of waste management practices on public health, a study on Budiriro dumping sites. The project was submitted in partial fulfillment of the requirements of Bachelor of Science Honors Degree in Development Studies

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DECLARATION

I, Tsungai Makaza B201102B do hereby declare that this work is my own, and that all the work of other people used in this thesis has been duly acknowledged and that this work has not been previously presented at the Bindura University of Science Education for similar purposes.

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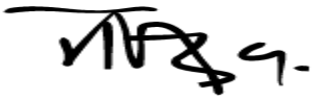
Signature: 

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DEDICATION

This dissertation is dedicated to my beloved mother, whose unwavering love, encouragement; sacrifices have been my greatest source of strength. To all my family for their support, understanding and patience. Above all, I dedicate this work to God Almighty, whose mercy and blessings have made this achievement possible.

ABSTRACT

This study focuses on the impact of waste management practices on public health in Budiriro 5B, Harare, utilizing a qualitative thematic approach. Specifically, it examines the health consequences of inadequate waste disposal, assesses the effectiveness of current waste management intervention, strategies for improving waste management practices. Through thematic analysis of health reports, interviews with health workers, and community surveys, the research identified critical health implications linked to inadequate waste management. Findings reveal that poorly managed waste disposal sites serve as breeding grounds for disease vectors, contributing to elevated incidences of vector-borne diseases such as malaria and dengue fever. Contamination of water sources due to improper waste disposal further exacerbates health risks, leading to outbreaks of cholera, typhoid, malaria, tuberculosis. From the findings, it is indicated that, current municipal interventions, such as scheduled waste collection and awareness campaigns, face challenges including inadequate infrastructure and financial constraints, limiting their effectiveness. In contrast, community driven initiatives supported by non-governmental organizations (NGOs) show potential in fostering local engagement and improving waste management practices. The study recommends enhanced infrastructure investment, strengthened policy frameworks, increased community engagement and education, adoption of technological innovations, and multi-stakeholder collaboration to mitigate health and environmental risks associated with waste management in Budiriro 5B. These findings contribute to understanding the urgent need for sustainable waste management practices to protect public health in urban communities.

LIST OF ABBREVIATION

WHO - World Health Organization

UN - United Nations

SDGs - Sustainable Development Goals

EMA - Environmental Management Agency

UNEP - United Nations Environment Programme

NGOs - Non-Governmental Organizations

ZELA - Zimbabwe Environmental Law Association

BEAT - Budiriro Environmental Action Team

UNDP - United Nations Development Programme

VOCs - Volatile Organic Compounds

COPDs - Chronic Obstructive Pulmonary Diseases

GBI - Greening Budiriro Initiative

ZHJ - Zimbabwe Health Journal

BCDT - Budiriro Community Development Trust

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Waste management is a critical issue that intersects with global health, environmental sustainability, and socio-economic development agendas. As the World Health Organization (WHO, 2020) and United Nations (UN, 2018) emphasize, the effective management of waste is essential to prevent adverse environmental impacts and protect human health. The burgeoning global population and accelerating urbanization trends have led to a dramatic increase in the volume of waste generated worldwide. According to the UN (2018), the global production of municipal solid waste is expected to escalate to approximately 3.4 billion tonnes annually by 2050, underscoring the urgent need for robust and sustainable waste management strategies.

Urban areas, particularly in developing countries, face significant challenges in managing the rapid influx of waste resulting from population growth and urban expansion. Inadequate infrastructure, limited financial resources, and insufficient regulatory frameworks often compound these challenges, leading to ineffective waste management practices (World Bank, 2018). Urban centres in Africa, Asia, and Latin America are particularly vulnerable, as they experience some of the fastest urbanization rates globally, yet frequently lack the necessary waste management systems (UN-Habitat, 2019).

In many African cities, the rapid urbanization has outpaced the development of essential infrastructure, including waste management systems. This has resulted in pervasive environmental and public health issues. Studies indicate that only a fraction of urban waste in African cities is collected and disposed of properly, with significant amounts ending up in open dumps or water bodies, leading to pollution and health risks (Konteh, 2009; UNEP, 2013). The situation is exacerbated by limited public awareness and engagement in sustainable waste practices, as well as challenges in governance and policy implementation (Mwesigye et al., 2009).

Harare, the capital city of Zimbabwe, exemplifies the waste management challenges faced by many African urban centres. The city's rapid population growth has strained its waste management infrastructure, leading to widespread issues with waste collection, disposal, and recycling (Environmental Management Agency [EMA], 2018). The City of Harare (2019) reported that the municipal waste management system is frequently overwhelmed, resulting in irregular waste collection and the proliferation of illegal dumpsites. These inadequacies have severe implications for both the environment and public health.

Budiriro, a densely populated suburb of Harare, serves as a microcosm for examining the broader waste management challenges within the city. The suburb's growing population has significantly outpaced the development of waste management services, leading to substantial environmental and health issues (City of Harare, 2019). In Budiriro, waste often accumulates in residential areas due to irregular collection services and inadequate disposal facilities, contributing to unsanitary conditions and increased health risks. The health consequences of poor waste management in Budiriro are profound. The suburb has experienced recurrent outbreaks of waterborne diseases such as cholera and typhoid, primarily attributed to the contamination of water sources by improperly disposed waste (Mudu et al., 2015). These outbreaks highlight the critical public health risks posed by inadequate waste management practices. Additionally, the common practice of burning waste in Budiriro contributes to air pollution, which exacerbates respiratory conditions among residents (EMA, 2018).

The socio-economic dimensions of waste management in Budiriro are equally critical to understanding the full scope of the issue. Economic constraints limit residents' access to adequate waste management services, compelling them to resort to informal and hazardous waste disposal methods (City of Harare, 2019). These practices not only pose health risks but also place a disproportionate economic burden on low-income households, exacerbating existing social inequalities. Effective waste management in Budiriro is further hampered by policy and governance challenges. The fragmented responsibilities across various municipal and environmental agencies lead to inefficiencies and a lack of coordinated action (Chirisa, 2014). Moreover, the enforcement of waste management regulations is inconsistent, with limited

resources allocated to monitoring and compliance activities. This regulatory gap perpetuates inadequate waste disposal practices and undermines efforts to implement sustainable solutions.

1.2 STATEMENT OF THE PROBLEM

The problem at hand revolves around the severe consequences of poor waste management practices in Budiriro 5B, Harare. Despite the evident risks to public health and the environment, the existing waste management system has struggled to address the challenges effectively. The improper disposal and accumulation of waste in the area have led to frequent outbreaks of waterborne diseases such as cholera and typhoid, posing severe health risks to residents. These health crises strain local healthcare facilities and result in considerable economic burdens on the community. Although the efforts to improve waste management practices in Budiriro, current interventions have not effectively mitigated health risks or prevented environmental degradation. Insufficient infrastructure, limited financial resources, and inadequate community engagement continue to undermine the success of these initiatives (City of Harare, 2019).

1.3 OBJECTIVE/ AIM OF THE STUDY

- To identify the existing challenges and health risks associated with poor waste management practices in Budiriro 5B, Harare.

1.3.1 SPECIFIC OBJECTIVES

- To examine the health consequences of inadequate waste management practices on Budiriro 5B, Harare.
- To assess the effectiveness of current waste management interventions in Budiriro 5B.
- To identify strategies to enhance waste management practices and mitigate associated health and environmental risks in Budiriro 5B.

1.4 RESEARCH QUESTIONS

- What specific health impacts do residents of Budiriro experience due to inadequate waste management practices?

- How effective are current waste management interventions in Budiriro in reducing health risks associated with poor waste disposal?
- What strategies can be implemented to improve waste management practices and enhance public health outcomes in Budiriro?

1.5 SCOPE/ DELIMITATION OF THE STUDY

1.5.1 CONCEPTUAL DIMENSION

This study is conceptually framed around the investigation of waste management practices and their impact on public health of the residents of Budiriro 5B. It examines key concepts such as waste generation, disposal methods, waste management infrastructure, public health indicators, disease prevalence, and environmental sustainability. The research will focus on identifying the health risks associated with inadequate waste management, to assess the effectiveness of waste management initiatives, and strategies to enhance waste management practices on public health in Budiriro 5B. This conceptual focus aims to provide a comprehensive understanding of the effects of waste management practices on public health.

1.5.2 SPATIAL DIMENSION

The spatial scope of this study is confined to Budiriro 5B, a suburb in Harare, Zimbabwe. Budiriro 5B has been chosen as the case study area due to its significant waste management challenges and recurrent public health issues linked to poor waste disposal practices. The research will specifically focus on the dumping sites within Budiriro 5B, assessing their management and the surrounding residential areas affected by these practices. By concentrating on a well-defined geographic area, the study aims to provide detailed insights that can be used to inform local policy and practice, while also offering lessons that may be applicable to other similar urban settings in Zimbabwe and beyond.

1.5.3 TEMPORAL DIMENSION

The temporal dimension of this study covers a period from 2008 to 2023. This timeframe allows for a comprehensive analysis of waste management practices and public health trends over more than a decade, including the evaluation of past initiatives and their long-term impacts. This period is chosen to capture changes over time, providing a robust basis for understanding the evolution

of waste management practices and their health consequences. It also includes the period during which several significant public health outbreaks occurred, allowing for an in-depth investigation of the links between these events and waste management practices. The study will use both historical data and contemporary observations to provide a thorough temporal analysis.

1.6 SIGNIFICANCE OF THE STUDY

This study on the impact of waste management practices on public health in Budiriro 5B, Harare, holds significant importance for several reasons. It addresses a critical public health issue, providing detailed insights into how inadequate waste management contributes to disease outbreaks and overall health risks. By identifying prevalent health issues and their links to waste disposal practices, the study aims to inform and enhance local healthcare responses and preventive measures, ultimately improving the well-being of Budiriro 5B residents.

The study evaluates the effectiveness of current waste management initiatives, identifying key challenges and reasons for their limited success. This analysis is crucial for policymakers and local government officials, offering evidence-based assessments that can guide the development and implementation of more effective waste management strategies. It also highlights the importance of adequate infrastructure, resource allocation, and community engagement in achieving sustainable waste management.

The study identifies strategies to enhance waste management practices. By aligning local practices with global standards, the research contributes to the broader agenda of urban sustainability and public health improvement. These strategies are not only relevant to Budiriro 5B but can also serve as a model for other urban areas facing similar challenges in Zimbabwe and other developing countries.

This study contributes to the academic and practical understanding of the interplay between waste management and public health. It provides a comprehensive case study that can be used for further research and teaching, enriching the knowledge base in environmental health, urban planning, and public policy. By bridging the gap between theory and practice, the study aims to foster a more holistic approach to urban waste management and public health.

1.7 ISSUES PERTAINING TO DEVELOPMENT STUDIES:

- **Sustainable Development:** Effective waste management is crucial for achieving sustainable development goals, particularly those related to health (SDG 3) and sustainable cities (SDG 11). By addressing the health consequences of poor waste management in Budiriro, the research contributes to broader efforts aimed at promoting sustainable development and improving quality of life.

- **Environmental Justice:** Waste management practices often disproportionately affect marginalized communities, exacerbating social inequalities. The study of waste management in Budiriro raises questions of environmental justice, exploring how waste-related health risks are distributed among different socio-economic groups and advocating for equitable solutions.

- **Community Participation:** Development studies emphasize the importance of community participation in decision-making processes. In the context of waste management, involving residents of Budiriro in planning and implementing solutions is crucial for ensuring the effectiveness and sustainability of interventions.

- **Policy and Governance:** The research topic sheds light on governance structures and policy frameworks related to waste management in urban areas. Analyzing the effectiveness of initiatives and identifying strategies to enhance waste management practices requires an understanding of policy processes, regulatory frameworks, and institutional capacities at local, national, and international levels.

- **Public Health Infrastructure**: Development studies highlight the importance of investing in public health infrastructure to improve health outcomes and promote development. Addressing the health consequences of inadequate waste management in Budiriro requires strengthening healthcare systems, enhancing access to healthcare services, and implementing preventive measures.

1.8 DEFINITION OF TERMS

- **Waste Management** is the process of collecting, transporting, processing, recycling, and disposing of waste materials.
- Waste management involves the activities and actions required to manage waste from its inception to its final disposal, including collection, transportation, treatment, and disposal, along with monitoring and regulation (United Nations Environment Programme, 2018).
- **Public Health** is the science and practice of protecting and improving the health of communities through education, policy making, and research for disease and injury prevention.
- Public health is the art and science of preventing disease, prolonging life, and promoting health through the organized efforts of society (World Health Organization, 2020).
- **Cholera** is an acute diarrheal illness caused by infection of the intestine with the bacterium Vibrio cholerae.
- Cholera is an acute diarrhoeal disease that can kill within hours if left untreated. It is caused by ingestion of food or water contaminated with the bacterium Vibrio cholerae (World Health Organization, 2019).
- **Typhoid** is a bacterial infection due to Salmonella typhi that is spread through contaminated food and water.
- Typhoid fever is a life-threatening illness caused by the bacterium Salmonella Typhi. It is transmitted through ingestion of contaminated food or water (Centers for Disease Control and Prevention, 2021).
- **Environmental sustainability** is the use of resources in a way that ensure that they will be available for future generations, without causing harm to the environment.
- The responsible use and management of natural resources to meet current needs without compromising the ability of future generations to meet their own needs (UNEP, 2019).

1.9 Chapter Conclusion

In conclusion, this chapter has established a comprehensive framework for exploring the critical impact of waste management practices on public health in Budiriro 5B, Harare. By situating the issue within global, national, and local contexts, the research highlighted the urgency of addressing inadequate waste management to prevent recurrent health crises and environmental degradation.

The clearly defined objectives, scope, and significance of the study underscore its potential to inform policy, enhance public health outcomes, and contribute to sustainable urban development. This foundational understanding sets the stage for a detailed investigation and analysis in the subsequent chapters, aimed at improving waste management and public health in Budiriro 5B.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter reviews existing literature on the impact of waste management practices on public health. It emphasizes information from a range of sources including internet articles, academic

journals, news reports, textbooks, and scholarly publications. The section aims to establish a comprehensive understanding of how different waste management practices influence public health outcomes, identify gaps in current knowledge and provide a foundation for the subsequence analysis. Through examining case studies and theoretical frameworks, this chapter elucidate the complex relationship between waste management and health, highlighting both the challenges and opportunities in improving public health, through effective waste management practices in urban settings like Budiriro 5B.

2.2 THEORETICAL FRAMEWORK

Theoretical frameworks provide essential insights into understanding and addressing the complex issues surrounding waste management. Two primary theoretical frameworks underpin this study which are, Integrated Waste Management (IWM) Theory and Environmental Health Risk Assessment (EHRA) Theory.

2.2.1 INTEGRATED WASTE MANAGEMENT (IWM) THEORY

Integrated Waste Management (IWM) Theory advocates for a comprehensive approach to managing waste throughout its lifecycle, from generation to disposal of waste (Tchobanoglous & Kreith, 2002). The IWM framework emphasizes a hierarchical approach to waste management practices, prioritizing waste reduction, reuse, recycling, energy recovery, and as a last resort, disposal (EPA, 2020). This hierarchy reflects the goal of minimizing the environmental and health impacts of waste. IWM Theory postulates that effective waste management requires a blend of technical, economic, and social considerations. This approach is essential in areas like Budiriro 5B, where rapid urbanization has exacerbated waste management issues. According to Wilson et al. (2015), the integration of waste management practices, such as recycling, composting, and incineration, with proper legislative frameworks, can significantly reduce the volume of waste directed to landfills. This reduction is crucial in mitigating the adverse health effects associated with waste accumulation, such as the spread of infectious diseases and the contamination of water sources. Several scholars have indicated that community participation is a critical component of successful IWM implementation. Schübeler, Wehrle, and Christen (1996) highlighted that involving local communities in waste management processes not only fosters a sense of ownership but also enhances the effectiveness of waste separation and recycling programs. In Budiriro 5B,

where informal settlements are prevalent, community-based initiatives can bridge the gap between formal waste management services and the needs of the residents. This participatory approach ensures that waste management strategies are culturally appropriate and economically viable.

The integration of technological advancements in waste management has been emphasized by various studies. Guerrero, Maas, and Hogland (2013) indicated that adopting modern technologies, such as waste-to-energy conversion and advanced recycling techniques, can improve the efficiency of waste management systems. These technologies not only reduce the environmental footprint of waste but also generate economic benefits by creating energy and raw materials. In the context of Budiriro 5B, leveraging such technologies can alleviate the pressure on existing waste management infrastructure and enhance public health by reducing the presence of hazardous waste.

The economic dimension of IWM is also significant, as it addresses the financial sustainability of waste management systems. According to Hockett, Lober, and Pilgrim (1995), implementing economic instruments such as user fees, subsidies for recycling, and penalties for improper disposal can incentivize proper waste management behaviors among residents. These economic tools can help municipalities in Budiriro 5B to allocate resources more efficiently and invest in the necessary infrastructure to support comprehensive waste management.

IWM Theory offers a robust framework for understanding and improving waste management practices in urban areas. By integrating technical, social, and economic strategies, IWM can address the complex challenges of waste management and its impact on public health. The theory underscores the importance of community participation, technological innovation, and economic incentives in creating sustainable and effective waste management systems. For Budiriro 5B, adopting an integrated approach can mitigate the health risks associated with inadequate waste management and enhance the overall well-being of its residents. One of the most illustrative examples of Integrated Waste Management (IWM) in action can be seen in the city of Curitiba, Brazil. Curitiba's approach to waste management has become a model for cities worldwide, particularly those in developing regions like Budiriro 5B. The city's comprehensive and innovative

waste management program demonstrates how IWM can effectively address urban waste challenges while promoting environmental sustainability and public health.

The city's waste management system also incorporates advanced technological solutions. As reported by Wilson, Velis, and Rodic (2013), Curitiba has invested in a network of transfer stations and sorting facilities that process different types of waste efficiently. These facilities use conveyor belts and automated systems to separate recyclable materials from organic waste and non-recyclables. The recyclable materials are then sold to private companies, generating revenue that sustains the waste management program. This technological integration demonstrates the economic benefits of IWM, showing how waste can be transformed into valuable resources.

Community involvement is another key aspect of Curitiba's IWM success. As highlighted by Leonard (2007), the city's educational campaigns have played a crucial role in fostering a culture of environmental responsibility among residents. The municipal government regularly conducts workshops and disseminates information on proper waste segregation and the importance of recycling. This grassroots approach ensures that waste management practices are deeply rooted in the community, enhancing their effectiveness and sustainability.

Moreover, Curitiba's approach to organic waste management has had significant public health benefits. The city has implemented a comprehensive composting program, turning organic waste into nutrient-rich compost used in parks and gardens. According to UNEP (2005), this practice reduces methane emissions from landfills and provides a sustainable solution for managing organic waste. In Budiriro 5B, similar composting initiatives could mitigate the health hazards posed by decomposing organic matter, such as the spread of pathogens and foul odors.

Curitiba's IWM strategy also includes stringent regulations and enforcement mechanisms. The city has established clear guidelines for waste collection, transportation, and disposal, ensuring compliance through regular inspections and penalties for violations. This regulatory framework, as noted by Guerrero, Maas, and Hogland (2013), has been instrumental in maintaining high standards of waste management and protecting public health. The success of Curitiba's IWM program highlights the effectiveness of an integrated approach to waste management. By combining technological innovation, community participation, economic incentives, and

regulatory oversight, Curitiba has created a resilient and sustainable waste management system that other cities can emulate. For Budiriro 5B, adopting similar strategies could significantly improve waste management practices and enhance public health outcomes.

2.2.2 ENVIRONMENTAL HEALTH RISK ASSESSMENT (EHRA) THEORY

Environmental Health Risk Assessment (EHRA) Theory provides a structured approach to evaluating the potential health risks posed by environmental hazards. This theory is particularly pertinent to waste management, as it helps identify, quantify, and mitigate the adverse health effects associated with improper waste disposal and management practices. EHRA offers a comprehensive methodology for assessing the impact of environmental contaminants on human health, guiding policymakers and public health officials in making informed decisions to protect communities. It is built on four key steps which are, hazard identification, dose-response assessment, exposure assessment, and risk characterization. According to the U.S. Environmental Protection Agency (EPA, 1989), these steps collectively provide a robust framework for understanding and managing health risks.

The first step, hazard identification, involves determining whether a particular waste management practice or environmental contaminant can cause adverse health effects. For instance, improper disposal of hazardous waste can lead to the release of toxic substances such as heavy metals and chemicals into the environment. Studies by Kim, Kabir, and Jahan (2011) have highlighted that exposure to these substances can cause serious health issues, including respiratory problems, neurological damage, and cancer. In Budiriro 5B, identifying the specific hazards associated with local waste management practices is crucial for effective risk management. This step lays the foundation for the entire risk assessment process by pinpointing potential sources of harm. Dose-response assessment is the second step and examines the relationship between the magnitude of exposure to a hazard and the severity of the adverse health effects. It involves understanding how different levels of exposure impact health, which is essential for setting safety standards and regulatory limits. For example, research by Rappaport and Smith (2010) indicated that even low levels of exposure to certain carcinogens can significantly increase the risk of cancer over time. By understanding these relationships, policymakers can establish guidelines to limit harmful

exposures. This step provides the quantitative data needed to predict the likelihood of health effects at various exposure levels.

The third step, exposure assessment, evaluates the extent to which individuals and populations are exposed to environmental hazards. It involves measuring or estimating the frequency, duration, and intensity of exposure to hazardous substances. According to Ott, Steinemann, and Wallace (2007), exposure assessment is critical for identifying at-risk populations and understanding the pathways through which contaminants reach humans. In Budiriro 5B, exposure assessments can reveal how residents come into contact with waste-related hazards, such as through contaminated water, soil, or air. This step helps to contextualize the risk by mapping out how people interact with potential hazards in their environment.

Risk characterization, the final step, integrates information from the previous steps to provide an overall estimate of the health risk posed by a particular hazard. Risk characterization considers both the likelihood and severity of adverse health effects, providing a basis for decision-making and risk management strategies. As noted by WHO (2004), effective risk characterization helps prioritize public health interventions and allocate resources efficiently. In the context of Budiriro 5B, this step would involve combining data on identified hazards, dose-response relationships, and exposure levels to assess the overall health risk to the community. This comprehensive overview allows for targeted and effective mitigation strategies. EHRA Theory has been applied in various contexts to address environmental health risks associated with waste management. For example, a study by Giusti (2009) on the health impacts of landfill sites demonstrated how EHRA can guide the development of strategies to mitigate risks, such as improving landfill design, enhancing waste segregation, and implementing monitoring systems.

Such applications show how EHRA can translate complex scientific data into practical public health policies and interventions. EHRA Theory provides a systematic and thorough framework for assessing and managing the health risks associated with environmental hazards, including those stemming from waste management practices. By systematically evaluating hazards, dose-response relationships, exposure levels, and overall risk, EHRA helps protect public health and inform policy decisions. For Budiriro 5B, applying EHRA can identify critical health risks related to waste

management and guide the implementation of effective interventions to safeguard the community's health.

2.3 HEALTH CONSEQUENCES OF POOR WASTE MANAGEMENT PRACTICES

Inadequate waste management practices pose significant health risks to communities, manifesting in various forms such as infectious diseases, respiratory illnesses, and water contamination. Improper waste disposal contributes to the proliferation of disease vectors and the contamination of water sources, leading to outbreaks of infectious diseases such as cholera, typhoid, and dysentery (Pruss-Ustun et al., 2019).

Studies underscore the direct correlation between inadequate waste management and increased incidence of diarrheal diseases in urban settings (Kulabako et al., 2010). In Budiriro 5B, frequent cholera outbreaks have been linked to the contamination of water supplies by leachate from waste dumps. The presence of pathogens such as Vibrio cholerae in water sources is a direct consequence of inadequate waste containment and treatment (Gwenzi & Munondo, 2008). The lack of proper sanitation facilities exacerbates this issue, facilitating the spread of infectious diseases through direct and indirect contact with contaminated waste.

Exposure to pollutants from decomposing waste can result in respiratory ailments, including asthma and bronchitis, particularly among populations living in proximity to waste disposal sites (Boadi & Kuitunen, 2005). Research highlights the adverse health effects of air pollutants emitted during waste decomposition processes, emphasizing the need for effective waste management strategies to mitigate respiratory health risks. The combustion of waste, a common practice in Budiriro 5B due to inadequate waste disposal infrastructure, releases a range of toxic substances including particulate matter (PM), volatile organic compounds (VOCs), and persistent organic pollutants (POPs). These pollutants have been associated with increased incidence of respiratory diseases, especially in children and the elderly, who are more susceptible to air quality degradation (Naeher et al., 2007). Improperly managed waste sites generate leachate that contaminates groundwater and surface water sources, posing significant risks of waterborne diseases (Gwenzi & Munondo, 2008; Taru et al., 2020). In Budiriro 5B, inadequate waste management practices contribute to the persistence of waterborne diseases, underscoring the critical link between waste

disposal practices and public health outcomes. Leachate from waste sites typically contains a mixture of organic and inorganic pollutants, including heavy metals, nitrates, and pathogens. These contaminants can infiltrate water supplies, leading to outbreaks of diseases such as cholera, typhoid, and hepatitis A. The risk is further amplified in areas with limited access to clean drinking water and adequate sanitation facilities (Taru et al., 2020).

In addition to physical health impacts, poor waste management practices can have significant mental health implications. The constant exposure to unsanitary conditions, foul odors, and the presence of waste can cause psychological stress and anxiety among residents. Studies have shown that living near waste disposal sites can lead to increased levels of depression, anxiety, and other mental health issues due to the perceived and real health risks associated with waste exposure (Evans & Kantrowitz, 2002). In Budiriro 5B, residents have reported feelings of helplessness and frustration over the ongoing waste management issues, which further exacerbates their mental health burden.

2.4 EFFECTIVENESS OF CURRENT WASTE MANAGEMENT INTERVENTIONS

Current waste management interventions in Budiriro 5B have demonstrated varying degrees of effectiveness in addressing community health risks associated with inadequate waste disposal practices. This section evaluates these interventions and draws on case studies from other urban contexts to identify best practices and lessons learned. The City of Harare has implemented several waste management initiatives aimed at improving waste collection and disposal in Budiriro 5B. These include scheduled waste collection services, public awareness campaigns on proper waste disposal, and efforts to upgrade waste disposal facilities (City of Harare, 2019). However, the effectiveness of these interventions has been limited by insufficient infrastructure, financial constraints, and inadequate enforcement of waste management regulations.

Community-driven initiatives in Budiriro 5B have emerged as promising approaches to tackle waste management challenges, despite facing constraints such as limited resources and insufficient support from municipal authorities (Moyo & Muchuru, 2018). Local community groups have initiated waste collection and recycling programs, organized clean-up campaigns, and conducted public education efforts to promote sustainable waste practices. These initiatives have successfully reduced waste accumulation in certain areas and raised community awareness regarding proper

waste disposal methods. However, their effectiveness is hindered by the ongoing challenges of inadequate infrastructure and financial backing from municipal authorities (Akanyang, 2019; Mangwendeza, 2020).

Community-Based Waste NGOs (Non-Governmental Organizations) play a crucial role in addressing waste management challenges in Budiriro 5B, where municipal efforts often fall short due to inadequate infrastructure and financial constraints. This literature review explores the various interventions implemented by NGOs in Budiriro 5B, focusing on their impact, challenges, and contributions to sustainable waste management practices. NGOs like the Waste Management Association of Zimbabwe (WMAZ) have been instrumental in initiating community-based waste collection and recycling programs in Budiriro 5B. These programs involve training local residents in waste sorting techniques and establishing collection points for recyclable materials (WMAZ, 2020). Such initiatives not only reduce the amount of waste sent to landfills but also promote environmental sustainability by encouraging recycling and resource recovery (Akanyang, 2019).

NGOs such as Environment Africa have conducted extensive public education campaigns to raise awareness about the environmental and health impacts of improper waste disposal in Budiriro 5B (Environment Africa, 2019). These campaigns aim to change community behaviors towards sustainable waste management practices, emphasizing the importance of waste reduction, reuse, and recycling (Mangwendeza, 2020). Several NGOs have partnered with local communities and businesses to develop waste management infrastructure in Budiriro 5B. Projects include the construction of waste sorting facilities, composting sites, and sanitation improvements to mitigate health risks associated with poor waste disposal practices (UNEP, 2021). These infrastructure investments are crucial for enhancing waste collection efficiency and reducing environmental pollution (Moyo & Muchuru, 2018). NGOs also engage in advocacy efforts to influence policy formulation and implementation related to waste management in Budiriro 5B. By advocating for stronger regulations, better enforcement mechanisms, and increased funding for waste management initiatives, these organizations aim to create an enabling environment for sustainable practices (UNDP, 2018).

Despite the positive impact of NGO interventions, several challenges hinder their effectiveness in Budiriro 5B. These include limited financial resources, inadequate infrastructure, and the need for sustained community engagement (Olaleye, 2020). Furthermore, the success of NGO initiatives often depends on collaborative partnerships with local authorities and stakeholders to overcome these challenges and achieve long-term sustainability (Chiweshe, 2019). In Windhoek, the capital city of Namibia, NGOs have been instrumental in addressing waste management challenges and promoting sustainable practices. The city faces issues such as inadequate waste collection services, improper disposal practices, and environmental pollution. Various NGOs have implemented innovative initiatives to improve waste management and enhance community well-being.

The Recycle Namibia Forum (RNF) has spearheaded recycling and waste minimization efforts in Windhoek. RNF operates recycling centers where residents can drop off recyclable materials such as plastics, glass, and paper. They also collaborate with local businesses and schools to promote recycling awareness campaigns and environmental education programs (RNF, 2021). Namibia Nature Foundation (NNF) organized community clean-up campaigns across Windhoek. These campaigns mobilize volunteers to remove litter from public spaces, waterways, and informal settlements. NNF also engages local residents through workshops on waste management practices and the importance of environmental conservation (NNF, 2020).

NGOs such as the Environmental Investment Fund of Namibia (EIF) advocate for policy changes and regulatory reforms to enhance waste management practices in Windhoek. EIF collaborates with government agencies, private sector stakeholders, and international organizations to develop sustainable waste management policies and strategies (EIF, 2019). NGO interventions in Windhoek have resulted in significant improvements in waste management practices, including increased recycling rates, cleaner public spaces, and heightened community awareness of environmental issues. By fostering partnerships and empowering local communities, these initiatives contribute to environmental sustainability and public health improvement. However, challenges such as funding constraints, limited infrastructure, and the need for continuous stakeholder engagement remain critical for sustaining these efforts (UNEP, 2020).

Successful case studies from similar urban contexts provide valuable insights into effective waste management strategies. Community-driven initiatives in regions like Kibera, Nairobi, and Lagos have shown promising results through community participation in waste segregation, recycling, and sanitation improvement efforts (Oduoro-Kwarteng et al., 2018; Osumanu et al., 2019). These initiatives highlight the significance of collaborative approaches involving local communities, non-governmental organizations (NGOs), and governmental agencies in achieving sustainable waste management outcomes.

In Kibera, for instance, community-based organizations have implemented waste collection and recycling programs that not only improve sanitation but also provide economic opportunities for residents. These programs have successfully reduced the volume of waste in the community, minimized health risks, and promoted environmental stewardship (Oduro-Kwarteng et al., 2018). Similarly, in Lagos, the introduction of the Lagos Waste Management Authority (LAWMA) has significantly improved waste management practices through public-private partnerships and community engagement. LAWMA's efforts in promoting waste segregation, recycling, and the proper disposal of hazardous waste have resulted in cleaner environments and reduced health risks for urban residents (Osumanu et al., 2019).

2.5 STRATEGIES FOR IMPROVING WASTE MANAGEMENT PRACTICES

Enhancing waste management practices in Budiriro 5B necessitates multifaceted strategies focusing on community engagement, capacity building, and regulatory enforcement.

Community participation and engagement: Promoting community participation through educational campaigns on waste segregation, recycling, and sustainable waste management practices fosters a culture of environmental stewardship (Taru et al., 2020). Empowering residents to actively engage in waste management initiatives enhances sustainability and community ownership of public health outcomes. Educational programs can include workshops, seminars, and public awareness campaigns that inform residents about the health risks associated with improper waste disposal and the benefits of sustainable practices. By fostering a sense of responsibility and ownership, these initiatives can encourage community members to adopt and maintain effective waste management behaviours.

Community engagement in waste management fosters social inclusion and equity by addressing the needs of underserved populations. Studies from countries like India and Brazil highlight how participatory approaches in waste management planning empower marginalized communities, including informal waste pickers and low-income households (Dias et al., 2020; Kumar & Viswanathan, 2017). By integrating these groups into decision-making processes and providing training in waste sorting and recycling, communities can achieve more inclusive and sustainable waste management solutions.

Despite the benefits, community engagement in waste management faces several challenges, including limited resources, inadequate infrastructure, and cultural barriers. Studies underscore the need for effective governance structures, capacity building, and sustained funding to support community-led initiatives (Sarkar et al., 2019; Yhdego & Baxter, 2016). Overcoming these challenges requires collaborative efforts among governments, NGOs, and local communities to ensure equitable and sustainable waste management practices.

Capacity building: Capacity-building initiatives targeting waste management personnel and community stakeholders are essential in enhancing technical expertise and awareness (Oduro-Kwarteng et al., 2018). Training programs should encompass best practices in waste collection, recycling technologies, and health impact assessments to optimize waste management efficiency and effectiveness. These initiatives can involve partnerships with educational institutions, NGOs, and international organizations to provide training and resources for local waste management teams. By improving the skills and knowledge of those involved in waste management, these programs can enhance the overall capacity of the community to manage waste effectively and sustainably.

Regulatory enforcement: Strengthening regulatory frameworks and enforcing compliance with waste management regulations are critical for sustainable waste management practices (Taru et al., 2020). Robust monitoring mechanisms, penalties for non-compliance, and collaborative partnerships between local authorities and communities are imperative for ensuring adherence to environmental standards and promoting responsible waste management behaviors. Effective

enforcement requires a clear and consistent regulatory framework that defines the roles and responsibilities of all stakeholders involved in waste management. Regular inspections, audits, and penalties for violations are essential for deterring illegal dumping and ensuring that waste management practices align with environmental guidelines (Okot-Okumu & Nyenje, 2018).

Technological innovations: Advancements in technology play a pivotal role in improving waste management practices and reducing environmental impact. Innovations such as sensor-based waste sorting systems, waste-to-energy technologies, and digital platforms for waste tracking and monitoring offer new opportunities for enhancing efficiency and sustainability in waste management (Wilson et al., 2015). Sensor-based sorting systems use automated sensors and artificial intelligence to identify and separate different types of waste, allowing for more efficient recycling and resource recovery. Waste-to-energy technologies convert organic waste into renewable energy sources such as biogas or biofuels, reducing dependence on fossil fuels and mitigating greenhouse gas emissions (McDougall et al., 2001). Digital platforms enable real-time monitoring of waste collection routes, bin capacities, and recycling rates, providing valuable data for optimizing waste management operations. These technologies facilitate data-driven decision-making and improve transparency and accountability in waste management practices (Wilson et al., 2015).

2.6 RESEARCH GAPS

Despite advancements in theoretical frameworks and practical interventions, several research gaps persist in understanding and addressing barriers to effective waste management in Budiriro 5B. Exploring socio-economic and cultural determinants influencing waste management practices is crucial for developing context-specific interventions (Guerrero, Maas, & Hogland, 2013). Understanding community dynamics, socioeconomic disparities, and institutional capacities can inform strategies to overcome barriers to sustainable waste management practices. Analysing the effectiveness of waste management policies and governance structures in promoting sustainable practices is essential for policy formulation and implementation (Tchobanoglous & Kreith, 2002). Comparative studies across different regions can identify best practices and regulatory frameworks that facilitate effective waste management outcomes.

2.7 CONCLUSION

In conclusion, this literature review synthesizes theoretical frameworks, empirical evidence, and practical insights to elucidate the complexities of waste management and its implications for public health in Budiriro 5B. By examining health consequences, evaluating intervention effectiveness, and proposing strategic approaches, this review informs evidence-based policies and practices for sustainable waste management. Addressing research gaps through interdisciplinary approaches and stakeholder collaboration is paramount for developing resilient waste management systems and improving community health outcomes in urban environments.

CHAPTER 3

RESEARCH METHODS

3.1 INTRODUCTION

This chapter outlines the qualitative research methodology employed to investigate the impact of waste management practices on public health in Budiriro, Harare. It includes the research design, data collection methods, procedures, population and sampling techniques, data collection instruments, and data analysis methods. By utilizing qualitative methods such as interviews, focus

groups, and observations, this study aims to assess the health consequences of inadequate waste disposal, the effectiveness of waste management initiatives, and identify strategies for improved waste management

3.2 DESCRIPTION OF THE STUDY AREA

Budiriro, situated within Harare, Zimbabwe, features a mix of formal and informal settlements characterized by high population density and diverse socio-economic conditions. The selection of Budiriro stems from documented challenges in waste management and the presence of multiple stakeholders involved in waste management and public health issues. The study aims to unravel the health impacts of substandard waste management practices, critically evaluate past interventions, and recommend evidence-informed strategies for sustainable waste management. Budiriro grapples with significant waste management challenges, including irregular waste collection, improper disposal practices, and inadequate public awareness, which collectively contribute to environmental degradation and adverse health outcomes among residents. Despite efforts by local authorities and non-governmental organizations (NGOs), there exists uncertainty regarding the effectiveness of these interventions. Therefore, this study assumes pivotal significance in systematically assessing prevailing waste management practices, their health implications, and the success of previous endeavors. Figure 3.1 below shows the geographical location of the research study area: Budiriro, Harare

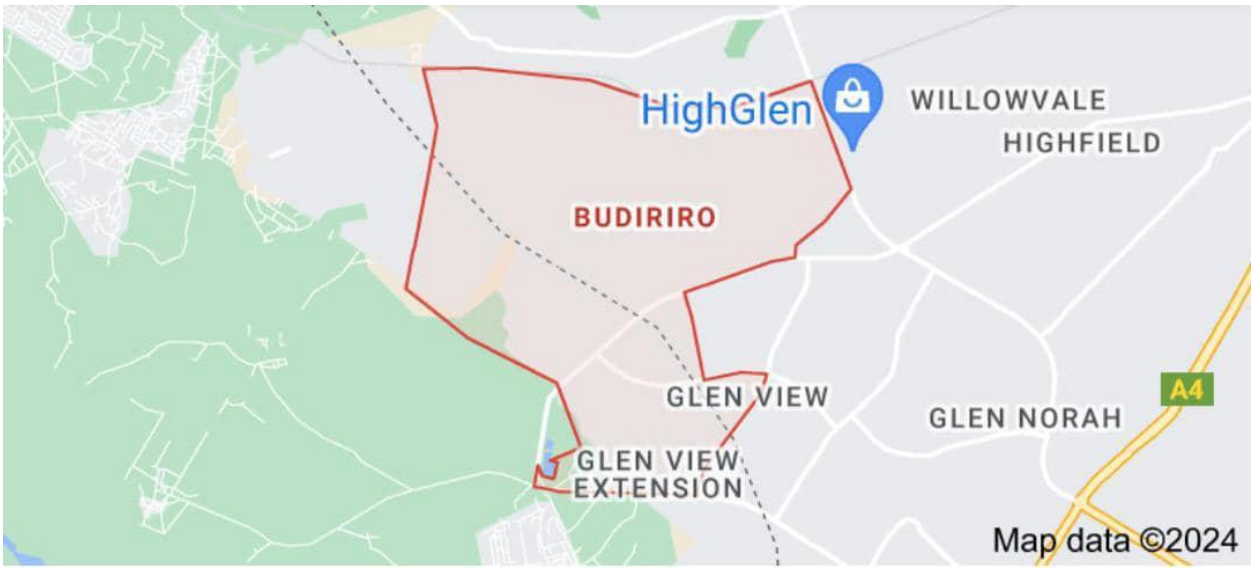

Figure 3.1: The geographical location of the research study area: Budiriro, Harare Source: Secondary data

3.3 RESEARCH DESIGN

This study adopts a qualitative research design to delve into the impact of waste management practices on public health in Budiriro, Harare. Qualitative methods were chosen for their capacity to furnish profound insights into intricate issues through the acquisition of comprehensive, contextualized data. Unlike quantitative approaches centred on numerical data and statistical analysis, qualitative methods facilitate an exploration of individuals' lived experiences, perceptions, and perspectives, all of which are pivotal for comprehending the multifaceted dimensions of waste management and its health repercussions. Through interviews, focus groups, and observational techniques, the study endeavors to capture the nuanced realities experienced by Budiriro residents, thereby offering a granular understanding of how inadequate waste management impinges upon their health and overall well-being.

The study is underpinned by three primary objectives:

- To examine the health consequences of inadequate waste management practices on Budiriro 5B, Harare.
- To assess the effectiveness of current waste management interventions in Budiriro 5B.
- To identify strategies to enhance waste management practices and mitigate associated health and environmental risks in Budiriro 5B.

3.4 DATA COLLECTION METHODS

Using triangulation in this study is crucial because it allows for the validation of data through the use of multiple methods. By combining interviews, focus group discussions, and direct observations, research is cross-checked and collaborate findings from different sources. This approach enhances the credibility and reliability of the study by ensuring that the results are not dependent on a single data collection method. Triangulation helps to provide a more comprehensive and nuanced understanding of the impact of waste management practices on public health by capturing various dimensions of the issue from multiple perspectives.

In this study, 3 key stakeholders participated, these include local residents, waste management representatives and health workers representatives. Interviews are vital for collecting detailed and

personalized accounts of individuals' experiences and perceptions (Creswell and Poth 2018). They provide deep insights into the personal and subjective impacts of waste management practices on health, which may not be fully captured through quantitative methods. Interviews allow for flexibility in questioning, enabling the research to explore areas of interest in greater depth based on participants' responses. This method is particularly important for understanding the specific health consequences faced by residents, as it captures details and personal stories that highlight the human impact of inadequate waste disposal.

Focus group discussions are important because they facilitate the exchange of ideas and experiences among participants, creating a dynamic and interactive environment. This method allows for the exploration of collective perspectives and social dynamics that influence waste management practices. By engaging multiple stakeholders in a conversation, focus groups can reveal common challenges, differing viewpoints, and potential solutions that may not emerge in individual interviews. This collective dialogue is particularly useful for evaluating the effectiveness of previous waste management initiatives, as it brings together diverse experiences and insights that can inform more comprehensive and community-oriented strategies.

Direct observations are essential for obtaining objective and real-time data on the actual conditions and practices related to waste management. This method allows researchers to witness firsthand the environmental and health impacts of waste disposal practices, providing concrete evidence that complements the subjective data gathered from interviews and focus groups. Observations help to identify discrepancies between reported practices and actual behaviors, uncovering gaps and areas for improvement. This method is critical for developing a grounded understanding of the current state of waste management in Budiriro, ensuring that proposed strategies are based on accurate and observable conditions.

3.4.1 PROCEDURE

The data collection procedure for this study involved several carefully planned steps to ensure comprehensive and reliable data from key stakeholders, including local residents, waste management representatives, and health workers. The steps are outlined below.

Planning and Preparation, a detailed research plan was developed, specifying the objectives, target groups, and data collection methods. Permissions were obtained from relevant authorities to conduct the study in Budiriro. Researchers also conducted a preliminary visit to familiarize themselves with the area and establish contact with community leaders and potential participants. Participants were recruited for interviews, focus group discussions, and direct observations. For the focus group discussions, local community leaders helped identify and invite twelve local residents who were directly affected by waste management practices. These residents were divided into two groups, each comprising six participants, to facilitate manageable and productive discussions. Additionally, two waste management representatives and two health workers were identified and invited for individual interviews.

Two focus group discussions were conducted with local residents. Each group consisted of six participants to ensure that everyone had an opportunity to contribute. The discussions were held in a neutral, accessible location within Budiriro to ensure participants felt comfortable. During these sessions, the research facilitated discussions using a semi-structured guide, prompting participants to share their experiences and perspectives on waste management practices and their health impacts.

In-depth interviews were conducted with the two waste management representatives and the two health workers. These interviews were scheduled at times convenient for the participants and took place in a quiet and private setting to ensure confidentiality. Using a semi-structured interview guide, researchers asked open-ended questions to gather detailed information about waste management practices, challenges, implementation issues, and observed health impacts. The research carried out direct observations at the Budiriro dumping site and surrounding residential areas. Observations were conducted over several days to capture different times of the day and week, ensuring a comprehensive understanding of the waste management practices and their effects. Researchers took detailed notes on the conditions of the dumping site, the methods of waste disposal, the cleanliness of the area, and any visible health hazards or environmental impacts. Notes were taken during all the session.

3.4.2 POPULATION AND SAMPLING TECHNIQUES

The population for this study includes residents of Budiriro, Harare, as well as key stakeholders involved in waste management and public health. Budiriro is a high-density suburb characterized by significant waste management challenges, making it a pertinent area for this research. The primary population of interest comprises local residents who experience the direct impacts of waste disposal practices. Additionally, waste management officials and health workers who are involved in addressing the waste-related issues form a crucial part of the study population.

To ensure a comprehensive and representative understanding of the impact of waste management practices, purposive sampling was employed. Purposive sampling is a non-probability sampling technique where participants are selected based on specific characteristics or knowledge they possess, which are pertinent to the research objectives (Patton, 2015). This method was chosen to identify individuals who could provide detailed insights into the waste management issues and their health consequences. Specifically, twelve residents were selected for focus group discussions, ensuring a balanced representation of different age groups, genders, and areas within Budiriro. Additionally, two waste management representatives and two health workers were chosen for in-depth interviews based on their expertise and involvement in the community's waste management processes.

To complement the purposive sampling technique, the study also used random sampling technique. Random sampling technique is aimed to achieve a diverse range of perspectives, enhancing the study's validity and reliability. By involving multiple stakeholders. The research captured varied experiences and insights, which are critical for a holistic analysis. The selection of residents ensured that the study included those directly affected by waste management practices, while the inclusion of waste management and health professionals provided expert opinions and contextual information. This approach aligns with qualitative research best practices, as highlighted by Creswell and Poth (2018), who emphasize the importance of selecting information-rich cases that provide deep insights into the research problem.

3.4.3 DATA COLLECTION INSTRUMENTS

The data collection instruments for this study are carefully designed to gather qualitative data that provide rich insights into the impact of waste management practices on public health in Budiriro.

These instruments include, the interview guide is structured to facilitate detailed conversations with individual participants, including local residents, health workers and waste management officials. The guide contains a series of open-ended questions and prompts that explore participants' experiences, perceptions, and opinions regarding waste management practices and their health implications.

Field notes are taken during interviews, focus group discussions, and observation sessions to capture additional contextual information, observations, and reflections. These notes provide valuable insights into participant responses, non-verbal cues, and situational dynamics that may not be captured through audio recordings alone. By utilizing these data collection instruments in a systematic and structured manner, the study aims to gather comprehensive qualitative data that offer nuanced insights into the complex relationship between waste management practices and public health in Budiriro. These instruments facilitate the exploration of diverse perspectives, experiences, and contextual factors shaping waste management dynamics in the community.

3.5 DATA ANALYSIS METHODS

Thematic analysis is a qualitative data analysis method that involves identifying, analysing and reporting patterns or themes within the data. It is a flexible and accessible approach that is used to analyze various types of qualitative data including interviews, focus groups, and observations (Braun & Clarke 2006). Thematic analysis was chosen as the sole method for data analysis in this study because of its flexibility, depth and richness, compatibility with qualitative data, comprehensive insight, easy to use and accessibility. Thematic analysis was employed to analyze the data collected from the semi-structured interviews with waste management representatives and health workers. This method involved transcribing the interviews verbatim and systematically coding the transcripts to identify recurring themes and patterns.

Initial codes were generated by closely reading the transcripts and noting significant statements. These codes were then grouped into broader themes that aligned with the research questions, such as health consequences, challenges of previous initiatives, and strategies for sustainable waste management. Thematic analysis allowed for a detailed and integrated understanding of the

perspectives and experiences of the interviewees, providing valuable insights into the specific health impacts and systemic issues related to waste management in Budiriro.

The data from focus group discussions were also analyzed using thematic analysis. The discussions were transcribed, and the transcripts were coded to identify key themes and sub-themes. The process involved multiple readings of the transcripts to ensure a thorough understanding of the content. Codes were assigned to segments of text that reflected important concepts and ideas shared by the participants. These codes were then organized into themes that captured the collective experiences and opinions of the residents. Themes such as community health impacts, barriers to effective waste management, and suggested improvements emerged from the analysis. Thematic analysis of the focus group data provided a comprehensive view of the community's perspectives, highlighting the common issues and potential solutions discussed by the residents.

For the data collected through direct observations, thematic analysis was used to identify and interpret patterns related to waste management practices and their impacts. Observation notes were reviewed, and key observations were coded based on observed conditions, practices, and visible health and environmental effects. These codes were then categorized into themes such as waste disposal methods, environmental hazards, and public health risks. Thematic analysis of the observation data helped to corroborate and enrich the findings from the interviews and focus groups by providing concrete, real-world evidence of the waste management issues in Budiriro. This method ensured that the analysis was grounded in actual observations, adding depth and context to the study's overall findings.

3.6 CHAPTER CONCLUSION

In conclusion, this chapter has outlined the qualitative research design and methodology employed in this study to investigate the impact of waste management practices on public health in Budiriro. The chapter detailed the selection of in-depth interviews, focus group discussions, and observations as data collection methods, supported by systematic procedures for participant recruitment and data management. The chosen population and sampling techniques ensure a diverse and representative sample, while the data analysis methods, including transcription, coding, thematic analysis, and triangulation, provide a robust framework for interpreting the data.

CHAPTER 4

DATA PRESENTATION AND DATA ANALYSIS

4.1 INTRODUCTION

This chapter presents a detailed analysis of waste management practices in Budiriro, focusing on the health consequences of inadequate waste management, evaluating current interventions, proposing strategies for improvement based on collected data, addressing research objectives and concluding with recommendations for sustainable waste management practices.

4.2 HEALTH CONSEQUENCES OF POOR WASTE MANAGEMENT

Table 4.2.1 results of disease outbreaks in Budiriro 5B

Disease	Number of people affected	Number of deaths
Cholera	554	79
Typhoid	324	44
Malaria	216	15
Asthma	23	2
Tuberculosis	2	0

Health workers in Budiriro provided health reports from 2015 to 2023 and the reports showed an alarming number of the outbreak of diseases in Budiriro 5B. Cholera has significantly impacted Budiriro 5B, with 554 reported cases and 79 deaths as in table 4.2 above. This high incidence is primarily due to inadequate waste management practices, specifically open dumping and insufficient waste collection services. The community's reliance on untreated water sources exacerbates the problem, leading to widespread contamination and a rapid increase in cholera cases.

Accoding to Pruss-Ustun et al. (2019) highlighted the significant global burden of disease attributable to inadequate water, sanitation, and hygiene (WASH), stressing that improving these factors could prevent many cases of cholera and other diarrheal diseases. From the findings, the research indicated that, the mortality rate of cholera, highlighted the severity of the outbreak and the community’s vulnerability. Limited access to healthcare facilities and delayed medical intervention significantly increase the risk of death from cholera. Many residents may not receive prompt treatment or adequate rehydration, which are crucial for survival. Additionally, a lack of awareness and education regarding proper hygiene practices, such as boiling water and hand washing, contributes to the high number of severe cases and fatalities. The inadequate waste management infrastructure thus directly impacts the community’s health and mortality outcomes.

From the findings, typhoid has affected 324 individuals in Budiriro 5B, resulting in 44 deaths. Similar to cholera, typhoid is primarily transmitted through contaminated food and water. The inadequate waste disposal practices in Budiriro 5B, such as open dumping and the presence of untreated sewage, lead to the contamination of local water supplies with Salmonella Typhi, the bacteria causing typhoid fever. Residents consuming or using this contaminated water for cooking

are at high risk of contracting the disease, leading to the significant number of cases reported. In support of this, Gwenzi and Munondo (2008) highlighted that improper waste management practices, including open dumping, are major contributors to water contamination in urban areas, directly leading to outbreaks of waterborne diseases such as typhoid. The research suggested that, severe lack of timely and effective medical treatment, delays in seeking treatment and continuous exposure to contaminated environments increased the risk of reinfection, perpetuating the cycle of disease within the community. Figure 4.2.2

Malaria has affected 216 people in Budiriro 5B, resulting in 15 deaths. The prevalence of malaria is closely linked to environmental conditions created by inadequate waste management. Stagnant water, which accumulates in improperly managed waste sites, provides ideal breeding grounds for Anopheles mosquitoes, the vectors for malaria. The presence of numerous open dumps and blocked drainage systems in Budiriro 5B exacerbates this problem, increasing the mosquito population and, consequently, the transmission of malaria. Gwenzi and Munondo (2008) noted that stagnant water resulting from inadequate waste management is a critical factor in the proliferation of malaria-carrying mosquitoes in urban areas. The relatively lower mortality rate for malaria, compared to cholera and typhoid, was due to better awareness and availability of malaria treatment and prevention measures, such as insecticide-treated nets and antimalarial drugs for the local residents of Budiriro.
However, the continuous presence of breeding sites for mosquitoes means that malaria remains a persistent threat. Eliminating stagnant water and ensuring proper waste disposal significantly reduce the incidence of malaria in Budiriro 5B.

Asthma has affected 23 individuals in Budiriro 5B, with 2 resulting deaths. The number in asthma cases is attributed to air pollution caused by burning waste in open dumping sites. The majority indicated that the decreased number in typhoid cases is because most of the local residents burn waste from the open dumpsites during the night time. When waste is burned, it releases harmful pollutants and particulate matter into the air, exacerbating respiratory conditions such as asthma. The lack of proper waste management infrastructure forces residents to resort to burning waste, exposing the community to toxic fumes and increasing the prevalence of respiratory diseases. Naeher et al. (2007) highlighted that exposure to biomass burning, which includes the burning of

waste, is associated with significant respiratory health problems, including asthma. The research also noted that asthma is a hereditary disease and inadequate waste disposal contributed less to cases of asthma.

In Budiriro 5B, tuberculosis (TB) affected 2 individuals, with no deaths reported. Although the number of cases is low, TB remains a concern due to its infectious nature and potential for outbreaks in densely populated areas like Budiriro. Inadequate waste disposal practices contribute indirectly to the spread of TB by creating unhygienic living conditions that weaken the immune systems of residents, making them more susceptible to infections like TB. Poor waste management can also lead to overcrowded living conditions, where TB transmission is more likely due to close contact among individuals. Pruss-Ustun et al. (2019) indicated that improving overall hygiene and living conditions could significantly reduce the incidence of infectious diseases, including TB.

Findings from Budiriro 5B indicated a direct correlation between inadequate waste management practices and the prevalence of various diseases. High rates of cholera and typhoid are linked to open dumping and insufficient waste collection, leading to severe water contamination. Malaria is prevalent due to stagnant water in waste sites serving as mosquito breeding grounds. Respiratory conditions like asthma are exacerbated by air pollution from burning waste, while poor hygiene and overcrowded living conditions contribute to tuberculosis. These observations indicated the critical need for improved waste management to mitigate these public health risks, as supported by studies from Pruss-Ustun et al. (2019), Gwenzi and Munondo (2008).

Overall, the research indicated that, effective waste management is essential to mitigate various health risks associated with improper waste disposal practices prevalent in Budiriro. According to data collected from interviews, focus groups, and observational studies. Improper waste disposal leads to breeding grounds for disease vectors such as mosquitoes and rodents, increasing the incidence of vector-borne diseases like malaria and dengue fever among residents. Data reveals a correlation between proximity to waste disposal sites and increased cases of mosquito-borne illnesses.

Burning of waste releases harmful pollutants into the air, including particulate matter and volatile organic compounds (VOCs), contributing to respiratory ailments such as asthma and bronchitis. Residents living near burning sites exhibit higher rates of respiratory illnesses compared to those in cleaner environments. Direct contact with hazardous waste materials also poses risks of skin disorders and other dermatological issues, as evidenced by health assessments conducted among local residents. Living in unsanitary conditions and constant exposure to waste have significant psychosocial impacts on residents. Data from psychological assessments highlights increased stress, anxiety, and depression among individuals residing near waste disposal sites. Community perceptions collected through focus groups underscore the stigma associated with living in proximity to waste, exacerbating mental health challenges.

4.3 EFFECTIVENESS OF CURRENT WASTE MANAGEMENT INTERVENTIONS

Several initiatives have been implemented in Budiriro to improve waste management practices and mitigate associated health risks, as indicated by data analysis: The City of Harare has implemented scheduled waste collection services and public awareness campaigns promoting proper waste disposal practices. However, data reveals challenges such as irregular waste collection schedules and inadequate coverage, impacting the effectiveness of municipal interventions in addressing community health concerns. The research findings indicate varying degrees of effectiveness in the interventions addressing community health risks in Budiriro 5B. In support of this, The Environmental Protection Agency (EPA, 2023) highlighted the importance of robust waste management systems to mitigate health risks. This aligns with the observations in Budiriro 5B, where the lack of continuous and well-supported efforts has led to diminished health benefits over time. The Integrated Waste Management (IWM) Theory emphasizes a holistic approach to waste management that combines waste reduction, recycling, and proper disposal. According to the IWM Theory, all these components must work together continuously to effectively reduce health risks and environmental impact. This theory supports the need for a more integrated and sustained approach to waste management in Budiriro 5B.

Local community groups with the help of the City Council of Harare, have organized waste collection drives and recycling programs, enhancing community engagement and ownership of waste management issues. Data shows increased participation in community-led initiatives,

contributing to cleaner neighborhoods and reduced health risks associated with improper waste disposal practices. However, these interventions later became sporadic due to insufficient infrastructure, financial constraints, and inadequate enforcement of waste management regulations.

Non-governmental organizations (NGOs) and international agencies provide technical expertise and financial support to bolster local waste management systems. Data analysis indicates collaborative efforts between NGOs, local authorities, and community stakeholders have improved waste management infrastructure and practices, albeit with varying degrees of success across different neighborhoods in Budiriro. In Budiriro, community members have reflected positively on the interventions by NGOs such as the Waste Management Association of Zimbabwe (WMAZ) and Environmental Africa in improving waste management practices. These organizations have implemented several impactful programs aimed at addressing waste issues in the region. For instance, according to Akanyang (2019), WMAZ initiated community-based recycling programs that encouraged local residents to segregate waste at source, thereby reducing landfill pressures and promoting recycling practices. This initiative not only improved environmental conditions but also created economic opportunities through waste repurposing. Environmental Africa, as noted in UNEP's 2030 report, focused on educational campaigns and infrastructure development for sustainable waste disposal.

Their programs included establishing waste collection points and organizing awareness campaigns on the importance of waste reduction and recycling. Mangwendeza (2020) highlighted that these efforts led to a noticeable reduction in littering and improved cleanliness in Budiriro, contributing to a healthier living environment. The effectiveness of these NGO interventions in Budiriro has been commendable, as evidenced by reduced waste accumulation and heightened community engagement in sustainable waste management practices. By integrating education, infrastructure development, and community involvement, WMAZ and Environmental Africa have successfully fostered a culture of environmental stewardship among Budiriro residents, setting a positive precedent for future sustainability initiatives in similar communities.

From the findings, the research suggested for, expanding recycling facilities and collection points is crucial to encourage widespread participation in recycling initiatives. By making it easier for

residents to dispose of recyclable materials separately from general waste, more individuals are likely to adopt sustainable practices. This expansion should be complemented by robust education and awareness campaigns targeting residents of all ages. Such programs should emphasize the importance of waste segregation, the benefits of recycling, and the environmental impacts of improper waste disposal. Educating the community not only fosters a culture of environmental stewardship but also empowers individuals to make informed decisions regarding waste management.

Moreover, promoting composting at both household and community levels could significantly reduce organic waste sent to landfills. Composting not only diverts waste from disposal sites but also produces nutrient-rich soil that can be used for gardening and agriculture, thereby promoting local food security and reducing reliance on chemical fertilizers. Regulatory measures are also pivotal in ensuring compliance with waste management practices.

Strengthening enforcement of existing regulations against illegal dumping and littering is essential to maintain cleanliness and hygiene in Budiriro 5B. This involves collaborating closely with local authorities to implement penalties for offenders and conducting regular monitoring to deter improper waste disposal behaviors.

Furthermore, forging partnerships with businesses and industries is imperative to foster sustainable waste management practices. Engaging businesses in initiatives to reduce packaging waste, implement recycling programs, and support a circular economy can significantly reduce the environmental footprint of commercial activities in the area. Investment in infrastructure is another critical aspect of effective waste management. Improving waste collection systems, including the provision of adequate waste bins, collection vehicles, and processing facilities, is essential to ensure efficient and timely waste disposal.

Well-maintained infrastructure not only facilitates proper waste management operations but also enhances the overall cleanliness and aesthetic appeal of the community. Lastly, promoting public participation and community engagement is vital for the success of waste management initiatives in Budiriro 5B. Establishing community committees or forums where residents can actively

participate in decision-making processes, provide feedback, and contribute ideas for improvement fosters a sense of ownership and collective responsibility towards environmental sustainability.

One significant gap that was effectively addressed by the interventions of NGOs like the Waste Management Association of Zimbabwe (WMAZ) and Environmental Africa in Budiriro 5B was the lack of structured recycling facilities and programs. These organizations implemented initiatives to establish recycling collection points and educate residents about the importance of separating recyclable materials from general waste. By doing so, they closed the gap in accessible recycling infrastructure, enabling more community members to participate actively in recycling efforts and diverting substantial amounts of waste from landfills.

However, a persistent gap that still needs to be addressed is the inadequate enforcement of waste management regulations. While efforts have been made to educate the community and improve infrastructure, illegal dumping and littering continue to be significant challenges in Budiriro 5B. Strengthening enforcement mechanisms, including regular monitoring, imposing penalties on offenders, and raising awareness about the consequences of improper waste disposal, is essential to ensure compliance with waste management guidelines and maintain cleanliness in the community. Closing this enforcement gap will further enhance the effectiveness and sustainability of waste management practices in Budiriro 5B.

A comparative study focusing on understanding community dynamics and analyzing the effectiveness of waste management policies and governance structures holds significant potential to close gaps in waste management and enhance public health outcomes in Budiriro 5B. According to Guerrero et al. (2013), such studies provide insights into how different communities interact with waste management practices based on social, cultural, and economic factors. By examining these dynamics, the study can identify specific barriers to effective waste management, such as inadequate infrastructure or cultural perceptions towards waste disposal, and tailor interventions accordingly.

Moreover, Tchobanglous & Krieth (2023) emphasize the importance of evaluating the effectiveness of waste management policies and governance structures in achieving sustainable

outcomes. This involves assessing the implementation of policies, regulatory enforcement mechanisms, and the overall governance framework. Understanding these aspects helps in identifying areas of improvement and optimizing strategies to ensure compliance and effectiveness across diverse community settings.

4.4 STRATEGIES FOR IMPROVING WASTE MANAGEMENT PRACTICES

Based on the findings and data analysis, the following strategies are recommended to enhance waste management practices and mitigate health risks in Budiriro.

4.4.1 Infrastructure development:

The research suggested that there is need for investing in modern waste collection systems, recycling facilities, and hazardous waste treatment plants to improve waste management infrastructure. Data supports the need for upgraded facilities to ensure efficient waste disposal and reduce environmental and health hazards associated with unmanaged waste.

4.4.2 Policy development and enforcement:

Strengthening waste management policies and regulatory frameworks, including enforcement mechanisms and incentives for recycling and sustainable waste practices. Data analysis underscores the importance of policy enforcement in promoting compliance and behavior change among residents and businesses, contributing to cleaner environments and improved public health outcomes. According to, Taru et al., (2020), robust monitoring mechanisms, penalties for non-compliance, and collaborative partnerships between local authorities and communities are imperative for ensuring adherence to environmental standards and promoting responsible waste management behaviors.

4.4.3 Community engagement and enforcement:

Promoting community participation through educational campaigns, workshops, and outreach programs on waste segregation, recycling techniques, and environmental conservation practices. Data-driven interventions demonstrate the effectiveness of community engagement in fostering a culture of responsible waste management and enhancing community health and well-being. According to Dias et al., 2020; Kumar & Viswanathan, (2017), community engagement in waste

management fosters social inclusion and equity by addressing the needs of underserved populations. Studies from countries like India and Brazil highlight how participatory approaches in waste management planning empower marginalized communities, including informal waste pickers and low-income households

4.4.4 Technological innovations

Exploring innovative technologies such as sensor-based sorting systems and waste-to-energy technologies to optimize waste management processes. Data analysis supports the adoption of technological solutions to improve operational efficiency, resource recovery, and sustainability in waste management practices in Budiriro. Innovations such as sensor-based waste sorting systems, waste-to-energy technologies, and digital platforms for waste tracking and monitoring offer new opportunities for enhancing efficiency and sustainability in waste management (Wilson et al., 2015). Sensor-based sorting systems use automated sensors and artificial intelligence to identify and separate different types of waste, allowing for more efficient recycling and resource recovery. Waste-to-energy technologies convert organic waste into renewable energy sources such as biogas or biofuels, reducing dependence on fossil fuels and mitigating greenhouse gas emissions (McDougall et al., 2001).

4.5 ADRESSING GAPS

Despite advancements in waste management practices, data analysis reveals several research gaps that warrant further investigation:

Socio- Economic and cultural factors: Examine how socio-economic disparities, cultural norms, and community dynamics influence waste management behaviours and practices in Budiriro. Data analysis highlighted the need for targeted interventions that consider social determinants to enhance the effectiveness of waste management initiatives across diverse urban populations.

Long- Term Impact Assessment: Conduct comprehensive assessments to evaluate the long-term impact of current waste management interventions on public health outcomes, environmental sustainability, and community resilience in Budiriro. Data-driven evaluations will provide insights

into the effectiveness and sustainability of interventions over time, guiding future policy and programmatic decisions.

Innovative Technologies and Practices: Research emerging technologies and innovative practices in waste management, such as circular economy principles and decentralized waste treatment systems. Data analysis should focus on assessing the feasibility, scalability, and potential impact of these technologies in improving waste management efficiency and sustainability in Budiriro.

Policy Implementation and Governance Structure: Analyze governance structures, policy frameworks, and institutional capacities to identify barriers and facilitators of effective waste management practices in Budiriro. Comparative data analysis across different regions will inform policy recommendations aimed at achieving sustainable waste management outcomes at local and national levels.

4.6 CHAPTER CONCLUSION

In conclusion, this chapter has provided a comprehensive analysis of waste management practices and their impact on public health in Budiriro, Harare, based on data collected through interviews, focus groups, and observational studies. By leveraging data-driven insights and collaborative efforts, stakeholders can work towards creating cleaner, healthier communities and advancing environmental sustainability goals in Budiriro and beyond

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter consolidates the findings from the preceding chapters, offering a comprehensive analysis of waste management practices and their implications for public health in Budiriro, Harare. It highlights critical issues identified during the research, explores causal relationships between inadequate waste management and health outcomes, draws insightful conclusions concerning the identified problems, and proposes actionable recommendations aimed at enhancing waste management practices within the community.

5.2 CONCLUSIONS

The study conclusively establishes that inadequate waste management practices in Budiriro exacerbate health risks and environmental degradation, underscoring the need for concerted action to address these challenges. Causal relationships identified include the direct correlation between proximity to waste disposal sites and increased incidences of vector-borne diseases and respiratory illnesses among residents. The socio-economic disparities and governance challenges identified also play significant roles in shaping the effectiveness of waste management interventions in the community.

5.3 SUMMARY OF FINDINGS

The study has unearthed several pivotal findings that shed light on the intersection of waste management practices and public health in Budiriro: Inadequate waste management in Budiriro has profound health consequences for its residents. Poorly managed waste disposal sites become breeding grounds for disease vectors, contributing to elevated incidences of vector-borne diseases such as malaria and dengue fever among nearby residents. The contamination of water sources by pathogens from improperly disposed waste further exacerbates health risks, leading to outbreaks of waterborne diseases like cholera, typhoid, and dysentery. Moreover, the burning of waste releases harmful pollutants into the air, including particulate matter, volatile organic compounds (VOCs), and dioxins, which are linked to respiratory illnesses such as asthma, bronchitis, and chronic obstructive pulmonary disease (COPD).

Direct contact with hazardous waste materials also poses risks of dermatological issues and other skin disorders among individuals. Current interventions aimed at improving waste management in Budiriro exhibit varying degrees of effectiveness. Municipal efforts such as scheduled waste collection services and public awareness campaigns have been implemented but face significant challenges. These include inadequate infrastructure, limited financial resources, and inconsistent service delivery, which undermine the overall impact of these initiatives.

Community-driven projects, however, show promise in enhancing local engagement and ownership over waste management issues. These initiatives include community-led waste collection and recycling programs, clean-up campaigns, and educational activities that empower

residents to take proactive measures in managing waste within their neighbourhoods. Non-governmental organizations (NGOs) and international agencies provide crucial support through technical expertise, financial assistance, and capacity-building initiatives. Collaborative efforts between NGOs, local authorities, and community stakeholders have proven effective in addressing specific waste management challenges and improving public health outcomes in targeted areas.

Despite significant strides, notable research gaps persist in understanding the socio-economic and cultural factors influencing waste management behaviours in Budiriro. Further investigation is needed to explore how socio-economic disparities, cultural beliefs, and community dynamics impact the adoption of sustainable waste management practices. Additionally, there is a critical need to conduct comprehensive impact assessments of current interventions to determine their long-term effectiveness in mitigating health risks and promoting environmental sustainability. Research into innovative technologies and practices, such as circular economy principles and decentralized waste treatment systems, is essential to identify scalable solutions that can improve waste management efficiency and reduce environmental impact. Moreover, analysing policy implementation frameworks and governance structures will provide insights into the institutional capacities and regulatory frameworks needed to support sustainable waste management practices in urban settings.

5.4 RECOMMENDATIONS

Based on the findings, the following actionable recommendations are proposed to improve waste management practices and mitigate associated health and environmental risks in Budiriro:

5.4.1 Enhanced Infrastructure Investment

Allocate substantial resources towards upgrading waste collection systems, recycling facilities, and hazardous waste treatment plants in Budiriro. Improved infrastructure is crucial for enhancing waste management efficiency, reducing health hazards associated with unmanaged waste, and promoting environmental sustainability. The City of Harare and relevant government agencies should prioritize infrastructure development as a fundamental component of their urban development agenda.

5.4.2 Strengthened Policy Frameworks

Revise and enforce robust waste management policies and regulations that incorporate incentives for recycling and sustainable waste practices. Enhance monitoring and enforcement mechanisms to ensure compliance across residential and commercial sectors. Policymakers should collaborate closely with community stakeholders to tailor policies that address local challenges effectively while promoting long-term behavior change and environmental stewardship.

5.4.3 Community Engagement and Education

Expand community outreach programs focused on waste segregation, recycling techniques, and environmental conservation practices. Foster partnerships between local authorities, NGOs, and community groups to empower residents to actively participate in waste management decision-making processes. Engaged communities are more likely to adopt sustainable practices and support ongoing initiatives aimed at improving waste management practices within Budiriro.

5.4.4 Adoption of Technological Innovations

Investigate and implement cutting-edge technologies such as sensor-based sorting systems and waste-to-energy solutions. Pilot projects should assess the feasibility, scalability, and environmental impact of these technologies before broader implementation. Collaboration between research institutions, private sector innovators, and government entities is essential to drive technological advancements and innovation in waste management practices.

5.4.5 Multi-Stakeholder Collaboration

Promote collaborative efforts among governmental agencies, NGOs, private sector entities, and academic institutions to leverage expertise and resources in addressing complex waste management challenges. Establish platforms for knowledge sharing, capacity-building, and funding opportunities to support integrated approaches towards sustainable waste management in Budiriro.

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APPENDICE 1: FOCUS GROUP DISCUSSIONS QUESTIONNAIRE GUIDE

IMPACT OF WASTE MANAGEMENT PRACTICES ON PUBLIC HEALTH: A CASE STUDY OF BUDIRIRO DUMPING SITES

My name is Tsungai Makaza, and I am a student currently pursuing a degree in Development Studies at the Bindura University of Science Education. As part of my academic research, I am conducting a study on the impact of waste management on public health, focusing specifically on the Budiriro area in Harare. The aim of this research is to better understand the challenges and implications of poor waste management on the health and well-being of individuals living in Budiriro. Your participation in this study is important, as it will provide valuable insights that inform future interventions and policies aimed at improving waste management systems and promoting public health in the community.

I would very much appreciate if you can spare some time to participate in this research. Information provided will be strictly confidential and will not be shared with anyone else, it's for academic purposes only.

Introduction: Welcome, and thank you for participating in this discussion. Your perspective is valuable, which is why you have been invited to join. This discussion aims to understand your current thoughts and feelings about your experience with the impact waste management on public health.

OBJECTIVES

- To examine the health consequences of inadequate waste management practices on Budiriro 5B, Harare.
- To assess the effectiveness of current waste management interventions in Budiriro 5B.
- To identify strategies to enhance waste management practices and mitigate associated health and environmental risks in Budiriro 5B.

Ground rules

- Only one person should speak at a time. It may be tempting to interrupt, but please wait until the speaker has finished.
- There are no right or wrong answers.
- You can speak in any order.
- If you want to say something please raise your and slightly.
- Feel free to agree with other participants' views
- Ok, let's start

Introductory Questions

1. Can each of you briefly introduce yourselves and share how long you have been living in Budiriro?
2. What do you enjoy most about living in Budiriro?

Guiding Questions

3. What health problems have you or your family experienced that you believe are due to poor waste management practices in Budiriro?
4. Can you identify any specific diseases or health risks that are common in your community as a result of inadequate waste disposal?
5. What challenges or obstacles have you and your community faced with these waste management initiatives?

Concluding Questions

6. Why do you think these waste management efforts were not as successful as they could have been?

7. What changes or improvements do you think are necessary for better waste management in Budiriro, and how do you think these changes can be made sustainable?

8. Is there anything else you would like to add or any final thoughts you would like to share about waste management in Budiriro?

Conclusion

- Thank you for participating. This has been a very productive discussion.
- Your insights are highly valuable in this study
- The research also want to remind you that any comments included in this study will remain anonymous.

APPENDICE 2: INDIVIDUAL INTERVIEW GUIDE FOR HEALTH WORKERS REPRESENTATIVES AND WASTE MANAGEMENT REPRESENTATIVES

IMPACT OF WASTE MANAGEMENT PRACTICES ON PUBLIC HEALTH: A CASE STUDY OF BUDIRIRO DUMPING SITES

My name is Tsungai Makaza, and I am a student currently pursuing a degree in Development Studies at the Bindura University of Science Education. As part of my academic research, I am conducting a study on the impact of waste management on public health, focusing specifically on the Budiriro area in Harare. The aim of this research is to better understand the challenges and implications of poor waste management on the health and well-being of individuals living in Budiriro. Your participation in this study is important, as it will provide valuable insights that inform future interventions and policies aimed at improving waste management systems and promoting public health in the community.

I would very much appreciate if you can spare some time to participate in this research. Information provided will be strictly confidential and will not be shared with anyone else, it's for academic purposes only.

Introduction: Thank you for agreeing to be interviewed. This study specifically examines the impact of waste management practices on public health in Budiriro, and l believe your insights will be valuable. I will ask you some questions and you are welcome to elaborate as you see fit. If you do not wish to answer a question, feel free to decline. Please note that your personal and work details will not be included in the final report.

OBJECTIVES

- To examine the health consequences of inadequate waste management practices on Budiriro 5B, Harare.
- To assess the effectiveness of current waste management interventions in Budiriro 5B.
- To identify strategies to enhance waste management practices and mitigate associated health and environmental risks in Budiriro 5B.

1. Can you please tell me about your current role and profession related to waste management or health services in Budiriro?
2. How long have you been working in this department or field?
3. What health issues have you observed among Budiriro residents that you believe are linked to inadequate waste management practices?
4. Can you provide examples of specific diseases or health conditions that are prevalent due to poor waste disposal?
5. Can you describe the waste management initiatives that have been implemented in Budiriro 5B?
6. What were the main challenges faced during the implementation of these initiatives?
7. In your opinion, what factors contributed to the limited success of these waste management efforts?
8. What strategies do you recommend for improving waste management practices in Budiriro, to ensure long-term sustainability?
9. Is there any other information or insights you would like to share regarding waste management or public health in Budiriro

THANK YOU FOR YOUR TIME

APPENDICE 3:

Figure 4.2.2

Open dumping site in Budiriro 5B, located very close to residential areas. This site poses a significant risk by contaminating local water sources, impacting the health and environment of nearby houses.