UNIVERSITY OF LUSAKA

EXAMINING FACTORS RELATED TO THE REOCCURENCE OF CHOLERA EPIDEMIC IN KANYAMA COMPOUND, LUSAKA

BY

HACHIBI RUTH

BSPH19217149

BSc PUBLIC HEALTH

SUPERVISED BY MR TIMOTHY M, CHABU

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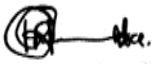
DECLARATION

Name: RUTH HACHIBI Student ID : BSPH19217149

I declare that this is my creative work and to the best of my acquittance has not presented for a degree in any other institution.

Signature of student:  Date: 20th April , 2023

Supervisor Name: Timothy M, Chabu

This dissertation has been submitted with my approval as a University of Lusaka (UNILUS) supervisor.

School of Medicine and Health Sciences , Department of Public Health

Signature of supervisor Date: 31 May, 2023

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ACRONYM

CDC	Centers for Disease Prevention and Control
CFR	case fatality rate
et al	And others
NORD	National Organization for Rare Disease
NHRA	National Research Authority
UNHR	United Nations Human Rights
UNILUSREC	University of Lusaka Research Ethics Clearance Committee
WHO	World Health Organization

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ABSTRACT

Introduction: For many countries rainy season is not a season to be worried about , however, for cholera endemic places like Zambia; rainy season greatly increase the risk of cholera. This is - because, majority of its people have no access to clean drinking water and good quality sanitation facilities. The first cholera outbreak in Zambia was observed in 1977-1978, and ever since, the country has continued to experience outbreaks on a yearly basis with a historical major outbreak occurring in 2017-2018. Cholera cases and deaths are more prevalent in Lusaka's peri-urban, which are characterized by unplanned settlements. These settlements tend to lead to overcrowding and a lack adequate clean water and sanitation facilities. Furthermore, human behavior leading to indiscriminate garbage disposal has been observed to cause blockages of drainage systems and flood. This study attempts to determine the factors associated with the recurrence of cholera in the Kanyama compound, Lusaka.

Methodology: A cross sectional study design was used, the respondents will be selected using purposive sampling method. Primary data will be collected using questionnaires and Data was analyzed using SPSS. Data will therefore be imported into excel to be able to make tables, charts, and graphs.

Results: The findings highlight the significance of inadequate sanitation facilities and their potential role in cholera reoccurrence. Comprehensive interventions, including improving sanitation infrastructure, ensuring access to safe water, promoting hygiene education, and targeting occupational groups, are necessary to effectively address cholera reoccurrence. While the study did not find a significant association between education level and cholera reoccurrence, the literature underscores the importance of education in cholera prevention.

Conclusion: In conclusion, the general objective of determining the factors that lead to the reoccurrence of cholera in Kanyama compound, Lusaka, was achieved through this study. The findings shed light on the significant role of inadequate sanitation facilities in the reoccurrence of cholera outbreaks in the study area. By identifying this crucial factor, the study contributes to understanding the underlying causes of cholera reoccurrence and provides valuable insights for developing preventive measures.

Key words : Cholera **,** Communicable disease**,** Health facilities **,** Prevention **,** Reoccurrence

Definition of Key Terms

Cholera is referred to as a disease of poverty because of the lack of social

Communicable have the ability to spread from one medium to another.

Health facility any place where people can seek for medical services or care.

Prevention Measures taken to reduce the likelihood that a disease or condition will develop in the areas where it occurs It is defined as acute diarrheal disease caused by the bacterium Vibrio cholerae, despite various stereotypes of cholera are known

Reoccurrence a new occurrence of something that happened or appeared before

CHAPTER ONE

1.0 Introduction

Cholera has continued to be a public health issue in Zambia and has claimed many lives especially the period between 2017 to 2018 about 5,935 cases were recorded in Zambia (Sinyange N, et al. 2017-2018). John Snow, considered by numerous to be the father of recent epidemiology, is well established for his work in identifying drinking water from the Broad Street pump as the origin of a cholera outbreak in London in 1851(Theodore H.et al, 2018).

Since John Snow's time, much has been learned about the causative agent, the mode of transmission, and methods of preventing the spread of cholera .Despite the advancements that have been made around the world in the area of water and sanitation , mass education and infrastructure, Cholera ,however, continues to be a major issue faced in Zambia especially in the peri-urbans due to poor infrastructure planning, poor water quality, poor sanitation and municipal (Miljan ,2018). Although cholera outbreak is no longer a front-page story, the epidemic remains a serious threat in Zambia especially during rainy season.

This chapter provides background information on the study. It also helps to provide detailed information about the problem statement, study goals, research questions, hypotheses, and chapter summaries.

1.1 Background

Cholera is a serious bacterial infection that can cause severe diarrhea and dehydration, leading to death if left untreated. According to the World Health Organization (WHO, 2022), cholera is classified as a disease of poverty due to the lack of social development in the areas where it occurs. It is defined as an acute diarrheal disease caused by the bacterium Vibrio cholera. Research has shown that vibrio cholerae (V.01 and O139) are known to be responsible for the disease. The transmission of the germ is via contaminated water or environment and from a person infected with the bacterium. Common sources include municipal water supplies, foods and drinks sold by street vendors, and vegetables grown with water containing human wastes (CDC, 2022).

Cholera is a significant public health issue, with an estimated 1.3 to 4 million people contracting the disease every year, and 21,000 to 143,000 dying from it worldwide. However, these numbers may be underestimated as cholera cases are often underreported, as noted by the Global Task Force

for Cholera Control and Health (GTFCC, 2022). Cholera outbreaks are often associated with poor sanitation and water quality, which are prevalent in low-income and developing countries.

To combat the spread of cholera, various measures can be taken. Efforts can be made towards developing low-cost water filtration systems, creating educational campaigns in at-risk areas to promote the importance of sanitation and hygiene, implementing regular water quality tests in municipalities, providing financial support to affected communities to build or repair water and sanitation infrastructure, offering training to healthcare workers in affected areas on the early detection and treatment of cholera cases, conducting research on the development of a cholera vaccine to prevent future outbreaks, collaborating with local farmers to promote the use of safe irrigation practices and prevent the contamination of crops, establishing partnerships with international organizations to coordinate efforts and resources for cholera control and prevention, promoting the use of oral rehydration therapy in affected communities to reduce cholera-related deaths, and developing a system for reporting and tracking cholera cases to improve disease surveillance and response.

Overall, cholera remains a significant global health challenge, particularly in areas with poor sanitation and water quality. However, with a comprehensive and sustained effort, it is possible to reduce the burden of the disease and prevent future outbreaks.

Cholera spreads rapidly in resource-constrained environments that have poor sanitation, inadequate water treatment, and poor hygiene (CDC, 2022). The bacterium can survive in any environment and the disease can affect both men and women alike. Children However , are more susceptible to cholera than adults, especially children under the age of five NORD (National Organization for Rare Diseases, 2021) Cholera occurrence is associated with poor access to improved water, poor sanitation and socioeconomic status Approximately 1 in 10 People with cholera experience severe symptoms that include in the early stages: profuse watery diarrhea, sometimes called rice water stool, vomiting, thirst, leg cramps, restlessness, or irritability, and death can occur within hours (Centers for Disease Prevention and Control (CDC , 2020).

Since 1977, Zambia has experienced cholera outbreaks in peri-urban areas, and the country experienced a major cholera outbreak that lasted from October 2017 to June 2018 with a total of 5,936 reported cases and 114 deaths (World Health Organization, 2021). Cholera cases in Zambia

are high due to extreme poverty, lack of adequate sanitation and lack of quality drinking water, overpopulation, inadequate shelter, poor excrement disposal systems, flooding, unsanitary human behavior, civil unrest leading to internal displacement, unsanitary food production and distribution and handling systems are all associated with the bacterial pathogen. Inadequate clean water, hygiene, and sanitation infrastructures have been identified as contributing factors to cholera outbreaks (Satoshi S et al., 2019).

Additionally, the only way to predict when and where such outbreaks will reoccur is to examine the environmental conditions that support the growth of the Vibrio bacterium. Unfortunately, there is no knowledge on how to do this. The effects of this gap include long-lasting diseases, avoidable human suffering, economic loss, and social discontent (Antarpreet ,2018)

Therefore, the main purpose of this research is to Examine the factors related to the reoccurrence of cholera epidemic in Kanyama compound. The findings may help in the development of sound interventions aimed at helping policy makers, and health care institutions in Zambia to ensure that awareness is built among the people to enhance preventative methods. The results may help with putting forward an efficient surveillance system, which is key to containing cholera outbreaks, controlling cholera in endemic areas and reducing cholera mortality (WHO, 2022). Research can help ensure that the results are presented in a clear and specific manner to help reduce the risks associated with cholera.

1.2 Statement of the problem

Cholera remains a major public health threat, despite technological advances and discoveries in curative and preventive medicine. Millions of people, mostly in developing countries continue to bear the burden of this scourge. In Zambia, cholera has continued to be a public health issue. People have the right to good health and wellbeing, access to clean water and good sanitation that prevents communicable diseases such as cholera according to United Nations Human Rights (UNHR 2016-2020).

According to the World Health Organization (WHO, 2019), the Zambian government has taken specific measures to eradicate cholera by 2025, including water supply precautions, verification and chlorination of water sources, enhanced surveillance and epidemiological investigations, case preparation, and cholera awareness-raising The provision of clean water and sanitation is critical

to curbing cholera transmission. (Mwaba et al., 2020). Poor water, sanitation and environmental infrastructure continue to encourage cholera recurrence. The prevalence of these factors varies from community to community. Cholera has devastated the well-being of individuals, it has destroyed and impaired livelihoods (death, morbidity) and caused social disruption in people's lives. Because cholera outbreaks occur over time, reducing exposure to pathogenic strains and/or high levels of cholera bacteria is the most effective way to treat or prevent the disease. (Elizabeth, 2018).

Therefore, looking ahead: prevention is better than cure. hence the need to assess factors that may lead to the reoccurrence, so as to offset the emergency of the consequences mentioned above. This study aims to assess different factors that lead to the reoccurrence of cholera in Kanyama compound and to help contribute to the holistic understanding of cholera in the health care systems of Zambia and to the people in the country mainly those living in shanty areas like Kanyama.

1.3 Justification

Cholera remains a major public health concern as it affects people's lives with every outbreak. In Kanyama compound, the outbreak of cholera as a waterborne disease could not be more real and ominous. In 2018 Kanyama township recorded over 700 cases and 25 deaths (Zimba ,2018). Identifying the factors leading to reoccurrence of cholera in Kanyama compound is therefore important. Despite the many interventions conducted in Kanyama compound such as; building more improved ventilated toilets, improving water supply, improved drainage systems , sensitizing people about the dangers of cholera and burying of shallow wells, Kanyama compound has however continued to experience the reoccurrence of cholera almost every year during the rainy season. It is for this reason that this study should be conducted to determine the factors contributing to cholera outbreaks reoccurrence in Kanyama compound. Many researchers have explained the causes of cholera and how it affects human health , but little research has been done on why cholera always occurs in Kanyama compound especially during rainy season.

Therefore ,The study will provide evidence-based information on the factors associated with cholera reoccurrence in Kanyama . The findings will be useful to the following:

- **General population**: the study will help residents of Lusaka and other parts of the country to have knowledge on factors related to cholera reoccurrence and help the researcher have deeper understanding and knowledge on the subject matter.

- **Policy makers**: formulating relevant policies to aid with the prevention of cholera
- **Health sector**: help with the prevention of the reoccurrence of cholera and can also be used as the baseline for future cholera related studies. Through community sensitization and education on the dangers of cholera.

The results may aid to add more knowledge in the identified Gaps of the factors leading to the reoccurrence of cholera in the Kanyama compound. Finally, this study will not eliminate certain ideologies regarding the reoccurrence of cholera but may help with the discovery of new knowledge of factors associated with cholera.

1.4 General Objective

To determine factors that leads to the reoccurrence of cholera in Kanyama compound, Lusaka

1.5 Specific Objectives

1. To assess the main factors leading to the reoccurrence of cholera of in Kanyama compound
2. To identify ways of preventing the reoccurrence of cholera in Kayama compound
3. To determine the relationship between socio-demographic traits and re-occurrence of cholera

1.6 Research Questions

1. What are the main factors leading to the reoccurrence of cholera in Kanyama compound?
2. How can the reoccurrence of cholera be prevented?
3. What is the relationship between socio-demographic traits and re-occurrence of cholera?

1.7 Hypothesis

$H_{0:}$ there is an association between reoccurrence of cholera and socio-economic factors

$H_{1:}$ there is no association between reoccurrence of cholera and socio-economic factors.

1.8 Chapter Summary

Cholera is a very deadly disease that is a gastrointestinal disease caused by infection with the gram-negative bacterium Vibrio cholerae (toxin-producing variants 01 and 0139). Cholera is mostly endemic in Africa and Asia that is south east Asia , south Asia and south east Africa. According

to WHO (2020) estimates that there at least 1.3 to 4.0 million new cases of cholera each year and about 21,000 to 143,000 deaths from cholera each year worldwide. Cholera can be transmitted through the ingestion of contaminated water and food and the bacteria *vibrio* survives on chitinous plankton which is a microorganism found in water. cholera can be transmitted in another way through human to human contact through the fecal- oral route .the risk factors of cholera can be ;due to decreased sanitation , ingestion of certain foods and decreased gastric acidity. Cholera is a major public health problem as it keeps reoccurring in places where there is lack of proper sanitation and Kanyama however, is not spared. Factors such as Poor sanitation , poor quality drinking water and poor waste disposal can lead to cholera reoccurrence. Cholera can be prevented through provision of safe water and sanitation, encouraging proper waste disposal , mass educating and sensitization can help in the control of cholera reoccurrence.

CHAPTER TWO

2.0 literature review

A literature review is an essential part of any research paper, thesis, or dissertation. It provides a detailed summary of previous research that has been conducted on a particular topic. The literature review examines scholarly articles, books, and other relevant sources for a specific field of study (Lawrence A., et al., 2016). The primary objective of a literature review is to avoid duplicating work by acquiring knowledge of what others have discovered and reported on a specific problem.

Cholera is a deadly disease that claims the lives of an estimated 1.3-4 million people worldwide each year (CDC, 2022). Cholera outbreaks cause panic among people, especially in developing countries like Zambia, where the country's economy is not in line with the outbreak of cholera, putting a strain on the limited available funds and medical resources transferred towards fighting against cholera, as reported by the Zambian Times (2018).

Cholera is a severe diarrheal illness that can cause dehydration and death within hours if left untreated. It is caused by the bacterium Vibrio cholerae, which is commonly found in contaminated water and food. Cholera spreads rapidly in areas where sanitation and drinking

water supplies are not adequately treated. People can also become infected by consuming raw seafood that has been contaminated with polluted water or drinking contaminated tap water.

The history of cholera dates back to ancient times, with the first known pandemic occurring in the early 19th century. Since then, cholera has become one of the most studied diseases due to its devastating impact on human health. Numerous studies have been conducted on various aspects of cholera, including its epidemiology, pathogenesis, treatment, and prevention.

Despite the efforts made to combat cholera, it remains a significant public health threat in many parts of the world. The World Health Organization (WHO) has identified cholera as one of the key diseases targeted for elimination by 2030. Achieving this goal will require a comprehensive approach that includes improving water and sanitation infrastructure, increasing access to safe drinking water, promoting hygiene and sanitation practices, and enhancing surveillance and response systems.

2.2 Global Perspective

Cholera According to global studies on environmental sanitation, cholera has been noted to be experienced in countries where there is poor environmental sanitation. According to reports in Yemen by Hesham M (2018). Since Yemen's first reported cholera outbreak, there has been an annual report on the country's outbreak cases. According to the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), the number of cholera cases has been increasing since January 2016 to April 2021 accounting for approximately 2538677 cases. The study discovered that the underground water in the country is largely contaminated and there is a big crisis in terms of the availability of fresh water. Sewage and drainage systems are clogged, and rubbish is piling up in the city polluting the water systems in the country. (Hesham M. 2018). With these factors coming into play, Yemen experiences cholera outbreaks annually.

Furthermore, according to reports by Richard Gelting et al, (2021) The study showed that the current cholera epidemic which started in Haiti on October 1st, 2010, was made worse and spread more quickly because of the lack of water and sanitation facilities. Richard discovered that as of June 2nd, 2013, there were 658,563 confirmed cases of cholera and 8,111 deaths because of the cholera outbreak and the main way in which cholera was spread, was by drinking water that has

been tainted with human waste. In Richard's conclusion, there were a few limits in place to restrict the fast spread of cholera, notably in a community that had not previously been subjected to the disease owing to insufficient sanitation coverage and insufficient drinking water supply and treatment.

Additionally, A study in Kolkata was conducted by Rajendran K, et al,. (2018) which showed an association between cholera and different climatic events, such as precipitation and humidity. The study discovered that *V cholerae* infection was associated with higher RH (>80%) with a 29°C temperature with intermittent average (10 cm) rainfall in Kolkata, India. Heavy rainfall indirectly influenced the V. cholera infection, whereas no correlation was found with high temperatures. In Rajendran's conclusion he discovered that this was most likely due to the feeding of nutrient-rich runoff into water bodies and the flooding of the water supply intended for human consumption with river water containing *vibrio* ch*olerae* (Gaudart et al., 2018).

Evidently , in 2016, a study was conducted in South Korea and it showed that only three people had cholera as this was not linked to poor environmental sanitation or water .A further study was conducted to find out what had led to the cholera outbreak and the link was raw seafood, People in different areas had consumed raw sea foods, and this resulted in cholera. A study by Jin Lee et al. Showed that three cases of cholera occurring in South Korea in August 2016 were recorded over a three-week period. Cholera isolated from three patients and a seawater sample from the Straits of Korea showed identical serotypes (O1 Ogawa), biotypes (El Tor), and toxins (ctx-positive), showing that all cases were associated with raw seafood consumption in the South were brought to South Korea's coastal area. Pulsed field gel electrophoresis analysis showed that the three clinical strains are identical (100%) and are 97% identical to the seawater sample

2.3 Sub-Saharan

According to O'Neil (2022). Sub-Saharan Africa is the geographical region south of the Sahara. Sub-Saharan Africa accounted for approximately 1.7 billion inhabitants in 2021. Sub-Saharan Africa is particularly vulnerable to cholera due to a lack of access to sanitation facilities and clean water. Cholera outbreaks are usually high during periods of flooding, when contaminated water can easily spread the disease.

During the 2012 cholera epidemic, a study was conducted in Ghana in two districts by Klenyuie et al. (2016). Kenyaite's finding served as a cautioning that cholera still poses a danger to areas not having adequate access to clean water and sanitization in the Lukanga Swamps. Poor sanitation combined with unsanitary behaviors in densely populated regions hosts the bacteria as a source of sporadic epidemics caused by tainted drinking water and/or inappropriate food preparation.

Furthermore, another study done in Tanzania in Dar es Salaam by Kizito Makoye (2018), which showed that the community suffered a high rate of cholera due to flooding and While there was mounting evidence linking poor sanitation to the spread of cholera, the study further revealed that the disease was also exacerbated by environmental and hydrological factors, such as changing weather patterns brought on by global warming. According to Kizito's findings, it was discovered that the effects of climate change on ecosystems are expected to have an influence on populations by making it easier for disease pathogens to spread and increasing the risk of malnutrition and diarrheal illnesses in local communities.

Additionally, A study was done in Ethiopia by Getachew D ,(2020) *Case-control research:* The results showed an association between food and cholera . The new findings showed foodborne cholera transmission from eating raw vegetables and waterborne transmission from eating contaminated holy water.

A study was conducted in South Africa by Anita Powell, (2017), where the statistics explained much about the danger of a cholera epidemic. Around 80% of the poor have no running water, and a higher proportion have no toilets. In KwaZulu Natal area of South Africa, more than 50 people died and about 14,000 had contracted cholera. Rural residents who have little to no access to running water or sanitary facilities where being hit by the disease. Finally, Powell discovered that cholera outbreaks appeared to have started in August, when a local government stopped providing free water and began charging very poor residents who began sourcing their water from contaminated lakes.

2.4 Local Perspective

Zambia is one of the countries most affected by cholera reoccurrence. Zambia is in an area of the world that is particularly prone to outbreaks of the disease. The country also has many people

living in poverty, which makes them more vulnerable to infection. Zambian Statistics Agency (2018) estimates that the population of the country is approximately 18.3 million.

According to a survey done by the World Health Organization (WHO) (2021) in Zambia, it was discovered that improper management of solid waste disposal is one of the things that helps cholera spread. The most affected localities are the ones with high populations that also have very shoddy or even nonexistent systems for disposing of the rubbish that has been gathered from various families. The World Health Organization discovered that communities have therefore resorted to haphazard dumping that even covers road networks. While some wait until nightfall to discard the trash along the highways or any open spots in the neighborhood, others excavate and bury or burn the junk. These serve as a haven for many microorganisms that spread sickness, jeopardizing the general cleanliness and hygiene of the population leading to cholera outbreak.

Additionally, a study was conducted in Zambia by Samson Mbewe (2018): The most recent cholera outbreak in Zambia's Lusaka District began in October 2017 but only became more severe by January 2018. This outbreak was dubbed as one of the deadliest in recent years by medical authorities. The study discovered that even though human activities such as inadequate waste management practices and a lack of sanitary infrastructure has been identified as the root cause of this outbreak, little attention was given to the possibility that climate change contributed to the "rapid" spread of cholera in Lusaka. In Samson’s conclusion, it was discovered that numerous international studies, including those published by the World Health Organization, found connections between cholera and climate change. Numerous studies found that the increasing negative consequences of climate change "indirectly" increased cholera transmission rates.

However, a study was conducted in Zambia, Kafue by Sinkala M., et al (2000–2022) aimed at finding out if there was an association between cholera and raw food , the findings of an inquiry into the severe cholera outbreaks that occurred in Lusaka, Zambia, between 2003 and 2004. It was discovered that there was a link between cholera and the consumption of raw vegetables. It is possible that eating contaminated vegetables can play a role in the spread of cholera, as the bacteria that cause the disease can survive in water and soil. Therefore, it is important to practice good hygiene when handling and preparing vegetables, and to wash them thoroughly before eating.

Sinkala acknowledged hand soap as a cholera preventative and the steps made by the Zambian Central Board of Health to strengthen cholera prevention efforts.

2.5 Risk factors

Cholera has not spared many countries throughout the globe and as a result many lives have been lost. Various studies have been conducted to try and find the contributing factors to this reoccurrence of the disease. A literature review will be discussed according to the factors that were used in the study, as described below.

2.5.1 Climate Change

Cholera outbreaks and diarrheal diseases can be linked to climatic variables and climate change because cholera is a waterborne disease which can be influenced by the changes in climate variables. Climate change can cause an increase in water temperature and changes in precipitation Causing more extreme weather events that can lead to flooding and contamination of water supplies. (Dimri A.P, 2019).

2.5.2 Environmental sanitation

Lack of pit latrines and open defecation in areas such as slums and camps is one of the biggest contributors to the spread of the disease. The Kanyama compound has a frightening situation when it comes toiletry, cleaning, washing, drainage systems, and the blocked sewer systems which have been observed in the area and as a result this contributes to poor environmental sanitation causing illness and raising the risk of cholera transmission (Olajide O. et al., 2022).

2.5.3 Poverty

Cholera is most common in areas with poor sanitation and poor access to clean water. Poverty also increases the risk of cholera by reducing the ability of people to afford health care and access adequate nutrition. People with low socioeconomic status are particularly vulnerable to cholera because they are unable to afford decent housing and water.

2.5.4 Contaminated food supply

Various foods have been linked to the transmission of cholera in Africa and around the world. Eating cooked but unheated leftovers has been a significant risk factor in several studies.

2.6 Theoretical Framework

A theoretical framework is a collection of coherent ideas based on theories. It is a reasoned set of prepositions derived from and supported by data or evidence. It attempts to clarify why things are the way they are based on theories (Donald K, et al., 2017).

2.6.1 The Germ Theory

This study will be guided by the germ theory in an attempt to explain factors related to the reoccurrence of cholera in Kanyama compound. This theory originated from the Miasma Theory, which looked at the representation of the cholera epidemic in the 19th century. This theory talked about how cholera as a disease was spread in the form of poisonous air. The germ theory of diseases studies how some diseases are caused by microorganisms, these small organisms are too small to be seen without magnification, so they invade humans, animals and other living organisms. Their growth and multiplication in the host body can cause diseases (Ajesh Kannadan 2018).

The study attempts to find out the factors that are related to the reoccurrence of cholera . This continues to be a heavy burden, especially in developing countries like Zambia. Even when the pathogen is also a major cause of a disease, environmental and hereditary factors often affect the severity of the disease and whether a given host can become infected when exposed to the pathogen. Even in the 21st century, this theory is still used and understood by researchers. The germ theory does not just look at how disease is caused but also addresses the environmental factors that may lead to the reoccurrence of cholera in many areas. Poor sanitation, poor drainage systems, poor waste management, floods, poor water quality, and other factors can all contribute to cholera. The cholera bacterium is usually found in water or food that has been contaminated with the feces (poop) of a person infected with the cholera bacterium. Cholera is most likely to

occur and spread in places with inadequate water treatment, poor sanitation, and poor hygiene (Centers for Disease Control and Prevention, CDC, 2022).

Therefore, the study attempts to find out to what extent the germ theory is applicable in indicating factors that can contribute to the reoccurrence of cholera. Based on this theory ,it is highly hoped that solutions can be suggested by making people aware of the factors . The communities can be able to adjust and adapt to the presented solutions, which will aid in reducing the reoccurrence of cholera and also give preventative measures as alternatives.

2.7 Conceptual framework

The conceptual framework often uses one or more theories, empirical evidence, or knowledge about a particular case. A conceptual framework helps to summarize and integrate knowledge to provide explanations for fortuitous associations that generate hypotheses. It requires complex reasoning and abilities. It requires the researcher to understand the details of the problem and surrounding issues.

The theoretical framework shows the factors that are associated with the reoccurrence of cholera within the external environment that contribute to cholera cases in Kanyama compound. Figure 1 depicts factors that influence cholera recurrence, such as geographical factors such as poor drainage, flooding, and poor hygiene, among others. This framework considers each factor to be relevant in the contribution of cholera reoccurrence in the Kanyama compound.

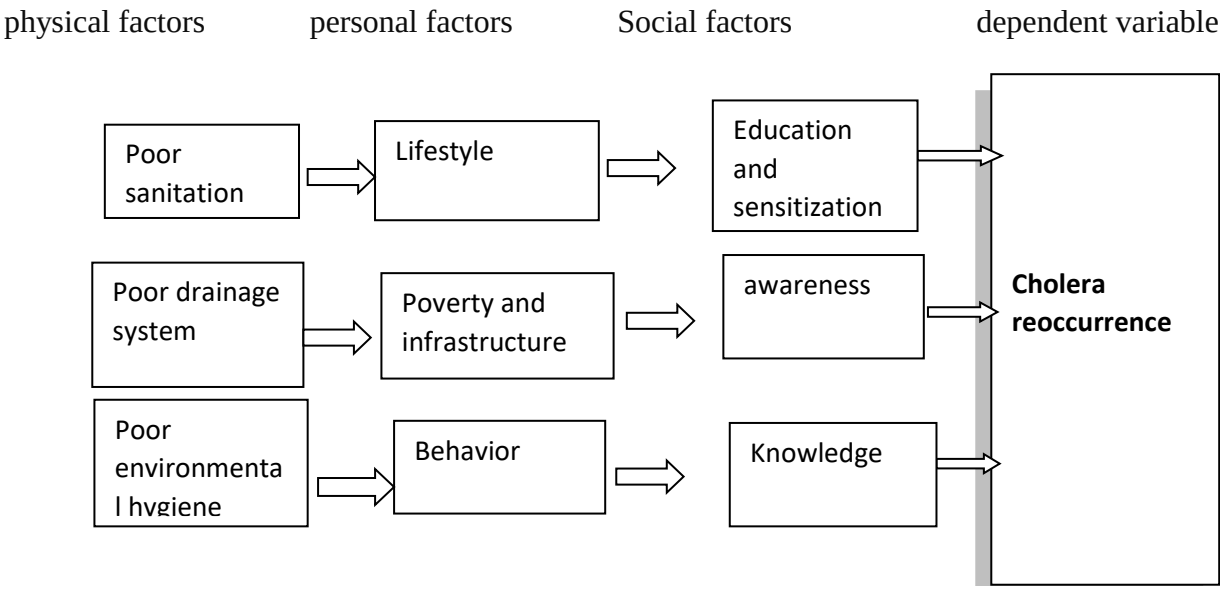

Figure 1: factors associated with the reoccurrence of cholera in Kanyama compound

Source (Author ,2022)

2.8 Chapter Summary

In my summary of the evidence from the studies above, it is evident to note that cholera outbreaks are linked poor sanitation and lack of access to clean water, creating an environment conducive to spread of cholera-causing bacteria. Poor public health infrastructure and weak disease surveillance systems make it difficult to effectively prevent and respond to cholera outbreaks. Crowded living conditions, which increase the likelihood of cholera transmission, high levels of poverty and food insecurity, which can lead to poor nutrition and weakened immune systems, making people more susceptible to cholera. Natural disasters or conflict, which can disrupt water and sanitation systems and lead to mass displacement of people, increase the risk of cholera outbreaks. These are some of the factors related to the reoccurrence of cholera.

Cholera is a deadly disease which needs to be prevented. It has come to my attention that globally, the recent studies since 2019-2022 are mainly focusing on figures to deal with COVID-19 and

fewer studies are being done on cholera. Cholera reoccurrence can be prevented once the factors are understood by everyone and there is constant community sensitization.

CHAPTER 3

3.0 METHODOLOGY

3.1 Introduction

The complete plan for the study, from the identification of the problem through the final arrangements for data collecting, is known as the research methodology (Castillo, 2019). It is basically all the techniques that researchers use to describe, explain, and anticipate events and provide an overview of their research's work plan. The following sections make up this chapter's presentation of the methodology used in this study: research design, setting, study population, sample size, sample selection, inclusion and exclusion criteria, data collection tools, data collection technique, validity and reliability, pilot study, and ethical considerations.

3.2 Study Approach

A quantitative approach was utilized in the study. A quantitative form of enquiry was used because it will help the researcher determine factors that leads to the reoccurrence of cholera in Kanyama compound, Lusaka.

3.3 Study Design

The study employed a cross-sectional design and a quantitative methodology to gather data on and examine the cause-and-effect relationships between the many variables that influence the prevalence of cholera in the Kanyama compound in the Lusaka district.

3.4 Study Site

A study site is a physical environment and condition in which data collection takes place in a study (Polit and Hungler, 2001). The research was conducted in Kanyama compound which is located in Lusaka district. Kanyama compound is one of the unplanned settlements in Zambia with a population of 169, 253 (CSO, 2020).

3.5 Target Population

The study was conducted among people living in Kanyama compound of Lusaka.

3.6 Inclusion criteria

- Only people who are residents of the compound participated in this study
- Men and women aged at least 18 years and above
- People willing to participate in the study will be included

3.7 Exclusion criteria

- People who were not residents of the compound
- People below 18 years of age,
- Residents who were not willing to participate

3.8 Sample size determination

The sample size was calculated using Epi info software. Calculating sample size for unknown population:

- Formula: $n=Z^2p(1-q)/e^2$

Where:

n = sample size

Z = Z score 1.96 at 95% confidence level significance level 5%

p denotes the proportion of the target population

e= is the standard error, set to 0.05

n= $\underline{((1.96)^2\times(0\ .12)(0.62))}/(0.05)^2$

=114.

3.9 Sampling Technique

Purposive sampling was used in this study. This strategy was used since it was created to speak to a particular demographic. When utilizing a purposive sample technique, a researcher must eliminate everyone who does not satisfy the study's inclusion criteria (Tongco, 2017). The following were the variables that were considered in this study, these included variables such as gender, knowledge, age, educational level, attitudes and employment status

3.10 Data Collection Methods

Information was gathered utilizing primary data. A comprehensive questionnaire was employed. To gather quantifiable data, pre-tested questionnaires with closed-ended questions will be used. The researcher administered all the questionnaires.

3.11 Data Analysis

The information gathered through questionnaires was first reviewed for uniformity, consistency, and accuracy. This was completed at the questionnaire level and upon the completion of the data entry. The data collected in the questionnaire was loaded in excel, for data analysis and then the raw data was loaded into the computer programs known as SPSS software, quantitative data was produced. The term "SPSS" stands for "Statistical Package for Social Sciences," or a program that will be used to analyze quantitative data. The next stage was data cleaning after entering the data into the SPSS software. This is the procedure that entails looking for discrepancies in the data that is collected. Additionally, analysis will start from the provided data by creating frequency tables. These were then utilized to create charts and graphs, which were used to build the interpretation. Data was therefore imported into excel to be able to make tables, charts, and graphs

3.12 Scientific rigor

Scientific rigor was used in this study to ensure that the results are trustworthy, plausible, and transferable to other fields of study. Scientific rigor is essential for this study since it carefully adheres to the scientific method to ensure a reliable, objective study design, methodology, analysis, interpretation, and comprehensive reporting of results (Marshall & Rossman,2019)

3.13 Ethical Consideration

This study was ethically cleared by the University of Lusaka research ethics committee. Full consent was gathered from those who took part in the earlier research and study. The study adhered to the principles of confidentiality and any kind of communication that is related to the research, which was carried out honestly and openly. It was crucial that the respondent participated voluntarily. Participants who were unwilling to participate in the research, however, had the freedom to withdraw from the study.

3.14 Chapter Summary

This chapter specifies the research methodology followed by the researcher, which included research design, sample size, data collection, data analysis, and ethical considerations.

CHAPTER 4

4.0 RESULTS

4.1 Participant Demographics

The age distribution of the participants (N=113) was analyzed and divided into six age groups. The largest group was 25-29 years, representing 38.1% (n=43) of the sample. The next most populous group was 20-24 years, accounting for 17.7% (n=20). The smallest groups were 35-40 years (1.8%, n=2) and 41 years and above (2.7%, n=3). Cumulatively, 70.8% of the participants were aged 25 years and above, and 95.6% were aged 30 years and above. When it came to occupation, the majority of participants (63.7%, n=72) identified as self-employed, while 15.0% (n=17) were housewives. Office jobs were reported by 12.4% (n=14) of the participants. Teachers represented 5.3% (n=6) of the sample, and nurses accounted for 3.5% (n=4). The education level of the participants was as follows: a small percentage of participants (5.3%, n=6) reported never

having attended school. The majority of participants (49.6%, n=56) had completed secondary school. High school education was reported by 11.5% (n=13) of the participants. Tertiary education, including college or university, was achieved by 33.6% (n=38) of the participants. When it came to marital status, 25.7% (n=29) reported being single, while the majority (59.3%, n=67) were married. Participants who reported being divorced accounted for 15.0% (n=17) of the sample. In terms of cumulative distribution, 85.0% of the participants were either single or married. The remaining 15.0% of participants were divorced. Finally concerning income, 91.2% of participants had incomes between K5000 and below K15000. The remaining 8.8% had incomes of K15000 or more.

Participants Sociodemographic Traits

Variable	Variable Description	Frequency (N=113)	Percent (%)	Cumulative (%)
Age	15-19 yrs.	17	15.0	15.0
	20-24 yrs.	20	17.7	32.7
	25-29 yrs.	43	38.1	70.8
	30-34 yrs.	28	24.8	95.6
	35-40 yrs.	2	1.8	97.3
	41 yrs. and above	3	2.7	100.0
Total		113	100.0	
Occupation	Self employed	72	63.7	63.7
	Housewife	17	15.0	78.8
	Office Job	14	12.4	91.2
	Teacher	6	5.3	96.5
	Nurse	4	3.5	100.0
Total		113	100.0	
Education	Never been to school	6	5.3	5.3
	high school	13	11.5	16.8
	Secondary school	56	49.6	66.4

	Tertiary school	38	33.6	100.0
Total		113	100.0	
Marital	Single	29	25.7	25.7
Status	Married	67	59.3	85.0
	Divorced	17	15.0	100.0
Total		113	100.0	
Income	k500 or less	88	77.9	77.9
	k5000-k10000	15	13.3	91.2
	k10000-k15000	6	5.3	96.5
	k15000 or more	4	3.5	100.0
Total		113		100.0

Table 1: Participant Demographic Variables

SO1: Factors leading to Re-occurrence of Cholera

The causes of cholera were investigated among the participants (N=113) and categorized into three groups: indiscriminate waste disposal, contaminated water, and unknown. The most frequently reported cause of cholera was indiscriminate waste disposal, with 75.2% (n=85) of participants identifying it as a contributing factor. Contaminated water was cited by 23.0% (n=26) of participants as a cause of cholera. A small percentage (1.8%, n=2) reported not knowing the specific cause.

Cause of Cholera

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	indiscriminate waste disposal	85	75.2	75.2	75.2
	Contaminated water	26	23.0	23.0	98.2
	I don't know	2	1.8	1.8	100.0
	Total	113	100.0	100.0	

Table 2: Cause of Cholera

The precautions taken to prevent and manage cholera were examined among the participants (N=113) and categorized into two groups: giving oral rehydration solution (ORS) and taking the patient to the hospital. A significant number of participants (39.8%, n=45) reported giving ORS as a precautionary measure against cholera. Taking the patient to the hospital was mentioned by a majority of participants (60.2%, n=68) as a precautionary action.

Precautions against cholera

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Give ORS	45	39.8	39.8	39.8
	Take patient to the hospital	68	60.2	60.2	100.0
	Total	113	100.0	100.0	

Table 3: Precautions Against Cholera

SO2: Means of Preventing Re-occurrence of Cholera

Most participants acknowledged the preventability of cholera (94%) while the rest thought it was not preventable.

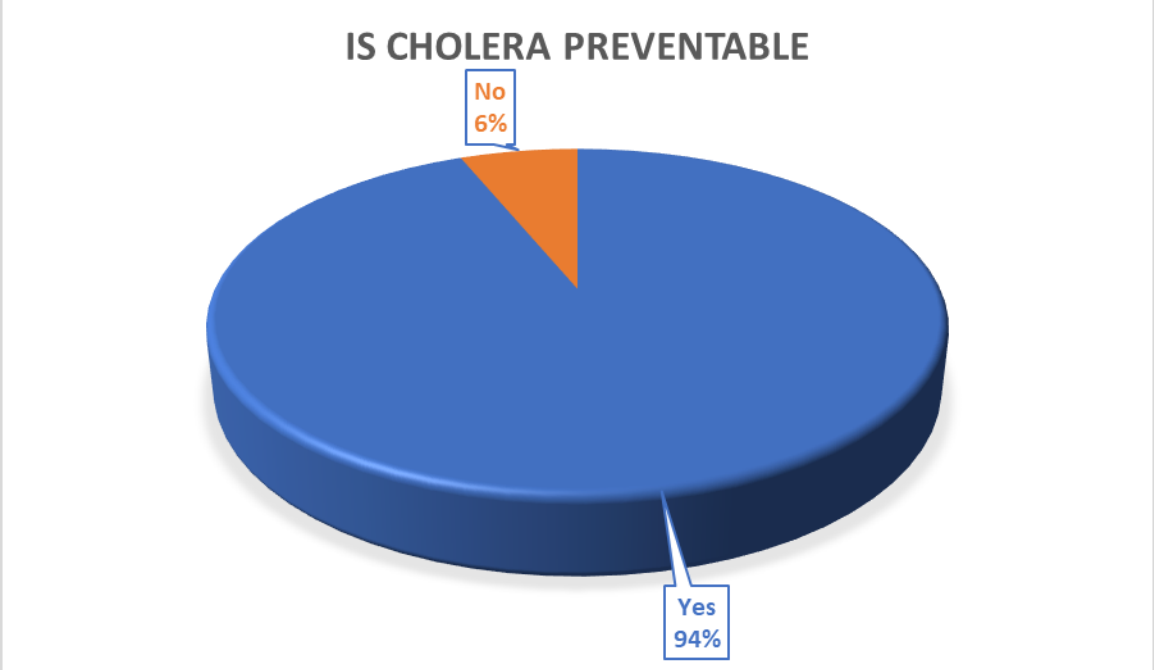

Figure 2: Perceived Preventability of Cholera

The vast majority of participants acknowledged that they most commonly washed their hands before serving food while nearly have made mention of washing after serving food.

Figure 3: Hand Washing Practices

The types of sanitation facilities used by the participants (N=113) were analyzed and categorized into two groups: flush toilet and pit latrine. A small percentage of participants (6.2%, n=7) reported using flush toilets as their primary sanitation facility. The majority of participants (93.8%, n=106) used pit latrines as their main sanitation facility.

Sanitation facility

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	flush toilet	7	6.2	6.2	6.2
	pit latrine	106	93.8	93.8	100.0
	Total	113	100.0	100.0	

Table 4: Sanitation Facility

SO3: Relationship between Socio-demographic Traits and Re-occurrence of Cholera

Relationship between Occupation and Re-occurrence of Cholera

The cholera experience among participants (N=113) was examined in relation to their occupation. Among self-employed individuals (n=72), 56 had experienced cholera (66.7%), while 16 had not (22.2%). For housewives (n=17), 12 had experienced cholera (14.3%), while 5 had not (17.2%). Among those in office jobs (n=14), 10 had experienced cholera (11.9%), while 4 had not (13.8%). For teachers (n=6), 4 had experienced cholera (4.8%), while 2 had not (6.9%). Lastly, among nurses (n=4), 2 had experienced cholera (2.4%), while 2 had not (6.9%). Overall, out of the total participants (n=113), 84 had experienced cholera, while 29 had not.

Crosstab of Occupation and Cholera

			Cholera experience		
			Yes	No	Total
Occupation	Self employed	Count	56	16	72
		% within Cholera experience	66.7%	55.2%	63.7%
	Housewife	Count	12	5	17
		% within Cholera experience	14.3%	17.2%	15.0%
	Office Job	Count	10	4	14
		% within Cholera experience	11.9%	13.8%	12.4%
	Teacher	Count	4	2	6
		% within Cholera experience	4.8%	6.9%	5.3%
	Nurse	Count	2	2	4
		% within Cholera experience	2.4%	6.9%	3.5%

Total	Count	84	29	113
	% within Cholera experience	100.0%	100.0%	100.0%

Table 5: Crosstab of occupation and Cholera

Pearson Chi-Square test yielded a chi-square value of 2.061 with 4 degrees of freedom (df). The associated asymptotic significance (2-sided) was found to be 0.725, suggesting that there is no statistically significant association between cholera experience and occupation.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	2.061[a]	4	.725	.766		
Likelihood Ratio	1.900	4	.754	.803		
Fisher's Exact Test	2.685			**.611**		
Linear-by-Linear Association	1.731[b]	1	.188	.204	.115	.032
N of Valid Cases	113					

Table 6: Chi-square tests of association between Cholera and occupation

Relationship between education Level and Cholera Re-occurrence

The relationship between education level and cholera re-occurrence was examined among the participants. Among participants who had never been to school (n=6), 5 had experienced cholera re-occurrence (6.0%), while 1 had not (3.4%). For those with a high school education (n=13), 8 had experienced cholera re-occurrence (9.5%), while 5 had not (17.2%). Among participants with

a secondary school education (n=56), 41 had experienced cholera re-occurrence (48.8%), while 15 had not (51.7%). Lastly, among those with a tertiary school education (n=31), 25 had experienced cholera re-occurrence (29.8%), while 6 had not (20.7%).

Crosstab of Educational Level and Experience with Cholera

			Cholera experience		
			Yes	No	Total
Education Level	Never been to school	Count	5	1	6
		% within Cholera experience	6.0%	3.4%	5.3%
	high school	Count	8	5	13
		% within Cholera experience	9.5%	17.2%	11.5%
	Secondary school	Count	41	15	56
		% within Cholera experience	48.8%	51.7%	49.6%
	Tertiary school	Count	25	6	31
		% within Cholera experience	29.8%	20.7%	27.4%
	5	Count	5	2	7
		% within Cholera experience	6.0%	6.9%	6.2%
Total		Count	84	29	113
		% within Cholera experience	100.0%	100.0%	100.0%

Table 7: Crosstab of Educational Level and Experience with Cholera

Chi-square tests were conducted to examine the relationship between education level and cholera re-occurrence among the participants. The results are summarized below. Pearson Chi-Square test yielded a chi-square value of 2.085 with 4 degrees of freedom (df). The associated asymptotic significance (2-sided) was found to be 0.720, suggesting that there is no statistically significant relationship between education level and cholera re-occurrence.

Chi-Square Tests For Relationship between education Level and Cholera Re-occurrence

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	2.085[a]	4	.720	.744		
Likelihood Ratio	2.056	4	.725	.743		
Fisher's Exact Test	2.185			**.738**		
Linear-by-Linear Association	.256[b]	1	.613	.638	.348	.082
N of Valid Cases	113					

Table 8: Association between Educational Level and Cholera Re-occurrence

Relationship between Marital Status and Cholera Re-occurrence

The relationship between marital status and cholera re-occurrence was examined among the participants. Among single participants (n=29), 22 had experienced cholera re-occurrence (26.2%), while 7 had not (24.1%). For married individuals (n=67), 50 had experienced cholera re-occurrence (59.5%), while 17 had not (58.6%). Among divorced participants (n=17), 12 had experienced cholera re-occurrence (14.3%), while 5 had not (17.2%).

Crosstab

			Cholera experience		
			Yes	No	Total
Marital Status	Single	Count	22	7	29
		% within Cholera experience	26.2%	24.1%	25.7%
	Married	Count	50	17	67
		% within Cholera experience	59.5%	58.6%	59.3%
	Divorced	Count	12	5	17
		% within Cholera experience	14.3%	17.2%	15.0%
Total		Count	84	29	113
		% within Cholera experience	100.0%	100.0%	100.0%

Table 9: Relationship between Marital Status and Cholera Experience

The chi-square test was conducted to examine the relationship between marital status and cholera exposure among the participants. The test yielded a chi-square value of 0.164 with 2 degrees of freedom (df). The associated asymptotic significance (2-sided) was found to be 0.921, and the exact significance (2-sided) was 0.909. The results indicate that there is no statistically significant relationship between marital status and cholera exposure in this study.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	.164[a]	2	.921	.909		

Likelihood Ratio	.160	2	.923	.909		
Fisher's Exact Test	.264			**.909**		
Linear-by-Linear Association	.135[b]	1	.713	.736	.421	.126
N of Valid Cases	113					

Table 10: Association between Marital Status and Cholera Experience

CHAPTER 5

5.0 DISCUSSION

5.1 Main Factors Leading to Cholera Re-occurrence in Kanyama Compound

The primary goal of this study's first objective was to identify the causes of cholera's recurrence in the Kanyama compound. The findings show that the majority of participants (75.2%) named indiscriminate garbage dumping as the primary cause of cholera. This conclusion is consistent with the literature that has already been written about cholera outbreaks, which emphasizes inadequate waste management as a key risk factor (World Health Organization, 2019). To solve this problem and lower the probability of cholera recurrence in Kanyama compound, appropriate waste disposal systems and community education campaigns should be put in place. The outcomes showed that administering oral rehydration solution (ORS) and bringing the patient to the hospital were the main measures employed to prevent and manage cholera. These results are consistent with other research that highlights the necessity of quick and effective treatment procedures to lessen the effects of cholera epidemics (WHO, 2019; Ali et al., 2018). The fact that so many participants (60.2%) mentioned transporting the patient to the hospital shows that professional medical assistance in cholera cases is seen as being necessary.

The findings addressing the participants' choice of sanitation facilities are in line with earlier studies emphasizing the importance of good sanitation in halting the spread of cholera (World Health Organization, 2020). Pit latrines are widely used (93.8%), and only 6.2% of people have

access to flush toilets, which points to an inadequate sanitation infrastructure in the neighborhood. This is in line with research done in comparable environments, which have demonstrated that poor sanitation causes cholera epidemics to recur (Johansson et al., 2019; Ali et al., 2018).

Methods of Preventing Cholera Re-occurrence

The second objective was to find strategies to stop the cholera outbreak in the Kanyama compound from happening again. The findings make it clear that stopping garbage disposal without consideration is essential for preventing cholera. To a great extent, cholera epidemics may be prevented by putting in place sanitary infrastructure, such as waste collection and disposal facilities, and encouraging behavioral changes surrounding waste management (Luby et al., 2018). In order to promote good hygiene habits and stop the spread of cholera, community awareness campaigns and educational programs can be extremely helpful (Parker et al., 2019). It is reassuring to see that a sizable percentage of participants (39.8%) reported administering ORS as a preventative intervention against cholera. As it helps to restore fluid balance and avoid dehydration, ORS is a well-known and successful intervention in the management of cholera cases (WHO, 2019; Thapa et al., 2020). There may be some knowledge of and adherence to advised preventative measures among community members, as indicated by the high percentage of individuals who reported using this preventive strategy. It is clear from comparing our results to prior research that the recommended techniques for controlling cholera epidemics (WHO, 2019; Ali et al., 2018) are aligned with the identified preventative measures, such as providing ORS and seeking medical attention. A considerable level of knowledge and awareness among the community members is suggested by the high number of participants who reported doing these steps. To ensure the broad adoption of these preventative measures, it is necessary to keep promoting and strengthening them.

The research on the link between occupation and cholera recurrence offers important new information. The percentage of people who had experienced cholera was highest among self-employed people (66.7%), then housewives (14.3%), office workers (11.9%), teachers (4.8%), and nurses (2.4%). Although these results suggest a connection between profession and the recurrence of cholera, more study is necessary to identify the underlying causes of this correlation. Previous research (Rebaudet et al., 2013; Piarroux et al., 2011) has demonstrated that occupation can affect exposure to cholera risk factors, such as polluted water sources or subpar sanitation standards.

Association of Poor Sanitation and Cholera Re-occurrence

The third objective sought to determine whether poor sanitation contributes to the recurrence of cholera outbreaks in Kanyama compound. The results firmly establish a link between inadequate sanitation, particularly careless waste disposal, and the recurrence of cholera. This is in line with other research That highlighted the critical part that cleanliness plays in cholera transmission (Barreto et al., 2020). To stop cholera epidemics, sanitation facilities must be improved. This includes having effective waste management systems and having access to clean water (Rheingans et al., 2021). Therefore, to lower the risk of cholera recurrence in Kanyama compound, measures concentrating on enhancing sanitation infrastructure and encouraging hygiene habits should be put into place.

The findings are consistent with the theory that cholera may recur because of insufficient sanitation infrastructure, notably the widespread use of pit latrines. This conclusion is consistent with previous research (Ahmed et al., 2019; Barzilay et al., 2013) that highlights the value of good sanitation systems and hygiene practices in reducing cholera epidemics. Improvements in sanitary facilities, the promotion of hygiene education, and encouraging behavior change in the community should be the top priorities of interventions if cholera is to be effectively prevented in the Kanyama compound.

Association between Education and Cholera Prevention

Studies on the relationship between education and cholera prevention have been conducted in great numbers, with a particular emphasis on the knowledge and behaviors associated with cleanliness and sanitation. The importance of education in raising public understanding of cholera transmission channels and protective measures has long been acknowledged (Lantagne et al., 2019; Bwire et al., 2017). Higher educated people are more likely to be knowledgeable about safe water and sanitation practices, which may help lower the risk of cholera outbreaks in the future (Mogasale et al., 2014). In contrast to predictions, this study did not discover a statistically significant link between education level and the recurrence of cholera. But a number of factors may have affected this result. First off, socioeconomic variables other than education alone may have a greater influence on cholera recurrence rates than education alone, such as income level and access to healthcare (Ali et al., 2015). Second, the results may have been impacted if the research sample wasn't typical of the larger population.

Despite the absence of statistical relevance, it is crucial to recognize the possible contribution of education to the fight against cholera. Cholera cases have decreased as a result of educational initiatives that have been shown to be successful in increasing awareness and encouraging behavior change in relation to hygiene and sanitation practices (Barzilay et al., 2014). As a result, future interventions in Kanyama compound must take into account educational initiatives aimed at the community, with an emphasis on enhancing understanding and behavior linked to cholera prevention.

Association between Marital Status and Cholera Re-occurrence

According to the findings, there is no statistically proven link between marital status and cholera recurrence. It is crucial to compare and contrast these findings with other literature on the issue in order to further contextualize them. Despite the fact that there are few studies that specifically look at the connection between marital status and cholera recurrence, research has looked at the broader impact of social variables on cholera outbreaks and preventative methods.

Studies have emphasized the value of community involvement and group efforts in cholera prevention when it comes to social aspects (Nichter, 2008; DeRoeck et al., 2005). These studies underline the value of community involvement in cholera epidemic prevention, including awareness raising initiatives and the adoption of sanitary practices. Although a person's marital status may affect their access to resources and social support, the current study did not discover a statistically significant link between married status and the recurrence of cholera. It is important to understand that social processes that affect the recurrence of cholera are complicated, and that marital status may not adequately reflect such dynamics. Cholera transmission may be more significantly impacted by other socioeconomic characteristics, such as household size, income, and access to clean water and sanitation facilities (Bailey et al., 2010; Sur et al., 2005). These variables, which are connected to marital status, can all work together to cause cholera epidemics to repeat.

The absence of statistical significance in the association between marital status and the recurrence of cholera points to the need for a more thorough investigation that takes a wider variety of

socioeconomic variables into account. Future research may examine how family dynamics, cultural practices, and social networks influence cholera transmission and preventive initiatives (Blum et al., 2019; Ali et al., 2016). Additionally, qualitative research techniques like focus groups and in-depth interviews may be able to provide more light on the sociocultural elements impacting the cholera outbreak in Kanyama compound.

Study Limitations

This particular study in Kanyama compound had a few limitations. Confounding variables: It's possible that not all possible confounding factors that can affect the association between wealth and the incidence of cholera were taken into account in the research. Environmental factors (such as water quality and sanitary facilities) and educational attainment levels may also be important, although they weren't properly taken into account or adjusted for in this study

Conclusion

According to the study's findings, the cholera outbreaks in Kanyama compound frequently occur because of insufficient sanitation facilities. The results are consistent with previous research highlighting the value of sanitation and hygiene measures in cholera prevention. To successfully combat cholera reoccurrence, comprehensive measures, such as enhancing sanitary infrastructure, assuring access to safe water, increasing hygiene education, and focusing on occupational groups, are required. The processes through which profession affects cholera risk should be investigated further in order to develop specialized preventive measures. The literature emphasizes the significance of education in cholera prevention even if the study did not uncover a significant link between education level and cholera recurrence. Future studies should examine additional socioeconomic aspects and assess the efficacy of educational interventions in contexts like these. Understanding and limiting the spread of cholera also requires taking the larger social environment and socioeconomic aspects into account. Future studies and treatments should include community involvement and a multifaceted strategy to effectively stop cholera outbreaks in Kanyama compound.

CHAPTER 6

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Summary of Findings

The goal of this study was to look at what causes cholera epidemics to recur in the Kanyama compound in Lusaka. The particular goals were to evaluate the primary causes of cholera epidemics, develop preventative strategies, and ascertain the part that sluggish sanitation plays in outbreaks. According to the study, socioeconomic characteristics and the recurrence of cholera

would be related. The results of this study are consistent with previous literature highlighting the necessity of sanitation and hygiene practices in cholera prevention, supporting the significance of insufficient sanitation facilities in the recurrence of cholera epidemics. The study did not, however, discover a statistically significant link between education level and cholera recurrence.

6.2 Implications of Findings

The findings emphasize the necessity for extensive interventions to successfully treat the cholera outbreak that has returned to Kanyama compound. Important strategies in avoiding cholera epidemics include enhancing sanitation systems and ensuring that people have access to clean water sources. The results highlight the value of improving hygiene education to increase community awareness and promote adequate sanitation practices. To address certain risk factors related to a given employment, targeted therapies catered to various occupational groups are also advised. It is important to take into account other socio-economic characteristics that may have an impact on cholera transmission even if the study did not discover a significant link between education level and cholera reoccurrence.

6.3 Recommendations

Based on the findings and implications of this study, the following recommendations are suggested for future interventions and research:

1. Sanitation Infrastructure Improvement: Efforts should be made to improve the sanitation infrastructure in Kanyama compound. This includes the construction and maintenance of flush toilets and pit latrines, as well as the implementation of proper waste management systems. Collaboration between government authorities, non-governmental organizations, and local communities is crucial in achieving this goal.
2. Access to Safe Water: Ensuring access to clean and safe water sources is essential for preventing cholera outbreaks. Infrastructure development, such as the establishment of community water points and water treatment facilities, should be prioritized. Regular monitoring and maintenance of water sources are necessary to ensure water quality.
3. Hygiene Education: Community-wide hygiene education programs should be implemented to raise awareness about cholera prevention strategies. These programs should focus on proper handwashing techniques, personal hygiene practices, and safe food handling.

Information should be disseminated through various channels, including community workshops, school programs, and public awareness campaigns.

4. Occupational Interventions: Targeted interventions should be designed to address specific risk factors associated with different occupational groups. For example, training programs on proper hygiene practices can be conducted for self-employed individuals, housewives, office workers, teachers, and nurses. Occupational health and safety guidelines should also be established to minimize exposure to cholera-causing agents.

Further Research: Future research should explore the mechanisms through which occupation influences cholera risk in order to develop more effective prevention strategies. Additionally, investigating other socio-economic factors beyond education level, such as income, housing conditions, and access to healthcare, would provide a more comprehensive understanding of the determinants of cholera reoccurrence.

6.4 Conclusion

In conclusion, this study has shed light on the factors contributing to the reoccurrence of cholera outbreaks in Kanyama compound. Inadequate sanitation facilities have been identified as a significant factor, emphasizing the importance of proper sanitation and hygiene practices in cholera prevention. Comprehensive interventions targeting sanitation infrastructure, access to safe water, hygiene education, and occupational groups are crucial for effectively addressing cholera reoccurrence. Future efforts should be guided by these findings and recommendations to minimize the impact of cholera outbreaks in Kanyama compound and similar settings.

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APPENDICES

1. **Gnat Chat**

	ACTIVITY	RESPONSIBILITY	2022 Nov	2022 Dec	2023 Jan	2023 Feb	2023 Mar	2023 Apr	2023 May
1	Prepare proposal and submit to the University	Researcher							
2	Preparation of study tools	Researcher							
3	Preparation for field work	Researcher							
4	Data collection	Researcher							
5	Data entry and cleaning	Researcher							
6	Data analysis and interpretation	Researcher							
7	Dissertation compilation	Researcher							
8	Dissertation submission	Researcher							

ii. Budget

No.	DESCRIPTION	QUANTITY	TOTAL PRICE
1	Transportation	Trips to and from selected sample sites	K1000
2	Food	Lunch x10	K1000
7	Printing and Binging of Final Research Report	04	K2000
	Total		K4000

iii. **Information sheet/ Consent Form**

"Information Sheet

My Name is RUTH, a bachelor's degree candidate in Public Health, UNILUS. I am researching on: Investigation of the Factors Related to The Recurrence of the Cholera Epidemic in Kanyama

The information you provide will help us understand the subject at hand. Additionally, the information you will provide is confidential and will be not disclosed to anyone. And shall be used only for research purposes. Your participation is voluntary, and you are at liberty to refuse to answer and/or withdraw at any time during the interview, however, your full participation will be very much appreciated. There are no monetary rewards for participating in the exercise.

Should you have any questions about the survey, you may contact me on +260972561754……email: ruthmimi872@gmail.com or contact my Supervisor, Mr. Timothy M Chabu, email: tchabu06@gmail.com and mobile line +260 979646633

iv. Consent Form

UNIVERSITY OF LUSAKA

SCHOOL OF MEDICINE AND HEALTH SCIENCES

DEPARTMENT OF PUBLIC HEALTH

I have read and understood the information presented to me in the local language and/or English. All of my questions were answered to my satisfaction. I have been asked to participate in the above study and have given my voluntary consent by signing this form. My consent to participate is voluntary and I can withdraw the survey at any time. I am also aware that the information I provide will be treated confidentially and that I will not be personally identified.

(a) Signature of participant: _____

(b) Signature of Researcher: _____

(c) Signature of Witness: _____

(d) Place: _____

(e) Date: _____

v. Questionnaire

SCHOOL OF MEDICINE AND HEALTH SCIENCES

DEPARTMENT OF PUBLIC HEALTH

Research Questionnaire

Dear Respondent,

I am a student at the University of Lusaka in Zambia doing research with the aim of determining factors leading to the recurrence of cholera in the Kanyama compound Lusaka. You were randomly selected as one of the respondents to take part in the research. Please do not hesitate to answer the following questions as objectively as possible. Rest assured that your answers will be kept strictly confidential. No information given in this study will be shared with third parties, and no information that will identify you as an individual or family will be included in the reports.

your researcher.

ii. QUESTIONNAIRE

TOPIC: EXAMINATION OF THE FACTORS RELATED TO THE REOCCURENCE OF CHOLERA EPIDEMIC IN KANYAMA COMPOUND, LUSAKA

SOCIODEMOGRAPHIC INFORMATION

1. What is your age?
    a) 15-19
    b) 20-24
    c) 25-29
    d) 30-34
    e) 40-49
2. What is your marital status?
    a) Single
    b) Married
    c) Divorced
    d) cohabiting
3. Are you a strong member of a religious group?
    a) Yes
    b) No

4. What religious affiliation do you belong to?
    a) Christianity
    b) Protestant
    c) Muslim
    d) others
5. What is your highest level of education?
    a) None
    b) Primary school
    c) High school
    d) University/graduate
    e) Postgraduate
6. What is your occupation?
    a) Housewife
    b) Teacher
    c) Doctor
    d) Nurse
    e) Office job
    f) Self employed
7. What's your monthly income of your family (household)?
    a) k5000 or less
    b) k5000- k10 000

c) k10 000-k15 000

d) k15 000 or more

SECTION B: KNOWLEDGE AND UNDERSTANDING ON CHOLERA

8. What causes Cholera?

A. Germs

B. Bad air

C. I don’t know

9. How do you know that a person has Cholera?

A. Coughs out blood

B. Loses weight

C. Having severe diarrhea and vomiting

D. I don't know

10. What do you do when a member of your household develops severe diarrhea and vomiting?

A. Give traditional medicine and keep in the house

B. Give ORS

C. Take the patient to the hospital

D. Suspect them for witchcraft

11. Can Cholera be prevented?

A. Yes

B. No

C. Not too sure

12. Do you eat leftover food?

A. Yes

B. No 16.

13. If yes, how do you store and use the leftover food?

A. Cover it and reheat before eating

B. Cover and eaten cold in the next meal

C. Not covered and eaten cold in the next meal

D. Put in the fridge

SECTION C: REOCURRENCE OF CHOLERA

14. How long have you been staying in this compound?

A. 5 years B. 6 years C. More than 7 years

15. Have you ever experienced any Cholera outbreak in this compound?

A. Yes B. No

16. How many times have you experienced Cholera?

17. Has any of your family members suffered from Cholera?

A. Yes B. No

18. If the answer to question 21 is yes, then what led to Cholera?

A. Drinking of contaminated food B. Eating contaminated food c. Ate unwashed fruits

19. What do you think is the cause of Cholera in this community?

A. drunk untreated water B. attended a funeral of someone who died from Cholera C. ate unwashed fruits from the market D. got it from another member of the family who had Cholera

SECTION D: PREVENTION OF CHOLERA

20. Do you think it's your responsibility to prevent cholera?

A. Yes B. No

21. Are there any waste collection services in your area?

A. Yes B. No

22. If No, where do you dispose off your waste?

A. Dump sites B. On the road sites c. Hand dug pits d. Drainages

22. When do you wash their hands?

A. Before serving food

B. After server food

C. Before eating food

23. Do you chlorinate or boil water before drinking?

A. Yes B. No

24. What sanitation facility do you use?

A. Flush toilet

B. Piped sewer system

C. Pit latrine

D. Pit latrine with a slab

iv. Permission Letter

TOPIC: EXAMINATION OF THE FACTORS RELATED TO THE REOCCURENCE OF CHOLERA EPIDEMIC IN KANYAMA COMPOUND, LUSAKA

Dear sir/ madam,

REF: PERMISSION TO CONDUCT A STUDY- KANYAMA

I am referring to the above topic.

I am a fourth year student at the University of Lusaka pursuing a degree in Public Health. I am conducting an academic study in your city with the above title. You can be assured that the data requested is for purely academic purposes as it is a requirement for partial fulfillment of the Bachelor of Science in Public Health award from the University of Lusaka and will be treated in the strictest confidence. Your cooperation is greatly appreciated.

Thanking you in anticipation

Yours faithfully

Hachibi Ruth

NATIONAL HEALTH RESEARCH AUTHORITY

Lot No. 18961/M, off Kasama Road, Chalala, P.O. Box 30075, LUSAKA

Tell: +260211 250309 | Email: znhrasec@nhra.org.zm | www.nhra.org.zm

Re: Request for Ethical Clearance and Authority to Conduct Research

The National Health Research Authority is in receipt of your request for ethical clearance and authority to conduct research titled **"Examination of Factors Related to the Reoccurrence of Cholera in Kanyama Compound, Lusaka."**

I wish to inform you that following submission of your request to the Authority, our review of the same and in view of the ethical clearance, this study has been **approved** on condition that:

1. The relevant Provincial and District Medical Officers where the study is being conducted are fully appraised;
2. Progress updates are provided to NHRA bi-annually from the date of commencement of the study;
3. The final study report is cleared by the NHRA before any publication or dissemination within or outside the country;
4. After clearance for publication or dissemination by the NHRA, the final study report is shared with all relevant Provincial and District Directors of Health where the study was being conducted, University leadership, and all key respondents.

Yours sincerely,

NATIONAL HEALTH RESEARCH AUTHORITY

Ms. Sandra Chilengi-Sakala,
ACTING DIRECTOR/CHIEF EXECUTIVE OFFICER

SCHOOL OF MEDICINE AND HEALTH SCIENCES LEOPARDS HILL CAMPUS
Plot No. 37413, Off Alick Nkhata Mass Media. P. O Box 36711, Lusaka.
Phone: +260211258505, 258409 Fax +260211233409; Cell +260976075850,961917862,
E-mail:unilus@zamnet.zm,ictar@zamnet.zm

SCHOOL OF MEDICINE AND HEALTH SCIENCES RESEARCH ETHICS COMMITTEE

Ref no: IORG0010092-2023/061

Date: 15th DECEMBER, 2022

HACHIBI RUTH - BSPH19217149

Re: RESEARCH TITLE: EXAMINING FACTORS RELATED TO THE REOCCURENCE OF CHOLERA EPIDEMIC IN KANYAMA COMPOUND, LUSAKA

The above research was submitted to the research ethics committee for review. The study has no major ethical problems and is approved subject to the following:

1. The study cannot be changed without express permission of the UNILUS Research ethics committee
2. Approval from the Lusaka District health Management or equivalent health authorities should be sought.
3. The study tools should be added.
4. An informed consent form should be attached and filled by all study participants (If dealing with primary data)
5. The risks and benefits should be included in the consent form.
6. Ensure before commencement that approval is sought from ZNHRA Congratulations and the committee wishes you success in your work.

Prof Kasonde Bowa
MSc(Glasgow),M.Med(UNZA),FRCS(Glasgow),FACS,FCS,DPH(LSTMH),MPH(UCL)
Chairman- UNILUS REC
Professor of Urology and Consultant Urologist
Executive Dean
University of Lusaka and University Teaching Hospital School of Medicine and Health Sciences.