

BINDURA UNIVERSITY OF SCIENCE EDUCATION
FACULTY OF SCIENCE
DEPARTMENT OF DISASTER RISK REDUCTION



**ASSESSING THE EFFECTIVENESS OF DISASTER RISK REDUCTION STRATEGIES
FOR PREVENTING ARTISANAL MINING INDUCED CHOLERA OUTBREAKS IN
SHAMVA DISTRICT, ZIMBABWE.**

BY

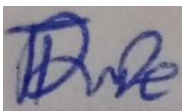
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DECLARATION

I, Dube Trish L, certify that this research project is the outcome of my own self labor. No sources have been used without acknowledging the original publisher or author. All references and sources have been properly credit.

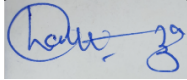
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APPROVAL

The undersigned certify that they have supervised the student Trish Lubelihle Dube's dissertation entitled Assessing the Effectiveness of Disaster Risk Reduction Strategies for Preventing Artisanal Mining Induced Cholera Outbreaks in Shamva District, Zimbabwe.



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DEDICATION

My mother, Mrs. R. Dube, my siblings, my husband, and the rest of my family are all honored in my dissertation because their love, sacrifices, and unfailing faith in me have supported and inspired me throughout my academic career. I am honored to make you proud because of your sacrifice and commitment to our family, which have taught me the importance of endurance and hard work. I am grateful to everyone who made it possible for me to succeed. Without your guidance, love, and support, this would not have been possible.

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ABSTRACT

Cholera outbreaks that are brought on by artisanal mining pose a serious risk to a community's health and well-being. The Shamva district's ward 19, which frequently experiences cholera outbreaks, is the key subject of this investigation. The region has seen a sharp rise in artisanal mining, which has led to worse living conditions, contaminated water supplies, and inadequate sanitation, all of which raise the risk of cholera transmission. Data was gathered through focus groups, observations, and interviews with citizens, artisanal miners, local community leaders and healthcare professionals using a qualitative research approach. The method guarantees a thorough comprehension of the lived experiences, socioeconomic impacts, and attitudes about cholera of artisanal miners and local community members. The results show that cholera outbreaks occur often, particularly during the rainy season, and that mining communities with inadequate sanitary facilities are disproportionately affected. Although there are certain DRR strategies, like awareness campaigns and emergency responses, they are not always used and have inadequate funding. The study comes to the conclusion that cholera in artisanal mining areas cannot be effectively controlled by the DRR measures currently in place. It suggests a more long-term, community-based strategy for managing water supplies, sanitation, and health education. These upgrades are essential for enhancing public health resilience in high-risk regions like Shamva, which will benefit local authorities, the public, and medical professionals while guaranteeing artisanal mining populations a safer living environment.

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LIST OF ACRONYMS

ASM - Artisanal and Small-scale Mining

DRR - Disaster Risk Reduction

FGD - Focus Group Discussion

UNDRR - United Nations Office for Disaster Risk Reduction

WHO - World Health Organization

WASH - Water, Sanitation and Hygiene

EWS - Early Warning System

CBDRR - Community Based Disaster Risk Reduction

MoHCC - Ministry of Health and Child Care

ZIMSTATS - Zimbabwe National Statistics Agency

VHW - Village Health Worker

CHAPTER I: INTRODUCTION

1.1 introduction

Cholera remains a significant public health threat, particularly in communities with inadequate water, sanitation, and hygiene infrastructure. Across the world, informal settlements and resource-driven economies, including artisanal mining areas, are highly vulnerable to outbreaks due to limited health services and exposure to contaminated water sources. In Zimbabwe, Shamva District, specifically Ward 19 exemplifies these challenges, as artisanal mining communities face recurrent cholera outbreaks amid constrained access to safe drinking water and effective disease prevention measures. This chapter examines the local dynamics influencing cholera transmission, exploring community perceptions, practices, and the effectiveness of Disaster Risk Reduction (DRR) strategies in mitigating future outbreaks.

1.2 Background of the Study

Cholera remains a significant public health concern globally, causing an estimated 21,000 to 143,000 deaths annually (WHO, 2022). The disease thrives in areas with compromised water sources, inadequate sanitation, and poor hygiene practices (Harris et al, 2017). Artisanal mining, in particular, contributes to cholera outbreaks due to environmental damage and water pollution (Ncube-Phiri et al, 2014).

In Zimbabwe, artisanal mining has become a major economic activity, attracting thousands of miners to rural areas (Muzenda, 2015). However, the growth of this industry has come at a cost. The lack of regulation and oversight allows artisanal mining to persist without proper monitoring, heightening the risk of waterborne illnesses like cholera.

Shamva district, with its thriving mining industry, is particularly vulnerable to cholera outbreaks. The temporary population of artisanal miners relies on polluted water sources, such as the Pote River and abandoned mining pits (Mashauri, 2019). Limited sanitation facilities and open defecation exacerbate the issue, creating an environment conducive to the spread of *Vibrio cholerae* (Sutherland et al, 2019).

Climate-related disasters further increase cholera risk in artisanal mining areas. Vulnerable populations, including children, women, the elderly, and people living with disabilities, are

disproportionately affected. Effective disaster risk reduction strategies are crucial to preventing cholera outbreaks in artisanal mining communities. Azman et al. (2018) suggests that proactive measures can significantly lower cholera recurrence rates compared to reactive measures.

1.3 Problem Statement

Artisanal mining in Zimbabwe triggers public health risks, particularly cholera, through environmental degradation and water contamination (Chakuya et al, 2023). According to Ncube-Phiri et al. (2015), there are important disaster risk reduction strategies that tackle environmental risks while encouraging sustainable mining practices. Artisanal mining often leads to poor sanitation and compromised water quality thereby creating a conducive environment for the transmission of cholera. The recurring cholera outbreaks in Shamva highlight a critical public health threat exacerbated by the lack of effective disaster risk reduction strategies. There is a gap in research regarding community based solutions that integrate local knowledge and practices into health interventions as well as the long term socio-economic effects of mining but also promote sustainable practices to safeguard the health of the local population and ensure the resilience of the community against future outbreaks. The central focus of this study is to examine the relationship between artisanal mining practices and the incidence of cholera outbreaks in Shamva district, Zimbabwe. Specifically investigating how environmental degradation and inadequate sanitation contribute to public health risks. Also, to explore effective disaster risk reduction strategies that integrate sustainable mining practices, community engagement and public health interventions to enhance resilience and mitigate health threats in Shamva. However, the benefits are significant as the study could lead to improved public health by reducing cholera outbreaks, promote sustainable mining practices, empower local communities and inform policymakers on effective disaster risk reduction strategies.

1.4 Aim of the Study

To assess the effectiveness of disaster risk reduction strategies in preventing cholera outbreaks induced by artisanal mining activities in Shamva District, Zimbabwe.

1.4.1 Research Objectives

- To evaluate the prevalence of cholera outbreaks in artisanal mining communities in Shamva District.

- To assess knowledge, attitudes, and practices of artisanal miners and local communities in cholera prevention and control.
- To analyze gaps and limitations in existing DRR strategies in reducing the spread of cholera.

1.5 Main Question

What are the gaps and limitations in existing Disaster Risk Reduction (DRR) strategies that hinder effective prevention and control of cholera outbreaks in artisanal mining communities in Shamva district?

1.5.1 Research Questions

1. How do socioeconomic and environmental factors influence cholera prevalence in artisanal mining communities?
2. What DRR strategies are currently being implemented to address cholera outbreaks in Shamva District, and how effective are they?
3. What are the knowledge gaps and misconceptions about cholera prevention and control among artisanal miners and local communities?
4. How do artisanal miners' and local communities' attitudes and practices affect cholera risk perception and prevention?
5. What policy and regulatory reforms can strengthen existing DRR strategies to prevent cholera outbreaks?
6. What community-based initiatives can enhance community engagement and participation in DRR strategies for cholera prevention?

1.6 Delimitations

This research investigation is specifically tailored to focus on Shamva district in Zimbabwe, with an emphasis on the unique needs and circumstances of local communities and artisanal miners residing within the geographic area. By prioritizing these groups, the study aims to gain a deeper understanding of their cholera risk views, WASH behaviors and existing coping mechanisms. While the study's duration may not capture the full spectrum of seasonal differences that may influence cholera outbreaks, its findings will nevertheless provide valuable insights into the complex interplay between environmental, social and economic factors that contribute to cholera

risk in Shamva district. This study's focused approach will enable the development of targeted interventions and strategies that can be effectively replicated in similar contexts. Ultimately, this research seeks to emphasize the importance of DRR techniques in mitigating the impact of cholera outbreaks, with a view to enhancing the resilience and adaptive capacity of local communities and artisanal miners in Shamva district.

1.7 Limitations

During data collection, some of the miners were not accessible due to their long working hours. It eventually reduced a better number of participants. However, this limitation was solved, the researcher utilized their lunch time to conduct Focus Group Discussions with artisanal miners and the outcome was great. Many residents refused to gather and have a FGDs, however, the researcher got assistant from the Ward Councilor and Village Health Workers.

1.8 Definition of key terms

1. Disaster Risk Reduction (DRR)

According to UNDRR, (2015), disaster risk reduction refers to the systematic approach to identifying, assessing, and reducing the risks of disasters through strategies that minimize vulnerabilities and disaster impacts while enhancing preparedness and resilience.

2. Artisanal Mining

Artisanal mining is defined as small-scale, informal mining typically carried out by individuals or communities using minimal technology and machinery. While it contributes to livelihoods, it often lacks environmental and health safeguards, (Hilson, 2005).

3. Cholera

Cholera is an acute diarrheal disease caused by *Vibrio cholerae*, often spread through contaminated water and poor sanitation, leading to severe dehydration and potentially death if untreated (WHO, 2023).

1.10 Summary of the Chapter

This chapter has provided a comprehensive introduction to the study, outlining the background of cholera outbreaks in artisanal mining communities and the broader public health implications. The discussion highlighted the unique challenges faced in Ward 19 of Shamva District, where inadequate sanitation, unsafe water sources, and limited access to health services contribute to

recurrent cholera outbreaks. The chapter clearly defined the study's aims, research objectives, and guiding questions, ensuring that the investigation is well-anchored within a qualitative framework. Significant delimitations were outlined to clarify the study's scope, alongside essential definitions of terms to enhance conceptual understanding. By establishing these foundational elements, this chapter lays the groundwork for the next phase of the study, where a deeper exploration into relevant literature will provide theoretical and empirical perspectives on cholera prevention and Disaster Risk Reduction (DRR) strategies. The subsequent chapter will critically engage with existing studies, helping to contextualize findings and strengthen the analytical framework of this research.

CHAPTER II: LITERATURE REVIEW

2.1 Introduction

In this chapter, the researcher will provide a comprehensive review of the current study relevant to assessing DRR strategies in preventing cholera outbreaks induced by artisanal mining in Shamva district. Cholera remains a significant public health challenge in many regions of the world, particularly in areas where environmental factors such as water contamination from mining activities exacerbate the risk of outbreaks. Artisanal mining, while providing economic opportunities, often leads to adverse environmental impacts that can undermine community health. The literature covered include; theoretical literature, and empirical literature related to the current study.

2.2 Cholera Risk Factors

Anbarci et al. (2012) mentions how poverty remains the key determinant of cholera risk. People in poverty are more likely to lack access to sanitary facilities, health education, and clean drinking water and some of them are the ones that seek refuge in artisanal mining activities for survival. In areas with poor sanitation, cholera thrives, and outbreaks are more frequent in overcrowded slums and refugee camps where these conditions are common (Ali et al., 2015). Furthermore, those who are economically disadvantaged are less able to purchase preventative items like water filters or latrines, making them more susceptible to the disease.

Rapid urbanization has led to an increase of informal settlements, which often lack basic infrastructure, particularly in poor countries. Since municipal water and sanitation services typically overlook these unplanned urban areas, cholera can spread quickly there. The concentration of cholera cases in urban slums in Asia and Africa points to a direct link between disease risk and unrestrained urban expansion, according to Rebaudet et al. (2019). These locations often have contaminated water supplies, inadequate public health surveillance, and poor waste management, which contribute to the development of cholera.

Health literacy in particular is a crucial socioeconomic component. The symptoms of cholera, the importance of personal hygiene, and the proper handling of contaminated water may be unknown to those with low levels of knowledge. In a research by George et al. (2021), the incidence of cholera is significantly reduced by public health education campaigns that promote proper

sanitation and hygiene practices. Even though these populations are typically the most vulnerable, they are often the ones that these programs fail to reach.

Countries with inadequate health services find it challenging to detect and control cholera outbreaks. A weak infrastructure can lead to poor patient care, delayed diagnosis, and inadequate containment of outbreaks. According to Debes et al. (2016), early detection and prompt response are crucial for managing cholera, but they require trained personnel, functional labs, and efficient communication systems all of which are typically lacking in low-income settings. Furthermore, underfunded health organizations are unable to sustain preventive measures like water and sanitation projects and vaccination campaigns.

Two of the most significant environmental elements influencing the transmission of cholera are temperature and rainfall. Warmer or rainier seasons are often associated with seasonal increases in cholera cases. In a seminal study, Pascual et al. (2002) mentioned that, the incidence of cholera in Bangladesh followed a bimodal seasonal pattern that was strongly associated with temperature and monsoon rainfall. Warmer temperatures promote the growth of *vibrio cholerae* in aquatic reservoirs, while heavy rainfall can overwhelm sanitation systems and contaminate drinking water sources. However, dryness may concentrate germs in smaller water bodies, increasing the risk of exposure.

Long-term changes in climatic patterns are expected to increase the likelihood of cholera by altering hydrological cycles and increasing the frequency of extreme weather events. While rising global temperatures may increase the habitable range of *vibrio cholerae*, rising sea levels and precipitation may affect the dynamics of cholera reservoirs. According to Markandya (2010), climate change may prolong cholera outbreaks and increase their frequency by maintaining favorable environmental conditions.

Environmental monitoring is one of the most crucial methods for cholera prevention. Remote sensing, satellite photography, and environmental data collection can help predict epidemics by tracking key indicators including rainfall, sea surface temperature, and chlorophyll concentration. By using predictive modeling, Jutla et al. (2013) showed how including environmental aspects into monitoring systems can significantly enhance early warning capabilities, allowing health authorities to promptly intervene in high-risk areas.

2.3 Cholera Prevention Challenges

A significant barrier is mistrust of health officials, which is usually the result of previous disregard or poorly carried out initiatives. This skepticism may make people unwilling to follow public health recommendations (Gillespie et al., 2016). Furthermore, cultural attitudes and misconceptions about the causes of cholera that defy scientific knowledge may restrict the community's acceptance of preventive efforts (George et al., 2022). Low literacy and a lack of health education make efforts much more difficult because many individuals do not know how cholera spreads or how to prevent it (Ramesh et al, 2020). According to Mengel et al. (2014), communities are unable to effectively use their knowledge when they are aware of it due to inadequate infrastructure, such as a lack of clean water and sanitary facilities. Language barriers, poorly adjusted communication methods, and community fatigue from repeated outbreaks all contribute to decreased engagement. Furthermore, political volatility and a lack of resources hinder long-term, meaningful engagement (Fleming et al., 2023).

2.4 Cholera Risk Perceptions

Artisanal miners' and local communities' perceptions of the risk of cholera vary significantly, and these discrepancies are mostly caused by variances in environmental exposure, health awareness, and access to necessary services. Artisanal miners frequently work in unregulated, dangerous environments with inadequate waste management, low sanitation, and contaminated water supplies. These circumstances lessen the perceived susceptibility to cholera and normalize disease exposure (Bempah & Ewusi, 2016). Because of this ongoing exposure and a lack of health knowledge, miners perceive less risk and may not place as much emphasis on preventive measures like handwashing or water purification.

On the other hand, nearby areas that are not directly impacted by mining might have easier access to public health initiatives, medical care, and comparatively better infrastructure. They consequently frequently exhibit a greater perceived risk of infection and a stronger awareness of the routes by which cholera is transmitted (Ngwa et al, 2016). These judgments are also influenced by cultural norms, educational attainment, and prior outbreak experiences. Legros (2018) asserts that communities that have previously received cholera interventions typically exhibit better risk awareness and reactivity.

Artisanal miners are often excluded from preventive health initiatives because they work outside of official public health organizations, which further widens the perception gap (Hilson, 2005). As a result, even though both groups might be at danger from the environment, they differ greatly in how they prioritize and comprehend cholera prevention, which influences how they react to emergency situations and public health communications. These variations highlight the necessity of focused, situation-specific risk communication and community involvement tactics that take into account the distinct attitudes, practices, and limitations of artisanal miners in contrast to other local groups.

2.5 Policy and Regulatory Reforms Needed to Strengthen Disaster Risk Reduction (DRR) Strategies

A key component of increasing resilience against both natural and man-made hazards is disaster risk reduction, or DRR. Comprehensive legislative and regulatory changes are necessary to guarantee the efficacy of DRR plans, particularly in areas that are susceptible. These changes must make it possible to take action in important areas like early warning systems, health systems, infrastructure, community involvement, and Water, Sanitation, and Hygiene (WASH). In the absence of legally mandated frameworks and intersectoral cooperation, DRR initiatives continue to be uneven and inadequately funded (UNDRR, 2019).

1. Community Engagement and Local Ownership in Disaster Risk Reduction (DRR)

Sustainable DRR is based on community engagement since it promotes local ownership and guarantees that interventions are appropriate for the local context and culture. Reforms to policy should empower local disaster management committees, institutionalize participatory risk assessments, and provide funding for community-driven preparedness projects. For instance, through legal mandates, Nepal's Local Disaster Risk Management Planning Guidelines have successfully incorporated DRR into local governance systems (Shrestha, Yadav, & Maskey, 2020). According to Maskrey (2011), community-based techniques have also been demonstrated to improve response efficacy and public trust, particularly when local knowledge is used to supplement scientific data.

2. Building Resilient WASH Systems and Infrastructure for Disaster Preparedness

WASH systems and resilient infrastructure are essential for reducing the effects of disasters, particularly in urban and flood-prone areas. Building codes must be updated to account for hazard exposure and the requirement for climate adaptation, and policies must enforce risk-informed land-use planning. Regulations should also demand emergency continuity plans for water and sanitation services and catastrophe risk assessments for WASH facilities. Infrastructure resilience during floods and cyclones has increased in Bangladesh as a result of the incorporation of DRR principles into the WASH sector under national catastrophe frameworks (Rahman & Rahman, 2015). Regulations that regard WASH as critical infrastructure are necessary for preparedness and recovery after a disaster, as argued by Wisner, Gaillard, and Kelman (2012).

3. Policy Support for Early Warning Systems (EWS)

Strong policy support is also needed for early warning systems (EWS), another important topic. For EWS to be successful, it needs to be multi-hazard, people-centered, and backed by national laws that require coordination between emergency response, telecommunications, and meteorological organizations. Moreover, laws ought to mandate that warnings be comprehensible to all groups, including those with impairments and linguistic hurdles. Nations such as Cuba and Japan have demonstrated how national policy directives can guarantee highly compliant, community-relevant EWS that is well-coordinated (Thomalla & Larsen, 2010). As emphasized by Basher (2006), the operation of early warning systems is frequently compromised by the lack of a legislative and institutional framework.

4. Strengthening Health Systems Through Integrated DRR Policies

The implementation of integrated DRR policy and regulation is also necessary to strengthen health systems. Public and private healthcare facilities should be required by law to store emergency supplies, practice disaster preparedness on a regular basis, and make sure that their buildings are structurally sound. For example, Chile and Thailand have enacted laws requiring hospitals to be prepared for emergencies, which has improved healthcare continuity in the event of a disaster (Kruk et al, 2015). Furthermore, the World Health Organization (2019) highlights that integrating disaster risk reduction (DRR) into health governance improves ordinary healthcare service delivery as well as disaster response.

2.6 Enhancing Resilience through Local Involvement

The importance of disaster risk reduction (DRR) in lessening the effects of natural hazards has grown, particularly in the age of urbanization and climate change. In certain instances, traditional top-down methods which frequently lack local input have not been enough. Localized, effective, and culturally sensitive solutions are made possible by the more inclusive and durable framework provided by community engagement and participation. In addition to enhancing resilience, researchers contend that empowering local populations guarantees that DRR strategies are sustainable and contextually appropriate (Pandey, 2019).

In disaster risk initiatives, community involvement fosters accountability and ownership. Contributing to the creation and execution of strategies gives people a stake in their success. Long-term dedication and resource stewardship are improved by this sense of ownership. Nkombi and Wentink (2022) stress that by promoting local leadership and monitoring initiatives, participatory planning in DRR enhanced public participation and produced better results in South African townships like Katlehong. Therefore, ownership is essential for community driven resilience building and goes beyond simple symbolism.

Local knowledge, which has been accumulated over many generations of experience with environmental risks, is abundant in communities. Location specific, more efficient solutions result from integrating local knowledge into formal DRR programs. However, donor-driven agendas, scarce resources, and the devaluation of non-scientific viewpoints frequently impede the integration process. Through their research in Malawi, Sakic Trogrlic et al. (2022) demonstrate these difficulties and demonstrate how local knowledge neglect can result in DRR initiatives that are ineffective in addressing local realities. Bridging the gap between indigenous and scientific techniques requires acknowledging and validating local knowledge.

Preparedness and recovery from disasters are greatly enhanced by social capital that is based on networks, trust, and mutual aid. Strong social cohesion enables communities to adapt more successfully through cooperative problem-solving and unofficial support networks. According to a review by Ibrahim et al. (2023), community members' and local authorities' trust has a direct impact on how well DRR programs work, especially when it comes to making sure that evacuation

orders are followed and early warning systems are adopted. Fostering collective resilience in the face of recurrent risks requires these social interactions.

All demographic groups must be included in an effective DRR, especially marginalized groups, who frequently face the highest risk. Therefore, to ensure that women, the elderly, people with disabilities, and minority communities are actively involved, participation must go beyond token efforts. In their analysis of DRR planning in Yogyakarta, Indonesia, Isni and Rahmatun (2021) discovered that although participatory methods were used, there were instances when genuine inclusion was absent, particularly during the planning and assessment phases. According to their results, DRR tactics need to be purposefully inclusive in order to provide fair access to training, information, and decision-making.

Models of community-based disaster risk reduction (CBDRR) greatly enhance stakeholder communication, guaranteeing prompt and effective disaster response. To spread knowledge and organize action, these models frequently make use of neighborhood organizations like cooperatives, schools, and places of worship. Through frequent simulations and multi-stakeholder discussions, Nepal's community-based models have enhanced local hazard mapping and emergency response, according to Pandey (2019). These frameworks improve readiness and lessen misunderstanding, especially in rural locations with limited resources.

Effective community involvement in DRR is hampered by a number of obstacles, despite its advantages. These include inadequate institutional support, insufficient financing, bureaucratic inefficiency, and limited education. Even when communities are driven, development can be halted by the lack of organized assistance from governmental and non-governmental organizations, according to Sakic Trogrlic et al. (2022). In order to overcome these obstacles, inclusive policy frameworks, capacity building, and consistent funding for grassroots projects are needed.

Participation and community engagement are essential to DRR; they are not merely supplemental elements. By empowering local members, integrating indigenous knowledge, creating trust, assuring inclusivity, and boosting coordination, DRR activities can become more flexible and sustainable. However, in order to fully realize this potential, institutional attitudes toward true community engagement must change and structural hurdles must be removed. The way to resilient

communities is to value and elevate local voices in national and international DRR frameworks, as noted by Nkombi and Wentink (2022) and Pandey (2019).

2.7 Theoretical Framework

2.7.1 Pressure and Release Model (Crunch Model)

Propounded by Blaikie et al 1994 and modified by Wisner et al in 2004, this model is based on three major components, which are, root causes of vulnerability, the dynamic processes and the unsafe conditions. It says disasters occur when two opposing forces, that is, vulnerability and a hazard interact. Thus, a disaster is ‘crunched’ between a hazard and processes generating vulnerability.

(1) Underlying / Root causes - are the deep rooted set of factors within a society that form and maintain vulnerability. These reflect the exercise and distribution of power in a society. An example are the political systems.

(2) Dynamic processes - are translating social macro-forces that channel the effects of a negative cause into unsafe conditions. This process may be due to lack of basic services or series of macro-forces such as urbanization and population growth.

(3) Unsafe conditions - these express how a population is vulnerable to hazards. This is the vulnerable context where people and property are exposed to the risk of disaster. Examples can be low income levels and unstable economy which expose people to some hazards. The model postulates that one can reverse these tendencies by addressing root causes because disasters are remotely and indirectly rendered possible by the power system of a society, (Wisner et al, 2004).

2.7.2 Systems Theory

Ludwig von Bertalanffy was the original developer of systems theory, which suggests that in order to comprehend complicated events and phenomena, one needs ... look at the interwoven relationships among the various parts of a larger system (Bertalanffy, 1968). This theory is very pertinent to disaster management because it highlights the dynamic relationships between infrastructure, social, health, and environmental systems. Disasters, like cholera outbreaks, are the consequence of several systemic failures that build up over time rather than being separate events.

Cholera outbreaks in artisanal mining communities, particularly in nations like Zimbabwe, offer a real-world example of how systems theory might be used. These communities frequently lack access to healthcare services, sanitary facilities, and clean water. Overcrowding, uncontrolled settlement, and reliance on already limited local resources are the outcomes of the transient miners' arrival (UNICEF, 2024). A feedback loop is produced by this systemic stress: cholera is caused by inadequate sanitation, which overburdens healthcare systems and further diminishes their ability to stop future outbreaks (Chigudu, 2020).

For instance, a cholera outbreak in 2023 exposed the precariousness of these informal dwellings in the Mukaradzi mining village. Cholera cases continued despite the distribution of cholera kits and short-term measures because of ingrained governance and infrastructure deficiencies (UNICEF, 2024). The World Health Organization (2024) also emphasizes how the danger of waterborne illnesses in mining communities is increased by systemic neglect, such as inadequately supported public health facilities and no government control.

Disaster managers and policymakers can take a comprehensive approach by using systems theory in this situation. It implies that cholera control involves more than simply emergency action; it also entails bolstering the foundational systems, such as community governance, water supply, sanitation, and health services (WHO, 2024). Resilience to future epidemics is increased and vulnerability is decreased by strengthening these subsystems.

Furthermore, systems theory highlights that actions must be carried out in concert. Enhancing healthcare won't have much of an impact if settlement planning and water access are neglected. Effective disaster risk reduction in these communities thus requires integrated, multi sectoral approaches, such as those including policy reform, infrastructure development, and health education (MoHCC, 2023).

2.7.3 Vulnerability Theory

According to vulnerability theory, which has been widely expressed by academics like Wisner et al. (2004), catastrophes are not just caused by environmental hazards but rather by the interplay of such hazards with the vulnerabilities of individuals and groups. Vulnerability in this sense refers to the circumstances that make people or groups more vulnerable to harm; these circumstances are frequently influenced by social, political, economic, and environmental variables. Vulnerability

theory offers important insight into why some groups are more vulnerable to watery diseases like cholera and how different systemic elements contribute to their heightened risk when applied to the problem of cholera outbreaks in artisanal mining communities.

Artisanal mining communities are often characterized by informal settlements that are poorly equipped to handle the basic needs of large, transient populations. In regions like Zimbabwe, where artisanal mining is a significant economic activity, these communities frequently lack access to essential services such as clean water, sanitation, and healthcare. According to UNICEF (2024), many mining settlements rely on surface water sources that are prone to contamination, and the absence of proper waste disposal facilities exacerbates the spread of diseases like cholera. Overcrowding and the informal nature of the settlements further increase vulnerability by limiting access to basic health and infrastructure services. From a vulnerability theory perspective, these conditions are not merely a result of the physical environment or the presence of hazards (i.e., cholera bacteria), but rather stem from social and economic inequalities. The lack of institutional support and governance structures, compounded by poverty and poor living conditions, significantly increases the likelihood of cholera outbreaks. This is supported by Chigudu (2020), who argues that cholera in Zimbabwe is not merely a disease event but a symptom of systemic social inequalities and the failure of state institutions to address the needs of vulnerable communities.

Vulnerability theory also highlights the importance of understanding the root causes and dynamic pressures that lead to increased vulnerability. The Pressure and Release (PAR) Model (Wisner et al., 2004) offers a framework to understand how these pressures develop. In the context of artisanal mining, root causes include poverty, political instability, and marginalization, which shape the socio-economic conditions of mining communities. Dynamic pressures arise from rapid urbanization, lack of proper infrastructure, and environmental degradation, all of which contribute to increased exposure to cholera. For example, Mukaradzi, an artisanal mining community in Zimbabwe, faced a major cholera outbreak in 2023. According to UNICEF (2024), despite the intervention of health organizations, the persistence of cholera was largely due to poor sanitation and inadequate water treatment systems, both of which are direct results of systemic vulnerabilities. The PAR model emphasizes how vulnerability is not accidental but is the result of accumulated pressures that are economic, political, and environmental and they make communities

more susceptible to the impacts of diseases like cholera. In this case, cholera is not merely the result of an outbreak but the consequence of long-standing social and infrastructural vulnerabilities.

Another crucial aspect of vulnerability theory is the role of governance and political structures in either reducing or increasing vulnerability. In the case of artisanal mining, inadequate governance structures often exacerbate the situation. For example, political corruption, lack of effective disaster management, and misallocation of resources are recurrent problems that hinder the development of infrastructure and public health systems. Chigudu (2020) emphasizes that cholera outbreaks are often not only health crises but are also deeply political, influenced by the way power is distributed and how resources are allocated. Governance issues also affect the ability of mining communities to prepare for and respond to cholera outbreaks. Many artisanal mining areas are poorly regulated, meaning that they do not benefit from public health programs or infrastructure development. The World Health Organization (2024) highlights that when political structures fail to prioritize the basic needs of vulnerable populations, outbreaks like cholera are more likely to spread and be harder to control.

Socioeconomic factors, particularly poverty and lack of access to basic services, are central to understanding vulnerability in mining communities. In many artisanal mining areas, miners live in extreme poverty, and their ability to access healthcare, clean water, or sanitation is severely limited. According to Blaikie et al. (1994), vulnerability is not only about exposure to hazards but also about the capacity of a community to resist or cope with them. Artisanal miners often lack the resources to respond effectively to cholera outbreaks, as many rely on traditional medicine and informal healthcare, which are less effective than formal healthcare systems. However, despite these challenges, there are examples of community resilience in mining areas. In Mukaradzi, community driven efforts, including the establishment of local health committees and awareness programs, have helped mitigate the impact of cholera (UNICEF, 2024). This reflects a core principle of vulnerability theory: even in highly vulnerable situations, communities have the capacity to adapt and build resilience if given the proper resources and support.

2.8 Empirical framework

Empirical evidence underscores the significant role of community engagement in mitigating cholera outbreaks across various regions. Here are several case studies highlighting the effectiveness of community-driven interventions.

The public's level of knowledge and hygiene practices contributes to the type of proactive measures that are implemented. In Dar es Salaam, the hygiene practices of the community reflected a lack of knowledge and a negative attitude towards cholera as well as specific misconceptions about the disease (Mpazi & Mnyika 2005). The influence of the measures taken to combat the disease, namely oral cholera vaccination, implemented after the Haiti cholera outbreak was evaluated by Aibana et al, (2013). There were fears that the vaccination would reduce recipients' hygiene practices. Pre- and post-surveys, however, reveal that the vaccination campaign improved the populations' knowledge of and practices regarding diseases such as cholera. As the levels of knowledge and hygiene practices determine the proactive measures needed to curb the recurrence of cholera.

A study by Tsurukawa et al. (2011) reported that in artisanal cobalt mining camps in Katanga, DR Congo, there is very little effort made to ensure sanitation. No latrines are available, the quality of drinking water is poor and human waste management is usually ad hoc. As a consequence, the health of mining communities is deteriorating, with higher prevalence rates of HIV, diarrhoea, hepatitis, bilharzia and cholera.

Community-Based Volunteers

During Zambia's severe cholera outbreak, community-based volunteers (CBVs) played a pivotal role in early detection and response. In remote areas like Shingoma and nearby islands, CBVs utilized mobile phones to alert health workers about suspected cases, facilitating timely treatment and transportation to health facilities. Additionally, local leaders enforced health measures, such as mandating the use of chlorinated water, which significantly reduced cholera transmission (Mulenga et al., 2024).

Empowering Health Promoters in Chitungwiza

In Chitungwiza, Zimbabwe, community health promoters received comprehensive training on cholera prevention, including recognizing symptoms and preparing oral rehydration solutions. These trained individuals conducted door-to-door education, distributed informational materials, and facilitated community dialogues, leading to increased awareness and early treatment-seeking behavior among residents (WHO Africa, 2024).

Village Health Volunteers Implementing Door-to-Door Interventions

Malawi employed a Case Area Targeted Intervention (CATI) strategy, where village health volunteers conducted door-to-door visits to educate households on cholera prevention and identify suspected cases. This approach led to a significant decrease in cholera cases in targeted areas, demonstrating the effectiveness of localized, community-led interventions in controlling outbreaks (Kamanga et al., 2024).

2.9 Summary

Chapter 2 provided a structured review of literature relevant to cholera prevention in artisanal mining communities. It explored key theoretical frameworks, with the Pressure and Release (PAR) Model serving as the main theoretical foundation, explaining how systemic vulnerabilities contribute to cholera outbreaks. The literature review examined global, regional, and local perspectives on lived experiences, perceptions, and coping mechanisms of artisanal miners and local communities, followed by discussions on their knowledge, attitudes, and preventive practices. It also analyzed stakeholder perspectives and institutional responses, highlighting the roles of governments, NGOs, and health institutions in cholera prevention efforts. This chapter sets a strong foundation for further analysis in subsequent sections.

CHAPTER III: RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter outlines the methodology employed to investigate cholera outbreaks in artisanal mining communities in Shamva District, specifically focusing on Ward 19. It describes the

research approach and design, the target population, and the sampling techniques used. The chapter further details the data collection methods and instruments, procedures for data analysis, and the ethical considerations observed throughout the study. Additionally, it discusses the feasibility of the research and acknowledges potential limitations. The chosen methodology is aligned with the study's objectives.

3.2 Description of the Study Area

Ward 19, Shamva District, is a rural community in Zimbabwe characterized by artisanal mining activities, limited sanitation infrastructure, and frequent cholera outbreaks. According to ZIMSTATS (2022), the area has a population of 4,894 people across 1,217 households, with settlements largely clustered around mining sites and informal markets. The region faces significant public health challenges, including inadequate access to clean water and poor waste management, contributing to recurring cholera cases.

This study selects Ward 19 due to its high vulnerability to cholera, exacerbated by low healthcare access, artisanal miners' migratory patterns, and gaps in institutional cholera prevention efforts. Research in this ward provides a localized understanding of cholera risk factors, coping mechanisms, and stakeholder engagement, ensuring practical insights for developing more effective Disaster Risk Reduction (DRR) strategies tailored to artisanal mining communities.

Figure 3.1 shows the map of study area, Ward 19, Shamva District. The map was created using QGIS.

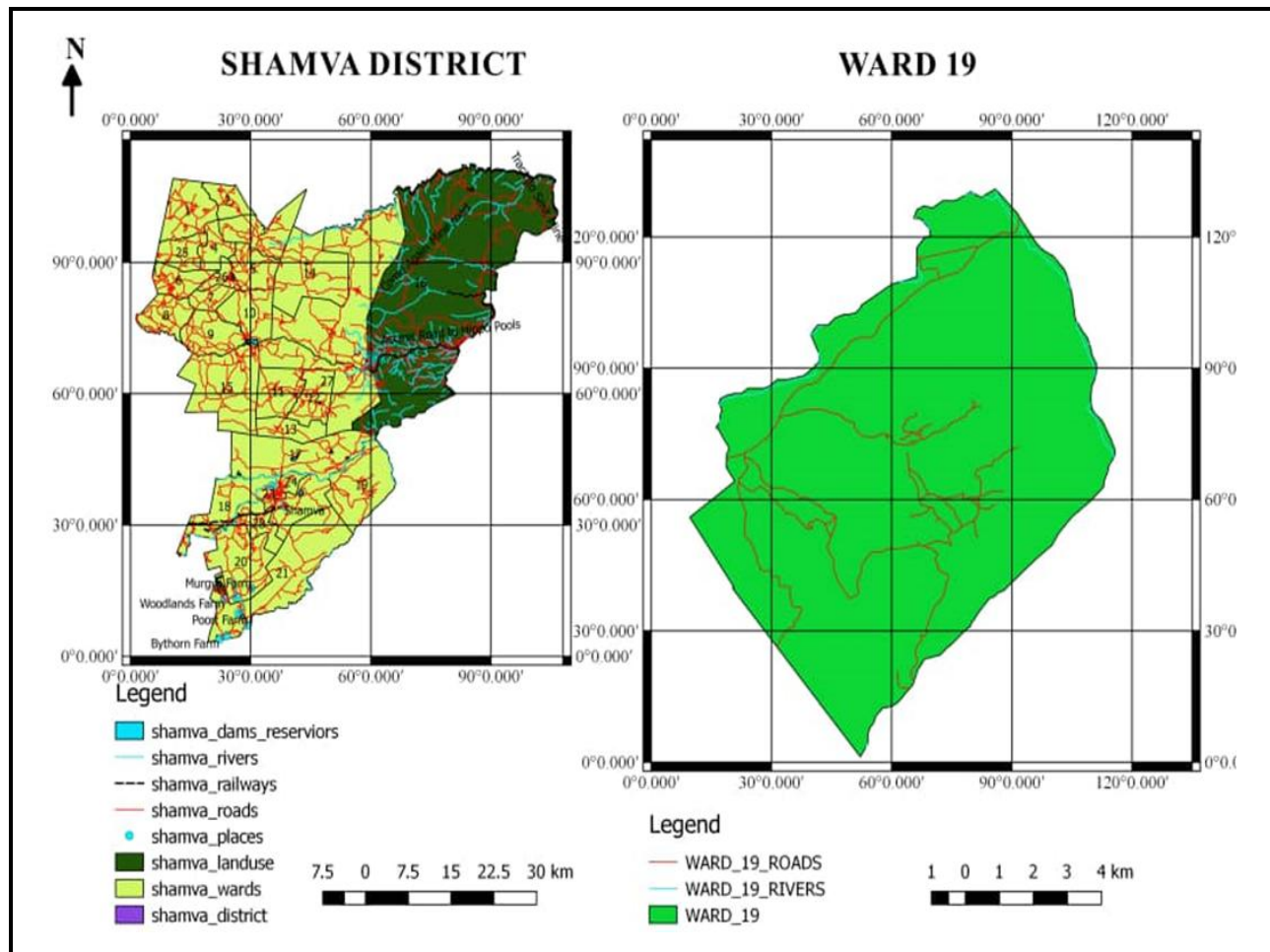


Figure 3.1 Study Area Map (Source: Author)

3.3 Research Approach

This study adopted a qualitative research approach to explore the lived experiences, perceptions, and practices of participants in Shamva Ward 19. According to Bandari (2020), qualitative research involves the collection and analysis of non-numerical data to understand concepts, opinions, and experiences. Given the exploratory nature of the study and the need for in-depth insights into cholera prevention practices and the effectiveness of disaster risk reduction (DRR) strategies, the qualitative approach was most appropriate. As Willig (2008) notes, this approach enables the collection of rich, contextual data in natural settings. It allowed the researcher to assess community knowledge, attitudes, and practices, as well as to identify gaps in DRR strategies for controlling cholera outbreaks, particularly within artisanal mining communities in Shamva under Ward 19.

3.4 Research Design

This study utilized a phenomenological research design to explore the lived experiences of individuals affected by cholera outbreaks in artisanal mining communities. According to Creswell (2007), phenomenology seeks to understand how individuals interpret their experiences with a given phenomenon. This approach was chosen to capture firsthand accounts of miners and local residents, providing insights into perceptions, coping strategies, and interactions with cholera prevention efforts. Data was collected through interviews and observations, ensuring rich, contextual narratives that highlight vulnerability, resilience, and institutional responses. The phenomenological method enabled participants to express their experiences in their own words, contributing to a deeper understanding of cholera risks and community adaptation in Shamva District.

3.5 Targeted Population

This study focused on households within Ward 19, Shamva District, which comprises 1,217 households primarily engaged in artisanal mining (ZIMSTATS, 2022). The population includes miners, local residents, and community leaders who experience frequent cholera outbreaks due to limited access to clean water and sanitation infrastructure. A study population refers to the specific group of individuals from which data is collected to address research objectives. It represents a defined subset of a larger population, selected based on relevance to the study's focus. In this research, households in Ward 19 were targeted to gain insights into lived experiences, perceptions, and coping mechanisms related to cholera outbreaks.

3.6 Sample Size and Sample Calculation

The sample size for this study was determined using the Rule of Thumb, which recommends, 10% for populations less than 100 and 1%–3% for populations greater than 100, ensuring data richness while maintaining feasibility.

Given the total household population of 1,217 in Ward 19, Shamva District, the following calculations were used:

- 1% of 1,217 = 12 households
- 2% of 1,217 = 24 households

- 3% of 1,217 = 36 households

For qualitative research, a sample size should not exceed 30 participants, ensuring depth and saturation. Based on this principle, 2% (24 households) was selected as a suitable size, providing a balance between data saturation, diverse perspectives, and feasibility in analysis.

3.7 Sampling Procedure

This study employed purposeful sampling to select participants who could provide valuable insights into cholera prevention and coping mechanisms in artisanal mining communities. The target population consisted of miners, local residents, and community leaders in Ward 19, Shamva District, as they have direct experiences with cholera outbreaks and public health interventions.

Purposeful sampling, as described by Campbell et al. (2020) involves selecting participants based on their relevance to the research topic, ensuring a deep exploration of lived experiences. The chosen participants were not limited by gender, age, or occupation, but rather by their knowledge, exposure, and involvement in cholera-related issues. This method was ideal for capturing diverse perspectives from those most affected by cholera and actively engaged in mitigation efforts.

3.7.1 Data Collection Methods and Tools

This study employed qualitative research methods to gather in-depth insights into the experiences, perceptions, and practices of artisanal miners and local communities in cholera prevention. The methods used were key informant interviews, focus group discussions, and observations which allowed for a comprehensive exploration of cholera-related challenges, ensuring that the findings reflect firsthand accounts and real-world practices.

3.7.1 Key Informant Interviews

Key informant interviews were conducted to collect expert opinions on cholera outbreaks, prevention strategies, and institutional responses in Ward 19, Shamva District. This method was used to gain detailed perspectives from professional health workers, local leaders, and village health workers (4 participants), who have direct knowledge and involvement in cholera mitigation efforts.

The interviews were structured using open-ended questions, allowing informants to share their experiences freely while providing deeper context to institutional cholera prevention measures.

According to Taylor and Blake (2015), a key informant interview involves selecting individuals with specialized knowledge on a subject to inform research findings. This method was chosen for its ability to capture expert insights that complement community-level experiences, ensuring a balanced understanding of cholera response strategies.

3.7.2 Focus Group Discussions

Focus group discussions (FGDs) were conducted to gather collective reflections from artisanal miners and local residents regarding their experiences with cholera outbreaks, hygiene practices, and challenges in prevention. Out of 10 targeted miners to participate during FGDs, only 8 managed to have a discussion with the researcher, and 9 participants out of 10 from the local residents also participated. FGDs provided an opportunity for participants to share their perceptions, debate community-wide issues, and express concerns about sanitation, healthcare access, and institutional responses.

The discussions were designed to be semi-structured, allowing for guided conversations while leaving space for spontaneous insights and shared experiences. According to Akyildiz and Ahmed (2021), FGDs enable researchers to understand group dynamics, community attitudes, and social interactions related to a phenomenon. This method was especially useful in identifying common themes and barriers in cholera prevention while fostering an inclusive and participatory research process.

3.7.3 Observation

Observational methods were employed to document hygiene practices, environmental conditions, and sanitation infrastructure in artisanal mining communities. This approach allowed the researcher to assess real-world behaviors, including water collection sources, waste disposal methods, and toilet facilities used by miners and local residents.

Observations were conducted in mining sites, ensuring a direct and unbiased assessment of cholera risk factors. According to Cohen et al. (2017), observation is a powerful qualitative research tool that enables firsthand examination of behaviors and interactions, providing data that may not be fully captured through interviews and discussions. This method was particularly valuable for validating self-reported hygiene practices, identifying gaps in sanitation infrastructure, and

assessing the environmental conditions that contribute to cholera outbreaks in Ward 19, Shamva District.

3.8 Data Analysis

The study used a qualitative data analysis approach, where collected data was coded and organized into themes to ensure a structured interpretation of participants' experiences and perceptions. Thematic analysis was employed to identify patterns and insights within the narratives, allowing for a rich understanding of cholera prevention efforts in artisanal mining communities.

To enhance the credibility and depth of analysis, direct quotes from participants were included to preserve authenticity and capture firsthand experiences. Additionally, photographic evidence from observations was utilized to illustrate key environmental conditions, sanitation challenges, and hygiene behaviors observed in artisanal mining settlements. These visual representations helped provide a concrete depiction of cholera risk factors, complementing the narrative data and ensuring a comprehensive exploration of cholera prevention strategies.

Thematic analysis was also used. Thematic analysis is optimal finding about people's views, opinions and knowledge, experiences or values from a qualitative data set. It has flexibility in interpreting data and it also allows to analyze large data set by grouping or chunking them into broad themes. The researcher used the deductive approach which involves approaching the data with preconceived themes expected to be found and mirrored in the findings. Based on theory or existing knowledge or inductive allowing the data to determine the themes and also semantic approach which involves analyzing explicit content of data. Six thematic analysis steps by Braun and Clarke (2006) was followed. The researcher read through the interview information and gained an in depth understanding of the subject, took notes and familiarized themselves with the data. The themes were generated identifying reoccurring themes, highlighting similarities and differences, reviews the themes to make sure they were useful and saturated splitting and combining some and creating new ones to make them more useful and accurate.

3.9 Ethics Consideration

The researcher assured that ethical considerations were essential in any research study to ensure the protection and well-being of participants. Ethics on research imply doing well and avoiding harm Willig (2008). Sign and Jarry (2015) define ethics as standards governing human behavior,

thus right and wrong, good and bad. The participants in the research study will be adequately informed about the nature of the study and their rights before it begins. They are free to withdraw from the study at any point if they feel uncomfortable or unhappy with any aspect of it. Riddler (2017) defines research ethics as moral values and doctrines which direct the study upon commencement up until it is finished. Research ethics are critical in conducting research studies for they ensure that proper guidelines are followed. If proper ethics are followed then the researcher is most likely to be allowed to conduct other future researches, Neuman (2013).

3.9.1 Voluntary Participation

The researcher ensured that participation in the study was voluntary, meaning that individuals were not coerced or forced to take part.

3.9.2 Debriefing

After the interviews, the researcher conducted a debriefing session to explain the aim of the study to the participants, providing them with a clear understanding of the research purpose.

3.9.3 Informed Consent

Participants were given a full explanation of the study procedures, and their informed consent was obtained. They were provided with a written consent form that detailed the study's procedures and confirmed their voluntary participation.

3.9.4 Right to Withdraw

Participants were informed of their right to withdraw from the study at any time without facing any negative consequences. They were also informed that they could choose not to answer any questions they were uncomfortable with.

3.9.5 Confidentiality and Privacy

To ensure confidentiality and privacy, the researcher used pseudonyms instead of participants' real names. This protected the participants' identities and allowed them to share their experiences and perceptions freely without fear of exposure.

3.9.6 Sensitivity

Considering the sensitive nature of the subject being studied, the researcher took extra care to ensure the well-being of the participants and created a safe space for them to share their experiences.

These ethical considerations demonstrate a commitment to respecting participants' autonomy, protecting their privacy and confidentiality, and minimizing potential harm throughout the research process.

3.10 Chapter Summary

Chapter 3 outlined the research methodology, including the study area, research design, population, sampling procedure, data collection methods, and analysis techniques. It emphasized the phenomenological approach and the use of key informant interviews, focus group discussions, and observations to explore cholera prevention in artisanal mining communities. The chapter also discussed validity and reliability, ensuring the credibility of findings. This methodological framework lays the foundation for Chapter 4, where the study's findings will be presented and analyzed in detail.

CHAPTER IV DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter presents and interprets the findings gathered from interviews, observation and focus group discussion conducted in ward 19 of Shamva District. The focus is on understanding how local communities and artisanal miners experience, perceive, and respond to cholera outbreaks linked to mining activities. Data was analyzed using thematic analysis, allowing key patterns and insights to emerge from participants' responses. The results are organized around recurring themes identified during analysis, and supported by direct quotations to reflect the voices of the community. This chapter provides a detailed account of the lived realities, challenges, and responses related to cholera in the context of a disaster-prone, resource limited mining area. The major voices of the participants were presented in italics.

4.2 Response Rate

The research targeted twenty-four (24) participants, comprising ten (10) miners for focus group discussion (FGD) participants, ten (10) local residents for focus group discussion (FGD) participants, and four (4) interviewees. However, a total of 21 respondents managed to participate in the study constituting a 90% response rate. Among these 21 respondents 4 out of 4 took part in interviews. Two Focus Group Discussion participants were 8 from miners and 9 from local residents

The table 4.1 presents information on the number of different categories respondents who participated in the study through two different data gathering methods.

Table 4.1 Response Rate

Data gathering methods	Targeted respondents	Frequency	Percentage
INTERVIEWS	4	4	100%
FGDs	20	17	85%

Table 4.1 indicated a strong engagement from respondents with an overall response rate of 90%. This shows that most of the miners and local residents in Ward 19 participated. A high response

rate minimize the risk of bias and this can also strengthen the validity of the conclusions drawn from participant responses.

4.3 Demographic Data

4.3.1 Demographic characteristics of participants

Gender

The researcher engaged a diverse group of participants from four categories namely; local leadership, healthcare professionals, local residents, village health workers, and artisanal miners. A total of 21 individuals participated, with 11 females and 10 males. The majority of male participants (5) were artisanal miners, while most female participants were from the local residents.

Age

In terms of age distribution, the data shows that most participants (9) fell within the 20–40 years' age group followed by 41-60 with 8 participants. Only four participants were below 20 years. This age range suggests that the study primarily captured perspectives from adults who are likely to be active in the workforce or community life.

Education level

Regarding education levels, 9 participants had primary-level education, 7 had secondary-level education, and 5 had attained tertiary education. Notably, all healthcare professionals held tertiary qualifications, while most artisanal miners had primary or secondary education. This indicates a potential correlation between occupation and education level, which may influence knowledge, attitudes, and practices related to cholera.

These demographic characteristics are important for contextualizing the findings, as factors such as age, gender, and education level can shape perceptions and responses to public health issues like cholera.

The following table 4.2 shows demographic data based on age, gender, level of education.

Table 4.2 Demographic Characteristics

Demographic	Gender		Age	Level of education				
Category	Females	Males	Below 20 years	20-40 years	41-60 years	Primary	Secondary	Tertiary
Local leadership (Ward 19 Councillor)	0	1	0	0	1	0	0	1
Healthcare professional	1	1	0	1	1	0	0	2
Village Health Workers	1	0	0	1	0	0	1	0
Local residents	6	3	2	3	4	3	4	2
Artisanal miners	3	5	2	4	2	6	2	0
Total	11	10	4	9	8	9	7	5

4.4 Prevalence and Impact of Cholera Outbreaks in Artisanal Mining Communities

The research findings indicate that cholera outbreaks are highly prevalent in artisanal mining communities in Shamva District, occurring almost every two to three years, particularly during the rainy season when water sources become easily contaminated. The interview participants

confirmed that mining camps are the most affected due to overcrowding, lack of toilets, and poor hygiene practices as shown in *Figure 4.1*, artisanal mining sites often lack proper toilets and clean water, conditions that were consistently cited by participants as contributing to cholera outbreaks. One of the participants described cholera as a seasonal issue, while the other stated, “outbreaks are quite common.” These outbreaks not only pose serious health threats but also disrupt daily life, forcing children to miss school, adults to miss work, and businesses to suffer losses. Local health facilities are overwhelmed during outbreaks, highlighting the limited capacity of the healthcare system. Participants shared firsthand accounts of illness and even fatalities. The environment marked by poor sanitation, unsafe water, and overcrowded camps creates ideal conditions for rapid cholera spread.

Illustrative evidence

Village Health Worker stated, “*Zvinoitika gore rega, kunyanya nguva yekunaya kana mvura yanyanyisa*” (It happens every year, especially during the rainy season).

Village Health Worker, “*Gore rakapera vamwe vakabatwa necholera, vamwe vakafa*” (Last year some got cholera, others died).

The councilor confirmed that “*Ward 19 is among the most affected because of artisanal pits with no ablution or clean water facilities.*”

During focus group discussion, local residents and miners put more emphasis on the rain season as the period which most of people got affected by cholera. One of the participants had to say:

“...cholera outbreak is high during the rainy season, miners are at risk most of the time because they do not have proper sanitation. Most of them have no toilets.”

During field visits, the researcher observed that many mining sites have no toilets, which is the most important thing to control cholera. These artisanal miners are practicing open defecation.

Figure 4.1 shows mining areas that has no sign of toilets.



Figure 4.1 Photo captured by the researcher in May 2025.

Image is showing an artisanal mining site in ward 19 with no sign of toilet close by or other WASH facilities.

Impact

Families have lost members, and many have fallen ill. Work disruptions during outbreaks reduce earnings for miners and vendors. People avoid markets and gathering spots, hurting local economies.

Implication for DRR Strategies

Outbreak monitoring and rapid response must be prioritized in high-risk areas. Mobile health units, emergency sanitation kits, and pit latrine interventions in mining zones could significantly reduce transmission.

4.5 Community Perceptions and Practices in Preventing Cholera

The researcher found that general awareness of cholera among community members is relatively high, with most individuals demonstrating a basic understanding of its causes, symptoms, and

methods of transmission. Many participants were able to identify contaminated water, poor hygiene, and improper food handling as key risk factors. However, attitudes toward prevention and treatment were mixed. While some community members took cholera seriously and followed recommended health practices, others still held traditional beliefs, attributing the disease to witchcraft or punishment. In terms of practices, measures such as handwashing, boiling water, and using latrines were mentioned, though these were often inconsistent due to limited access to clean water, soap, and sanitation facilities. Traditional remedies and delayed healthcare seeking behavior were also noted as barriers to effective prevention. These findings point to both progress and persistent gaps in community behavior that influence the spread and control of cholera.

Illustrative evidence

Professional Health 2 Worker stated: *“Cholera spreads through dirty water, poor hygiene, and food that’s been contaminated.”*

Professional Health Worker 1 said: *“Lack of clean water, poor disposal of human waste, and dirty food”* as key causes.

During FGDs one of the residents had to say:

“...Vanhū vanogara vakawanda munzvimbo dzekuchera goridhe, hapana zvimbuzi, mvura inoshandiswa yakasviba, ndizvo zvinoita kuti chirwere chipararire” (People live in overcrowded mining areas, there are no toilets, and the water used is dirty, that’s what causes the disease to spread).

During FGDs with miners, in terms of attitudes, many participants acknowledged improved awareness, though traditional beliefs still persist. One noted,

“...Some believe it’s punishment or witchcraft, but many now understand it’s a hygiene issue.” Another added, *“Some people take it seriously, others still think it’s witchcraft.”*

Practices varied depending on access to resources. Positive behaviors such as boiling water and handwashing were mentioned: *“At home we boil water, wash hands regularly, and encourage our kids to keep clean.”* However, challenges were widespread. One participant said, *“Yes, some try traditional herbs or delay coming to the clinic.”*

During field visits, the researcher noticed some unprotected wells which were being used as a source of water. Figure 4.2 shows some of the wells being used at mines.



Figure 4.2 Photo taken in May 2025 by the researcher.

This image is showing the unprotected well used by the residents of ward 19. This is evidence that there is scarcity of clean, safe water fueling the spread of cholera in the area.

Knowledge and Practices Summary

The findings reveal that while general knowledge of cholera causes and prevention is relatively widespread in Shamva Ward 19, practical implementation of preventive behaviors remains inconsistent. Most participants correctly identified contaminated water, poor sanitation, and unclean food as transmission routes. However, attitudes varied as some community members viewed cholera as a hygiene-related issue, while others still attributed it to supernatural causes like witchcraft. Preventive practices such as handwashing and boiling water were adopted by many, but a significant portion of the population still engaged in high-risk behaviors or relied on traditional remedies. These inconsistencies highlight key gaps in the effectiveness of DRR strategies. While education campaigns and outreach programs exist, they are often reactive and short-term. As a result, community knowledge is not always reinforced, and behavior change is not sustained. Strengthening DRR strategies requires more consistent health education, better

access to clean water and sanitation infrastructure, and culturally sensitive interventions that address local beliefs and barriers to effective cholera prevention.

4.6 Barriers to Effective Cholera Control in Artisanal Mining Areas

The study identified several critical gaps undermining the effectiveness of disaster risk reduction (DRR) strategies in curbing cholera outbreaks in Shamva Ward 19. Firstly, the community suffers from inadequate WASH infrastructure, with participants reporting a lack of clean, reliable water sources and insufficient or poorly maintained toilets, particularly in artisanal mining areas. Community engagement was also found to be weak, as many residents only participate in health education during outbreaks, with cultural beliefs still influencing health behaviors and limiting the adoption of preventive practices. The absence of a structured disease surveillance system further hampers early detection and response, with delayed reporting and no clear channels for issuing early warnings. Additionally, DRR interventions were largely reactive, only intensifying during cholera outbreaks, with little evidence of sustained or preventive health promotion. The local clinic staff face resource and staffing constraints, making it difficult to cope during emergencies. Poor coordination among stakeholders, especially in the post-outbreak period, results in inconsistent follow-up and fragmented efforts.

Illustrative evidence

Inadequate WASH Infrastructure

During FGDs with the local residents, one had to say: “*Vanhu vanogara vakawanda munzvimbo dzekuchera goridhe, hapana zvimbuzi, mvura inoshandiswa yakasviba, ndizvo zvinoita kuti chirwere chipararire.*” (“People live in crowded mining areas with no toilets, and the water they use is dirty, that’s how the disease spreads.”)

Weak Community Engagement

During the interviews, one of the Professional Health Worker mentioned that: “*Vanhu havachateerera kana pasina denda. Vanongouya kumisangano kana chirwere chatobuda.*” (“People don’t pay attention unless there’s an outbreak. They only come to meetings when the disease is already spreading.”)

Poor Early Warning and Surveillance Systems

During FGDs miners put more emphasis on poor early warning systems, one respondent noted: *“Hapana anozivisa vanhu nezvechirwere kusati kwaita denda. Tinongonzwa kuti kune cholera kana vanhu vafa.”* (“No one warns people about the disease before an outbreak. We only hear about cholera after people have died.”)

Reactive Rather Than Preventive Approach

“Programs dzacho dzinongouya kana chirwere chabuda, tozozoti tapora vanonyangarika.” (“The programs only come during an outbreak, and once it’s over, they disappear.”)

Resource and Staffing Constraints

“Kana chirwere chabata, zvipatara zvinotambura nekuti vanhu vanouya vakawanda zvekuti tinotadza kubata vese.” (“When the outbreak hits, clinics suffer because too many people come and we fail to manage them all.”)

Poor Coordination among Stakeholders

During interviews with Professional Health Workers, one noted that: *“Zvinhu zvinovhurwa chete neMinistry kana maNGOs, asi hapana anoramba achitarisa zvinhu pano.”* (“Things are only initiated by the Ministry or NGOs, but no one stays around to follow up.”)

4.7 Discussion of the Findings

This section presents a proportional analysis between the research’s findings and existing literature on cholera prevalence, community perceptions, prevention challenges, and disaster risk reduction (DRR) strategies. The discussion highlighted similarities, differences, and unique observations, assessing their implications for cholera prevention in artisanal mining communities.

4.7.1 Prevalence and Impact of Cholera Outbreaks

The findings revealed frequent cholera outbreaks in Ward 19, Shamva District’s artisanal mining communities, particularly during the rainy season. This trend aligns with Pascual et al. (2002), who observed that seasonal variations in temperature and rainfall drive cholera outbreaks. Similarly, Markandya (2010) noted that climate change may prolong and intensify cholera outbreaks, reinforcing the study’s observation that rain-induced flooding contaminates water sources and worsens sanitation conditions. Overcrowding and poor sanitation have emerged as

primary drivers of outbreaks, which is consistent with Ali et al. (2015) and Rebaudet et al. (2019), who found that urban slums and informal settlements face heightened cholera risks due to inadequate sanitation infrastructure. The struggles of the health system during outbreaks, as highlighted in this study, reinforce Debes et al. (2016), who emphasized that underfunded health systems lack capacity for outbreak management.

While these findings largely align with previous studies, some unique observations set Ward 19, Shamva District apart. Unlike existing research that primarily focuses on urban slums, the findings emphasize that cholera outbreaks in artisanal mining communities are exacerbated by migratory lifestyles, which contribute to rapid disease spread. This aspect has been less discussed in mainstream cholera literature, making the Ward 19, Shamva District case particularly relevant. Furthermore, field observations confirmed open defecation at mining sites, a critical finding that aligns with Tsurukawa et al. (2011), who reported poor sanitation in DR Congo's mining camps. However, existing literature has not extensively explored open defecation as a primary risk factor in artisanal mining communities, indicating a potential gap in cholera research. The normalization of cholera outbreaks as an annual event rather than an urgent health crisis is another striking finding. While literature advocates continuous engagement in prevention strategies, the study revealed that many residents and miners view cholera as inevitable, leading to a passive acceptance of outbreaks rather than proactive intervention.

4.7.2 Community Perceptions and Practices in Cholera Prevention

The study found that general awareness of cholera causes and transmission is relatively high, yet prevention behaviors remain inconsistent. This reflects patterns seen in George et al. (2021), who argued that public health education improves cholera-related behaviors but often fails to reach the most vulnerable populations. The persistence of traditional beliefs, including witchcraft as a cholera cause, suggests that cultural influences remain strong barriers to effective prevention, reinforcing arguments made by Gillespie et al. (2016) and George et al. (2022). These researchers noted that misconceptions about cholera defy scientific understanding and often obstruct the adoption of preventive health measures.

While miners and residents identified contaminated water, poor hygiene, and overcrowding as transmission factors, the study's findings illustrate gaps between knowledge and actual preventive

action. Mengel et al. (2014) attributed these inconsistencies to limited resources, poor infrastructure, and economic constraints preventing communities from applying their knowledge. The use of unprotected wells, observed in Shamva, Ward 19, further supports Ali et al. (2015), who emphasized that economic disadvantage limits access to safe drinking water, increasing cholera vulnerability. Additionally, Malawi's Case Area Targeted Intervention (CATI) strategy demonstrated that door-to-door education significantly reduces cholera cases (Kamanga et al., 2024). However, Shamva's reactive rather than preventive approach suggests that education efforts lack consistency and sustainability, reinforcing concerns from Ramesh et al. (2020) regarding low literacy and inadequate health education in vulnerable communities.

Besides these similarities, the study also presents key differences. The inconsistency in preventive behaviors is more pronounced in artisanal miners than in other groups, likely due to their informal settlement structures and migratory work patterns. This dynamic has not been extensively explored in previous cholera studies, indicating a need for more research on how mobility impacts public health interventions. Observations also revealed widespread skepticism toward formal health interventions, which has not been widely documented in cholera research. This suggests the need for culturally tailored education efforts that address mistrust and misinformation within mining communities.

4.7.3 Barriers to Effective Cholera Control

The study identified several major barriers to cholera prevention, including inadequate WASH infrastructure, weak community engagement, poor disease surveillance, reactive interventions, and stakeholder fragmentation. These findings echo observations made by Wisner et al. (2012), who argued that DRR initiatives must integrate WASH as critical infrastructure to ensure sustained cholera control. The research's evidence of poorly maintained sanitation facilities aligns with Rahman & Rahman (2015), who highlighted how Bangladesh's WASH sector reforms improved disaster resilience, suggesting that similar reforms could benefit Shamva District.

Another critical barrier identified in the findings is the failure of early warning systems, which aligns with Basher (2006), who noted that many vulnerable areas lack structured outbreak alert mechanisms. The study confirms that in Shamva, miners reported that cholera warnings only come after deaths have occurred, highlighting the failure of proactive surveillance systems. This suggests

that early warning systems in artisanal mining communities remain weak and reactive, limiting timely intervention. Stakeholder coordination gaps also emerged as a recurring issue, mirroring findings from UNDRR (2019), which emphasized that multi-sector collaboration is essential for cholera prevention.

While existing literature discusses policy weaknesses, Shamva's reliance on reactive rather than preventive approaches highlights specific gaps in current intervention frameworks. Unlike findings from Nkombi & Wentink (2022), who advocate for continuous community engagement in DRR initiatives, the study confirms that miners engage with health education only during outbreaks. Similarly, the absence of long-term sanitation solutions contrasts with Nepal's community resilience models (Shrestha et al., 2020), where DRR integration was sustained over time. These findings indicate a need for more structured, policy-driven public health interventions.

4.7.4 Policy and Disaster Risk Reduction (DRR) Implications

The study reinforces the urgent need for policy-driven cholera prevention, emphasizing community-led initiatives, early warning systems, and sustained stakeholder engagement. These findings align with Nkombi & Wentink (2022), who argued that strong local participation enhances cholera resilience. Furthermore, Chitungwiza's health promoter initiative (WHO Africa, 2024) demonstrates how trained local educators improve cholera preparedness, reinforcing the study's findings that grassroots efforts enhance outbreak response capacity.

Despite these similarities, the study highlights critical policy gaps in Shamva District. Unlike Cuba and Japan's structured early warning models (Thomalla & Larsen, 2010), Shamva's cholera detection mechanisms remain weak, showing a lack of enforcement in public health policies. Additionally, community engagement levels appear inconsistent, contradicting Nepal's integrated DRR approach, where preparedness measures are sustained beyond immediate outbreaks (Shrestha et al., 2020). Unlike Bangladesh's successful WASH sector reforms (Rahman & Rahman, 2015), Shamva's sanitation efforts remain largely reactive, emphasizing the urgent need for long-term infrastructure development and policy enforcement.

4.8 Summary

The chapter presented the findings and it also discussed the findings comparing them with the reviewed literature in chapter 2. Discussion reveals strong thematic alignment between the study's

findings and existing literature, particularly in seasonal cholera patterns, community knowledge gaps, and infrastructure challenges. However, notable differences emerge in areas such as cholera normalization, miner-specific vulnerabilities, and weak stakeholder engagement, indicating critical gaps in current cholera prevention frameworks. The study underscores the need for proactive, structured DRR strategies that go beyond reactive interventions, advocating for early warning systems, community-led health initiatives, and infrastructure resilience to strengthen cholera prevention in Shamva's artisanal mining communities.

CHAPTER V: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

This chapter provides a comprehensive summary of findings, conclusions, and recommendations based on the study's assessment of the effectiveness of Disaster Risk Reduction strategies in preventing cholera outbreaks in artisanal mining communities in Ward 19, Shamva District. The discussion has highlighted significant issues surrounding sanitation infrastructure, health awareness, early warning systems, and stakeholder coordination, all of which shape cholera prevention efforts. Building on these insights, this chapter concludes the study and offers

recommendations for policymakers, health practitioners, and community stakeholders, alongside suggestions for further research.

5.2 Summary of Findings

The study revealed that cholera outbreaks occur frequently in Shamva's artisanal mining communities, with most cases emerging during the rainy season due to contaminated water sources and poor sanitation practices. The findings confirmed that open defecation, overcrowded mining settlements, and unprotected wells contribute significantly to the spread of the disease. Community members expressed that outbreaks have become seasonally inevitable, affecting livelihoods, education, and access to healthcare. The local health system struggles to cope during outbreaks, reinforcing previous concerns regarding underfunded healthcare infrastructure in vulnerable settings.

Regarding community perceptions and prevention practices, the study found that general awareness of cholera transmission is high, with most respondents correctly identifying poor hygiene, unsafe drinking water, and inadequate waste disposal as key risk factors. However, preventive behaviors were highly inconsistent, with hand-washing, boiling water, and sanitation practices being applied sporadically due to limited access to clean water and sanitation facilities. The persistence of traditional beliefs, including the idea that cholera results from witchcraft or punishment, remains a barrier to effective prevention, particularly among miners. Field observations confirmed that artisanal mining communities often rely on unprotected wells, reinforcing the economic constraints limiting access to safe drinking water.

The study identified major barriers to cholera control, including inadequate WASH infrastructure, weak community engagement, poor early warning systems, and lack of stakeholder coordination. The reactive nature of cholera response strategies emerged as a central issue, with public health interventions only intensifying during outbreaks but showing little evidence of sustained prevention. Participants highlighted that cholera alerts only come after deaths occur, revealing gaps in early detection and communication networks. These findings reinforce the need for policy-driven solutions that focus on long-term cholera prevention strategies rather than short-term emergency responses.

5.3 Conclusion

The study concludes that cholera remains a persistent public health issue in artisanal mining communities due to a combination of poor sanitation, weak health infrastructure, and limited preventive engagement. Findings indicated that while awareness of cholera transmission is relatively high, inconsistent preventive behaviors and continuing traditional beliefs continue to fuel outbreaks. Mining sites with no toilets, reliance on unprotected wells, and seasonal flooding were identified as key contributors to disease spread, confirming previous studies linking overcrowded and unsanitary environments to cholera outbreaks.

The study further concludes that the failure of early warning systems, reactive rather than preventive intervention approaches, and weak stakeholder coordination significantly undermine cholera prevention efforts. Communities lack proactive engagement in health education, with public health measures only taking effect once outbreaks have started. Given these findings, the study emphasizes the need for strengthened DRR policies, improved WASH infrastructure, and culturally tailored public health education to address both behavioral and structural challenges. Sustained cholera prevention will require long-term investments in health communication strategies, early detection mechanisms, and integrated stakeholder collaboration to ensure community resilience against recurrent outbreaks.

5.4 Recommendations

Based on the findings, the study makes the following recommendations, targeting policymakers, public health officials, and community stakeholders to strengthen cholera prevention and DRR efforts:

- ✓ **Strengthening WASH Infrastructure:** Government and local authorities should prioritize investment in sanitation and clean water facilities in artisanal mining areas, particularly by ensuring access to pit latrines and protected water sources to reduce cholera transmission.
- ✓ **Community-Led Cholera Prevention Initiatives:** NGOs and local health organizations should train and empower community volunteers to lead ongoing health education campaigns, rather than relying on reactive approaches that only emerge during outbreaks.

- ✓ Implementation of Early Warning and Surveillance Systems: The Ministry of Health should establish cholera monitoring and alert systems that notify communities before outbreaks occur, improving timely intervention and reducing mortality rates.
- ✓ Culturally Tailored Public Health Education: Health workers should design cholera awareness programs that address traditional beliefs by incorporating local perspectives into educational materials to combat misinformation and encourage preventive behaviors.
- ✓ Improving Stakeholder Coordination in Cholera Prevention: Government agencies, NGOs, and community leaders should develop a structured collaboration framework to ensure continuous engagement in cholera prevention, moving away from temporary outbreak-focused responses.
- ✓ Establishing Mobile Health Units for Rapid Response: Public health departments should deploy mobile health teams to artisanal mining areas during high-risk seasons, ensuring that medical supplies and sanitation kits are readily available to contain outbreaks.
- ✓ Policy Support for Long-Term DRR Strategies: Policymakers should revise existing disaster response policies to integrate cholera prevention as a permanent DRR priority, ensuring consistent funding for sanitation infrastructure rather than relying on emergency relief efforts.

5.5 Further Research Implications

This research has provided qualitative insights into cholera prevention in artisanal mining communities, future research could adopt a mixed-methods or quantitative approach to expand understanding of disease patterns and intervention effectiveness. A quantitative study could examine statistical trends, such as infection rates, seasonal variations, and correlations between sanitation infrastructure and cholera prevalence. This would allow researchers to measure the impact of existing interventions with numerical precision.

Alternatively, a mixed-methods study could combine survey data with qualitative narratives, offering a more comprehensive analysis of behavioral patterns and risk perceptions. This approach would help validate themes identified in this study and assess whether awareness truly translates into sustained preventive behaviors. Future research should also explore the impact of mobility

patterns among miners on cholera transmission and investigate cost-effective, scalable WASH solutions that address sanitation challenges in informal settlements.

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APPENDICES

Appendix 1: Key Informant Interview Guide

(For Professional Health Officials, Local Leaders, and Village Health Workers)

My name is Trish L Dube and I am a student at Bindura University of Science Education conducting research on cholera prevention in artisanal mining communities. This study explores how cholera spreads in mining communities, the challenges of prevention, and potential solutions. Your insights are valuable in understanding health risks, policy gaps, and local interventions. This interview is confidential, and your responses will remain anonymous. Your participation is voluntary, and you may choose not to answer any question or withdraw at any time.

Demographic Information

- Age

- Gender
- Educational Level

A. Cholera Prevalence and Impact in Artisanal Mining Communities

- Can you describe the frequency of cholera outbreaks in Shamva's artisanal mining communities?
- How do seasonal changes, particularly the rainy season, influence cholera prevalence in these areas?
- Based on your experience, which mining camps are most affected, and why?
- How does cholera disrupt mining activities, household livelihoods, and access to healthcare?

B. Community Awareness and Perceptions of Cholera

- How would you assess the general level of knowledge among miners regarding cholera causes and prevention?
- What traditional beliefs or misconceptions about cholera have you encountered among miners and residents?
- Are there differences in cholera awareness between miners and the broader community?
- Do miners and residents perceive cholera as an urgent health risk, or do they view it as a normal seasonal issue?

C. Sanitation and Water Access in Mining Areas

- What are the main sources of drinking water for artisanal miners, and how safe are they?
- How do miners manage human waste in areas without toilets or sanitation facilities?
- What challenges do miners face in accessing clean water and sanitation infrastructure?

D. Cholera Prevention and Policy Support

- What efforts have been made to educate miners about cholera prevention, and how effective are these programs?
- How do government agencies and NGOs collaborate in preventing cholera outbreaks in mining areas?
- What key improvements are needed in cholera prevention strategies for artisanal miners?

Thank you for taking your time, your insights are valuable.

Appendix 2: Focus Group Discussion (FGD) Guide for Artisanal Miners

Thank you for joining this discussion. My name is Trish L Dube and I am conducting research at Bindura University of Science Education on cholera prevention in artisanal mining communities. Our goal today is to talk about how cholera affects miners, their living conditions, hygiene practices, and ways to prevent outbreaks. Everything discussed will remain confidential, and you are free to share your thoughts openly.

Demographic Information

- Age Range of Participants:
- Gender Representation:
- Educational Background:

A. Cholera Awareness and Risk Perception

- Have cholera outbreaks affected your mining area? If so, how frequently do they occur?
- What do miners believe causes cholera? Are there any traditional explanations for outbreaks?
- How do miners view cholera—do they see it as preventable or inevitable?

B. Hygiene and Sanitation Practices in Artisanal Mining Sites

- What are the common sources of drinking water for miners, and how do you ensure they are safe?
- Are there toilets available in mining areas, or do miners rely on other ways to manage human waste?
- How often do miners practice hygiene habits such as hand-washing, boiling water, or treating drinking water?

C. Barriers to Cholera Prevention in Mining Camps

- What challenges make it difficult for miners to maintain hygiene and sanitation?
- When miners fall sick with cholera symptoms, where do they seek treatment?
- What are the biggest obstacles preventing effective cholera prevention in mining communities?

D. Solutions and Community-Driven Cholera Prevention Strategies

- What do miners think would be the best way to reduce cholera risks in mining communities?
- How can miners contribute to improving sanitation and cholera prevention?
- What support do miners need from health officials, local leaders, or NGOs to better control cholera outbreaks?

Thank you for taking your time, your insights are valuable.

Appendix 3: Focus Group Discussion (FGD) Guide for Local Communities

Greetings, my name is Trish L Dube, and I am conducting research at Bindura University of Science Education on cholera prevention in artisanal mining communities. This discussion will focus on cholera risks from mining activities, community perceptions, and ways to strengthen prevention efforts. Your views are valuable in shaping better cholera control strategies.

Demographic Information

- Age Range of Participants:
- Gender Representation:
- Educational Background:

A. Cholera Risks and Perceptions of Artisanal Mining Activities

- How does artisanal mining affect water sources and sanitation in your community?

- Have you noticed cholera outbreaks linked to mining activities?
- How do people in your community perceive cholera risks associated with miners?

B. Household Cholera Prevention Practices

- How do families ensure safe drinking water and proper sanitation at home?
- What challenges do households face in maintaining hygiene and preventing cholera?
- Do people seek medical treatment when they experience cholera symptoms? If not, why?

C. Barriers to Cholera Prevention and Public Health Engagement

- How do cultural beliefs and traditional knowledge influence attitudes toward cholera prevention?
- What difficulties do residents face in accessing health education about cholera?
- What prevents effective cholera prevention efforts in this community?

D. Strengthening Community Cholera Prevention Efforts

- What improvements would you like to see in cholera prevention programs?
- How can miners and residents work together to reduce cholera risks?
- What role should health workers, NGOs, and local leaders play in supporting cholera prevention?

Thank you for taking your time, your insights are valuable.

Appendix 4: Observation Checklist

Broad Context	Sub-Context	Yes	No	Comment
Water Sources in Artisanal Mining Areas	Presence of protected wells or boreholes			
	Signs of water contamination (stagnation, debris, human waste)			
	Use of water treatment methods (boiling, filtration, chlorination)			

Sanitation Facilities and Waste Management	Availability of latrines or evidence of open defecation			
	Waste disposal methods (dumping, burning, structured collection)			
	Presence of hand-washing stations and soap availability			
Hygiene and Public Health Practices in Mining Camps	Observed hygiene behaviors such as hand-washing before meals			
	Use of safe drinking water storage containers			
	Presence of cholera awareness materials (posters, leaflets, community education efforts)			
Environmental and Risk Factors for Cholera Transmission	Flooded areas or stagnant water near living spaces			
	Overcrowded housing conditions in mining settlements			
	Proximity of toilets or waste disposal sites to water sources			

Appendix 5: Approval Letter from Bindura University

DISASTER RISK REDUCTION DEPARTMENT



Bindura University
of Science Education

BINDURA, Zimbabwe
Mobile No: +263 773 487 211
WhatsApp: +263 773 487 211
E-mail: emavhura@buse.ac.zw

BINDURA UNIVERSITY OF SCIENCE EDUCATION

CHAIRPERSON'S OFFICE

To Whom It May Concern

Dear Sir/ Madam,

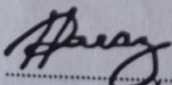
REF: SPECIAL REQUEST FOR TRISH LUBELIHLE DUBE (B211269B) TO BE GRANTED SPECIAL PERMISSION TO ACCESS YOUR INSTITUTION'S DATA FOR EDUCATIONAL PURPOSES

This is to confirm that **TRISH LUBELIHLE DUBE**, Registration Number **B211269B**, is a student pursuing a Bachelor of Science Honours Degree in Disaster Management Sciences (HBSc.DMSc) in the Disaster Risk Reduction Department at Bindura University of Science Education. As part of her degree program, she is required to complete a research project, for which she will gather data from various sources, including your institution.

We kindly request your assistance in providing any information she may need from your organization.

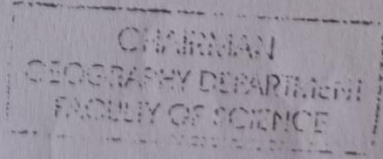
For any further information or clarification, please feel free to contact the undersigned.

Yours faithfully



.....

H. Musarandega (Dr.)
Acting Chairperson, Disaster Risk Reduction Department



Appendix 6: Approval Letter from District Development Coordinator (Shamva District)

TEL: (0662137) 282 -4
FAX: (0662137) 282 - 3
*All correspondences should be addressed to
"The District Development Coordinator"*



ZIMBABWE

DISTRICT DEVELOPMENT COORDINATOR
Ministry of Local Government and Public Works
P O Box 61
Shamva

12 May 2025

TO WHOM IT MAY CONCERN

**PERMISSION TO CARRY OUT A RESEARCH ON THE: ASSESSING DISASTER
RISK REDUCTION STRATEGIES FOR PREVENTING ARTISANAL MINING
INDUCED CHOLERA OUTBREAKS IN SHAMVA DISTRICT, ZIMBABWE.**

The above subject matter is relevant.

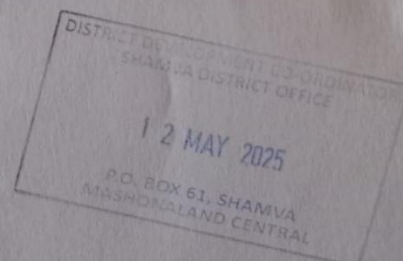
This minute serves to confirm that TRISH LUBELIHLE DUBE, has been granted permission to carry out a research with the above mentioned topic, which is scheduled to commence from May 2025. This research is basically an academic research in partial fulfillment of her Bachelor of Science Honours Degree in Disaster Management Sciences (HBSc.DMSc).

The student is expected to share her research findings with District Development Coordinator's Office - Shamva. Confidentiality of information is guaranteed

Please do not hesitate to offer them any assistance.

Tichareva, T
Tichareva, T

For: District Development Coordinator Shamva



Appendix 7: Turnitin Plagiarism Report

research_1			
ORIGINALITY REPORT			
13 %	11 %	6 %	6 %
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS
PRIMARY SOURCES			
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2	pmc.ncbi.nlm.nih.gov Internet Source	1 %	
3	Submitted to Great Zimbabwe University Student Paper	1 %	
4	www.coursehero.com Internet Source	<1 %	
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6	Submitted to Bindura University of Science Education Student Paper	<1 %	
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