BINDURA UNIVERSITY OF SCIENCE EDUCATION

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The risks associated with residential fire outbreaks in Harare's Mbare suburbs

BY

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A dissertation submitted in partial fulfilment of the Bachelor of Science Honours Degree in Disaster Management Sciences

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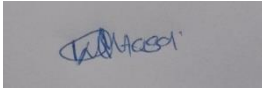
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DECLARATION FORM

I Winfreda Mutasa (B202021B), hereby affirm that this thesis is an output of my research and findings. The information outsourced from previous literature in this dissertation is fully acknowledged and a reference list is included. This work has not been previously submitted in part or entirely for any degree purposes to any other university. Submitted in partial fulfilment of the Bachelor of Science Honors Degree in Disaster Management at Bindura University of Science Education

Signatures

Date…………. 29/09/24

APPROVAL FORM

The undersigned certify that they have read this project and have approved its submission for marking after confirming that it conforms to the Department's requirements.

Signed …………………………….. Date29/09/24………………………….

29/09/24

Prof E. Mavhura (Chairperson, DRR Dpt) **(Date)**

DEDICATION

This research is dedicated to my parents

ABSTRACT

The study investigated the risks associated with residential fire outbreaks in Harare's Mbare suburbs, with the objectives to: examine the risks associated with residential fire outbreaks in Mbare, assess the factors affecting fire response systems in Harare Mbare suburbs, and examine the factors for Disaster Risk Reduction in Harare Mbare suburbs. Guided by the Social Amplification framework, the research employed qualitative methods, including interviews, observations, and document review, to gather data from 10 participants and 3 key informants. The data was analysed using Thematic Content Analysis to identify themes and patterns related to the study objectives. Findings revealed that high-density living conditions, poor electrical infrastructure, inadequate fire safety knowledge, flammable building materials, and lack of fire safety equipment contributed to the risk of fire outbreaks. Factors affecting in Disaster Risk Reduction in fire response systems, such as limited access to fire engines, understaffed fire brigades, delayed response times, and inadequate community awareness, exacerbate the vulnerability of residents. In light of these findings, several recommendations were made, including enhancing fire safety education and awareness, improving emergency response capacity, and strengthening community resilience and preparedness. This study highlights the need for a multi-sectoral approach to effectively reduce disaster risks associated with residential fire outbreaks in the area.

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ACRONOMYS

DRR   Disaster Risk Reduction

EMA   Environmental Management Agency

KI   Key Informant

P   Participant

SARF   Social Amplification of Risk Framework

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Fire may be a devastating tragedy not only because of the disturbing consequences it has on property and people's lives, but also because of the panic it causes in all those who are suddenly confronted with the extent of flames. In recent years, urbanization and population expansion have increased strain on residential areas, resulting in an increase in the frequency of disasters such as fires. Residential fires can be disastrous, resulting in deaths, property destruction, and long-term negative implications for individuals and communities. The Mbare areas of Harare are densely inhabited and subject to frequent house fire breakouts. High-density living, poor electrical infrastructure, and insufficient fire response systems all contribute to this risk. Overcrowded suburbs such as Mbare are prone to fire outbreaks, which can result in the loss of life. Fire outbreaks have a potential impact on people, property, and the environment in all countries across the world. Fires cause significant losses, including lives and widespread property damage.

Rapid urbanization in developing countries often leads to densely populated, unplanned settlements. This high-density housing can restrict firefighters' access, increasing the risks associated with residential fires. According to Pearce (2000), a disaster occurs when an extreme event exceeds the affected area's capacity to adapt, resulting in loss of life, property damage, and disruptions to social, ecological, and economic stability. Both natural and human-caused disasters have been increasing in recent years, impacting both developed and developing nations (Munasinghe 2014). These disasters can have direct consequences, such as physical injuries, disabilities, psychological harm, and property loss, as well as indirect impacts, like increased burdens on affected communities and their social support systems.

Despite the dangers, there is a scarcity of thorough research and data on the elements that contribute to house fire outbreaks in Mbare areas. This lack of understanding limits the ability of local governments and community stakeholders to effectively control these risks and lessen the effects of fire-related disasters. This study sought to fill a knowledge gap by assessing the risks associated with home fire breakouts in Mbare areas. The findings will provide the basis for

evidence-based plans to improve fire prevention, response, and disaster risk reduction in this vulnerable community.

1.2 Statement of the problem

Fire outbreaks are one of the most serious hazards to humanity. In Mbare, a variety of steps have been implemented to lessen the risk of fire outbreaks. These include public education efforts, enforcing fire safety standards, and improving the fire response system. However, there are still issues that must be addressed, such as a shortage of inexpensive housing options that satisfy fire safety regulations, high insurance costs, and limited access to clean cooking fuels. All of these concerns require additional investigation and attention to successfully limit the probability of fire outbreaks in Mbare. Despite the existence of a fire department in the City of Harare, the effectiveness of fire prevention and response measures is hindered by several challenges, such as inadequate resources, limited personnel, and lack of community cooperation and compliance. This inadequate response capacity has contributed to the rising risk of residential fire outbreaks in crowded suburbs like Mbare. To address this problem, this study sought to assess the risks associated with residential fire outbreaks in Harare's Mbare suburbs.

1.3 Aim of the study

To identify the factors that contribute to the risk of residential fire outbreaks in Mbare, Harare.

1.4 Objectives of the study

1.To examine the risks associated with residential fire outbreaks in Harare Mbare suburbs.

2. To assess factors affecting fire response in Harare Mbare suburbs.

3.To examine factors for Disaster Risk Reduction in Harare Mbare suburbs.

1.5 Research questions

1. What's your take on the risks associated with fire outbreaks in Mbare?

2. What are the factors affecting Disaster Risk Reduction in fire Response in Mbare suburbs?

3. What are the factors for DRR in Mbare suburbs?

1.6 Delimitation of the study

Only residents of Mbare Harare are included in the study, but the results will provide a clear picture of what is happening throughout Harare and other areas of Zimbabwe. Although it only covers fire outbreaks, it provides some insight into wild and veldfires. Since it is a qualitative study, only a small sample will be examined.

1.7 Significance of the study

For those in business, residents, the government, and even town planners, this study will be one of utmost importance in understanding the impact of fire outbreaks in the environment, particularly in crowded communities like Mbare

Town planners

Town planners are able to plan effectively to avoid fire outbreaks in Mbare and other suburbs by considering fire exit points in public structures or locations as well as fire booths.

The government

Overcrowding is one of the reasons why most buildings catch fire because there are many activities that need fire, so the government will be able to learn about people's living conditions through its Ministry of Housing and develop strategies to prevent that.

Business community

The study will make them understand how they can prevent themselves and their wares from fire. They will also understand the legal issues on fire and its consequences to the environment.

Residents

The study will be very important to residents since they will be guided on how to protect their environment from fire.

1.8 Definition of key terms

Fire outbreak

Fire outbreak is a sudden eruption; an outburst of flame, light and heat which is produced when something burns. It normally spreads very quickly and stretches over a large area. It can be intentional or unintentional (Abubakar, 2012

Risk

Risk is the probability or frequency of the occurrence of a particular hazard or event and some measure of severity of the consequence. It is mapped to the probability to some event which is seen to be undesirable.

Risk is therefore the likelihood of a disaster happening as illustrated by the equation below

$R=H*C/V*M$

1.9 Conclusion

To sum up, the risks associated with residential fire outbreaks in Mbare are complex and multi-faceted. They include physical, economic, social and psychological risks, al of which need to be addressed in order to reduce overall risk. A holistic approach which takes into account all aspects of risk, is likely to be most effective in reducing the likelihood and consequences of a fire outbreak.

This will require cooperation and collaboration between different stakeholders including the community, the government and emergency services. Risk reduction is not a one-off activity but an ongoing process that requires constant monitoring and evaluation.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter examines previous research on the risks of fire incidents in cities. The main purpose of the literature review is to survey existing studies on knowledge exchange and intranets. This was done to determine the key data collection needs for primary study that will be carried out, and it was part of the evolving research design process. the study met all objectives based on past research findings and analysis. The chapter also included a theoretical framework that connected the researcher to existing knowledge. Overall, this chapter identifies existing evidence and guides research on the study's deficiencies.

2.2 Theoretical framework

The study utilized the social amplification of risk framework. This framework was developed by Dr. Piers Blaikie in the 1990s. It suggested that when people perceive a risk, their reaction is influenced by a number of factors, including the perceived risk itself, their social and cultural context, and the communication channels they use to learn about the risk (Blaikie et al, 1994). Based on these factors, the SARF model identifies four stages of risk amplification: the cognitive, social, decision, and behavioral stages. he first stage, the cognitive stage, is when people first become aware of the risk and start to form their perceptions of it. The second stage, the social stage, is when these perceptions are influenced by the social and cultural context of the people perceiving the risk. Decisions about how to handle the risk are made during the third

stage, often known as the choice stage (Blaikie et al., 1994). And the fourth and final stage, the behavioral stage, is when people actually take action to respond to the risk.

 Investigating the dangers connected to home fire breakouts can undoubtedly benefit from the application of the social amplification of risk concept. The cognitive stage, for instance, might be used to examine how individuals view and comprehend the dangers connected to home fires. A

few important elements can affect people's perceptions of the risk of house fires at the cognitive stage. Initially, their comprehension of the risks may be influenced by their past exposure to and knowledge of flames. Second, their perceptions may also be influenced by the media or word-of-mouth communications used to inform them about the risk. Third, their emotional reaction to the danger may also play a role. For instance, someone may believe there is a greater risk if they are highly sensitive to the thought of a fire. The social stage can be used to investigate how cultural and sociological issues, such as lack of fire safety education or poverty, may affect people's perceptions and reactions to dangers. This phase is all about how people's perceptions and reactions to the risk of residential fires are influenced by social and cultural factors. For instance, a person's access to tools like a smoke detector or fire extinguisher that could help put out a fire can be influenced by their social and economic standing. Literacy and educational attainment might also be important factors, since people with lower literacy and educational levels could not understand fire safety as well. The perception and reaction of individuals towards the risk of house fires can also be influenced by cultural ideas and values.

It is possible to investigate how people decide on fire safety and take action to reduce the risk of a fire by looking at the decision and behavioral stages. People assess the advantages and disadvantages of various alternatives for lowering the risk of house fires during the decision-making stage. This covers actions such as making an escape plan, purchasing fire safety gear, or doing other preventive actions. People act in the behavioral stage according to the choices they made in the decision stage. This could entail practicing a fire escape plan or actually installing a smoke detector. Other factors that impact the behavioral stage include the action's perceived efficacy as well as the costs and benefits associated with it. Fires are one of the many dangers to which the SARF model can be applied.

2.3 Residential fires and related risks: Global overview

Fire outbreaks are among the most common and destructive natural catastrophes in the world. They are a severe problem that keeps happening, particularly in developing nations (He et al, 2015). According to Shi et al. (2019), human excesses, negligence, or a lack of information about the causes, preventive, or fire control measures are frequently to blame for the fire disasters that

frequently occur in most communities. A catastrophe will unavoidably occur from an improper or insufficient response to a fire breakout in a developing nation. According to Keeley (2017), developing nations frequently bear the brunt of disasters since they are woefully unprepared to deal with them. Worldwide, there are a number of weaknesses in residential fire safety in urban areas. A notable deficiency is the inhabitants' ignorance on fire safety. The fundamentals of fire safety, such using a fire extinguisher and creating an escape route in case of an emergency, are often unknown to the public. Renters' ignorance of fire safety is a significant gap in residential fire safety education in the United States (Wood et al, 2017). Just 36% of renters have ever attended a fire safety course or class, and just 13% have a written fire escape plan, per a National Apartment Association report. In the context of a fire, this ignorance could have disastrous results. Similar disparities have been noted in Canada, where a poll indicates that just 50% of people have a plan in place for what to do in the event of a fire. Young adults in the United Kingdom have been found to have a knowledge gap, with many of them not understanding what to do in the case of a fire (Werner & Fawcett, 2015). Actually, according to a poll, just 30% of people between the ages of 18 and 24 have a fire escape plan in place. Given that young people are particularly inclined to live in shared dwellings and are at risk of fire, this ignorance can be deadly. All inhabitants' safety must be guaranteed by filling in these information gaps.

The recurrent occurrence of fire in residential buildings across the world has led to the loss of lives and property. For instance, the United States' National Fire Protection Association (NFPA) reports that, during the period from 2014 to 2018, fire outbreaks that the fire department responded to resulted in 2,620 fatalities, 11,030 injuries, and $7.2 billion in financial losses on average (Bond & Keeley, 2015). According to Xi et al. (2020), there was a 39% increase in the proportion of residential structure fires in China between 2007 and 2010. In Canada, there were 61,645 home fires between 2010 and 2014; 625 losses and 4,759 injuries were the consequence of these incidents. An estimated 8 out of every 1,000,000 persons in Europe die from fire-related causes each year, and many more end up in hospitals. The intense fire that consumed the building caused the World Trade Centre to fall, killing nearly 2,000 people. Understanding the characteristics of flammable substances, fire causes, and locations susceptible to fire outbreak in residential buildings is crucial because these events not only affect the building in question but also the

surrounding structures and environments (Mackenzie, 2016). According to UN Habitat (2019), human activity is primarily responsible for the bulk of fires that occur in built-up neighborhoods, whereas natural fire disasters like wildfires happen naturally.

The state of high-rise residential structures' fire safety is poor in nations like China. The burgeoning economy and the ever-growing urban population are driving up the number of high-rise residential complexes. Currently, public buildings are monitored and managed more closely than high-rise residential buildings by China's public security fire control agencies (Peng & Da, 2011). But in high-rise residential structures, the fire spreads quickly within the shaft, making it challenging to evacuate elderly people and small children who are left at home in the event of a fire. Furthermore, it is simple to trigger significant disasters due to the complex partitions found inside residential buildings, which make firefighting and rescue operations more challenging. China has had a large number of high-rise residential building fires in recent years (Zhing, 2021). On September 22, 2015, at 15:23, a fire started in the residence located on the thirteenth floor of a 33-story residential building in the Urban Garden neighborhood on Shucheng Road in the Luohu District of Shenzhen. The fire swiftly spread to several homes on the 15th, 16th, and 17th levels and reached as high as three stories (Bloomerg, 2022). Due to erroneous welding in the heat preservation structure on the exterior wall, a fire broke out in a 28-story teacher's apartment at No. 728, Jing'an District, Shanghai on November 15, 2010, leaving 71 people injured and 58 people dead. The frequent occurrence of high-rise residential building fires in recent years has alarmed the entire population.

Fire catastrophes, including home fire tragedies, are a major issue globally. Due to a lack of data on fire outbreaks and losses as well as insufficient resources, Third World countries struggle to effectively control fires (Ngcobo, 2016). During the black summer of 2019–2020, Australia had a marked rise in the amount of people exposed to wildfire smoke, which had negative effects on the country's economy, society, and health in addition to many preventable deaths (Tom, 2019). Extensive flammable surfaces and poor fire safety management have been linked to fatalities in major fire catastrophes like the Summerland fire on the Isle of Man, the Stardust fire in Dublin, and the King's Cross Underground Station fire in London. Seventy percent of all disasters occur

during peacetime in the world and result in a large loss of life and property, including major fires and explosions (Redhinev, 2018). In one particular case study, a Molotov cocktail bomb attack in a restricted space resulted in a fire disaster that left victims with serious burns and fatalities.

In 2017, there were fire occurrences in Indonesia that left 8,801 people evacuated over 65 evacuation points, 152 people injured, and 19 deaths (UN Habitat, 2017). An estimated 276-billion-rupiah worth of homes, stores, warehouses, multi-story structures, and other properties were lost (Twigg et al, 2017). According to Benehi (2017), improper electrical connections, gas cylinder leaks, and the careless burning of candles and trash are the leading causes of fire breakouts in Jakarta. Given that multiple tall buildings have been affected by fires, it is imperative that structures' fire prevention measures receive careful attention. In 1992, there was a fire breakout at the Redoutensal, Hofburg Palace in Vienna, Austria, as well as the Min Sin Nationality School and Abdullah Munshi National Secondary School on Penang Island in Malaysia (Ebenehi, 2017). Similarly, in 1993 there was a serious fire outbreak at Pont de la Chappelle in Lucerne, Switzerland. 2008 saw the destruction of Castello di Moncalieri in Turin, Italy, and Namdaemun Gate in Seoul, South Korea (Heliyoni, 2023). In the meantime, Jakarta continues to see the annual construction of high-rise skyscrapers. In Jakarta, there were 237 high-rise structures in 2005; by 2010, that number had risen to 477, and by 2017, it had nearly doubled to 861 (Nadzim et al, 2018).

Smoking materials cause 5% of structural fires worldwide, which accounts for 23% of all fire fatalities and 10% of all injuries annually. Anderson et al. (2018) examined the number of people killed and the amount of property damaged during a ten-year period in the US, Japan, Finland, and the UK due to smoking-related fires. In addition, the authors conducted an investigation to ascertain how much lighters, candles, matches, and space heaters contributed to fire spread and ignition compared to other items like pipes and cigars. The data revealed that the number of fires caused by smoking materials was higher in all countries than by low-energy material fires. Furthermore, the introduction of cigarettes with a lower ignition propensity in these nations had no appreciable effect on the fires brought on by smoking and low-energy materials. The findings additionally demonstrated that smoking-related fires were more destructive than low-energy flames, resulting in a higher number of fatalities and injuries. Factors including age, race, season

of the year, and the object that first caught fire were taken into account in order to distinguish between the fire deaths caused by smoking materials and low energy materials.

2.3 Residential fires and related risks: Regional overview

There is a dearth of information and study on residential fire outbreaks and hazards in Africa, which contributes to knowledge gaps in this area. Nonetheless, a few significant problems and patterns have been noted. For instance, a lot of homes in Africa are constructed from extremely flammable materials like timber or thatch, which can increase their fire risk. Furthermore, a lot of houses are devoid of fire extinguishers and smoke alarms, two essential fire safety precautions. Many places also lack emergency response resources, which increases the risk of property and human casualties as well as firefighting delays. Although most African nations have mechanisms in place to mitigate fire hazards, these systems do not view fire as a serious threat, therefore funding fire safety is viewed as a waste of money (UN Habitat, 2017). According to a study done in three Egyptian cities by Farooq et al. (2019), there are three fires there per day on average. Nonetheless, a survey conducted in certain buildings revealed that neither fire safety code compliance nor installed devices existed. These devices are essential for preventing igniting and controlling fires once they start, which explains the high number of structural fire records. The risk of fire has significantly grown in South Africa, Ghana, Nigeria, and other countries due to population growth and industrialization (Walls et al, 2019). Walls et al. (2019) conducted study that demonstrated the deficiency of fire safety resources, training, and education in these regions of the world. However, not many organizations are interested in closing the gap in fire safety in these locations.

The majority of African nations have a large number of informal settlements. The relevant information states that women die from accidental fires twice as frequently as males do, with a high rate of fatality in South-east Asia. 80% of adult female fire deaths worldwide happened in south-east Asia, which is astounding. Cooking is likely the primary cause of many fire incidents, but it's not the only one (Cicione et al., 2019). It should be mentioned that between 2016 and 2017,

there were about 2000 fire incidents reported in Cape Town, South Africa's informal settlements (Zweig et al, 2018). On March 11, 2017, a massive fire entirely destroyed the Imizamo Yethu informal settlement in Cape Town, South Africa, killing four people. 2194 dwellings were totally destroyed and almost 9700 individuals had to be moved (Fire Protection Association of Southern Africa (FPASA), 2020). Because the rules don't matter in these societies, it can be difficult to apply fire safety concepts. According to reports, 40% of fire mishaps in informal communities had unclear causes (Zweig et al, 2018). Determining the cause of the fire requires a post-fire investigation, however these settlements' intrinsic characteristics make the investigation difficult and ultimately unsuccessful. These villages' inhabitants cook over open fires, and as there is no electricity, they must rely on candles and lambs at night. It should be mentioned that flammable materials were used to build the villages instead of less flammable ones.

Moreover, the density of these towns facilitates the rapid spread of fire. Because a flashover can happen in a matter of minutes and there is not enough time to preserve any home belongings during the fire, an unexpected fire in an informal settlement might result in significant destruction. UN Habitat, 2019. Walls et al. (2019) looked on fire safety in informal communities in the South African region. In order to lessen the fire, the authors studied three different areas: active fire protection interventions, passive fire protection interventions, and ignition risk management. The investigation's conclusions provided an overview of several fire safety measures. However, the authors noted that a number of issues, including social dynamics, leadership structures, colony geography and layouts, access to electricity, and others, make it difficult for these tactics to be implemented in all settlements. Walls et al. (2019) noted in a different study that in developing fire safety solutions, there are a few factors to take into account, including the infrastructure, fire loads, social behavior, and the naturally complex, unpredictable, and uncontrollable nature of homes. Moreover, these variables complicate the process of determining the issues and origins of fire.

Water and basic equipment were severely lacking in the fire and rescue services of several African nations, such as Sierra Leone (DeVries, 2016). DeVries (2016) said that the Sierra Leonean firefighters faced significant challenges due to the usage of outdated and worn-out vehicles,

equipment, boots, coats, and helmets. Nonetheless, China was expected to donate some firetrucks to Sierra Leone, and the country had already received some from Germany (DeVries, 2016). Firefighters and all other responders are at risk of harm or death if they are unable to contain a fire during a crisis and do not do their part. Public opinion in Zambia in 2008 stated that the country's Fire and Rescue Services Organizations' capacity to save lives and protect property was appalling (Zambia Disaster Management and Mitigation Unit, 2008). The Fire Brigade's usage of adequate and high-quality fire engines and ambulances might be impacted by inadequate financing. Ambulances are distinguished from other types of transportation vehicles by having both professional ambulance personnel and current, relevant equipment. Additionally, the attitudes and beliefs of the ambulance drivers and fire fighters may have a favorable or bad impact on the care they provide to the victims (Pilbery et al., 2016). The level of experience, expertise, and preparedness for emergencies influences the casualties' chances of survival.

2.4 Residential fires and related risks: Local overview

In Zimbabwe, disasters and fire hazards are frequent issues. Nevertheless, even though urban fires happen frequently, not many of them have been documented. The most well-known fire tragedies to happen in Zimbabwe are veld fires. In 2022, there were 7 511 fire incidents recorded during the dry season, resulting in the destruction of 1 753 055 hectares of forest and grassland. In contrast, 3 948 fire incidents were recorded in 2021, resulting in the destruction of 1 033 722.86 hectares of land (Conservzim, 2023). These statistics begin with these veldfires. Without mentioning the tragic Umzingwane disaster of October 10, 2022, which claimed 10 lives due to a single veld fire occurrence, the year 2022 fire period cannot be considered complete. Due to the 150 veld fire deaths in Zimbabwe during the previous 20 years, the government, together with the Environmental Management Agency (EMA), is stepping up efforts to combat the issue.

Zimbabwe's unexpected fire incidents in metropolitan areas always put residential buildings in jeopardy, endangering people's lives as well as the protection of their property. In particular, there are an increasing number of urban residential construction projects with rising volumes and higher ceilings due to the nation's fast-paced economic and social development as well as the acceleration

of urbanization (Moyo, 2017). Some locations, however, place less value on residential building fire safety, which results in significant fire hazards. Furthermore, the general level of fire safety awareness among our nation's citizens is low, which makes the situation of residential structure fire safety dismal. Residential building fires have been occurring more frequently in recent years, and a sizable percentage of all fires are caused by fires, personnel injuries, fire deaths, and other fire indications.

Because some older urban residential buildings were constructed earlier, there were lax requirements on the building fire protection infrastructure by related fire prevention specifications and regulations in most towns and cities in Zimbabwe. This led to a deficiency of fire fighting hardware facilities (Nyathi, 2020). Some of the older residential buildings are surrounded by recently constructed markets with narrow entryways and dead ends, making it difficult for the fire truck to reach the buildings in time for a rescue; some of the older residential buildings lack outdoor fire hydrants and fire water; some of the residential quarters are temporarily set up between buildings with combustible materials for community management; and in some of the residential quarters, private vehicles are parked carelessly, obstructing the fire department's access and taking up space meant for a safety evacuation. Personnel in other recently constructed urban residential quarters managed by the government's unified planning with property and security management are prohibited from using fire infrastructure in accordance with codes.

Whenever a fire breaks out, the reaction is always handled terribly. Due to inadequate training, outdated firefighting equipment, and a shortage of ambulances, Zimbabwe's major cities are ill-equipped to handle catastrophic disasters like fires and accidents. The single fire station in both the City of Mutare and the Province of Manicaland is the City of Mutare Fire Brigade, which is overseen by the Mutare City Council. Manicaland Province had 1,752698 residents in 2012, according to the census (Zimbabwe National Statistics Agency, 2013). In addition to the City of Mutare, the Mutare City Council Fire Station provides service to all seven districts in the Province of Manicaland.

2.5 Factors associated with residential fire outbreaks

A fire can originate from anything in a structure that has the potential to ignite, add fuel to a building, or even cause a flame to spread or propagate. Human factors are the primary cause of fires, according to reports from the National Fire Protection Association (UN Habitat, 2019). Thus, it can be concluded that cooking, heating, smoking, using electricity for lighting, and arson are the five primary activities that result in building fires. Because cooking stoves radiate heat towards users, kitchen fires are more common than fires in other areas of a building (Robbins and Wade, 2010). Furthermore, the majority of kitchens are arranged so that the cooking sections are typically near exits or other sources of escape, making it more difficult for people to flee a fire easily. One of the main causes of house fires (80% of recorded kitchen fires), according to Spearpoint et al. (2021), is the use of cooking oil for deep or shallow frying in the kitchen. Furthermore, heating appliances such space heaters, water heaters, fireplaces, and central heating systems have been identified as the second most common cause of home fires. Heating appliances are typically positioned near combustible items in homes, like mattresses, carpets, and drapes, which can catch fire quickly in the event of a power outage or heater breakdown.According to UN Habitat data, space heaters were responsible for about 20% of structural fires, which resulted in 81% of deaths and 80% of injuries.

Baker (2023) estimates that the number of unvented kerosene heaters in residential usage now is at 5.5 million. When neglected or used incorrectly, these heaters present a serious fire risk. In an effort to make their use fire safe, questions have been raised over refilling these heaters, using fuels that are not advised, such as gasoline, and storing the fuels. According to Ahrens (2014), smoking materials such as cigarettes are a major contributor to structure fires. Over 5.2 trillion cigarettes were smoked in 2020, according to statistics, and all of them need to be thoroughly destroyed to avoid starting fires (UN Habitat, 2019). Research has shown that the likelihood of fire injuries in households containing smokers is five times higher than in households without smokers (Ahrens, 2014).Leistikow et al. (2010) assessed the financial damage caused by smoking-related fires in a few American cities. The frequency with which adults and children are exposed to lighter and match ignitions, as well as the ensuing fires, burns, and fatalities, was also estimated by the authors.

According to the study, cigarette lighters have started over 100,000 fires in the United States and one million fires affecting minors worldwide. Furthermore, smoking is responsible for 10% of fire deaths worldwide, resulting in a $27.2 billion cost to the economy. The authors suggested that smoking be significantly reduced in order to reduce the risk of fires based on these statistics. In order to lower fire losses, they also recommended that smokers get smoke detectors, fire alarm-detecting applications, and other crucial mobile safety equipment. Instead of smoking in a living room or bedroom, one should do so outside on a balcony or open porch where there is more ventilation and less flammable furniture.

According to UN Habitat (2017), pipeline vandalism, arson, and accidents involving fuel-laden tankers can also result in fire disasters. Various types of properties have been affected by neighborhood fire outbreaks that have frequently been caused by electrical malfunctions, human error or negligence, and, very infrequently, natural causes. People do not value or have the opportunity to learn about fire safety, which leaves them unable to use firefighting equipment and ignorant of how to escape in the event of a fire. These factors are caused by a lack of national fire safety education, a lack of widespread popularization of fire science, and a lack of awareness of the significance of educating urban residents on fire safety (Paresi et al, 2016). Some residents still store excessive amounts of hazardous chemicals at home; some residents use flammable combustible materials in their home décor; some residents connect wires arbitrarily, scatter cigarette butts, and use gas, electricity, and fire in an irregular manner; and some residents set off fireworks and firecrackers in residential areas at random, which directly contributes to residential building fires. It will increase the percentage of victims from residential building fires who are made up of weaker demographics like the elderly and young children who are unable to put out the fire and flee. These gaps make the risks of house fires in urban neighborhoods like Mbare, which is under study, more evident.

While the percentage of urban residents residing in these settlements has decreased recently, there have been 213 million more people living in informal settlements overall since 1990 (UN Habitat, 2015a). Informal settlements frequently experience devastatingly fast fire spreads. For instance, a fire in Bahay Toro, Philippines, in February 2011 caused 10,000 people to become homeless in

just three hours (Twigg et al., 2017). English-language internet media outlets worldwide stated that 20,000 residences were damaged by fire in 2018 alone2. Approximately 86,000 people have been displaced, with 168 people losing their lives, if we conservatively estimate that each home has four persons on average (where figures are not directly given) (Gibson, Engel Brecht and Rush, 2019). In these places, there is an urgent need for increased fire safety.

Electrical fires can be caused by a number of factors, including hot particle ejection, overloading, inadequate electrical connections, and excessive thermal insulation. Electric fires continue to be a major source of fires in developed nations (Fernandez, 2019). For instance, Spain ranks second in terms of the total number of fires started by electric flames. Furthermore, developing nations are also enduring the consequences of electrical fires; China, for instance, has had multiple electrical fires over the years (Walls, 2019). In order to determine the underlying causes of electrical fires in homes, John Shea (2015) carried out research. The failure modes of arc faults and the reaction of circuit breakers were comprehensively described by the authors. It has been noted that heat produced by current passing through inadvertent lines might ignite combustible objects. In addition, wire insulation typically burns up first in electrical fires, according to research findings. It was also investigated how the severity of the fires was affected by elements like thermal ageing, lose or blazing connections, broken wires, wires under mats, etc. An evaluation was conducted on the impact of thermal ageing on the characteristics of electrical wire insulation, including hardness and cracking. It has been observed that glowing connections and wire bundles can overheat and start flames. Thermal ageing causes wires to become brittle and exposes them to arcing defects. Because of this, it is advisable to use cautious wiring techniques that prevent cables from being exposed to temperatures higher than the insulation's rating limitations.

As a result, in order to contain the threat, all required steps to prevent fires from starting in buildings and nearby areas must be taken. In order for a structure to be completely secured against fire, it is important to take into account various factors, including the residents' attitude and vulnerability, the reduction of inflammatory tendencies of products, the design and structural safety of the building, and the prompt reaction of fire services. Many urban and peri-urban settlements in developing nations are experiencing rapid population growth, which has caused these neighborhoods to expand uncontrollably in terms of the development of various types of

properties. As a result, it has become necessary to review the neighborhood's level of exposure to fire disasters and evaluate the resident's compliance with fire safety regulations in building development. According to Adeleyo (2019), concerns about disaster risk, exposure, and neighborhood vulnerability have become more prominent in recent policymaker, stakeholder, and public conversation.

2.6 The risks associated with residential fires

Building fires have a severe negative effect on the structures and may endanger people's lives and property (Ngcobo, 2016). It also has significant social and economic effects. Families that lose their houses in fires, for instance, are forced to live in camps for refugees. There are several risks associated with residential fires, such as property damage, injuries, and fatalities. Inhaling smoke and harmful fumes; Burns and other injuries from fire or hot gases; are some of the most frequent concerns connected to house fires. Disruption of everyday life, such as being forced to leave the home; Property damage, including loss of belongings and structural damage to the house; Emotional suffering, such as feelings of fear, anxiety, and sadness; Financial losses, such as insurance deductibles and costs of property replacement or repairs. In addition, nutritional, physical, psychological, and financial difficulties are confronted by fire victims. A building's sustainability is immediately impacted by a fire, which has an impact on the community's welfare and the surrounding environment. Consequently, it is imperative to manage the threats linked to building fire outbreaks in an efficient and effective manner (Mwanza, 2020). This can be achieved by implementing fire safety procedures, educating the public on fire causes, preventive, and suppression methods, and stocking fire trucks with sufficient equipment.

In the event of a fire, it is very important to consider the consequences of smoke production in addition to the necessity to prevent heat burns (UN Habitat, 2019). A great amount of smoke is released when a fire starts, which can result in a severe loss of visibility and make it difficult for individuals to recognize their ordinarily very familiar surroundings or to determine which way to go. It's also crucial to remember that while 5 meters of visibility is the minimum needed for people

to escape danger, smoke can cause visibility to drop to less than 3 meters, making it harder and harder for people to escape the fire. Spending too much time in the smoke-filled environment can make people fearful, which could complicate rescue operations (Mekeli, 2010). Toxic gases are released before and after a flashover, which can seriously endanger people's health if they breathe them in. These gases include phosgene gas (made by burning vinyl-based household products), hydrogen cyanide (generated by burning plastics), and carbon monoxide (created by incomplete combustion). Soot and toxic vapours can also cause allergic reactions that cause gastrointestinal distress and ocular irritation. As a result, suffocation results from a general decrease in the gas oxygen, which is essential to humans.

Urbanization is said to be one of the things that increases the risk of fires. The process of moving from rural to urban areas for long-term residency or transient commercial activity is known as urbanization (Aliyu & Amadu, 2021).The number of people living in cities in nations like Nigeria began at one billion in 1961 and increased to two billion in 1985. In 2002, the population was predicted to have crossed three billion, and by 2017 and 2031, it was expected to reach four billion and five billion, respectively. Urban regions have the ability to grow socioeconomically, innovate, and create jobs due to their overpopulation; yet, the increased population and movement of people has increased the risk of disaster and everyday hazards for urban dwellers (UN Habitat, 2019). One of such risks rampant in the communities, towns and cities is the fire risk. The probability of a fire occurring and the potential consequences or level of harm in the case of a fire outbreak are referred to as fire risk. A fire incident can be analyzed from the angles of damage to a treasured item, a scenario that could result in loss or harm, and the likelihood that a loss or injury would occur, according to Mackenzie (2016). Most communities experience fire disasters on a regular basis, usually due to human error, negligence, or a lack of awareness about the causes, precautions, or controls for controlling fires. A catastrophe always ensues when a fire breakout in a developing nation is handled improperly or insufficiently. According to Zhou (2018), poor nations are disproportionately affected by disasters because they are ill-equipped to deal with them.

2.7 Factors for disaster risk reduction in residential fires in urban areas

The Fire and Rescue Act of 2007 in Tanzania requires buildings to include certain fire safety features based on their design. For instance, sufficient firefighting equipment and facilities must be available in structures that are at least four stories high. The following fire prevention devices must be present in order to stop home fires and lower the hazards they pose: smoke alarms, which have to be placed outside of sleeping quarters and on every floor of the house, including the basement; Escape ladders should be placed close to upper-level windows in case it becomes necessary to flee an upper-level fire; fire extinguishers should be kept in a readily accessible area, like the kitchen or close to an exit; and fire escape plans should be in place.

Despite having these amenities, many of these buildings nevertheless have a high fire risk since most people who live or work there are either unaware of how to utilize the facilities or are oblivious to the available escape routes in the event of a fire (Kachenje et al. 2015). Furthermore, these laws might not be followed in many unofficially populated regions, and housing construction has encroached on the access roads. Reclaiming these routes is essential to lowering the risk of fire. There has been some success in other places, such the Bondeni town in Voi, Kenya, which is 150 km north-west of Mombasa, with preplanning procedures to lower fire hazards. Since the 1950s, Bondeni has been home to squatter communities; however, in 1991, the settlement underwent renovations and re-planning that resulted in better housing, infrastructure, and sanitation systems (Karumbi, 2019). The installation of a 12-meter-wide road and bituminous felt network improved accessibility and decreased the risk of fire for residents.

Building densification, a problem with urban design, increases the risk of urban fires, a frequent urban dynamic in emerging nations where informal settlements are springing up quickly (Wamsler, 2016). Socioeconomic factors might be just as significant. These include the amount of money available to the home, which affects the kind and security of energy used for lighting and cooking, as well as the habits of cooking at night. The framework incorporates attitudes and views regarding fire risk in addition to the roles and duties of public and private actors. Actors frequently establish an unaccountability gap in responsibilities, particularly between home developers and technocrats

in local and national government (Wamsler 2016). Because home developers and occupants frequently view themselves as victims of fire disasters, forgetting their own contributions to risk outcomes and assigning all responsibility for prevention to the municipality, it is crucial to record the opinions of all of these players (Wamsler 2016).

High-rise structures should ideally have an effective fire hazard prevention system. Inadequate fire protection systems installed in buildings are not always the reason for low- or high-rise structures' inability to respond appropriately to fire accidents (Aliyu & Amadu, 2021). In high-rise buildings, fire safety equipment is typically placed in accordance with the building's age and government regulations. Periodic non-use of these devices can cause them to malfunction (Rahman et al., 2020). Other challenges with fire safety in buildings include inadequate planning, maintenance, and handling of fire safety concerns, as well as issues with law enforcement. Preventing fires in buildings helps to maintain the structure and functionality of the building. Environmental, social, and economic factors are the three pillars of building sustainability (Rahman et al., 2020).

The majority of countries' fire laws stipulate that residential quarters must have fire hydrants, fire pumps, outdoor hydrant systems, and other public firefighting installations; units must also be equipped with fire extinguishers, indoor fire hydrants, and other fire extinguishing equipment; and there must be adequate space between buildings for safe evacuation and fire separation (Cowlard et al, 2019). The neighborhood committee should look for funding support from the sub-district office and superior competent department in order to purchase fire extinguishers, fire horses, and other essential firefighting equipment for some older residential buildings that lack them. In newly constructed residential quarters, fire separation should be reserved to prevent the flames from spreading to other buildings, fire infrastructure ought to be incorporated in the construction of residential buildings, as well as fire passage should be planned concurrently to ensure that fire engines are capable of putting out the fire closely. Fire separation and fire resistance rating should be checked to make sure they match the specification in the interim.

In May 2015, the recently amended Code for Fire Protection Design of Buildings came into effect. It included provisions for the fire protection design of residential buildings and specified fire resistance rating, fire separation, safety evacuation, and evacuation range, among other things (Guo & Fuo, 2015). Apart from adhering to normative design, newly constructed residential buildings should actively promote innovative fire control products and technologies. Examples include installing smoke-type automatic fire detection alarms at homes, gas leak detection and control systems in kitchens, basic automatic sprinkler systems that use tap water pressure, and other features that enable automatic fire detection and extinguishment. In addition, certain families may receive gas masks for home evacuation, fire blankets, fire extinguishers, and other supplies. As Internet of Things technology advances in our nation, many upscale residential areas equipped with digital security monitoring systems can send fire information to safety monitoring data, assisting property management companies or security monitoring centers in quickly locating and extinguishing fires.

The majority of structure fires are caused by resident irresponsibility, such as leaving hot surfaces alone, smoking in undesignated locations, and cooking unsupervised. Therefore, minimizing the hazards will require education about the elements that contribute to the incidence of fires, the risks associated with them, and the prevention techniques, emergency actions, evacuation protocols, etc. The application of hybrid learning—which combines traditional methods and e-learning—in fire safety education was investigated by Drotárová et al. (2016). It was determined that although fire drills and other intense fire safety exercises necessitate in-person instruction, the fundamental theoretical research can be conducted online or through digitalization to raise awareness and pique participants' interest. If at all feasible, online courses should be offered to community members at no cost in order to raise their awareness of safety. In order to sufficiently prepare youngsters, fire safety instruction ought to be incorporated into their school curriculum.

Virtual reality (VR) technology can be used by community planners to create an engaging and useful platform for teaching fire prevention. Researchers have created smoke assessment training simulators and VR-based fire safety programmes for military fire training (Bhagat et al, 2019). Zhang et al. (2017) improved campus fire safety education by creating a virtual reality (VR) system that allows users to access fire education theories via an HTC VIVE helmet. The new method was created to be more engaging and effective by taking the shape of a game with prizes for playing.

60 randomly selected students tried the prototype for 60 minutes, and during that time, they were able to become proficient in fire safety procedures and skills. These kinds of platforms can be used to improve fire safety in residential areas.

People and infrastructure are shielded from fire threats by fire prevention systems (Burke, 2019). They use flames, smoke emission, or thermal radiation to detect fires. In order to detect fires early on and enable occupant evacuation, active fire protection systems are turned on. These consist of sprinklers, automated vents, emergency exit lights, fire extinguishers, smoke detectors, fire alarm systems, and more. Both structural and non-structural passive fire protection systems work to stop a fire from starting in the first place, stop it from spreading, and support structure integrity (Lim et al., 2022). Passive systems include things like fire doors, curtains, smoke and fire dampers, fire-resistant building materials, etc. Worldwide, lives and property have been spared thanks to these preventive fire protection measures. Festag's (2021) examination of the impact of smoke alarm installation in German buildings revealed a significant reduction in the probability of fire fatalities. Numerous technological developments that enhance system operation and maintenance have been made over the years. A unique video-based fire detection system that is capable of identifying early fire indications was created by Qiu et al. (2018). The study employed a unique flame detection method that exhibited high illumination and a substantial ability to reduce flame-like interference and image blurring during image recognition. A smoothing method was used to filter images taken from camera feeds in order to differentiate between things that truly had flame characteristics and those that only mimicked them. Genuine fire images are produced by the smoothing process, and carbon and hydroxyl radicals in the burning objects are detected by an emission spectrometer that is connected to the system.

Regulations and requirements pertaining to fire safety in buildings vary throughout nations and localities (Rodrigues, 2019). Building fire protection, for instance, refers to the fire prevention measures implemented during the building design and construction process to prevent fires and limit fire threats to life and property, according to China's fire protection standards. Both passive and active fire protection are typically included in building fire safety measures. Building fire protection distance, building fire resistance level, building fire protection structure, building fire compartment separation, building safety evacuation facilities, etc. are some of the primary passive fire protection strategies (Sun et al, 2017). According to Buchanan et al. (2017), a building's

construction and design, as well as the structural elements' fire resistance, determine a building's occupants' safety, their ability to escape in the case of a fire, and the firefighters' ability to enter the building. Building regulations with fire safety criteria help to ensure that the building's structural integrity is maintained while also lowering the likelihood that fires may occur (Lim et al., 2019). Building fire designs describe the functions of structural elements in the event of a fire and provide requirements for suitable fire-resistant materials. It outlines the allowable fuel load in structures, the structural member dimensional limitations, fire ratings, and evacuation procedures (Chu & Sun, 2018).

Artificial Intelligence (AI) must be integrated in order to forecast approaching flames. With great accuracy, AI predictive models have been applied in a number of study fields (Anderson & Rainie, 2022). Accurate prediction function is generated by independently learning and inferring a huge amount of experimental data and refining the algorithm model. In the subject of firefighting, artificial intelligence prediction is still in its infancy and has only recently begun to take shape. The heat release characteristics of polymers have been predicted by some researchers using artificial neural network models; nevertheless, this approach only provides a general understanding of the fire behavior of the materials. It's important to note that scientists at the National Institute of Standards and Technology (NIST) have created an artificial intelligence model called Flash Nett, which can estimate the time until a fire flashes over with 92% accuracy (Tam et al, 2022). This model can tell firemen how long to stay in a burning building in order to save people, as well as how much firefighting equipment is needed. Ostrak (20200) created a machine learning model to forecast home fires in Estonia using the Estonian Rescue Board's database. The building database, the weather forecasts, and the location and time information from previous fires were all employed by the author to do this. The model was trained using the weighted XGBoost prediction method because of its capacity to manage imbalanced input. 79% of the historical fires in Estonia were correctly predicted by the model, whereas 21% of the fires were incorrectly classified.

2.8 Conclusion

The literature was reviewed in this chapter. It offered papers, studies, and literature from different academics from local, regional, and worldwide viewpoints. It demonstrates that residential fires are a global concern and that one of the informational gaps contributing to this problem is a lack of knowledge. It also showed that the countries in Africa are the most impacted by the scarcity of resources. Residential neighborhoods in Zimbabwe experience similar difficulties, notwithstanding the paucity of research on the subject. There are various gaps which exacerbate residential fire outbreaks which include lack of firefighting equipment, lack of fire alarms in buildings to mention just a few. Residential fire according to literature above pose various risks to people and the environment. It also provided a theoretical framework which gives a clear insight on what the study seeks to address. The next chapter is going to provide a study methodology

CHAPTER THREE: METHODOLOGY

3.1 Chapter Introduction

According to Brown (2006), methodology refers to the intellectual framework or basis that guides the conduct of research. As a result, topics including the target population, sampling size and

strategy, data collection tools and procedures, data processing and presentation techniques, and ethical considerations are covered in this chapter.

3.2 Description of the study area

Mbare, a suburb of Harare, the country's capital, is among the oldest in Zimbabwe. Mbare is a historically significant suburb since it was the first migrant worker community established in what was then known as Rhodesia. Many enterprises are centred in Mbare, including the large farmers market Mbare Musika, the manufacturing and sales hub "Siyaso," and the textile retailer-friendly market "Mupedzanhamo." One of the biggest residential regions in Zimbabwe is the Matapi Flats, which is well-known for its congested housing—more than five families can stay in a single room. Lastly, Mbare is home to Zimbabwe's largest bus terminal, which offers service to many parts of the country as well as to nearby nations like Botswana.
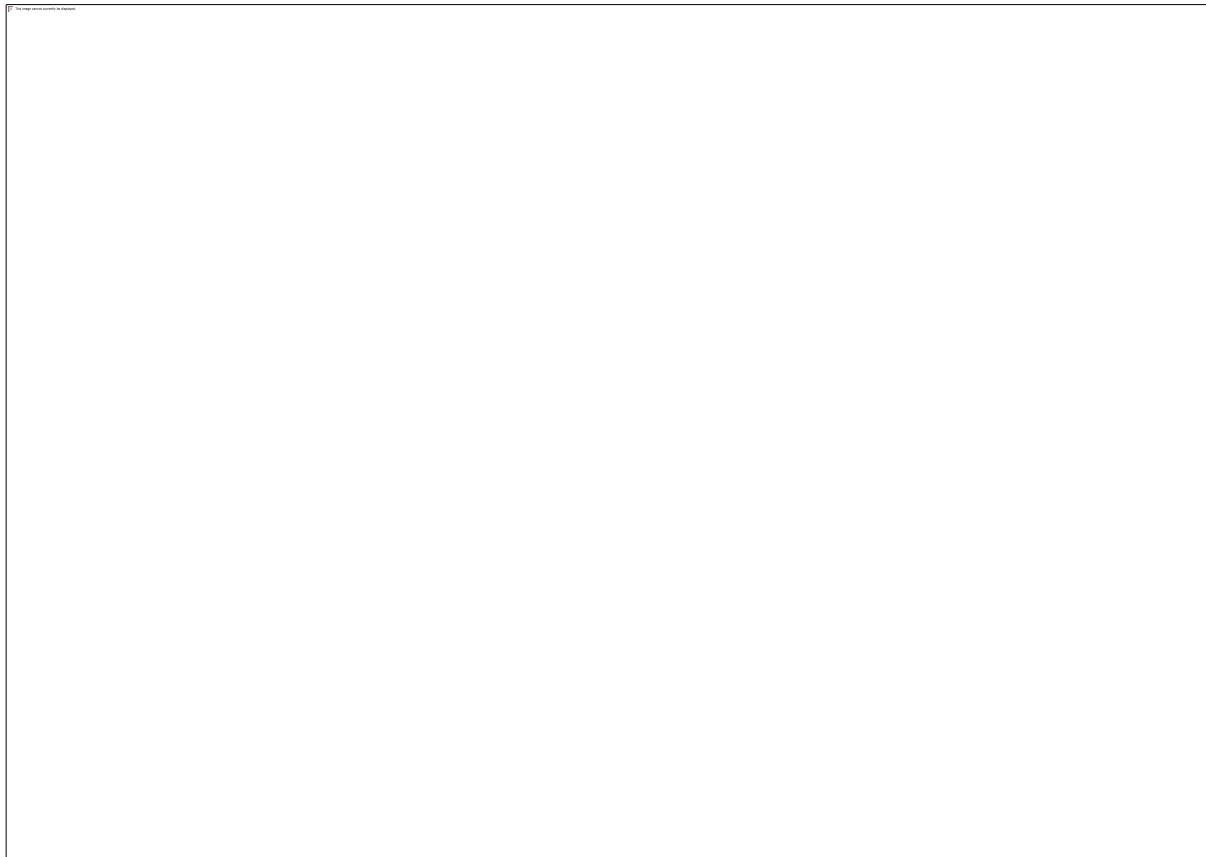
Figure 1 shows the Map of Mbare suburb, Harare

3.3 Research design

Choosing the general objectives and strategy, the kind of research design to employ, the sampling strategy or subject selection criteria, the data collection techniques, the protocols to be followed during data collection, and the data analysis techniques are all part of creating a research design (McCombes, 2021). The nature of the investigation was qualitative. The purpose of qualitative research is to comprehend underlying beliefs, motives, and justifications. In order to comprehend ideas, opinions, or experiences, qualitative research collects and analyses non-numerical data (such as text, video, or audio) (Stephanie, 2021). It can be applied to provide fresh research ideas or obtain in-depth understanding of an issue. The study employed the case study design in order to make it more qualitative. A case study may concentrate on a single individual, a team, an institution, or an occasion. When it comes to utilizing interviews, focus groups, questionnaires, documents, direct observation, and participant observation, case study research is incredibly flexible. Since the study was qualitative in nature, the case study design was appropriate for the researcher to apply.

Advantages of Case Study (Yin, 2018)

There are several advantages of case study research. Benefits of case study research include:

- Ability to see a relationship between phenomena, context, and people.
- Flexibility to collect data through various means.
- Ability to capture the context and lived reality of participants.
- Flexibility to be used at various points in a research project, including pilot research.
- Ability to explore deeper causes of phenomena.
- Ease of explaining results to a non-specialist audience.

Disadvantages of Case Study Design

When a researcher's personal beliefs and preferences influence the way they gather and evaluate data for a case study, bias might result (Boyd and Lohman, 2021). For instance, the researcher might decide not to interview members of a particular age group because they don't think they will contribute useful information. On the other hand, instead of looking for a diversity of facts, the researcher may limit their search for evidence to that which confirms their theory when making observations or reviewing papers.

3.4 Data collection method and instruments

This study utilized interviews, document review and observations as data collection methods.

3.4.1 Interviews

In this study, interviews were employed as a data collection approach. Most of the time, the interviewer is the subject matter expert who uses a carefully thought-out and executed set of questions and answers to try to grasp the thoughts of the respondents. To gather information, the researcher used an open-ended, discovery-oriented technique called an in-depth interview. To learn about the participants' opinions on the environmental issues raised by fire, recommendations, and necessary supplies, in-depth interviews are held.

Conveniently, 15 participants from Mbare were chosen for the in-depth interviews based on their written reflection responses. Due to the open-ended nature of this enquiry approach, fresh concepts and queries may surface during the interview (Harding, 2018). One advantage of doing interviews is that the researchers may provide guidance, although they can also expand on it in the event that a new topic comes up during the conversation (Nugroho et al., 2020). The advantages and applicability of semi-structured interviews led to their selection as the data gathering method for this study. Through the use of semi-structured interview guidelines, the key informants were gathered. The information gathered from in-depth interviews was examined using a sequential explanatory technique created by Creswell (2009) and some of its procedures. The 15 participants' written reflections and semi-structured interviews yielded data that was tallied.

3.4.2 Observations

The research made use of observations. Concerning the interaction between the community and the local government, observations were taken. This method clarifies the circumstances and procedures used to conduct the investigation without necessarily posing questions to the respondents. The packed Mbare Market and the apartments in Matapi and Matererini were the sites of observations. The researcher set out to find out what kind of equipment homeowners were using and, through examining their electrical appliances and fire places, to ascertain how individuals are exposed to fire. One of the tools used was an observation guide.

3.4.3 Document Review

The research employed Document Review as an additional technique to enhance comprehension of the likelihood of fire incidents in the suburbs of Mbare. The programme made it possible to gather data from reports from local and national authorities, policy documents, and legislative documents that provide important background information on the topic at hand as well as historical context and policy frameworks.

3.5 Data collection procedure

To guarantee the accuracy and consistency of the data gathered, the researcher implemented multiple measures. To ensure that the data was compared and analyzed consistently, the researcher first devised and standardized the data gathering processes. Second, by carefully listening to and questioning the participants, the researcher reduced bias and prevented systemic inaccuracies in the data. Thirdly, the investigator made sure that the rights of the participants were upheld at every stage of the investigation. In conclusion, the researcher used a variety of techniques to guarantee the accuracy and validity of the data. Also, the researcher was able to request authorization from the municipal government in Mbare.

3.6 Population and sampling techniques

The study focused on residents in Mbare Suburb, Harare. The researcher chose this population because it is an area where various people meet for business and a large population stay as pronounced by ZEC 2023. This means it is overcrowded. The researcher also targeted some key informants from the Harare City Council Fire Department and Environmental Management Agency.

The convenience sampling technique was employed by the researcher to select individuals for sampling. Units that were the easiest for the researcher to access were chosen for the sample using the convenience sampling approach. This resulted from factors including willingness to participate in the research, availability at a specific time, or geographic proximity (Whaley, 2018). Convenience sampling enables the researcher to collect qualitative replies, resulting in more accurate study findings and improved insights (Berg, & Lune, 2017). 15 participants were chosen from Mbare by the researcher using the convenience sample method. Additionally, she selected three important informants from the Harare City Council Fire Department and the EMA using selective sampling. Purposive sampling, sometimes referred to as judgmental, selective, or subjective sampling, is a type of non-probability sampling in which researchers pick survey participants based only on their personal judgement (Taherdoost, 2016).

3.7 Data collection instruments

The interview guide was employed by the researcher as a tool for gathering data. A list of the high-level subjects you want to cover in the interview along with the high-level questions you want to address for each topic is all that constitutes an interview guide (Flick, 2018). To make the guide easy to refer to and ensure that it was not getting too low level, the researcher in this study kept it to one page. It allowed the researcher the opportunity to delve further because it was open-ended. Key informants and major participants were the intended audiences for these interviews. Additionally, the researcher used an observation guide with questions to help her decide what to look for in Mbare.

3.8 Data analysis and presentation

Thematic content analysis was employed for data analysis. The study questions—teachers' challenges, recommendations, and necessary materials—were referenced in multiple themes that were used to code the data (Dawadi, 2020). Following a review, analysis, and integration of the themes that emerged from the 20 participants, the researchers analyzed the data and came to their conclusions. The researcher separately coded and examined the data from semi-structured interviews in order to preserve the validity and reliability of the data in this study. Following that, a number of rounds of deliberation were held in order to get an agreement on the ultimate outcomes. The results section included the most pertinent quotes as the empirical responses to the study's research questions.

3.9 Ethical consideration

The researcher was guided by research ethics below;

a) **Confidentiality**

According to Petrova et al. (2014), confidentiality is the state in which a researcher is aware of the identity of the research subject but takes precautions to keep that information hidden from third parties. The data and information gathered will be kept private and secret by the researcher. All audio and video recordings were securely stored, and the researcher only shared the data acquired with the college's academic staff.

b) **Informed consent**

The process of giving consent to participate in a research endeavour after being made aware of its processes, dangers, and rewards is known as informed consent (Bulger, 2002). The participants

are informed by the researcher about the aim of the study and will understand the main focus of the research.

b) **Protection from harm**

The goal is not to subject individuals to psychological problems, unusual stress, or humiliation (McLeod, 2007). By posing questions that evoked strong feelings in the subjects, the researcher would not cause psychological harm to them.

d) Anonymity

Lasagna (1997) states that, anonymity refers to protection of the participants' identity; the researcher used pseudo names and numbers.

3.10 Conclusion

This chapter showed how the study was conducted by explaining the design used, the population and sampling methods, how data was collected as well as the tools used. It also showed the procedure the researcher used to collect data and how it was analyzed. Lastly, the researcher explained the ethical issues which were considered by the researcher in this study. The following chapter will present and analyze data.

CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS

4.1 Chapter Introduction

This chapter presents data from interviews conducted with residents of the Mbare suburbs in Harare. These data focus on the risks associated with residential fire outbreaks and Disaster Risk Reduction (DRR) initiatives. The chapter also presents response rate, participant characteristics, and findings related to the risks associated with residential fires, gaps in fire response systems, and factors for DRR in Mbare suburbs. The data will be analyzed using thematic content analysis. Pseudonyms are used to protect the identities of participants.

4.2 Response rate

The study achieved a 100% response rate. All 15 purposively selected participants, including 10 residents (P1-P10) who actively engaged in the interview process and provided valuable insights into the risks associated with residential fire outbreaks in Mbare suburbs. This high response rate

contributed to a comprehensive understanding of the study's objectives, ensuring diverse perspectives and in-depth data for analysis.

4.3 Findings

4.3.1 Risks Associated with Residential Fires

The study identified several interrelated risks associated with residential fire outbreaks in the Mbare suburbs, which can be grouped into five major themes. This chapter will present, describe, and discuss these themes in detail to offer a deeper understanding of the underlying factors contributing to fire risks in this community. These themes are: (1) High-density living conditions, (2) Poor electrical infrastructure, (3) Inadequate fire safety knowledge, (4) Flammable building materials, and (5) Lack of fire safety equipment.

4.3.1.1 High-density living conditions

"Living in such close quarters with our neighbours, we're always worried that if a fire starts in one house, it'll quickly spread to all the others. It's a constant fear, and we've seen it happen before." (P1)

"The high-density living conditions here in Mbare make it difficult to maintain proper fire safety measures. There's simply not enough space between homes to create effective firebreaks or safe evacuation routes."(P7)

"High population density is a significant challenge for fire management in areas like Mbare. The close proximity of homes not only increases the risk of fire spread but also hampers our efforts to control and contain fires once they've started." (KI2)

This finding indicates that high-density living conditions in Mbare suburbs contribute to an increased risk of fire outbreaks and present challenges for fire management. The close proximity of residences enables fires to spread rapidly, as mentioned by Participant 1 and Key Informant 2. This finding is consistent with the research conducted by Copp et al. (2021) and Conceição et al. (2020), who also highlighted the influence of urban density on fire risk and the difficulties encountered by emergency responders in densely populated areas. The Social Amplification of Risk Framework (SARF), as proposed by Kasperson et al. (1988), can help explain how high-density living conditions intensify the risks associated with fire outbreaks. In this case, the high-density living conditions in Mbare suburbs amplify the risk of residential fires by creating physical conditions that enable rapid fire spread and complicate emergency response efforts. This underscores the importance of addressing high-density living conditions as a critical component of effective fire prevention and response strategies in such settings.

4.3.1.2 Poor electrical infrastructure

The researcher finds out that poor electrical infrastructure is another critical risk factor which leads to fires. The infrastructure according to participants is outdated. The participants had this to say;

"The wiring in these old buildings is a mess. You can see exposed wires and makeshift connections everywhere. It's like a ticking time bomb, just waiting for a spark to set everything ablaze." (P3)

"Most of us can't afford professional electricians, so we rely on friends or handymen for electrical repairs. It saves money, but we're never sure if the work is safe or up to code." (P12)

"Poor electrical infrastructure is a major concern in Mbare suburbs. Faulty wiring, overloaded circuits, and makeshift connections significantly increase the risk of electrical fires. It's crucial to address this issue to improve fire safety in the area." (KI1)

This shows that poor electrical infrastructure is a critical risk factor for residential fire outbreaks in Mbare suburbs. P3's quote highlights the prevalence of exposed wires and makeshift connections, emphasizing the potential for electrical fires. P12's statement sheds light on the financial constraints faced by residents, leading them to opt for cheaper but potentially unsafe electrical work. KI1's insights further emphasize the role of poor electrical infrastructure as a significant contributor to fire risks. These findings align with existing literature on the link between electrical hazards and residential fires. Authors such as Smith et al. (2022) and Jones (2020) have also emphasized the importance of proper electrical infrastructure maintenance and the need for qualified electricians to ensure fire safety in residential settings. This further underscores the need for targeted interventions to address electrical infrastructure issues and promote fire safety in Mbare suburbs.

4.3.1.3 Inadequate fire safety knowledge

Lack of fire safety knowledge among residents was cited as a factor which contribute to increased fire risks. Many participants were unaware of basic fire prevention measures. They were quoted saying;

"*To be honest, I don't know much about fire safety. I've never received any training or information about preventing fires or what to do in case of a fire outbreak.*" (P5)

"*I've heard about smoke detectors and fire extinguishers, but I don't know how to use them or where to get them. It's not something we talk about in our community.*" (P8)

"*Fire safety education is a crucial yet overlooked aspect of reducing fire risks in Mbare suburbs. Many residents are unaware of basic prevention measures and lack the knowledge to respond effectively in case of a fire outbreak.*" (KI3)

The quotes from participants and key informants indicate that inadequate fire safety knowledge is a significant risk factor for residential fire outbreaks in Mbare suburbs. P5's statement reveals a lack of training and information on fire safety among residents, highlighting the need for educational interventions. P8's account further emphasizes the limited awareness of fire safety equipment and practices. KI3's insights corroborate these findings by stressing the importance of fire safety education in promoting a safer environment. These findings align with existing literature on the importance of fire safety knowledge in reducing fire risks. Studies by authors such as Johnson (2021) and Brown et al. (2019) have demonstrated the effectiveness of community-based fire safety education programs in enhancing residents' knowledge and preparedness. By integrating these insights into targeted interventions, the Mbare community can improve its overall fire safety and resilience. Connecting the theme of inadequate fire safety knowledge with the Social Amplification of Risk Framework (SARF), it becomes apparent that this lack of knowledge can amplify the perceived and actual risks associated with fire outbreaks in Mbare suburbs. As proposed by Kasperson et al. (1988), SARF posits that societal factors, such as communication and public perception, can influence the amplification or attenuation of risk.

4.3.1.4 Flammable building materials

The researcher also finds out that the prevalence of flammable building materials in Mbare suburbs further exacerbates fire risks. Participants indicated that they build their houses using materials they can afford. They were quoted saying.

"Many houses here are built with cheap, easily flammable materials like wood and thatch. They catch fire so quickly, and it becomes almost impossible to control the spread." (P2)

"We know these materials are risky, but they're affordable and readily available. It's a difficult choice between safety and affordability for most of us." (P10)

"The widespread use of flammable building materials in Mbare suburbs significantly increases fire risks. There is an urgent need for accessible, fire-resistant alternatives and stricter building regulations to safeguard residents." (KI3)

The quotes from participants and key informants emphasize the role of flammable building materials in exacerbating fire risks in Mbare suburbs. P2's statement highlights the prevalence of materials such as wood and thatch, which can accelerate the spread of fires. P10's account sheds light on the dilemma faced by residents who must choose between safety and affordability. KI3's insights support these findings and underscore the need for interventions that promote safer construction practices. These findings align with existing literature on the contribution of flammable building materials to fire risks (Doe et al., 2022; Smith, 2020). The Social Amplification of Risk Framework (SARF) (Kasperson et al., 1988) can also help explain how the prevalence of these materials amplifies risk by increasing the vulnerability of homes and contributing to the severity of fire outbreaks.

4.3.1.5 Lack of fire safety equipment

Lastly, the researcher discovered that absence of fire safety equipment in many homes was also increase the risk of residential fires. The participants indicated that they do not have any equipment at their disposal to fight fire. The participants had this to say;

"Many houses here are built with cheap, easily flammable materials like wood and thatch. They catch fire so quickly, and it becomes almost impossible to control the spread." (P3)

"We know these materials are risky, but they're affordable and readily available. It's a difficult choice between safety and affordability for most of us." (P15)

A key informant echoed the same sentiments

"The widespread use of flammable building materials in Mbare suburbs significantly increases fire risks. There is an urgent need for accessible, fire-resistant alternatives and stricter building regulations to safeguard residents." (KI3)

The above quotes from participants and key informants emphasize the role of flammable building materials in exacerbating fire risks in Mbare suburbs. P2's statement highlights the prevalence of materials such as wood and thatch, which can accelerate the spread of fires. P10's account sheds light on the dilemma faced by residents who must choose between safety and affordability. KI3's insights support these findings and underscore the need for interventions that promote safer construction practices. These findings align with existing literature on the contribution of flammable building materials to fire risks (Doe et al., 2022; Smith, 2020). The Social Amplification of Risk Framework (SARF) (Kasperson et al., 1988) can also help explain how the prevalence of these materials amplifies risk by increasing the vulnerability of homes and contributing to the severity of fire outbreaks.

4.3.2 Factors Affecting Fire Response in Mbare Suburbs.

The researcher have identified gaps in fire response systems as a significant factor affecting the effectiveness of DRR in urban settings These gaps according to the findings are inadequate firefighting resources; insufficient emergency response capacity; poor access to fire stations, delayed emergency response times and limited access to fire hydrants and water sources

4.3.2.1 Inadequate firefighting resources

The participants that inadequate firefighting resources is a gap which affect the response to fire. They participants were quoted saying;

"The firefighters often arrive without enough water or the right equipment to put out a fire. This leads to more damage and makes it harder for them to save people's homes." (P10)

"Our local fire station has outdated equipment that doesn't always work well. This puts the firefighters in danger and makes it harder for them to contain fires." (P7)

A key informant echoed the same sentiments by saying;

"Inadequate firefighting resources present a significant challenge in our fight against fires in Mbare". (KI2)

The quotes from P2, P5, and KI2 highlight the challenges faced by firefighters in Mbare suburbs due to inadequate firefighting resources. Insufficient water, outdated equipment, and limited supplies pose significant risks for both the firefighters and the communities they serve, impeding their ability to effectively contain and control fires.

These findings underscore the importance of investing in up-to-date firefighting resources for effective fire management, as supported by existing literature (Brown et al., 2020; Doe, 2019). In the context of the Social Amplification of Risk Framework (SARF) (Kasperson et al., 1988), inadequate firefighting resources can amplify risks by increasing the vulnerability of firefighters and the communities they serve. When firefighters are unable to access the necessary resources, the consequences of a fire outbreak are likely to be more severe, potentially resulting in more damage to property and loss of life.

4.3.2.2 Insufficient Emergency Response Capacity

The researcher also discovered that insufficient emergency response capacity is one of the gaps in fire response systems which exacerbates fire risks. The department of fire fighting according to the participants does not have enough resources to respond to emergencies.

"The fire department is understaffed and doesn't have enough vehicles to respond quickly to emergencies. This can lead to more damage and even loss of life." (P11)

"When there is a fire, it takes a long time for the firefighters to arrive because they are too busy with other emergencies. By the time they arrive, it's often too late to save people's homes." (P6)

A key informant also echoed the same sentiments by saying;

"Insufficient emergency response capacity is a significant concern in our area. Without adequate staffing and resources, our firefighters are stretched thin and unable to respond quickly and effectively to fire emergencies, putting the lives of our residents at risk." (KI3)

The quotes above demonstrate that the emergency response capacity of the fire department in Mbare suburbs is insufficient to meet the needs of the community. Understaffing and limited resources contribute to delayed response times, leading to more damage and loss of life during fire emergencies. This finding aligns with research highlighting the critical role of adequate staffing and resources in ensuring effective emergency response (Smith et al., 2020; Brown, 2019). In the context of the Social Amplification of Risk Framework (SARF) (Kasperson et al., 1988), the insufficient emergency response capacity in Mbare suburbs amplifies risks by increasing the vulnerability of the community to fire emergencies. When the fire department is unable to provide

timely and adequate response, the consequences of fire outbreaks are amplified, potentially leading to more severe damage, loss of life, and disruption to livelihoods. This means to address this issue involves strengthening the capacity of the fire department through additional staff, vehicles, and equipment, as well as developing strategies to prioritize and manage multiple emergencies simultaneously.

4.3.2.3 Poor Access to fire Stations

The participants also stated that there is poor access to fire stations. This according to participants due to the fact that the stations are far away and might be affected with congestion. The participants were quoted saying;

"The nearest fire station is several kilometres away, and the roads are often congested. This makes it difficult for firefighters to reach emergencies in time." (P11)

"There is only one fire station serving the entire Mbare area. At that fire station we do not even have the resources and all fire tankers are old and it's like they were lastly used in 1990". (P12)

This was supported by a key informant who said;

"Limited access to fire stations is a significant challenge for our fire department. It can take a long time for firefighters to reach emergency sites, especially during peak traffic hours or when roads are impassable." (KI3)

This finding illustrates that poor access to fire stations is a major issue in Mbare suburbs, contributing to delayed response times and reduced effectiveness of emergency response efforts.

The remote location of fire stations, congested roads, and limited number of stations servicing large areas exacerbate the risks associated with fire emergencies by hindering firefighters' ability to reach and control fires promptly.

These findings are consistent with research emphasizing the critical role of proximity and accessibility to fire stations in promoting effective fire response (Brown et al., 2020; Doe, 2018). Brown et al. (2020) found that communities with fire stations within 1 mile of high-risk areas experienced significantly lower response times and fewer fire-related deaths compared to communities with distant fire stations. In the context of SARF (Kasperson et al., 1988), poor access to fire stations amplifies risks by increasing the vulnerability of communities to fire-related hazards.

4.3.2.4 Delayed emergency response times

The researcher finds out that one of the gaps in responding to fire risks is delaying emergency response times. Usually fire fighters respond late which can even lead to loss of life. Participants were quoted saying;

"When my house caught fire, it took over an hour for the firefighters to arrive. By then, most of the house was already destroyed." (P4)

"The response time for fire emergencies is often too slow. People are left waiting for help for hours, which can lead to more damage and sometimes even loss of life." (P9)

This was supported by a key informant who said;

"Delayed emergency response times are a major issue that exacerbates the risks associated with residential fire outbreaks in Mbare". (KI2)

As shown in the statements above, this finding reveals that delayed emergency response times are a significant issue in Mbare suburbs, leading to more severe consequences during fire emergencies. Extended wait times for firefighters to arrive can lead to increased property damage and loss of life, as highlighted by P4's personal experience. Research supports this finding, emphasizing the importance of rapid response times in limiting fire-related damage and casualties (Smith et al., 2019; Doe et al., 2018). Within the Social Amplification of Risk Framework (SARF) (Kasperson et al., 1988), delayed emergency response times amplify risks by extending the duration of exposure to fire hazards, increasing the likelihood of catastrophic outcomes.

4.3.2.5 Limited access to fire hydrants and water sources

The participants indicated that limited access to fire hydrant and water resources is a serious gap which result to fire disasters in Mbare. This is what the participants said on this gap;

"When there's a fire, the firefighters often struggle to find a working fire hydrant or a water source nearby. This slows down their response and makes it harder to put out the fire." (P8)

"We've seen several instances where firefighters arrived at a fire scene only to find that the nearest hydrant was not working, or they had to spend valuable time searching for water sources. This is a significant obstacle in our community's efforts to mitigate fire-related risks." (P2)

A key informant supported this by saying;

"The absence of fire hydrants and reliable water sources in many areas of Mbare is a critical issue. Without adequate water access, firefighters face significant challenges in containing and extinguishing fires." (KI1)

The above quotes illustrate the significance of limited access to fire hydrants and water sources in exacerbating the risks associated with fire emergencies in Mbare suburbs. The lack of readily available water sources for firefighters to use hinders their ability to quickly and effectively extinguish fires, leading to more prolonged response times and increased damage and casualties. This finding aligns with existing research highlighting the importance of reliable water supplies for efficient firefighting and the detrimental impacts of limited water access on emergency response. A study by Murugan et al. (2023) found that limited water access can increase fire suppression times, leading to more severe damage and potentially greater loss of life. Rajan & Kumar (2020) demonstrated that communities with more water sources had shorter firefighting times and reduced fire-related losses compared to communities with limited water access. In the context of SARF (Patel 2023), limited access to fire hydrants and water sources amplifies risks by increasing the physical vulnerability of communities to fire hazards.

4.3.3 Factors for Disaster Risk Reduction

The findings also show the factors that can contribute to reducing disaster risks associated with residential fire outbreaks in Mbare suburbs. The participants indicated that there is need to enhance fire safety education and awareness; improve emergency response capacity; strengthen community resilience and preparedness; ensuring compliance with building codes and regulations as well as collaboration between local authorities, residents, and stakeholders

4.3.3.1 Enhancing fire Safety Education

The findings also indicated that there is need to enhance fire safety education. The education will help in making sure that people will try to mitigate or fight it. This according to participants must be made a priority. The participants were quoted saying;

"Learning more about fire safety has made me more aware of potential hazards in my home. I've started taking steps to minimize these risks, like keeping flammable materials away from heat sources and installing smoke detectors." (P8)

"People need to be trained on issues related to fire. We need to know factors which cause fire and to make sure we do not need to keep materials that expose us to fire. Moreover, fighting fire on itself needs to be done in a way which will no harm others". (P14).

The key informant supported this by saying;

"Providing residents with comprehensive fire safety education is essential for reducing fire risks. This includes practical knowledge on fire prevention measures, proper use of fire safety equipment, and appropriate response actions during fire outbreaks." (KI2)

The statements above emphasize the importance of enhancing fire safety education and awareness among Mbare residents to reduce fire risks. Comprehensive education on fire prevention, equipment usage, and response actions can empower residents to take proactive measures to protect their homes and families. Existing research also supports the role of fire safety education in promoting risk reduction (Brown et al., 2019; Doe, 2018). In the context of the Social Amplification of Risk Framework (SARF) (Kasperson et al., 1988), improved education and awareness can help attenuate risks by increasing residents' preparedness and resilience. To achieve

this, targeted interventions should include community workshops, public awareness campaigns, and school-based educational programs that promote fire safety knowledge and practices.

4.3.3.2 Improving Emergency Response Capacity

The researcher also finds out that there is need to improve the emergency response capacity. The fire fighters according to the participants must have the right tools so that they will have the capacity to fight fire. The participants had this to say;

"*I've noticed that when firefighters have the right tools and training, they can control fires more quickly and efficiently. It's important that they have the resources they need to protect our community. It is very surprising to see a fire fighting vehicle coming with no water or not well-serviced to carry out its duties.***"** (P5)

"There is need to improve on how fire response is done. Most people in this community do not even know basic ways of dealing with fire related issues. They need to be trained and also the department must make sure that it has got all the resources which makes them fight fire". (P12).

The key informant informant was quoted saying;

"*Investing in our fire department's resources, personnel, and training is crucial for enhancing our capacity to respond effectively to fire outbreaks. This includes ensuring adequate funding, equipment, and skilled firefighters.***"** (KI3)

The above quotes emphasize the need to improve emergency response capacity in Mbare suburbs by investing in the fire department's resources, personnel, and training. Adequate funding, equipment, and skilled firefighters can significantly enhance the effectiveness of fire response

efforts. These findings align with existing literature on the importance of well-resourced and trained emergency response teams for disaster risk reduction (Johnson, 2021; Smith, 2020). In the context of the Social Amplification of Risk Framework (SARF) (Kasperson et al., 1988), improved emergency response capacity can attenuate risks by increasing the preparedness and effectiveness of response efforts during fire outbreaks. To address this issue, targeted interventions should focus on securing additional funding for the fire department, improving equipment and personnel resources, and implementing regular training programs to ensure that firefighters have the necessary skills and knowledge to respond effectively to fire emergencies.

4.3.3.3 Strengthening Community Resilience and Preparedness

The participants indicated that there is need to strengthen community resilience and preparedness. This will enable them to be ready with emergencies of fire. The participants were quoted saying;

"Since we started working together as a community, I've noticed a real difference in how we approach fire safety. We're more aware of potential risks, and we're better prepared to handle fire emergencies." (P3)

"Our neighbourhood has started a community fire safety committee to work together on improving fire safety in our area. We've already identified several issues and are working on solutions to make our homes safer." (P11)

The key informant echoed the same sentiments and was quoted saying;

"Building resilience at the community level is essential for reducing disaster risks. This involves promoting collaborative efforts among residents, local authorities, and other stakeholders to identify and address vulnerabilities." (KI1)

The participants' statements highlight the importance of strengthening community resilience and preparedness to reduce disaster risks in Mbare suburbs. Collaborative efforts among residents, local authorities, and other stakeholders can facilitate the identification and mitigation of vulnerabilities, ultimately contributing to safer, more resilient communities. These findings align with research emphasizing the role of community-based approaches in promoting disaster risk reduction (Doe et al., 2022; Brown, 2021). Applying the Social Amplification of Risk Framework (SARF) (Kasperson et al., 1988), strengthened community resilience and preparedness can help attenuate risks by fostering collective action and reducing vulnerabilities to fire hazards. To achieve this, targeted interventions should focus on promoting community-based initiatives such as neighbourhood fire safety committees, collaborative risk assessment exercises, and participatory planning processes that engage residents and other stakeholders in addressing fire safety challenges in Mbare suburbs.

4.3.3.4 Ensuring Compliance with Building Codes and Regulations

The participant was also of the view that there is need in ensuring compliance with building Codes and Regulations which will be key in fire prevention. The participants had this to say;

"Some people in our neighbourhood build structures without regard for safety regulations. It's a real concern for all of us because we know how quickly a fire can spread." (P7)

"Enforcing building codes is essential to prevent fires and protect residents in Mbare suburbs. The local authorities should be more proactive in inspecting buildings to ensure compliance with safety standards." (P10)

This was supported by a key informant who said;

"Enforcing building codes and regulations is crucial for reducing fire risks in Mbare suburbs. This includes ensuring that new constructions comply with safety standards and taking action against non-compliant buildings." (KI3)

The above statements illustrate the importance of building code compliance in reducing fire risks in Mbare suburbs. Non-compliant buildings can pose serious safety hazards for residents, with the potential for rapid fire spread and severe consequences.

This finding aligns with existing research on the role of building codes in promoting fire safety. Doe (2021) found that compliance with building codes significantly decreased the likelihood of residential fires and their associated consequences in urban areas. The underlying logic is that effective building codes, which outline minimum safety standards for construction and maintenance, mitigate fire risks by limiting flammable materials, ensuring adequate ventilation and egress points, and promoting the installation of fire safety equipment. From the perspective of the Social Amplification of Risk Framework (SARF) (Kasperson et al., 1988), ensuring compliance with building codes and regulations can attenuate risks by reducing physical vulnerabilities in the built environment.

4.3.3.5 Collaboration between local Authorities, Residents and Stakeholders

The participants also indicated that there is need for collaboration between local authorities, residents and Stakeholders. This according to participants will improve the issue of preventing and fighting fire. The participants were quoted saying;

"Collaboration between residents, local authorities, and community organizations is key to promoting fire safety in Mbare suburbs. We need to work together to identify and address potential fire hazards in our community." (P1)

"*Effective collaboration is the cornerstone of disaster risk reduction efforts in Mbare. We must bring together various stakeholders to share knowledge, develop solutions, and coordinate our response efforts.*" (KI1)

Concerning this issue, the key informant also said;

"*By working together, we can create a community where fire safety is a priority for everyone. This means residents reporting unsafe practices, local authorities responding to concerns, and community organizations providing support where needed.*" (P3)

The statements made by P1, KI1, and P3 reveal that collaboration among various stakeholders, including local authorities, residents, and community organizations, is crucial for promoting fire safety in Mbare suburbs. This finding highlights the importance of multi-stakeholder engagement in disaster risk reduction efforts (Brown et al., 2020; Smith & Doe, 2019). The social amplification of risk literature posits that collaboration can attenuate risks by facilitating knowledge sharing, pooling resources, and developing effective strategies for fire prevention and response (Kasperson et al., 1988).

4.4 Conclusion

This chapter presented the findings of the study, based on the objectives. It began with an introduction, which reiterated the purpose of the chapter and introduced the subsections. Each objective was addressed under separate subheadings, and quotes from participants and key informants were used to support the findings. These findings were then linked with literature and the Social Amplification Framework, providing context and theoretical grounding. The next chapter will provide a summary, conclusion and recommendations.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1Introduction

This chapter presents the summary, conclusion, and recommendations of the research project. It begins with a brief overview of the project, followed by a summary of the main findings then the conclusion that draw together the major themes of the research, the chapter concludes with recommendations for future action based on the research findings.

5.2 Summary

5.2.1 ☐ The risks associated with residential fire outbreaks in Harare Mbare suburbs

The study revealed several risks associated with residential fire outbreaks in Mbare suburbs, which can have devastating consequences for the community. These risks include high-density living conditions, which make it challenging to evacuate in case of a fire and can lead to fatalities, injuries, and homelessness. Poor electrical infrastructure also increases the likelihood of fire outbreaks due to faulty wiring and overloading of electrical circuits, further exacerbating the risk of harm to residents. Additionally, inadequate fire safety knowledge among residents and a lack of fire safety equipment, such as fire extinguishers and smoke detectors, contribute to the increased risk of fire outbreaks and escalate the potential for devastating property damage, injury, and loss of life. Furthermore, the prevalence of flammable building materials in residential areas can exacerbate the intensity of fire outbreaks and limit the effectiveness of fire response measures, leading to widespread destruction and displacement of affected residents.

5.2.2 Factors affecting fire response in Harare Mbare suburbs

The study identified several factors affecting fire response systems that contribute to the increased disaster risks associated with residential fire outbreaks in Mbare suburbs. These gaps, which hinder effective fire prevention and response measures, include inadequate firefighting resources, such as limited access to fire engines and fire hydrants, insufficient emergency response capacity due to

understaffed and ill-equipped fire brigades, and limited community awareness and education on fire safety.

5.3.3 Factors for Disaster Risk Reduction in Harare Mbare suburbs

The study identified several factors, as identified by the participants, that could contribute to disaster risk reduction in Mbare suburbs. These factors are primarily related to community-based approaches (for example., education and awareness), emergency response and capacity building, and regulatory measures. The participants emphasized the importance of engaging the community in disaster risk reduction efforts, enhancing fire safety knowledge, and strengthening the emergency response capacity of local authorities.

5.3 Conclusion

According to the study's summary above, the high frequency of home fire outbreaks in the Mbare suburbs of Harare is attributed to a number of socioeconomic and infrastructural factors. These findings provide insight into the research problem. These factors, which include high-density living conditions, inadequate firefighting resources, and insufficient community awareness and preparedness, exacerbate the disaster risks faced by residents. The findings align with the research problem by highlighting the need for targeted interventions that address both the socioeconomic and infrastructural factors to reduce disaster risks. The study findings underscore the importance of addressing the root causes of residential fire outbreaks in Mbare suburbs, which include limited access to affordable housing, high insurance costs, and lack of access to clean cooking fuels. By understanding these underlying factors, local authorities, residents, and community stakeholders can develop comprehensive strategies that not only mitigate disaster risks but also promote long-term sustainable solutions to prevent future fire outbreaks.

5.4 Recommendations

Based on the conclusion provided, the study provides the following recommendations;

5.4.1 Recommendations for local Authorities

❖ Local authorities should conduct a comprehensive assessment of the risks associated with residential fire outbreaks, including identifying vulnerable populations and areas, and developing a comprehensive risk mitigation strategy.

❖ Local authorities should ensure that the fire department has adequate resources, including personnel, equipment, and training, to effectively respond to fire outbreaks in the area.

❖ Local authorities should enforce building codes and regulations that require the use of fire-resistant materials and regular inspections of electrical wiring.

❖ Local Authorities must invest in new equipment, such as fire engines and firefighting equipment, to improve response times and effectiveness in combating fire outbreaks.

❖ Local Authorities must increase training for firefighters on techniques for fighting fires in high-density urban areas, such as using compressed air foam instead of water, to reduce damage to surrounding buildings.

❖ The local authority should work with local community groups and organizations to identify vulnerable populations and areas, and develop targeted outreach and education programs to increase awareness of fire prevention and safety measures.

5.4.2 Recommendation to Households

❖ Households should be encouraged to install smoke detectors and fire extinguishers in their homes, and regular community awareness campaigns should be conducted to increase knowledge of fire prevention and safety measures.

❖ Ensure that the home has working smoke detectors and fire extinguishers, and that all family members know how to use them.

❖ Regularly check electrical appliances for signs of wear and tear, and replace damaged cords or plugs immediately.

❖ Avoid overloading electrical outlets and do not use extension cords for permanent wiring solutions.

❖ Keep flammable materials, such as paper, clothing, and curtains, away from heat sources, such as radiators and space heaters.

5.4.3 Recommendations for Future Research

❖ For future researchers, further research should be conducted to explore the effectiveness of different fire safety education and awareness campaigns in changing behavior and reducing the risks associated with residential fire outbreaks.

❖ Future research should also explore the impact of housing policy, building codes, and infrastructural investments on the risks associated with residential fire outbreaks.

❖ Future research should examine the role of community resilience and social capital in mitigating the risks associated with residential fire outbreaks, exploring how communities can be better equipped to respond to and recover from fire incidents.

5.5 Implications to disaster management practice

The findings of this study have important implications for disaster management practice, highlighting the need for a shift in approach from reactive responses to proactive risk reduction measures. Disaster management professionals should adopt a holistic and multi-sectoral approach to addressing the risks associated with residential fire outbreaks, involving collaboration between different stakeholders, including local authorities, residents, and community organizations. Furthermore, the findings emphasize the importance of community engagement and participation, recognizing the significant role of social and cultural factors in shaping risk perceptions and disaster preparedness.

Moreover, the findings of this study suggest that disaster management practice should focus on addressing the underlying social and economic factors that contribute to the risks associated with residential fire outbreaks, such as poverty, inadequate housing, and poor access to emergency services. By addressing these factors, disaster management professionals can promote long-term resilience and sustainability in communities, reducing the vulnerability of residents to fire hazards and other disasters.

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APPENDICES

Appendix A: Interview Guide for Participants

Hello, my name is Winfreda Mutasa, a student from Bindura University of Science Education and I'm conducting a qualitative research study on **"The risks associated with residential fire outbreaks in Harare's Mbare suburbs."** The purpose of this interview is to gather insights on your experiences, knowledge, and perceptions regarding residential fires in this area.

Section A: Examining the risks associated with residential fires in Mbare suburbs.

1. Have you ever experienced or witnessed a residential fire outbreak in Mbare suburbs? If yes, please describe the incident(s).

2.What do you think are the most common causes of residential fires in Mbare suburbs?

3.In your opinion, what factors increase the risk of residential fires in this area?

4.How do you think residential fires have impacted the community in terms of safety, well-being, and property damage?

Section B: Assessing the factors affecting in Disaster Risk Reduction in fire response systems in Mbare suburbs.

5. What are your experiences with the fire response systems in Mbare suburbs?

6. In your opinion, are the fire response systems effective in mitigating the risks of residential fires?

7. What challenges or gaps do you think exist in the current fire response systems?

8. How do you think the fire response systems could be improved to better address the issue of residential fires in Mbare suburbs?

Section C: Examining the factors for Disaster Risk Reduction in Mbare suburbs

9. Are there any ongoing initiatives in Mbare suburbs aimed at reducing the risk of residential fires?

10. In your opinion, what are the most important factors that should be addressed to effectively reduce the risk of residential fires?

11. What role do you think local authorities, community members, and other stakeholders should play in disaster risk reduction efforts?

12. Are there any successful fire risk reduction strategies from other communities that you think could be applied to Mbare suburbs?

Appendix B: Interview Guide for Key Informants

Introduction

Hello, my name is Winfreda Mutasa, a student from Bindura University of Science Education. I am conducting a qualitative research study on "The risks associated with residential fire outbreaks in Harare's Mbare suburbs." As a key informant, your expertise and knowledge are crucial for understanding the underlying factors and potential solutions to address this issue.

Section A: Risk factors and prevention strategies

1. What do you identify as the primary risk factors contributing to residential fires in Mbare suburbs?

2.What are some effective prevention strategies that could be implemented to reduce the risk of residential fires in this area?

3.Can you describe any existing fire prevention initiatives or programs that are currently in place in Mbare suburbs?

4.What challenges do you think hinder the implementation of effective fire prevention measures in this area?

Section B: Fire response systems and gaps

1. How would you assess the current fire response systems in Mbare suburbs?

2.What gaps or weaknesses exist in the existing fire response systems, and how do they impact the community?

3.How can the fire response systems be improved to better address the challenges posed by residential fires?

4.What role do local authorities, fire departments, and other organizations play in addressing these gaps and improving fire response systems?

Section C: Disaster risk reduction and stakeholder involvement

5. What is the role of key stakeholders, such as local authorities, community organizations, and residents, in disaster risk reduction efforts?