



# DISASTER PLANS, PREPAREDNESS AND RESPONSE: A CASE STUDY OF MUTARE CITY COUNCIL FIRE BRIGADE

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## Abstract

**Objective:** The major objective of this research was to assess how prepared the City of Mutare Fire Brigade was, to respond to emergencies and disasters. **Design:** This research used the mixed methods approach. The descriptive research design was used. The study was based on the positivism philosophy. **Setting:** The target population were all the 26 Fire Brigade staff working at the Mutare City Council Fire Brigade at the time of study and 3 ambulance drivers. However, data were collected from 19 firefighters and 2 ambulance drivers. **Methods:** Data were collected using questionnaires, key informant interviews and participant observation. The data were collected from January to March 2020. The quantitative data were analyzed using the Statistical Package for Social Sciences (SPSS). **Results:** A disaster plan, which had a list of potential hazards, risks or threats, was available. The most common disasters in the opinion of respondents were road traffic accidents (100%), fire (95%), mine collapse (79%) and disease epidemics (53%). The Fire Brigade had one functional ambulance stationed at a clinic instead of at least 5 ambulances, and no ambulance was stationed at the Fire Station. The respondents had inconsistent answers on whether the Fire Brigade had a pre-hospital disaster scene plan or incident scene guide, which guides their operations at the incident scene such as a road traffic accident. More than half (53%) indicated that they had a pre-hospital disaster plan, whilst 37% indicated that they did not have it and 10% indicated that they did not know whether they had it or not. Most respondents (95%) were of the view that, poor organisation at the road traffic accident scene can cause more disasters. A significant proportion (74%) agreed that there could be deaths and injuries of responders on duty at poorly organised accident scenes. The majority (84%) agreed that the arrangement of emergency vehicles and traffic control devices at the scene of a road traffic accident with the aid of a pre-hospital disaster plan could create safer working environment for responders. There was no specific budget for disasters and disaster preparedness trainings, workshops and drills, in the Mutare City Council budget. Slightly above half (53%) of the respondents had attended disaster preparedness training/workshops. Close to half (47%) of the respondents had not done mass casualty disaster preparedness drills involving clinics and hospitals. Close to half of the respondents (47%) were of the view that the Fire Brigade equipment was not in good condition, 68% indicated that the vehicles they were using were too old and 63% indicated that the Fire Brigade did not have all the equipment needed to effectively respond to emergencies or disasters. The personal attitude of respondents towards disaster preparedness at a personal and family level was weak. **Conclusion:** The absence of and insufficiency of disaster preparedness trainings, workshops and mass casualty disaster preparedness drills as well as insufficient equipment could have been responsible for the City of Mutare Fire Brigade's poor state of disaster preparedness. It was recommended that Mutare City Council specifically budget for disaster preparedness trainings, workshops, mass casualty disaster preparedness drills, upgrade the

Fire Brigade vehicles and equipment and update the disaster profile and disaster plans.

**Keywords:** disaster, preparedness, disaster plans, firefighter, drills.

## 1.0 Background

### 1.1. The Fire Brigade Ambulance Services

The City of Mutare Fire Brigade, which is run by Mutare City Council, is the only fire station in the City of Mutare and the entire Manicaland Province. According to the 2012 census, Manicaland Province had a population of 1752698 (Zimbabwe National Statistics Agency, 2013). The Mutare City Council Fire Station serves all the seven districts in Manicaland Province in addition to the City of Mutare.

The Mutare City Council Fire Brigade also runs the Ambulance Services department, which service the Mutare City Council clinics and hospitals. The demand for ambulance services often exceeds their supply in developing countries. If there is a road traffic accident and some casualties are still trapped in the wreckage, the fire fighters might be needed but might to be available (Mustaffa, Hoko, Rohani, Aman and Saifullizan, 2014).

The golden hour philosophy states that, accident casualties have a poor chance of survival if they are not delivered to definitive care in a hospital within an hour from the time of the accident (Colville et al., 2009). The golden hour is the total time taken to call for help, travel to the incident site, extrication of casualties, and travel from incident site to hospital (Colville et al., 2009). From the time of accident occurrence, the golden hour can be broken down as follows: Call to Emergency Services (5 minutes), turnout and travel to incident (10 minutes), extrication (15 minutes), package patient and transfer to ambulance (5 minutes) and transport to hospital (25 minutes) (National Directorate for Fire and Emergency Management, 2009).

The efficacy of the Fire Brigade during the rescue operations can shorten the time taken to call for help, travel to the incident site, extrication of casualties, and travel from incident site to the hospital. Therefore, a pre-hospital disaster plan is important because it helps to reduce time wastages. A pre-hospital disaster plan gives specific guidelines on the organisation of people, equipment and activities at the disaster or accident scene. The public expectation of the fire fighters is that they are experts called to successfully deal with crisis-situations swiftly (Angulo, 2020).

## 2.0 The Fire Brigade in developing countries

In 2017 Botswana hosted a disaster preparedness training, which had twenty-one participants from different African countries (International Atomic Energy Agency, 2021). Most of the participating country representatives realised that they had a lot to work on and improve in their home countries (International Atomic Energy Agency, 2021). The Zambia Fire and Rescue Services Organisations' ability to serve lives and properties was dismal in 2008, according to the country's public opinion (Zambia Disaster Management and Mitigation Unit, 2008). Poor funding can affect the adequacy and quality of fire engines and ambulances used by the Fire Brigade. The combination of modern and appropriate ambulance equipment and skilled ambulance personnel differentiates ambulances as mobile medical facilities from ordinary transportation vehicles. Further, the fire fighters and ambulance clinicians' attitudes and beliefs might negatively or positively affect the care they offer to the casualties (Pilbery et al., 2016). The casualties' chances of survival are affected by the state of emergency preparedness, skills, experience, and attitude of the rescue teams. The Comprehensive Conceptual Model of disaster management by Nojavan, Salehi, and Omidvar (2018) is silent on the aspect of attitudes of management or responders in the process of disaster management.

The condition of ambulances and their equipment is very important because they can have an impact on the time taken to take patients from the disaster scene to the hospital. Ambulances and their equipment have to meet specific minimum safety standards to ensure the safety of the crew and patients (Zygowicz, 2017). An ambulance is sometimes expected to travel at high speed and to be able to travel on poor roads. Fire engines and ambulances have to be well serviced, durable and reliable. The BMC Health Services Research (2015) reported that, in Zimbabwe, the barriers that affect the ambulance services were that, ambulances travelled for too long to respond to emergencies, ambulances were not in good condition and not well equipped, and service providers lacked pre-hospital disaster training. In serious disasters, such barriers can lead to loss of lives in transit to hospitals.

## 2.1 The role of the Fire Brigade

The Fire Brigade is responsible fire suppression and rescue operations during and after different types of disasters (Angulo, 2020). Fires can have different origins but they can all cause injuries, death and loss of property. According to a 2008 study, origins of fires across the world were structure (35.5%), chimneys (0.9%), out of buildings (7.1%), vehicles (14.2%), forestry (1.0%), grass (5.3%), rubbish (2.4%) and other (33.6%) (Mlađan, Subošić, and Jakovljević, 2012). Therefore, the Fire Brigade has a great responsibility to attend to fires of different origins.

The responses to road traffic accidents need the services of the fire fighters who have the expertise and suitable tools for the quick extrication of trapped casualties (Colville et al., 2009). If the wreckage is on fire, it might be too risky for the medical personnel to get close and save lives. The fire fighters have to put out any fires and make sure that the accident or disaster scene is safe from any possible fire outbreaks (Mustaffa et al., 2014).

Fire and Rescue Services in some African countries like Sierra Leone, had some serious shortages of basic equipment and water (DeVries, 2016). According to a report by DeVries, (2016), the challenge for Sierra Leone Fire Fighters was great, because they were using old and worn out coats, boots, helmets, vehicles and other equipment. However, Sierra Leone had received some fire-truck donations from Germany and was anticipating some donations from China (DeVries, 2016). If a disaster involves a fire, and the fire fighters fail to effectively tackle the fire, it leaves them and all the other responders at risk of injury and death.

## 2.3 The safety of Fire fighters during disaster response

It is very difficult to predict with accuracy, the date and time of occurrence of future disasters and their intensity or magnitude. It is better for the Fire Brigade to prepare for the worst-case scenario in their disaster preparedness (Mlađan, 2012). The disaster preparedness should be holistic; disaster plans, equipment, materials, and the human resources should be adequate.

Fire fighters, ambulance technicians, nurses and doctors attending to a disaster incident might be at the risk of injury, illness and even death due to the risky environment of the disaster scene. Constant monitoring of the disaster scene is important in order to ensure the safety of responders, especially the medical staff. The emergency responders' perception of their own safety can influence their willingness to execute their duties effectively. The key informant interview confirmed this. Further, fear was reported to increase with worsening insufficiency and poor quality of protective clothing and equipment.

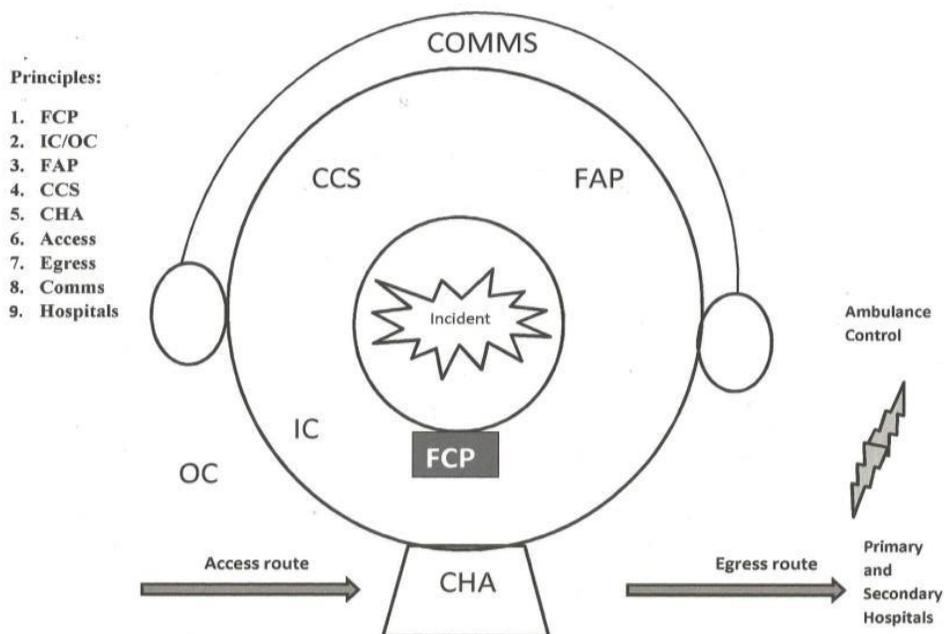
About 412 rescue workers died among the 2977 people who died during September 11 attacks in 2001 in United States of America (History.com, 2018). Out of the 412 rescue workers who died, 343 were fire fighters (History.com, 2018). The Action News (2020) reported on 11 September 2020, that 227 fire fighters who responded to the September 11 attacks disaster in 2001 had died of illnesses related to impact and effects of the disaster. The BBC (2020) also reported the death of a fire fighter due to pancreatic cancer related to the September 11 disaster. The Uniformed Fire-fighters Association (UFA) in 2018 estimated that, about one in eight of the fire fighters who responded to the September 11 disaster were down with cancer (BBC, 2020). Crane (2018), an Associate Professor, Environmental Medicine and Public Health reported that about 10000 September 11 disaster first responders and those who were in the World Trade Centre had been diagnosed with cancer seventeen years after the disaster. Crane (2018) also pointed out that, more people might eventually die due to their toxic exposure than those who died on the day of the September 11 disaster.

Mass casualty disasters to which fire fighters respond can have serious instant and long-term health effects on the fire fighters. They can be injured and some die on duty. Some are traumatised and may have psychological problems. In the end, some may suffer from cancers related to inhalation of dust, fumes, gasses and chemicals during the disaster response and rescue operations. Inadequate and substandard protective clothing exposes Fire fighters. The fire fighters' and the public's own poor attitudes towards disaster preparedness can also cost their lives (Los Angeles Fire Department, 2021).

## 2.4 Pre-hospital disaster plan

A pre-hospital disaster plan shows how various responders, their equipment and vehicles are arranged, organised, and positioned on the disaster scene. This improves the order at the disaster scene. The pre-hospital disaster plan as summarised by the 'FACE' diagram in Figure 1 by Wallis and Reynolds (2013, p.907) was used in this study as a model of a disaster scene plan. The 'FACE' diagram shows forward control post (FCP) (mouth), inner cordon (IC) and outer cordon (OC) (face), first aid post (FAP) (left eye), casualty clearing station (CCS) (right eye), central holding area (CHA) (neck), access route (TO), egress (FROM), communication (ear phone), and nearest primary and secondary hospitals (Wallis and Reynolds, 2013). The (FCP) which represents the mouth in the face diagram provides the much needed command and control at the site of the incident or accident. This is the hub of all communication where the senior medical staff and support services such as the Fire Brigade and Police network with other agencies (Wallis and Reynolds, 2013).

Inner cordon (IC) and outer cordon (OC) prevent unauthorised interference; secure the incident scene, the victims and their belongings and the rescuers (Wallis and Reynolds, 2013).



(Source: Wallis, Reynolds, (2013:907).

**Figure 1:** Mass casualty Pre-hospital 'FACE' diagram disaster plan

The pre-hospital disaster plan can be tested through disaster preparedness exercises or drills. This ensures that the organisation or country does not have a perfect plan just on paper, which may not be a useful tool in times of actual disasters. Disaster preparedness drills prepare fire fighters for the risky battle of putting out different types of fires, rescuing victims in critical situations, saving lives and ensuring the safety and survival of fellow fire-fighters (Angulo, 2020).

## 2.5 The possible hazards and disasters that could affect the City of Mutare

The City of Mutare is vulnerable to both natural and human-made hazards. Zimbabwe has suffered several earth tremors in the past and should therefore be prepared for earthquake mass casualty disasters, which may occur in future (Machamire, 2016; Pembere, 2017; Chikoto et al., 2009).

Flash floods affected the City of Mutare in 2014 (Zimbabwe Red Cross Society, 2014). Flash floods exacerbate the risk of disease outbreaks. The City of Mutare is a Malaria zone (Mambondiyani, 2018). Raw sewage from burst sewer pipes contaminate rivers that pass through the City of Mutare (Chiketo, 2013). This made the City of Mutare vulnerable to cholera outbreak. The City of Mutare Fire Brigade is responsible for running ambulance services. Therefore, disease outbreaks are also a concern for the Fire Brigade.

### 3.0 Methods

#### 3.1 Research Design of the Study

This research used the mixed methods approach. Mixed methods was an ideal technique to analyse issues that could not be satisfactorily assessed using either a qualitative or a quantitative approach in isolation (Wisdom and Creswell, 2013). The findings from the quantitative and qualitative approaches reinforce each other.

#### 3.2 Target population

The target population were twenty-six workers working in the City of Mutare Fire Brigade and three ambulance drivers at the time of the study. The researcher did a census to collect data since the research was dealing with a small population (Blanche et al, 2006:134). Not all the subjects were readily available. Twenty-one respondents out of the targeted population participated in the research.

#### 3.3 Data Collection Tools

The data collection tools that were used in this research were questionnaires, key informant interviews and participant observation. The researcher participated in a one-day workshop on disaster preparedness and response, and was involved in all the workshop activities. Workshop participants were from different departments within Mutare City Council. Qualitative data were collected from January to March 2021 using key informant interviews.

#### 3.4 Analysis

The quantitative data analysis was done using the Statistical Package for Social Sciences (SPSS) software. The researcher produced tables, charts, figures, and discovered patterns and themes. Qualitative data analysis involved organizing the notes from key informant interviews and notes made from observations made during the Mutare City Council disaster preparedness workshop. The outcome of the qualitative data analysis complemented the quantitative data analysis.

### 4.0 Results

#### 4.1 Disaster Plans

The researcher was able to get the Mutare Fire and Rescue Services Disaster Plan, which had a list of potential hazards, risks or threats. The disaster plan showed that, the City of Mutare was exposed to various hazards such as road traffic accidents, train collisions, floods, industrial accidents, house and forestry fires, structural collapse, earthquakes, air crashes and epidemics (City of Mutare, 2019). Potential hazards indicated by respondents were mostly the same with those in the disaster plan. The disaster plan had not been updated to include the hazards and disasters such as terrorist attacks. The city can be attacked when it is least expected and the fire fighters will be expected to respond if the attack results in fire or structural collapse. The September 11 terrorist attacks in 2001 in USA was a revelation, that fire-fighters can be overwhelmed by terrorist-related disasters.

In addition to the Mutare Fire and Rescue Services Disaster Plan, the Fire Brigade also had the “Fire and ambulance services manual of procedures” The manual gives a guide on how things are done following the stipulated procedures at the Fire Station. It covered areas such as: recruitment, shift work, parade, call reception dispatch and response, daily routine programme, daily work routine, reporting procedures, fuel issues, uniform and protective clothing. Further, it included cleaning materials, tools and equipment, loaning of items, handover takeover, ordering of items, telephone, ambulance fees collection and banking, stand-by duties, fire emergency and special service reports, reversing, training of brigade staff, training of recruits, brigade library, uniforms, discipline, inspection, appliance response determination, radio checks, ambulance crew disposition, attendance to outside calls, and appliances. In addition, the Fire Brigade had a Fire and Rescue Management / Health and Safety Policy. Respondents had varying knowledge and understanding of the contents of these documents.

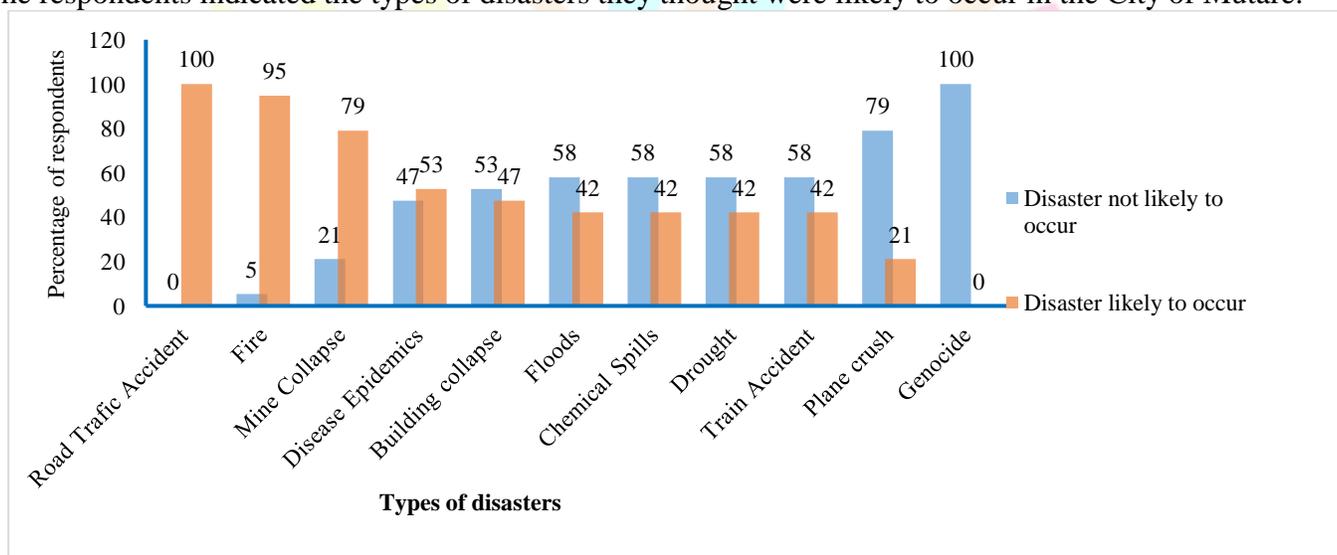
## 4.2 Disaster Scene and Pre-hospital disaster plan

Responders at the disaster scene need a pre-hospital disaster plan to guide them on the scene. Slightly more than half (53%) of respondents indicated that they had a pre-hospital disaster scene plan or incident scene guide which guides their operations at the incident scene such as a road traffic accident, whilst 37% indicated that they did not have it and 10% indicated that they did not know whether they had it or not. None of the documents availed, the Mutare Fire and Rescue Services Disaster Plan, the Fire and Ambulance Services Manual of Procedures and the Fire and Rescue Management / Health and Safety Policy had diagrams to show the setup of equipment and people at the accident scene as shown in the pre-hospital disaster plan in Figure 1. Therefore, a pre-hospital disaster plan diagrammatic template or guide was not available and was not being used as a tool during disaster response.

Disaster scenes may not be static, but can rapidly change over time and responders may also need to adjust accordingly. The majority (68%) of the respondents indicated that they did ongoing scene assessment at an incident scene such as a road traffic accident scene. This was done to identify and manage risks and hazards that might further affect casualties and personnel attending to the accident. The few (26%) respondents who did not indicate that they did ongoing scene assessment might expose themselves and other responders at an incident scene to unfolding hazards after the major disaster. Continuous disaster scene assessment during disaster response is coherent with the process of risk communication, risk identification, risk analysis, and risk evaluation shown in the Comprehensive conceptual model of disaster management by Nojavan, Salehi, and Omidvar (2018).

## 4.3 Hazards and potential disasters in the City of Mutare

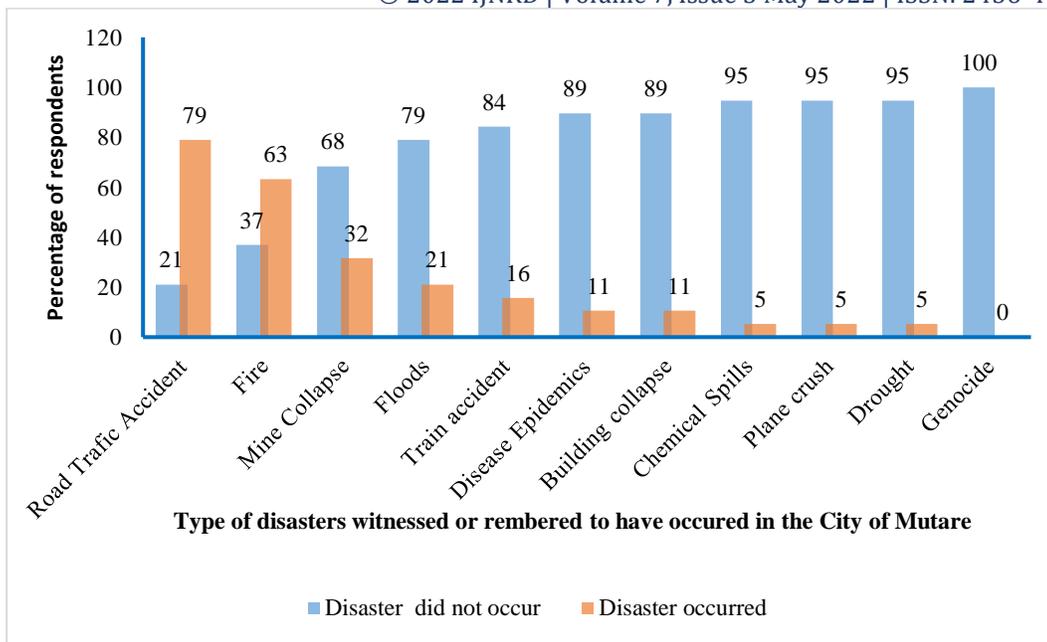
The respondents indicated the types of disasters they thought were likely to occur in the City of Mutare.



**Figure 2:** Different disasters that respondents thought were likely to occur in the City of Mutare

The top five likely disasters as shown in Figure 2, were road traffic accidents (100%), fire (95%), mine collapse (79%), disease epidemics (53%) and building collapse (47%). Building collapse could be due to earthquakes. Most of the potential hazards and disasters were identified. In the view of respondents, the disasters that were considered very unlikely to occur in Mutare were genocide (0%), plane crush (21%) and train accident (42%).

The respondents were further asked to indicate the disasters, which they knew or heard, had actually occurred in the City of Mutare at some point and the responses were shown in Figure 3.

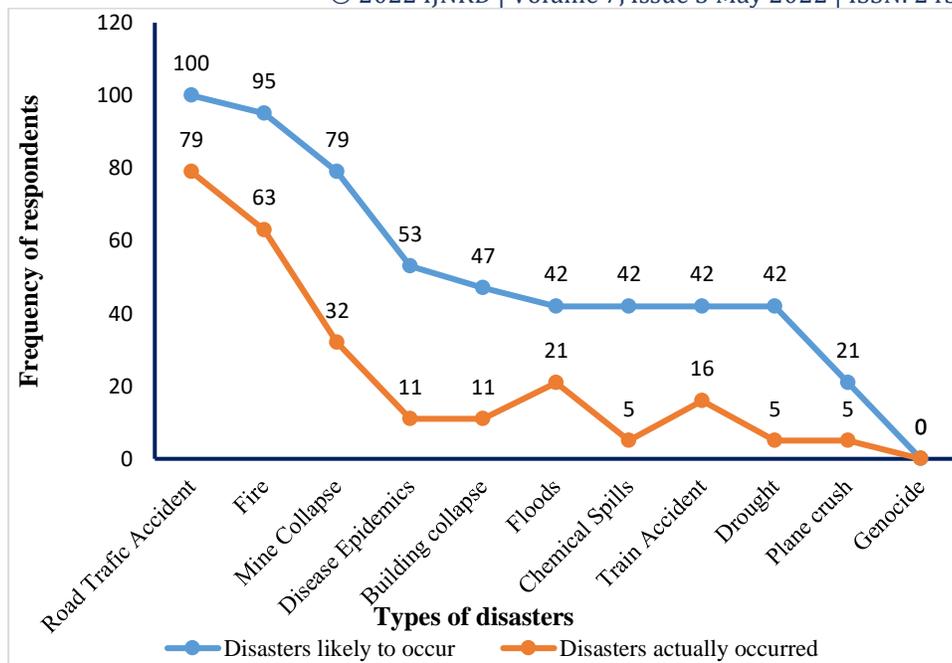


**Figure 3:** Disasters known or remembered to have actually occurred in the City of Mutare

In the opinion of respondents, the top five disasters that had actually occurred or were known to have occurred were road traffic accidents (79%), fire (63%), mine collapse (32%), disease epidemics (11%) and building collapse (11%). The least witnessed or least remembered disasters were plane crush (5%), drought (5%), chemicals spills (5%) and genocide or terrorist attack (0%).

There was not a big difference between the opinions of respondents on disasters likely to occur in the City of Mutare and disasters that actually occurred in the City of Mutare. Figure 4 shows the comparison between the disasters that were likely to occur and the disasters that actually occurred at some point. The general trend was that, the respondents' opinions on the likelihood of the occurrence of a disaster was greater than the actual occurrence of the disaster.

These findings were in consonance with how the Americans felt before the 11 September 2001 terrorist attacks. The September 11 terrorist attack disaster was least expected because nothing similar had happened in the history of America (A&E Television Networks, 2021). The terrorist attack disaster which was least anticipated and least prepared for, became the most difficult to deal with in American history (A&E Television Networks, 2021). Hazards in the City of Mutare are not static but can change from time to time. Some hazards may disappear or cease to be a threat whilst some hazards emerge and become a threat to the city. Seventy-nine percent (79%) of the respondents had also witnessed a mass-casualty disaster at some point in their lifetime.



**Figure 4:** A comparison between disasters that were thought to likely occur and disasters that were known or heard to have actually occurred at some point in the City of Mutare

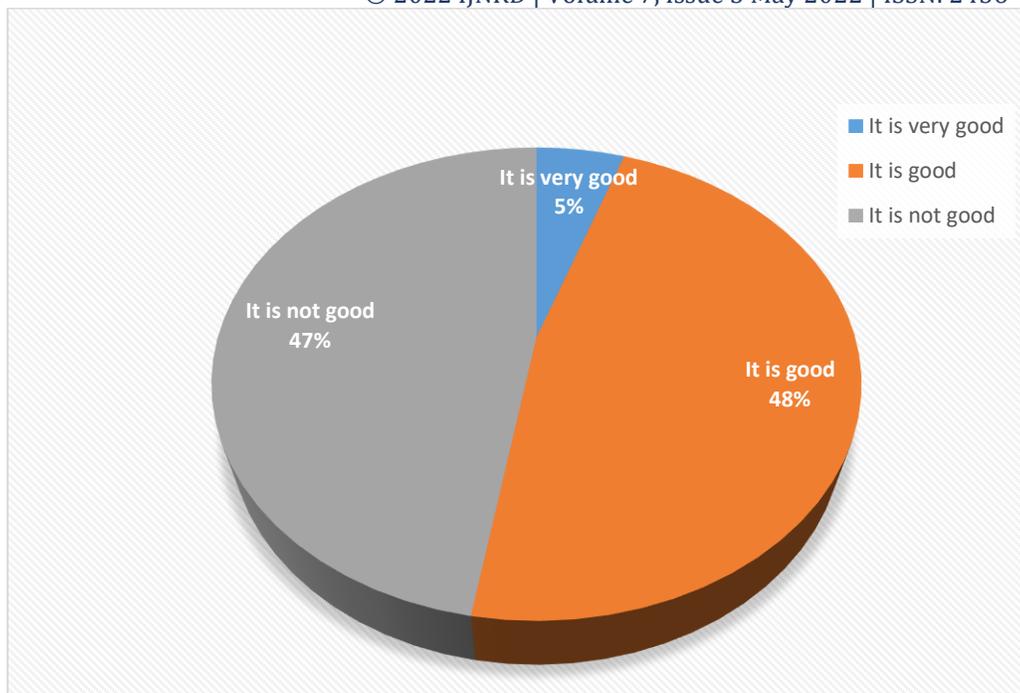
#### 4.4.Triaging

The respondents were asked for which reasons they did triaging at the accident scene. Some of the respondents' opinions on the reasons for triaging were; to assign treatment priorities (53%) and to determine the needed specialists to assist critical victims (11%). Therefore, some respondents did not have a good understanding of triaging and its essence.

#### 4.5 State of the Fire Brigade fire engines, equipment and ambulances

The Fire Brigade vehicles included one fire engine, one water carrier, one service vehicle and one ambulance. The ambulance was stationed at a clinic and there was no ambulance stationed at the fire station at the time of the study. Therefore, there was one fire engine against a population of 1752698 in Manicaland Province (Zimbabwe National Statistics Agency, 2013). The inadequacy of equipment was similar to the situation in 2012 in Nairobi, Kenya, where the city had two fire trucks for a population of five million people (Africa Fire Mission, 2020). Only 5% of the respondents thought that their equipment was in a very good state, 48% thought it was good and 47% were of the view that their equipment was in a bad state. Sixty-eight percent (68%) of the respondents indicated that the vehicles they were using were too old, 5% said that the vehicles were bad, and 21% felt that the vehicles were good.

The ambulance drivers (n=2) indicated that the ambulances they were using were too old. These findings were confirmed during participant observation in a one-day Mutare City Council disaster preparedness workshop where it was pointed out that, Mutare City Council needed at least five new ambulances and their complete set of equipment. The findings concurred with the situation in Malawi, where the whole country had 200 firefighters in 2017 and the country had never bought its own fire trucks or equipment but relied on aid (Africa Fire Mission, 2020).



**Figure 4:** Respondents' rating of the equipment that they were currently using in responding to emergencies and disasters.

More than three quarters (84%) of the respondents were of the opinion that, to ensure the safety of responders at a road traffic accident scene, all emergency warning devices such as sirens and lights should always be functional. Although 79% of the respondents confirmed the use of protective clothing in emergency and disaster response, only 21% felt very safe, 68% felt safe, whilst 11% did not feel safe at all using such protective clothing. When one or more Fire Brigade responders at a disaster scene fail to do their duties properly, such as putting out a fire, due to a sense of insecurity, the victims, fellow fire-fighters and other responders such as, the police, nurses and doctors are at risk of injury or death. Therefore, the 11% of the respondents who did not feel safe using their current protective clothing were a matter of concern. Their performance could be affected by a sense of insecurity.

Securing or cordoning an accident scene was considered as important by 90% of the respondents. Further, 63% of the respondents also agreed that an adequately secured accident scene is clearly visible to motorists and pedestrians and they will be able to safely move around the accident scene in an orderly manner. However, 42% indicated that they did not have the reflective cordoning materials in stock, whilst 26% of the respondents were not sure if they had the reflective cordoning material and 16% thought they had the materials in stock. In case of a disaster, the 42% of the respondents who indicated that they did not have cordoning materials might not make an effort to carry such important materials with them because according to them, there are not there. In the event that the 16% who thought they had the materials were making a wrong assumption, it might mean that restocking of such materials, might not be done on the wrong assumption that they have them. Respondents were not well informed on the available materials and resources needed during mass-casualty disaster response.

Sixty-three percent (63%) of the respondents were against the assumption that the City of Mutare Fire Brigade had all the material resources and equipment needed to effectively respond to emergencies or disasters. On the other hand, 37% of the respondents were not sure if they had all resources they needed and none of the respondents agreed that they had sufficient resources. Similarly, 63% of the respondents also felt they did not have adequate staff to deal with mass-casualty disasters. Shortages of human resources supported earlier findings by BMC Health Services Research (2015) that some African countries had a critical shortage of staff trained in pre-hospital disaster management.

Forty-seven percent (47%) of the respondents indicated that they did not have high visibility protective clothing and the organisation did not have enough reflective cones to direct traffic at a road traffic accident scenes. Those who were not sure were 5% and 37% indicated that they had the high visibility clothing and the reflective cones. The challenges faced by the Ambulance Services and the Fire Brigade in this study supported earlier

findings by the BMC Health Services Research (2015) that in some African countries ambulances and their equipment were not in good condition.

The fact that the quality of services provided by the Fire Brigade staff depended on the availability of sufficient resources was confirmed by 90% of the respondents against 10% who did not agree. These results support earlier claims by International Committee of the Red Cross (2013) that pre-hospital and ambulance service providers are under great strain and may fail to offer the best quality services due to limited material and human resources.

#### **4.6 Disaster preparedness drills, trainings and workshops**

Close to half (47%) of the respondents had not done mass casualty disaster preparedness drills organised by the Mutare City Council involving clinics, hospitals and the Fire Brigade. However, 47% of the respondents had been involved in disaster preparedness drills within the previous two years.

Fifty-three percent (53%) of respondents had participated in disaster preparedness trainings and workshops. The low frequency and total lack of disaster preparedness trainings and workshops was also identified as a gap in the Mutare City Council disaster preparedness and response workshop in which the researcher participated. On the other hand, 42% of the respondents had been taught about mass-casualty disasters and 37% were taught on the impact of disasters on health in previous workshops. A much lower percentage (16%) of the respondents had covered disaster cycle as a topic in their trainings or workshops. The majority (84%) of the respondents were of the opinion that, disaster planning, preparedness and response should take a multidisciplinary approach.

The Fire and Rescue Management / Health and Safety policy had a section on training, which read “Shortfalls in training may cause on-the-job injuries when poorly trained personnel may make mistakes which could result in fire fighter injury or death.” This statement supports Angulo’s (2020) emphasis that some of the fire fighters attribute most of the fire-fighter injuries and deaths to forgotten, omitted and neglected actions and basic skills. Basic training of recruits and continuous training of all staff is critical.

#### **4.7 Personal attitudes towards disaster planning and preparedness**

There was a big difference between the 79% of the respondents who knew the importance of having a first aid kit in their homes and the 16% who actually had first aid kits at home. The knowledge on the importance of a first aid kit in disaster preparedness was not matched by the corresponding action of acquiring one. All the respondents knew the importance of having a fire extinguisher in their homes but only 21% had a fire extinguisher at home. The knowledge was not being used effectively at an individual level for disaster preparedness. This could have been a result of a poor personal attitude towards disaster preparedness. Thirty-seven (37%) percent of the respondents had fire extinguishers in their cars and 47% did not have cars. These results may point to the fact that, an individual, family and organization’s knowledge on disaster preparedness may not always be matched by practical disaster mitigation and preparedness actions.

#### **4.8 Resource allocation towards disaster preparedness training and workshops**

It was established from the Mutare City Council disaster preparedness workshop in which the researcher participated that, disaster preparedness had no specific budget line in the annual budget. Therefore, there was no provision for disasters and disaster preparedness trainings and workshops. Mass-casualty disaster preparedness drills were not budgeted for.

#### **5.0 Recommendations**

The Fire Brigade plays a critical role in responding to different types of emergencies and disasters. The Mutare City Council Ambulance Services also falls under the management of the Fire Brigade. Although there was evidence that the Fire Brigade staff had some experience of responding to emergencies, they might not be able to effectively deal with big mass-casualty disasters that require the services of the Fire Brigade due to old and insufficient equipment. It was therefore recommended that the Fire Brigade: updates the disaster profile and disaster plan; acquires new fire engines; upgrades its equipment; and prepares pre-hospital disaster plan or scene disaster plans for different groups of disasters. Further, it was recommended that Mutare City Council acquires 2 ambulances designated to the Fire Station and 5 or more ambulances to cater for Mutare City Council clinics and hospitals, and increase the frequency of disaster preparedness trainings, workshops and drills. Mutare City Council could strive to inculcate an enthusiastic positive attitude towards disaster preparedness in the fire fighters. The meagreness and paucity of literature on the state of disaster preparedness of the Fire Brigades or Fire fighters

in Zimbabwe calls for more research in this subject area. There was little documentation on the efficacy of the Fire Brigade in responding to emergencies and disasters in Zimbabwe. Therefore more research was needed.

## 6.0 Conclusion

The greatest challenge faced by City of Mutare Fire Brigade was the inadequacy of fire engines, ambulances and all the other necessary equipment. The fact that, the inadequate vehicles and equipment that were currently in use were old and worn out, exacerbated this challenge. Mass-casualty disaster preparedness drills were not being done and the frequency of disaster preparedness workshops and trainings was low. Therefore, the Fire Brigade's state of preparedness for mass casualty disasters was low. Based on the challenges highlighted, Mutare City Council could improve the Fire Brigade's state of disaster preparedness by budgeting for disaster preparedness trainings, workshops, and drills and purchasing new fire engines, ambulances and all the needed equipment. Development partners could also be approached for funding. Disaster risk reduction principles could be integrated in all activities and programming. A culture of disaster awareness and preparedness could be inculcated in the organisation.

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## REFERENCES

- [1] Action News (2020). Sept. 11 attacks are still killing first responders 19 years later. Retrieved on 1 June 2021 from <https://6abc.com/911-illness-deaths-after-new-york-firefighter/6418931/>
- [2] Africa Fire Mission (2020). Committed to building and increasing the sustainable capacity of fire departments in developing communities. Retrieved on 8 July 2021 from <https://www.africafiremission.org/>
- [3] Angulo, R.A. (2020). Drills that you are not going to find in books. Retrieved on 8 July 2021 from <https://www.fireengineering.com/firefighter-training/drills-youre-not->
- [4] Association for Professionals in Infection Control and Epidemiology (2011). Mass casualty disaster plan checklist. Retrieved on 1 May 2021 <http://bioterrorism.slu.edu/bt/quick/disasterplan.pdf>
- [5] A&E Television Networks (2021). September 11 History. Retrieved on 29 June 2021 from <https://www.history.com/topics/21st-century/9-11-attack>
- [6] BBC (2020). 9/11 firefighter who found own brother in rubble dies of related illness. Retrieved on 8 June 2021 from <https://www.bbc.com/news/world-us-canada-51634771>
- [7] Blanche, T., Burrheim K., & Painter, D. (Eds). (2006). Research in Practice: Applied methods for the social sciences (2<sup>nd</sup> ed). South Africa: University of Cape Town.
- [8] BMC Health Services Research. (2015). Identifying barriers for out of hospital emergency care in low and low-middle income countries: a systematic review. Retrieved on 7 August 2020 from <https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-018-3091-0/tables/2>
- [9] Chiketo, B. (2013, January 8). Mutare turns streams, rivers into sewers. Daily News. Retrieved on 20 April 2020 from <https://www.dailynews.co.zw/articles/2013/01/08/mutare-turns-streams-rivers-into-sewers>
- [10] Chikoto, G.L., & Sadiq, A. (2009). Zimbabwe's Emergency Management Systems: A promising Development. Retrieved on 21 April 2020 from <https://training.fema.gov/.../comparative%20em%20book%20-%20chapter%20zimba>
- [11] City of Mutare (2019) Fire and Ambulance Services Manual of Procedures. Mutare. (Unpublished)
- [12] City of Mutare (2019) Fire and Rescue Services Disaster plan. Mutare. (Unpublished)

- [13] Colville, E. A., Daly, C., O'Neill, A., O'Donnell, E., Carroll, D., Doyle, W., ..., Gleeson, T. (2009). Road Traffic Accident Handbook. U.S.A. Retrieved on 3 August 2020 from <http://docshare02.docshare.tips/files/25149/251492146.pdf>
- [14] Crane, M. (2018). "Deaths From 9/11 Diseases Will Soon Outnumber Those Lost On That Fateful Day" - Nancy Cutler. Retrieved on 10 June 2021 from <https://www.mountsinai.org/about/newsroom/2018/deaths-from-911-diseases-will-soon-outnumber-those-lost-on-that-fateful-day>
- [15] DeVries, N. (2016). Lack of Gear, Water Shortages Plague Fire-fighters in Sierra Leone. Retrieved on 15 August 2020 from <https://www.voanews.com/africa/lack-gear-water-shortages-plague-fire-fighters-sierra-leone>
- [16] History.com, (2018). September 11 Attacks. Retrieved on 25 June 2021 from <https://www.history.com/topics/21st-century/9-11-attacks>
- [17] International Atomic Energy Agency (2021). Emergency Exercise Prepares African Countries for Radiological Emergencies. Retrieved on 8 July 2021 from <https://www.iaea.org/newscenter/news/emergency-exercise-prepares-african-countries-radiological-emergencies>
- [18] International Committee of the Red Cross (2013). Ambulance and pre-hospital services in risk situations. Retrieved on 8 July 2021 from <https://www.icrc.org/en/doc/assets/files/publications/icrc-002-4173.pdf>
- [19] Los Angeles Fire Department (2021). Disaster preparedness. Retrieved on 8 July 2021 from <https://www.lafd.org/safety/disaster-preparedness>
- [20] Machamire, F., (2016, September 25). Zimbabwe no longer safe from earthquakes. Daily News. Retrieved on 21 April 2018 from <https://www.dailynews.co.zw/articles/2016/09/25/zim-no-longer-safe-from-earthquakes>
- [21] Mambondiyani, A. (2018, January 19). Amid wet weather, Zimbabwe's Mutare sees hike in Malaria deaths. The Relief Web. Retrieved on 25 April 2018 from <https://reliefweb.int/report/zimbabwe/amid-wet-weather-zimbabwe-s-mutare-sees-hike-malaria-deaths>
- [22] Mlađan, D., Subošić, D., & Jakovljević, V. (2012). Fire and rescue service in the world: status and new challenges. Retrieved on 14 August 2020 from file:///C:/Users/hp%20255/Downloads/mladan.pdf
- [23] Mustaffa, A. A., Hoko, K., Rohani, M.M., Aman, M.Y. & Saifullizan, M.B. (2014). Integrated Road Traffic Accident Systems (IRTAS) for Emergency Service Providers, International Journal for Research in Emerging Science and Technology, 1, (5). Retrieved on 6 August 2020 from file:///C:/Users/hp%20255/Downloads/pid-15201406.pdf
- [24] National Directorate for Fire and Emergency Management. (2009). RTA Handbook. Retrieved on 4 May 2020 from <http://docshare02.docshare.tips/files/25149/251492146.pdf>
- [25] Nojavan, M., Salehi, E., and Omidvar, B. (2018). Conceptual change of disaster management models: A thematic analysis. Jamba: Journal of disaster risk studies, 10(1). Retrieved on 15 November 2020 from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6014072/#:~:text=An%20integrated%20mode%20of%20disaster,of%20the%20famous%20integrated%20models.>
- [26] Pembere, K. (2017, April 3). Breaking: Zimbabwe hit by a minor earthquake. Daily News. Retrieved on 21 April 2018 from <https://www.technomag.co.zw/2017/04/03/Zimbabwe-hit-by-tremor/>
- [27] Pilbery, R., & Lethbridge, K. (2016). Ambulance Care Practice. United Kingdom: Clash Professional.
- [28] Premier Service Medical Investment. (2020). Emergency Medical Rescue Ambulance Service. Retrieved on 18 August 2020 from <https://www.psmi.co.zw/our-divisions/hospitals/emras/>
- [29] Wisdom, J. & Creswell, J.W. (2013). Mixed Methods: Integrating Quantitative and Qualitative Data Collection and Analysis While Studying Patient-Centered Medical Home Models. Retrieved on 7 May 2020 from <https://pcmh.ahrq.gov/page/mixed-methods-integrating-quantitative-and-qualitative-data-collection-and-analysis-while>

[30] Zimbabwe National Statistics Agency. (2013). Compendium of Statistics 2012. Retrieved on 6 August 2020 from <https://www.zimstat.co.zw/>

[31] Zimbabwe National Statistics Agency. (2014). Compendium of Statistics 2013. Retrieved on 6 August 2020 from <https://www.zimstat.co.zw/>

[32] Zygowicz, W.M. (2017). 10 Things to Consider When Improving Ambulance Safety. Journal of Emergency Medical Services, 42 (10). Retrieved on 13 August 2020 from <https://www.jems.com/2017/10/01/10-things-to-consider-when-improvingambulance-safety/>

[33] Zambia Disaster Management and Mitigation Unit (2008). The severity and extent of fire disasters – Zambia's technical capabilities. Retrieved on 8 July 2021 from [https://www.preventionweb.net/files/11024\\_11020ResearchProposalforFireDisaste.pdf](https://www.preventionweb.net/files/11024_11020ResearchProposalforFireDisaste.pdf)

