Assessment of Higher Education Institutions' Man-Made Disaster Preparedness Nairobi, Kenya.

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Abstract

The aim of this paper is to discuss the higher institutions level of man-made disaster preparedness. It is based on a study carried out in educational institutions in Nairobi County Kenya. The study sought to answer the questions: How are the universities prepared for all existing and potential man made hazards? Are there any risky areas and practices in the universities? And do the universties have a practical disaster preparedness and emergency action plan? With the view of gaining more insight on this matter a descriptive survey design which focused on the level of disaster preparedness in the institutions was used. The assessment was conducted between October 2015 and January 2016. The sample size constituted four universities; 3 public universities and 1 Private University with a total of 452 respondents. The universities were purposively sampled due to their location within Nairobi city. The respondents were proportionately sampled from the universities using simple random sampling technique. Data was collected through use of questionnaires, focus group discussions, key informant interviews, observations and secondary data were also used. The research established that 59.9% of the respondents professed that the target institutions were not prepared with respect to man-made disasters while, 41.1% perceived otherwise. About half of the respondents 49.73% reported having low level of awareness on responding to man-made disasters. The assessment concludes that there exist unsafe prevailing circumstances in the target institutions premises that increase the vulnerability of their population to man-made disasters. The target institutions are unprepared to handle potential man-made disasters and the situation could be worsened due to the low levels of awareness among their population. The study recommends that the institutions endeavor to establish operational emergency preparedness/action plans for common man-made disasters and invest in man-made disaster preparedness training to enhance awareness among the population at the institutions.

Key Words: Disaster, Preparedness, Assessment, Hazards, Institutions and Education

Introduction

Over the last ten years, approximately 240 million people each year were affected by natural disasters (Hansford, 2011). Preliminary estimates from Swiss Re sigma put insured losses from disaster events at $32 billion in 2015, of which $23 billion were triggered by natural catastrophes and $9billion by manmade disasters. These disasters cause immeasurable damage to life, property and livelihoods, sometimes in the space of a few minutes, but more often over weeks or months. In recent years according to Booker (2014), higher education has been shocked by violence on college campuses, including campus assaults and several campuses, such as Virginia Polytechnic Institute, State University (Virginia Tech) and Northern Illinois University, have dealt with tragedies related to student-initiated shootings or man-made disasters. Much of higher education treats crises as rare occurrences or as anomalies and therefore generally are not equipped or prepared to respond.

According to Mamogale (2011) In a South African context, Enabler 2 of the National Disaster Management Framework (2005:156) encourages the need to promote a culture of risk avoidance through education and training throughout the Republic of South Africa. The National Curriculum Statements also makes provision for the teaching of hazards and disasters to Grade 7 learners.

In Liberia according to UNDP (2009) report, the most common hazards causing disasters in the communities are floods, windstorms, fire, and sea erosion, with a few incidents of drought having been reported.

In Kenya, the draft National Policy for Disaster Managemment (2009), acknowledges the fact that the country has been exposed to a variety of disasters such as droughts, fires, floods, HIV/AIDS, industrial accidents and terrorism, among others. The Country, like many others in Africa and elsewhere in the world has experienced an increase in the frequency of disasters over the past two decades. In many cases these have resulted in an increase in the number of people affected and property damaged leading to rising economic losses.

The draft Policy indicates that in Kenya there is neither a coordinated policy framework nor a legal basis for the current disaster management system. What exists is partly a spontaneous system, which has assisted the Government and its development partners (the UN system and other relief agencies) to respond to disasters in the country.

The current disaster scenario has led many to predict that the Millennium Development Goals and the current Sustainable Development Goals may not be met, because disasters are eroding the advances made in several sectors. Disasters resulting from technological hazards such as pollution, and complex emergencies, such as conflict, are also on the increase. Countries that seek to prevent disasters require a good and comprehensive Disaster Preparedness Framework which has elements such as: Hazard, Risk and Vulnerability Assessment; Response Mechanisms and Strategies; Preparedness Plans/Planning; Coordination; Information Management; Early Warning Systems; Resource Mobilization; Public Education, Training & Rehearsals; and Community Based Disaster Preparedness (IFRC, 2000). The magnitude of the global impact of occupational accidents and disease, as well as major industrial disasters, in terms of human suffering and related economic costs, have been a long-standing source of concern at workplace, national and international levels. Significant efforts have been made at all levels to come to terms with this problem, but nevertheless ILO estimates are that over 2 million workers die each year from work related accidents, and diseases and globally the figure is on the rise (ILO,2003).

Research has shown that a knowledgeable and well educated public in terms of disaster preparedness and emergency management is capable of fully cooperating with authorities before, during and after a disaster hence highlighting the important role that education and awareness has in enhancing public safety and preventing loss of lives and property.

This research therefore sought to gather current information on internal and external factors that affect institutional resilience either positively or negatively and generate tangible outputs for higher education institutions and thus create a basis for development of an effective and efficient disaster preparedness and emergency management system that ensures the safety of the institution's community within and outside the institution's premises.

Problem Statement

In the recent past, Kenya as a country has generally experienced a number of disasters ranging from building collapses to fires (mostly urban). The most dominant however has been terrorism perpetrated by the terror group Al Shabaab based in Somalia and currently occupying some parts of Kenya (Mandera, South Coast and some parts of North Eastern Kenya). In Kenya, Learning Institutions are vulnerable to ISIL, Al-Shabaab and Al-Qaeda terrorist attacks as demonstrated by attack in Garissa University College in Kenya, where 148 people were killed on 2nd April 2015, Odhiambo, (Wasike, & Kimokoti, 2015). Education was hampered in learning institutions because the personnel were not sufficiently prepared to handle disasters or emergency situations, and most of them had not attended drill demonstrations on disaster management (Lutomia & Kisurulia, 2014). There is low compliance with the requirement to provide Emergency lighting, Automatic Fire suppression systems and Fire Hydrants in both public and private universities in Kenya; these necessitates the need for comprehensive fire safety policies and programs that will cover prevention, protection and emergency response backed by University executives' endorsement and support (Makachia, 2014).

The International Labour Office (ILO) Constitution sets forth the principle that workers should be protected from sickness, disease and injury arising from their employment. Yet for millions of workers the reality is very different.

Every day, 6,300 people die as a result of occupational accidents or work-related diseases – more than 2.3 million deaths per year. 317 million accidents occur on the job annually; many of these resulting in extended absences from work. The human cost of this daily adversity is vast and the economic burden of poor occupational safety and health practices is estimated at 4 per cent of global Gross Domestic Product each year. Employers face costly early retirements, loss of skilled staff, absenteeism, and high insurance premiums due to work-related accidents and diseases. Yet many of these tragedies are preventable through the implementation of sound prevention, reporting and inspection practices. ILO standards on occupational safety and health provide essential tools for governments, employers, and workers to establish such practices and to provide for maximum safety at work (ILO, 2003). It was therefore important to assess institutions preparedness to avert future disasters.

Literature Review

Institutions Vulnerability to Terrorists Attacks

Terrorist attacks on educational institutions have taken many forms; armed assaults, bombings, hostage takings, chemical attacks and arson. Educational institutions represent "soft targets" where people congregate, normally in large numbers, thus offering potential for mass casualties. In the United States most universities and college campuses are engaged in developing policies, programs, and systems to reduce risks and maintain safety and security on their campuses (Kapu& Khosa, 2013). Results show that developing an all-hazards plan, conducting regular training and exercises, and developing strong community partnerships are the most important elements for creating a disaster-resilient university, well prepared to tackle any calamity or tragedy (Kapu & Khosa, 2013). University students throughout California are generally unprepared for disasters hence there is need for development of strategies to prepare students for disasters (Schmidt et al., 2011).

During an active shooter event at The University of Texas at Austin in 2010, it was noted that, distance from a threat predicted an individual's perception of message credibility; innovativeness was a strong driving factor in individuals' reliance on social and personal media to contact others who need safety updates and perceptions of mortality and experience to negative media portrayals were positively related to active information sharing during this event (Egnoto, Griffin, Svetieva, & Winslow, 2014). With tragic incidents like the 2007 Virginia Tech campus shooting and the 2014 Seattle Pacific University shooting, it is clear that crisis is always a possibility for institutions of higher learning; the study further found out that perceived knowledge may be a better predictor of self-efficacy and perceived preparedness than actual knowledge (Liu, Blankson& Brooks, 2014). Lack of proper training of campus population can add to increased fatalities, loss of property, and disrupt the campus environment. Campuses' inability to build relationships, communicate, or train together with external agencies prior to a crisis negatively impacts a critical event (Ellies, 2015).

Mississippi's private and public institutions of higher learning crisis include violence and terrorism; nonetheless, the ability of these institutions to continue operation during disruptive events is determined by their plans to minimize the impacts of these events. These impacts can be minimized by two main strategies: (1) develop emergency preparedness plans and (2) develop business continuity plans (Johnson, White, & Mosley, 2014).

Most of the academic institutions in Malaysia do not have a written disaster preparedness plan hence will not be able to manage disasters efficiently in case it happens (Khalid & Dol, 2014). Students at Evergreen State University do not understand the reality of local hazards and the potential social and physical dangers involved with being unprepared (Edwards, 2014).

In Taiwan, the procedure of building disaster preparedness in campuses contains three steps: 1, examining the safety issues of campus, developing disaster preparedness plan, drawing emergency maps, and conducting drills for disaster preparedness; 2, understanding local disasters, learning disaster management, and developing related teaching materials & learning activities; 3, conducting disaster preparedness activities, holding disaster preparedness education exhibitions, and offering mass media reports for disaster preparedness education (Chang & Lin, 2012).

In Nigeria, Boko Haram was responsible for 47 attacks on learning institutions, resulting in 77 fatalities and it undertook a series of coordinated attacks on military and civilian targets in northern part of the country (Cilliers, 2015). Polytechnics in Ghana need to develop policies and plans for disaster management, organize training programs for staff in order to increase their awareness about disasters and be involved in cooperative networks (Ayoung, Boatbil, & Baada, 2015).

It is important for the campuses to coordinate and collaborate with law enforcers and other relevant agencies, on issues related to campus safety including history of critical incidents, perceived risk of future incidents, mutual assistance, and preparedness activities so as to share a common understanding on issues of importance (Giblin, Haynes, Burruss, & Schafer, 2013). Universities need to consider the following in the face of bomb scare, focusing on individuals closest to the danger, improvement of messaging systems, development of more comprehensive plans, and the need for university administrations to create a feeling that they are in control and concerned with student safety (Baer, Zarger, Ruiz, Noble, & Weller, 2014). Few campuses engage in drilling exercises to test and evaluate their emergency plans.

In a 2012 survey of campus emergency managers, Sullivan found that less than a third of the campuses responding to the survey, senior administrators participated in one or more annual drills. These findings led Sullivan to conclude that higher level management did not significantly support the operationalization of campus emergency management. The lack of drilling would pose problems when emergency response was needed (Green, 2013).

The relative lack of physical security compared to other potential targets make institutions vulnerable to acts of terrorism (Emma Bradford & Wilson, 2013). A university's legal obligation is to protect its employees, staff and students. It is suggested that campus and department administrators must develop a crisis plan to address a crisis event to protect students, faculty and staff, the related community, and the institution (Booker, 2014). Recent disasters and acts of violence underscore the importance of informing campus communities about emergency preparedness and how to minimize harm and loss of life by taking protective actions (Sattler, Kirsch, Shipley, Cocke, & Stegmeier, 2014). Research is limited on crisis management planning in higher education because many institutions of higher education have written their crisis management plans after a crisis event occurred; a reactive approach to crisis that seems to typify crisis management (Booker, 2014).

School safety

According to the safety standards manual for schools 2008, safety of the learner is central to the provision of quality education in any Country and disaster management guidelines are stipulated in the School Safety Standard No.12 which states that; The School management/board should create mechanisms and procedures that ensure stakeholders are conversant with measures needed to prevent occurrance of disasters and steps required to reduce the impact as indicated below:-

Guidelines:

a) Every school should post evacuation maps at every entrance and exit to buildings, classrooms, enclosed hallways, stairways and offices.

b) The school should schedule practice drill sessions for fire, earthquake, lockdown, shelter-in-place and other situations that the safety committee determines necessary to practise.

c) Fire drills are required once a month.

d) It is recommended that other drills follow the same format.

e) Every school should develop a telephone tree list including all employees (include e-mail address, pagers, mobile phones numbers as necessary).

f) Every school should maintain school emergency kit(s).

g) School management need to ensure that schools are safe from natural and human made disasters by observing the safety of their operating environments.

Recommended items in the emergency kit will include:

1. First aid kit
2. Whistles
3. Fire blankets
4. Flash torchs
5. Fire extinguishers
6. Blueprints of school buildings

The guidelines were important for this study as it aimed at assessing institutions disaster preparedness.

Occupational safety and health

Ali (2008) defines Occupational safety and health (OSH) as the science of the anticipation, recognition, evaluation and control of hazards arising in or from the workplace that could impair the health and well-being of workers, taking into account the possible impact on the surrounding communities and the general environment. This domain is necessarily vast, encompassing a large number of disciplines and numerous workplace and environmental hazards. A wide range of structures, skills, knowledge and analytical capacities are needed to coordinate and implement all of the "building blocks" that make up national OSH systems so that protection is extended to both workers and the environment.

The purpose of occupational health according to ILO/WHO Committee on Occupational Health is the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention amongst workers of departures from health caused by their working conditions; the protection of workers in their employment from risks resulting from factors adverse to health; the placing and maintenance of the worker in an occupational environment adapted to his physiological and psychological capabilities; and, to summarize: the adaptation of work toman and of each man to his job.

The promotion of occupational safety and health, as part of an overall improvement in working conditions, represents an important strategy, not only to ensure the well-being of workers but also to contribute positively to productivity. Healthy workers are more likely to be better motivated, enjoy greater job satisfaction and contribute to better-quality products and services, thereby enhancing the overall quality of life of individuals and society. The health, safety and well-being of working people are thus prerequisites for improvements in quality and productivity, and are of the utmost importance for equitable and sustainable socio-economic development (Ali, 2008).

The right to safety and health at work is enshrined in the United Nations Universal Declaration of Human Rights, 1948, which states:-

> Everyone has the right to work, to free choice of employment, to just and favourable conditions of work …(Article 23)

The United Nations International Covenant on Economic, Social and Cultural Rights, 1976, reaffirms this right in the following terms:-

> The States Parties to the present Covenant recognize the right of everyone to the enjoyment of just and favourable conditions of work, which ensure, in particular:…(b) Safe and healthy working conditions … (Article 7)

Core Occupational safety and health principles

Occupational safety and health is an extensive multidisciplinary field which has the following principles:

1. All workers have rights.

Workers, as well as employers and governments, must ensure that these rights are protected and must strive to establish and maintain decent working conditions and a decent working environment.

More specifically:

a) work should take place in a safe and healthy working environment;
b) conditions of work should be consistent with workers' well-being and human dignity;
c) work should offer real possibilities for personal achievement, selffulfilment and service to society (ILO, 1984).

2. **Occupational safety and health policies must be established.**

Such policies must be implemented at both the national (governmental) and enterprise levels. They must be effectively communicated to all parties concerned.

3. A national system for occupational safety and health must be established.

Such a system must include all the mechanisms and elements necessary to build and maintain a preventive safety and health culture. The national system must be maintained, progressively developed and periodically reviewed.

4. Occupational safety and health programmes and policies must aim at both prevention and protection.

Efforts must be focused above all on primary prevention at the workplace level. Workplaces and working environments should be planned and designed to be safe and healthy.

5. Continuous improvement of occupational safety and health must be promoted.

This is necessary to ensure that national laws, regulations and technical standards to prevent occupational injuries, diseases and deaths are adapted periodically to social, technical and scientific progress and other changes in the world of work. It is best done by the development and implementation of a national policy, national system and national programme.

6. Information is vital for the development and implementation of effective programmes and policies.

The collection and dissemination of accurate information on hazards and hazardous materials, surveillance of workplaces, monitoring of compliance with policies and good practice, and other related activities are central to the establishment and enforcement of effective policies.

7.Education and training are vital components of safe, healthy working environments.

Workers and employers must be made aware of the importance of establishing safe working procedures and of how to do so. Trainers must be trained in areas of special relevance to particular industries, so that they can address the specific occupational safety and health concerns.

8. Workers, employers and competent authorities have certain responsibilities, duties and obligations. For example, workers must follow established safety procedures; employers must provide safe workplaces and ensure access to first aid; and the competent authorities must devise, communicate and periodically review and update occupational safety and health policies.

9. Policies must be enforced.

A system of inspection must be in place to secure compliance with occupational safety and health measures and other labour legislation.

Conceptual Framework

This study adopted the Pressure and Release Model

Disaster Pressure and Release (PAR) Model

The PAR model explains vulnerability as a process that starts from root causes. These root causes, such as political or economic systems, establish a distribution of power within a society, which determines access to resources. Through a series of processes and practices, called dynamic pressures, these root causes can be channeled and transformed into unsafe conditions. The entire process from root causes, through dynamic pressures into unsafe conditions is called the progression of vulnerability. Disasters occur when unsafe conditions are combined with physical exposure to hazards. This model is summarized in the figure 1. below:

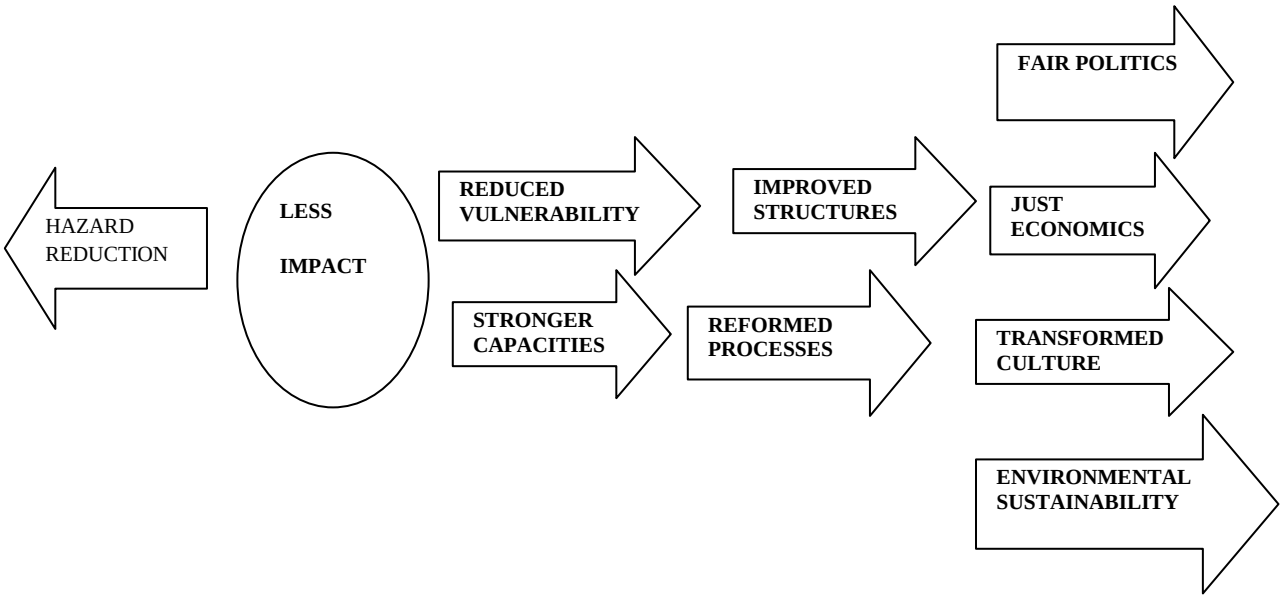


Figure 1.1: Conceptual Model

Source: Bob Hansford (2011)

Changing the direction of the arrows is not always easy and requires activities at local, national and international levels.

Hazard Reduction

There are many ways of reducing the occurrence, frequency or strength of some hazards. In the case of higher education institutions, hazard reduction measures can include improved security measures, acquiring important equipment e.g. fire extinguishers, ambulances, detectors, installation of security cameras and alarm systems in vulnerable zones amongst others.

Reduced Hazard Impact

Some of the 'elements at risk' can perhaps be strengthened to reduce disaster risk. The elements at risk in higher education institutions include teaching and non-teaching staff, students, visitors, sensitive equipment/installations, buildings (office and residential) amongst others.

Measures that can be taken include hazard safety awareness, trainings on the use of safety equipment e.g. fire extinguishers and ensuring all essential security installations are fully functional etc.

Reduced Vulnerability

A risk assessment process will identify specific vulnerabilities, and measures can be taken to reduce them. In the vulnerability reduction process, the most vulnerable elements at risk should be targeted first. Measures to reduce vulnerability higher education institutions may include amongst others: awareness creation, training and capacity building of all the human elements at risk to improve resilience, and modifying buildings or other structures to enhance security and ensure safe means of escape/evacuation.

Stronger Capacities

Communities will always have some capacities which they use in times of disaster. If the existing capacities can be strengthened, the impact of hazards is reduced. Higher educaion institutions have safety measures e.g. fire extinguishers, fire alarms etc. The capacity of already existing structures and systems could be enhanced through training, developing safety procedures etc. New capacities can also be developed e.g. through establishment and training of emergency response and rescue teams, installation of different alarms for different emergency occurences amongst others.

Improved Structures and Reformed Processes

Dynamic pressures can act in a positive or negative way. The process should determine the negative ones and develop action plans can then attempt to change them.

Methodology

The study was based on a descriptive survey design and focused on the level of disaster preparedness in the institutions (Kothari, 2013). The study was conducted in three public and one private universities: Nairobi, Kisii, St.Paul's and Masinde Muliro universities. The universe for this study comprised the principal stakeholders of the universities, the academic staff, the non-teaching staff and students. The total targeted populations for the four universities were: Nairobi 7,000, St Paul's 4,000, Masinde Muliro 3,000 and Kisii 1,000 giving a total of 15,000. The population for this study was clustered into four categories: Students, academic staff, non-teaching staff and institutions management. The study preferred the use of Krejcie & Morgan (1970) Model for establishing a sample size. According to this model, an estimate of 375 samples is a fair representative size of a population of 15,000 respondents. The sample was increased by 10%- 30% to compensate for non-response and increase representation (Israel, 1992). Therefore, the figure of 375 was increased by 75 (20%) to give a size of 450. The distribution of the sample size for each university was proportional to its population. The sample size for students was 80% since they have the higher numbers in the institutions compared to the staff. The response rate was 89%. The survey was carried out by the principal researcher, 2 assistant researchers and 8 enumerators. Multiple methods were used to conduct this study with use of four instruments to collect data: questionnaires were used to collect data from the students using simple random sampling technique, teaching and non-teaching staff; interview guides were used to collect data from the university management directly concerned with students affairs from each University, this was done through direct administration; focus group discussion guides were used to collect data from students.

One Focus Group Discussion consisting of 8 students was conducted for each University; and an observation checklist was used to establish the risky areas and practices in the institutions. Quantitative Data was analyzed using Statistical Package for Social Scientists (SPSS) Version 21. Qualitative data was summarized accordingly to capture the important and relevant themes of this study.

Results and Discussion

Population Distribution

A total of four universities in Nairobi city were sampled. Out of these, 47.2% of the respondents were drawn from University of Nairobi, 26.5% from St. Paul's University, 19.6% from Masinde Muliro University of Science & Technology, 6.6% from Kisii University. 54.9% of the respondents were male and 45.1% female. The distribution by sex in all the sampled universities is shown in figure 2 below.

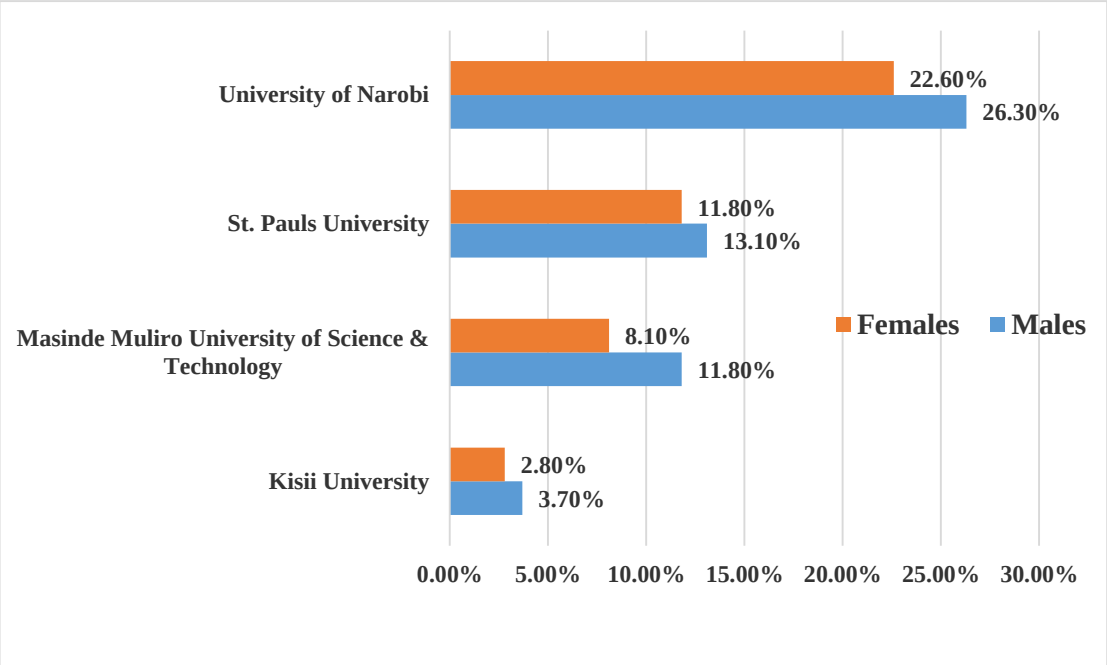


Figure 2: Sex of respondents by University

Source: Author, 2015

Age of the respondents

Out of all the respondents who participated in this study, at least 13.1% did not indicate their age. The age distribution among those who indicated their age was as follows: 50.1% were between 21 – 25 years; 22.4% were aged 20 years and below; 13.0% between 26 – 30 years; 8.7% between 31 – 40 years; and 5.1% above 40 years. The mean age of the respondents was 25.5 years. Table.1 shows the distribution of respondents by age.

Table 1: Age Distribution of Respondents

Age in Years	Frequency	Percent (%)
20 years & below	88	22.4
21 - 25 years	197	50.1
26 - 30 years	51	13.0
31 - 40 years	34	8.7
Above 40 years	23	5.9
Total	**393**	**100.0**

Source: Author, 2015

Respondent Category

There were four categories of respondents in this study. 79.50% were students; 3.30% management; 10.20% non-teaching staff; and 7% teaching staff. Figure 3 below illustrates the distribution of the different categories of respondents.

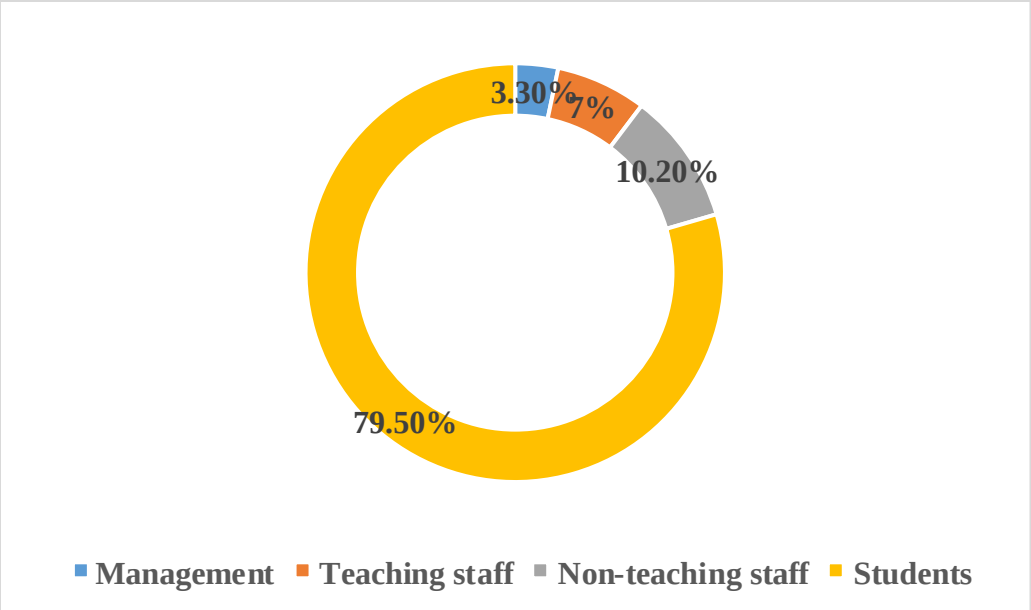


Figure 3: Distribution of respondents by category

Institution Safety Perception

Safety of Premises

Safety perception of premises is an important aspect in identifying risks in learning/working environments and enhancing disaster preparedness of occupants. Over 50.0% of the respondents felt safe while within the university premises. Only 9.5% felt unsafe. Figure 4, illustrates the results in detail.

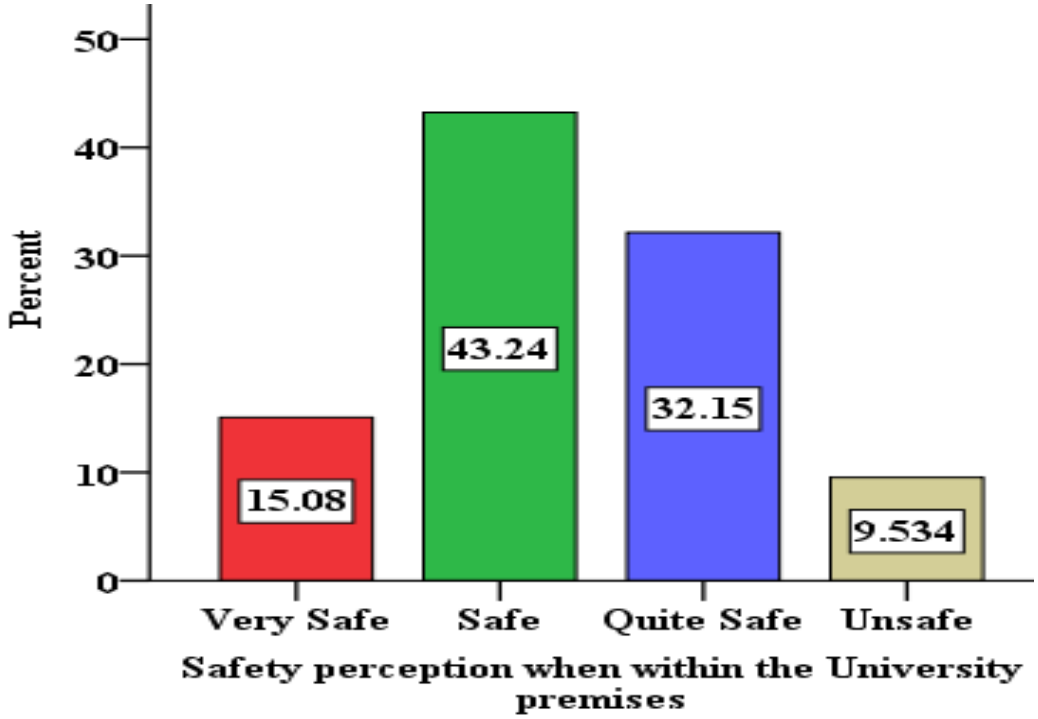


Figure 4: Safety perception when within the university premises

Source: Author, 2015

Safety perception by Gender

The results indicate that Male gender felt safer in the institutions 23.6% as compared to the female gender 19.7% in Figure 5.

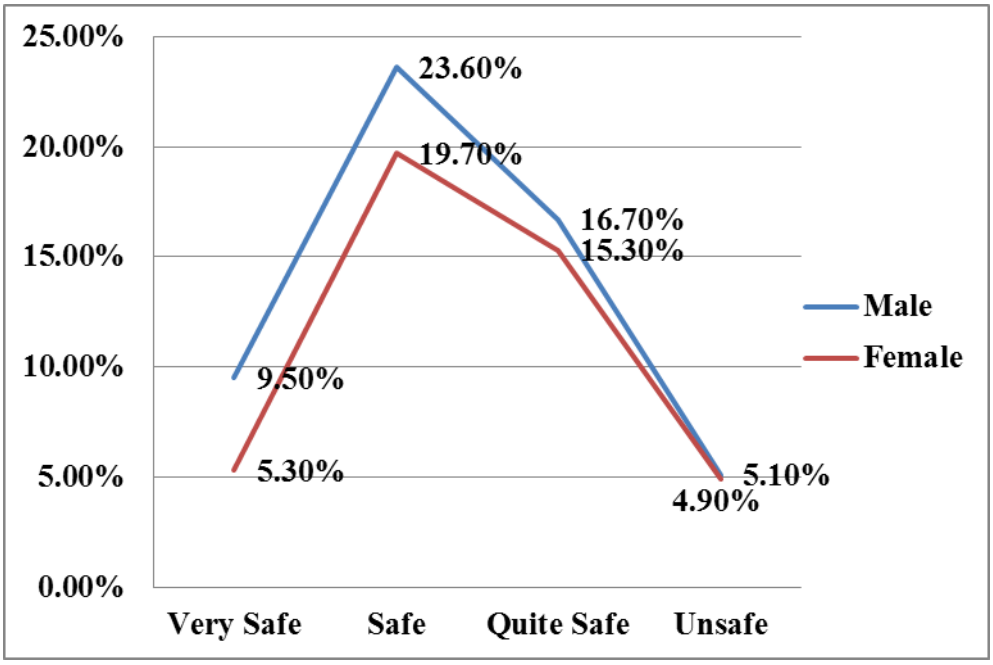


Figure 5: Safety perception when within the university premises

Source: Author, 2015

Distribution of unsafe areas, conditions, prevailing circumstances

Factors influencing perception of risks in the university premises varied widely among the respondents, Figure 6 presents the results in detail.

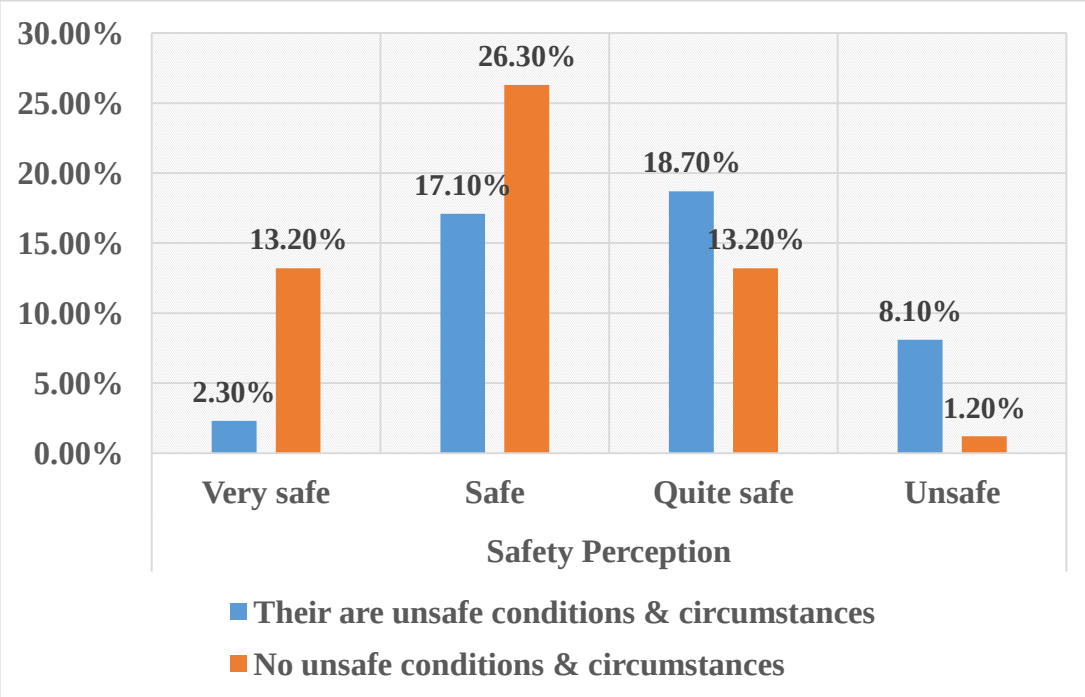


Figure 6: There are areas, conditions and prevailing circumstances that endanger respondents' safety

Source: Author, 2015

Figure 6 shows that despite having had over 50% of the respondents feeling safe in the institution's premises, atleast 46.2% of them indicated that there were unsafe areas, conditions and prevailing circumstances in the institution premises. It is very clear that even those who felt very safe are not really safe since they feel there are unsafe conditions.

Universities possess characteristics which distinguish them from other communities in many ways and that can contribute to increased vulnerability to man-made disasters. Poor security screening was the most dominant (60.30%) unsafe condition among universities within Nairobi City. Only 4.8% of the respondents cited lack of security rooms as an unsafe concern. Respondents raised concern about fencing of institutions; some have very good gates, well equipped with security yet the backyard can easily be accessed Figure 7.

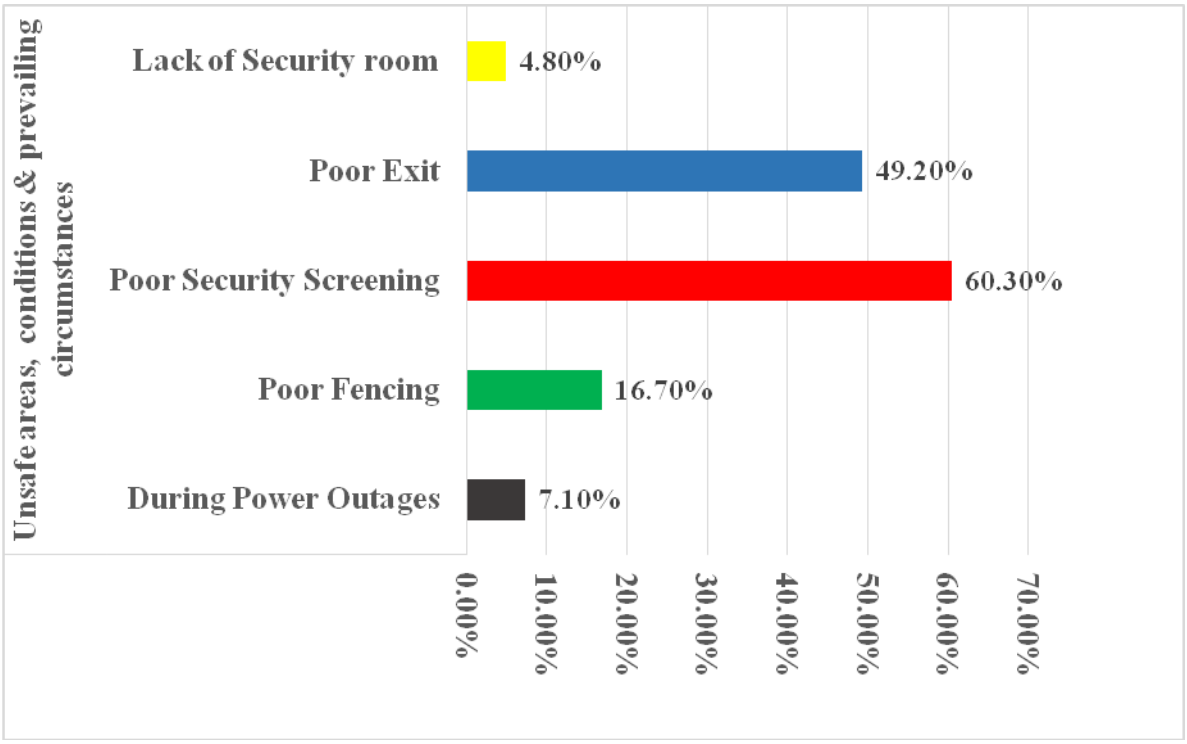


Figure 7: Unsafe areas, conditions and prevailing circumstances within institution premises

Source: Author, 2015

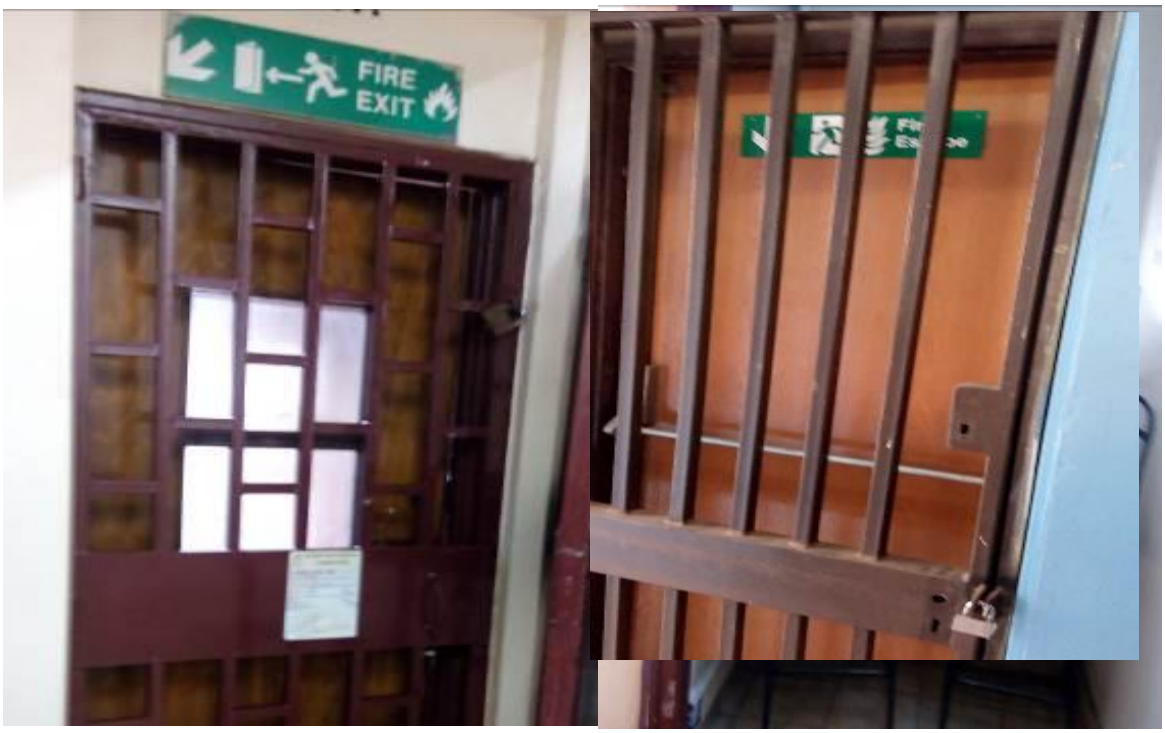
Safety Practices in the Institutions

The study sought to establish safety practices in institutions through assessment and observation check list. The findings Plates;1-2 indicate the best practices in the institutions. Some institutions endevoured to post a customized fire action card and ensured fire extinguishers and smoke detectors were mounted strategically. Most of the institutions have a safety policy however from the assessment, students and staffs were not fully aware of the content.

Plates 1and 2: Fire extinguishees and a ction card strategically placed

Risky Practices Identified

Plates 3-13 show risky practices identified in the institutions. Emergency egress and firefighting equipment i.e. Fire extinguishers and hose reels were available however the hose reel gate valves have no turn keys and fire extinguishers are not strategically located and easily accessible. Most exists were locked and the keys were not easily accessed. This is a high risk for any emergency that can lead to loss of many lives and destruction of property.



Plates 3 and 4: Locked and obstructed exists

Plates 5 and 6: Locked and obstructed exists

Plates 7and 8: Locked and obstructed exists

Plates 9 and 10: Locked fire exit and obstructed hose reel.

Plate 11 and 12: A Non-functioning Fire Alarm Control Panel with a call point, exit signage and fire action card

Plate 13: Sealed passageways

Plate 13 shows a completely sealed pathway which lead to a stampede in case of an emergency.

The assessments indicate that hazard reduction measures have been put in place in some institutions however the efficiency and effectiveness of the equipment makes the institutions to remain vulnerable to disasters.

Rating of Institution Preparedness Levels

Generally most respondents felt the levels of preparedness by universities in the city were not appropriate. Only 41.1% of the respondents rated the levels of preparedness by universities as suitable. Results on the rating of institution preparedness have been presented in Figure 8 in detail.

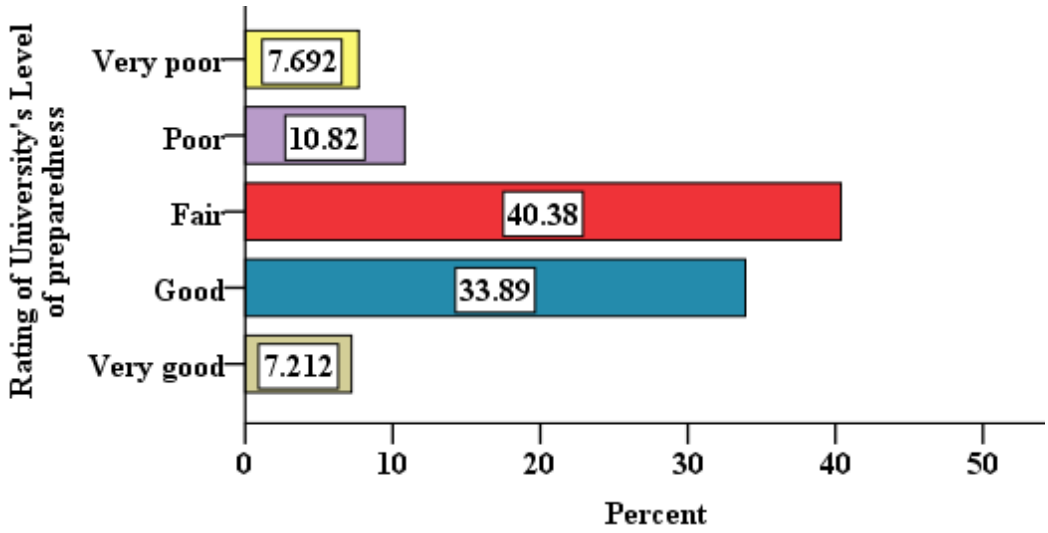


Figure 8: Institution level of preparedness to manmade disasters

Source: Author, 2015

Reasons for poor preparedness by universities in the city

Respondents cited various reasons contributing to poor preparedness on man-made disasters by university institutions in the city. Low awareness on how to respond in the event of man-made disaster was most common (49.73%). Lack of back-up power source was the least cited reason at (10.93%). Figure 9 elaborates the reasons hampering preparedness levels of the institutions in detail.

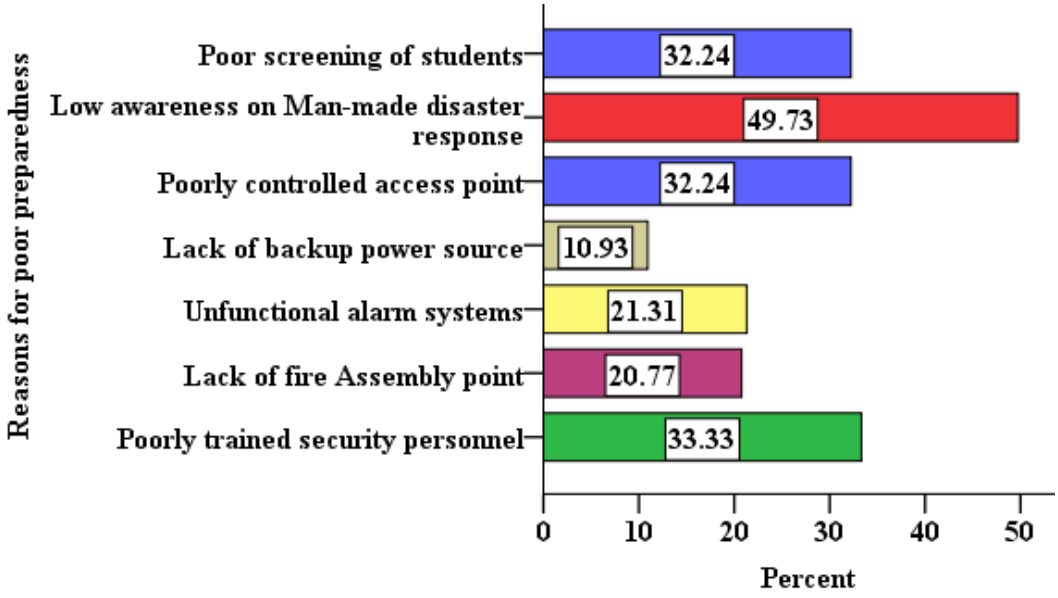


Figure 9: Reasons for poor preparedness by universities in the city

Source: Author, 2015

Knowledge of Respond to Dangerous Occurrences On-campus

Disaster response knowledge is critical in enhancing preparedness levels to dangerous occurrences. Almost half of the respondents did not have knowledge on responding in case of a dangerous occurrence on campus. Figure 10, illustrates the distribution of respondents by disaster response knowledge. The trend as indicated in figure 1, shows that lack of knowledge and awareness is likely to increase hazard impact in the institutions.

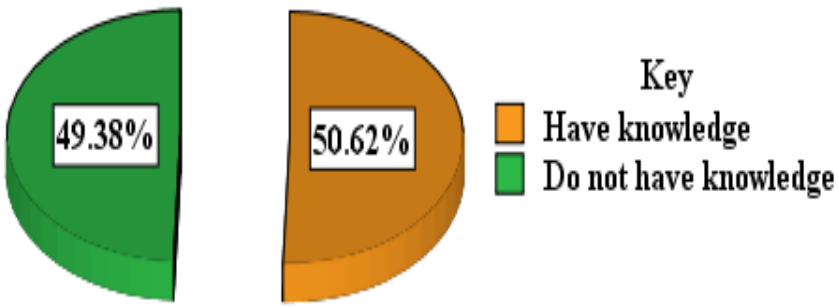


Figure 10: Respondents with knowledge to respond to dangerous occurrences

Source: Author, 2015

Gender versus Knowledge on how to respond to dangerous occurrences

The results in Table 2 indicate that the male gender is more knowledgeable on disaster response 29.1% as compared to their female counterparts 21.8%. Female gender is more vulnerable since most of them 49.1% have no knowledge on how to respond in the event of a disaster occurrence.

Table 2: Gender versus knowledge on how to respond

	Knowledge of Responding in the event of any dangerous occurrence when on campus		
Gender	**Yes**	**No**	**Total**
Male	112	92	204
	29.1%	23.9%	53.0%
Female	84	97	181
	21.8%	25.2%	47.0%
Total	196	189	385
	50.9%	49.1%	100.0%

Level of Familiarity university Environment

Effective response during man-made disasters is dependent on adequate familiarity by the vulnerable populations on their local environment. Most respondents were familiar with their institution’s environments. This is illustrated in Figure 11.

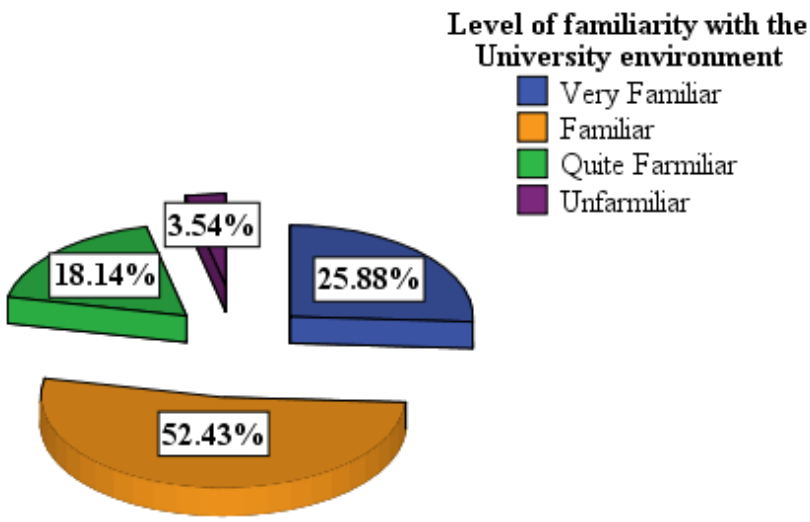


Figure 11: Respondents level of familiarity with the university environment

Source: Author, 2015

Level of familiarity with areas where respondent spends most time

Knowledge of neighboring buildings and activities being undertaken is key in effective response to man-made disasters. Despites (43.99%) of the respondents having knowledge of the neighboring buildings, most of them did not know what activities were taking place in those buildings since they spend most of their time in classrooms. The results are illustrated in Figure 12

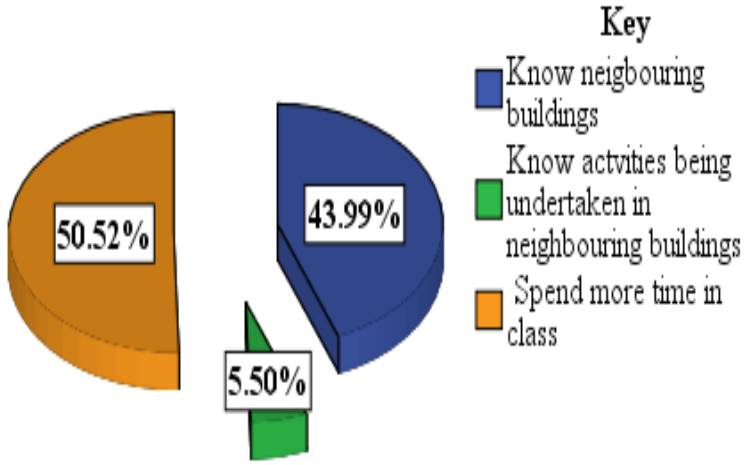


Figure 12: Level of familiarity with areas where respondent spends most time

Source: Author, 2015

Suggestions for Improving Institution Safety

Sensitization workshops, arming institution security guards and install fire extinguishers at visible places were the most dominant recommendations from the respondents. Respondents also recommended installation of metal detectors at entry points. Figure 13 presents the results in detail**.**

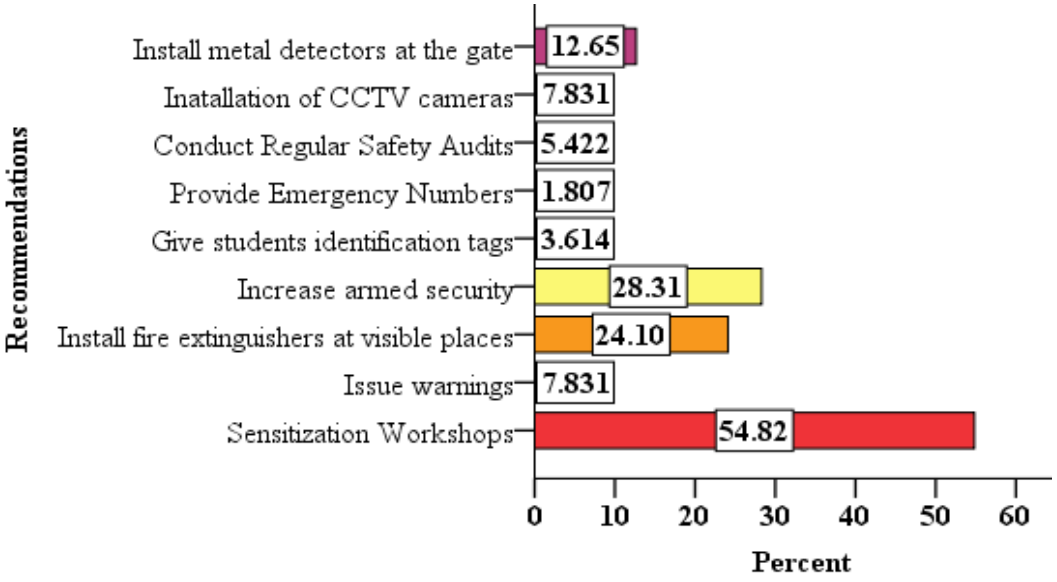


Figure 13: Suggestions made by the respondents on the way forward

Source: Author, 2015

Conclusion

The assessment findings reveal the level of preparedness by various university institutions within Nairobi city to man-made disasters. It was clear institutions understood the need for disaster preparedness and have tried to put in measures as required by ILO and School Safety Manual by the Ministry of Education, 2008; however there exists the presence of unsafe areas, conditions and prevailing circumstances in the institution premises which make them vulnerable to man made disasters.

Recommendation

Based the assessment findings, the following recommendations are proposed:

Vulnerability and capacity assessment

These should include detailed assessment of unsafe areas, conditions and prevailing circumstances in the institutions. There is need to screen all people including students, staff and visitors at all entry points to the institutions. The institutions should endeavor to ensure emergency exit doors can easily be opened, or the keys to such doors are within easy access. Steel staircase should not be used for emergency exits. Institutions should ensure access is restricted only to gates by ensuring proper fencing/safeguarding of their premises. To prevent risks associated with power outages during emergencies, the institutions need to install backup power sources. To improve security surveillance at the institutions, there is need to establish security rooms.

Preparedness planning

The target institutions should endeavor to establish operational emergency preparedness plans for common man-made disasters. The plans should provide clear strategies for increasing man-made disaster response awareness among the institution population. There is need to invest in emergency training targeting institution security personnel on security and safety surveillance.

Emergency preparedness training

There is need to improve awareness of the entire target institutions population on common hazards, emergency preparedness/action plans to enable efficient and effective response during real emergencies.

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