American Research Journal of Humanities & Social Science (ARJHSS)

E-ISSN: 2378-702X
Volume-05, Issue-06, pp-01-08
www.arjhss.com

Research Paper Open Access

Mitigating Occupational Risks and Hazards in the Workplace; a Study of Public Agencies in Kenyan

Kimeli M. Chirchir, Letangule L. Solomon, Hillary Kipkosgei, Mugane Phylis, Lilian Wabala, Elijah Odera, Gilbert Serem, Francis Siro Omari, Samuel Kosgei Yego, Sammy Lekatai, David Rono, Florence Kemboi, Japhether M. Wanyama

*Senior Management Course No. 155/2022 Kenya School of Government, Baringo P O Box 91-30400 Kabarnet, Kenya
[2]Director, KSG, Baringo

Abstract Safety is a priority and an integral part of our Public Institutions. Incidences of occupational risks andhazards in the workplace are frequent. This demands urgent interventions in terms of preparedness to mitigateimminent losses. The study sought to analyze the factors influencing employee safety preparedness in publicinstitutions in Kenya; specifically to determine the extent to which employee training, safety equipment andbuilding design influence institutional preparedness in safeguarding employees from occupational risks andhazards. Anchored on Stakeholders Theory, the study adopted the descriptive survey research design targetingpublic officers in Kenyan public service. Simple random sampling technique was used to obtain the study'ssample of 44. The study adopted structured questionnaires as research instruments for the collection of primarydata which was analyzed with the aid of SPSS version 20 through descriptive statistics. This study concludedthat public institutions that highly train their workers on safety are well prepared to handle safety hazards.Further, availability and access to safety equipment and infusion of safety gadgets to public buildings had apositive effect on the safety preparedness of public institutions. The study recommends that authorized officersresponsible for public institutions provide periodical training of their workforce on skills necessary for safetypreparedness alongside acquisition, mounting, maintenance and servicing of safety equipment and ensuring thefitting of safety gadgets in all public institutions.

Key words: Employee, Safety, Hazards, Occupational Risks

I. INTRODUCTION

Globally, risk and safety management is increasingly attracting the attention of international organizations like GIZ, UN and World Bank since safety hazards have caused many deaths in various countries including Kenya. Management of Safety hazards is anchored in United Nations (UN) policy framework. Safety hazards constitute an event or sequence of events, leading to casualties and damage or harmto property, infrastructure, and important services like training or means of livelihood.

For example, fire incidences in different countries the world over have shown that fire incidents have been occurring in many schools and probably many counties have experienced this problem. Fire disasters have huge damage including loss of lives. Fire incidences that could be caused by lightning, electrical faults, or other causes have brought devastating damages and loss of lives and property. Studies conducted by Arson Control Forum in 2006 in the United Kingdom, revealed nearly half of all schools surveyed had experienced incidences of fire serious enough to call fire rescue services in the past three years[1]

Kenya's efforts on safety and management of staff safety are anchored in the Kenya constitution 2010 on a large scale as disasters, the 2009 National policy for Disaster management in Kenya, the National Risk and Disaster management supplementary Bill No 34 of 2021 and the health and safety Act, 2007 (Government of Kenya., 2010, 2018, 2021). In the past, Kenya has experienced many hazardous and emergency occurrences that have led to the loss of lives, displacement of people and property destruction. In most of those incidences, there was a lack of proper preparedness, coordination, command and control of rescue efforts.

Given disaster risk management problems in the country, The President of The Republic of Kenya directed the establishment of an inter-agency unit led by the National Police Service. He directed that this unit collaborates with stakeholders before, during and after emergencies and disasters in Kenya. This was done through letter Ref. No. CAB/NSC/14/2/32 dated 8th August, 2013 as an effective and competent disaster management unit **(**NDMU**)** with an established command structure, budget and Standard Operating Procedures (SOPs) based on best practices. The unit together with stakeholders formulated the National Emergency/Disaster Plan and SOPs which were signed on 27th. June 2014. The plan and SOPs recognize the existence of other National and contingency plans. The National plan and SOPs are anchored in the medium-term plan phase two of vision 2030 which promotes safety, and security and protects Kenyan assets from adverse impacts of hazards and disasters.

The disaster management policy is anchored inthe Education Sector Disaster Management policy of 2017 (Government of Kenya., 2018). In the case of Public officers' safety, the major impediment to these aspirations is the perennial phenomenon dominated by safety incidences such as firesthat disrupt peoples' livelihoods and by extension learning. The safety of the learners is central to the provision of quality education and even a small disturbance can lead to a loss of education gains (Government of Kenya., 2018).

1.2 Statement of the Problem

Safety is a priority and an integral part of our Public Institutions. There is a need for countries to meet the requirements of the Millennium Development Goal (MDG), Priority 2 related risk reduction through the creation of awareness among stakeholders such as staff and students so that they can protect themselves and properties from hazards (ISDR, 2010). The government of Kenya also formulated a National Policy on Disasters Management to institutionalize mechanisms for addressing a disaster, further the Occupational Safety and Health Act, 2007 implores employers to provide a safe and healthy working environment.

Further, the National Disaster Management Policy Legal Framework (NDMPLF) of 2004 requires the Public Institutions to develop Disaster Risk Management plans to manage disasters and to have education and training done to equip staff. The school safety standards manual for use by schools describe safety procedures to be followed and the training requirement (GoK, 2008).However, the policy frameworks and manual guideline efforts have been futile as public institutions including training Institutions like colleges and schools continue to be vulnerable to hazards.

The Secretary-General of Kenya National Association of Parents according to a report on disaster preparedness and security in schools carried out in 5,000 schools established that 96% of schools were prone to hazards. Further, The study in Kiambu County schools by [2]revealed that 67% of the schools had ineffectivesafety management policies.

Based on the foregoing, it is clear that staff and other stakeholders in public institutions remain vulnerable to hazards. It remains unclear why despite the existence of a range of legal, regulatory and policy frameworks, employee safety remains a challenge. It is against this backdrop that this study sought to analyze the factors influencing safety preparedness in public institutions in Kenya, specifically, the study sought to determine the extent to which training safety equipment and building design influence the preparedness of public agencies in Kenya to proactively address employee safety.

II. LITERATURE REVIEW

The study is anchored in the Stakeholders Theory, which postulates the purpose of the firm is to create wealth or value for its stakeholders [3]or to serve as a means for managing stakeholder interests. Accordingly, institutionsshould be managed for the benefit of their stakeholders including their workers, customers, suppliers, owners, employees and local communities, and to maintain the survival of the firm [4]. The conceptual framework presented in Figure 1.1 guided the study. It was conceptualized that training, safety equipment and building design are the precursors of safety preparedness, hence the study sought to ascertain the individual effect of these variables on the safety preparedness.

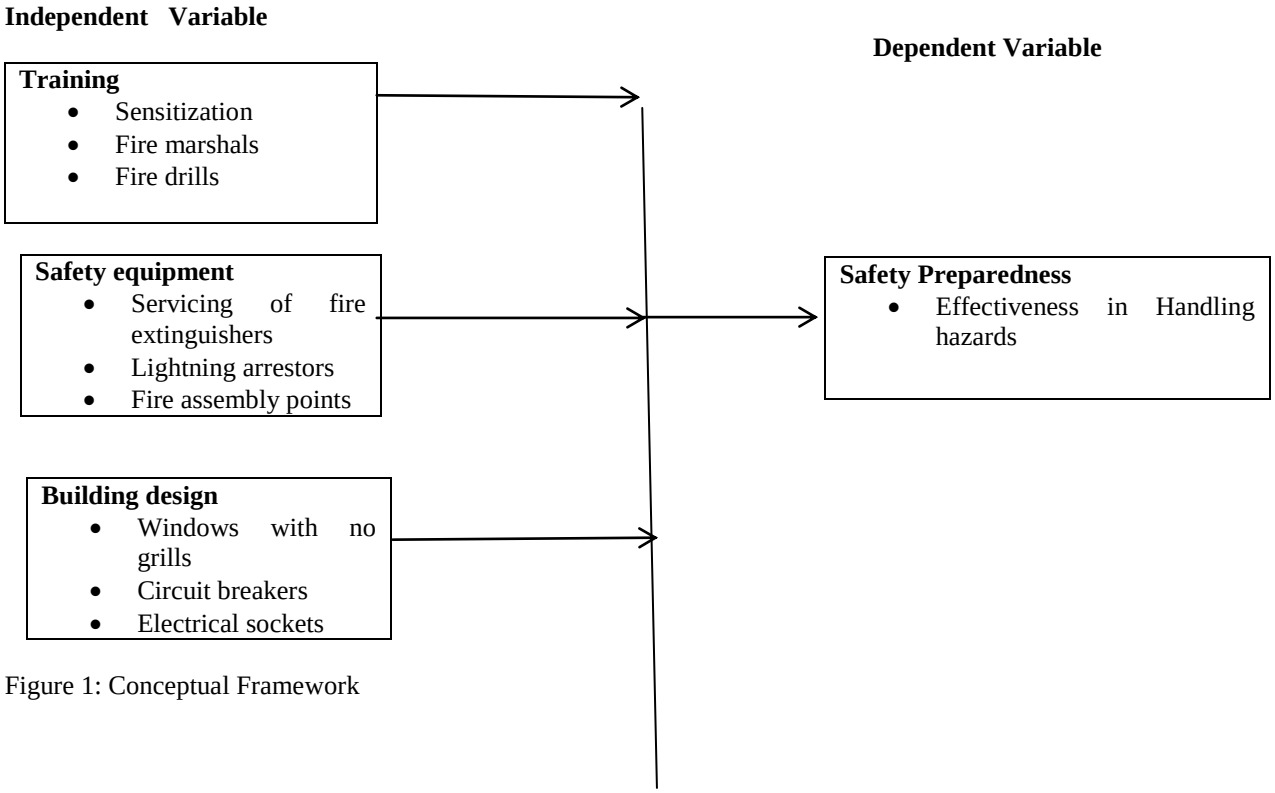

Figure 1: Conceptual Framework

2.4 Training and Safety Preparedness in Public Institutions

[5] In their study on the effectiveness of basic training in the management of hazards established that the level of preparedness of students in the control group dealing with hazardsscored lower than the level of preparedness of the students in the treatment group receiving attending basic safety management and safety simulation training.

On a larger scale, a study conducted in Petang and Abiansemal public health centres (Indonesia); on the association between knowledge in disaster management, perception of disaster preparedness and participation in training, and experience in disaster preparedness among health workers, found that disaster preparedness among public health centre health workers remains low and participation in training was significantly associated with disaster preparedness. They emphasized the need for continuous training and simulation to increase disaster preparedness among health workers[6].

[7]in his study on awareness of fire safety measures for users and staff inTanzania's Dar-es-Salaam malls,identified the presence of fire safety measures and equipment in place as per the Fire and Rescue Force Act 14 of 2007 but established the awareness of safety measures presented was low, and, most staff and users did not know how to use the fire safety equipmente.g.dry powder, drenchers, horse reel and sprinklers.

[8] In their study on Analysis of Training Needs in Safety Preparedness recommended that both government and other agencies should work together to encourage the public to participate in safety management programs through a series of training. Training should also be provided to workers in the focused area susceptible to hazards. This initiative enhanced knowledge, awareness, and expertisein handling real-life situations. Training also enhanced emergency communication and built effective safety preparedness and response.

The study by[9] on the correlation betweenperceptions of training benefits and the level of confidence of Unjani campus residents in applying knowledge and skills onsafetymitigation, established that correlation between the benefits and confidence of the participants showed a positive correlation with high strength of the relationship, inferring that, the better the perception of educational and training benefits, the higher the confidence level of participants in applying their knowledge onsafety mitigation.

2.5 Safety Equipment and Disaster Preparedness in Public Institutions

A study by [10]established that a great populace in Bangladesh reported recurrent lightning during particular seasons and many persons who experienced numerous lightning incidences were able to describe more

dangerous places as opposed to those who faced fewer lightning incidences. The majority of the population received no warning messages, and only a small percentage received lightning safety precautions or training. They emphasized the need for the government to sensitize the masses on the two safe locations against lightning are substantial buildings with conducting material within lightning arrestors or around it that conduct a direct or nearby lightning strike away from persons within and an enclosed metal-topped vehicle. Similarly;[11] identified Mkhanyakude District Municipality in South Africa as a vulnerable region to lightning.

A study conducted in Kisumu revealed that hospitality industry players are at risk of fire hazards attributed largely to open flames, cooking and spontaneous ignition, poor electrical connection largely attributable to negligence, as damaged electrical conductors, plug wires or extension cords; use of faulty, modified or unapproved electrical equipment; short or overloaded circuits, loose electrical connections and lightning. This can largely be prevented by formulating risk reduction measures quality control on electricity installation material being legislated, standardized, inspected and enforced and safety equipment is provided to fight the fire during an outbreak [12].

[13]Sought to establish the factors influencing fire safety preparedness in primary schools in Makueni County in Kenya. They established that policy knowledge, guidelines implementation practices, and provision of support resources influence fire hazards preparedness and management in primary schools. It further established that the most (42%) common hazard faced by schools was a fire. However, it was established that 86.7 percent of schools had fire extinguishers and fire alarms.

[13] Concluded that fire safety guidelines implementation practices have a significant effect on fire management preparedness and recommended the need for staff and other school stakeholders to conduct fire drills regularly and inspection for compliance with fire safety guidelines to be conducted often. Provision of fire safety support resources including fire hose reels, blankets, extinguishers, detectors and water should be acquired, installed and periodically serviced for the realization of operative fire disaster management in public learning institutions.

2.6 Building Design and Safety Preparedness in Public Institutions

[14]in his study on construction involvement in disaster management planning in Australia identifies two major impediments to the building industry participating in disaster preparation. The first is that the building sector does what is necessary to meet the criteria while being cost-effective and maximizing its profit potential. The second hurdle is that unless the government takes steps or imposes initiatives, it would be difficult to overcome and disaster management stays outside the realm of performance rewards. However not having building contractors' involvement affects the overall disaster plan and the level of preparedness for a disaster.

A study conducted on designing buildings to cope with emergencies in turkey by [15]highlighted that the key principle for safety in buildings is to ensure that the occupants in a building are safe during emergency events as well as normal conditions and to provide the opportunity for the occupants to move to a safe area, either inside or outside the building before the environment or building becomes hazardous in case of a disaster. They emphasized the number and location of exit routes and doors that ensure safe and continuous flow without any obstructions and the evacuation process are dependent on the performance of the exits which is influenced by several factors related to the characteristics of both the building and the building occupants including the door dimensions, visibility of the exits, door condition (open or closed) the building geometry and the signages in the buildings.

[16]in their study in Nigeria on crowd control in public buildings concluded on the need for the designers of large-capacity spaces to do an adequate appraisal of the capacity of seating clusters in the church auditorium as it influences the level of crowd congestion in the aisles as well as the success of emergency evacuation of crowds during extreme situations. They mentioned priority being given to crowd safety over space maximization when determining the type of seats to be specified for large capacity buildings.

Workplaces should promote the safety and health of workers and other occupants of the premises, according to Occupational Safety and Health Legal Notice No. 15 of 2007 Laws of Kenya (OSHA, 2007). However, many businesses continue to expose employees to hazards that hurt their bodily, social, and psychological health. The Sendai Framework (2015), which was created as a guide for disaster risk reduction initiatives between 2015 and 2030, emphasizes the importance of improving disaster preparedness to respond effectively and comprehend disaster risk.

The level of preparedness is usually higher following a disaster in institutions. For instance, following six fire outbreaks that occurred at the Cleveland Clinic operating suites in 2010[17] all the operating room employees

underwent training on surgical fire prevention and fire safety preparedness procedures. These strategies were geared toward improving the workers' fire safety preparedness.

III MATERIALS AND METHODS

The study adopted the descriptive survey research design (Kothari, 2012) and targeted public officers in Kenyan public service. The study'saccessible population comprised of the officers working at KSG Baringo campus together with SMC class Number 155 totaling 142. Simple random sampling technique was used to select the survey units. Stage one involved the selection of Departments within KSG Baringo and the second stage involved the selection of survey units within the departments upon which a random sampling technique was used to obtain the study's sample of 44. The study adopted structured questionnaires as research instruments for the collection of primary. Completed questionnaires werechecked for accuracy and completeness during the coding of responses. Data were analyzed with the aid of SPSS version 20through descriptive statistics (frequencies and percentages. The results were presented using charts, graphs and tables.

IV. RESULTS AND DISCUSSION

4.1 Influence of Training on Disaster Preparedness in Public Institutions

Most of the respondents 73.4% agreed that Staff in their institution has been sensitized to evacuation procedures in case of disaster.This is attributed to the fact that most public institutions train their workers on evacuation procedures.On Fire marshals in the institution having been adequately trained to prepare to handle fire disasters, 70.3% agreed, while 14% disagreed and 15.6% were undecided. This could have been attributed that most of the staff working in the institution have well-trained fire marshals to handle disasters (Table 1).
On whether the institution has undertaken fire drills to prepare staff in case of a fire outbreak, 67.2% agreed, and 24.4% disagreed while 14.1% were undecided. This could be attributed to the fact of positive attitude in the training of the fire drills within the institution in case of a fire outbreak.

Most of the respondents 73.5% agree that the institution has trained its workers on the effective use of safety equipment in case of a disaster while 14.1% were undecided and 12.6% did not agree. Probably this could be because of positive performance standards undertaken that require every staff to undertake train on the use of safety equipment in case of a disaster.

Most of the respondents 67.2% are in agreement that the institution was committed to training staff on the disaster every quarter while 14.4% are in disagreement and 18.8% are undecided. Probably, this could be because of the adherence to performance standards set within the institution in which the institution is mandated to train its staff every quarter on issues concerning disaster preparedness.

Table 1: The influence of training on disaster preparedness

Items	Strongly agree (%)	Agree (%)	Undecided (%)	Disagree (%)	Strongly disagree (%)
Staff in our institution have been sensitized to evacuation procedures in case of disaster	23.4	50.0	14.1	7.8	4.7
Fire marshals in our institution have been adequately trained to prepare to handle fire disaster	21.9	48.4	15.6	10.9	3.1
Our institution has undertaken fire drills to prepare staff in case of a fire outbreak	18.8	48.4	14.1	12.5	6.3
Staff in our institution have been trained on how to effectively use safety equipment in case of disaster	34.4	39.1	14.1	6.3	6.3
The institution is committed to training staff on the disaster every quarter	23.4	43.8	18.8	9.4	4.7

4.2 Effect of Safety Equipment and Disaster Preparedness in Public Institutions

Most of the respondents 76.5% agreed that fire extinguishers are regularly serviced as per scheduled in readiness for use.This is attributed to the fact that most public institutions regularly service their fire extinguishers as a requirement of their internal policies.On the placement of fire extinguishers at the strategic points to facilitate easy accessibility during times of disaster, 95.4% agreed, while 4.7% disagreed (Table

2).This could have been attributed that most students and staff working in the institution are trained on the strategic points where the fire extinguishers are allocated within the organization which can be used anytime in case of a fire outbreak.

On whether, the buildings have windows with no grills as an escape in case of a disaster, most of the respondents 90.6% were in agreement whereas 4.7% disagreed and 4.7% were undecided. The results could have been attributed to the safety precautions taken by the institution to allow ease of escape from its buildings in case of a disaster.

Most of the respondents 90.7% agreed that Fire assembly points have been strategically placed outside buildings for accountability of persons evacuated from a building in case of a disaster, similarly, 6.3% of the respondents were undecided and 3.1% disagreed. This could be attributed to strict adherence to government policies that requires all public institutions to establish fire assembly points where staff or workers can meet in case of a disaster.

Table 2: Safety Equipment and Disaster Preparedness in Public Institutions

Items	Strongly agree (%)	Agree (%)	Undecided (%)	Disagree (%)	Strongly disagree (%)
The fire extinguishers are regularly serviced as per scheduled in readiness for use	48.4	28.1	18.8	3.1	1.6
The institution has placed fire extinguishers at the strategic points to facilitate easy accessibility during times of disaster	68.8	26.6	0	3.1	1.6
The buildings in the institution have inbuilt lightning arrestors to avert lightning disaster	50.0	40.6	4.7	3.1	1.6
Fire assembly points were strategically placed outside buildings for the accountability of persons evacuated from a building in case of a disaster.	56.3	34.4	6.3	3.1	0
Buildings have two or more exits for ease of escape during a disaster	65.6	23.4	4.7	6.3	0

4.3 Influence of Building Design and Disaster Preparedness in Public Institutions

Most of the respondents 76.6% agreed that the buildings in the institution have inbuilt lightning arrestors to avert lightning disasters (Table 3). However, this is attributed to the fact that most public institutions install arrestors to avert disasters associated with lightning.

On the buildings in the institutions are fitted with smoke detectors to facilitate early detection of fire outbreaks/disasters, 81.2% agreed, similarly 6.2% of the respondents disagreed and 12.5% were undecided (Table 3).This could have been attributed to the fact that most contractors contracted to construct buildings in the institution follow building design guidelines put in place for the installation of smoke detectors.

On whether the buildings with tiled slippery floors have been carpeted or warning signs strategically placed to avoid disasters, 75 % agreed, and 14.1% disagreed while 10.9% were undecided. This could be attributed to the fact that institutions ensure their building designs ensure are strategically placed to avoid disaster.

Most of the respondents 73.5% agree that institutions' buildings are fitted with circuit breakers to aid in case of disaster while 12.5% are undecided and 6.3% did not agree. Probably this could be because building designs for the public institutions should be fitted with circuit breakers to aid in case of disaster.

Most of the respondents 82.8% are in agreement that the buildings are properly fitted with electrical sockets/ connections/circuit breakers to minimize the risk of electrical-related disaster, whereas 7.8% of the respondents were in disagreement and 9.4% are undecided. Probably, this could be because of the adherence to performance standards set within the institution to minimize risk together with adherence with other government policies on the adopted building design that embraces the installation of circuit breakers to minimize the risk associated with electric faults that can cause a disaster.

Table 3: Building design and Disaster Preparedness in Public Institutions

Items	Strongly agree (%)	Agree (%)	Undecided (%)	Disagree (%)	Strongly disagree (%)
The buildings have windows with no grills as an escape in case of a disaster	29.7	46.9	15.6	6.3	1.6
The buildings in the institutions were fitted with smoke detectors to facilitate early detection of fire outbreaks/ disaster	45.3	35.9	12.5	3.1	3.1
Buildings with tiled slippery floors have been carpeted or warning signs strategically placed to avoid disasters	26.6	48.4	10.9	7.8	6.3
The institutions' buildings were fitted with circuit breakers to aid in case of disaster	42.2	39.1	12.5	4.7	1.6
The buildings were properly fitted with electrical sockets/ connections/circuit breakers to minimize the risk of electrical-related hazards.	35.9	46.9	9.4	3.1	4.7

4.4 Training, Safety Equipment, Building Design and Safety preparedness in Public institutions

From the responses, training, safety equipment and building designs affect safety preparedness (Table 4).

Table 4: Training, Safety equipment, Building Design and Disaster Preparedness in Public Institutions

Items	Strongly agree (%)	Agree (%)	Undecided (%)	Disagree (%)	Strongly disagree (%)
Training of employee in disaster management prepare institutions for the eventuality	31.3	46.9	12.5	7.8	1.6
Availability of safety equipment prepares institutions to effectively deal with disaster eventuality	43.8	40.6	7.8	3.1	4.7
The institution adheres to Ministry of Education policies on disaster management.	42.2	43.8	7.8	1.6	4.7
Incorporation of safety features in building design prepares institutions to effectively deal with hazards eventuality	29.7	53.1	7.8	7.8	1.6
Public institutions in Kenya are prepared to deal with disaster eventuality	20.3	46.9	18.8	7.8	6.3

V. CONCLUSION

This study concludes that public institutions that are involved in the higher training of their workers on disaster issues are well prepared for safety preparedness while those public institutions that are not involved in the training of their workers are poorly prepared for disaster preparedness. The study also concludes that safety equipment alsoinfluenced disaster preparedness positively. It was established that public institutions with safety equipment such as fire extinguishers and fire assembly points are well prepared to handle disaster preparedness. The study also concludes that building designfactors such as lightning arrestors, smoke detectors, warning signs and circuit breakers had a positive effect on the safety preparedness of a public institution largely.

VI. Recommendations

Based on the study's findings, it is recommended that:

i. Authorized officers responsible for public institutions through their respective human resource divisions/departments/sections/units provide for periodical training of their workforce on skills necessary for disaster preparedness.

ii. Authorized officers should provide for the acquisition, mounting, maintenance and servicing of safety equipment in all public institutions.

iii. The departments responsible for the construction of public buildings with the help of the department of public works ensure that all buddings under construction are fitted with inbuilt safety gadgets. Similarly, such authorities should undertake a comprehensive audit of all public buildings to establish the number of compliant and non-compliant buildings. To facilitate the development and implementation of a comprehensive corrective plan.

Funding: This study did not receive any funding from any public, commercial, or non-profit agency.

Declaration of interest: The authors declare that they have no interest.

REFERENCES

[1] Arson Control Forum, Evaluation of the Arson Control Forum Implementation Fund: Emerging Findings. Research. *Research gate*, Bulletin no. 7. February 2006

[2] J. Kimathi, Disaster preparedness in public secondary schools in Githunguri District, Kiambu county, Kenya, masters diss., Kenyatta University, Nairobi, Kenya, 2011.

[3] Max B. E. Clarkson. "A Stakeholder Framework for Analyzing and Evaluating Corporate Social Performance." *The Academy of Management Review*, vol. 20, no. 1, 1995, pp. 92–117. *JSTOR*, https://doi.org/10.2307/258888.

[4] Evan, William M, and R E. Freeman. *A Stakeholder Theory of the Modern Corporation: Kantian Capitalism.* , 1988.

[5] J. Farida, S, Suratmi, and I. Maghfiroh, Effectiveness of basic training on disaster management pilot program for disaster preparedness in community, *Jurnal INJEC*, 2(2), 2017, 126-135

[6] I. M. Susila, D. P. Januraga, P. P. Utami, *et* al. Government of Kenya Ministry of State for Special Programmes Office of the President Draft National Policy for Disaster Management in Kenya. *IEEE Technology and Society Magazine*, 2019, 11–12.

[7] G. J. Kikwasi, A study on the awareness of fire safety measures for users and staff of shopping malls: the case of mlimani city and quality centre in Dar es Salaam, *Journal of Civil Engineering and Architecture*, 9, 2015, 1415-1422

[8] N. Nazli, N. N. Nisa and S. Sapora, and M. R. Husni. Analysis of Training Needs in Disaster Preparedness. Procedia, *Social and Behavioral Sciences*, 140, 2014, 576-580.

[9] A. P. Fransiska, The correlation between perceptions of training benefits with the level of confidence of unjani campus residents in applying knowledge and skills about disaster mitigation, *Advances in Health Sciences Research*, 37, 2021, 298 -301.

[10] M. M. Rahman, I. A. Nabila, M. S. Sakib, et al., Knowledge, Attitude, and Practices towards Lightning in Bangladesh. *Sustainability*, *14*(1), 2022, 448.

[11] I. Moyo, and S. Xulu, S. Public Knowledge, Perceptions and Practices in the High-Risk Lightning Zone of South Africa, *International Journal of Environmental Research and Public Health*, *18*(14), 2021.

[12] N. W. Kiveu, Fire Disaster Preparedness in Hospitality Premises in Kisumu City, Kenya, *International Journal of Recent Research in Social Sciences and Humanities, 2*(3), 2015, 122 – 130.

[13] D. K. Ndetu, and V. Kaluyu, *Factors influencing fire disaster management preparedness: a case of primary schools in Makueni County, Kenya*, 2016, *European Journal of Education Studies*, 2(6), 2016, 63 - 67.

[14] P. Stringfellow, Construction contractors' involvement in disaster management planning, *Construction Economics and Building*, *14*(2), 2014, 120–132.

[15] A. Sagun, C. Anumba, and D. Bouchlaghem, Designing buildings to cope with emergencies: findings from case studies on exit preferences. *Buildings*, *3*(2), 2013, 442–461.

[16] J. H. Ikibe, and O. K. Akande, Crowd control in public building designs: current trend and strategies for ecclesiastical buildings in Abuja, Nigeria, *Journal of Architecture and Construction*, 1(3), 2018, 25-33.

[17] D. Suchetka, Cleavland clinic reports six operating room fires in past year, *Ochsner Journal*, 11(1), 2010, 32-37.