

# Fire Disaster Preparedness in Hospitality Premises in Kisumu City, Kenya

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**Abstract:** Fire disasters have in the recent past increased in frequency complexity, scope and intensity thereby severely disrupting the pace of socio-economic development in the country. The scope, frequency, complexity and destructiveness of fire disaster has increased due to climatic changes, limited capacity among fire emergency responders, lack of awareness, lack of enforcement of the building codes, inadequate response and coordination mechanism and rapid growth of unplanned and uncontrolled settlements among others. The overall objective of this study was to assess fire disaster preparedness in hospitality business premises in Kisumu City. The specific research objective was to: Determine the causes of various types of fire disasters on hospitality businesses in Kisumu City. Both probability and purposive sampling strategies were employed to select a sample size of 86 units from hospitality business personnel, humanitarian organizations and government personnel. Data collection tools included questionnaires, focus group discussions, observation checklists and key informant interviews. Quantitative and qualitative data collected from primary and secondary sources were analyzed both for descriptive and inferential parameters using statistical package for social sciences (SPSS). Chi-square tests were carried out to establish the degree of significance among the variables. The study has revealed that there are various types of hospitality industry players who are at risk of fire disasters. They include hotels, restaurants, bars, shopping malls and night clubs. Firefighting service provision in Kisumu apparently is grossly inadequate operating on weak capacity to sufficiently respond to the needs of hospitality industry in event of fire outbreak. The findings of this study will be used to bolster enforcement of fire safety regulations and ensure unified command structure to enhance effective response to emergencies.

**Keywords:** Fire disaster, complexity, destructiveness, climatic changes, uncontrolled settlements.

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## 1. INTRODUCTION

The hospitality industry has expanded tremendously from taverns and inns used in the 17th Century to modern and sophisticated service industry. The hospitality Premises thus includes lodgings, restaurants, hotels, night clubs, transportation and cuisine (Rotich et al., 2012). It's a billion dollar industry that contributes enormously to wealth creation and employment generation across the globe (Sindiga, 1996). At any time it holds a large Labour force and huge populations of tourists, businessmen and general travelers on transit who need various hospitality services such as accommodation, cuisine, travel, drink and leisure. Because it accommodates large numbers of people with huge investments on property and equipment and contributes to national economies, there is need to ensure there is utmost safety and security of all the parties involved in these important premises.

Most fire disasters erupt from negligent handling of ignition flash points, faulty energized electrical fittings and combustible material that increase heat intensity. Uncontrolled fires disrupt people's lives through destruction of livelihoods and property, deaths and injuries. Consequently they take back years of overall development thus posing a major challenge to the achievement of the Millennium Development Goals (MDGs) especially the target of halving extreme poverty by 2015 (UNDP, 2004). Studies by the New Zealand Fire Service indicates that the lodging and

entertainment industries sector/hospitality industry experienced four times more fires per establishment than the national average and accounted for nearly all recent fire deaths in commercial establishments.(Gunn, 1996 ).In the USA hospitality fire disasters led to enactment of the Hotel and Motel Fire Safety Act of 1990 that hinges on control and enforcement of construction and maintenance of hospitality premises and installation of smoke detectors and sprinkler system as the most effective safeguards against the loss of life and property from fire Dowling et al . (1996). In Britain fire statistics show that the top three causes are arson, careless handling of hot substances and appliance defaults Kellet et al., (1990).Vulnerability - the condition determined by physical, social, economic and environmental factors or processes increases the susceptibility of a community to the impact of disasters such as fire (UNISDR, 2005).Generally, fire disasters remain largely unpredictable due to lack of awareness, inadequate preparedness and response.

Fire disaster preparedness encompasses all activities taken before during and after fire emergency with view of reducing the impact of disasters based on sound risk analysis (GoK, 2011a). These measures include identification of fire hazards, installation of firefighting equipment, training and awareness creation, marking fire emergency exits and developing fire emergency response procedures (GoK, 2011b). On the other hand, fire rescue involves all measures aimed at assisting, hoisting, carrying or dragging victims from emergency area by means of interior access such as stairs or by ladders, fire escapes, or other means of escape – using rescue harnesses, ropes, backboards and other equipment (GoK, 2011a). It also involves extricating victims from vehicles, aircraft, cave-ins, collapsed buildings or other entrapments in order to save lives by using shovels, torches, drills, pry bars, saws, jacks, jaws, air bags, and other equipment.

#### **Statement of the problem:**

Urban disasters especially fires in Kenya are reported widely and frequently, the expectation that these fires will be contained is normally met with disheartening reports that these disasters have led to total loss of property and in some cases life and injury, this apparent failure to deal with fires at ignition stage (when fire spread is low) to conflagration (when heat intensity is overwhelming) is of major concern, rescue endeavours have invariably proved futile by the teams either arriving late at fire disaster scene or getting there on time but ill equipped and unable to counter the emerging threat.

#### **Overall objective:**

The overall objective was to examine fire preparedness on the hospitality business premises in Kisumu County City, Kenya.

#### **Specific objective:**

Determine the causes of various types of fire disasters on hospitality businesses in Kisumu City,

#### **Significance:**

The findings of this study will shed a clear light on all these phases of the fire disaster. Findings will fill the gap on fire risk reduction in the hospitality industry area and other areas prone to fire disasters. These findings will enhance better understanding of fire disaster mitigation measures necessary at both internal premises level and external stakeholder and fire policy formulation level

## **2. LITERATURE REVIEW**

The purpose of this literature review is to summarize the findings of other researchers in areas that are thematic to the research objectives and the problem formulated in this study.

#### **Theoretical aspects of fire disaster:**

Theoretically, fire occurs when there is a chemical union of oxygen with fuel accompanied by evolution of thermal energy in form of incandescence or flame (Omwega and Akinala, 2009). The manner in which and the factors that influence the release of heat energy, involves the study of fire behavior which is defined as the release of heat energy during combustion as described by fire intensity, rate of spread of the fire front, flame characteristics and other related phenomena (Trollope and Tainton, 1986). Various fire parameters have been developed to quantitatively describe the behavior of fires. Basically the effect of fire depends upon the amount, rate and the vertical level at which the heat energy is released and the fire behavior parameters have been developed that quantitatively describe the different aspects of the release of heat energy during a fire (Trollope and Trollope 2002).

A disaster is a large and sudden misfortune or calamity such as fire outbreaks, floods, drought, earthquake, etc. that disrupt normal pattern of life within a community where people are plunged into helplessness and suffering beyond their capacity to cope, anticipate and recover from the effects of the disaster (UNISDR, 2005). It is a combination of a hazard and vulnerable conditions. Vulnerability condition is determined by physical, social, economic and environmental factors or a process that increases the susceptibility of a community to the damaging impact of fire hazards (UNISDR, 2005).

Fires are among the most destructive hazards causing extensive damage to the built and natural environment, and devastation to human settlements across the globe (ADPC, 2007). According to Prideaux et al., (2003), disasters are unpredictable catastrophic change that they can usually only be responded to after the event either by deploying contingency plans already in place or through reactive response. Essentially, the distinction between a crisis and a disaster is therefore the extent to which the root cause of the situation is either self-inflicted through such problems such as inept management practices and failure to adopt to change.

Fire has been used in the daily life of human-kind from time immemorial. Traditionally, fire has been used for cooking, steam engines, wood and coal, smelting of iron and other metal, drying hides and meat for preservation, charcoal burning, and communication signalling. Fire has been a significant tool for humans by playing a key role for conversion of raw material to usable food, energy and light. Within the hospitality industry, fire is used in cooking through use of gas, charcoal, electrical appliances and equipment. However, fire risk would be high due to the vulnerability factors such as lack of training and exposure to flammable materials. Thus, it would be important to incorporate fire preparedness among such businesses to safeguard them from loss or disruption of business.

#### **Fire disaster preparedness globally:**

A survey on high-rise building fire safety, emergencies and evacuation procedures conducted in Chicago, USA in 2006 indicated that almost all occupants knew where fire exits were located. The findings supported the need for continued public education about emergency evacuation procedures in high-rise buildings (Zmud M. 2008). Further studies on the importance of fire safety preparedness through training for occupants of premises are demonstrated by Mekanjuola et al (2009) in Nigeria. This research focused on the assessment of the level of fire safety provisions in buildings and associated safety awareness of users and occupants. The study considered a number of scenarios that would affect the success or otherwise of an evacuation, including the knowledge of occupants regarding the location of safe exits, dealing with people with disabilities, and occupants attempting to re-enter the building. He concluded that inadequate staff training in conducting evacuations could be a major contributor to subsequent fatalities and injuries. A low level of training on fire safety for occupants was manifested by lack of knowledge on both availability and use of firefighting equipment. This could be countered by improving training and enhancing effective administration of fire regulations to reduce fire incidents in buildings.

Another study by Clark (2008) dealt with specific behavior and actions of people in fire situations, such as reporting fires to the Fire Brigade. Clark (2008) establishes that only a tenth of fire outbreaks in colleges and universities are ever reported to fire officials and documented. Case studies done on human behavior in fires that resulted in fatalities reveal that none of those who witnessed the incidents attempted to call the fire brigade. Carter & Burgess (2009) found that a significant proportion of people will attempt to extinguish the fire, rather than warn others or call the fire department. They attribute this situation to lack of knowledge on fire prevention among the staff and student population, hence the inappropriate behavioral response to fires that occur in campus settings. They conclude that raising fire awareness could lead to appropriate behavioral response to fires that occur in educational institutions.

#### **Fire disasters in Kenya:**

In Kenya, memorable industrial, highway and workplace accidents that have occurred in the past are those that associated with fires. Fire can devastate wide range of critical utilities and businesses such as hotels, restaurants, malls, hospitals and schools. While the occurrence of fires disasters can either be natural or manmade it remains unpredictable in its outcomes, largely because effective fire disaster preparedness and response strategies are not well developed or deployed in these events. It is clear that risk assessment is very low. The main causes of fire disasters in the Kisumu include faulty electrical systems; carelessness in handling of fire sources in domestic, commercial and industrial premises and arson (GoK, 2011a).

**Linking disasters to hospitality Premises and development:**

Hospitality industry plays a critical role in employment creation and poverty alleviation. In Kenya it is a multi-billion industry with one person in ten people depending on the industry in one way or the other (Rotich, et al., 2012). It has grown over the years from small restaurants and food kiosks used by travelers to big hotels and restaurants to provide various services to business travelers and tourists. According to Sindiga, (1996) in order to improve the quality of tourism and hospitality services, the key strategy would be continuing vocational training and education. Ideally such training and education should incorporate fire risk reduction in hospitality Premises. The study on fire disaster preparedness in Kisumu city is designed to further this cause by highlighting critical gaps in emergency preparedness training and capacity development. These gaps could impact negatively on growth in the hospitality industry and the overall economy.

The Disaster Management Policy document (2011) identifies fire as a major hazard in Kenya and emphasizes disaster preparedness on the part of the Government, communities and other stakeholders in disaster risk reduction activities. The DMPD aims to increase and sustain resilience of vulnerable communities to hazards through diversification of their livelihoods and coping mechanisms. The goal of the draft policy is to have a safer, resilient and more sustainable Kenyan society. This policy document provides for systematic monitoring and evaluation of the whole Disaster Management System, as well as the management of every disaster occurrence. The DMP provides for continuous monitoring, evaluation, analysis, research, storage and application of an effective database for management of disasters at all levels, National, District/County, Divisional and Community.

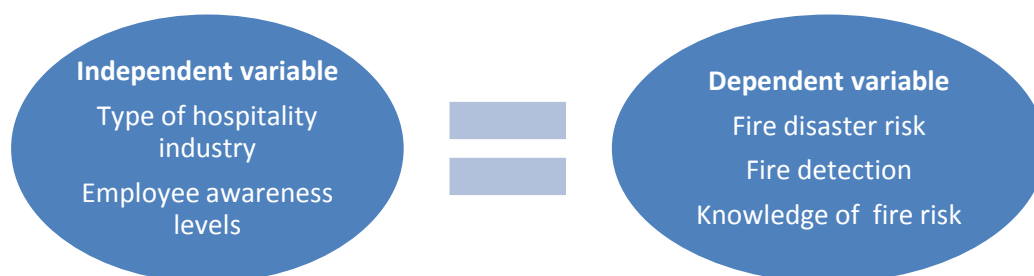
**Types and classification of fires:**

According to the GoK (2010) fire consists of three elements: fuel, oxygen and source of heat. Source of heat raises the temperature to its ignition point. Fuel is the material that burns while oxygen is supplied by air from the atmosphere. The working together of these three elements form the fire triangle, which creates the reaction called fire (GOK, 2010). According to the Kenya Fire Safety Management Policy (2011) (draft) the main types of fires include: domestic fires, fires in commercial buildings, traffic fires. The others include aviation fires and mining fires (GOK, 2011). Below is a brief description of the types of fires. Classification of fires can also be categorized by the type of combustible material involved Grant, (2012)

**Theoretical and Conceptual framework:**

The study used a set of input variables collected as innate to the hospitality industry's disaster preparedness and processed through analyses to achieve an output, the fire risk and vulnerability dependent variable (Figure 2.1).

The input variable (independent variable) is type of hospitality Premises, holding capacity, number of employees, fire awareness levels by the employees and capacity of fire emergency responders. The output (dependent) variable is the fire risk.



### 3. MATERIALS AND METHODS

This research used a case study design. This design used description as a tool to organize data into patterns that emerge during analysis. This is because it is ideal in identifying hypothetical constructs and can thus acquire a lot of information through description. There are two categories of descriptive designs: evaluation surveys and observational studies (Kothari, 2003). This study adopted both designs. Both evaluation and descriptive research designs were applied. Out of a population size of 300 premises which included hotels, restaurants, bars, malls and small eating places (cafes). A sample of 75 respondents was selected. Data was gathered using Questionnaires, Key Informants, interview guides and FGDs.

**Table 3.1: Summary of verifiable indicator and statistical data analysis techniques by objective**

Specific objective	Variable(s)	Analyses techniques
i) Determine the causes of various types of fire disasters on hospitality businesses in Kisumu City	<ul style="list-style-type: none"> <li>• Risk awareness level of personnel</li> <li>• Type of hospitality Premises</li> <li>• Prevalence/incidents of fires</li> </ul>	Frequencies Percentage Descriptive Document analysis

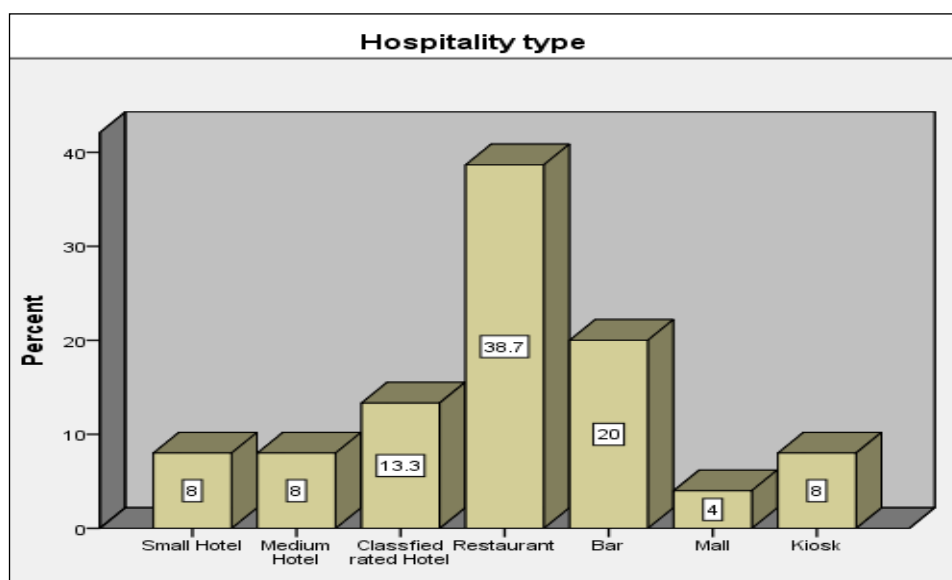
**Table 3.2 Study population and sample size**

Study population unit	Sample size	Sampling method	Data collection tools used
Classified Hotels	10	Cluster random sampling	Questionnaires, KII guide, FGDs, observation checklists, photography (
Medium and small Hotels	40	Cluster random sampling	Questionnaires, KII guide, FGDs, observation checklists, photography (
Liquor sales (Bars)	30	Cluster random sampling	Questionnaires, KII guide, FGDs, observation checklists, photography
Hostels	3	Census method	Questionnaires, KII guide, FGDs, observation checklists, photography
Shopping malls	3	Census method	Questionnaires, KII guide, FGDs, observation checklists, photography

### 4. RESULTS AND DISCUSSIONS

#### Types of Hospitality businesses:

The sample population was drawn from hospitality premises and amongst those sampled was; 39 % restaurants, 20 % bars, 13 % classified hotels, 8% small hotels, 8% medium hotels 8% food kiosks and 4% Business malls. The profile of hospitality businesses sampled in Kisumu city is shown in Figure 4.1.



Source: Field Survey, 2013

**Figure 4.1: Types of hospitality in Kisumu city**

**Incidents of fire disasters on hospitality business in Kisumu City:**

Several fire disasters incidents have been reported in Kisumu, whilst the actual sources of ignition could not be conclusively be explained by the respondents. They reported that most of the fire incidents occur in business premises(54.7 %), followed by residential homes (21.3%), schools (1.4%), roads and highways (1.3%).According to the Kisumu City Fire Brigade and Kisumu County Engineer, majority of the fires in the recent past have occurred in public institutions, houses and residential houses. From these findings, fire incidents occur mostly in hospitality premises as shown in Table 4.1.

**Causes of fire disasters on hospitality businesses in Kisumu City:**

According to information gathered from the study and key informants on causes of fire, it is a lengthy process involving multi agency participation. They include stakeholders such as the Kenya police, the Kisumu fire brigade, the Ministry of Public Works and witnesses at the scene. The process normally takes the form of a legal inquiry procedure. Thus, it is therefore not possible to conclude at the immediate time when the fire occurs as to the cause, other than perception of witnesses present at the fire disaster scene. However, they pointed out that from professional experience, as a fire incident investigator, most common causes of fire are related to open flames, electrical faults, cooking and spontaneous ignition. The noted that open flames occur from negligence in conducting heat related work, such as welding, cutting or grinding of metals contributes to 8% improper handling of flammable or combustible liquids or flammable gases in near-to-potential ignition sources that are improperly disposed of, and or left unattended near combustible materials contribute 20% of causes.

**Table 4.1: Causes of fire in Hospitality premises in, Kisumu City**

Causes of fire	No of Respondents	Percentages
Class C (Electrical fires)	37	42%
Class B (Fuel and gases)	18	20%
Class A (Combustible ordinary material)	15	17%
Class k (fats and oil)	11	13%
Class D (Combustible metals)	7	8%

It was further observed that electrical fires occur in unsafe conditions such as damaged electrical conductors, plug wires or extension cords; use of faulty, modified or unapproved electrical equipment; insufficient space or clearance between electrical heating equipment and combustibles; short or overloaded circuits; loose electrical connections and lighting and contribute to a majority of fires. 42% He intimated that Fires occurring as a result of cooking arise from unsafe conditions such as deep frying in pots or pans on stove tops; unattended cooking appliances 13%; and combustibles located dangerously close to cooking equipment, other causes are spontaneous ignition and the ignition of trash and or waste materials 17%.

**Type of losses incurred in fire Disaster, Kenya:**

The impact of fire on hospitality businesses as analyzed by value of property lost in fire disaster is shown in Figure 4.4. The findings revealed that 67.6 % of hospitality businesses have suffered business loss ranging from KSHS 1,000 up to KSHS 3 Million, 16.9 %, suffered losses of KSHS 1,000 up to KSHS 49,999

15.5 % reported losses of between KSHS 50,000 and KSHS 199,999, 11.3 % lost between 200,000 and 499,999, 9.9 % reported losses of between KSHS 500,000 and KSHS 2, 999,999.00, 2.8 % suffered losses of more than KSH 3 Million.

**Status of Fire disaster preparedness among the hospitality premises, Kisumu city, Kenya:**

Assessment of fire disaster preparedness was achieved by analysis of the capacity of hospitality Premises to respond to fire emergency, as well as the capacity of fire emergency providers in Kisumu City. This was aimed at achieving objective three of the study. Inquiry on level of emergency and evacuation procedures, ownership of appropriate fire equipment and skills, compliance with fire safety building codes, presence of smoke detectors and capacity of Kisumu fire brigade and other emergency responders, among others.

**Fire safety of hospitality premises:**

Fire disaster preparedness is critical for effective response in the event of fire occurrence. Various fire disaster preparedness measures assessed included installation of smoke detectors in premises, presence of public address system, marked emergency exits in buildings and emergency trainings offered to the employees of various hospitality businesses. According to the study findings, 62 % of respondents revealed that the business premises or buildings are not installed with smoke detectors. On presence of public address system for warning of people on impending occurrence of fire, 60 % of respondents indicated that they don't have any way of conveying emergency warnings (Table 4.2).

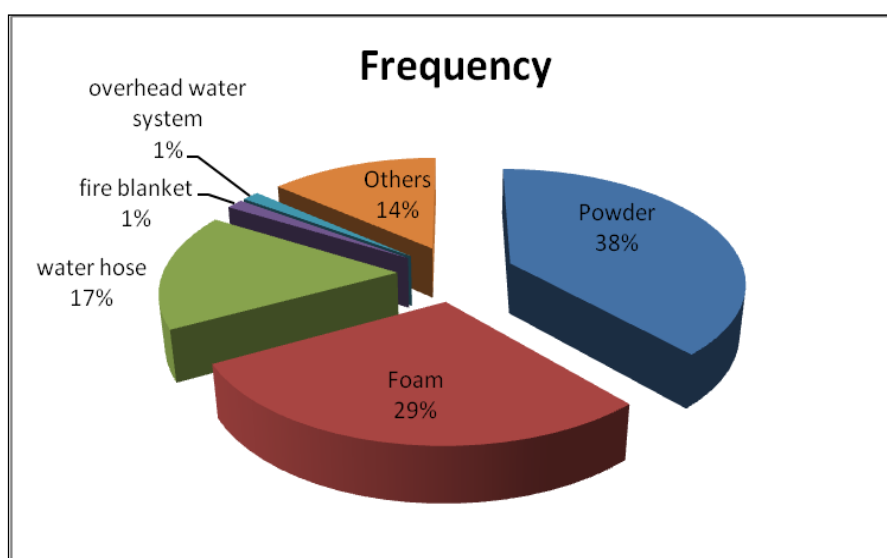
**Table 4.2: Hospitality premises fire emergency preparedness, Kisumu City**

Verifiable indicator	Count	Yes (%)	Count	No (%)
1. Premises have smoke heat detectors	24	32%	47	62%
2. Public address system	30	40%	45	60%
3. Roll called at the assembly point	40	53%	32	42%
4. Lighted Signs	53	70%	21	28%
5. Directions floor maps	40	53%	34	45%
6. Electrical surge protectors	40	53%	33	44%
7. First aid kits and flashlights	52	70%	22	30%
8. Written emergency procedures	29	38%	45	62%
9. Emergency response training for employees	12	16%	63	84%
10. Safety marshal	25	33%	44	67%
11. Fire extinguishers	68	90%	6	9%
12. Building and utilities receive regular maintenance and inspections	50	66%	23	34%
13. Hose reels installed in premises	7	9%	77	91%

Only 32 % of hospitality premises had installed smoke detectors. However, Pearson Chi-Square analysis showed that there was highly significant ( $P < 0.01$ ) variation in the distribution of presence of smoke/heat detectors in premises. This implies that the distribution of smoke detectors across the various hospitality premises show wide variation and inconsistency thus posing great fire risk to the premises. Majority of the respondents, 45 %, revealed that their hospitality businesses lack signs at emergency exits (Table 4.1).

**Use and types of fire extinguishers:**

Some 50% of the respondents have installed various portable fire extinguishers in their hospitality premises. The extinguishants included dry powder (38 %), foam (29 %), and hose reel 9.3 %. The other extinguishants used are fire blanket and overhead sprinkler both by 1.3 % of the respondents. Sand bucket was used by 9.3 % of the respondents (Figure 4.2).

**Figure 4.2: Types of fire extinguishers used in hospitality premises in Kisumu City, Kenya**

**Kenya police:**

In most of the fire incidents experienced in the city, the Kenya Police have arrived earlier than other emergency response organizations according to focus group discussions. They largely maintain order at the incident scenes. The Kenya Red Cross Society has been the most consistent emergency response organization in providing leadership in operations at the scene during the first minutes of most emergencies. The City Fire Brigade and St. John Ambulance follow in that order.

Through FGDs it was revealed that there is lack of teamwork amongst firefighting organizations in Kisumu. These units do not work together in most emergency cases. This is corroborated with UN-Habitat (2006) which decried lack of coherent framework for private sector participation and public-private partnerships in emergency service delivery. According to UN-Habitat there have been no pro-poor policies to regulate urban services in many urban areas of developing countries (UN-Habitat, 2006).

## 5. SUMMARY CONCLUSIONS AND RECOMMENDATIONS

The study has shown that there are various types of hospitality Premises which are at risk of fire disasters. They include hotels, restaurants, bars, shopping malls and night clubs. The findings have revealed that firefighting service provision in Kisumu today is evidently inadequate. It operates within a system of meager resources and inadequate training, which does not equip it to sufficiently respond effectively and efficiently to the needs of hospitality industry in event of fire outbreak.

**Conclusions:**

The study has revealed that there are various types of hospitality industry players who are at risk of fire disasters. They include hotels, restaurants, bars, shopping malls and night clubs. Fire disasters have occurred severally in Kisumu in hospitality premises due 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. Other contributing factors include inadequate training, lack of awareness on emergency responders' contacts and weak enforcement of safety laws. Study findings indicate majority (42%) are class C fires caused by faulty electrical fittings whilst the lowest causes of fire at (8 %) are class D fires of combustible.

**Recommendations:**

- (i) Procedures should be established to document incidence and causes of fires in the hospitality industry to guide the players on formulating risk reduction measures quality control on electricity installation material be legislated ,standardized, inspected and enforced.
- (ii) Mechanisms should be established to document the economic impact of fire on the hospitality premises to gather hard data for convincing decision makers of the need to establish fire preparedness measures. This would elicit appropriate action from government and industry players to invest in fire risk reduction measures to safeguard the industry from losses.

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