Level of Fire Disaster Awareness in Buildings within the Nairobi Central Business District

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Abstract- This paper is a summary of findings of a research established to assess the level of fire disaster preparedness in buildings within the Nairobi Central Business Area. The data examination was focused on the level of fire disaster preparedness of Tenants, Landlord and Building occupants.

The results showed that the effects of presence of hazards in buildings 66.5% ($R^2 = 0.651$) can be explained by presence of hazards and vulnerabilities leaving 34.9% of the variability in preparedness to be accounted for by other variables. The results further revealed that the level of preparedness and fire safety awareness accounted for 66.5% ($R^2 = 0.665$) leaving 33.5% of the variability in fire safety management to be accounted by other variables. Influence of bylaws on fire disasters 62.1% ($R^2 = 0.621$) can be explained by lack of adherence to by laws leaving 37.9% of the variability in preparedness to be accounted by other variables. The level of fire safety awareness is very low as 55% of the respondents indicated that they had not been trained on fire disaster preparedness. This in essence implies that the people are exposed to fire disasters and the level of preparedness is low.

Index Terms- Disaster, Hazards, vulnerability, disaster preparedness, Fire Safety Awareness, Fire safety, Hazardous chemicals, variability.

I. INTRODUCTION

Buildings and other infrastructure require fire protection to facilitate their regular functioning and service delivery. Protection of buildings is not only necessary for such purposes, but also for the safety of the users. Experience has shown that much emphasis has been placed on ensuring that equipment and various means against fire hazards are put in place in buildings. The Government of Kenya by-laws on building codes stipulates that every building with more than one storey should be installed with a number of facilities for firefighting. It does not however compel the building owners to conduct training of the building users so that they can acquire some knowledge on the use of the facilities. Lack of knowledge on how to use the equipment, lack of fire equipment and means against fire hazards could render attempts to contain fire outbreaks at their preliminary stage almost impossible.

The human population of Nairobi according to 2009 census was 3,138,369 million and is continuing to grow at an annual growth rate of 4.5% (KNBS, 2009). In tandem with population growth, many buildings have been constructed which continue to increase in number and complexity, but many have inadequate or no fire safety measures (Celly, 1999).

In response, NCC and other players have tried to reduce fire disasters including conducting annual building inspections, approval of building plans, forming fire training schools and equipping all this facilities for fire disaster preparedness and compliance. Despite all these efforts, fire incidents in NCBD continue to rise with increasing frequency and severity.

Consequently, there is need to identify the underlying causes of city fire disaster and provide a holistic and sustainable solution to fire disasters in NCBD.

II. REVIEW OF LITERATURE

2.1 Level of Fire Safety Awareness

This is the ability to recognize the danger of fire, ability to know what to do to prevent fire as well as what action to take in case one happens. All fire disaster preparedness is based on the knowledge about fire hazards, the likelihood of different causes of fire outbreaks and the likely effects on the built and natural environment (Comolotti, 2004). He says people with knowledge about fire disaster will acquire equipment’s such as fire extinguishers, fire blanket and smoke detectors among others to support response activities. They also prepare their families and employees to take immediate action to prevent death injury and destruction of property whenever disaster strikes. Safety regulations in U.K impose mandatory fire safety training to all employees working within a building, a construction area or any other busy area which helps provide employees with crucial information, develop skills such as those used in operating fire extinguishers and proper escape behaviors (Sime, 2001).

Wood (1990) explored levels of awareness of and preparedness for fire disaster in community members in Queensland and found that the level of fire safety awareness has direct influence on the level of preparedness. He says being ignorant of dangers of fire makes people ignore the installation of firefighting gadgets which will help save life and property in case of fire outbreak. He also found that poor awareness of fire caused a lot of fire outbreaks while good knowledge enabled people to know the possible fire risks in ones premises. This study supported the more intensive and comprehensive capacity building in order to instill the need of preparedness (Wood, 1990).

In a study conducted in Oshogbo in Nigeria to assess the relationship between levels of awareness and disaster preparedness found, that 73.4% of houses studied had “burglary proofs” installed on windows, doors and sometimes the veranda. Out of those interviewed 64% said they had never thought of the implication in case of fire outbreak. To them this is a security measure aimed at preventing robbers from gaining access to the
house. The escape of inhabitants of a house, who commonly get trapped by the rigid non-removable metals in case of fire, become difficult (Bukowski, 2006).

Incidents of fire outbreaks in Tanzania will not go down unless peoples level of awareness of their duties to prevent fire is raised (Mfinanga, 2007). Mfinanga also noted that most people do not know that it is their responsibility to prevent fire outbreak and the first response is to call fire fighter as portrayed by one of a stall owner in Mchikichini market in Tanzania where 80 stalls were destroyed by fire who asked, “Is it our responsibility to fight fire?” While reacting to the question what steps the businessmen took to ensure that such incidents never reoccur again. To him it is the duty of the fire fighters.

People who regularly visit or use buildings or even visitors should be aware about the presence of the exit door which should not be blocked with anything and with proper signage showing the path out (Odour and Atsiaya, 2004). They said that observations show that in most of the buildings in Nairobi there were locks on doors while grilled outdoors were also locked a situation that presents doubts on their usability for escape purposes during emergency. They also noted that in most of the buildings, especially the storey ones, escape routes are a fare tales and therefore when fire breaks out, people crumble in one staircase exposing them to more danger of fire. Many of the surveyed buildings, fire disaster may hardly be escaped using the emergency exits since many do not know the location of fire exits. However the location of fire escape ways does not necessarily imply easy access through the ways as one of the respondents was quoted saying “the escape ways are known to many but the environment is not welcoming : stairs are old ,the exit doors are regularly locked ,whereas the keys to are with the watchmen downstairs”. Worse still the respondent did not know among the watchmen held the key (Odour and Atsiaya, 2004).

III. PURPOSE OF THE STUDY

This study was undertaken after several rampant cases of fires had been reported in different parts of the country hence raising fears on the issue of fire preparedness and safety measures in place. This study thus sought to investigate fire disaster preparedness in the NCBD as the frequency of fire disasters in NCBD has been on the increase and there are no documented findings on the holistic state of the fire disaster preparedness in NCBD. The need to unearth the underlying causes of these disasters is urgent.

The findings of this study can assist in formulating fire preparedness measures in buildings to mitigate fire disasters. Furthermore, the study will propose the changes that need to be put in place in order to comply with the fire disaster preparedness codes. This may go a long way in minimizing disasters within the NCBD. There is a gap in the knowledge on whether or not the said weakness is due to limited awareness and knowledge on fire protection/fighting equipment or lack of firefighting equipment in buildings.

IV. FINDINGS OF THE STUDY

2.1 Awareness of Fire Safety Laws among the respondents

The researcher sought to determine the level of fire safety awareness among building occupants and the results is as shown in figure 2.1

![Figure 1.1: Awareness of Fire Safety Laws among the respondents (source: Field data, 2014)](chart)

The results obtained from questionnaire to Landlord and tenants 280(80%) were unaware of fire safety laws and 70(20%) were aware of the fire safety by laws. Fire safety awareness helps to recognize the danger of fire, know what to do to prevent fire as well as what action to take in case one happens. People with knowledge about fire safety will purchase fire devices and also prepare their families and employees to take immediate action to prevent death, injury and destruction of property whenever disaster strikes (Perrow 2005).

Report from Focused discussion group and key informant interviews revealed that most building do not have enough fire exits, there is non-existence of well-lit fire exits, emergency
doors not sufficient as they were blocked/locked. The number of occupants to the building are not controlled hence go beyond required standards all these factors expose the building occupants to vulnerability in the event of fire.

4.2 Awareness of fire risks among the Landlord/Ladies and Tenants

The study sought to find out whether respondents are aware of fire risks that they are exposed to in their buildings as this increases the level of fire safety which is viewed to influence level of fire disaster preparedness. The findings are as illustrated in Table 5.1

<table>
<thead>
<tr>
<th>Table 2.1: Fire disaster risks (Source: Field data, 2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
</tr>
<tr>
<td>Do you have emergency escape routes</td>
</tr>
<tr>
<td>No response</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Housekeeping standards</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>No response</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>Stock of combustible materials</td>
</tr>
<tr>
<td>No response</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Awareness of use of fire extinguishers</td>
</tr>
<tr>
<td>No response</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

Table 2.1 indicates that there is no enough escape routes in buildings 45 (37.5%) response from landlords and 91(39.5%) tenants respectively. There is poor housekeeping standards 79(65.8%) and 171(30.8%) from Landlords and Tenants respectively, 66(55.0%) and 121(52.6%) respectively from Landlords and tenants respectively. Most respondents were unaware of how to use fire extinguishers 66(55.0%) and 121(52.6%) absence of safe fire assembly which exposes the building occupants to so much vulnerability in the event of outbreak of fire.

Results from Focused group discussion revealed that majority of buildings occupants were unaware of how to use extinguisher, there was noted absence of proper housekeeping standards, most buildings do not have doors to exist as most were blocked/locked. Presence of assembly points observed in most building but small and not clearly labelled and most of the time occupied as parking area. This was noted to expose the building occupants to a lot of danger in the event of outbreak of fire.

4.3 Awareness of fire response/control measures among respondents

Table 2.2: Fire Safety Awareness among respondents (Source: Field data, 2015)

The study sought to find out whether respondents are aware of fire risks that they are exposed to in their buildings as this increases the level of fire safety which is viewed to influence level of fire disaster preparedness. The findings are as illustrated in Table 2.1

<table>
<thead>
<tr>
<th>Table 2.2 Fire safety Awareness among respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
</tr>
<tr>
<td>Number of times the tenants attended Fire Safety training</td>
</tr>
<tr>
<td>No response</td>
</tr>
<tr>
<td>Never</td>
</tr>
<tr>
<td>Once</td>
</tr>
<tr>
<td>Twice</td>
</tr>
<tr>
<td>Fire outbreak response among</td>
</tr>
</tbody>
</table>
Landlords/Ladies/Tenants

<table>
<thead>
<tr>
<th>Shout/Scream</th>
<th>72</th>
<th>20.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call fire brigade</td>
<td>94</td>
<td>26.8</td>
</tr>
<tr>
<td>Call police while helping to put off fire</td>
<td>57</td>
<td>16.2</td>
</tr>
<tr>
<td>Try to save life and personal property</td>
<td>39</td>
<td>11.6</td>
</tr>
<tr>
<td>Pour a lot of water</td>
<td>24</td>
<td>6.85</td>
</tr>
<tr>
<td>Switch off Electricity Appliances</td>
<td>23</td>
<td>6.57</td>
</tr>
<tr>
<td>Use fire blanket</td>
<td>25</td>
<td>7.1</td>
</tr>
<tr>
<td>Use Available Fire extinguisher</td>
<td>20</td>
<td>5.71</td>
</tr>
<tr>
<td>Use escape routes</td>
<td>17</td>
<td>4.8</td>
</tr>
<tr>
<td>I don’t know what to do</td>
<td>13</td>
<td>3.7</td>
</tr>
</tbody>
</table>

The results in table 5.2 indicate that most of the tenants have not been trained in fire safety 177(50.5%) and also unaware of what to respond in the event of fire outbreak. 94(26.8) would shout/scream, call fire brigade and many opted for other available options. Hence this is an indication that most respondents are not aware of their obligation that is to ensure their own individual safety in the event of fire outbreak. Instead they would resolve to calling fire brigade, shouting/Screaming.

4.4 Factors determining awareness Levels among Landlords/Tenants (Source: Field data, 2014)

The researcher computed the mean index of the level of preparedness by the number of times.

The respondents have attended training on fire safety preparedness and the results are given below. The researcher has used post hoc method for pair wise comparison to establish the influence of the training on the level of preparedness among the tenants.

In the study the researcher sought to find the percentage of landlord/Ladies and tenants who attended training and the results are as discussed in Table 5.3 below.

Table 2.3: Level of Preparedness among Respondents who have attended training on fire Safety measures

<table>
<thead>
<tr>
<th>F</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>205</td>
</tr>
<tr>
<td>Once</td>
<td>106</td>
</tr>
<tr>
<td>Twice</td>
<td>39</td>
</tr>
</tbody>
</table>

FireSafety Measures

From the results in table 5.3 the research further sought to find out the relationship between level of training and fire safety awareness and the results revealed that 66.5% (R^2=0.665) can be explained by training, leaving only 33.5% of the variability in fire safety management to be accounted by other variables. Training of building occupants contributes (p<0.05) significantly to fire safety awareness.

Information from Key Interview Informants and focused group discussion revealed that factors determining preparedness was majorly training on awareness of fire measures, use of firefighting equipment, escape routes, obligation of Landlords/tenants on fire safety, by laws especially of workplace/buildings and their responsibility in the event of fire outbreak.

V. DISCUSSIONS

The findings revealed that the level of fire safety awareness is very low among the respondents in the Central Business District of Nairobi. This explains why they do not know how to prevent outbreak of fire or even deal with it if it occurs. This is greatly contributed by the fact that most of them have not been trained on fire safety preparedness. These findings are in line with those of Wood (1990) who sought to explore the levels of awareness and preparedness for the disaster in community members in Queensland. He found that the level of fire safety awareness has direct influence on the level of preparedness.

There is also a clear indication that majority of the people do not know that it is their responsibility to be prepared with fire safety devices that can help them in the initial stages of fire outbreak and the only option is to call the fire brigade. This state of affairs can be attributed to lack of training. These results support a study done by Mfinanga (2007) in Tanzania which revealed that magnitude of fire destruction will not go down unless people’s level of awareness of their duties to prevent fire is raised. Mfinanga also noted that most people do not know that it is their responsibility to prevent fire outbreak and the first response is to call fire fighters.

Findings revealed that some buildings within the Central Business Area are not safe since they are not served with fire safety devices. The occupancy levels in many of the buildings exceed the recommend standards as per National planning and Buildings Regulations, 2009. Most of the buildings had the doors to their escape routes blocked with no fire safety devices, hazardous chemicals stored inside their premises, non-existence...
of emergency numbers exit doors did not have signage to the escape routes missing.

It was further established that the effects of presence of hazards in buildings 65.1\% (R^2 = 0.651) can be explained by presence of hazards and vulnerabilities leaving 34.9\% of the variability in preparedness to be accounted for by other variables. Hazards and vulnerabilities contribute (p<0.05) significantly to fire disaster preparedness.

Majority of buildings occupants were unaware of how to use of extinguisher, there was noted absence of proper housekeeping standards, most buildings had doors to fire exit blocked/locked. Presence of assembly points observed in most building but small and not clearly labelled and most of the time occupied as parking area for vehicles and most of the building occupants had not been trained in fire awareness. Most respondents had low perception of the implementation of NCC by-laws. The numbers of prosecution, penalties, and fines for non-compliance is low compared to a population of over 3 million residents living in the Nairobi City Council.

The influence of by-laws on fire disasters 62.1\% (R^2 = 0.621) can be explained lack of adherence to by laws leaving only 37.9\% of the variability in preparedness to be accounted for by other variables. Hazards and vulnerabilities contribute (p<0.05) significantly to fire disaster preparedness.

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