

Towards Sustainable Disaster Management: An Assessment of Levels of Community Awareness on Fire Outbreaks and Safety among Public Universities in Tanzania

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Abstract: This study assessed community awareness on fire outbreaks and safety among public universities in Tanzania with reference to The Open University of Tanzania and the University of Dar es Salaam. Specifically, the study intended to explore individuals' awareness and knowledge on causes of fire incidents; identify individuals who had witnessed fire incidents; assess knowledge on essential facilities for firefighting and safety; assess the individual's ability to fight against fire incidents using local and relevant firefighting gears available in one's premise; examine the individual ability to use modern and specified firefighting gears and safety facilities and to measure the attempts made by the universities under study towards raising community awareness on using firefighting appliances and safety measures. The study adopted phenomenological qualitative research design. Questionnaires, in-depth interviews, focus group discussions (FGD) and observation approaches were used to collect data from 76 respondents obtained through purposive and random sampling. Data collected were quantitatively and qualitatively analyzed. Numerical data were analyzed using simple descriptive statistics with the help of SPSS software. Qualitative data on the other hand was analyzed using content analysis approach. The study findings revealed that community awareness on fire outbreaks and safety was low. This comes as a result of inadequacy of trainings for facility users, lack of enlightenments for creating community awareness and cautions on fire incidences and poor fire outbreaks management. The study recommended on the improvement of integrative fire management and public fire disaster awareness (PFDA) strategies so as to create community awareness and safety on fire outbreaks.

Key words: Fire outbreak; firefighting gears; vulnerability; community awareness

INTRODUCTION

Fire outbreaks in buildings have been causing vast socio-economic destructions to the affected population all over the world. For instance, the deadly Comayagua prison fire that occurred on 14/15th February, 2012 at the National Penitentiary in Comayagua, Honduras, killed 360 people (BBC, 2012). The United States Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) statement said crowding, poor safety practice and the presence of flammable materials in and around the tightly packed bunk beds caused the rapid spread of the flames (CTV, 2012). Consequently, the 2013 Kolkata market fire was a fire accident that occurred in a five-storey market place in Kolkata, the capital city of West Bengal, India on 27 February 2013. Mostly, estimated 19 labourers working in the market were killed in the accident. The initial reports indicated that fire might have been initiated by a short circuit in the first floor of the market (Dhar, 2013).

In Tanzania, fire incidents have been occurring unexpectedly causing irreplaceable damages. As taken from the research reviews, there have been trend of 22 inconsistent fire incidences and their consequences in schools and institutions in Tanzania between 1999 and 2009 (Kahwa, 2009). Moreover, the Dar es Salaam City Council Fire Brigade recorded 852 fire outbreaks in Dar es Salaam buildings between 2004 and 2008 (Kachenje *et al.*, 2010). Most past studies show that fire incidences in schools in Tanzania have been repeatedly occurring notwithstanding the damages that were caused. Such fire incidents resulted from negligence and lack of communities' awareness on availability and proper using of fire fighting facilities (Kahwa, 2009). The existing literature further indicates that in most public buildings there is limited fire management capacity particularly low public awareness and availability of means and facilities that may facilitate fire fighting (Kachenje *et al.*, 2010). On experience and from literatures, the fire incidences kept on occurring repeatedly in different public and secondary schools since 2010 to 2015 (Mwakanosya, 2015).

Experience has shown that much emphasis has been placed on ensuring that fire equipments and other facilities for firefighting are put in place in all public services buildings. The Fire Fighting and Rescue Act of 2007 stipulates that every building should be installed with all necessary facilities for fire fighting. However, the Act does not oblige the facility owners to conduct trainings and create awareness of the facility users in such a way that they can acquire necessary knowledge concerning fire incidents and on the use of the fire fighting facilities. It should be noted

however that lack of such knowledge may expose the community to vulnerability of the consequences. Furthermore, although most past studies including Fire Emergency Preparedness Levels at Secondary Schools in Kilimanjaro (Kahwa, 2009) and The Assessment of Urban Fire Risk in the Central Business of Dare es Salaam, Tanzania (Kachenje *et al.*, 2010) have revealed on the consequences resulted from fire incidences in some secondary schools and commercial buildings in Tanzania, yet fire incidences are on the rising trend. Because of that one may be interested to explore the current status as far as fire outbreak incidences in public services buildings is concerned and levels of awareness among community members. Since most past studies concentrated mostly on secondary schools and commercial centres only, other public services institutions including public universities remain to be gray areas as far as the status of public awareness on safety measures at times of fire outbreak is concerned. From the reviewed literature, for example, no study attempted to assess community awareness on fire outbreaks and safety in public universities in Tanzania.

It is under these grounds that this study was then undertaken to assess the community awareness on fire outbreaks and safety at public universities in Tanzania. Specifically the study attempted 1) to explore individuals' awareness on causes of fire incidents; 2) to assess knowledge on usage of essential facilities for firefighting and safety; 3) to assess the individual's ability to fight against fire incidents using local and relevant firefighting gears available in one's premise; 4) to examine the individual's ability to use modern specified firefighting gears and safety facilities; and 5) to assess the attempts made by the university towards raising community awareness towards using firefighting appliances and safety measures through trainings and drills.

METHODOLOGY

The focus population for the study was all public universities in the country. The country has 15 public universities in total (Table 1). Two public universities were selected, namely The Open University of Tanzania (head quarters) and the University of Dar es Salaam making a 13% of all universities in the country. Taking into account the fact that all public universities are prone to fire outbreaks, random sampling was employed to select the two universities; this gave all universities equal chance for inclusion. The head quarter of The Open University of Tanzania (OUT) is located alongside the Kawawa Road in Kinondoni Municipality.

Table 1: List of Public Universities operating in Tanzania

SN	Name of the Institution	Approved Acronym	Category of University	Head of University
1	University of Dar es Salaam	UDSM	Fully Fledged University	Dar es Salaam
2	Sokoine University of Agriculture	SUA	Fully Fledged University	Morogoro
3	Open University of Tanzania	OUT	Fully Fledged University	Dar es Salaam
4	Ardhi University	ARU	Fully Fledged University	Dar es Salaam
5	State University of Zanzibar	SUZA	Fully Fledged University	Zanzibar
6	Mzumbe University	MU	Fully Fledged University	Morogoro
7	Muhimbili University of Health & Allied Sciences	MUHAS	Fully Fledged University	Dar es Salaam
8	Nelson Mandela African Institute of Science and Technology	NMAIST	Fully Fledged University	Arusha
9	University of Dodoma	UDOM	Fully Fledged University	Dodoma
10	Katavi University of Agriculture	KUA	Fully Fledged University	Katavi
11	Mbeya University of Science and Technology	MUST	Fully Fledged University	Mbeya
12	Butiama University of Agriculture and Allied Sciences	BUAAS	Fully Fledged University	Mara
13	Moshi Cooperative University	MoCU	Fully Fledged University	Moshi
14	Mkwawa University College of Education	MUCE	University College	Iringa
15	Dar es Salaam University College of Education	DUCE	University College	Dar es Salaam

Source: TCU (2015)

The University of Dar es Salaam(UDSM) is situated on the western side of the city of Dar es salaam, alongside Sam Nujoma Road, on the observation hill in the Kinondoni Municipality. The two universities experience an influx of people visiting the place with various needs and purposes. By virtue of using the buildings and other facilities that are hazardous to fire including electrical and electronic appliances, they are vulnerable to fire incidences

The study adopted a phenomenological qualitative research design which focused on cross-section descriptive approach. The study population comprised of 314 members of staff from the selected universities and Ministry of Home Affairs including members of academic, administrative and technical staff, students, guards, cleaners as well as fire men. A sample size of 76 respondents was selected basing on sample size calculation by Yamane (1967), whereas both purposive and random sampling techniques were used. The selection of these two methods considered the different roles and functions of the selected samples; their visibility and geographical locations which enhanced obtaining the desired information appropriate to the subject matter. As a matter of clarity, purposive sampling was applied

on obtaining samples from academic and administrative staff, fire safety experts, guards and cleaners as well as the students. On the other hand, random sampling was applied in getting the elements amongst the clusters that represented the whole population with the related characteristics from the study areas. Random sampling was applied to reduce biases in getting the desired information and gave respondents equal chances to be selected. In achieving the set objectives of the study, different methods and tools of collecting data were employed. Those included structured questionnaires, focus group discussions, in depth interviews, observations and documentations.

The application of both qualitative and descriptive statistical data analysis techniques encompassing descriptions, graphs, charts and statistics was applied so as to support the exploration, presentation, description, identification and examination of collected data. Content analysis was especially applied to analyze non-numerical data. Numerical data were analyzed with the help of the Statistical Package for Social Sciences (SPSS) computer software. The selection of this package put into consideration its wider range of application domains such as survey analysis focusing on the qualitative and quantitative data analysis. All ethical issues were observed in a strict manner. Confidentiality and secrecy was maintained and that any used data and information obtained in the course of this research was only to be utilized for the purpose of academic endeavors. Questions asked were non-offensive to any respondent or any institution. Table 2 presents the distribution of respondents.

The study was guided by social learning theory which explains human behaviour in terms of continuous reciprocal interaction between cognitive, behavioural, and environmental influences. The central idea in learning theory is that a person's current behaviour is determined by prior experience. In any given situation, a person learns certain behavior that, over time, may become habit (Taylor *et al.*, 2006). Social psychologist Albert Bandura theorized that social learning through observational, imitation and vicarious learning were the more powerful learning processes in understanding social behaviour. The idea is that people do not just imitate the specific social behaviours they see, but they make cognitive inferences based on their observations, and these inferences lead to generalizations in behaviour (Baumelster and Bushman, 2011).

Table 2: Distribution of respondents

SN	Public Institute	Selected Population	Number
1.	The Open University of Tanzania HQ	Academic	6
		Administrative staff	4
		Firemen	5
		Guards	4
		Cleaners	3
		Students	15
2.	University of Dar es Salaam	Academic	6
		Administrative staff	4
		Firemen	5
		Guards	4
		Cleaners	3
		Students	15
3	Ministry of Home Affairs	Fire and Rescue Unit	2
Total Sample Size			76

Source: Field Data, 2015

Basing on Albert Bandura's theory on social learning, there is a connection between seeing and acting triggered by knowledge and past experiences. In most cases on fire incidences, people have been failing to respond towards stopping fire due to the fact that they lack knowledge. Leaving people without knowledge make them vulnerable whereby the risks that are created may result into disasters. Besides, giving people knowledge creates self-assurance on them hence complement on their sense of preparedness. Fire drilling and rescue exercises may act as live models involving an actual individual demonstrating or acting out behaviour. This may be complemented by verbal instructional models involving descriptions and explanations of a behavior in this case proper firefighting habits. A symbolic model involving real or fictional characters displaying behaviors in books, films, television programs, or online media and mental states are important to learning on how to fight with fire incidences. It is of the nature that these models need to act as positive reinforces because learning is

effective when supported by not only internal but also external reinforces (Taylor *et al.*, 2006).

FINDINGS AND DISCUSSION

Age of respondents

Figure 3 indicates the varying categories of age between nineteen to thirty-five years (57%), thirty-six to fifty years (23%), fifty-one to sixty years (18%) and above sixty years (2%). The groups contributed of academic and administrative staff, security guards and cleaners, fire and rescue team as well as students.

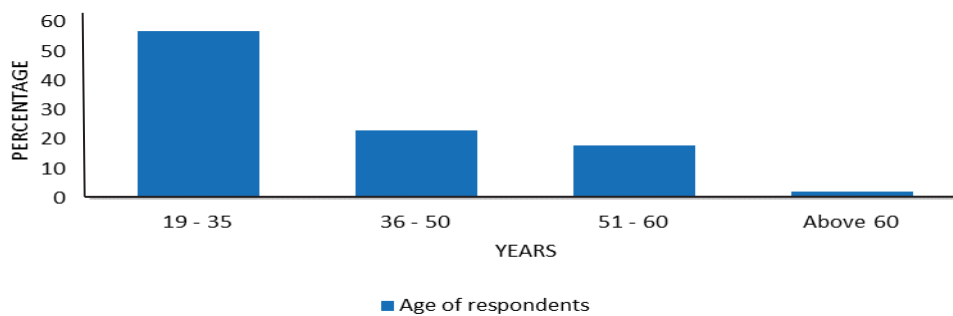


Figure 3: Age of respondents

Source: Field Data, 2015

Sex of respondents

Figure 4 shows that male respondents constituted of 63% while female respondents constituted of 37% of the whole population. The male group appears to be high due to the fact that it included fire and rescue team and units that were composed of men only.

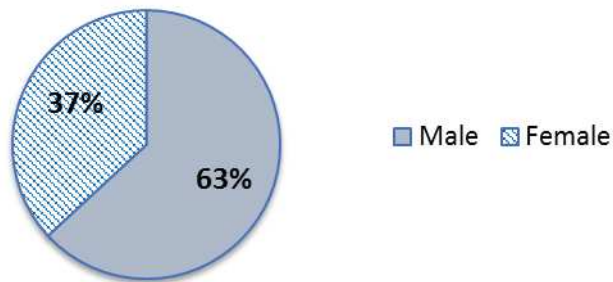


Figure 4: Sex distributions of respondents

Source: Field Data, 2015

Education levels of respondents

Figure 5 distributes the respondents' level of education that were provided with questionnaires, interviewed and focus group discussions. As it is shown in the figure, most of the respondents were included in a bachelor degree category. This is because most of the students engaged in either filling questionnaires or in focus group discussions were students under different undergraduate programmes.

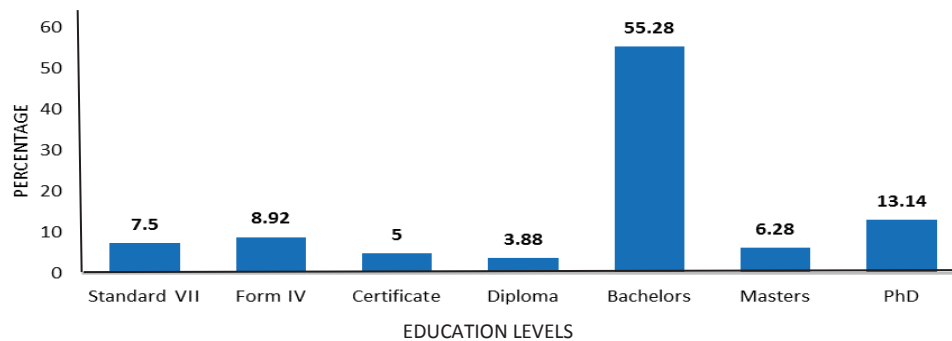


Figure 5: Education levels of respondents

Source: Field Data, 2015

Awareness on causes of fire incidence

Ignorance is in most cases the cause of fire disasters. Poor awareness of what fire is and how it can be prevented has led to a lot of fire outbreak. A good knowledge of fire will enable you to know the possible fire risk areas in your house. It will also enable you to understand how to prepare for a fire disaster and how to prevent fire disasters. Being ignorant of firefighting gadgets will make you to ignore gadgets that can save your property during a fire outbreak. Ignorance will also make you to compromise with buying a fire insurance policy (Amaoko, 2014). Fire and Rescue General Regulations in Tanzania make better guidance for the provision of training of firemen, and of members of the public in matters relating to awareness of, and preparedness to overcome fire and other calamities when occur (URT, 2008). This implies that knowing the causes of fire incidences can increase the level of cautions to be taken unto reducing fire outbreaks. But one may be aware of some reasons for fire outbreaks yet remain ignorant of what to do when fire erupts. Figure 6 presents the responses on causes of fire incidences from all data collection tools used. Of all the reasons that were identified, ignorance on the use of fire hazardous materials took the lead in causing fire outbreaks by 82.8%. Other factors included negligence (78.6%), poor installation of electrical appliances (74.4%), which the respondents believed to be causes of fire outbreaks. Fewer responses

(43.3%) were on sabotage and 26.7% were on other unknown factors. Besides, 78.6% of respondents suggested ignorance, negligence and poor installation of electrical appliances to be the major factors contributing to fire outbreaks. This entails that poor investments have been put to increase community awareness on fire accidents and the safety measures to be taken during such accidents.

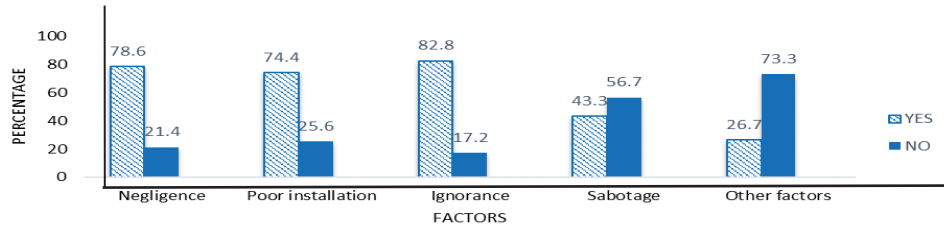


Figure 6: Factors causing fire incidences (N=74)

Source: Field Data, 2015

Awareness of respondents on witnessing fire incidences

The study intended to assess whether the community in the selected public universities was aware of the occurrences of fire outbreaks. As seen from Figure 7, sixty eight percent of all respondents were aware of fire incidences while 30% had never witnessed fire incidences and the rest 2% did not show any response. Subsequently, twenty-two respondents who were asked through interview and FGDs regarding their awareness on fire incidences appeared to have at least once witnessed fire outbreaks. One of the respondents during interview said, “...I have been witnessing fire incidents reported in the TV and I once witnessed my neighbor’s house burning to ashes. It was terrible because we had no any means to rescue the properties.”

These responses imply that witnessing of fire incidences by the majority of community members was not a new thing. But what remained shocking was the ignorance of what to do when fire erupts. This implies of danger that is prospected incase of fire outbreak.

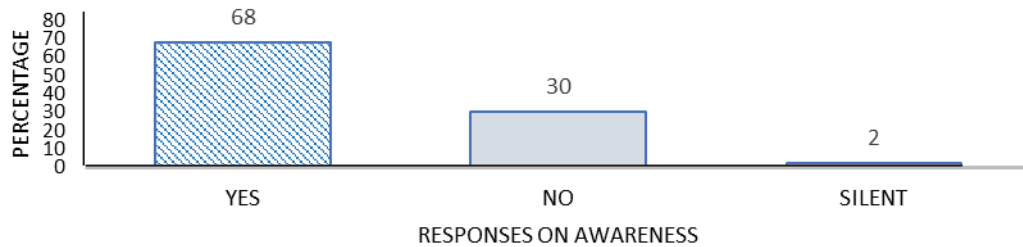


Figure 7: Awareness of respondents on witnessing fire incidences

Source: Field Data, 2015

Awareness of respondents on essential facilities for firefighting and safety

The study intended to assess the respondents' awareness on fire fighting facilities and safety. As per this study the focus was on fire extinguishers, sacks of sand, water storage, and assembly points, exit/escape roots, First Aid Kits and fire detectors/alarms in the buildings. Figure 8 indicates that 53% were unaware of the firefighting and safety facilities as opposed to 47% of those who seemed to be aware notwithstanding the slight difference between them. This gives an indication that the level of awareness on facilities for firefighting and safety is slightly low. Some added that,

“We did not know of the sand to be among firefighting facilities. In fact, we need to be told of the essential facilities as some are cheap within our reach”

This calls for something to be done to increase community's knowledge on important facilities to be used during fire outbreak and especially for those that are within their capacities to manage.

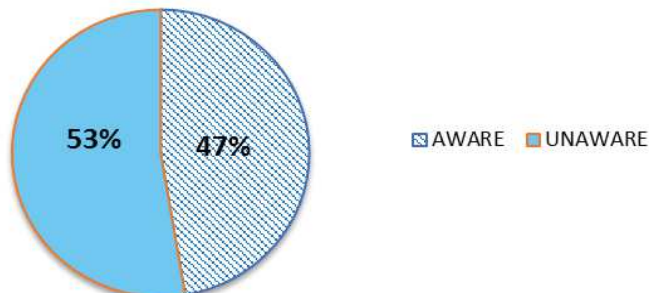


Figure 8: Awareness on essential facilities for firefighting and safety from all the respondents

Source: Field Data, 2015

Awareness of respondents on fighting against fire incidences using local and relevant firefighting gears available in their private premises.

Awareness of respondents on fighting against fire incidences using local and relevant firefighting gears available in their private premises was also figured out in this study. The local firefighting gears referred to in this section include water and sand. As per findings the majority of the responses from the questionnaires, about 79% out of 52 respondents, lacked knowledge on how to fight and stop fire incidences using local fire fighting gears. As taken from the FGD with the identified 16 respondents, ten of them also lacked knowledge on how to stop fire using firefighting gears.

The same question was asked to 6 respondents out of 8 who were proposed for the interview session. They all appeared to be aware of what had to be done in fighting against fire outbreaks using the relevant gears. Figure 9 presents the overall responses regarding the respondents' awareness on fighting against fire incidences using relevant gears. What is interpreted from the findings in Figure 9, presented 71% of respondents were not aware enough on using local firefighting gears to fight against fire outbreaks. That informed of the community's low awareness level on how to fight against fire outbreaks using relevant firefighting gears.

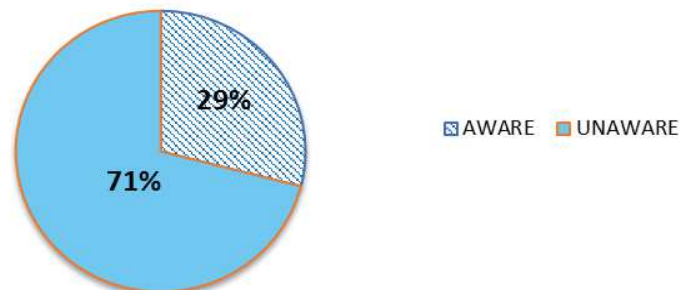


Figure 9: Awareness of all the respondents on the use of local firefighting gears (N=74)

Source: Field Data, 2015

Awareness of respondents on the use of special and modernized firefighting and safety facilities.

Figure 10 illustrates responses given by 74 respondents regarding their knowledge on the uses of fire fighting and safety gears. As it can be seen in Figure 10, seventy percent (70%) of 74 respondents had no any know how of the uses of fire fighting and safety gears. It intimates of the danger ahead on life and properties if at all fire erupt. More than half of total number of

respondents could not use the firefighting facilities for stopping fire, protection and safety due to lack of fire fighting trainings and drills by the facility owners.

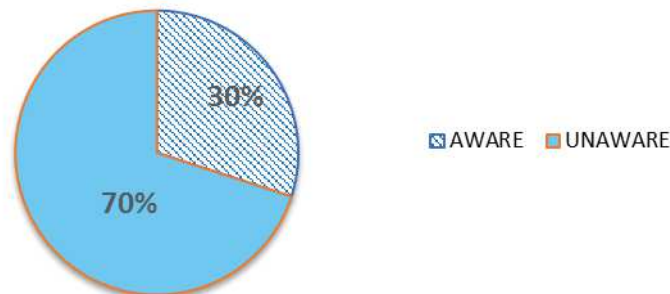


Figure 10: Respondents' awareness on the uses of modern firefighting and safety facilities

Source: Field Data, 2015

Awareness of respondents on safety measures to be taken during fire incidences.

Knowing what to do when a disaster strikes is essential for all facility users. This will ensure that there is no stampede and confusion when a disaster strikes (Ahenkorah-Marfo and Borteye, 2010). In this regard, all the facility users should know the procedures to be taken during the emergency. This entails the detection of fire and its strength, identify the alerts from the alarms, getting out of the building using the identified escape routes to the assembly point, help others who may be in need of such assistance and check out your number of those in the building (CFPA, 2011).

In an attempt to find out the facts about the respondents' awareness on what to do during fire outbreaks, the responses from the distributed questionnaires gave the indication of the situation. Again 60% of 52 respondents showed being unaware of safety measures to be taken during fire outbreaks. The responses from the FGD and interview sessions regarding the respondents' awareness on safety measures to be taken during fire outbreaks came up with different views on the same. Apart from 70% of 6 respondents who were interviewed to be aware of the safety measures during fire outbreaks, they on the other hand showed their doubts regarding their different experience on what to do during fire outbreaks. They actually claimed that,

“We are not being updated with the new techniques on how to go about saving life and properties during fire incidences.”

As regards to focus group discussions, ten (60%) out of 16 respondents appeared to be unaware of the safety measures to be taken during fire incidences. The discussion here so far was on what right measures were meant concerning safety. As observed, the respondents thought of just running out of the building without taking into consideration other factors as aforementioned.

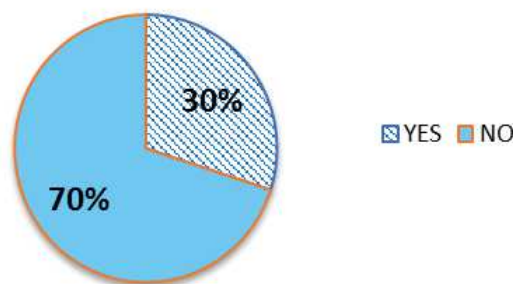


Figure 11: Awareness of all respondents on safety measures to be taken during fire incidence

Source: Field Data, 2015

However, the total responses as compiled from questionnaires, FGD and interviews regarding the level of respondents' awareness on the right safety measures to be taken during fire incidences as per Figure 11 showed that 63% (from 'NO' responses) was low compared to 27% (from 'YES' responses). Taken from the field, much of the respondent's knowledge based on their personal experiences. But this could not guarantee the community to be safe from fire disasters as the level of respondents' awareness on taking right measures during fire incidences is slightly low.

Public awareness sessions on fire safety

Community awareness can reduce a population's vulnerability to specific hazards (IFRC, 2000). When the public is aware of fire incidences, it is safe from disasters that cause irreplaceable damages. As for this study, the question was directed to find out the presence of public awareness sessions on fire safety through trainings and enlightenments.

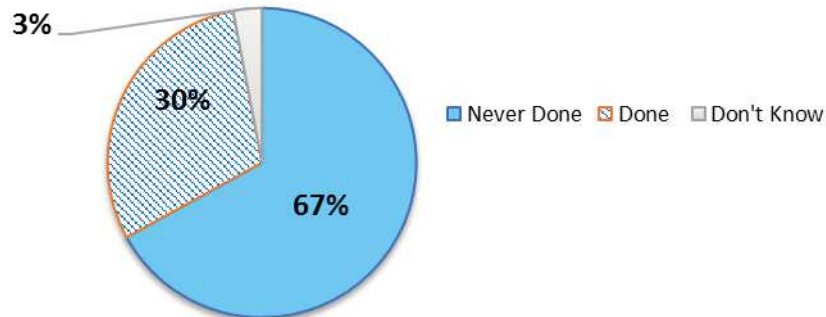


Figure 12: Public awareness sessions on fire safety

Source: Field Data, 2015

The findings from the questionnaires, interviews and FGD presented in Figure 12 illustrate that 67% of the respondents (49 out of 74) never witnessed any session conducted for public awareness regarding fire outbreaks. Thirty percent (30%) of the respondents indicate that there have been public awareness sessions at the institutions while there was a non-response of only 3%. The findings tell of very few public awareness sessions were conducted which imply of the danger facing the community if at all fire erupts. This suggests that public awareness sessions are still needed for the reduction of community's vulnerability and increase of safety.

Community awareness on fire outbreaks and safety at the Public Universities in Tanzania

The overall findings as per Figure 13 show that the level of community awareness on fire outbreaks and safety at Public Universities in Tanzania in terms of causes of fire incidents; individuals who had witnessed fire incidents; knowledge on essential facilities for firefighting and safety; individual's ability to fight against fire incidents using local and relevant firefighting gears available in one's premise; individual's ability to use modern and specified firefighting gears and safety facilities; the attempts made by the universities towards raising community awareness towards using firefighting appliances and safety measures is low by 60%. This gives the picture of the danger facing the institutions if at all fire erupts. In this regard, the majority of the community members are still vulnerable of the fire incidences likely to happen in their respective areas.

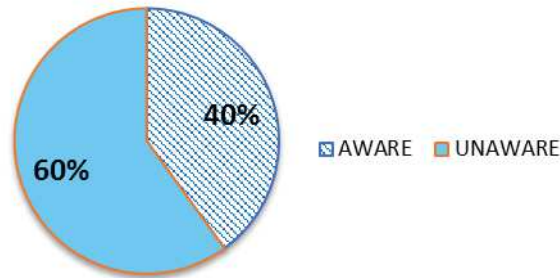


Figure 13: Community awareness on fire outbreaks and safety at the Public Universities in Tanzania

Source: Field Data, 2015

CONCLUSION AND RECOMMENDATIONS

Conclusion

Fire incidences, as it has been revealed in this study, are potential hazardous events that can occur in any public institution and that if not well handled can lead into disasters. This is due to lack of awareness and preparedness of the universities community in terms of management of fire disasters as featured in this study. Even though buildings in the selected universities were fitted with some fire fighting gears that could not make the facility users become aware of their usability. Expected were the raising of community awareness on fire outbreaks and how to undergo safety measures which could seldom be done by the universities. Thomas Jefferson, third president of the United States, and founder of the University of Virginia, always emphasized on the importance of being knowledgeable by saying, '*Knowledge is Power,*' the phrase attributed to Francis Bacon (Jefferson, 2015). Leaving the community without right knowledge on fire safety and protection forecast dangers and increase the state of vulnerability. Social learning theory emphasizes that a person's current behaviour is determined by prior experience. In any given situation, a person learns certain behaviour that, over time, may become habit (Taylor et al., 2006). Social psychologist Albert Bandura theorized that social learning through observation, imitation and vicarious learning make the learning processes to be more powerful in understanding social behaviour involved hence strengthen the habit obtained. In reference to the study findings, the level of community awareness on fire outbreaks and safety has seen to be low (Figure 12). The community members showed lack of enough knowledge on causes of fire incidences and few individuals seemed to have witnessed fire incidents. Knowledge on essential facilities for firefighting and safety and individual's ability to fight against fire

incidents using local and relevant firefighting gears available in one's premise were also low whereas individual's ability to use modern and specified firefighting gears and safety facilities appeared to be lacking. There were no clear attempts made by the universities towards raising community awareness towards using firefighting appliances and safety measures

Recommendations

Disasters can be substantially reduced if people are well informed and have a culture of disaster prevention and resilience. This requires collecting, compiling and disseminating relevant knowledge and information about hazards, vulnerabilities and capacities (UNISDR, 2013). What is important is learning by seeing. Social learning theory by Albert Bandura states that, behaviour is learned from the environment through the process of observational learning (McLeod, 2011). Learning is effective when there is a positive reinforcement. As long as the majority users (60%) of the facilities in the study areas as shown in Figure 11 were in most cases unaware of fire causes, usage of firefighting gears and what needed to be done during fire incidences, the study makes several recommendations as follows:

- That Universities in Tanzania should strive to apply Public Fire Disaster Awareness (PFDA) approach which encompasses campaigns through media (TV, radio, news papers), posters and drills as they are the most effective reinforces which people can see, learn and practice. This requires collecting, compiling and disseminating relevant knowledge and information about hazards, vulnerabilities and capacities. The campaigning exercise through media may comprise of conducting interviews, short educative messages and video clips; dissemination of messages through posters and increase fire fighting and safety drills. The ultimate goal upon this model is to create a culture of fire disaster prevention and resilience.
- The Universities in the country should also adopt the International Federation of Red Cross and Red Crescent Societies safety plan (IFRC, 2013). This may include conduct and coordination of a comprehensive disaster awareness campaign which may be implemented frequently and ultimately during a disaster awareness week each year. During such campaigns the universities may conduct, among other things, poster contests and perform fire safety drills as well as displaying fire safety posters within Universities as well as in different community centres. Each event may hold its own theme so as to create more awareness and sense of community fire response ownership.

- The universities may also employ the *integrative fire management mechanism* whereby all stakeholders need to be involved. As far as the decision making of all the activities in the universities is done by the management, the administration part should be willing to bear the task to involve other systems on the entire management of the disaster that may be caused by fire outbreak. Referred to here are the university disaster committees, fire and rescue force units and social workers to advocate for the positive change in saving people's lives. The ultimate focus of these two parties, the administration and other stakeholders, is to make sure that the community awareness on fire outbreaks' causes, usage of firefighting facilities and proper safety measures to be taken during fire outbreaks is increased.

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