



Evaluation of Fire Safety Preparedness among Healthcare Providers in Braithwaite Memorial Specialist Hospital

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ABSTRACT

Background/Aim: Hospital fires can have grave implication for patients, health personnel and its infrastructure. The first line of protection in preventing and fighting hospital fire is properly informed and trained personnel. The objective of this study was to evaluate fire safety preparedness among healthcare providers in BMSH

Methods: A cross sectional study of 248 health care providers attending a workshop on infection prevention control recruited by purposive sampling technique after stratification according to respondent's cadre. The questionnaire was self administered. Data was analyzed using SPSS-22.

Result: Majority of responders (91; 36.7%) were in the 30-39 years bracket and their mean age was 38.76 (3.24) years. The nurses

(96; 38.7%) constituted the majority of the responders while pharmacist (2; 0.8%) constituted the least responders. Awareness of fire safety parameters and training on fire safety was generally low among the different cadres of responders. There was no significant statistical association between designation of responders and fire safety training ($p=0.885$). Training on fire safety preparedness was lacking among the respondents irrespective of the duration of employment. The association between duration of employment and training fire safety preparedness was not significant ($p=0.08$)

Conclusion: Fire safety awareness and training among the respondents is low. Fire safety education and preparedness should be instituted as part of training and retraining of health personnel

Keywords: Fire safety, preparedness, hospital

INTRODUCTION

Fire is the quick oxidation of a material in the exothermic chemical process of combustion, releasing light, heat and diverse reaction products.¹ The actions of human beings directly or indirectly have led to devastating fire outbreaks.² Some of these fire outbreaks have taken place in public institutions that are of important value, thereby making fire

an issue of public concern and debate.³ Hospitals have increased risk of fire hazard with enormous consequences which threatens patients and staff safety, disrupt supply lines, destroys infrastructure and results in loss of public confidence. It is one of the most intricate and precarious challenges clinicians' face.^{4,5,6}





The incessant fire outbreaks in health institutions in Nigeria should act as a reminder to the authorities, managers and staff of the institutions that fire disaster can occur anytime thus, the lives of the hospital personnel, patients and properties are at risk. Although, mechanical safeguards such as sprinklers, extinguishers, etc play a major part in fire safety, the responsibilities of human beings are more pivotal. Their failure to act may turn a minor incident into a disaster,⁷ properly informed and trained personnel are first line of protection in preventing and fighting hospital fire, thus hospital personnel should therefore be proactive in fire safety preparedness procedures in order to ensure that the workplaces are safe. Fire risks evaluation and fire safety preparedness compliance in the health institutions is therefore paramount. Hospital administrators should ensure that health care employees are provided with comprehensible instructions which will guarantee quick standardized actions in an emergency.⁸

Fire safety preparedness is intended at fire disaster risk reduction and is a segment of fire emergency management. It is an unbroken cycle of planning; organizing, training, equipping, exercising, evaluating and improving strategy to ensure effective synchronization and improvement of capabilities to react to fire disasters.⁸ As a result of the undesirable consequences of fire outbreak in the hospital, fire safety preparedness is an indispensable procedure that must be learnt by all staff.

Although the incidence of fire outbreak in public institutions in Nigeria is rife, there is no known study evaluating the level of fire

safety preparedness among health workers in Port Harcourt. This study is aimed to evaluate the level of fire safety preparedness among healthcare providers in BMSH Port Harcourt so as to determine compliance to fire safety preparedness guidelines.

MATERIALS AND METHODS

This is a descriptive cross sectional study conducted in the Braithwaite Memorial Specialist Hospital (BMSH). Braithwaite Memorial Specialist Hospital is 350 bed capacity tertiary health facility in the city of Port Harcourt which caters for most of the health care needs of the people in Rivers state and the adjoining Bayelsa, Abia, Imo, and Akwa Ibom States. It is located in Port Harcourt, the capital of Rivers State, Nigeria.

Sample Size

248 responders were sampled for the study

Study Population

The study population comprised health professionals such as nurses, medical doctors, dentists, pharmacists, laboratory scientists and other health-related professionals in attendance at an Infection Prevention Control workshop conducted in 2016

The staffs are supposed to be given regular training on fire safety preparedness procedures as a health promotion practice and as a requirement to enhance workplace safety.

Sample selection

The eligibility criteria for the study respondents are staffs working in BMSH Port Harcourt and who had worked in the institution for a period of at least one month.



The staff that declined to participate was excluded from the study.

First the respondents were stratified according to their cadres (nurses, medical doctors, dentists, pharmacists, laboratory scientists and other health-related professionals). Purposive sampling technique was applied in selecting the respondents.

The data collection instrument was a pretested self-administered questionnaire which comprised sections on socio-demographics (gender, age, marital status, occupation, cadre, and length of practice in occupation), awareness of fire safety parameters and training on fire safety procedures. Data collection was done daily by the principal researchers.

Statistical Analysis

Data was coded, cleaned and then imported to Statistical Package for the Social Sciences (SPSS) version 22.0 software for analysis. Test for statistical significance was performed using the chi square test to ascertain statistically significant differences between the variables. P-value of <0.05 was taken as significant. The data was summarized and presented in form of frequency tables and percentages.

Minimization of Biases and Errors

Pre-testing of the data collection tools was done on 10% of the sample size by the principal investigator. Revision of the questionnaires was done based on the results of the pilot study. The findings of the pre-test were used to improve validity of the data collection tools and the reliability of the research findings. Pre-testing was done using

a sample which did not take part in the main study.

Ethical Considerations

The ethical approval for this study was obtained from the Rivers State Ethics Committee. The purpose of the study was clearly explained to the respondents, who were made to understand that their participation was voluntary. They were informed of their freedom to withdraw from the research at any given time without facing any consequences. Confidentiality of the information obtained was maintained and no names were written on the questionnaires, instead, code numbers was used. The data collected was stored in a personal computer and protected with password.

RESULTS

A total of 248 respondents were recruited. Majority of them (91; 36.7%) were in the 30-39 years bracket and their mean age was 38.76 (3.24) years. The females (178; 71.8%) constituted the largest percentage of the respondents. Two hundred and twenty-seven (91.5%) participants had tertiary education while six (2.4%) participants had primary education. The nurses (96; 38.7%) constituted the majority of the participants while pharmacist (2; 0.8%) constituted the least participants. Most of them (86; 34.7%) had less than five year's employment (Table 1).



Table 1. Socio-demography characteristics of respondents

Socio-demography characteristics	N=248	Percentage (%)
Gender		
Male	70	28.2
Female	178	71.8
Age		
20-29	40	16.1
30-39	91	36.7
40-49	65	26.2
50-59	52	21.0
Educational level		
Primary Education	6	2.4
Secondary Education	15	6.0
Tertiary Education	227	91.5
Designation		
Medical Doctor	88	35.5
Nurse	96	38.7
Pharmacist	2	0.8
Laboratory scientist	23	9.3
Ward maid	17	6.9
Others	22	8.9
Duration of Employment		
<5 years	86	34.7
5-10 years	71	28.6
11-15 years	20	8.1
16-20 years	12	4.8
> 20 years	59	23.8

Their awareness of fire safety parameters was generally low as manifested in their negative responses although most of them (154; 54%) were aware of the availability of fire extinguishers (Table 2).

Table 2. Awareness of Fire safety parameters

Fire safety parameters	YES N (%)	NO N (%)	
Availability of Fire extinguisher provided for use in case of fire	134(54.0)	114(46.0)	
Identification of the major types of portable fire extinguishers	93(37.5)	155(62.5)	
Can you confidently use a fire extinguisher	65(26.2)	183(73.8)	
Are you aware of any fire evacuation procedure?	75(30.2)	173(69.8)	
Do you have a copy of a priority list to be used for the evacuation in case of a fire outbreak	14(5.6)	234(94.4)	X²= 248.22 p =0.000
Are you aware of a fire emergency number to call in case of a fire?	75(30.2)	173(69.8)	
Are you aware of a fire detection device	72(29.0)	176(71.0)	
Are you aware of a fire alarm system	99(39.9)	149(60.1)	
Have you ever been trained on fire safety preparedness	30(12.1)	218(87.9)	
Have you ever participated in any fire drill	25(10.1)	223(89.9)	



Training on fire safety was generally low among the different cadres of staff. There was no significant statistical association between designation of staffs and fire safety training ($p=0.885$) (Table3).

Table 3. Designation of respondents and fire safety training

Designation	Have you ever been trained on fire safety preparedness		Total N (%)	χ^2	p
	Yes N (%)	No N (%)			
Medical Doctor	12(13.6)	76(36.4)	88(100)	5.096	0.885
Nurse	10(1.0)	86(98.9)	96(100)		
Pharmacist	0(0)	2(100)	2(100)		
Laboratory scientist	5(21.7)	18(78.3)	23(100)		
Ward maid	1(5.9)	16(94.1)	17(100)		
others	2(9.1)	20(90.9)	22(100)		
Total	30(12.1)	218(87.9)	248(100)		

Training on fire safety preparedness was lacking among the respondents irrespective of the duration of employment. The association between duration of employment and fire safety training was not significant ($p=0.08$) (Table 4)

Table 4. Duration of employment and fire safety training

Duration of Employment	Have you ever been trained on fire safety preparedness		Total N (%)	χ^2	p
	Yes N (%)	No N (%)			
<5 years	12(14.0)	74(86.0)	86(100)	8.19	0.08
5-10 years	14(20.0)	57(80.0)	71(100)		
11-15 years	2(10.0)	18(90.0)	20(100)		
16-20 years	0(0)	12(100)	12(100)		
> 20 years	3(5.1)	56(94.9)	59(100)		
Total	30(12.1)	218(87.9)	248(100)		



DISCUSSION

This study was carried out among 248 healthcare providers from Braithwaite Memorial Specialist Hospital to assess their level of fire safety preparedness. Most of the respondents were females, nurses, had tertiary education and had been in the hospital employment less than five years. Their awareness of fire safety procedures and related training was generally low.

Although majority of the respondents (54%) were aware of the availability of fire extinguishers majority of them (73.8%) could not confidently use them. This contrasts partially with the findings by Kulkarni et al⁹ and Abdulsalam¹⁰ in which most respondents were aware and could use fire extinguishers. Similarly, majority of the respondents (62.5%) could not identify the major types of portable fire extinguishers. This corroborates the findings of Kulkarni et al⁹ and Yeturu et al.¹¹

The mismatch between the awareness of availability of fire extinguishers in the hospital, inability to identify the types of extinguishers and confident use of these extinguishers in this study imply that any occurrence of fires in the hospital may result in catastrophic and irreparable consequences such as death of patients and workers, job interruption, high cost of repair and replacement of equipment, and also financial losses. Changes in system approach to improve safety are therefore required.¹²

In this study, majority of the respondents (94.4%) had no copy of an evacuation priority list, had inadequate knowledge on the proper evacuation procedure (60.9%) and had not participated in a fire drill

(89.9%). This is like the result obtained by Abdulsalam et al coworkers¹⁰ but contrasts the findings obtained by Kulkarni et al⁹ which found that 94.4% of its respondent had adequate knowledge on evacuation procedure. Similarly, this study noted that majority of the respondents were not aware of a fire emergency line (69.8%), fire detection (71%) and fire alarm systems (60.1%) which is in consonance with the findings obtained by Kulkarni.⁹ and Abdulsalam et al.¹⁰ The observation in this study noted that majority (87.9%) of the respondents have not received fire safety training is similar to the findings by Muindi (84%)², Hart and co workers (70.2%)¹³ but is in contrast to a study carried out in India by Kulkarni⁹ which noted that only a small percentage(46.0 %) of the respondents had not received a fire safety training.

The findings in this study shows paucity of knowledge about fire safety procedures in the hospital. This could be attributed to the fact that hospital staffs do not undertake fire safety induction and regular drills after employment. Misconception about hospital fire such as the notion that (1) hospital fires are not widespread; (2) if fires do take place, they were not avertable; (3) fires only occur at substandard facilities¹³; could also be the reason hospital fire safety is not an area of concern amongst health workers and hospital administrators; hence paucity of fire safety knowledge.

The lack of statistically significant relationship between duration of employment and fire safety training in this study is in contrast to the study conducted in Iran by Zamanian and co- workers¹⁴ which obtained a significant relationship between



job tenure and fire safety training. While this study was in a single center the Iranian study¹⁴ was multicentre. This could have accounted for the difference.

CONCLUSION AND RECOMMENDATIONS

Over all, majority of the health care workers in BMSH had significantly low awareness regarding fire safety preparedness; Fire education and awareness programs should be part of training and retraining of health personnel, there is need to conduct regular drills and trainings on fire safety preparedness. Institution should make arrangement for fire safety equipments like smoke detector, fire alarm and create awareness after availability of these equipments.

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REFERENCES

1. Glossary of Wildland Fire Terminology. National Wildfire Coordinating Group. November 2009. <https://www.nwccg.gov/glossary/a-z>. Accessed 01-10-2017.
2. Muindi EM. Assessment of workplace fire preparedness 2014 Nairobi, Graduate Thesis and Dissertations. 2014. Available at http://erepository.uonbi.ac.ke/bitstream/handle/11295/75839/Muindi_ Accessed 20-10-17.
3. Addai EK, Tulashie SK, Annan J, Yeboah I. Trend of Fire Outbreaks in Ghana and Ways to Prevent These Incidents. *Saf Health Work*. 2016; 7(4): 284–292.
4. Zurimia S, Ardyanto D, Yudhastuti R. Evaluation of the Implementation Fire Emergency Response in Hospital of Jombang District. *ASRJETS*. 2016; 17(1):15-33
5. Murphy GR, Foot C. ICU fire evacuation preparedness in London: a cross-sectional study. *British Journal of Anaesthesia*. 2011; 106 (5): 695–698.
6. Bates DW, Gawande AA. Improving Safety with Information Technology. *N Engl J Med* 2003; 348:2526-2534.
7. Ronoh, R. K. and Kyallo, W. B. Safety Awareness and Preparedness in Secondary Schools in Kenya; a Case of Turkana District. *Educational Research and Reviews*. 2009; 4 (8): 379-384.
8. Federal Emergency Management Agency, 2007 National Preparedness Guidelines. Washington, DC: Department of Homeland Security. Available at https://www.fema.gov/pdf/emergency/nrf/National_Preparedness_Guidelines.pdf. Accessed 23-10-17
9. Kulkarni R. S, Giri P.A, Gangwal P. R. Knowledge and practices regarding fire safety amongst health care workers in tertiary care teaching hospital in Marathwada region of Maharashtra, India. *Int J Community Med Public Health*. 2016; 3(7):1900-1904
10. Abdulsalam A, Kabir R, Arafat Yasir S.M. Assessment of Fire Safety Preparedness in Selected Health Institutions in Niger State. *International Journal of Perceptions in Public Health*. 2016; 1(1):50-58.
11. Yeturu S. K, Janakiram C, Joseph J, Pentapati K C. Assessment of Knowledge and Attitudes of Fire Safety – An Institution Based Study. *J. Pharm. Sci. & Res*. 2016; 8(11): 1281-1284
12. Mahdinia M, Yarahmadi R, Jafari M, Kouhpaei A, Khazaei M. Fire risk



- assessment and the effect of emergency planning on risk reduction in a hospital. *Qom Univ Med Sci J*.2011;5:71-78.
13. Hart SR, Yajnik A, Ashford J, Springer R, Harvey S. Operating Room Fire Safety. *Ochsner J* 2011; 11(1): 37-42.
 14. Zamanian Z, Mohammad E, Iman H, Hadi D. Fire Safety Status in the Hospitals of Shiraz University of Medical Sciences, Shiraz, Iran. *International Journal of Occupational Hygiene*. 2013; 5(3): 96 - 100.