

Knowledge, Attitude and Practices of Health Care Providers towards Disaster and Emergency Preparedness in Mtwara, Tanzania

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Abstract

Background

Over the past decade, the magnitude and intensity of reported natural and human-made disasters have been rising globally with substantial mortality and long-term morbidity.

Objectives

To assess the health care providers' knowledge, attitude and practices towards disaster and emergency preparedness at Ligula Regional Referral Hospital in Mtwara, Tanzania.

Methods

A descriptive and analytical cross-sectional study was conducted among 94 health care providers; and a stratified sampling technique was employed to recruit the participants. Bivariate and multivariable regression analyses were performed using IBM SPSS Statistics for Windows version 25.0 (IBM Corp, Armonk, NY, USA) to determine the association between independent and dependent variables. A $P < 0.05$ was considered statistically significant.

Results

More than half 50 (53.2%) and more than three-quarters 75 (79.8%) of the participants had adequate knowledge and positive attitude towards disaster and emergency preparedness respectively. Younger participants aged 20–29 years had 5.252 (95% CI 1.313–21.016) times higher odds of having adequate knowledge of disaster and emergency preparedness than the older groups.

Conclusions

More disaster and emergency preparedness training programs and clinical simulations are needed to enhance the competencies of health care providers in handling disastrous events efficiently.

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Keywords: Knowledge, Attitude, Practices, Disaster Preparedness, Emergency preparedness, Health care providers, Tanzania

Introduction

Disasters are sudden destructive events that lead to serious disruptions in community functioning with remarkable material, human, environmental and economic losses.[1] The events usually overwhelm the ability of the affected community to cope using their own resources, and thus require exceptional measures and nationwide engagements to manage the situation.[1] Over the past few decades, there has been a global increase in disaster occurrences, such as tsunamis, hurricanes, floods, and earthquakes, which have resulted in a significant increase in morbidity and mortality in the population, and adversely impacted the economies of the affected countries.[2,3] Disaster and emergency preparedness, which correlates with all initiatives adopted to prepare for and address the associated burden, enables the community and allied stakeholders to predict and, if possible, to prevent them.[4]

In the year 2022, the Center for Research on the Epidemiology of Disasters (CRED) recorded 387 natural disasters with 185 million people affected, 30,704 deaths, and an economic loss of US\$ 223.8 billion worldwide.[5] According to the International Emergency Events Database, about 88.9 million people in Africa have been affected by drought disasters with a mortality rate of 16.4% in the year 2022.[6] Tanzania as a country has reported a total of 34 natural disasters from the year 2013 to 2020, the majority of which were due to severe weather. The disasters destroyed more than 35,700 houses and 1000 crucial infrastructures (hospitals, schools, and roads), and affected about 572,600 people with multiple injuries and deaths. Moreover, the government has spent over US\$ 20.5 million in response to these disasters.[7]

In contrast to most high income countries, disaster preparedness, and response are poorly developed in low- and middle-income countries, with limited comprehensive human and non-human resources required to respond to disasters.[2,8]

The highly devastating impacts attributed to disasters particularly in low- and middle-income countries have necessitated the presence of well-equipped emergency health care providers in hospital facilities.[8,9] In times of chaos related to disasters, health care providers working in local facilities should be well-organized and equipped with adequate knowledge, attitude, and practices sufficient to respond effectively and efficiently to such disasters.[10] In disaster events, health care providers particularly nurses and doctors, are the first group of medical professionals to treat the victims, provide required emergency care, and prevent possible complications and undesired outcomes.[11,12] Among the roles of healthcare providers during disasters include detecting danger, attending critical situations, triaging at the scene, managing victims, managing available medical resources, and ultimately enhancing adaptive coping mechanisms among the affected population.[13,14]

Having well-organized and equipped healthcare providers is associated with better emergency decision-making and an effective response to disasters.[2,9] Knowledgeable healthcare providers can help minimize the devastating effects of disasters through the application of the learned concepts in providing relevant care.[15,16] Hence, emergency healthcare providers must have adequate disaster and emergency preparedness knowledge to rescue the traumatized population.[14] Secondary disasters are expected to occur if healthcare providers fail to respond appropriately as first responders during response phase of managing the disaster events.[15,17] Negative attitude regarding disaster and emergency preparedness fuels incorrect response decisions among health care providers leading to delays in treatment initiation and poor medical care to the victims.[11]

Studies conducted over the past decade among healthcare providers, particularly

in low-and middle-income countries concerning the level of preparedness, revealed inadequate knowledge levels, unfavorable attitudes, and practices in the arena of disaster management.[18,19] A study conducted in two hospitals in Lagos Nigeria among emergency health workers revealed that less than half (47.8%) of the study respondents had good knowledge of disaster planning and emergency preparedness, with the rest of the respondents having fair to poor knowledge level.[20] The latter implies that most of the health workers in those health facilities lacked necessary knowledge and skills towards emergency preparedness therefore affected the provision of care in case disasters occur.[11] Comparable findings were revealed in studies conducted among healthcare workers in Ethiopia and Kenya.[18,19] Despite the lack of sufficient knowledge among the studied healthcare workers, most of them had a favourable attitude toward disaster and emergency preparedness.[11,18,19]

Considering the vital role played by healthcare providers during events of disasters, it is imperative to assess their disaster and emergency preparedness knowledge, attitude, practices, and associated variables that affect their capability to respond appropriately. With findings from such studies, tangible strategies can be designed and adopted by key stakeholders in producing competent healthcare providers who can respond to unforeseen events effectively and efficiently. This study aimed to assess the health care providers' knowledge, attitude and practices towards disasters and emergency preparedness at Ligula Regional Referral Hospital in Mtwara, Tanzania.

Methods

Study design and setting

A quantitative cross-sectional study was conducted to assess the knowledge, attitude, and practices of healthcare providers toward disaster and emergency preparedness at Ligula Hospital in Mtwara, Tanzania.

The hospital is located in the Mtwara Region, in the southern part of Tanzania, and operates as a Regional Referral Hospital. At the time of this study, the total staffing level of the hospital was 258 with 124 health care providers; it had 16 working departments and 48 sections or units. All departments, units, and sections were interconnected for service delivery.

Study population and eligibility criteria

The target population of the study was all healthcare providers, particularly nurses, and doctors working at Ligula Regional Referral Hospital in the Mtwara Region. Nurses and doctors who were not directly involved in bedside patient care, such as nurse managers and medical officers in charge, were excluded from this study.

Sample size and sampling technique

The sample size formula for the finite population was employed because the sample population was known, as follows:

$$n = N \cdot X / (X + N - 1)$$

But,

from single population proportion formula; $X = Z^2 \cdot p \cdot (1-p) / e^2$, where:

Z = Standard normal deviate (1.96) corresponding to a 95% confidence level;

e = Margin of error (5%);

p = Expected proportion of healthcare workers with good knowledge of disaster management and emergency preparedness (49.2%), based on a previous related study conducted in Addis Ababa, Ethiopia,[18]

N = is the population size (124 healthcare providers).

Using these numbers in the formula:

$$X = (1.96)^2 \cdot 0.492 \cdot (1 - 0.492) / 0.05^2 = 384.06$$

$$n = 124 \cdot 384.06 / (384.06 + 124 - 1) = 94$$

Therefore, the sample size for this study was 94 healthcare providers (nurses and doctors) working at the Ligula regional referral hospital in Mtwara, Tanzania.

A stratified random sampling technique was used to identify the hospital department units (sampling units), with proportionate allocation method being used to determine the sample size in each stratum. In each stratum, a convenience sampling technique was employed to recruit the study participants.

Data collection

Data was collected from the study participants using an interviewer-administered questionnaire with closed-ended questions from July to September 2022. An English questionnaire was adapted from previous related studies,[14,21] and the questions were modified to suit the specific objectives of this study. The questionnaire was organized into four parts, the first part had questions on the socio-demographic characteristics of the participants, the second part had questions about the knowledge of participants on disaster and emergency preparedness, the third part had questions on the attitude of participants towards disaster and emergency preparedness, and the fourth part had questions on participants' disaster and emergency preparedness practices. Before the data collection process, two research assistants were recruited and oriented with the particular study to help in data collection from the participants. About 15-20 minutes were spent to complete each interviewer-administered questionnaire. Participants were approached and asked for their willingness to participate in the study. Moreover, written informed consent was obtained from each participant who willingly volunteered to participate in the survey before they responded to questions from the questionnaire.

Validity and reliability of the questionnaire

A pilot study was done involving 5% of the sample (5 participants) who were later excluded from the actual study. Based on the findings of the pilot study, the questionnaire was corrected to ensure clarity, wording, and logical sequence. A reliability test was performed by calculating the reliability coefficient (Cronbach's alpha), and its value was 0.814.

Data management and analysis

All data analyses were performed using IBM SPSS Statistics for Windows version 25.0 (IBM Corp, Armonk, NY, USA). The analysis included descriptive statistics such as frequency tables to present the summary of categorical variables while means, standard deviations (SD),

and ranges were employed to summarize continuous variables data. The data were analyzed to get the final scores of the healthcare providers' knowledge, attitude, and practices. In the knowledge test, the participants could get one score for each correctly answered question and zero for an incorrect response. The maximum obtainable score was 7. Participants with total correct scores of 5 or higher were graded as having "adequate knowledge" and those with scores of 4 or less were graded as having "inadequate knowledge". The participants' attitude was ascertained by 10 questions, each negative attitude response was scored as 0, and a positive attitude response was scored as 1 depending on the attitude implication of the statement posed. The total attitude scores ranged from 0 to 10 points, and we categorized them as follows: positive attitude was labeled with scores of 7-10 and negative attitude with scores of 0-6. Participants' practices were analyzed and reported descriptively depending on the practice implications of their responses. Inferential statistical analysis using binary logistic regression was conducted to determine the factors associated with the knowledge and attitude of participants regarding disaster and emergency preparedness. The variables that showed association in binary logistic regression, $p < 0.25$ were candidates for multivariate logistic regression to adjust for possible confounders. The test of significance was performed using a 95% confidence interval, and a p -value of < 0.05 was considered statistically significant.

Ethical considerations

Ethical approval was obtained from the Institutional Review Board (IRB) of the Muhimbili University of Health and Allied Sciences (Ref. No.DA.282/298/01.C/), and the permission letter to conduct the study was obtained from the administration of Ligula Regional Referral Hospital (Ref: No.C.3/2/179). The written informed consent form was given to every participant to read, and if agreeable to sign before participating in the study of which the aim,

nature, purpose, and risk of the study had been clarified to them. Participation in this study was fully voluntary and information was collected anonymously. Confidentiality was strictly maintained by omitting any personal identification details. Participants were also informed about their right to skip any question or withdraw from the study if they desired so.

Results

Socio-demographic characteristics of participants

A total of 94 healthcare providers participated in the study.

The age of the participants recruited ranged from 23 to 49 years, with a mean of 39.4 (SD 8.0) years. Close to a half (42, 44.7%) of the participants were in the age group of 40 to 49 years. The majority of the participants (53, 56.4%) were females. We found that more than half 61 (64.9%) of the participants were nurses. Around half of the participants 44 (46.8%) had a diploma education level, and only 7 (7.4%) had postgraduate educational qualifications. The majority, 39 (41.5%) of the participants had a working experience of not more than five years. Only 33 (35.1%) of the participants reported having undergone training on disaster and emergency preparedness (Table 1).

Table 1. Participants' socio-demographic data

Variables	Frequency (n)	Percent (%)
Gender		
Female	53	56.4
Male	41	43.6
Age		
20-29	19	20.2
30-39	33	35.1
40-49	42	44.7
Profession		
Nurse	61	64.9
Doctor	33	35.1
Education level		
Diploma education	44	46.8
Bachelor Degree education	43	45.8
Postgraduate education	7	7.4
Working experience		
≤5 years	39	41.5
6-10 years	32	34.0
≥11 years	23	24.5
Training/exposure to disasters		
Yes	33	35.1
No	61	64.9

Knowledge of participants regarding disaster and emergency preparedness

Overall, more than half of the participants 50 (53.2%) had adequate knowledge concerning disaster and emergency preparedness. All participants 94 (100%) reported having heard about the disaster, and the majority of the participants 85 (90.4%) responded

correctly that a disaster is an imbalance between the demands caused by an event and an available resource. However, only 41 (43.6%) of the participants responded positively to the question that surrounding hazards that most likely cause disaster to their facility must be identified and dealt with (Table 2).

Table 2. Participant’s knowledge assessment of disaster and emergency preparedness

Knowledge assessment item	Yes n (%)	No n (%)	I don’t know n (%)
Have you heard about disaster?	94(100)	0(0)	0(0)
A disaster is an imbalance between the demands caused by an event and an available resource?	85(90.4)	5(5.3)	4(4.3)
A disaster can occur either from natural or man-made causes?	42(44.7)	42(44.7)	10(10.6)
Disaster planning is to prepare for what might be needed to be done, and how to be done, before and after disaster?	76(80.8)	14(14.9)	4(4.3)
The surrounding hazards that most likely cause disaster to your facility must be identified and dealt with?	41(43.6)	42(44.7)	11(11.7)
Does disaster management include both health and non-health professional employees in the facility?	29(30.9)	33(35.1)	32(34.0)
Disaster management is an integral collaborative action of different agencies such as hospitals, local health authorities, civil defense, and others?	45(47.9)	37(39.4)	12(14.9)

Attitude of participants regarding disaster and emergency preparedness Overall, more than three-quarters of the study participants 75 (79.8%) had a positive attitude towards disaster and emergency preparedness. The majority of the participants 82 (87.2%) agreed that potential threats that are likely to cause disaster should be identified and handled,

and 80 (80.2%) of the participants agreed that disaster simulations should occur frequently in the hospital. However, more than one-third of the participants 34 (36.2%) were unsure of whether disasters are likely or unlikely to happen in their hospital settings. Moreover, 21 (22.4%) disagreed with the statement that disaster plans need to be regularly updated (Table 3).

Table 3. Participant's attitude towards disaster management and emergency preparedness

Attitude assessment item	Agree n (%)	Disagree n (%)	Unsure n (%)
I do not need to know about disaster plans	12(12.8)	72(76.6)	10(10.6)
Management should be adequately prepared when a disaster occurs	75(79.8)	11(11.7)	8(8.5)
Disaster preparation is for a few people in the hospital	18(19.2)	57(60.6)	19(20.2)
Potential threats that are likely to cause disaster should be identified and handled	82(87.2)	8(8.5)	4(4.3)
Training is necessary for all healthcare providers	75(79.8)	13(13.8)	6(6.4)
Do you think it is necessary to have a disaster operational plan?	59(62.8)	20(21.3)	15(15.9)
Disaster plans need to be regularly updated	71(75.5)	21(22.4)	2(2.1)
Disasters are unlikely to happen in our hospital	7(7.4)	53(56.4)	34(36.2)
Disaster management is for nurses and doctors only	5(5.3)	84(89.4)	5(5.3)
Disaster simulations should occur frequently in the hospital	76(80.8)	6(6.4)	12(12.8)

Associations between demographic characteristics and knowledge of the study participants about disaster and emergency preparedness

We compared participants' sex, age group, profession, education level, working experience, and training exposure with disaster and emergency preparedness knowledge for any significant associations. In bivariate analysis, the significant characteristics associated with disaster and emergency preparedness knowledge were sex, age group, profession, education level, and training exposure. After controlling the potential confounders by multivariable analysis, we found that participants of younger age (20-29 years) were 5.252 more likely to have adequate knowledge of disaster and emergency preparedness than the older groups (AOR 5.252, 95% CI 1.313–21.016, $P = 0.019$); and participants with diploma education level were 0.038 less likely to have adequate knowledge of disaster and

emergency preparedness than participants with bachelors and higher education levels (AOR 0.038, 95%CI 0.003–0.453, $P = 0.010$) (Table 4).

Associations between demographic characteristics and attitude of the study participants towards disaster and emergency preparedness

Binary and multivariable logistic regression analyses were conducted to determine the factors associated with the attitude of participants toward disaster and emergency preparedness. The bivariate analysis showed a significant association between participants' education level, working experience, and training exposure with attitude toward disaster and emergency preparedness among participants.

However, after adjusting for the confounders through multivariable logistic regression, participants with 6–10 years’ experience were 5.371 more likely to have a positive attitude towards disaster and emergency preparedness than participants with fewer years of working experience (AOR 5.371, 95%CI 1.038–27.794, P = 0.045); and participants with training exposure were 14.286 more likely to have a positive attitude towards disaster and emergency preparedness than participants without training exposure (AOR 14.286, 95%CI 1.619–126.050, P = 0.017) (Table 4).

Table 4. Multivariable analysis of the factors associated with emergency preparedness knowledge and attitude (N=94)

Demographic characteristics	Emergency preparedness knowledge		Emergency preparedness attitude	
	AOR (95%CI)	p-value	AOR (95%CI)	P Value
Gender				
Male	0.489(0.185-1.296)	0.15		
Female	1			
Age group				
20-29 years	5.252(1.313-21.016)	0.019*		
30-39 years	1.858(0.454-7.444)	0.382		
40-49 years	1			
Profession				
Nurse	0.981(0.267-3.605)	0.977		
Doctor	1			
Education level				
Diploma education	0.038(0.003-0.453)	0.01*	1.711(0.206-14.216)	0.619
Bachelor Degree	0.122(0.010-1.447)	0.096	2.933(0.365-23.555)	0.311
Postgraduate education	1		1	
Working experience				
≤5 years			1.545(0.325-7.354)	0.585
6-10 years			5.371(1.038-27.794)	0.045
≥11 years			1	
Training exposure				
Yes	2.232(0.821-6.065)	0.116	14.286(1.619-126.05)	0.017
No	1		1	

AOR, adjusted odds ratio; CI, confidence interval; 1, reference category.

Participants’ practices towards disaster and emergency preparedness

Only 22(23.4%) of the participants reported that disaster drills are done at their working units in the hospital. About three-fourths 69(73.4%) of the participants denied

the existence of any ongoing training regarding disaster and emergency preparedness at their respective facilities. Moreover, only one-fourth 24(25.4%) of the participants revealed that emergency operational (disaster) plan is updated periodically at their working facilities.

Discussions

Low- and middle-income countries are at increased risk of confronting both natural and man-made disasters with the constant threat of devastating suffering from such disasters due to limited resources and poorly developed emergency response systems. The increased devastating impacts attributed to disasters in such scanty-resource countries have necessitated the presence of well-equipped emergency healthcare providers in hospital facilities to act as primary responders. This study aimed to ascertain the healthcare providers' knowledge, attitude, and practices regarding disaster and emergency preparedness at Ligula Regional Referral Hospital in Mtwara, Tanzania.

This study found that more than half of the participants (53.2%) had adequate knowledge concerning disaster and emergency preparedness. The knowledge results in this study are consistent with those of a study conducted among healthcare workers at Tikur Anbessa specialized hospital in Addis Ababa, Ethiopia.[18] Similar findings were also found in the previous related study conducted among emergency health care nurses in Machakos County, Kenya.[19] This could be explained by comparable socio-economic contexts in the setting where this study was conducted. Inconsistent findings were reported in a study conducted among emergency nurses at a University Hospital in Egypt where more than two-thirds (72.7%) of participants had unsatisfactory knowledge levels concerning preparedness for disaster management.[22] The knowledge findings from this study imply that the healthcare providers at the studied facility had basic knowledge of disaster and emergency preparedness, and thus more in-service training should be conducted to update and advance their skills.[2,8]

The findings of this study revealed that the majority (79.8%) of the health care providers had a positive attitude towards disaster and emergency preparedness.

These findings show the extent to which healthcare providers' mindset is positive in responding to expected calls to attend and manage effectively mass gathering disasters. The findings show the need for the government authorities and other stakeholders to lead disaster and emergency preparedness seminars and empower these healthcare providers with the necessary equipment and working atmosphere.[12, 13] Similar findings were reported in a study conducted among hospital staff at a public hospital in India,[9] and another study done among emergency personnel at two tertiary hospitals in Lagos, Nigeria.[20] Inconsistent findings were reported from a previous related study conducted among health professionals working in emergency units at South Gondar Zone hospitals, in Ethiopia where 55.0% of participants had a negative attitude towards disaster preparedness.[10]

Concerning disaster and emergency preparedness practices, this study found unfavourable practices among healthcare providers. Only 23.4% of the participants reported the presence of disaster drills at their working units in the hospital and 73.4% denied the presence of any ongoing training. Likewise, three-quarters (74.5%) of the participants reported that emergency operational (disaster) plans were not updated periodically at the hospital. These findings indicate that there is absence of simulation exercises and drills as tools to test the capacity of a hospital facility that could help the healthcare providers acquire real practical skills applied in actual situations of disasters.[8] Similar findings were reported from a previous study conducted among hospital staff at a public hospital in India where 77% of the participants were not aware of any related drill being conducted at the study facility and 93% of the participants were not aware if the facility was conducting any training on disaster preparedness.[9] Consistent findings were also revealed from previous related studies conducted in Lagos-Nigeria and Ethiopia.[10,18,20] findings were reported from a previous study conducted among emergency department staff at a tertiary hospital in central Saudi Arabia where 81% of the participants reported

the conduct of disaster drills at their facility and nearly two-thirds acknowledged the periodic update of the emergency operations plan and the presence of ongoing training on disaster and emergency preparedness.[21] This variation might be due to differences in the development of hospital emergency response systems between the two settings as the ones in the context of the current study are poorly developed compared to those of a tertiary hospital in Saudi Arabia.

Following multivariable logistic regression analysis, the education level of the study participants was identified as the significant factor influencing the disaster and emergency preparedness knowledge of healthcare providers. Participants with a diploma education level were 0.038 less likely to have adequate knowledge of disaster and emergency preparedness than participants with bachelor's and higher education levels. Congruent findings were obtained in a study done among emergency nursing and medical personnel in Malaysia,[12] and a study conducted among nurses in Machakos County, Kenya.[19] This could be because participants who had higher educational levels are more likely that to have come across correct information regarding disaster and emergency preparedness through their learning experiences. As far as attitude towards disaster and emergency preparedness is concerned, working experience and training exposure were identified as significant factors. Comparable findings were reported in a study conducted among health professionals working at emergency units in South Gondar Zone hospitals, in Ethiopia.[10]

Study limitations

This study was limited to healthcare providers from one health facility, and this might preclude the generalization of the findings to other populations in other settings. However, a reasonable sample size was studied with respect to total study population at the facility. Moreover, this study utilized a cross-sectional design that limits the determination of cause-effect relationships of the factors investigated.

Conclusions

This study found that only 53.2% of the participants, mostly the younger ones, had adequate knowledge concerning disaster and emergency preparedness. It is therefore recommended that health care providers, particularly the older ones, receive continuous professional development to enhance their knowledge and skills through trainings with drills and simulations for effective and efficient response in case of disasters. The findings of this study revealed that the majority of the health care providers had a positive attitude towards disaster and emergency preparedness. Thus, health facilities should leverage on staff positive attitude to prepare them for disaster and emergency response. In addition, emergency (disaster) operational plans should be updated periodically at the hospital to comply with current requirements. Furthermore, multi-centre qualitative studies should be conducted to explore the practices of health care providers towards disaster and emergency preparedness at individual level.

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Authors' contributions

All authors made a substantial contribution to this study. SW, EZC, MLN, and FBR designed the study. SW and EZC collected and analyzed the data and prepared the first draft of the manuscript. MLN and FBR were also involved in providing a critical review of the manuscript. All authors reviewed the drafts of this manuscript and approved the final version for submission.

Competing interests

The authors declare that they have no competing interests.

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