

EVALUATION OF DISASTER PREPAREDNESS OF TERTIARY HOSPITAL IN ZARIA, NIGERIA

Musa-Maliki A. U. & Ibrahim A. H.

Correspondence address: aishaudu@yahoo.com, +2347038159582

Abstract

Motivated by the increasing global incidences of disaster and the global recognition of the pivotal role played by tertiary hospitals (TH) in disaster management (DM), this article seeks to assess the preparedness of TH to assume such a role. The research objectives are; to scrutinize international best practices templates as benchmarks for evaluating the level of disaster preparedness of Nigerian tertiary hospitals, determine how the tertiary hospital, managed disasters in the past and how prepared it is for future disasters, and identify factors affecting the capacities of THs for DM. An explanatory sequential mixed method research design was used, questionnaires were administered to the respondents, there after in-depth interviews were conducted with key informants who are highly placed. The data was analysed using SPSS version 24 while the qualitative data was analysed thematically. It is found that TH is not prepared for disaster, there are no adequate resources both human and equipment to deal with casualty above 50 patients and also lack of funds. In conclusion, TH has a major role to play in DM, their Emergency Preparedness (EP) should be upgraded in line with global best practices to better position them for that role. As such, TH should adopt any of the global Emergency Management Plan (EMP) templates to guide them in preparing a manual for EP, which staff must be familiar with through wide circulation and regular disaster drills and exercises based on the manual.

Keywords: Disaster Management, Emergency Preparedness, Emergency Management Plan.

Background to the Study

Disaster can be defined as any occurrence that results in damages to life and property, ecological disruption, injury and loss of human life, deterioration of health and health services, and creates general sufferings and needs on a scale beyond the resources of affected communities or government and warranting an extraordinary response from outside (UNDHA, 1992; WHO 2011). According to Achora & Kamamyire (2016), disasters, both natural and man-made, have been on the rise globally in recent years. Disaster management (DM) is the organization and management of resources and responsibilities for dealing with all humanitarian aspects of disasters in order to lessen their impact (Sonawane, 2017). Disaster or Emergency Preparedness (EP) refers to the state of having a deliberate plan for responding to a variety of emergencies and disasters. It is one of the major components of disaster response. The process of planning for such emergencies is a continuous cycle that involves stakeholders in planning, organizing, equipping, and training (UNDHA, 1992).

Hospitals play a critical role in health care infrastructure as they have the primary responsibility of saving lives and provide 24-hours a day and 7-days a week (24x7) emergency care services. They are therefore recognized as vital resources for diagnosis, treatment, emergency and follow-up care when disasters strike (GOI-UNDP, 2009). During disasters, hospitals have to provide care to a large, sudden, and unexpected influx of patients beyond their normal capacity in a limited time. They may, in the process,

be overwhelmed by a temporary lack of resources (Brown 2006). Hence, it is necessary for hospitals to have an Emergency Management Plan (EMP) in place (WHO 2011, Musa-Maliki 2015).

An (EMP) provides the opportunity to plan, prepare, and enable a rational response in case of disasters or Mass Casualty Incidents (MCI). The EMP is concerned with how to control a large number of patients and manage the resulting problems in an organized manner. It seeks to enhance admission and treatment capacities, individual management of patients regardless of sudden surge, ensure proper on-going treatment for all patients already present in the hospital, and smooth handling of all additional tasks caused by such an incident (GOI-UNDP, 2009; WHO, 2011; CCHN 2012, Alimed, 2019). The GOI-UNDP's (2009) "Guidelines for Hospital Emergency Preparedness Planning Checklist" is a major template in use worldwide for designing EMPs. It notes that the absence of a tangible plan to fall back upon in times of disaster leads to a situation where there are many sources of command, many leaders, and no concerted efforts to solve the problem.

Therefore, it is essential that all hospital's EMPs have the primary feature of defining the command structure in their hospital, and to extrapolate it to disaster scenario with clear cut job definitions once the disaster button is pushed (see also CCHN 2012, Alimed, 2019, Sonawane, 2017). Alimed (2019) notes that to adequately provide care and ensure patient and staff safety during public health

emergency or natural disaster, the planning process should address all phases of the crisis, namely: Facility Risk Assessment; Hazard Vulnerability Analysis; Training; Command and Coordination; and Evacuation. Others include Facility Security, Communication and media relations, and continuous updates of emergency readiness. Clinicians must remain alert for unusual diseases that could result from an act of bioterrorism, weather conditions that may redirect contaminants in case of chemical incidents (GOI-UNDP, 2009). In making EMP, the hospital administrators should use a phased plan divided into three phases: Pre-Disaster, Disaster, and Post-Disaster phases.

Most of the assessment and planning is done in the pre-disaster phase. The EMP addresses not only the mass casualties which may result from Mass Casualty Incidents (MCI) that has occurred away from the hospital, but should also address the situation where the hospital itself has been affected by disaster (USDHHS, 2007; GOI-UNDP, 2009; WHO, 2011; CCHN, 2012; and Alimed, 2019). The EMPs are formulated and then discussed in a suitable forum for approval. The approved plan may then be produced as a written Disaster Manual which copies are made available in all the areas of the hospital. Staff education and training in the use of the manual by regular suitable drills are undertaken in this phase. Once the Disaster Plan is ready, it should be followed by the education and training of the staff of the hospital about the plan and specific roles of each staff member in case of disaster. There must be proper planning on how to evacuate and which areas of the hospitals need to be evacuated first.

The rationale is for everyone to know his/her job and to work continuously in an orderly fashion without confusion during the emergency. Disaster Drills is part of the EMP and is to be routinely used to test the hospital's structures for responding to emergencies and to provide a learning opportunity for all who participate in the drill. It should help identify specific weaknesses that can be targeted for improvement

and to promote continuing revisions in the EMP with a view to refining the plan, covering up the deficiencies faced in the Drill Phase, and thereby strengthening the hospital's EP and DM (USDHHS, 2007; GOI-UNDP, 2009; WHO, 2011).

The disaster phase is the time of activation or operation and entails the actual tackling of MCIs according to the EMP. Sonawane (2017) observes that activation of EMPs should include developing a standard operating procedure, Reception area, Disaster control room, Triage system, Documentation at control room, Public relation and Crowd management, and Community clean-up efforts including Teaching Proper Hygiene, Alertness for Environmental Health Hazards, Home Visits, and Follow up care.

The post-disaster phase has to do mainly with deactivation, debriefing, and demobilization. It is when after proper assessment of the situation, the Command of the hospital is satisfied that the disaster has abated, and calls for a critical self-review of the hospital's performance during the emergency. The inadequacies, if any, are noted for future improvements (GOI-UNDP, 2009; WHO, 2011; Sonawane, 2017).

Mass casualty incidents are lesser form of disasters that occur commonly in an environment resulting in large casualty that place significant demands on medical supplies (Lee, 2010). The closest to Mass Casualty Incidents (MCI) that the tertiary hospital has ever experienced, occurred in the early 2010s when there are spates of terrorist bombings, with high casualty figures, in Zaria. One of the incidents has a record of 300 injured victims, while two others produced fatality rates of 47 and 50. Yet the TH's resources are not able to handle the MCIs and they are over stretched and staff overwhelmed (Musa-Maliki 2015; Idenyi 2018; Daniel 2020). A table summarizing the terrorist MCIs in Zaria of 2010s is presented below.

Table 1: MCI Incidents in Zaria in the 2010s

Date of attack	Nature of attack	Place of attack	No. Injured	No. Dead	Property destroyed
29/05/2011	Dropping of IED	White House Recreation Centre	5	0	NA
17/06/2012	Suicide Bombing	CKC Catholic Cathedral	112	47	N200m
17/06/2012	Suicide Bombing	Evangelical Church Winning All	300	2	N70m
29/07/2012	Gun Battle	Nigeria's Vice Presidents residence	NA	3	NA
03/10/2012	Dropping of IED	Recreation Centre Uche Road	NA	NA	NA
06/10/2012	Gun Attack	Recreation Centre Muchia	NA	2	NA
15/11/2012	Gun Attack	Recreation Centre Uche Road	NA	2	NA
12/02/2012	Gun Attack	Tundun Wada	3	3	N10m
07/07/2015	Suicide Attack	Sabon-Gari LGA Secretariat	30	50	N90m
TOTAL	9	Zaria Metropolis	450	109	N369,700,000

Source: Idenyi (2018), page 85.

Regarding factors hampering EP and DM by hospitals, it is observed that even relatively advanced healthcare system, like that of the USA have been found wanting in EP for catastrophic disasters. Hence, Jacobs-Wingo et al.'s (2019:5) recommendation that all U.S. hospitals be made to "participate in a healthcare coalition that prepares and respond collaboratively to common medical disasters and CHEs". The major needs of hospitals for EP and DM in developing countries are outside the capability of self-sustaining hospitals, especially as those capital-intensive needs are provided on an "in case basis" and may amount to tying capital down. The hospitals' capacity to manage disaster can only be boosted by government and community. These would be areas in of disaster Funding, Training, Equipping, and Stocking of hospitals even when these investments may actually never be needed as they will only be activated during emergencies. In developing countries like Nigeria, THs are largely dependent on government funding and can hardly break even in routine funding of salaries and basic equipment not to talk of long-term funding for disaster preparation.

Tertiary and Teaching hospitals (TH), worldwide, are the major hospital settings for treating and responding to mass casualty incidents (MCI). Observations have shown that Nigerian teaching hospitals, while at the crux of disaster management, cannot by global standards or international best practice, be adjudged to be adequately prepared. GOI-UNDP (2009) notes that with the growing global awareness about the critical role of THs in DM, many countries are reassessing and upgrading their existing emergency preparedness plans with tertiary hospitals at the nucleus. Nigeria, however, appears to be lagging behind and lacking in the essentials for EP and DM. This study provides an insight into the resources available and where and what hospital management and government need to provide. The aim of this study is to evaluate the Disaster/Emergency Preparedness (EP) of a TH in Zaria.

Objectives of the study

1. To identify the most common type of disaster that occurs in Zaria, northern Nigeria.
2. To determine the disaster preparedness of TH in northern Nigeria
3. To identify the factors that affect disaster preparedness of TH.

Methodology

An explanatory sequential mixed method research design was used. This study was conducted in Kaduna State, which is part of the seven states in the North West geopolitical zone of Nigeria. The main research

setting was tertiary hospital in Zaria. This tertiary hospital has equipment and best practices comparable to basic standards in other parts of the modern world (Musa-Maliki 2019).

The quantitative data was collected first, then the qualitative data which was used to explain the quantitative data. The population of study was broadly broken into two parts, namely; medical personnel and members of the public. A sample size of 180 was obtained using Naing (2006) sample size calculation. 90 respondents were drawn from each of these categories of population for the survey component of this study. From the medical category, 18 respondents were randomly drawn from nurses, doctors, medical laboratory technician, pharmacist, and the social health workers. The sampling strategy ensured that the respondents cut across all relevant variables. For example, there were 45 males and 45 females, falling within the age brackets of 20 – 75 years, and had minimum of 2years working experiences. From the members of the public, 90 respondents were drawn from Zaria using a multi-stage cluster procedure which led to 15 respondents being drawn from Samaru, Sabo Garri, Tundun-Wada, Wusasa, Kwangila, and Zaria City. They also cut across major age, gender, educational, income, occupational, ethnic, marital, religious and residential duration categories.

Data collection was conducted between April and May 2019. The Questionnaires containing open and close ended questions were directly administered to these respondents by the researcher or her trained assistants, which eliminated the problem of low retrieval. In-depth interviews were also conducted with selected key informants including; the Medical Consultants, Chief Nursing Officer (CNO), and two heads of Departments. The purpose was to use qualitative data to explain the findings from the quantitative data and these are key members of a standard Disaster Management Team (DMT). The quantitative data generated were analyzed using the SPSS package. Thematic analysis was conducted with the qualitative data. These data were transcribed, coded then categorized and arranged in themes. A second person also coded and the similarity index was calculated which was 85%. Ethical approval was obtained for this study from Ahmadu Bello University Teaching Hospital Health Research Ethics Committee before the commencement of this study.

Results

Objective one

To identify the most common type of disaster that occurs in Zaria, northern Nigeria.

Precisely 64% of the medical respondents and 45% of the public respondents indicate that they have

witnessed or partaken in disaster events, however, for over 90% of these, the events have been man-made disasters like mass casualties from multiple road accidents, fire outbreaks or terrorist’s bombings.

Objective two

To determine the disaster preparedness of TH in Northern Nigeria.

In Table 2; Most of the respondents maintain that the TH is not prepared for, and would easily be overwhelmed by any casualty above 50 people {32.8%}. 27.8% and 22.8%, of the total respondents agree that the TH is “adequately equipped”, “adequately staffed” or “is prepared for DM”, respectively. To be prepared for disaster, there must be adequately trained staff, but that seem not to be the case for only 18% or 20% of the medical respondents have undergone any EP or DM training and out of these 10% or 55.6% are undertaken from personal pockets while the remaining 8 (or 44.4%) are sponsored by the hospital management. This shows that they are grossly undertrained to handle disaster. This factor affects the disaster’s preparedness of the TH.

About 51.1% of the medical respondents assert that the TH has an emergency communication system and it is effective. Majority of them also report that there is an effective power supply and back-up power supply in the TH, which can be resuscitated in an emergency though it presently works epileptically and only guarantees constant supply to the operating theatres. Most also agree that the TH is well-equipped with the following emergency services such

as; intensive care unit, laboratory services, blood bank services, x-ray and emergency unit. However, majority of both categories of the respondents express doubts about the adequacy of the equipment and services to manage disaster with large casualty.

On a more positive note, we observe through the interview conducted with the Pharmacist that there are enough emergency drugs to manage casualty of 50 people in case of a disaster. The hospital is also well equipped with personal protective equipment such as face masks, hand gloves for staff but these may not be enough to cover the increased number of staff and patients during disaster. Available goggles and boots are however, grossly insufficient in quality and quantity. Also, results from the qualitative data indicate that Drills are also important in preparing for disaster. This is in simulation of real disaster case and that hospital’s staff are in position to take decision on what to do first and what to do next, what to do in case of mass casualty for disaster so that there will not be chaos. In the TH, disaster drills have never been conducted and there is no Emergency Management Plan in place to guide the staff in case of a disaster. This is illustrated below;

“Regarding disaster training, the TH sponsors one staff in A&E Ward for emergency training abroad (Israel) per annum. There is no DMT in place, no EMP Manual, and Disaster drills have never been carried out, though this is presently on the drawing board and may take off any moment.” (MD:49 years old with 20 years in practice)

Table 2: Summary of TH Preparedness for Disaster

Statement	Medical Respondents			Public Respondents			Total Respondents			Grand Total			
	A	D	U	A	D	U	A	%	D	%	U	%	
													F
TH is adequately equipped for DM	38	42	10	21	44	25	59	86	35	180			
							32.8	47.8	19.4	100			
TH is adequately staffed for DM	30	50	10	20	42	28	50	92	38	180			
							27.8	51.1	21.1	100			
THs can effectively work with other DMTs	60	18	12	51	24	15	111	42	27	180			
							61.7	23.3	15.0	100			
TH can handle casualty above 50	17	64	09	26	33	31	43	97	40	180			
							23.9	53.9	22.2	100			
Overall, TH is prepared for DM	12	67	11	29	38	23	41	105	44	180			
							22.8	58.3	24.4	100			
TH is abreast of global DM Standards	47	20	23	25	23	42	72	43	65	180			
							40.0	23.9	36.1	100			
THs are most important team in DM teams	72	12	06	49	29	12	121	41	18	180			
							67.2	22.8	10.0	100			
TH in Zaria better in DM than most other THs.	46	25	19	38	20	32	84	45	51	180			
							46.7	25.0	28.3	100			

Key: A=Agree; D=Disagree; U=Undecided.

Objective three

To identify the factors that affect disaster preparedness of TH.

Inadequate equipment (32.8%) affects the capacity of TH to handle disaster as seen in table 1.

When the variable on emergency equipment is broken down, the lack is quite glaring in all Departments. For example, there are presently only 2 ambulances for transportation, 8 Suction Machines, 6 Endotracheal tubes, 7 Oropharyngeal tubes, 6 ventilator bags, oxygen store, 14 Oxygen Pumps/Points, 20 BP Machines, 9 Pulse Oximeter, and 3 Distillatory in the TH.

Also, result from the qualitative results indicates that, respondents cite the non-frequent occurrence of disasters and lack of government funding as major reasons for non-incorporation of disaster concerns into the management of the TH. It is noteworthy that superstitious beliefs are among the possible explanations cited for the apparent lackadaisical attitude of TH towards EP and DM by some respondents and informants. They claim that preparing for disaster may amount to wishing for disaster as highlighted in an extract below;

“God knows we cannot handle disaster and has placed us in a region without natural disasters. If we start preparing for them it is like we are wishing for them, and they may just come. As for the man-made disasters, we can only blame ourselves as Nigerians and not the hospitals. Why are our planes suddenly crashing, and terrorists bombing innocent citizens? Why are there suddenly so many fire disasters with many casualties? Well when they happen we do what we can do within the confines of emergency training we have all received. But to say we have to do the elaborate thing you call EMP or produce disaster manuals for everyone and keep doing disaster exercises and drills, that is taking it too far and unnecessary”. (NUR:49 years old with 25 years in practice)

Further the qualitative results reveal that the factors affecting the capacity of TH to handle disaster are further elaborated by the qualitative data. These are inadequate funds, staff, equipment and space. This is illustrated in an extract below from a respondent;

“the TH has no emergency fund store, reserve staff, or Volunteer Scheme set aside to draw from in disaster situations. They recall that in the aftermath of the spate of mass bombings in Zaria in the early 2010s, the hospital had to rely on the good will of visiting VIP sympathizers, NGOs,

and the personal funds of victims or their relatives to meet the cost of treatment”. (MD: 53 years old with 25 years in practice)

In terms of manpower, the TH has 517 nurses and 496 doctors working in the hospital but few are allocated to A&E as stated by a respondent:

“The Accident and Emergency unit has 24 nurses and 12 doctors that manage the routine emergency cases in the hospital. The pharmacists are 5 that dispense drugs to patients in A&E. There are no specialist trauma doctors.” (NUR: 48years old with 18 years of practice)

There are about 500 bed spaces in The TH distributed into different wards but A& E have few of this.

The A&E has 14 bed space/couch but these are almost always fully occupied with admitted cases, both emergency cases and cold. Cold cases are patients that have passed the critical phase and should be transferred to regular wards; but because of non-availability of free bed space in the relevant regular ward, the patient is left in the A&E. Also some cold case patients have respiratory problem requiring oxygen to stabilize them and there are limited in the ward therefore they are sent to A&E to get oxygen. It is only in the A&E that we have eight (8) oxygen pipes/points. These are quite insufficient in a disaster. There are many empty oxygen tanks to be cited behind the A&E building, it can only be hoped that the refilling can be sped up during mass disasters.” (MD: 53 years old with 25 years in practice)

Open space is an important resource in the management of disaster victims, in terms of triaging and attending to the most seriously wounded victim that need little resources to manage him/her to survive, but this space has been used for parking cars, as illustrated in the extract below;

“There is a space in front of the A&E which is used as car park, that space was meant for triaging of victims of disasters but presently cars are being parked there. Therefore, in case of disaster, there will be no space to put the victims for triaging and it will be difficult to get the owners of those cars to vacate the car park immediately.” (MD: 46years old with 15years in practice)

Discussion

This study reveals that most of the common causes of disaster in Northern Nigeria are man-made disaster such as road traffic accidents, fire outbreak and casualty from terrorist attack, unlike in Southern Nigeria, floods,

building collapse, pipe line explosion and road traffic accident, are the major causes of man-made disaster (Obafunwa, et al., 2015; Oloyede, Omoogun, & Akinjare, 2010).

This is contrary to the type of disaster that occur in developed countries such as China, Singapore, Thailand, USA, Australia and Haiti, they suffer natural disasters such as, earthquakes, landslides, tsunami, Forest fire, and typhoon (Carlin, Love, & Zechmeister, 2014; Chan, et al., 2020; Sangha, et al., 2017). This natural disaster occurs without the influence of man. The knowledge of the type of disasters that occur in a locality, help the TH to prepare and plan ahead before the disaster occur, in terms of the type of drugs to store, equipment to acquire and workshops training to send staff for. This knowledge also helps to cushion the effect of disaster on the casualty and does not overwhelm the TH since they will be prepared.

To be prepared for disaster, there has to be an Emergency Management Plan in place, which will serve as a guide in case of a disaster and be activated when disaster occur. In this study, there is no EMP in place to activate during disaster, this also affect the training of staff, as well as disaster drills. This disaster drills simulate a real disaster situation and indicates who does what in real disaster to avoid confusion and chaos. All these sum up the unpreparedness of the TH. In China, Cao et al. (2020) state that the Emergency Management Plan in place make them to have zero infection rate of corona virus within their health staff and are not overwhelmed by the workload. This is so because of the Plan in place in case of disaster, the team knows who does what to prevent confusion and duplication of work. Equipment that needed to be stored, to prevent unnecessary storage of Personal Protective Equipment, as well as, funds set aside to purchase this equipment.

Drills form part of disaster preparedness in hospital, in this study, to the best of our knowledge, disaster drills has never been conducted, although there are plans in place to carry out drills in the TH. Contrary to the case in developed countries such as UK, USA, Saudi Arabia, and Japan where drills are conducted regularly and skills of staff are being updated in case of disaster. (Fowkes, Blossom, Sandrock, Mitchell & Branstein, 2010; Kotora et al., 2014; Nofal, Alfayyad, Al Aseri, & Abu-Shaheen, 2018). This shows the unpreparedness for disaster in the TH. Tertiary Hospitals play important roles in disaster management, since they have equipment of international standard. This study shows that the TH has such equipment but this equipment is not enough to manage mass casualty in disaster, as such unprepared for disaster. Inadequacy of funds, equipment, staff, and space are largely indicted as factors incapacitating the TH to prepare for Disaster.

This study reveals that the TH has no emergency fund stored, reserve staff, or Volunteer Scheme set aside to draw from in case of disaster situations. They recall that

in the aftermath of the spate of mass bombings in Zaria in the early 2010s, the hospital has to rely on the good will of visiting VIP sympathizers, NGOs, and the personal funds of victims or their relatives to meet the cost of treatment. This is consistent with the findings of Musa-Maliki (2015) and Idenyi (2018). In developed countries, such as Singapore, china, and USA, funds and adequate space in hospital seems not to be factors affecting their disaster preparedness, rather inadequate training of staff is the major factor affecting their disaster preparedness (Labrague, et al., 2018; Tzeng, et al., 2016). Lim, Lim & Vasu (2013) found that the main factor affecting the disaster preparedness is the inadequate training of staff on disaster management as such, affects their preparedness to function in disaster situation. Similar findings are reported by Labrague, et al., (2018), Seyedin, Dolatabadi, & Rajabifard (2015), and Tzeng, et al., (2016) and they concluded that workshops and training need to be conducted for healthcare staff to equip them with the needed knowledge to be prepared for disaster.

Conclusion and recommendations

THs by their resources and operations have a prominent role to play in DM. However, they are not well prepared to carry out that role due to the lack of EMP, resources, personnel and funds. Therefore, the TH should adopt/adapt the tested and trusted EMP templates especially of world organizations like UN, to enabling easy and flexible activation, operation and deactivation when necessary. The management of the TH should train staff on disaster management courses, employ expatriates in EP and DM, provide adequate and up-to-date equipment in managing emergency cases, expand the A&E unit to increase the space capacity of the unit to effectively manage disaster. Drills should be conducted once or twice a year in the hospitals, especially in the A & E unit. The government on its part should set aside funds for emergency or disaster that can be easily accessed by THs when needed.

References

- Achora S & Kamamyire J, K, (2016). "Disaster Preparedness: Need for Inclusion in Undergraduate Nursing Education". Sultan Qabos University Medical Journal www.squ.edu.om/squm.
- AliMed (2019). "Disaster Preparedness for Healthcare Facilities" <https://www.alimed.com/disaster-prepared-ness-for-healthcare-facilities-blog/>
- Brown A. (2005). "Hurricane Katrina and Emergency Care at Tulane Hospital" (<http://transcript.cnn.com/TRANSCRIPT/0508/29/ash.01.html>).
- Cao, Y., Li, Q., Chen, J., Guo, X., Miao, C., Yang, H., ... & Li, L. (2020). Hospital emergency management plan during the COVID-19 epidemic. *Academic Emergency Medicine*, 27(4), 309-311.
- Carlin, R. E., Love, G. J., & Zechmeister, E. J. (2014). Natural disaster and democratic legitimacy: The public opinion consequences of Chile's 2010 earthquake and tsunami. *Political Research Quarterly*, 67(1), 3-15.
- CCHN (2012). Emergency Management Plan (EMP) Template: For use by Colorado Community Health

- Centers and Clinics, Version 2. Developed by Colorado Community Health Network (CCHN).
- Chan, C. S., Nozu, K., & Cheung, T. O. L. (2020). Tourism and natural disaster management process: perception of tourism stakeholders in the case of Kumamoto earthquake in Japan. *Current Issues in Tourism*, 23(15), 1864-1885.
- Daniel R. O. (2020). An Analysis of the Socio-Economic Effects of Flood Disaster in Makurdi and Lokoja Metropolis, Nigeria (2012 – 2018). An unpublished PhD Thesis Submitted to the Post Graduate School of Ahmadu Bello University (ABU) Zaria.
- Fowkes, V., Blossom, H. J., Sandrock, C., Mitchell, B., & Brandstein, K. (2010). Exercises in emergency preparedness for health professionals in community clinics. *Journal of community health*, 35(5), 512-518.
- GOI-UNDP (2009). "Guidelines for Hospital Emergency Preparedness Planning. GOI-UNDP DRM Programme (2002-2008). Government of India. National Disaster management Division. Ministry of Home Affairs, North Block, New Delhi. http://asdma.gov.in/pdf/publication/undp/guidelines_hospital_emergency.pdf
- Idenyi I. A. (2018). Sociological Study of Victims of Terrorism and Their Coping Strategies in Zaria Metropolis, Kaduna State Nigeria. An unpublished PhD Thesis Submitted to the Post Graduate School of Ahmadu Bello University (ABU) Zaria.
- Jacobs-Wingo J.L., Schlegelmilch J, Berliner M., Airall-Simon G., Lang W. (2019) "Emergency Preparedness Training for Hospital Nursing Staff". New York City, 2012–2016. Journal of Nursing Scholarship Wiley Online Library.mou Office of Public Health Preparedness and Response, Centers for Disease Control and Prevention, Atlanta, GA and Office of Emergency Preparedness and Response, New York City Department of Health and Mental Hygiene, New York, NY, USA.
- Kotora, J. G., Clancy, T., Manzon, L., Malik, V., Louden, R. J., & Merlin, M. A. (2014). Active shooter in the emergency department: A scenario-based training approach for healthcare workers. *American journal of disaster medicine*, 9(1), 39-51.
- Labrague, L. J., Hammad, K., Gloe, D. S., McEnroe-Petitte, D. M., Fronda, D. C., Obeidat, A. A., ... & Mirafuentes, E. C. (2018). Disaster preparedness among nurses: a systematic review of literature. *International nursing review*, 65(1), 41-53.
- Lee, C. H. (2010). Disaster and mass casualty triage. *AMA Journal of Ethics*, 12(6), 466-470.
- Lim, G.H., Lim, B.L., & Vasu, A. (2013). Survey of factors affecting health care workers' perception towards institutional & individual disaster preparedness. *Prehosp Disaster Med*, 28(4), 353-358.
- Musa-Maliki A. (2015). Evaluation of the Role of Medical Sector in Disaster Preparedness: A Case Study of Ahmadu Bello University Teaching Hospital, Zaria. An unpublished MRDM Project submitted to the School of Post Graduate Studies, Ahmadu Bello University (ABU) Zaria.
- Musa-Maliki A. (2019) "Adaptation of the Abuse Assessment Screening Tool for Midwives in Northern Nigeria". An Unpublished PhD Thesis Submitted to the Post Graduate School of University of Cape Town (UCT).
- Nofal, A., Alfayyad, I., Khan, A., Al Aseri, Z., & Abu-Shaheen, A. (2018). Knowledge, attitudes, and practices of emergency department staff towards disaster and emergency preparedness at tertiary health care hospital in central Saudi Arabia. *Saudi medical journal*, 39(11), 1123.
- Obafunwa, J. O., Faduyile, F. A., Soyemi, S. S., Eze, U. O., Nwana, E. J., & Odesanmi, W. O. (2015). Forensic Investigation of mass disasters in Nigeria: A review. *Nigerian medical journal: journal of the Nigeria Medical Association*, 56(1), 1.
- Oloyede, S. A., Omoogun, C. B., & Akinjare, O. A. (2010). Tackling causes of frequent building collapse in Nigeria. *Journal of sustainable Development*, 3(3), 127.
- Sangha, K. K., Sithole, B., Hunter-Xenie, H., Daniels, C., Yibarbuk, D., James, G., ... & Russell-Smith, J. (2017). Empowering Remote Indigenous Communities in Natural Disaster Prone Northern Australia. *International Journal of Mass Emergencies & Disasters*, 35(3).
- Seyedin. H., Dolatabadi. Z.A., & Rajabifard. F, (2015) Emergency Nurses' requirements for disaster preparedness. *Trauma monthly* 20(4).
- Sonawane N. (2017) Role of a Nurse in Disaster Management. *Healthcare Journal*, LinkedIn Corporation. <https://www.slideshare.net/Ashins/role-of-a-nurse-in-disaster-management>.
- Tzeng, W. C., Feng, H. P., Cheng, W. T., Lin, C. H., Chiang, L. C., Pai, L., & Lee, C. L. (2016). Readiness of hospital nurses for disaster responses in Taiwan: a cross-sectional study. *Nurse education today*, 47, 37-42.
- UNDHA (1992) Internationally Agreed Glossary of Basic Terms Related to Disaster Management. Geneva, United Nations Department of Humanitarian Affairs, (http://reliefweb.int/sites/reliefweb.int/files/resource_s/004DFD3E15B69A67C1).
- USDHHS (2007). Medical Surge Capacity and Capability. A Management System for Integrating Medical and Health Resources during Large-Scale Emergencies. Washington, D.C., U.S. Department of Health and Human Services, 2007 (<http://www.phe.gov/preparedness/planning/mscc/handbook/pages/default.aspx>).
- WHO (2011). "Hospital Emergency Response Checklist: An All-Hazards Tool for Hospital Administrators and Emergency Managers". WHO Regional Office for Europe Scherfigsvej 8 DK-2100 Copenhagen, Denmark.