JOSTIP

Vol. 6 No. 1 (June 2020)

RWA Scale of Preparedness for Healthcare Personnel towards Radiation Emergency

Siti Hasliah Salleh[1*], Nor Ashikin Mohamed Yusof[2], Intan Sazrina Saimy[3] & Fadillah Ismail[4]

[*1,2,3]Razak Faculty of Technology and Informatics, Universiti Teknologi Malaysia Kuala Lumpur, Jalan Sultan Yahya Petra, 54100 Kuala Lumpur, Malaysia

[4]Faculty of Technology Management and Business, Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu Pahat, Johor, Malaysia

[*]Corresponding author:
sitihasliah@utm.my

Submitted: 3rd July 2020
Correction received: 18th Aug. 2020

Abstract

The article discussed the development of the 'Ready, Willing and Able' (RWA) Scale for the use of Malaysia healthcare personnel involved in radiation emergency focusing on medical response team only. Usually the members of medical emergency response team are doctors, medical assistances, nurses and hospital attendances. The scale is based on RWA framework by McCabe et al., with necessary modification to fit the local circumstances. It is to improve public health emergency preparedness system. The study is exploratory in nature as it investigates factors of each RWA construct. The scale is expected to reveal the level and profile of preparedness behaviour amongst personnel. The scale is insightful in offering guidance to healthcare providers on the development of possible educational and training programmes. These programmes are essential to motivate personnel in providing medical emergency response before the real radiation emergency strikes. Results of the study demonstrate eleven sub-constructs and multiple items of the RWA Scale. The study shall put forward some recommendation to ensure the validity of measurement scale.

Keywords: disaster preparedness, RWA Scale, ready, willing, able, healthcare personnel, radiation emergency

■1.0 INTRODUCTION

Preparedness is one of the fundamental phases in disaster management (Bronfman et al, 2019; Siti Hasliah, 2019). It is defined as capability to take actions that will lessen the consequences of the event (Bronfman et al, 2019; IAEA, 2007). According to the Directive No. 20: Policy and Mechanism on National Disaster Management 2010, it is essential for rescue agencies to evaluate their preparation from time to time (National Security Council, 2012). This is to ensure the agencies are physically and psychologically prepared before the eventuality. One of the agencies referred above is Emergency Medical Services (hereinafter is referred to as EMS). They are classified as one of the most critical services to be called upon when radiation emergency strikes (Siti Hasliah, 2019; Mohd Abd Wahab and Hamrah, 2011).

As compared to the other main rescue agencies such as the Atomic Energy Licensing Board, the Royal Malaysia Police, the Fire and Rescue Department, the Special Malaysia Disaster Assistance and Rescue Team and the Malaysian Armed Forces, the EMS are responsible in providing medical services at the site of emergency and in hospital. The EMS are also required to examine members of the public who flocked the hospital due to their concerns on their health even after few weeks or months after the emergency (Siti Hasliah, 2019; Mohd Abd Wahab and

Hamrah, 2011).

As such, the process for measuring the EMS's level of preparedness is relatively critical and exigent. One of the basic or fundamental challenges is to identify the significant paradigm of preparedness for proactive and pre-emptive responses (Siti Hasliah, 2019; Sorani et al., 2018; McCabe et al., 2010). Thus, this study tries to close the above gap by developing a scale that will measure and interpret healthcare personnel perceptions of their level of preparedness towards possible radiation emergency. Following Slavec and Drnovse (2012), the development of the scale is divided into three phrases. In general, the first stage is item generation. The second stage is scale development, and followed by scale evaluation. For the purposes of this writing, the article would only focus on the first stage of the scale development process.

This article is divided into several sections. Section one serves as general introduction, followed by Section two, which discusses on the background of 'Ready, Willing and Able' (hereinafter is referred to as RWA) framework, which in turn is used as the foundation in developing the sub-constructs and items of each RWA components. Section three will articulate the methodology of study. Section four and five are the findings and discussions respectively. Section six puts forward few recommendations.

■ 2.0 BACKGROUND OF RWA FRAMEWORK

Historically, it was McCabe et al who first talked about RWA framework in 2010. They mooted the idea of applying the framework to the area of public health services. It intended to improve the preparedness amongst individual or organization in responding to possible catastrophes and public health emergencies. As illustrated in Figure 1, the framework is consisted of three equal-sized circles. Each of them represents 'ready', 'willing' and 'able' construct. The intersection of circles denotes that they are equivalently significant. In this context, the fulfillment of all constructs shows that the individual or organization has achieved a high level or quality of preparedness.

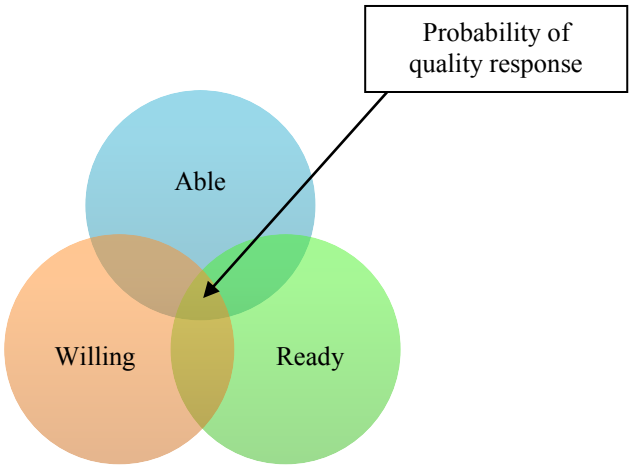

Figure 1: RWA framework (McCabe et al., 2010)

■ 2.1 Readiness (R)

Readiness could be described as the support of human and material resources possesses by healthcare personnel to perform well in medical emergency response operation (McCabe et al., 2010; McGonigle et al., 2005). On the same hand, readiness amongst healthcare personnel is influenced by four hierarchy levels. From the top, they are organizational, department, individual, and family levels respectively. Each of them is fundamental in ensuring the individual working as healthcare personnel) is always ready to report for duty.

■ 2.2 Willingness (W)

Willingness is defined as the tendency of healthcare personnel to participate in medical emergency response

operation enthusiastically. According to McCabe et al. (2010), willingness of an individual to respond to disaster event is essentially depending on their perceptions on personal and contextual factors. These factors include their perception on risk, personal responsibility, and support system. These information are equally applicable to this study. They could be interpreted as perception on radiation emergency risk, personal responsibility as healthcare personnel, and healthcare support system.

■ 2.3 Ability (A)

Ability refers to capacity of healthcare personnel to perform a task that requires particular competencies9). According to a report on public health preparedness and response competency model by Centers for Disease Control and Prevention (hereinafter is referred to as the CDC), there are at least 18 competencies required by healthcare personnel in responding to disaster event (CDC, 2012). These competencies could be divided into four major groups. They are namely leadership, communication and management of information, plan and improve practice, and protection on worker health and safety.

■ 3.0 METHODOLOGY

Currently there is limited study conducted on the measurement of preparedness amongst healthcare personnel in Malaysia. In order to fulfill the gap, the researchers tried to develop the scale through exploratory research. The research is divided into several phases and adopted qualitative approach method. The qualitative methodology would require the researcher to inspect and analyze the all national policies on emergency, emergency plans for responders, relevant government documents, published journal papers or books. Their inputs would be used as basis in constructing the "ready", 'willing' and 'able' constructs. The data were later on analyzed through computer aided qualitative data analysis. As a result, a list of sub-constructs and items are generated.

■ 4.0 FINDINGS

Currently there are numerous studies conducted on disaster preparedness in Malaysia. It is specifically to flood disaster which is frequently happened in the country (Nurhanie et al., 2019; Ahmad Zamree et al., 2018; Noorhashirin et al., 2016). However, the number of studies on the other prioritized but rare disaster is hardly any. This includes radiation emergency.

In order to fulfill the gap, the researchers tried to develop the scale through exploratory research. The research is divided into several phases and adopted qualitative approach method. The qualitative methodology would require the researcher to inspect and analyze the all national policies on emergency, emergency plans for responders, relevant government documents, published journal papers or books. Their inputs would be used as basis in constructing the "ready", 'willing' and 'able' constructs. The data were later on analyzed through computer aided qualitative data analysis. As a result, a list of sub-constructs and items are generated.

■ 4.1 Readiness to Respond to Radiation Emergency

The performance of healthcare personnel either as an individual or a group contributed to the success of medical emergency response. However, there are several groups of people that could influent their degree of performance. As described in Section 2.1, they are people at organizational, department, individual and personal-family levels. Based on literature review, findings on readiness construct are as follows:

(1) Organizational Readiness

Readiness at organizational level is essentially inter-connected with the readiness of EMS providers to respond to radiation emergency. In Malaysia, there are only several hospitals endorsed to provide EMS for victims that are contaminated by, or exposed to radioactive material (Kuala Lumpur Hospital, 2011). On top of this, they are also responsible to manage victims with general injuries at all time. Thus, these hospitals are responsible to organize their human and material resources that could support particular departments when radiation emergency strikes. Generally as the forerunner organization in any types of emergency or radiation emergency specifically, the endorsed hospitals for EMS providers are expected to have a (i) specific and comprehensive medical emergency response plan towards possible radiation emergency, (ii) adequate number of personnel, (iii) accessible and current equipment, as well as (iv)

budget for training and development purposes. In furtherance, the EMS is supposed to (v) communicate and disclose to other responsible departments of their subject matters mentioned above so that the latter know of the hospitals' capabilities.

(2) Readiness at Department Level

During an emergency, nearly all departments of endorsed hospitals are involved in medical emergency response operation. As the frontline medical providers in the Ministry of Health (Medical Development Division, 2012), the services and assistance of Trauma and Emergency Department are usually highly sought. Thus, the department is expected to have adequate human and material resources to be located at both locations. In general, regardless whether it is at departmental or organizational level, both demand and require the same types of resources. Often too, the department is required to do something specific in ensuring the organization is able to discharge its function well. For example, in carrying out a medical emergency response plan the hospital as an organizational is expected to establish a standard operating procedure. In support of this, the department in turn is expected to have a well-practiced personnel and well-functioning equipment.

(3) Readiness at Individual level

At individual level, the attention is focused on healthcare personnel who work in the Trauma and Emergency Department. They are namely emergency doctors, medical assistances, nurses and hospital attendances. If radiation emergency strikes, it is their responsibility then to rescue victims at the site of emergency, as well as in hospital. As part of proactive and pre-emptive response in radiation emergency event, it is expected of them to be ready before the eventuality. As far as this study is concerned, it has purposely left the personal aspects of human such as behavior, personal and emotional factors out, when assessing the level of "readiness of individual". The study therefore would only focus on factors or dimensions which are considerably more relevant and closely related to level of readiness of individual such as personal health status, monetary, transportation, and types of training and developmental programs attended.

(4) Family Readiness

It is a fact that family members of healthcare personnel are not in any way directly involved in medical emergency response operation. Nonetheless their personal and emotional supports are crucial to the personnel personally. Admittedly the healthcare personnel's very nature of work demands them to be ready, able and willing to leave their family members and dependent at any time and place. Consequently, it is essential for the family members to be equally ready, mentally prepared and accept the above facts. In view of this the personnel and their dependents have to have some contingency plans in preparing themselves when radiation emergency strikes. For instance, family members are expected to have adequate water, food and electricity supply. It is to ensure they could continue their daily activities without difficulties. If necessary the personnel is supposed to call upon individual that he trusts to look after his family and keep them safe at home. Logically, until and unless his family is safe and their welfare are taken care of; it is highly probable that the healthcare personnel could not concentrate on his duties well.

■ 4.2 Willingness to Respond to Radiation Emergency

Based on the above discussion on the conceptual definition of willingness in Section 2.2, there are three factors that contribute to willingness to respond to radiation emergency. They are perception on radiation emergency risk, personal responsibility as healthcare personnel, and support system. Details on each factor are as follows:

(1) Perception towards Radiation Emergency Risk

Perception on risk may vary between countries and even amongst individual. Because of that, some personnel could perform well in medical emergency response, while some could not. Thus, it is salient for all healthcare personnel to have and share a common understanding on the risk of radiation emergency. It is firstly to minimize the gap of varying perception amongst them. At the same, all of them are expected to be able to professionally provide medical emergency response at equivalent level of motivation (Siti Hasliah, 2019). As a whole, their views include the risk of radiation emergency towards their health and family members, the risk of radiation emergency if they lack knowledge and skills to provide response, and the risk of radiation emergency due to inadequate personal protective equipment.

(2) Perception towards Personal Responsibility

By right, each healthcare personnel must personally have a sense of responsibility in playing his role during emergency when radiation emergency strikes. In general, their personal responsibility includes providing treatment to patients with different health conditions, localities and stratum. In addition, they are expected to be available to report

for duty at all time since the Trauma and Emergency Department is responsible to provide EMS at any time, day or place.

(3) Perception towards Healthcare Support System

At this point, support by those who are close to healthcare personnel is equivalently significant in influencing, encouraging or motivating them to work as response team of radiation emergency The kinds of support meant here may even expand to include emotional and practical encouragement by co-members of response team within or outside the departments and organizations. In developing the scale, the study would look the followings as part considerations for the effort of healthcare personnel in providing services and response. They are namely avenues and platforms for healthcare personnel to state their opinions and opportunity to obtain relevant incentives or compensation in return.

■ 4.3 Ability to Respond to Radiation Emergency

The ability of healthcare personnel to respond to radiation emergency is extracted from the established medical emergency response plan by Kuala Lumpur Hospital. Kuala Lumpur Hospital acts as National Radiation Treatment Centre (Kuala Lumpur Hospital, 2011). After making a cross-references the above Kuala Lumpur Hospital emergency response plan document with public health preparedness and response competency model (CDC, 2012), the study noticed that both documents commonly and consistently spoke about abilities of healthcare personnel in four different contexts. They are as follows;

(1) Leadership

Healthcare personnel considered leadership as essential when working in critical situation. Personnel with leadership characteristics enable them to select, equip, train, and influence each other achieve organizational mission and objectives (Demiroz and Kapucu, 2012). In ensuring the medical response team is proactive and pre-emptive, there are several traits which a leader should possess. These traits could be measured by looking at his ability to solve problems, control emotions, work in team, empathy or concern about to others, knowledge about legislation, and adapt to changes in response operation.

(2) Communication

Communication during emergency response operation is particularly complex (Moorthy et al., 2018). This is because healthcare personnel usually work in different teams, departments, organizations with varying ranks. They also communicate through chain of command accordingly. During radiation emergency, their tasks become increasingly challenging due to the needs to provide immediate medical treatment without delay. This is to contain and control the effect of radiation on victims. This explains why, it is essential for healthcare personnel to communicate correctly and effectively in the response operation. In measuring effective communication, the study shall measure ability to receive, deliver and report information. These are the three basic principles of effective communication.

(3) Plan and Improve Practice

It is always good if healthcare personnel could participate in strategic planning for medical emergency response operation. The practice could increase their understanding of the organization's purpose and strategic targets better (Awuah- Gyawu, 2019). In this context there are two types of activities in which they could get involved. Firstly in developing medical emergency response operation plan, and secondly in making an implementation plan for such medical emergency response operation plan. By so doing they could in both instances clarify the reasons in introducing and implementing certain strategies. In the end, it is hoped that healthcare personnel either as an individual or team member have a sense of common purposes.

(4) Protection on Worker Safety and Health

One of the main responsibilities of a healthcare personnel is to rescue victims at the hazardous site of radiation emergency, as well as in hospital (Descatha et al., 2017; Kohtamaki et al., 2012). While on duty, it is also their duty to ensure that they are personally safely protected at all time. If they are not careful, there is always a high probability that they could be inadvertently exposed to hazardous material such as radioactive material, chemical, and physical hazards. In this context, the proposed RWA scale would look at several competencies and evaluate them accordingly. These include the use of personal protective equipment, knowledge on related law and regulations, handling of decontamination process, and reporting unresolved safety and health crisis.

■ 5.0 DISCUSSION

Research findings show that there are eleven sub-constructs identified in the RWA Scale. They are namely (1) organizational readiness; (2) department readiness; (3) individual readiness; (4) family readiness; (5) perception towards radiation emergency risk; (6) perception towards personal responsibility; (7) perception towards healthcare support system; (8) leadership; (9) communication; (10) plan and improve practice; and (11) protection on worker safety and health. Each of them generates multiple items to measure level of preparedness. However, the number of items generated is too many, which results in a lengthy measurement scale. It is advisable to reduce the number of items measured since it could de-motivate personnel from participating. At the same time, it could increase the risk of response error. Thus, the study chose to adopt Analytical Hierarchy Process since it is capable of identifying which of these items has better priority over the others. This is where several experts are invited to give their judgment on the importance of each item over the others. Thereafter, the researchers shall translate their judgments into a system of hierarchy. Once the above is done, only the top prioritized items are chosen to appear in the RWA Scale.

■ 6.0 CONCLUSION AND RECOMMENDATION

The generation of items is the most important part of developing sound measures. In order to ensure the adequacy of generated items to sample the sphere of 'ready', 'willing' and 'able' constructs, the researchers recommend further investigation of items through content validity assessment. Towards the end, the RWA scale could be insightful in offering guidance to healthcare providers on the development of possible educational and training programmes. These programmes are essential to motivate personnel in providing medical emergency response before the eventuality.

AKNOWLEDGEMENT

This article is part findings of PhD research project funded by Ministry of Higher Education under the MyBrain15 sponsorship.

REFERENCES

Ahmad Zamree N, Said NA, and Sibly S. (2018). Hospital Disaster Preparedness: A Model for Hospital Disaster Preparedness based on 2014 Flood in Kelantan. *Education in Medicine Journal*. 10(4):69 – 80. Doi: 10.21315/eimj2018.10.4.7

Albtoush, R., Dobrescu, R., and Ionescou, F. (2011) A hierarchical model for emergency management systems, *U.P.B. Science Bulletin*, Series C (2011).

Awuah- Gyawu M, Halidu O, and Brako S (2019). Effective Disaster Preparedness Strategies; A Supply Chain Perspective. *International Journal of Advanced Research*, 6(1), 420-429. Doi: 10.21474/IJAR01/6236

Bronfman NC, Cisternas PC, Repetto PB, and Castañeda JV. (2019). Natural Disaster Preparedness in a Multi-hazard Environment: Characterizing the Sociodemographic Profile of Those Better (Worse) Prepared. *PLOS ONE*, e0214249**,** https://doi.org/10.1371/journal.pone.0214249

CDC (2012). Knowledge, Skills and Attitudes (KSAs) for the Public Health Preparedness and Response Competency Model. Association of Schools of Public Health.

Demiroz F and Kapucu N (2012). The Role of Leadership in Managing Emergencies and Disasters. *European Journal of Economic and Political Studies*, 5(1): 91 – 101

Descatha A, Schunder-Tatzber S, Burgess J, et al. (2017). Emergency Preparedness and Response in Occupational Setting: A Position Statement. *Frontliners in Public Health* 5(251). Doi: 10.3389/fpubh.2017.00251

IAEA (2007). IAEA safety glossary: Terminology used in nuclear safety and radiation protection (2007).

Kohtamaki M, Kraus S, Makela M, et al. (2012). The role of personnel commitment to strategy implementation and organizational learning within the relationship between strategic planning and company performance, *Int*.

Journal of Entrepreneurial Behaviour & Research, 18:159-1782

Kuala Lumpur Hospital (2011). Medical Response for Radiation Emergency (draft)

McCabe OL, Barnett DJ, Taylor HG, et al. (2010) Ready, Willing, and Able: A Framework for Improving the Public Health Emergency Preparedness System, *Disaster Med Public Health Preparedness*, 4:161-168

McGonigle TP, Casper WJ, Meiman EP, et al. (2005). The Relationship between MWR Programs and Readiness: A Model to Guide Future Research, *Military Psychology*, 17:25-39.

Medical Development Division (2012). Emergency Medicine and Trauma Services Policy, Ministry of Health Malaysia.

Mohd Abd Wahab Y, and Hamrah MA (2011). Radiological Emergency: Malaysian Preparedness and Response. *Radiation Protection Dosimetry*, 146(1-3):38-41. doi: 10.1093/rpd/ncr102.

Moorthy R, Benny G, and Gill SS (2018). Disaster Communication in Managing Vulnerabilities. *Malaysian Journal of Communication*, 34(2): 51 – 66

National Security Council (2012). National Security Council Directive No. 20: The Policy and Mechanism on National Disaster and Relief Management. Malaysia. Department of Prime Minister.

Noorhashirin H., Nor Faiza T., Mohammad Farhan R., and Muhamad Hanafiah J (2016). Assessing Malaysian Disaster Preparedness for Flood. International Journal of Public Health and Clinical Sciences, 3 (2)

Nurhanie M, Zuriadah I, and Fatimah Salwa AH (2019). A Review of the Preparedness in the Management of Disaster in Malaysia. *International Journal of Academic Research in Business and Social Sciences*, 9(1): 802 – 810

Siti Hasliah S. (2019). Barriers to Preparedness amongst Emergency Medical Personnel towards Radiation Emergency. *Journal of Science, Technology and Innovation Policy*, Vol. 5(2): 11 – 18

Slavec A, and Drnovse, M (2012). A Perspective on Scale Development in Entrepreneurship Research. *Economic and Business Review*, 14: 39–62

Sorani M, Tourani S, Khankeh H, Panahi S. Prehospital Emergency Medical Services Challenges in Disaster; a Qualitative Study. *Emergency*. 2018; 6(1): e26.