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Disaster emergency preparedness literacy education and training for city dwellers: A proposed model

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Abstract---The heavy rains in Malaysia in 2021 caused big flooding and landslides in major cities have stunned the unprepared residents over the torrential downpours. The most affected city dwellers are among those low-income categories residents who live in low-cost housing and highly populated areas. Thus, this research is proposed to understand the state of disaster preparedness among city dwellers in Malaysia. The research will adopt a mixed methods approach. The qualitative approach will take place first in the data collection process. Subsequently, a quantitative approach will be conducted. The respondents will be among the city dwellers aged 20 and over. The expected findings will be the city dwellers' disaster preparedness effectiveness and efficiency in rebuilding their livelihood. They seem in line with the two decades government policy on Disaster Reduction Risk which started in the 1970s. The expected implication will be a new model of disaster emergency preparedness for city dwellers, particularly the low-income city dwellers including the special groups. Hence, the research output is expected to assist the emergency management of stakeholders in educating, monitoring, and acting upon the physical and mental preparedness at all levels.
Keywords---*Disaster preparedness, Emergency, Information literacy, Literacy education, City dwellers.*

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Introduction

The Malaysia's Disaster Management Agency (NADMA) reported that 33 districts in eight states across Peninsular Malaysia (Perak, Selangor, Kuala Lumpur, Negeri Sembilan, Melaka, Kelantan, Terengganu, and Pahang) were affected by flash floods and landslides due to heavy rains. It was estimated that 70,000 people were directly involved, with 67,629 persons (18,650 households) displaced in 470 evacuation centers. The loss of life was estimated about 50 people have died (of which 25 in Selangor, 21 in Pahang and four in Kelantan) and two others were missing. By January 3rd, NADMA confirmed that the States of Kelantan, Terengganu, Selangor, Pahang, Johor, Malacca, Negeri Sembilan and Sabah were the most affected by floods, with 14,459 individuals taking shelter at 191 evacuation centers. This flooding also significantly impacted people's livelihoods, hitting the state of Selangor and the Federal Territory of Kuala Lumpur hard, where the population density is highest in the country, and prolonged flooding is not the norm.

Unofficial estimates pointed to economic losses around USD 200 million (IFRC, 2022). Dozens of roads and highways remain closed. There have been unscheduled water cuts and disruptions to the electricity supply. Search and rescue have been hampered by a lack of assets (boats and other vessels) to navigate through the waterways formed around high-density residential areas near low-lying flood basins, exacerbated by coordination issues between authorities. The situation is worsening in low-cost housing areas, where residents of single-storey linked houses do not have the option of moving themselves and their assets to the upper floors. There have been medical evacuations as the elderly and families with chronic diseases suffered from lack of food, running water, disrupted electricity supply and shortage of medication (IFRC, 2022). Looking at the damage, loss, and sufferings, the most affected members of society will be the low-income categories (also known as B40) of households, the disabled groups, and the elderly.

Respective Federal and State government agencies have developed guidelines, schemes, and strategies for Disaster Risk Reduction (DRR) since the 1970s until now. For example, the Malaysia Civil Defence Force (MCDF), as a responsible government agency, has conducted the Public Preparedness Program throughout Malaysia to enhance society's preparedness and resilience. In 2019, MCDF spent MYR686,000 in organizing such programs, and MYR2,062,992 for disaster response and preparedness courses in three (3) MCDF training centers. Just within a year, nearly MYR 3 million was spent on educating and training the public.

In fact, since 2004, the early warning systems have been established as first developed by the Meteorological Department for early tsunami warning at national level. The early alert systems such as sirens, short messaging, telephone, telefax, public announcement, and mass media broadcast are now enhanced with the information communication technologies (ICT). However, the damage and losses seemed not to reduce. There is a discrepancy in the efforts of government

agencies, the dissemination of early warnings and communication systems, and the individual's preparedness with unpredictable calamities.

The problem is, the researchers do not know to what extent city dwellers are prepared for their personal safety and survival tools' prearrangement such as emergency medical aid, shelter, food ration, and adequate drinking water during or following a search and rescue operation. We do have the knowledge about training for public awareness and preparation, but a systematic education and training to prepare the public with disaster management is scarce. Thus, this research is proposed to understand the state of preparedness for a disaster among individuals and households of city dwellers in Malaysia. By understanding the reality of city dwellers disaster emergency preparation, responsible government agencies and other stakeholders could revisit, reformulate, and revise their two decades DRR plan and policy, so that the aftermath of disaster could be better communicated and responded to as well as faster recovery.

It is hypothesized that a new model of disaster emergency preparedness for city dwellers supporting the information sharing to convey the value to the community among individuals and households of city dwellers in Malaysia. Thus, the research attempts to answer the following research questions and objectives prior to designing the model.

Research Questions

This proposed study is an attempt to answer the following questions:
1. What are the levels of disaster emergency responses and preparedness among city dwellers in Malaysia and their households in the last 12 months?
2. How do the existing disaster communication materials disseminate to the city dwellers in Malaysia in the last 12 months?
3. What will be the proposed development of a new model for disaster emergency preparedness among city dwellers in Malaysia?

Research Objectives

The research objectives are to:
1. Identify the level of responses and preparedness among city dwellers in Malaysia and their households in the last 12 months;
2. Evaluate the dissemination of the existing disaster communication materials for city dwellers in Malaysia in the last 12 months;
3. Propose a development of new model for disaster emergency preparedness among city dwellers in Malaysia.

2 An Overview of Disaster Emergency and Community Preparedness

Disaster meaning (an event that results in) great harm, damage, or death, or serious difficulty (Cambridge, 2022). Based on The International Federation of Red Cross and Red Crescent Societies (IFRC) 2022, disasters are serious disruptions to the functioning of a community that exceed its capacity to cope using its own resources. Disasters can be caused by natural, man-made and technological hazards, as well as various factors that influence the exposure and vulnerability of

a community. It can be Geophysical: a hazard originating from solid earth (such as earthquakes, landslides and volcanic activity), Hydrological: caused by the occurrence, movement and distribution of water on earth (such as floods and avalanches), Climatological: relating to the climate (such as droughts and wildfires), Meteorological: relating to weather conditions (such as cyclones and storms), Biological: caused by exposure to living organisms and their toxic substances or diseases, they may carry (such as disease epidemics and insect/animal plagues) and Man-made: technological hazards are events that are caused by humans and occur in or close to human settlements. They include complex emergencies, conflicts, industrial accidents, transport accidents, environmental degradation and pollution.

Malaysia was shocked by a major flood on 16 December 2021. A tropical depression made landfall on the eastern coast of Peninsular Malaysia, bringing monsoon throughout the peninsula for three days. The resulting floods, affecting eight states across the country, have left at least 54 dead and two missing. The effect was a total devastation. It was like they were hit by a tsunami. Thousands of people were evacuated to relief centers (The Star, 2021). In 2017, at least 25 people, mostly students, were killed after a blaze broke out early on Thursday at a religious school in Kuala Lumpur – the deadliest fire in decades in Malaysia. The fire at *Darul Quran Ittifaqiyah* – a "tahfiz" boarding school where students learn to memorize the Quran – was reported at 5:40am (21:40 GMT) Wednesday, according to a statement from the Malaysian Fire and Rescue Department (Al-Jazeera, 2017). Over the past four decades, Malaysia has sustained more than USD 100 million in total estimated damages due to floods and landslides (Noorhashirin, et al, 2016).

Potential Lifesaving Preparedness Information

Previous study reported the understanding of the relationship between information sufficiency, community participation and intentions to prepare. Community participation, as demonstrated, helps disaster risk communicators unravel why disaster information sometimes failed to impact intentions to prepare (Abunyewah, et al., 2020). The relationship between adequate information provision and behavioral change has been found to be mixed (Cornes, et al., 2019; Chowdhury, et al., 2019). Several studies have found that provision of adequate information substantially influences behavioral change (Cook, et al., 2019; Moser, et al., 2011; Falco, et al., 2019; Leturiondo, et al., 2019). According to Feldman et al. (2016), public receipt of sufficient information on scientific findings could translate into a behavioral change when certain activities either precede or proceed information sufficiency provision. In other words, information sufficiency provision predictive ability on behavioral change could be enhanced when other social or psychological variables serve as antecedent or mediate or moderate the relationship. Previous literature also indicated the absence of community participation as a major reason why information provision has not translated in a positive intention to disaster preparedness (Cook, 2019).

Disaster Communication Materials

Information is an important tool and resource for flood preparedness. Without information, people cannot effectively and adequately prepare to adapt to flood and other disaster hazards (Coughlan de Perez et al., 2017; Ramirez et al., 2013; Maidl and Buchecker, 2015; Leman et al., 2016). Information dissemination through diverse media and forms such as weather reports, maps, and among others have been major components of mass communication campaigns aimed at influencing public behavior, intentions, and actual preparedness toward disaster hazards (Cheng, et al., 2018; Kawasaki, et al., 2018). This study aims to identify the cities dwellers' / urbanites' ability to understand and effectively use the potential lifesaving preparedness information; to evaluate the existing disaster communication materials for the city's dwellers/ urbanites; and to propose a new model of disaster emergency preparedness for the city's dwellers/ urbanites.

The following section describes the proposed methodology in order to gather data that will assist the development of proper disaster and hazard literacy education among the community.

3 Methodology

The research methodology will adopt a mixed methods approach. The proposed methodology will be submitted to the MARA University of Technology (UiTM) Ethics Committee to be reviewed and approved. The research will first involve qualitative inquiry using purposive sampling, face-to-face and online interviews with city dwellers living in Shah Alam, Johor Bharu, and Kuantan during the disaster (i.e., flood).

Initial interviews will take place earlier with the participants who were the victims in September 2022 who will be recruited through religious associations (such as United Sikhs Malaysia, and *Jawatankuasa Masjid Taman Sri Muda*) and other emergency management agencies. The participants will be asked about how a year of flood had impacted upon their lives, how they responded during the disaster, their preparedness prior to the incidents, and how information about the disaster was disseminated to them.

This qualitative research will be extended to the disabled groups. These participants will be recruited through contacts provided by the Department of Social Welfare, Malaysia Association for the Blinds, and other disability advocacy groups. Similar questions will be inquired including to what extent they received the disability support from the government agencies, communities and non-governmental groups. Respondents' ages will range between 20 to over 80 years of age. This age range is the highest age group who resides and earns a living in major cities of Malaysia. They will be grouped into the most common groupings, such as 20-29 year old; 30-39 year old; 40-49 year old; 50-59 year old; 60-69 year old; and 70-79 year old.

The interview sessions will be audio-taped and will take place either in participants' own homes or via telephone or online. The same interviewer will conduct all the interview processes and procedures, including review information

sheets, explain participants their rights, and answer any questions. All participants will sign a consent form.

Last but not least, interview recordings will be transcribed verbatim, and participants will be assigned with pseudonyms to ensure confidentiality. The qualitative approach will be the first data collection process, conducted by telephone and online interviews. Telephone interviews will be conducted by calling landline and mobile telephones. The online interviews will be conducted via Google and Zoom Meetings. The interviews will be executed about two years.

The qualitative research will be followed by a pilot quantitative survey conducted. This will involve the city dwellers including the special groups living in the cities that were affected by the disaster. Prior to administration, the survey will be reviewed by staff from the Department of Social Welfare. Survey respondents will be recruited through contacts provided by the Department of Social Welfare, Malaysia Association for the Blinds, and other disability advocacy groups. Surveys will be made accessible in large print format and electronically. Respondents who use a reader/writer will need to sign a consent form after being taken through the information sheet attached to the front of the survey. The survey will collect information regarding city households' levels of disaster response and preparedness, which incorporates forced response, 5-point Likert scale and short answer questions. The age of the survey respondents will range between 20 and 60 years old.

Qualitative interview material will be analyzed using thematic analysis (see Braun & Clarke, 1996) and quantitative data will be analyzed using descriptive statistics. Comments written in the short answer sections of the survey, as well as notes written in survey margins by the participants, will be included as additional data for qualitative analysis. These data will be manually coded alongside interview transcripts and arranged into themes. Themes will then be analyzed in relation to literature concerning city dwellers, B40 categories, disability, disaster response and recovery. Although meaningful and capturing the important issues for this population of city dwellers and disabled people, the sample cannot be said to be representative of the larger population of those city dwellers and disabled groups, particularly the qualitative data. The maximum margin of error will be points at the 95% confidence level.

The following section discloses the expected results and benefits as well as the impact of the research on society, academia, industry and economy of the nation.

4 Expected Results and Discussions

The expected result will be a new model for "Disaster Preparedness Literacy Education and Training for Cities Dweller in Malaysia". The model is expected to inform individuals and households of city dwellers to identify what those disasters might be and how they could impact their day-to-day livelihood. The potential disasters and their impact may not always be predicted. However, the benefits derived from identifying potential hazards and then working to eliminate or mitigate them could reduce the disaster risks.

The city dwellers must know the strategy to ensure their safety and survival of their life and property. Human life is always the first consideration in any emergency or disaster. It takes planning to be prepared to prevent the worst from happening and practice in order to recover and survive. Investing in the planning process can be seen as a type of protection too. There is a need to prepare detailed written procedures of disaster emergency management.

The model will help individual city dwellers to respond to events appropriately, protect against and recover from the calamity too. This model will help to convey the individual emergency preparation before the events, and the individuals' safety during the events. Practice drills will be part of the emergency exercise planned on a regular basis to reduce panic during the real event. Escape routes and procedures for evacuating the building will be presented to all for an effective recovery operation.

Impact Statement on Quintuple Helix

The expected research deliverables on society, academia, industry or economy are as follows:

1. At society's level, a new model will facilitate disaster emergency preparedness information to the community, capture values, and support information sharing in society, and for the next generation.

2. In academia, the research and proposed model may provide base-line research and access to knowledge pertaining to useful emergency preparedness information for disaster.

3. At industry/economy sector, the model could facilitate the disclosure of required elements and useful emergency preparedness information that can be applied in disaster and risk management.

Conclusion

In sum, Malaysia began implementing its disaster management plan in the 1970s. At present, the plan formerly known as DRR is referred to as myDRR. myDRR is a nationally owned, involving multi-stakeholders working on reducing the risk of disaster. The National Security Council (MKN) of the Prime Minister's Department is responsible for ensuring effective disaster management through systematic efforts to analyze and manage the factors during and following the disasters in the country. The disasters are not solely caused by land, environment, and exposure to specific hazards, but also struck by the COVID-19 virus pandemic. The pandemic has directed to on and off episodes of Movement Control Order (MCO) that led to the National Recovery Plan (NRP) anchored by the Immunization Program. Thus, Malaysia disaster emergency management and preparedness activities are seen as more important because the causal factors of disaster are unpredictable, yet affected the most vulnerable section of society, that is, the B40 and special group of city dwellers.

In accordance with the government commitment in Budget 2022 to focus on Nation's Well-being, the Twelfth Malaysia Plan (12MP) as to continue the economic assistance and stimulus packages, and the Shared Prosperity Vision (SPV) 2030 as to celebrate ethnic and cultural diversity and enhance nation's income, as well as linked with the climate action in the 2030 Agenda for Sustainable Development Goals (SDG), the plans and policies are built to reduce the disaster risk that affects all walks of life, strengthen the recovery, and drive the reform in society toward a resilient and sustainable development of the nation. Hence, this research seems to be aligned and relevance to the government plans and policies such as the first key pillar of Budget 2022, the 12MP, the SPV 2030, and SDGs that will provide a comprehensive individual needs input in relation to disaster emergency preparedness.

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