

# Application of Behavioural Model to Disaster Preparedness in A Developing Country Malaysia: An Overview

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**Abstract:** The world was recently shocked by an outbreak of a deadly virus. The recent emergence of the COVID-19 pandemic has increased societal stress levels through disruptions in daily work routines, adoption of new norms, low viral predictability, loss of source of income, death of loved ones, long-covid symptom, and subsequently being pushed to cope with a global economic crisis. It is believed that an endemic crisis will have a grave impact on everyone. Therefore, preparedness for disasters at individual, community and organisational levels are important to reduce disaster risk and minimising their impacts. The existing evidence on the application of behavioural coping models on disaster and emergency preparedness is predominantly from developed countries. The purpose of this study is to provide an overview of the existing behavioural models on the subject, and also to present cross cultural issues that may contribute to ways of understanding the community's coping behaviour during a disaster. Following a discussion of their utility in developing countries such as Malaysia, this paper first discusses how cultural characteristics influence a community's behaviour to cope with the unprecedented events. It then reviews how behavioural model can be applied to reduce risk- or to cope with the stress of a natural disaster. Future research on behavioural model addressing preparedness needs to focused on developing countries where there is a high probability of lacked coping capacity.

**Keywords:** Behavioral model, developing country, disaster preparedness, coping capacity

## 1. Introduction

Disasters have always been seen as unique, singular distinct events. However, during the last decade, the potential overlap between disasters has come to be more widely reported. Recent significant flooding that badly affected Malaysia's capital city of Kuala Lumpur and the majority districts in the state of Selangor happened at a time when the number of daily cases of covid-19 infection was at an all-time high.

An important component of a comprehensive Disaster Risk Reduction (DRR) strategy is encouraging sustained preparedness [1]. Preparedness functions not only to decrease risk and increase people's ability to cope, adapt and recover when disaster strikes, but also contributes to reduce escalating costs of hazard events. Disaster preparedness has become increasingly relevant due to the unpredictability of nature across the world and its lethal effects dependent on the severity of each emergency. Disasters can have immediate and long-term impact on someone's physical and emotional well-being, as well as indirect effects due to evacuation, social disruption, financial loss, lifestyle changes, damage to healthcare facilities, and shifts in the larger political and socioeconomic environment.

The United Nations International Strategy for Disaster Risk Reduction defines preparedness as the knowledge and capacities developed by governments, response and recovery organizations, communities and individuals to effectively anticipate, respond to and recover from the impacts of likely, imminent or current disasters [1]. A key component of this

definition is its alluding to the need for knowledge and capability to be developed. It is generally known that preparedness at the individual, community, and organizational levels is important for reducing the impacts of disasters. However, the fact that higher disaster incidence and awareness seem to have very little impact on increasing preparedness indicates that intervention is required to put this goal into practice.

According to the 2015 Sendai Framework for disaster risk reduction the design and implementation of risk management strategies should be based on a holistic understanding of risk in all its dimensions, including vulnerability, coping capacity, exposure of persons and assets, hazard characteristics and the environment.

It seems clear that behavioral theories and models are used more frequently in developed countries to prepare for emergencies and disasters especially in the Western countries. Unlike Asia, in which there are more disaster incidences and fatalities each year compared to other continents, there are relatively few research that apply behavioral theories and models to crises and disasters. This revealed a need for more investigation into the application of behavioral change theories in the Asian countries most affected by disasters and their impacts.

However, little is known about which behavioral theories are more commonly used, where they have been used, and why any one theory has been preferred over other behavioral theories, despite the fact that there have been numerous initiatives that have applied behavioral theories to disaster and emergency preparedness.

As a result, this present study was designed to evaluate the application of behavioral theories to disaster and emergency preparedness throughout the world as there hasn't been a prior evaluation undertaken in Malaysia.

The main goals of this conceptual study were to; i) determine which behavioral theories have been applied to disasters preparedness; ii) provide an overview of the existing behavioral models on the subject, and also iii) to present cross cultural issues that may contribute to ways of understanding the community's coping behaviour during a disaster. This present study highlighted on the application of behavioral theories and models to the preparedness dimension of disaster management.

## **2. Needs for Behavioral Disaster Preparedness**

One of the fundamental elements of Disaster Risk Reduction (DRR) is preparedness for disasters. The measures needed to improve the probability of avoiding or minimizing hazard impact outcomes are identified as being prepared. Hazard identification and mapping, vulnerability analysis, and risk assessment are used to establish preparedness plans, and behaviour modification approaches are used to help determine how the results of this process may be applied into procedural safeguards. Effective preparation reduces vulnerability, increases mitigation, permits rapid and effective response to a disaster event and so minimizes the time it takes for communities to recover from a disaster.

Disaster preparedness has recently gained attention as it has the ability to reduce deaths and has an impact on emergency response operations. Disaster preparedness is a crucial method for reducing the stress caused by natural disasters since they are often unpredictable occurrences with long-term psychological impact. Similarly, it is important to investigate the adoption of health-protective behaviour and raising awareness about natural disasters as a successful method to manage stress brought on by disasters. Morrissey & Reser [2] stated that preparing for natural disasters might lessen the psychological suffering associated with the likelihood of their occurrence since thinking about unforeseen natural disasters is a significant source of stress that must be managed.

Numerous studies suggested that promoting healthy behaviour might lessen vulnerabilities and improve in disaster preparedness. It is possible to increase awareness of this issue through the media, catastrophe-related activities, and disaster risk management strategies. According to Blake et al. [3], the great majority of disaster preparedness studies provide a distinctive viewpoint that increases awareness of a particular problem; however, disaster preparedness behaviour is an immediate reaction.

In addition, the tendency in recent research has focused at how individuals behave in disaster preparedness. The majority of these studies emphasized as to how social interaction, individual thoughts, and environmental factors interact during disasters. As well as engaged in developing environments that make disaster preparedness manageable. Disaster preparedness is a process that involves taking various measures to minimize the effects of natural disasters on vulnerable populations. It can also help them respond efficiently and effectively to emergencies.

According to O'Sullivan & Lemyre [4], communities and individuals that are adequately prepared can bounce back from natural disasters and maintain their regular functioning. This can be achieved through sustained behavioral change. Being able to understand the effects of their actions on themselves can help communities and individuals make informed decisions when it comes to preparing for emergencies.

## **3. Discussion**

### **3.1 Cultural Characteristics' Influence On a Community's Behaviour**

Communities affected by natural disasters will generally take self-defenses efforts (coping mechanisms) to survive in conditions filled with tension and fear. The impact of disasters on social aspects is related to separation and loss of social status, position and role in society, damage to social values and damage to social infrastructure. The social impact of disasters can result in the disintegration of society, the destruction of family values, conflict, psychological trauma and physical, economic-social powerlessness and the destruction of the social order [5].

Preparation for natural disasters and emergencies essentially focuses on individual behaviour. People's perceptions of danger, lessons learned through direct and indirect prior experiences with disaster incidents and emergencies, interactions between people and their environment, and many other variables influence how people behave.

These variables interact to affect the kind and quality of public preparedness for emergencies and disasters. These studies also make it evident that persons within a certain location, who often confront equivalent levels of risk, vary in terms of the kind and degree of their readiness as well as in how they choose to manage that risk. These approaches center on the ability to capture prior experiences in variables whose impact on behaviour can be objectively tested. Scores on a self-efficacy test can be used to determine an individual's prior success in handling difficult situations.

As a result, if certain factors can be reliably identified as being part of behavioral change interventions in various regions of the world, this information may be utilized to inform educational programs that attempt to spread awareness of preventative measures. According to research, these strategies can efficiently encourage disaster preparation habits. The evidence is not clear-cut, though. The process and degree of disaster and emergency preparedness at a given time, for instance, may depend in part on how the risk itself is perceived by individuals. Some studies have found that providing information or education to the community does not always result in disaster and emergency preparedness. The issue then becomes why such conflicting conclusions have been made.

One reasoning has to do with figuring out the cognitive, affective, emotional, and other social relationship and interaction factors that influence how people understand information about environmental hazards and how this relates to behavioral readiness for disaster and emergency. That is to say, whether or not agencies employed an evidence-based approach to their risk communication programs, as opposed to a more ad hoc approach, is one factor contributing to the disparity in the efficacy of information-based change programs outlined above.

Finding important variables and behaviour change processes becomes difficult due to the large number of theories that describe the interpretative processes that influence behaviour change. However, looking into this is crucial from the standpoint of providing risk management policy makers and planners with the procedures they need to direct the creation and fusion of knowledge and behaviour into the necessary actions.

Natural disasters can also have an impact on people's spiritual lives. Individuals or communities respond by believing that what is happening is God's will, so they engage in spiritual activities such as prayer or other spiritual activities. There are, however, individuals or communities who oppose the occurrence of natural disasters and blame God for making them despondent and preventing them from engaging in spiritual activities.

The diverse characteristics of Peninsula Malaysia, Sabah and Sarawak's hazard-scape has implications for preparedness (e.g., climate change, earthquake, landslide and flooding can occur in the same jurisdiction, but create different preparedness needs). Hence, ensuring that theories can predict preparedness irrespective of the source of a hazard (i.e., all-hazards) becomes a pertinent goal of preparedness research. Preparedness theorising must also be cognisant of the fact that hazards impact on populations characterised by considerable social and cultural diversity.

To increase the applicability of preparedness theory in multicultural countries and across international borders, it becomes necessary to explore the cross-cultural utility of theories and constructs. Accommodating all-hazards and cross-cultural issues increases confidence in being able to use preparedness theories to provide an evidence base for DRR planning and implementing irrespective of the location, the hazard-scape prevailing within a jurisdiction, or the socio-cultural characteristics of the population being encouraged to prepare [6].

### **3.2 Implementing Health Behavioral Model On Disaster Preparedness**

Therefore, it is important to understand the various behavioural theoretical models that are related to disaster preparedness to improve the behaviours of individuals and organizations in preparing for emergencies.

Disaster and emergency preparedness efforts focus predominantly on human behaviours derived from diverse factors that range from people's risk perception to lessons from direct and indirect past experiences of disaster events and emergencies [7]. According to literatures, theories could be used to explain the structural and psychological determinants of behaviour as well as guide the development and refinement of health promotion and education [6].

The Health Belief Model (HBM) is one of the oldest and most widely used models in which theory has been adapted from the behavioural sciences to health problems [8]. The HBM describes the decision-making process that individuals employ when adopting a health protective behaviour [9]. Though the use of the HBM is very versatile, it can be beneficial when discussing disaster preparedness, because it can be applied to encourage individuals to change a potentially detrimental behaviour. In the current study, behaviour is seen as an intentional or unintentional lack of preparedness for imminent occurrence of disaster.

This article discusses how psychological constructs and theories contribute to developing community and individual preparedness and to answering calls for preparedness to encompass all-hazards and cross-cultural issues [7].

Table 1 shows a summary of behavioural theories used in disaster preparedness from the literature.

**Table 1 - Summary of behavioural theory used in disaster preparedness**

| Types of Disaster Preparedness                  | Behavioural Theory  | Constructs/components/variables  |
|---|---|--|
| Disease outbreak preparedness                   | <ul style="list-style-type: none"> <li>Health Belief Model (HBM)</li> </ul>                     | <ul style="list-style-type: none"> <li>susceptibility to threat, severity of the threat, perceived threat, personal costs and benefits, likelihood of taking action</li> </ul>   |
|   | <ul style="list-style-type: none"> <li>Theory of Planned Behaviour (TPB)</li> </ul>             | <ul style="list-style-type: none"> <li>attitudes, subjective norms, perceived behavioural control</li> </ul>   |
|   | <ul style="list-style-type: none"> <li>Multidimensional Locus of Control (MLOC)</li> </ul>      | <ul style="list-style-type: none"> <li>“internal locus of control”, “powerful others locus of control”, and “chance locus of control”</li> </ul>   |
|   | <ul style="list-style-type: none"> <li>Theory Extended Parallel Process Model (EPPM)</li> </ul> | <ul style="list-style-type: none"> <li>understand adaptive behaviour “in the face of unknown risk”</li> </ul>  |
| Flood disaster preparedness                     | <ul style="list-style-type: none"> <li>Protective Action Decision Model (PADM)</li> </ul>       | <ul style="list-style-type: none"> <li>affective and cognitive routes, expectancy-valence models (model of risk reduction process), outcome expectancy and self-efficacy</li> </ul>  |
|   | <ul style="list-style-type: none"> <li>Protective Motivation Theory (PMT)</li> </ul>            | <ul style="list-style-type: none"> <li>risk perception, response efficacy, acceptance/personalizing of risk, self-efficacy, coping appraisal, protection motivation</li> </ul>   |
|   | <ul style="list-style-type: none"> <li>Vested Interest Theory (VIT)</li> </ul>                  | <ul style="list-style-type: none"> <li>assess flood hazard preparedness</li> </ul>   |
| Earthquake preparedness                         | <ul style="list-style-type: none"> <li>The social cognitive model</li> </ul>                    | <ul style="list-style-type: none"> <li>test for earthquake preparedness reported that all variables directly or indirectly contributed to predicting intentions to prepare for earthquakes.</li> </ul>                                     |
|   | <ul style="list-style-type: none"> <li>Person-relative-to-event model</li> </ul>                | <ul style="list-style-type: none"> <li>threat and vulnerability appraisal, self-efficacy, outcome efficacy, coping appraisal, perceived resource availability, perceived event severity</li> </ul>   |
| Climate change including heatwaves preparedness | <ul style="list-style-type: none"> <li>Social-ecological resilience theory</li> </ul>           | <ul style="list-style-type: none"> <li>applied the HBM to assess the adaptive behaviours of individuals during a heat wave stated that this theory was selected as some of its constituent constructs “relate to perception”</li> </ul>    |
| Tornado preparedness                            | <ul style="list-style-type: none"> <li>Precaution Adoption Theory (PAT)</li> </ul>              | <ul style="list-style-type: none"> <li>identifies absolute risk perception, relative risk perception, negative affect, fear, preoccupation and perceived control as predictors, and protective action as the dependent variable</li> </ul> |

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|                                |   |  |
|--------------------------------|---|--|
| Terrorism preparedness         | <ul style="list-style-type: none"> <li>• Theory of communicating actionable risk</li> </ul> | <ul style="list-style-type: none"> <li>• information (observed, received-content and density) as determinant factors and preparedness actions as dependent variable; knowledge, perceived effectiveness of preparedness, milling behaviour, were treated as mediating factors</li> </ul> |
| <hr/>                          |   |  |
| General emergency preparedness | <ul style="list-style-type: none"> <li>• Trans-theoretical Model (TTM)</li> </ul>           | <ul style="list-style-type: none"> <li>• pre-contemplation, contemplation, action, maintenance, sustaining preparedness</li> </ul>   |

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### 3.3 Disaster Preparedness in Malaysia

The disaster management organization structure continues under three levels: federal, state, and district. Malaysia has an early warning system for earthquake, flood, and tsunami including Short Message Service (SMS) capabilities, and other technologies to alert communities of impending disaster risks.

Malaysia is often considered as a country less prone to major disasters. However, as an equatorial climate country, Malaysia is vulnerable to risks such as flooding, landslides and mudslides. In 1997, the Malaysian National Security Council (MNSC) has formulated a national policy, management mechanism and disaster aid known as the Directive No. 20. MNSC, as the leading agency, was given a mandate under the Directive No. 20 to coordinate and execute appropriate actions during disasters. The federal government had established a special agency, National Disaster Management Agency (NADMA) in October 2015, dedicated to disaster risk management (DRM). Under the Malaysia DM structure, seven service themes were established, including; a) search and rescue, b) health and medical services, c) media, d) support, e) security control, f) welfare, and g) warnings and alerts.

There are 79 agencies have been identified responsible for carrying out activities related to DRM both from a top-down and bottom-up perspective. This long list of agencies contained, among others, 38 federal agencies, 21 state agencies and 17 district agencies and 2 NGOs. These agencies might have their own and/or work together with other agencies to execute DRM projects at various levels. Previous studies had identified three major issues and challenges in DRR in Malaysia, particularly from the perspective of agencies. These issues and challenges include; i) disaster management planning imbalanced between top-down and bottom-up approaches; ii) lack of coordination in disaster management cycle, with greater focus only on the disaster emergency response stage and; iii) lack of planning of long-term recovery (post-disaster) process, which resulted in low level community and stakeholders' resilience to disasters [10].

Thus, it should be mentioned that a distinction between individual (referring to an individual's strategy and capacity to deal with natural disaster risks) and institutional coping capacity (referring to the coping capacity provided for by the society, the government, etc.) can be made.

The emphasis on preparedness emerges from the understanding that the conventional concept of risk communication programmes, according to which informing individuals of their risks will inevitably inspire them to take comprehensive precautions, is inaccurate. The consequent need to delve deeper into the social and psychological processes that influence whether and to what extent people prepare (i.e., acquire knowledge and response resources and develop capacities to apply them) for hazard events has resulted in preparedness becoming a phenomenon that has attracted considerable psychological interest.

### 3.4 Recommendation for Future Studies

Based on our perspective, it is advised that researchers, health professionals, policymaker working in the field of disaster and emergency management concentrate on behavioural change models in the emergency preparedness realm.

#### 3.4.1 Behavioural Intervention Studies

The review show that the behavioural factors of attitude, social norms, and perceived behavioural control, can explain disaster preparedness among communities. Successful behavioural interventions should not only convince people of the value of disaster preparedness, but also equip them with the knowledge and resources necessary to carry it out. Such knowledge would be beneficial for policymakers to understand how behavioural factors are significant and necessary for integration in policy. The enforcement of policies regarding disaster preparedness should be embedded at a very young age specifically among the most vulnerable groups of society in the event of a disaster.

### 3.4.2 Preparing Disaster Management Model – Malaysian Behavioural Model

Behaviour is driven, in part, by thoughts and feelings, which provide insight into individual psyche, revealing such things as attitudes and values. Human behaviour is shaped by psychological traits, as personality types vary from person to person, producing different actions and behaviour. This is why as a country; Malaysia offers a unique diverse cultural which might influence its people to behave during a disaster. Therefore, this present study intends to suggest a behavioural model to be implemented among the society.

- i. Identification of hazard
- ii. Analyse risk
- iii. Control/preventive measure
- iv. Transfer risk (savings, insurance, hibah etc)
- v. Practise/training

## 4. Conclusion

In the behavioural theories discussed above, the predominant approach to doing so involves inquiring into people's interpretation of environmental threat/ hazard (e.g., risk perception). The cross-cultural analyses offer the possibility of exploring influences on preparedness based on appreciation of one's social-environment interdependence or co-existence. While this kind of thinking is not generally endorsed in western settings, evidence of the existence of culturally-embedded social-environmental relationships was evident in Taiwan, Indonesia and Japan.

Exploring how this kind of fundamental thinking might be developed more widely could be accomplished using transformative education and leadership. Doing so would shift preparedness research more towards the United Nation Sendai Framework goal of reconciling social and environmental contributions to DRR [11]. In conclusion, behavioural studies have a rich history of contributing to the advancement of understanding hazard/disaster preparedness. Behavioural Models through psychological constructs and theories can inform how the preparedness component of DRR strategies are developed and implemented.

In an era in which climate change and societal development are creating ever-increasing social, psychological, economic, and environmental risks, behavioural studies in a communities can play important roles in supporting the attainment of UNISDR preparedness goals and assist Malaysia to meet its Sendai obligations. It can do so by developing strategies that function to reduce risk and enhance resilience and adaptive capacities in people, families, communities, and societies.

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