Human Behaviour and Resilience Hospital

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Abstract

Hospitals themselves vulnerable to numerous types of disasters and can get damaged risking the lives of human being. To a certain extent, despite hard resilience (structural and non-structural), human behavior is one of the contributing factors affecting the hospital's capability in achieving disaster resilience. Hence, the objectives of the paper are twofold: to explore human weaknesses; and to investigate strategies for achieving disaster resilience for existing public hospitals. Qualitative research techniques employed in the form of focus group approach. The findings revealed that six human weaknesses and five strategies have been asserted by the respondents as of utmost critical.

Keywords: Disaster Resilience; Hard and soft Resilience; Hospital; Human Behaviour

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1.0 Introduction

Disaster defines as event or occurrence that usually sudden and unexpected. Consequently, it intensely alters the beings, objects, and localities under its influence. It results in loss of life, severe environmental damage, destruction or loss of material goods and disruption of normal patterns of life (Pan American Health Organization (PAHO), 2000). Hence, the concept of resilience is widely adopted across academic and policy debates as a way of reducing society's vulnerability to threats posed by natural and human-induced disasters (Haigh & Amaratunga, 2010). According to Bruneau et al. (2003), disaster resilience is the ability of social units (e.g. organizations, communities) to mitigate hazards, contain the effects of disasters when they occur, and carry out recovery activities in ways that minimize social disruptions.

The concepts of resilience take two broad forms of strategies, namely hard resilience and soft resilience (Proag, 2014). Fiksel (2003) and Rose & Liao (2005) emphasize on three types of capacities which are: absorptive capacity (the ability of the system to absorb the disruptive event); adaptive capacity (ability to adapt the event); and restorative capacity (the ability of the system to recover).

Bruneau et al., (2003) and Ranjan & Abenayake (2014) suggest that hospital facilities as one of the attributes of disaster resilience community. It corroborates with Proag (2014), which highlights that public health and healthcare are amongst the infrastructure assets that should be pondered upon as resilient. Pursuing this further, disaster resilience hospital is the hospital's capability to resist, absorb, respond to the shock of disasters while still retaining their most essential functionality, then recover to its original state or a new adaptive state (Albanese et al., 2008; Bruneau et al., 2003; Cimellaro, Reinhorn, & Bruneau, 2010).

2.0 Literature Review

Disasters were neither an 'act of god' nor an 'act of science' but consequences of vulnerabilities (O' Keefe et al., 1976). As such, according to Voogd (2004), the disaster impacts are caused by the actions of human beings. In addition, Neil (1986) identifies disasters as social events created by human behaviors where the tendency is dependent on the relationship between humans and their use of the physical and social world. For instance, Quarantelli & Perry (2005) argue that disasters stem from the social system and not necessarily from the event itself. It corroborates with (Haigh & Amaratunga, 2010), by which many of the other disasters affecting populations in the last decade are unquestionably of human origin. In addition, technical disasters also have human origins, either caused by accident, negligence or incompetence.

It is proven from previous cases in Malaysia, the impacts of various types of disasters (i.e. flood, fire, ceiling collapses, unhygienic hospital conditions, stolen equipment, and technical glitches) are affecting negatively towards public hospitals' resilience (Hang-Soon,

2012; Susil, 2013; Subramaniam, 2013; National Audit Department Malaysia, 2013; Mohammad-Idrose, 2014; Yahaya, 2015; Abdullah, 2014; Yusof, 2014; Subramaniam, 2014). To a certain extent, it is believed that human behaviours are one of the contributing factors affecting the hospital's capability for achieving disaster resilience. These human behaviours could be in the form of different disaster risk perceptions, and human weaknesses that result to incapability in establishing coping strategies for hospital's organisation.

Weakness is defined as the state or quality of being weak; particularly in human behaviour context weakness is a deficiency or failing in a person's character (http://www.collinsdictionary.com, 2015). Consequently, Seguí-Mas & Izquierdo (2009), highlight that behaviour contributes to the performance of tasks inherent to one's activity and responds to the individual's experience and situational stimulus in certain periods of time. Hence, it could be inferred that human weaknesses in terms of human behaviours could result in individual's performance in coping towards disasters.

Therefore, it can be deduced that human behaviour in the form of weaknesses (i.e. negligence and lack of integrity) among the hospital stakeholders (e.g. clinicians, health service, and facility managers) could results to various types of disasters that affecting the hospital's resilience. Carthey et al. (2008) highlight that it is essential to integrate responses with existing asset and disaster management frameworks and also to involve clinicians, health service, and facility managers in decision-making processes to ensure more effective community responses and greater pressure for the development of adaptive capacity for healthcare infrastructure. In regards of these notions, Achour & Price (2010) highlight the need to review current resilient strategies. It is supported by Achour et al. (2014), developing the right strategy could be the most significant step towards the resilience of healthcare facilities. Therefore, the objectives of the paper are twofold: to explore human weaknesses; and to investigate strategies for achieving disaster resilience for existing public hospitals.

3.0 Methodology

Qualitative research techniques were employed in the form of focus group approach among public agencies involving MERCY Malaysia; hospital emergency physicians; and academicians. The purposes of focus group approach are: to explore human weaknesses and to investigate strategies for achieving disaster resilience for existing public hospitals. The approach was conducted in the form of brainstorming session which the session was taped and transcribed verbatim for content analysis.

Morse (1994) recommends a minimum of six interviews for phenomenological studies. It is supported by Guest et al. (2006) by which it is suggested that a sample of six interviews could have been sufficient for various forms of data collection methods, such as focus

groups, observation, or historical analysis. Six respondents have been selected for the purpose of this research.

Hence, it can be inferred that the number of respondents involved is acceptable. The six potential respondents were selected based on their experience in disaster management area, particularly in the hospital. Therefore, it could be deduced that the data collected for the purpose of this paper are reliable. Table 1 provides the sample of the six respondents that were involved in the focus group approach.

Table 1: Respondents' Background

	Organisation	Designation	Years of experience
R1	MERCY Malaysia	Head of Technical Team	25
R2	Public Hospital	Emergency Physician	6
R3	Public Hospital	Emergency Physician	5
R4	Public Hospital	Emergency Physician	3
R5	Faculty of Health Science, UiTM	Academician	31
R6	Faculty of Civil Engineering, UiTM	Academician	21

4.0 Results and Discussions

Human weaknesses - hindering the capability of existing public hospitals to achieve disaster resilience

Table 2: Human weaknesses hindering the capability of existing public hospitals to achieve disaster resilience

Respondent	Respondents' statements
R2, R3	*Absence of clear guidelines / assessment tool / framework* established for disaster resilient hospital
R1,R5, R6	Lack of hospitals' organisation *awareness on international guidelines / assessment tool / framework*
R3	Established *computerized systems* are too rigid
R1	*Limited spaces* for modified critical care and treatment space
R4	*Limited bed capacity* and *high intensity of patient* in the future would cause the hospital unable to function accordingly
R5	Varies *legal procedures* designed by policy makers to be endured

Table 2 shows six human weaknesses that are hindering the capability of existing public hospitals to achieve disaster resilience. These are: absence of clear guidelines / assessment tool / framework; lack of hospitals' organisation awareness on international guidelines / assessment tool / framework; limited spaces and limited bed capacity; high intensity of patient; established computerized systems are too rigid and vary legal procedures designed by policy makers to be endured.

Based on the results, R2 and R3 agreed that the hospitals' organisation has not yet established a clear guidelines /assessment tool/ framework for disaster resilient hospital. It particularly implies for the trauma center and decontamination unit. In addition, the disaster simulation was done only for ISO purposes, none massive fire drill conducted and all parties were not being integrated during the safety or risk assessment. It corroborates with Malalgoda et al. (2014), empirical evidence revealed that the existing regulatory frameworks on planning, design and construction does not adequately look into disaster impacts and resilience as one of the challenges in achieving disaster resilience built environment. R3 postulated that the guidelines, assessment tool or framework should be implemented as a holistic approach, not solely involved emergency department.

Apart from that, R1, R5, and R6 emphasised that lack of hospitals' organisation awareness on international guidelines / assessment tool / framework could hinder the capability of existing public hospitals to achieve disaster resilience. At presence, R6 highlighted that none of the international guidelines, particularly seismic code of practice being referred to the hospital's construction. As a result, R1 recommended that guidelines by National Society for Earthquake Technology (NSET) Nepal could ponder upon into the process of designing and construction of public hospitals in Malaysia. In addition, R5 suggested that the Hyogo Framework for Action 2005 – 2015 should act as the baseline for all the guidelines, assessment tool and framework.

Furthermore, R3 indicated that despite few public hospitals have implemented computerized information system; the system itself is too rigid and unable to keep pace with the high intensity of patients. R3 recommended that the computerized system should be more flexible. It in-line with Ismail et al., (2010) that few recommendations such as regular upgrading of hardware and software on needed basis to keep up with the pace of technology advancement and increasing number of patients and development of hospital information system to be flexible as to readily accommodate changes and advances in technology.

Moreover, R1asserted that in few public hospitals, there are limited spaces that could be modified for mass casualty critical illness and injury. It is in-line with Hotchkin & Rubinson (2008) that expansion of complex, everyday critical care for hundreds to thousands of people is immensely difficult for nearly all communities because of limited reserve critical care medical equipment, specialized staff, and traditional intensive care unit (ICU) treatment space. It is suggested that when traditional critical care capacity is full, additional critically ill patients should receive care in non-ICU hospital rooms that are

concentrated on specific hospital wards or floors. However, if the hospitals' organisations are unable to provide these spaces, it could result in the hospitals' service breakdown.

On the other hand, R4 points out that limited bed capacity and high intensity of patient in the future would cause the hospital unable to function accordingly. It is supported by National Association of Public Hospitals and Health System (NAPH) (2007), which the ability to manage daily surge, adequate amounts of space and staffing directly affects how hospitals will handle patient surges during an emergency. Proudlove et al., (2003) propose bed management as one of the strategies to be incorporated within the hospitals' organisations.

In addition, R5 stressed that vary legal procedures designed by policy makers could result to incapability of existing public hospitals to achieve disaster resilience. The growing bureaucracy in the hospitals' organisations presents a serious threat to physicians' ability to provide quality patient care. To recapitulate, these human weaknesses mentioned earlier, have been asserted by all the respondents as the utmost critical factors that could hinder the capability of existing public hospitals to achieve disaster resilience.

Given the above, without any control on the six human weaknesses, it could lead to a severe impact on hospital's infrastructure and organisation. Hence, strategies to control human weaknesses mentioned earlier should be established.

4.1 Strategies - for achieving disaster resilience for existing public hospitals

4.1.1 Combination of Hard Resilience (Structural & Non-Structural) and Soft Resilience (Functional)

Table 3 shows the combination of hard and soft resilience strategies for existing public hospitals. Both hard and soft resilience strategies are classified into three components such as: structural, non-structural and functional. Structural and non-structural are considered to be hard resilience; meanwhile functional is regarded as soft resilience. The findings revealed that those components mentioned earlier have been asserted as critical components for hard and soft resilience strategies to be implemented by public hospitals in Malaysia.

Based on the results, R1, R3, and R6 agreed that disaster resilience hospital should equip its structure in order to resist and absorb the shock of disasters. The structure should focus on the components such as: type of design; structures; construction materials; and prior events affecting hospital safety.

Apart from that, both R1 and R3 recommended that non-structural components (i.e., architectural elements; lifeline facilities; medical and laboratory equipment; and security of equipment and supplies) are worth to be considered as hard resilience strategies for the purpose to absorb, adapting and recovering to disasters.

Moreover, R1, R2, R3 and R4 asserted that functional components (i.e., site and accessibility; internal circulation and interoperability; equipment and supplies; emergency standard operating procedures and guidelines; logistic systems and utilities; security and

alarm; transportation and communication systems; human resources and monitoring and evaluation) are another components to be incorporated into resilience strategies (soft resilience) for existing public hospitals.

Table 3: Combination of Hard Resilience (Structural & Non-Structural) and Soft Resilience (Functional)

	Combination of Hard Resilience (Structural & Non-Structural) and Soft Resilience (Functional)
R1	The disaster resilience hospital should have the capability to protect their *structural* and *non-structural* element through its *functional* capacity such as *emergency planning system* (i.e. nursing call system) and *community management* (i.e. staff and patient)
R2	Disaster resilience hospital is the hospital's capability to respond from any disasters by incorporating its *functional* element via *emergency management system*.
R3	Disaster resilience hospital integrates the management of its *physical* aspect, *non-structural*, hospital *emergency system* and the *human resources* in order for the hospital to continue functioning during disaster occurrences.
R5	Disaster resilience hospital is the ability to minimise any disruption in hospital operation during the occurrences of any types of disasters and it can be achieved by providing *contingency planning* and *training* to the hospital organisation.
R6	Disaster resilience hospital is the ability of the organization to contain the effects of disasters through strengthening its *structure* particularly in *seismic code of practice*

(Source: Samsuddin et al., 2015)

4.1.2 In-depth soft resilience strategies

In relation to this paper with regards to human behavior, Table 4 shows in-depth findings for five soft resilience strategies (functional components). The findings revealed that the five strategies have been asserted by the respondents as of utmost critical which are: establishing disaster hospital policy / assessment tool / framework; continuous assessment; comprehensive planning; awareness through table top exercise; and transparency. Unanimously, the respondents agreed that the recommended strategies were seen as the essential element in soft resilience. In addition, those strategies will be extensively classified to absorptive, adaptive and restorative capacity.

Based on the results, R5 affirmed that the hospitals' top management should establish and endorse the policy, assessment tool or framework related to disaster resilient hospital. It is due to the fact that, it could serve as guidelines to the hospitals' stakeholders in achieving disaster resilient hospital (Zhong et al., 2014). The guidelines, assessment tool or framework should encompass for mitigation, preparedness, response and recovery in order to absorb, easily adapt to the disaster and able to recover quickly. Hence, it implies that this strategy will enhance the hospital's *absorptive, adaptive and restorative capacity.*

Furthermore, R1 stressed that the continuous safety assessment of the hospitals could ensure the sustainability of disaster resilience hospital. This implies that it is essential for the hospitals' stakeholders to assess the facilities continuously, in order to address the gaps in emergency management competencies (Rockenschaub & Harbou, 2013). According to Smith et al. (2010) the assessment could be accomplished through the use of a checklist. In relation to that, continuous improvement could be established for strengthening *absorptive capacity* and adaptive *capacity.*

Table 4: In-depth soft resilience strategies for existing public hospitals

Respondent	Respondents' statements	Soft resilience		
		AB	AD	RT
R5	*Establish policy, assessment tool or framework* and should be endorsed by top management	√	√	√
R1	*Continuous assessment* to ensure the sustainability of disaster resilience	√	√	
R6	*Comprehensive planning* involving all stakeholders including the end users. Backup storage room should be planned to cater for disaster in the future	√	√	√
R2	*Awareness through table-top exercise*	√		√
R1, R3	*Transparency* with the budget in providing better hospital, education and training	√		

*AB – Absorptive Capacity; AD – Adaptive Capacity; RT – Restorative Capacity

Apart from that, R6 asserted that comprehensive planning should be involving all stakeholders including the end users. In addition, R6 pointed out that the utmost critical component in the plan is the allocation of backup storage room for future disaster. The backup storage room will be equipped with alternative supplies. The purpose of allocating these alternatives supplies is for *easily adapting* to disaster in any case the available supplies are non-functioning and limited. It is supported by Phalkey et al. (2012), which simple steps like developing facility-specific preparedness plans for hospitals' facilities will strengthen the response to future disasters. In addition, each hospital facility should maintain contingency funds for emergency response and *recovery* along with local vendor agreements to ensure stock supplies during disasters. It could be deduced that those strategies are integrated for the purpose of *absorbing, adapting and restoring* to the disasters.

On the other hand, R2 uphold that awareness should be created among the hospitals' organisation through the tabletop exercise. Peterson & Perry (1999) assure that successful exercises can enhance perceptions of teamwork, training adequacy, response network effectiveness, job risk, and equipment adequacy for the hospitals' organisations. Table-top

and field exercises are efficient tools to ensure *readiness* and assess *response* capabilities. In addition, a tabletop exercise could be in the form of disaster *recovery* (DR) exercise that provides a practical checklist of procedures to follow during a disaster. It implies that those exercises provide better absorptive and restorative capacity.

Based on Malalgoda et al. (2014) corruption and unlawful activities are quite common in the construction sector and as a result planning regulations and approval systems are sometimes overruled due to various reasons such as political pressure and bribery. Ad hoc construction and land use decisions further aggravate the situation and adversely affect the efforts of building a safer built environment. In relation to that, R1 and R3 alleged that transparency as one of the practical measures is taken to curtail corruption. It is in-line with Takim et al. (2013) by which transparency is an essential precondition for containing corruption. It is suggested that any method that helps ensure *quality*, timely delivery at the reasonable cost is a transparency strategy. Hence, by establishing a quality hospital in terms of its structure, the structure itself could resist and absorb any shocks of disasters.

Given the above, implementing these five strategies it could enhance the ability of the hospital to resist, *absorb* and respond to the shock of disasters while still retaining their critical functions, then *recover* to its original state or a new *adaptive* state.

5.0 Conclusion

This paper has presented the findings on human weaknesses that hindering the capability of existing hospitals to achieve disaster resilience and strategies to combat those weaknesses, Six human *weaknesses (i.e. absence of clear guidelines / assessment tool / framework; lack of hospitals' organisation awareness on international guidelines / assessment tool / framework; limited spaces and limited bed capacity; high intensity of patient; established computerized systems are too rigid and varies legal procedures designed by policy makers to be endured*) have been addressed as utmost critical weaknesses that affecting the existing public hospitals in achieving disaster resilient.

In relation to that, the respondents pointed out that resilience strategy for existing public hospitals is in the form of hard resilience (structural and non-structural) and soft resilience (functional). Consequently, in relation to this paper with regards to human behavior, in-depth findings for five soft *resilience strategies* (*i.e. establishing disaster hospital policy / assessment tool / framework; continuous assessment; comprehensive planning; awareness through table top exercise; and transparency*) have been identified as vital components in achieving disaster resilience for existing public hospitals. Those hard and soft resilience strategies will result in enhancing the hospitals' absorptive, adaptive and restorative capacity. Hence, the paper makes an original contribution to the broader area of hospital disaster management. The results of the study could serve as guidelines for the future development of hospital buildings. In addition, those strategies could help in disaster response and recovery to the hospital's infrastructure and organisation.

The research presented in this paper is part of an ongoing Ph.D. research study at the Faculty of Architecture, Planning, and Surveying, UiTM to develop a framework of disaster resilience for public hospitals in Malaysia. The result of the study justifies the research gaps which establishing framework is needed to enhance disaster resilience for public hospitals in Malaysia. Hence, the research presented in this paper is limited to validating the research needs in disaster management for public hospital buildings.

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