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Resilient Health Infrastructure: strengthening hospitals' capacity to respond effectively during disasters and crises

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Abstract

Resilient Health Infrastructure (RHI) is part of MERCY Malaysia's Building Resilient Communities (BRC) initiative. It is a program focusing on advocating a planned preparation in strengthening hospitals' in order to respond effectively during disasters as well as fast recovery from the impact of extreme events. Hospital management and its built environment representing building and infrastructure systems within a defined boundary should perform in a predictable manner during and after a hazard event and/or disaster. The failure of hospitals to absorb and accommodate pressures during disasters will cause performance degradation of services and health care of the hospital. This paper will discuss strategic approaches taken to increase the level of resiliency for health infrastructure, with focus on the criteria of robustness, redundancy and rapidity. The study of this paper will share the RHI/BRC initiatives in the investigation of health infrastructure's (i) robustness through building codes and structure, architecture, planning and zoning; (ii) redundancy through planning and operations; and (iii) rapidity through communication, movement and risk assessment. The case studies conducted in partnership with the Kelantan State Health Department in Malaysia. This study will form a clear understanding of hospital resilience, and help in the understanding of drafting preliminary conceptual framework for a more resilient health infrastructure.

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1. Introduction

Most health facilities in Malaysia were designed, constructed and developed without taking into account possibilities of disasters [1]. Often hospital's failure to absorb or withstand pressure of disaster with a certain magnitude affects their performance and functionality. Hospitals either do not have the correct build environment or staffs are not aware of their full capacity, which are the two important elements in ensuring that it remains accessible and functioning to operate with optimum capacity during the critical times. MERCY Malaysia's involvement in Disaster Risk Reduction (DRR) program began in 2008 for school children and communities in the flood-prone areas [2]. According to Shaw and Izumi, the program emphasizes the importance of local governments and community involvement and their capacity development in disaster preparedness [3]. Within the health sector, MERCY Malaysia had initiated DRR programs for hospitals aiming at identifying disaster risks, vulnerability and capacity in order to enhance its resiliency. The workshop entitled "Making hospitals more resilient: My hospital is getting ready!" is a commitment by MERCY Malaysia in promoting DRR as the main focus area in the concept of 'total disaster risk management' [4]. The workshop emphasizes the subject of introductions of DRR to hospital, resilient hospital, incorporating hospital staff's experience during the emergency, on-site observation to identify hospital capacities and vulnerabilities, simulation exercises and disaster action plan for hospital [4].

2. Problem Statement

In the end of December 2014, Kelantan has severely experienced extreme flooding whereby most health infrastructures in major towns of the state were heavily affected. The flooding has submerged some hospitals and at some places the flood has turned other hospitals into islands. The extraordinary flood was unexpected and many hospitals were inadequately prepared, thus making relief efforts such a demanding challenge. Flood situation has the potential to affect utilities that are vital for health care and patient management, such as power and water supply thus affecting the overall hospital services. Hospitals and clinics play a crucial role in providing health services to the communities, in particular during disasters and emergencies. Disaster preparedness and risk management are therefore essential to ensure the increasing demands are met during any disaster situation, including continuation of services and surge capacity and ultimately creating a more resilient hospital.

3. Objectives

There are two main objectives, (i) understanding disaster risk for hospital and (ii) to identify hospitals' capacity to respond effectively during disaster or crisis. The program focusing on advocating a planned preparation in strengthening hospitals' and the other capacity of health infrastructure in order to respond effectively during disasters as well as fast recovery from the impact of extreme events. The similar study had been conducted by Zhong [5] which contains an instrument with associated measures for assessing aspects of hospital capacity in responding to disasters.

4. Methodology

This study was performed in three steps: first, the case studies in Kelantan, Malaysia; second, an expert workshop on resilient health infrastructures; and third, the field observation of the hospitals' built environment. In response to that, a workshop called "Making hospitals more resilient: My hospital is getting ready!" has taken place in three hospitals which is located in the major towns of the state were heavily affected, (i) Kuala Krai Hospital, (ii) Tanah Merah Hospital and, (iii) Raja Perempuan Zainab II Hospital, Kelantan. This workshop involves a number of activities including capacity development of the hospital staffs through series of lectures on introductory of DRR to hospital and resilient hospital (refer to Table 1). Using a Venn diagram and table on historical disaster (Hazard time line), the staff would then share their previous experiences that they have witnessed. Next, field observation also referred to as 'hospital watching' would be conducted systematically to collect data on vulnerability and capacity of the hospital build environment. 'Hospital watching' was adapted from a Town Watching method which has been conducted since 1970 in Japan [6]. Finally, a table-top simulation exercise would be conducted to re-enact a disaster situation and how the hospital would react based on their existing Response Plan. The objective of this exercise is to achieve a more effective and pro-active action plan in managing disaster risk, especially during critical moments [7].

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