

Are Indonesian Hospitals Ready to Response to Disaster? Hospital Disaster Preparedness in West Java Province

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ABSTRACT

Introduction: Hospital is an overly complex facility that plays an important role in medical response delivery during disasters. Many hospitals have collapsed or been damaged and become non-functional because of a disaster. Hospital needs to have the ability to run its normal functions during a disaster. However, studies show that hospitals located in disaster areas are not well-prepared to response to disasters due to damages caused by the disasters as well as confusion over roles and responsibilities, poor communication, lack of planning, suboptimal training, and a lack of hospital integration into community disaster planning. This can lead to a situation where the hospital is not prepared to response to disaster.

Hospital preparedness plan is part of the disaster plan and should be built on a standardized protocol. Indonesia has potential risks of disasters. Nevertheless, information on the current levels of safety as well as the emergency and disaster management in hospitals is limited. This study aimed to evaluate the readiness of hospitals in Indonesia to respond to disasters.

Methods: The Indonesian version of HSI checklist from the World Health Organization (Pan American Health Organization/WHO; 2015) was used to assess hospital emergency and disaster management was translated into Bahasa Indonesia. This checklist consists of several sub-modules. The score from the overall modules was then used to categorize the Emergency and Disaster Management in a hospital into one of the following three categories: A) safe; B) at risk; or C) inadequate.

Results: All public hospitals in this study (n=5) were categorized as level B hospital, meaning that the hospitals only had limited emergency and disaster response as well as recovery planning. Coordination regarding emergency and disaster management activities was limited.

Conclusion: Hospital Disaster Preparedness is very important in disaster management. Therefore, it is mandatory that hospitals have good commitment and policies as well as good support for Hospital Safety, especially for Hospital Disaster Preparedness.

Key words: Disaster, Hospital, Hospital Safety Index, Preparedness

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INTRODUCTION

Indonesia, which is the largest archipelago of more than 17,000 islands, lies at the junction of 4 mobile tectonic plates. Known as a country located in the ring of fire, this country has 128 active volcanoes. As the home of more than 230 million people with various religions, cultures,

ethnicity, and traditions, Indonesia is prone to different types of emergencies and disasters. West Java Province is one of the provinces in Indonesia that is categorized as a high-risk disaster area in the Indonesia Disaster Risk Index issued by the National Disaster Management agency [1].

The health sector plays an important role in emergency and disaster management. The Sendai Framework for Disaster Risk Reduction (2015-2030) stated that it is mandatory to promote the resilience of new and existing critical infrastructures including water, transportation

and telecommunications infrastructures; educational facilities; and hospitals and other health facilities to ensure that they remain safe, effective, and operational during and after disasters in order to provide life-saving and essential services [2].

Hospital safety from disasters is a challenge in both developing and developed countries [3-6]. During disasters, hospitals must be able to continue their functions in a safe environment and to save the lives of injured victims [7]. Hospitals are potentially vulnerable to disasters because of their complexity in terms of structural, non-structural, and functional components; high level of occupancy and expensive equipment [8].

The "Hospitals Safe from Disasters" strategy therefore aims to ensure that hospitals will not only remain functional in the case of a disaster, but also able to operate effectively and without interruption. In addition, hospitals and health care facilities are highly vulnerable due to their complexity, occupancy, critical supply availability, heavy objects, hazardous materials, and external dependence. There is a huge possibility of economic loss and damage that hospital may face during disasters, emphasizing the importance of hospital preparedness in facing disasters. A reliable and comprehensive hospital assessment can only be carried out by considering all three main categories of vulnerability in the following order: (a) structural; (b) nonstructural; and (c) administrative/organizational [9].

Hospital administrative/organizational failure during disasters is more often seen compared to the structural failure. Functional emergency and disaster management is a cornerstone of hospital preparedness and is defined as the level of preparedness of hospital staff for dealing with major emergencies, incidents and disasters, as well as the level of the implementation of the hospital disaster plan. Hence, emergency and disaster management represent a comprehensive measure of hospital preparedness.

To facilitate the process of hospital safety assessment for disasters, the World Health Organization (WHO) has developed the Hospital Safety Index (HSI) (7). According to WHO, the HSI is a rapid, reliable, and low-cost diagnostic tool that addresses the structural safety, non-structural safety and functional capacity of a hospital. This is a standardized tool to measure hospital preparedness through an assessment

of 40 "elements" that are categorized into coordination of emergency and disaster management activities; hospital emergency and disaster response and recovery planning; communication and information management; human resources; logistics and finance; and patient care and support services.

Evacuation, decontamination, and security [10]. While the HSI does not replace detailed vulnerability studies, it provides the decision makers with an overall idea of the hospitals' ability to respond to major emergencies and disasters. In other words, an assessment using the HSI is the first step toward prioritizing a country's investments in hospital safety. This helps the decision makers to prioritize the resource allocation [7]. The objective of this study is to assess hospital preparedness in West Java province through the measurement of emergency and disaster management using the HSI from WHO.

SUBJECTS AND METHODS

Setting

This cross-sectional study was conducted in West Java province, Indonesia from December 2017 through April 2018. Since access to a hospital depends very much on the openness and willingness to share, random sampling was not possible in this study. Instead, sampling was done using convenience sampling approach. All participating hospitals had received permission from the authority to participate in this study.

Inclusion criteria for this study were public general and specialized hospitals while the exclusion criteria were small hospitals and private hospitals. The type of disaster and level of risk used in this study were based on the Indonesia Risk disaster database [1].

Affiliation (university or non-university hospital), size (small: less than 100 beds; medium: 100-400 beds; large: more than 400 beds), and the most common hazards were the background variables and were measured for each participating hospital.

The Emergency and Disaster Management module of the "HIS" was applied through the use of the modified "HIS" checklist from the World Health Organization (8) that had been translated into Indonesian. The structural and non-structural elements, which are also parts of the HSI according to WHO, were not included in this study.

The emergency and disaster management consists of 40 elements that are grouped into the following seven sub-modules in "HIS":

Coordination of emergency and disaster management activities.

Hospital emergency and disaster response and recovery planning.

Communication and information management.

Human resources.

Logistics and finance.

Patient care and support services.

Evacuation, decontamination, and security.

Emergency and disaster management evaluation

The evaluators in this study were the authors who have background education and expertise in hospital disaster management. The level and value of each element was determined through the consensus of all evaluators. Three levels were assigned for each element, i.e. high, average, and low, as defined in the HSI evaluation guideline. The value of each level was 1, 0.5, and 0, respectively. Scoring was performed in accordance with the guideline.

All seven sub-modules have equal weighting. Thus, the maximum total sum of the sub-modules is 1 (100%). According to the HSI evaluation guideline, the emergency and disaster management level is categorized into Level A, Level B, and Level C. Level A is assigned when the range of the functional capacity is 0.66-1 (66-100%), showing that it is likely that the hospital will function in a disaster. It is recommended, however, to continue with measures to improve response capacity and to improve

the functionality. Level B is assigned when the range of the functional capacity is 0.36-0.65 (36-65%), showing that interventional measures are needed. The hospital's current functionality is such that the ability of the hospital to function during and after a disaster is potentially at risk. Lastly, Level C is assigned when the range of the functional capacity is 0-0.35 (0-35%), showing that urgent intervention is needed, and that the hospital's current functionality is inadequate during and after a disaster.

Statistical analysis

Descriptive statistics were performed through the measurement of central tendency for the value of emergency and disaster management. The distribution of the emergency and disaster management was tested by the normality plot. A HSI calculator was used for data analysis.

Ethical review

This study was performed in accordance with the Public Health Faculty University of Indonesia Ethical Committee recommendation no: 80/UN2.F10/PPM.00.02/2017 dated 20 November 2017 stating that participating hospitals' name and exact location have to be treated as confidential and not to be discussed outside the research team.

RESULTS

Five hospitals were included in this study. All hospitals were general hospitals (Table 1). The highest emergency and disaster management score attained was 0.575 with 0.437 as the lowest total score (Table 2). The five hospitals were found to be in Level B.

Table 1: Hospital background characteristics.

Hospital	N	%
Type of Hospital		
University Affiliated Hospital	1	20%
Non-University Affiliated Hospital	4	80%
Type A	0	0%
Type B	3	60%
Type C	2	40%
Hospital Function		
General Hospital	5	100%
Specialized Hospital	0	0%
Number of Beds		
<100	2	40%
>100	3	60%
Hospital Accredited		
Yes	5	100%
No	0	0%

Table 2: Hospital safety index from emergency and disaster management perspective.

HSI	HOSPITAL				
	1	2	3	4	5
Sub Module 1	3.5	4.5	3	3.5	4
Sub Module 2	2	2.5	2	2	2.5
Sub Module 3	2	2	1.5	2	2
Sub Module 4	2.5	2.5	2.5	2	2.5
Sub Module 5	2	4	2	3	2
Sub Module 6	6	5	4	5	4
Sub Module 7	2.5	2.5	2.5	3.5	2.5
Total Score	20.5	23	17.5	21	19.5
	0.5125	0.575	0.4375	0.525	0.4875
HAI Level	B	B	B	B	B

Notes: Sub-module 1: Coordination of emergency and disaster management activities (8 item); Sub Module 2. Hospital emergency and disaster response and recovery planning (5 item); Sub module 3. Communication and information management (4 item); Sub Module 4. Human resources (5 item); Sub Module 5. Logistics and finance (4 item); Sub Module 6. Patient care and support services (9 item); Sub Module 7. Evacuation, decontamination, and security (5 item).

DISCUSSION

The lowest score was found in sub module hospital emergency and disaster response and recovery planning submodule while the highest score was seen in the logistics and finance submodule. All hospital already had a disaster management system, but the existing system did not thoroughly meet the HSI assessment standards. Indonesia as a middle-income developing country with a high risk for disasters need to put strong efforts in anticipating disasters. The lack of or the availability of financial support can become a barrier or a facilitator for the planning, training, and developing resources for hospitals with respect to mass-casualty incidents [10,11]. Providing funding for hospital emergency management activities enables hospitals to direct resources towards improving their emergency management preparedness [12,13].

All hospitals need to be safe and functional during disasters. In this study, no difference was seen between university affiliated and non-university affiliated hospitals. It was implied from this result that all hospitals in West Java need to develop contingency response plans in addition to enhancing the overall hospital disaster preparedness. West Java is classified as a high-risk area; therefore, these plans should be based on an all hazards approach.

Hospital preparedness appears to be a result of government policies, regulations, focus, and guidance as well as community standards rather than university affiliation [10]. The hospital size did not affect the preparedness level, which is consistent with findings from previous studies [14-16]. However, accreditation status may reflect the hospital preparedness because since

January 2018, self-assessment for hospital disaster preparedness using HSI from WHO has become one of the components of the hospital accreditation.

CONCLUSION

Hospitals are at risk for having to deal with disasters in West Java Province; hence, the use of a tool to evaluate health care facilities disaster preparedness is necessary. The Hospital Safety Index (HSI) tool from WHO helps to assess the preparedness for the purpose of improvement in the effectiveness and implementation of hospital preparedness in West Java. Further actions for improvement are needed to increase the level of preparedness of hospitals in West Java. Further studies are still needed to be able to get the complete picture of hospital preparedness in anticipating disasters in West Java by including private hospitals in the study.

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