



Published by DiscoverSys

Preparedness of Hormozgan province hospitals against disasters in 2016



CrossMark

Salahaddin Safari Lafti,¹ Somayah Hessam,^{2*} Abbas Yazdanpanah³

ABSTRACT

Introduction: As the most critical component in medicine, hospitals ought to be prepared for disasters. Ideally, all hospital must have a readily executable plan in case of disaster. This study aimed to identify and prioritize factors which were effective in hospitals disaster preparedness in Hormozgan Province in 2016.

Method: This study was conducted with descriptive-survey method in three steps. First, library studies to identify the main factors of hospital disaster preparedness. The second stage, Delphi method was used to determine the effective factors, and the last step was Analytical Hierarchy Process (AHP) used to prioritize it. Data were collected with a researcher-made 5-point Likert scale questionnaire. The questionnaire validity assessed through the expert judgment, and the reliability was measured by Pearson correlation. SPSS 22 was used to analyze the data.

Results: The most important factors in the preparation stage was the formulation of Emergency Operations Plan (EOP) of treatment in the province (weight 0.02895). Other factors including creation, reinforcement, and advancement of Emergency Operation Center (EOC) at the province level (weight 0.02745), and providing logical strategies to deal with crises and environmental incidents (weight 0.02716) followed. Additionally, a comprehensive annual exercise program for exercising and maneuvering from home to the reference hospital (weight of 0.02496), and the center of disaster management training and practice program at the province (weight 0.02185) were the next priorities.

Conclusion: It is necessary for hospitals in Hormozgan Province to establish and strengthen its disaster preparedness with elements recognized in this study utilized as proper guidance.

Keywords: Preparedness, Disasters, Hospital

Cite this Article: Lafti, S.S., Hessam, S., Yazdanpanah, A. 2019. Preparedness of Hormozgan province hospitals against disasters in 2016. *Bali Medical Journal* 8(1): 221-226. DOI:10.15562/bmj.v8i1.1167

¹PhD Student in Health Services Management, Shiraz Branch, Islamic Azad University, Shiraz, Iran.

²Assistant Professor, Department of Health Services Administration, South Tehran Branch, Islamic Azad University, Tehran, Iran.

³Assistant Professor, Department of healthcare management, Marvdasht Branch, Islamic Azad University, Marvdasht, Iran.

INTRODUCTION

One of the main indices of nation development is the preparedness of their society against various types of disasters. Disasters are of the major cause of humans and the environmental damage. In just past decade, millions of people have suffered or died from it.¹

Despite the fact that the preparedness to disasters can vary, no nation is fully protected from them.² In addition, studies showed that the incidence and frequency of disasters were increased steadily worldwide.^{3,4} These was mostly attributed to Asia as in 2014 that the number of disasters recorded reached 144.⁵ The consistent trend of expanding frequency of cataclysmic events, particularly in the Asia-Pacific area, has threatened the world's future development. The literature of the past catastrophe from developed nations accentuates that, in addition to adopting an approach to all hazards, all elements of society with its all available potential and instruments are ought to be prepared to deal with the disasters effectively.⁴

The World Health Organization (WHO) considers disaster as an ecological phenomenon requiring extra-institutional assistance. In general, there are two types of disaster: natural and human-made.

According to the degree of destruction, they could divided further into major and minor categories.⁶ Disasters can be regarded as a serious disorder in the functioning of the community as well since it can cause massive damage to humans and the environment. In addition, disaster also features the element of unpredictability, unknowingness, speed, urgency, uncertainty, and threat.^{6,7}

Healthcare sector readiness is necessary for the reduction of mortality and physical damage due to accidents and disasters. The implementation of efficient hospitals and health centers management has a tremendous effect on the performance of these critical sectors.⁸ Hospitals are among the most important centers at the time of disasters and should be able provide critical patients care and support the personnel of emergency care.^{6,9} Hospital as the most critical medical institution should be prepared for accountability and proper management of disasters far before it occurs.¹⁰ Nevertheless, effective hospital planning could optimize its ability to treat disaster-stricken patients.¹¹

Disaster Management in health science, along with its theories and principles, is rapidly becoming a unique specialty throughout the world.^{12,13} It's

*Corresponding to:
Somayah Hessam, Department of Health Services Administration, South Tehran Branch, Islamic Azad University, Tehran-Iran.
somayehh59@yahoo.com

goal is to reduce the impact of disasters on human health and well-being by providing immediate health care during and after an accident and also arrange a preparation to ensure a health systems readiness in time of disaster.^{14,15} The preparation step includes actions that increase the community's ability in performing various stages of disaster management including information gathering, planning, organizing, creating the management structures, providing resources and facilities, as well as training and maneuvering.¹⁶

The Islamic Republic of Iran is a standout amongst the most defenseless countries on the planet because of its geological area and climatic variety. Out of 45 of catastrophic events enlisted on the earth, 35 types had occurred in Iran which made it one of the 10 most disaster-inclined nations on the planet.¹⁷ One of the disaster-prone provinces is Hormozgan where the dispersion, the extent of the province and 14 islands, make emergency relief more sensitive and critical. Thus, there must be sufficient facilities to deal with disasters especially by the hospital.¹⁸

Given the problems described above, the proper and successful approach to disaster management and the application of efficient and effective approaches are of the major challenges. For this reason, one of the success factors in this regard is the awareness of local society toward these factors that are affecting disaster management as well as understanding the importance of each of these factors. In this regard, the motivation behind this investigation was to help recognize and organize the components influencing disaster preparedness in Hormozgan hospitals to resolve one of the disaster management challenges in this province.

MATERIALS AND METHODS

The study is conducted using descriptive-survey method. The first step of this study is library studies to identify the main components of hospital disaster preparedness, and the suitable stages in line with the study objectives were selected. In the second stage, classic Delphi method was used to identify the factors that affect the preparedness of the hospitals. In the third step, Analytical Hierarchy Process (AHP) was used to prioritize the factors of preparedness against disasters in the hospitals of Hormozgan.

First, we identified the main components of disaster management at the hospital preparation stage using library method by referring to databases, books, related publications, dissertations and digital resources, especially valid articles and literature from Scopus, Science, Google Scholar,

PubMed, and Farsi resources from SID.ir, Medix.ir. In order to retrieve and search for information, we used keywords "preparedness", "disasters" and "hospitals".

In Delphi and AHP stages, middle, operational and senior managers (head of the hospital, internal directors, matrons, and medical units administrative) in 14 hospitals in Hormozgan were included as the population in this study. In this stage, members of the population including middle (34 subjects in 4 stages), operational (42 subjects in 4 stages) and senior managers (29 subjects in all stages) were selected as the sample. All these subjects participated in filling out the questionnaire at the first stage; and in the second stage, the questionnaires were given to those who had participated in the first stage, and the same was done accordingly in the third and fourth stages. The data collection tool in the second stage was a questionnaire designed based on previous studies and review of resources. The questionnaire consisted of two sections: the first part was the demographic information and the second part included the factors in the preparation phase. Questionnaire questions were scored based on a five-point Likert scale. To assess the validity of the questionnaire, expert's judgment was used. A poll among the members of the experts made the sub-categories and finalized to perform Delphi stage. The reliability of the questionnaire was measured using Pearson correlation method (0.89). The researcher delivered the questionnaire in person or sent to the samples by e-mail. At all stages of the research, permission was asked to the participants with the informed consent form. They also assured that the privacy of the individuals would be preserved.

For data analysis, during Delphi's first round, a list of questions was provided to respondents, which had been extracted from disaster preparedness components in a hospital from previous research and verified by the experts. In addition, respondents were asked to highlight the factors that were not relevant but important for the respondents. Delphi's second round questionnaire contained the first-round components of the Delphi method and respondent's suggestions. In the second-round, the respondent had to comment on the extent of the impact of each factor in the form of Likert scale (1: Very low impact, 2: Low impact, 3: Moderate impact, 4: High impact, and 5: Very high impact). The mean and standard deviations of questions in the second round were calculated using SPSS software. In this round, questions with a mean less than 3.5 were deleted. Second round Delphi questionnaire included a set of factors whose mean in the second round was higher than 3.5. In this

section, the respondent had to re-comment on the impact of each factor. In this round, questions with a mean less than 3.3 were deleted. The fourth round of Delphi was conducted with questions whose mean was above 3.7. In the fourth round of Delphi, questions with a mean less than four were deleted and the rest of the questions were considered as the main questions to distribute to the population. AHP was used to prioritize the factors affecting the preparedness against disasters in Hormozgan hospitals. To ensure its validity, the inconsistency rate was calculated to assess the compatibility of experts judgement. After obtaining the sub-criteria, using AHP and the conceptual model, the sub-criteria was ranked.

RESULT

The results of the first stage were a list of effective factors that were used in the Delphi stage to identify the preparedness factors in Hormozgan hospitals. Table 1 presents the demographic information of the participants in the preparedness stage of Delphi Round. During the four rounds of Delphi, most of the participants were male. Regarding the age of the participants, throughout the first and second rounds of Delphi, the age range of most participants were 30-39 and 40-49 years old; in the third and fourth rounds, most of them were in the range of 30-39 years. Regarding the educational level, most of the participants were Master's Degree. In terms of management level, most of the participants in the four Delphi rounds were at the operational level. The work experience of most people in the first, second and fourth rounds was between six and ten years, while in the third round, it was about one to five years and six to ten years.

After four stages of Delphi, 20 effective factors were identified in the preparation phase (table 2). The results have been prioritized and ranked according to its importance in disaster management in the preparation stage. The most important factors affecting disaster management at this stage were developing a response strategy or EOP in health care (weight 0.02895), creation, strengthening, and development of EOC in the province (weight 0.02745), providing strategies for dealing with crises and environmental incidents (weight 0.02716) respectively. At next priorities were the establishment of a comprehensive annual exercise program from home health to the reference hospital level (weight 0.02496) and the center of disaster management training and practice program at the province (weight 0.02185).

DISCUSSION

The purpose of this study was to identify and prioritize the effective factors against disasters in the stage of preparation of hospitals in Hormozgan province, which was carried out using a combination of quantitative and qualitative methods. The result of this study shows that there were 20 effective factors on disaster management, especially at the preparatory stage. The first five most important factors were as follows: development of EOP in provincial treatment, establishing, strengthening and developing an EOC at the provincial level, providing strategies for dealing with environmental disasters, formulating a comprehensive annual practice program from home health level to the reference and headquarters hospital, and development of disaster management training and practice program in the field of provincial treatment.

Table 1 Demographics of participants in the preparedness stage of Delphi round

| Variable | | Gender | | Age | | | Degree | | | Managers' levels | | | Work history | | | | |
|---------------------|---|--------|-------|-------|-------|-------|-------------|-----------------|----------|------------------|-------------|--------|--------------|------|------|-------|-------------|
| | | Man | Woman | 30-39 | 40-49 | 50-59 | General PhD | Specialized PhD | Master's | Bachelor's | Operational | Middle | Senior | 1-5 | 6-10 | 11-16 | 16 and more |
| First round Delphi | N | 19 | 14 | 14 | 14 | 5 | 5 | 6 | 15 | 7 | 13 | 11 | 9 | 7 | 10 | 7 | 9 |
| | % | 57.6 | 42.4 | 42.4 | 42.4 | 15.2 | 15.2 | 18.2 | 45.4 | 21.2 | 39.4 | 33.3 | 27.3 | 21.2 | 3.4 | 21.2 | 27.3 |
| Second round Delphi | N | 17 | 12 | 12 | 12 | 5 | 5 | 6 | 13 | 5 | 12 | 9 | 8 | 7 | 9 | 5 | 8 |
| | % | 58.6 | 41.4 | 41.4 | 41.4 | 17.2 | 17.2 | 2.7 | 44.8 | 17.2 | 41.4 | 31 | 27.6 | 24.1 | 31.1 | 17.2 | 27.6 |
| Third round Delphi | N | 14 | 10 | 12 | 8 | 4 | 3 | 5 | 11 | 5 | 9 | 8 | 7 | 7 | 7 | 4 | 6 |
| | % | 58.3 | 41.7 | 50 | 33.3 | 16.7 | 12.5 | 2.8 | 45.9 | 2.8 | 37.5 | 33.3 | 29.2 | 29.2 | 29.2 | 1 | 16.6 |
| Fourth round Delphi | N | 10 | 9 | 9 | 8 | 2 | 3 | 4 | 9 | 3 | 8 | 6 | 5 | 5 | 6 | 4 | 4 |
| | % | 52.6 | 47.4 | 47.4 | 42.1 | 1.5 | 15.8 | 21.1 | 47.4 | 15.8 | 42.1 | 31.6 | 26.3 | 26.3 | 31.6 | 21.1 | 21.1 |

Table 2 Prioritization of the sub-criteria affecting disaster management in the preparation phase

| Factor | Effective factors | Weight | Rank |
|---|--|---------|------|
| Preparedness | Providing strategies for dealing with environmental disasters | 0.02716 | 3 |
| | Compiling work instructions in disaster situations | 0.01026 | 15 |
| | Creating a backup of all provincial health information | 0.00878 | 18 |
| | Storage of supplies and periodic inventory control | 0.00945 | 17 |
| | Development of disaster management training and practice program in the field of provincial treatment | 0.02185 | 5 |
| | Establishment of an integrated identification system for all ambulances and all treatment facilities in the province | 0.01076 | 11 |
| | Establishment of coordination between the pre-hospital emergency and hospitals and the Red Crescent organizations, firefighting and law enforcement agencies | 0.02152 | 6 |
| | Establishing an appropriate communication system between the emergency department and hospitals and other centers and institutions with ambulance | 0.01085 | 10 |
| | Gaining support and participation of the private sector and other non-academic centers in cooperation with the university in the event of disasters | 0.01094 | 8 |
| | Improvement of inter-sector coordination in the field of medicine of the University of medical sciences | 0.01035 | 14 |
| | Providing recipes for identifying potentially epidemiological deterrents | 0.00967 | 16 |
| | Providing mobile laboratories in accordance with international standards in the province | 0.00768 | 19 |
| | Collection and review of demographic data and outbreak rates and indicators of non-contagious diseases and diseases with annual frequency in the province | 0.01098 | 7 |
| | Disaster management education for all healthcare staff in five categories: preparation, screening, diagnosis, accountability, and communication with other units | 0.01075 | 12 |
| | Establishing a specialized support team at the University of Medical Sciences and its subsidiary cities, and training and practicing them | 0.00766 | 20 |
| | Developing and implementing a program for promoting intergenerational partnership, monitoring and evaluating it, covering all hazards and all aspects of health | 0.01045 | 13 |
| | Formulating a comprehensive annual practice program from home health level to the reference and headquarters hospital | 0.02496 | 4 |
| | Establishing, strengthening and developing an EOC at the provincial level | 0.02745 | 2 |
| Establishing GIS-based databases and extending them to the health system by defining levels of access | 0.01087 | 9 | |
| Developing EOP in provincial treatment | 0.02895 | 1 | |

The next priorities were the establishment of coordination between the pre-hospital emergency, hospitals and other institutions, the collection and review of demographic data, outbreak rates and indicators of non-contagious diseases, and gaining support from the private sector and other non-academic centers in the event of disasters. Moreover, factor regarding integration between various components of health system including the establishment of GIS-based databases to define the levels of access, the creation of appropriate communication system between the emergency department, hospitals and other centers with ambulances, and the establishment of an integrated identification system for all ambulances and all treatment facilities in the province were nonetheless important.

The third tier priorities were disaster management education for all healthcare staff in five categories: preparation, screening, diagnosis, accountability and communication with other units, the development and implementation of programs to promote intergenerational partnership, monitoring and evaluating, covering all hazards and all aspects of health, and improvement of inter-sector coordination in the field of medicine among University of Medical Sciences. Additional factors in the last priorities were compiling work instructions in disaster situations, providing recipes for identifying potentially epidemiological deterrents, storage of supplies and periodic inventory control, creating a backup of all provincial health information, providing mobile laboratories in accordance with international standards in the province, and establishing a specialized support team at

the University of Medical Sciences and its subsidiary cities, and training and practicing them.

The results of this research showed that in the preparation stage, the preparation of policies, rules and processes, contingency planning of various hazards and vulnerable groups in disaster management organizations, planning of empowerment groups, their families, those responsible for their care, rescuers and authorities, and planning for formation information infrastructure, communication and rapid alert can be considered as important factors.¹⁹ In their research, Aghaeshini Ashkavandi, Rezai Dolatabadi and Neilipour Tabatabaei identified and prioritized effective factors in the preparation phase, which included predicting the quality of access to program in the event of power outages and systems, prediction of the blood needed for the crisis, appropriate consumable material storage, and receiving and analyzing statistics and information. Moreover, they continued the list with updating equipment, using the experiences of other countries in various disasters, predicting the creation of high-quality locations for service, creating comprehensive crisis planning strategies, creating support bases for special conditions, identifying civic communication methods to prevent crowds, identifying key people for dealing with disasters, implementing a pilot manual for use when needed, using modern and advanced equipment, monitoring the changes and reacting appropriately to them, and meetings of relevant authorities.²⁰

Other effective factors in disaster management emphasized at the preparatory phase in other studies were: effective information management system, the competency of managers and team members, effective relationship with stakeholders, effective communication mechanism.²¹ In another study, the discussion of infrastructures was considered critical at this stage and the hospitals' being aware of the dangers of lack of preparedness for disasters was stressed.²² Other important factors emphasized at this stage include inter-organizational training for emergency preparedness, disaster maneuver, coordination and cooperation with the private sector, increased budgets for disaster preparedness of families and local teams, and ongoing education by the coordinators of immediate response.¹⁷ Comparison of research results with other similar research shows that one of the most important factors in the preparation stage is and training, preparation, and the readiness of managers to deal with disasters.

CONCLUSION

Improvements in disaster management in preparatory stages were needed to be implemented

in hospitals of Hormozgan Province. Important factors have been identified and prioritized according to expert's opinion. Now that there is a state of tranquility in Hormozgan, it is better that the hospitals set EOP as a priority to prepare for a response to disasters. It is also necessary to put on the agenda to establish, strengthen, and develop a disaster management center in the province, prepare logical strategies for dealing with disasters and environmental incidents and develop a comprehensive annual exercise program from home to the hospital. Likewise, the outcomes of this exploration can be used as the suitable guidance.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interests regarding the publication of this paper.

REFERENCES

1. Askarizadeh S, Garaei S, Zohoor M. Natural Disaster Management for Sustainable Development. In: International Congress of the Islamic world geographers. 2010.
2. What is disaster management?: World Confederation for Physical Therapy. [12/5/2016]. Available from: <http://www.wcpt.org/disaster-management/what-is-disaster-management>. 2016.
3. Smet H, Lagadec P, Leysen J. Disasters out of the box: a new ballgame. *J Contingencies Cris Manag*. 2012;20(3):138–48.
4. Taghizadeh A, Latifi MF, Ardalan A. Role of innovative technologies in disasters rehabilitation. *Rescue*. 2013;5(1):1–8.
5. Guha-Sapir D, Hoyois P, Below R. Annual disaster statistical review the numbers and trends. Centre for Research on the Epidemiology of Disasters. 2015.
6. Jahangiri K, Tabibi SJ. Disaster management: provide a model for effective planning to deal with bioterrorism. *Payesh*. 2003;2(3):205–14.
7. Shah A. An overview of disaster management in India. *Wit Trans Built Environ*. 2011;119:73–83.
8. Maleki M, Khoushkam M, Shojaei P. Preparation aspects of supplies provision encounter disasters in selected hospitals of Iran University of Medical Sciences. *Heal Inf Manag*. 2008;5(1).
9. Donahue AE, Featherstone RM. New roles for hospital librarians: a benchmarking survey of disaster management activities. *J Med Libr Assoc*. 2013;101(4):315–8.
10. Hojat M, Sirati Nir M, Khaghanizadeh K, Karimi Zharchi M. A survey of hospital disaster management in medical science universities. In: The 19th International Nursing Research Congress Focusing on Evidence-Based Practice. 2008. p. 1–10.
11. Yi P, George SK, Paul JA, Lin L. Hospital capacity planning for disaster emergency management. *Socioecon Plan Sci*. 2010;44(3):151–60.
12. Koenig KL, Schultz CH. Disaster medicine: advances in local catastrophic disaster response. *Acad Emerg Med*. 1994;1(2):133–6.
13. Zhong S, Clark M, Hou X-Y, Zang Y, FitzGerald G. Progress and challenges of disaster health management in China: a scoping review. *Glob Health Action*. 2014;7(1):24986.
14. Razzak JA, Kellermann AL. Emergency medical care in developing countries: is it worthwhile? *Bull World Health Organ*. 2002;80(11):900–5.

15. Sauer LM, McCarthy ML, Knebel A, Brewster P. Major influences on hospital emergency management and disaster preparedness. *Disaster Med Public Health Prep.* 3(2 Suppl):S68-73.
16. Four phases of crisis management: Bushehr Crisis Management Central Office; [11/5/2016] [Internet]. 2016. Available from: <http://bohran.ostb.ir/?part=menu&inc=menu&id=39>.
17. Prizzia R, Helfand G. Emergency preparedness and disaster management in Hawaii. *Disaster Prev Manag An Int J.* 2001;10(3):173-82.
18. Reduce problems in times of crisis and disasters by implementing educational programs: Hormozgan Crisis Management Central Office. [Internet]. 2016. Available from: http://hcmgo.ir/index.php?option=com_content&view=article&id=-04-08-50-01&catid=43:news-h.
19. Abbazi D. *Developed care model for disaster vulnerable population in Iran.* Iran University of Medical Sciences; 2016.
20. Aghahoseini A, Rezaei D, Nilipoor T. Identify and prioritize the factors in strategic foresight, disaster management and agility of human resources in blood transfusion center with Delphi technique and of Management. *J Manag Res.* 2015;26(102):55-68.
21. Moe TL, Pathranarakul P. An integrated approach to natural disaster management: Public project management and its critical success factors. *Disaster Prev Manag An Int J.* 2006;15(3):396-413.
22. Chand AM, Loosemore M. Hospital disaster management's understanding of built environment impacts on healthcare services during extreme weather events. *Eng Constr Archit Manag.* 2016;23(3):385-402.



This work is licensed under a Creative Commons Attribution