

Proposing an optimization procedure and applying management performance in health and Medical emergency on preparedness of Emergency department in suburb city Hospitals

Case Study: Shahid Motahari Hospital, Foulad Shahr

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Abstract:

Introduction: The management performance of hospitals in emergency departments in coping with clinical hazards is necessary for their success in providing quality services. The purpose of this study is to provide an optimization procedure and applying management performance in health and medical emergency on the rate of emergency preparedness of the suburb city hospitals.

Research method: A semi-experimental and interventional descriptive study in the emergency department of Shahid Motahari Hospital in 2015-2016. Data was collected through the standard checklist of hospital emergency responsiveness test to WHO disasters with 90 questions in 9 domains which is codified by the World Health Organization, in the form of interviews and observing evidences , and if necessary a numerical analysis. Initially, the situation was measured according to this checklist. In the next stage, a set of solutions was developed and then the solutions were implemented according to the obtained information. Data analysis before and after proposing the procedure and its application in order to improve the quality of health management performance and emergency preparedness was performed using central indices, and for describing and presenting the survey results, tables and graphs were used.

Results: The highest and lowest emergency preparedness rates for disasters and emergencies before the proposed procedure were the Communication Factor (%77/8) and Human resource factor (%2/8) respectively. The degree of preparedness of the medical center was measured in the management performance according to the model (WHO) before proposing the procedure (%77.98). The researcher's procedure provided and applied based on the information obtained from survey environment, location and type of hospital structure. After providing the procedure, the maximum and minimum rates were the continuity of service factor (%58.3) and post-accident rebuilding factor (%100), respectively. Generally, the rate

of emergency preparedness of studied medical center in management performance for coping with disasters and medical emergencies was measured (% 97.2) according to hospital emergency responsiveness test for accidents and (WHO). The significance level is less than 0.05, so we can say that the effectiveness with confidence (95%) was effective.

Conclusion: According to the statistics of accidents and disasters in the suburb cities, the results of the research and the importance of the role of emergency departments in interurban hospitals in controlling accidents, the need for planning and implementation of practical measures such as conducting training courses on health management in disasters and emergencies, having an estimate of critical and essential resources, changing the structure, providing manpower (emergency management) in order to more precise control and ease of service, maintenance and repair of equipment, timely triage and retrofitting of hospitals were effective in improving their preparedness.

Keywords: emergency; hospital; emergency health; medicine; management

Introduction:

However, preventing and reducing the risk of natural disasters, as well as other preventive activities for social development and sustainable economics based on a national strategy, disaster management and incidental disasters, and based on a scientific methodology is intended for all authorities in different areas involved in the crisis, but the response, preparedness and the necessary coordination before that, is also the basic principles of work, especially in the field of health, which essentially meets the first needs of people at risk. In this regard, rebuilding the hospitals, which are the pivot points particularly, have a tremendous significance. (Dr. Hamid Reza Khankeh et al. 2012).

Today, accidents and disasters constitute a great fraction of the resources and government programs. The media reports daily is informing about the incidents in the world. Changes in climate, human manipulates in the nature and rapid growth of technology, has increased the vulnerability of people and occurring the accidents. Iran is a catastrophic country and is one of the most prone countries in the world for accidents and disasters, which from 40 cases of known natural accidents, 31 cases are located in Iran. Therefore, it's necessary to pay attention to the disaster management debates in our country. Certainly, the greatest and the most important role among the many components of disaster management in the health sector, about the incidental accidents, is for medical and health systems especially hospitals which act as the main unit for providing services in the first phase (Dr. Hamid Reza KhanKhan, 2012).

Hospitals and health centers are considered as a symbol of social progress and a prerequisite for development and economic stability of each country. (Dr. Ardalan et al. 2014). In addition, medical and health centers, especially hospitals, are one of the most important financial resources for the country, that their destruction can bring a huge economic burden to any country (Robb, Seddon, Kennedy, 2010). in fact, the hospitals are the symbol of health, not only provide health care in the normal course of life, but also they must be able to take appropriate health care and medical services in critical and special conditions , and therefore it is necessary to maintain this performance in the worst and most critical conditions and provide the security of patients, visitors, staff and available equipments (Sabzghabaie, Kondori 2011). When disasters occurs and when hospitals are damaged for a variety of reasons, they lose their ability for providing proper health and medical services, and so a kind of secondary crisis is created, therefore it is essential to ensure the maintenance and preserving the structural and functional safety of hospitals in critical situations (Lari, Jahangiri, Hajinabi 2012). Islamic Republic of Iran with more than 900 hospitals is among the first three countries in the middle East area in terms of the number of hospitals (Ardalan , Sabzghabaei,...2011)

One of the main duties of the health centers is providing emergency services to the injured. Therefore, these centers should always be prepared to deal with these situations, and, each hospital must have a comprehensive crisis management plan, in order to reduce the effects of the disasters, in other word, the hospitals should establish appropriate physical, engineering, structural and management measures (Mohamadi Yegane, 2011).

With conducting a correct and comprehensive measurement before the disaster, while estimating the actual efficiency of medical centers during the crisis, the possibility of performing preventive measures and increasing preparedness are provided for crisis times. Under these conditions, planning and organizing facilities, human resources and expected resources are more purposeful and conducted more accurately (Fazli.2011).

Therefore, with proper planning and periodic and frequent monitoring we can eliminate weaknesses and improve the hospital's safety level, especially employee and referrals safety

(Etchegaray, Thomas. 2012). The importance and effectiveness of these plans is verified in critical cases, especially in the face of disasters (Gibbs, 2009).

Nowadays, injuries and human - financial losses due to natural and unnatural disasters, has a tremendous impact on human life and health, as far as whose destructive effects disturbs the ability of a society to meet basic needs and causes death or injuries and disabilities for many people in the world (Nivolianitou, Synodinou) (2011).

The secretary general of the World Health Organization says: "Disasters make problems every time and every day, but still there is no sufficient motivation in individuals, national and local authorities to plan for the prevention of the accidents". World Health organization, declared 2009, as the year of health in disasters (WHO 2012) .According to the International federation report of Red Cross and Red Crescent Societies in 2002, the disasters has affected the lives of 170,000 people in the whole world, and has caused a lot of mortality. It has been mentioned in the WHO report that 5,000,000 people die each year due to disasters and dozens of people are disabled (Akbari 2003). Among these, the unnatural disasters are the most important cause of death in developing countries (Peden, Scurfiel, 2006).

Meanwhile, the emergency department is one of the essential and inevitable units in public and semi-public hospitals. (Nasiri poor, 2009) and its service due to sensitivity and importance, is of particular interest among other parts of the hospital and includes a large number of studies in the field of healthcare. (Ashour, 2013). Because the most serious and most frequent referral of patients is to the emergency department of the hospital, the way of make services in this section can be a symbol of the general situation of the hospital services. (Salimifard 2014).

Emergency department should be structurally organized in terms of sensitivity, and the process of making services in this section should be carefully considered so that efficient management can function properly in patient services (Nasiri poor, 2009). There are several ways to improve the quality and efficiency of patient's services which are used in the emergency department. Among these methods, we can point to, for example, improved patient flow and reduced congestion and overcrowding (Cabrera, 2011) (Lin, 2012) (Peck, 2010) and also improved the quality of service provision in this section (Zeng, 2012) (Ashour,

2013). In this research, the main goal is to improve the quality of the performance of the emergency sector in Shahid Motahari Hospital, Foolad Shahr, using a procedure and its implementation.

Therefore, this study aims to determine the situation and provide a procedure for calculating health and safety indicators of the people (personnel and patients) in one of the hospitals in Isfahan to measure the preparedness of the hospital and its personnel in the face of disasters (natural, unnatural), and tries to provide an appropriate procedure to states that what measures should be done to reduce the vulnerability, prevent disasters and to minimize disturbance.

Method:

This is a semi-experimental interventional study that was conducted during the pretest / posttest period, September 2015 - 2016. The population studied in this study was census-based which includes departments involved with the emergency department at the time of the crisis, and all emergency department personnel at the Shahid Motahari Foulad Shahr hospital. To carry out the main research, the required data are collected through the standard checklist for responsiveness of emergency department with 90 questions in 9 domains (control, command, communication, safety and security, triage, wave capacity, continuity of essential services, human resources, material and inventory management and after-accident recovery), developed by the World Health Organization, provided by the researcher referral directly to the emergency department of the relevant hospital on a certain date and with a timetable from the relevant persons (secretary of the crisis committee, head nurse of the emergency and Hospital Manager and Emergency Department personnel) and then he observed the evidence and documentation about the spoken words . By exact cognition of the situation and accurately identifying the chosen procedures by the administrators at health centers called crisis management procedures and data analysis from interviews , a suitable procedure for improving the performance of health management or enhancing its structure and function and applying it to evaluate the procedure was proposed.

To determine the validity of the translation, the original text of the checklist is translated from English to Farsi and then from Persian to English, and we used the opinion of three faculty members and the experts in the field of crisis and various experts in the field of health care

service management and after collecting their comments and making necessary amendments, the final questionnaire with the opinion of respected professors were prepared and codified. For reliability, the standard checklists of the emergency responsiveness designed by the WHO and co-sponsored by certified professors of the world's leading universities. (WHO and EURO Hospital emergency response, 2011).

Findings:

Descriptive Results: Frequency among the 36 subjects, the highest percentage of frequency was sexual responsiveness %55.6 in males, with the highest percentage in the age of response rate of 22.2 between the age group 28-47 from the age group of 35 years. The highest percentage of respondents 'habitat situation in Isfahan province was %36.1 in the city of Foulad Shahr, the highest percentage of the number of respondents' children was %47.2 for one child than two children and without children, percentage of marital situation of the respondents were %80.6 married compared to single and divorced. The percentage of respondent's education situation among diploma, bachelor, MA, and PHD degrees, and the highest % 61.1 was pertaining to bachelor degrees. Frequency of occupational situation of respondent's % 50 was for nurses, between nurse assistance, assistant, nurse, secretary, anesthetist technician, operating department technician and general practitioner.

The frequency of the employment period of the respondents between 1 to 24 years was %16.7 for 5 years, the frequency of salaries of respondents is %41.7, between less than 312.5 \$ (10,000,000 Rials) and more than 625\$ (20,000,000 Rials) , was pertaining to the incomes between 390.625\$ and 468.43\$ (12500000 and 14990000 Rials).

Frequency of the number of working hours of respondent's %69.4 that was pertaining to working hours of 192 hours between 150- 175-192 working hours. Frequency of working shift hours of the respondent's %77.8 was related to 12 hours shifts between 6-8-12 shifts. In descriptive indices, the WHO scores before and after the effectiveness of the data average procedure, was 28.75 and 35.62 respectively. Situation of the WHO before and after the effectiveness is presented in the table below:

indices	WHO after the effectiveness	WHO before the effectiveness
number	36	36
average	28.75	35.62
mean	29.87	36
Mode	30	20.42
Standard deviation	7	3.98
variance	49.41	15.50
Minimum score	13	20
Maximum score	38	41

Inferential Findings: Hospital Emergency Management Preparedness: At shahid Motahari Hospital of Foulad Shahr before and after proposing a procedure and applying it to health and clinical hazards

Hospital preparedness before effectiveness	
Weak & middle	
Good & excellent	
Hospital preparedness after effectiveness	cumulative percentage
Weak & middle	2.8
Good & excellent	97.2

The above table shows the means before and after the effectiveness.

Index	mean	number	Standard deviation
WHO before effectiveness	35.62	36	3.98
WHO after effectiveness	28.75	36	7.02

Considering that the level of significance is less than 0.5 we can say that WHO is effective. Effectiveness effects on factors like control, communication, safety, triage, wave capacity, continuity of service, human resources, materials inventory and reconstruction after the accident.

Mean	Indicators
3.93	Controls after Effectiveness
3.80	Control before effectiveness
3.99	Communication after Effectiveness
3.93	Communications before Effectiveness
4.08	Safety after Effectiveness
3.23	Safety before Effectiveness
3.94	Triage after Effectiveness
3.25	Triage before Effectiveness
3.81	Wave capacity after Effectiveness
2.95	Wave capacity before Effectiveness
3.33	Continuity of services after Effectiveness
3.29	Continuity of Services before Effectiveness
3.92	Human Resources after Effectiveness
2.11	Human Resources before Effectiveness
4.05	Materials inventory after Effectiveness
2.83	Materials inventory before Effectiveness
4.54	Post-accident reconstruction before effectiveness
3.33	Post-accident reconstruction after effectiveness

In study of emergency management preparedness before and after proposing a procedure in Foulad Shahr Shahid Motahari Hospital, on health and clinical hazards in 9 domains (control, command, communication, safety and security, triage, wave capacity, continuity of essential services, human resources, material and inventory management and post-accident recovery, we observed that communication factor (77.8%) and human resources factor (2.8%) (Respectively) are the highest and the lowest emergency preparedness rates for disasters and emergencies before the procedure. The emergency medical center preparedness rate according to (WHO) was assessed (77.98%) for management performance before proposing the procedure. The researcher's strategy provided and applied according to ministry of health's accreditation standards, based on the location and type of hospital structure. After proposing the procedure, the highest and the lowest rates were continuity of the services (58.3%) and the recovery after the accident (100%), respectively. Overall, the emergency preparedness rate of the medical center studied in the management performance in the face of disasters and emergencies according to (WHO) was assessed 2.97%. Given that the significance level was less than 0.5, it can be said that effectiveness has been effective with 95% confidence.

after proposing the procedure		Before proposing the procedure		9 domains
Weak& middle	Good& excellent	Weak& middle	Good& excellent	
25	75	25	75	Control &command
77.8	22.2	77.8	22.2	communications
86.1	13.9	54.4	55.6	Safety & security
63.9	36.1	47.2	52.8	triage
77.8	22.2	38.9	61.1	Wave capacity
58.3	41.7	58.3	41.7	Essential service continuity
86.1	13.9	2.8	97.2	Human resources
83.7	16.7	41.7	58.3	Material management and inventory
100	0	69.4	30.6	Recovery after accident

Discussion and conclusion:

An emergency department is a place to provide patient care services and designed for the patient's flow process and proper usage of the resources are necessary for it. Emergencies are the heart of the hospital and sometimes they are called as one small hospital. Certainly, whenever an organization's heart is threatened, causes a failure in other organs. As a result, maintaining them in dealing with disasters and incidents is one of the essential elements of the strategic and operational plan in every hospital. The results of this study showed that the rate of emergency preparedness of the shahid Motahhari hospital according to the WHO model against disasters and incidents is in moderate level. This level of preparedness is not appropriate for a country that has experienced 31 kinds of incidents and disasters and it's possible to occur in the future (Partoy Shayan 2012). Kalhor et al., 2006, studied four educational centers in studying the preparedness of educational hospitals affiliated to Qazvin University of Medical Sciences. In this study the preparedness of the four educational medical centers in Gazvin city was 55%, which is in moderate level (Kalhor 2006). While the emergency department of hospitals in Alborz University of Medical Sciences based on the WHO model was only able to respond (%17.44) to the disaster and incident (Hasanpour 2013), which is consistent to our results. Dr. Richard and his colleagues concluded that up to

now almost all hospitals have emergency responsiveness plans to deal with chemical events (99%), natural events (97.8%), prevalence of infectious / epidemic diseases (94.1%), biological incidents (93.2%) and military attacks (81/3%) (Richard, 2011).

The results from a survey in Alborz University of Medical Sciences hospitals showed weak situation of preparedness in these hospitals in the face of disasters and events. In another study, Ghaffari and colleagues investigated "the preparedness of hospitals affiliated to the University of Welfare and rehabilitation Sciences against unexpected incidents in 2011". The findings of this study showed that the rate of preparedness of the Rafideh hospital against unexpected accidents was very low with a score of 12 out of 142 and the level of preparedness of Razi hospital against unexpected accidents, was moderate and about 84 out of 142, however, this level of preparedness is not enough to cope with accidents (Ghafari, 2011), which is consistent with our results.

Another research by vahed Parast and his colleagues under the title of "Investigating the preparedness of hospitals in Bushehr province against disasters" in 2009, also led to this conclusion that the level of preparedness of the hospitals in Bushehr province was moderate and poor in the case of disasters. (vahed parast, 2009). Mehrabady, in his research, found that in 62% of hospitals, there is no committee of accidents and disasters (Mehrabadi, 2006)

Limitations: This research, like any other research, has some limitations, especially in the implementation of the solution, and may be accompanied by errors. Different resources and similar internal and external studies in this area for using the results was limited compared with obtained results. Some structural reforms required more time and cost that was out of the researcher work area, which can affect work results.

index	Average	95% confidence		t value	Degree of freedom	Significance level
		upper bound	Lower bound			
Safety-safety	0.850	0.398	1.30	3.82	35	0.001
Triage- triage	0.694	0.196	1.19	2.83	35	0.008
Wave capacity- wave capacity	0.854	0.368	1.34	3.57	35	0.001
Human resources- human resources	1.81	1.47	2.15	10.70	35	0.000
Material inventory- material inventory	1.21	0.756	1.67	5.37	35	0.000
Recovery after accident - Recovery after accident	1.21	0.835	1.59	6.50	35	0.000

The table above shows the means before and after the effectiveness. Effectiveness has been effective on WHO.

index	mean	number	Standard deviation
WHO after effectiveness	35.62	36	3.98
WHO before effectiveness	28.75	36	7.02

The above table shows the means before and after the effectiveness.

index	mean	95% confidence		t value	Degree of freedom	Significance level
		upper bound	Lower bound			
WHO after effectiveness	6.77	4.83	8.45	7.44	35	0.000
WHO before effectiveness						

Considering that the level of significance is less than 0.5, so it can be said that effectiveness is effective on WHO.

The situation of the WHO factors before the effectiveness:

Descriptive indices of WHO factors before effectiveness is presented in the following table.

indices	control	communication	safety	triage	Wave capacity	Service continuity	Human resources	Material inventory	Recovery after accident
number	36	36	36	36	36	36	36	36	36
average	3.80	3.93	3.23	3.25	2.95	3.29	2.11	2.83	3.33
mean	3.85	4.55	3	3	2.84	3.75	2.13	3	3.71
Mode	3.86	4.56	2.80	3	4.08	3.75	2.60	3.20	3.86
Standard deviation	0.98	1.14	0.97	1.01	0.87	1.03	0.58	0.70	1.01
variance	0.97	1.31	0.94	1.02	0.76	1.06	0.34	0.49	1.02
Minimum score	1	1	1	1	1	1	1	1	1
Maximum score	5	5	5	5	4	5	3	4	5

The situation of WHO factors after effectiveness:

Descriptive indices of WHO factors after effectiveness is presented in the following table.

indices	control	communication	safety	triage	Wave capacity	Service continuity	Human resources	Material inventory	Recovery after accident
number	36	36	36	36	36	36	36	36	36
average	3.93	3.99	4.08	3.94	3.81	3.33	3.92	4.05	4.54
mean	3.85	4.55	4.20	4.80	4.23	3.75	3.53	5	4.57
Mode	3.86	4.56	5	5	4.23	3.75	3.53	5	5
Standard deviation	1.14	1.19	0.96	1.33	1.11	1.08	0.81	1.46	0.43
variance	1.31	1.35	0.92	1.77	1.25	1.12	0.65	2.15	0.19
Minimum score	1	1	1	1	1	1	2	1	3
Maximum score	5	5	5	5	4	5	3	4	5

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