

Awareness of Hospital Internal Disaster Management Plan among Health Team Members in A University Hospital

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Abstract: A disaster management plan is a formal plan of action which enables the hospital staff to respond effectively and efficiently when confronted with a disaster. The aim of this study was to assess the awareness of health team regarding hospital internal disaster management plan at a university hospital. The study was conducted in a university hospital using a cross-sectional design. It included six groups of subjects namely, medical leaders, head nurses, staff nurses, technicians, employees, housekeepers, in addition to a jury group to test validity of the study tool. A self-administered questionnaire form was used to assess staff awareness about the internal disaster management plan in the hospital. The results showed the absence of a disaster plan in the study setting and absence of a hospital evacuation plan. Also the majority of various categories of the study subjects had low awareness about all items of the disaster plan. It is concluded that there is a need for an internal disaster plan for the hospital, and the awareness of study subjects about internal disaster preparedness need to be raised. Therefore, it is recommended that the hospital administration should develop policies for disaster management and pay more attention to the problem of internal disasters and preparedness for their management. Training programs are essential for all categories of hospital staff in order to increase their awareness about disaster management.

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1. Introduction:

Disaster can be defined as a sudden extraordinary event that brings great damage, loss, destruction and injury to people and their environment (Stanhope and Lancaster, 2008). Alternatively, disaster is defined as a phenomenon that produces large-scale disruption of societal infrastructure and the normal healthcare system, presents immediate threat to public health, and requires external assistance for response (Bradt and Drummond, 2007). A disaster may be natural or human-made incident that causes destruction that cannot be relieved without assistance. According to hospital involvement, disasters may be classified into internal disasters that occur inside the health care facility or external disasters that occur outside the health care facility (Hassmiller, 2008).

At the end of the 20th century, national thinking about emergency preparedness led to two important developments: identification of the key competencies needed for effective emergency response, and increased attention to planning for and practicing emergency response. While there was a dramatic increase in both attention and funding following the World Trade Center fall of 2001 and the Anthrax events, these emergency preparedness activities were well underway prior to that time (King and Jatou, 2005). Effective response requires a disciplined team in which each participating

individual follows clear lines of communication and performs according to clearly assigned role directions (National Incident Management System [NIMS], 2004).

Disaster management includes four phases: mitigation, preparedness, response and recovery (JCAHO, 2003). Mitigation includes any activity taken to prevent the occurrence of the disaster whenever possible (Maurer and Smith, 2005). Preparedness is defined as activities and measures taken in advance of an event to ensure effective response to the impact of hazards (WHO expert consultation, 2007). Response phase is the point at which actions are started to save lives, property, and the environment and to prevent secondary harm (National Commission on Terrorist Attacks Upon the United States, 2004). During the recovery phase efforts are started to restore the community to normal (Ciotto, 2006).

The goal of disaster management includes prevention of the occurrence, minimizing casualty number, preventing further casualties, rescuing the injured, providing first and evaluating the injured, and providing definitive care and facilitating reconstruction recovery (Abd-Elazez, 2001). Disaster management by nature is an interdisciplinary, collaborative team effort (Lundy and Janes, 2001). It requires much planning, drilling, evaluating, revising and preplanning to successfully

handle sudden events that injure humans, destroy property, and overwhelm responders. Hospitals must not only have an external disaster plan, but a plan for internal disasters as well (Afifi, 2001; Kitt *et al.*, 2005).

A disaster plan is a systematic procedures that clearly detail what needs to be don, how, when, and by whom- before and after the time an anticipated disastrous event occurs. (Carolyn, 2006 and Kein and Giannone, 2004). It describes the action to be taken in the event (Karen, 2001). Moreover, any plan must address acquisition of equipment, supplies, medicine, and even food, clean water, blankets, and shelter (Allender and spradley, 2005. The disaster plan is site specific; it is governed by factors related to nature of work performed, number of workers and contractors at site and, the hours of operation. The plan is applied to all persons on site, including workers, contractors and visitors (Salazar, 2001).

A key to disaster preparedness is that the plan must be kept both realistic and simple (Chyna, 2005). It should clearly document basic approaches to various situations, general assumptions, and critical event sequences that need to be followed (Nosalek, 2003). A disaster plan committee should include representative from medical staff, emergency room physician or trauma surgeon, administration, OR manager, nursing staff, emergency department, security, communication, public relations, medical record and admission, engineering maintenance laboratory, radiology and respiratory therapy (Clarke, 2002).

Although disaster plans should be targeted for the specific community, certain components should be included, which have to show elaboration, detail, and specifics according to the needs of the community to which it applies. So, these components have to include authority, communication, supplies, equipment, human resources, team coordination, transportation, documentation, record-keeping, evacuation rescue, acute care, supportive care, recovery, and evaluation (Higgins *et al.*, 2004).

Hospital emergency preparedness has come under scrutiny (Russ, 2005). Recent events have brought disaster medicine into the public focus; both the government and communities expect hospitals to be prepared to cope with all types of emergencies (Bartley *et al.*, 2006). Contemporary events all over the world have raised awareness of mass causality events and the need for a capable disaster response. Recent natural disasters have highlighted the poor preparedness and infrastructure in place to respond to mass causality events. In response, public health policy makers and emergency planners developed plans and prepared emergency response systems (Chockshi *et al.*, 2008). Health professionals,

including nurses will need to be personally and professionally prepared to respond to any type of emergency event. All agencies now recognize that a response to any sort of emergency requires an inter-agency, interdisciplinary response, and that nearly all emergencies have potential health consequences (Gebbie and Qureshi, 2006).

Nurses will continue to be key players in the local and national level emergency response through the 21st century. As members of the community, the basic emergency preparedness of nurses can be an example to other members of the community (Qureshi *et al.*, 2005). Nurses are also looked to as planners and policy-makers at many levels of the emergency response system. They are frequently assigned to emergency planning committees and councils, or are asked to develop the site-specific emergency plans (Gebbie and Qureshi, 2006). Therefore, they should become involved in every level of disaster management (Burger and Canton, 2007). This study aimed at assessing the awareness of health team members regarding hospital internal disaster management plan. It was carried out to answer the research question of whether health team members are aware of hospital internal disaster management plan or not?

2. Subjects and Methods

Research design

A cross-sectional descriptive design was used in this research.

Study setting

The study was conducted at A University hospital. It consists of two buildings, which contain twenty-eight departments. This hospital was selected because it is the largest hospital in the university providing various services to a large number of clients, that might increase the risks of internal disasters.

Study subjects

The subjects of this study consisted of a group of hospital staff. This group was recruited from all categories of the hospital manpower (physicians, nurse leaders, staff nurses, administrative employees, technicians, and housekeepers) in order to assess their awareness about internal disasters and disaster plan. The required sample size was calculated to determine the prevalence of any positive awareness about disasters or disaster plans of 50% or more, with a 5% absolute precision and a 95% level of confidence (Schlesselman, 1982). The estimated sample size is 384 subjects. After adjustment for a dropout rate of about 5%, it was increased to 400 subjects. The sample was recruited through stratified random

sampling technique (221 health care personnel, 99 from administrative employees, and 80 from housekeeping). The health care personnel included 56 physicians, 22 nursing leaders, 73 nurses, and 70 technicians.

Data collection tool

The data collection tool was a self-administered questionnaire form aimed at assessing health team awareness of the hospital internal disaster management plan. The tool was developed by the researchers based on review of pertinent literature, reviewed by experts, and pilot tested. The questionnaire included one part for subjects characteristics (6 questions), one part for expectations regarding internal disasters (13 questions), and a final part regarding awareness about internal disaster preparedness plan in the studied hospital (71 items categorized into internal disaster plan, hospital preparedness, special disasters precautions, preparation for outage of power/supplies, and hospital preventive measures for some disasters.

Reliability of data collection tool

Tool reliability was assessed through estimating its internal consistency. It proved to be of good reliability, where Cronbach alpha coefficient ranged between 0.52 and 0.87.

Fieldwork

To carry out the study in the predetermined hospital, letters explaining the aim of the study were directed from the Faculty of Nursing to hospital director, and nursing director in their facilities. The researchers then met with them in the hospital, and explained the purpose and the method of data collection for the study to obtain their permission to conduct the study. The fieldwork was executed from May 2007 through August 2007 for the questionnaire. The researchers visited each department in the study setting and distributed the tool to the chosen sample in their workplaces after explaining the aim of the study to them and how to fill the tool. Study subject's responses were checked against the administrator's tool to verify whether they were correct or incorrect, i.e. the administrator's responses were considered as the standard.

The principles of ethics in research were closely followed in this study. The proposal was approved by the ethics committee. The participants gave their verbal consent to participate after being briefed with the study aim and procedures. They were informed about their rights to refuse or withdraw. Anonymity and confidentiality of the obtained information was assured.

Statistical analysis

Data entry was done using Epi-Info 6.04 computer software package, while statistical analysis was done using SPSS 13.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for categorical variables. Qualitative categorical variables were compared using chi-square test. In larger than 2x2 cross-tables, no test could be applied whenever the expected value in 10% or more of the cells was less than 5. Statistical significance was considered at p-value <0.05.

3. Results:

Table 1 displays awareness of various categories of the study subjects about internal disaster plan. It points to generally low awareness about all items. According to the table, there are statistically significant differences between all categories of the study subjects in relation to telecom system ($p < 0.001$). The lowest percentages of awareness in this item were among physicians and housekeepers, while it was highest among nurse leaders.

Table 2 demonstrates the awareness of various categories of the study subjects about hospital mitigation measures for internal fire and radiation accidents. The table points to statistically significant differences among various categories of the study sample in all items of internal fire. It is evident that technicians had generally the lowest percentages of awareness about most items. However, they had the highest percentages of awareness regarding checking visitors for flammables and precautions for electric fires. Also, nurse leaders, nurses, and technicians had the lowest percentages regarding sprinklers system. As regards awareness of radiation accidents, the table shows statistically significant differences related to regular maintenance and regulations for use. It is noticed that technicians had generally the lowest percentages, particularly in relation to regular maintenance. Meanwhile, physicians had the highest percentages related to regulations for use of radioactive materials.

The awareness of various categories of the study subjects about hospital mitigation and preparedness related to infection, food poisoning outbreaks, gas explosion and earthquakes is described in Table 3. As the table shows, there are statistically significant differences among various categories of the study subjects in relation to infection control program ($p < 0.001$). Technicians had the lowest awareness about the infection control program (82.9%).

Table (1): Awareness of various categories of the study subjects about internal disaster plan (n= 400)

Plan	Group												X ² test (p-value)
	Physicians (n=56)		Nurse Leaders (n=22)		Nurses (n=73)		Technicians (n=70)		Administrative employees (n=99)		Housekeepers (n=80)		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
There is a plan	0	0.0	1	4.5	2	2.7	4	5.7	0	0.0	0	0.0	--
There is a disaster committee	1	1.8	1	4.5	0	0.0	4	5.7	1	1.0	0	0.0	--
For effective Communication: there is:													
Notification system	7	12.5	1	4.5	3	4.1	9	12.9	0	0.0	0	0.0	--
Telecom system	19	33.9	22	100.0	67	91.8	67	95.7	53	53.5	15	18.8	<0.001*
There is a disaster control centre	3	5.4	1	4.5	4	5.5	8	11.4	0	0.0	1	1.3	--

(*) Statistically significant at p<0.05

(-- Test result not valid

Table (2): Awareness of various categories of the study subjects about hospital mitigation measures for internal fire and radiation accidents (n=400)

Preventive measures	Group												X ² test (p-value)
	Physicians (n=56)		Nurse Leaders (n=22)		Nurses (n=73)		Technicians (n=70)		Administrative employees (n=99)		Housekeepers (n=80)		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Internal fire: there is:													
No smoking rules	51	91.1	18	81.8	70	95.9	56	80.0	99	100.0	78	97.5	<0.001*
No heaters in departments	51	91.1	19	86.4	64	87.7	51	72.9	99	100.0	79	98.8	<0.001*
No smoking signs	52	92.9	20	90.9	67	91.8	56	80.0	99	100.0	79	98.8	<0.001*
Visitors checked for flammables	5	8.9	5	22.7	24	32.9	28	40.0	1	1.0	1	1.3	<0.001*
Precautions for electric fires	1	1.8	6	27.3	24	32.9	26	37.1	1	1.0	0	0.0	<0.001*
Grounding	1	1.8	5	22.7	21	28.8	13	18.6	29	29.3	11	13.8	<0.001*
An alarm	6	10.7	6	27.3	18	24.7	19	27.1	28	28.3	11	13.8	0.04*
Notification phone number	54	96.4	21	95.5	72	98.6	56	80.0	98	99.0	80	100.0	<0.001*
Fire extinguishers	53	94.6	20	90.9	71	97.3	57	81.4	99	100.0	80	100.0	<0.001*
Training on the use of fire extinguishers	7	13.2	3	15.0	16	22.5	14	24.6	7	7.1	1	1.3	<0.001*
Working sprinklers system	51	91.1	2	9.1	17	23.3	12	17.1	55	55.6	66	82.5	<0.001*
Radiation accidents: there is:													
Regular maintenance of mobile X- ray units	53	94.6	21	95.5	73	100.0	56	80.0	99	100.0	80	100.0	<0.001*
Maintenance of these units	52	98.1	18	85.7	67	91.8	51	91.1	99	100	80	100.0	<0.001*
Regulations for use of radioactive materials	48	85.7	13	59.1	49	67.1	38	54.3	51	51.5	47	58.8	0.001*
Warning signs	1	1.8	2	9.1	7	9.6	14	20.0	0	0.0	0	0.0	--
Guiding signs	0	0.0	2	9.1	6	8.2	12	17.1	1	1.0	0	0.0	--
Plans to deal with radiation accidents	1	1.8	1	4.5	5	6.8	15	21.4	0	0.0	0	0.0	--

(*) Statistically significant at p<0.05

(-- Test result not valid

Table (3): Awareness of various categories of the study subjects about hospital's mitigation and preparedness related to infection control , food poisoning outbreaks, gas explosion and earthquakes. (n=400)

Special disasters precautions	Group												X ² test (p-value)
	Physicians (n=56)		Nurse Leaders (n=22)		Nurses (n=73)		Technicians (n=70)		Administrative employees (n=99)		Housekeepers (n=80)		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Infection control													
There is an infection control program	52	92.9	21	95.5	72	98.6	58	82.9	98	99.0	80	100.0	<0.001*
With a person in charge	52	100.0	16	76.2	57	79.2	53	91.4	97	99.0	79	98.8	<0.001*
Regularly revised	52	100.0	16	76.2	58	80.6	47	81.0	98	100.0	80	100.0	<0.001*
With continuing training	6	10.7	12	54.5	41	56.2	41	58.6	28	28.3	9	11.3	<0.001*
With patient isolation	0	0.0	2	9.1	4	5.5	12	17.1	3	3.0	1	1.3	--
food poisoning outbreaks:													
There is a unit for food poisoning	1	1.8	0	0.0	4	5.5	10	14.3	3	3.0	0	0.0	--
There is a nearby poisons centre	52	92.9	18	81.8	65	89.0	55	78.6	97	98.0	80	100.0	<0.001*
There is a trained team	1	1.8	0	0.0	5	6.8	11	15.7	0	0.0	0	0.0	--
There are regulations for food poisoning prevention	3	5.4	5	22.7	13	17.8	16	22.9	29	29.3	10	12.5	0.005*
Gas explosion: there is:													
Written procedures	0	0.0	0	0.0	4	5.5	12	17.1	0	0.0	0	0.0	--
Maintenance of connections	6	10.7	5	22.7	12	16.4	16	22.9	3	3.0	1	1.3	<0.001*
Maintenance of equipment	1	1.8	7	31.8	10	13.7	14	20.0	2	2.0	0	0.0	<0.001*
Medical engineering department	53	94.6	19	86.4	66	90.4	55	78.6	97	98.0	79	98.8	<0.001*
Guiding signs	1	1.8	4	18.2	7	9.6	13	18.6	2	2.0	0	0.0	<0.001*
Earthquakes:													
Regulations to deal with	0	0.0	1	4.5	4	5.5	13	18.6	1	1.0	0	0.0	--

(*) Statistically significant at p<0.05

(-- Test result not valid

The same table demonstrates a number of statistically significant differences regarding awareness about hospital precautions related to food poisoning outbreak. It is obvious that technicians had the lowest percentages regarding the presence of a nearby poisons centre (78.6%). Meanwhile, the administration employees had the highest percentage of awareness about the presence of regulations for prevention of food poisoning (29.3%).

The same table illustrates the awareness of various categories of the study subjects about hospital mitigation and preparedness for gas explosion. Statistically significant differences were revealed among various categories in almost all items of gas explosion. It is noticed that nurse leaders, and technicians had the highest percentages related to maintenance of gas connections, maintenance of gas

equipment, and guiding signs. Conversely, they had the lowest percentages in relation to medical engineering department. At the same time the awareness about regulations to deal with earthquakes was low in all categories (86.4% & 78.6%) .

Table 4 shows awareness of various categories of the study subjects about hospital preparedness for internal disasters plan related to hospital environment, emergency, evacuation, and training. As regarding the hospital environment, the table indicates very low awareness levels about all items, except for the safe exits and entries, and the phone lines. Statistically significant differences were revealed between categories regarding their awareness about equipment for calling staff, special alarms for specific disasters, phone lines for all departments, and easy access for persons in charge.

Table (4): Awareness of various categories of the study subjects about hospital preparedness for internal disaster plan related to hospital environment, emergency, evacuation, and training (n=400)

Precautions	Group												X ² test (p-value)
	Physicians (n=56)		Nurse Leaders (n=22)		Nurses (n=73)		Technicians (n=70)		Administrative employees (n=99)		Housekeepers (n=80)		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Hospital environment:													
Easy opening/ closing of exits/ entries	54	96.4	21	95.5	69	94.5	64	91.4	98	99.0	80	100.0	0.052
Enough beds	1	1.8	0	0.0	0	0.0	12	17.1	0	0.0	0	0.0	--
Stock periodically revised	0	0.0	0	0.0	1	1.4	16	22.9	0	0.0	0	0.0	--
Equipment for calling staff	0	0.0	6	27.3	11	15.1	19	27.1	5	5.1	1	1.3	<0.001*
Special alarms for specific disasters	0	0.0	3	13.6	3	4.1	14	20.0	7	7.1	1	1.3	<0.001*
Phone lines in all depts.	52	92.9	15	68.2	57	78.1	57	81.4	95	96.0	79	98.8	<0.001*
Persons in charge have easy access	1	1.8	4	18.2	7	9.6	18	25.7	10	10.1	0	0.0	<0.001*
There is a plan for traffic	0	0.0	9	13.6	6	8.2	16	22.9	6	6.1	1	1.3	<0.001*
Emergency dept with:													
Special entrance	2	3.6	17	77.3	45	61.6	42	60.0	12	12.1	0	0.0	<0.001*
Special communication system	53	94.6	18	81.8	68	93.2	58	82.9	85	85.9	79	98.8	0.0049*
Mobile X ray units	0	0.0	7	31.8	14	19.2	25	35.7	8	8.1	1	1.3	<0.001*
Enough ambulances	0	0.0	3	13.6	7	9.6	16	22.9	8	8.1	1	1.3	<0.001*
Hospital evacuation: there is:													
A plan	0	0.0	5	22.7	10	13.7	21	30.0	8	8.1	1	1.3	<0.001*
A person is in charge	2	3.6	4	18.2	7	9.6	18	25.7	8	8.1	1	1.3	<0.001*
Special exits	55	98.2	22	100.0	73	100.0	66	94.3	96	97.0	80	100.0	0.11
Special lifts	5	8.9	13	59.1	44	60.3	56	80.0	15	15.2	4	5.0	<0.001*
Arrangement with other hospitals	34	60.7	12	54.5	45	61.6	42	60.0	44	44.4	61	76.3	0.002*
Training: there is:													
Drills	0	0.0	1	4.5	0	0.0	5	7.1	0	0.0	0	0.0	--
Training plan	0	0.0	0	0.0	2	2.7	7	10.0	2	2.0	0	0.0	--
A person is in charge for media	0	0.0	1	4.5	1	1.4	7	10.0	3	3.0	19	23.8	<0.001*

(*) Statistically significant at p<0.05

(--) Test result not valid

Table (5): Awareness of various categories of the study subjects about hospital preparedness related to water/electricity/gas supply and earthquakes (n=400)

Hospital preparedness for failure of power/ supplies	Group												X ² test (p-value)
	Physicians (n=56)		Nurse Leaders (n=22)		Nurses (n=73)		Technicians (n=70)		Administrative employees (n=99)		House-keepers (n=80)		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Water supply:													
More than 1 source	27	48.2	5	22.7	16	21.9	30	42.9	32	32.3	54	67.5	<0.001*
Plans for shutdown	5	8.9	3	13.6	11	15.1	16	22.9	1	1.0	6	7.5	<0.001*
Water tanks:	51	91.1	17	77.3	63	86.3	60	85.7	99	100.0	80	100.0	<0.001*
Electricity:													
More than 1 source	52	92.9	11	50.0	47	64.4	40	57.1	85	85.9	71	88.8	<0.001*
Contingency plans	0	0.0	2	9.1	5	6.8	14	20.0	0	0.0	0	0.0	--
Generators	54	96.4	22	100.0	69	94.5	47	67.1	99	100.0	79	98.8	<0.001*
There is a special source for disasters	0	0.0	3	21.4	6	12.5	13	31.0	0	0.0	0	0.0	--
Gas supply:													
More than 1 source	47	83.9	12	54.5	55	75.3	54	77.1	83	83.8	75	93.8	0.001*
Regulations to ensure supply	1	1.8	2	9.1	7	9.6	15	21.4	0	0.0	0	0.0	--
Procedures in case of shortage	0	0.0	2	9.1	9	12.3	14	20.0	0	0.0	0	0.0	--
Contingency sources	35	62.5	8	36.4	24	32.9	36	51.4	60	60.6	42	52.5	0.003*

(*) Statistically significant at p<0.05

(--) Test result not valid

4. Discussion:

A disaster management plan is an agreed set of arrangements for preparing for, responding to, and recovering from emergencies and involves the description of responsibilities, management structures, strategies, and resource and information management. Disaster planning is about protecting life, property, and the environment (Keine and Rhyne, 2001). The present study was aimed at assessing the awareness of health team members regarding hospital's internal disaster management plan. The study was conducted in all the departments of a University Hospital and included all categories of staff.

For reasons of prudent stewardship, and because of the requirements of accreditation and licensure, hospitals must prepare for the possibility of disaster within the facility. The present study results revealed the absence of a disaster plan in the study setting. Also, the majority of various categories of the study subjects had low awareness about all items of a disaster plan. In an explanation of this lack of disaster plan, Milsten (2000) clarified that healthcare professionals have long been aware that they should make preparations for external disasters causing a surge in the number of patients. They have been less inclined to confront the possibility that disruption may occur within the facility itself and undermine their ability to provide care. Yet, these internal

disasters appear to be more common events in hospitals than are patient surges from external disasters.

Similar to the present study results regarding the low awareness of respondents of the disaster plan, O'Sullivan *et al.* (2008) indicated that studied nurses felt unprepared to respond to large scale disasters. Approximately 40% of them were unaware that their hospital has an emergency plan. Moreover, nurses reported inadequate access to resources to support disaster response capacity, and expressed a low degree of confidence in the preparedness of Canadian health care institutions for future outbreaks. Therefore, the authors recommended that more training and information were needed to enhance preparedness for frontline health care workers, and of important members of the response community. The lack of awareness about the disaster plan, and its related items is quite alarming. The shortage in the required local knowledge and capacity would lead to inability to manage disasters even if there is a written plan. In this respect, Russ (2005) emphasized that knowledge management has not been at the core of the healthcare business model despite healthcare being a knowledge-intensive business. Meanwhile, very early, Auf der Heide (1989) referred to the "paper-plan syndrome", the belief that disaster preparedness can be achieved simply through the filing of a written plan, and strongly cautioned that

such plans prove more useful in practice when they are relied upon not as documents to be suddenly consulted in an emergency, but as forms of training complemented with additional forms of preparedness.

As regards hospital prevention measures for internal fire, the present study findings showed that the presence of preventive measures for internal fire concerning no smoking rules and signs, fire extinguishers in working condition, but no training of staff in their use. This area of internal disasters has been shown to be the most expected. Therefore, preventive measures are of utmost importance. This might explain the good awareness of respondents about it. The findings are in agreement with Mostafa (2003) who pointed to a high awareness about the presence of safety precautions as no smoking regulations implemented by security. Moreover, the great majority of them were aware about the lack of tests and practical training on fire extinguishers, as well as the lack of training of newly nurses.

Concerning hospital preventive measures for radiation accidents, the present study results showed wide differences among various categories in almost all items. Nurse leaders had the lowest percentages in relation to maintenance of mobile X ray units, whereas physicians had the highest percentages related to regulations for use of radioactive materials. However, there were no plans to deal with such accidents as radiation, gas explosion, or earthquakes. In congruence with this, Mostafa (2003) reported that half of the studied nurses were aware about the daily maintenance to avoid explosions. In this regard, Michael (2003) emphasized that prearranging for fire or explosion allows the nursing to respond quickly to the victims, and triage and evacuation when needed.

According to the results of the present study, the study setting had an infection control program that is regularly revised, with a person in charge. However, continuing training was deficient, and there were no patient isolation techniques. In the same respect, Rebmann *et al.* (2008) emphasized that infection control professionals' role in disaster preparedness and response is essential, even in non-infectious disease emergencies. Meanwhile, Hui *et al.* (2007) mentioned that infectious diseases do not respect hospitals' classification system. Therefore, a minimum preparedness requirement, e.g., emergency plan, staff, beds, drugs, and equipment for infectious diseases of public health significance should be applied to all types of hospitals.

Although the university hospitals including a poisons centre the awareness of most categories of the health team about food poisoning is very low. They reported that there is no regulation for food poisoning prevention. In addition to absence of trained team to deal with. These results could be

explained by that, managers of all university hospitals are depending on the presence of a nearby poisons centre and that its team is efficient to deal with such incidents that lead to low level of hospital preparedness in all items related to food poisoning

Concerning hospital preparedness for internal disasters related to hospital environment, the present study revealed low levels of preparedness and of awareness about all items, except for the safe exits and entries, and the phone lines. Nurses and nurse leaders had generally better responses, while housekeepers were more aware about phone lines in all departments. The findings are quite unexpected given the size and status of the study setting, which is a large university hospital. In this regard, Rebmann *et al.* (2008) claimed that smaller sized hospitals were less prepared than larger facilities for internal disaster. Smaller sized hospitals were also less likely than larger facilities to have surge capacity in terms of laboratory, negative-pressure rooms, staff, or medical equipment (ventilators, surgical masks, and medication). These differences in infectious disease disaster planning most likely relate to an inequitable distribution of resources within communities, with larger facilities having more resources than smaller hospitals.

In the same vein, Masoud (2003) claimed that safety in hospital environment could only be achieved through complex coordination of efforts, integration of a wide range of scientific systems and ergonomic factors, as well as well planned process of feasibility study through medical planning design, construction, outfitting, operating, and maintaining the facility, and staffing it with trained doctors and nurses. Additionally, Mohamed and Zakaria (2003) reported that safety and welfare of patients and all employees working in the hospitals were the primary concern of all medical team, hospitals environment needed more attention to prevent accidents, reducing injuries errors and increasing organizational function. The present study findings demonstrated the absence of a notification system for disasters. Conversely, a special communication system was present in the emergency department and recognized by all categories of respondents. The findings highlight a major deficiency in communication, which is the backbone of a disaster plan. Without efficient communication, nothing could be done in disaster management. In this regard, Kaji *et al.* (2008) emphasized the role of effective communication, and mentioned that a more comprehensive approach that reflects both communication and teamwork behaviors, as well as a quantitative assessment of surge capacity, supplies, and equipment might be required for disaster management. In this same respect, Reddya *et al.* (2008) stressed that some of

the major challenges associated with team coordination during crisis management included information mismanagement, resource allocation issues, and ineffective communication.

The present study findings point to a major problem, which is the lack of a hospital evacuation plan. The only available items were those related to exits. Generally, nurse leaders, nurses, and housekeepers had the highest percentages of awareness. The findings are in congruence with Gretenkort *et al.* (2002) reported that although every hospital needs a security plan for the support of immobile patients who do not possess autonomous escape capabilities, little information exists to assist in the development of practical patient evacuation methods. The authors concluded that experiences from a hospital during an evacuation exercise should provide decision criteria for changes in the disaster preparedness plan.

Concerning arrangement with other nearby hospitals, there was some availability of such arrangement according to the present study respondents. These items of the plan are very important for efficient use of available and potential resources. The findings are in agreement with Kaji and Lewis (2006) who did a survey study for disaster preparedness among a cohort of hospitals in Los Angeles County. The results showed that about one-fourth of the hospitals had mutual aid agreements with other hospitals or long-term care facilities. The authors concluded that among hospitals in Los Angeles County, disaster preparedness and surge capacity appear to be limited by a failure to fully integrate interagency training and planning, although there is a generally high level of availability of equipment and supplies.

The results of the current study also revealed lack of hospital preparedness for internal disasters related to hospital drills, and training. These findings indicate a major shortcoming in the study setting preparedness for disaster. In this regard, Adini *et al.* (2006) mentioned that emergency preparedness can be defined by the preparedness pyramid, which identifies planning, infrastructure, knowledge and capabilities, and training as the major components of maintaining a high level of preparedness. This necessitates integrating knowledge through drills.

In congruence with these present study findings, Mostafa (2003) indicated that nurses were aware about the absence of training programs. Meanwhile, Sanders (2000) emphasized that training was obviously essential for all medical personnel, including participation in realistic drills for potential natural and manmade disasters. In any health care settings, basic medical procedures do not change

frequently, although some may be simplified or omitted in large-scale disasters.

The present study results demonstrated the presence of more than one source for power and gas supply, and to some extent for water, to be used in case of failure. Also, most respondents were aware of these sources. Nevertheless, no contingency plan was found. The consequences of power failure without contingency plans or secondary sources could be serious. In this regard, Sternberg (2003) indicated that a power outage combined with failure of the back-up generator is a particularly notorious cause of cascading failures. These present study findings are in agreement with Kai *et al.* (1994) in Japan, where 78% of the studied hospitals were found to have independent electric power generating plants. Additionally, 71% of these hospitals had reserve water supply, and 83% of them reported that it would be impossible to provide meals for patients and staff with no main gas supply. Additionally, Yamauchi *et al.* (1996) reported that only 31.7% of surveyed hospitals in Japan had manuals for power outages.

5. Conclusion and Recommendations:

On the basis of the study findings, it is concluded that there is a major deficiency in the hospital health team members' awareness regarding internal disasters and related disaster management plan. This was noticed in all categories including nursing, medical, paramedical, and auxiliaries. Therefore, hospital administration should develop policies for disaster management and pay more attention to the problem of internal disasters and preparedness for their management. Training programs are essential for all categories of the health team in order to increase their awareness about disaster management. Drills should be done regularly, with full participation of all hospital staff in order to be ready for managing any internal disasters. The designed checklist should be applied in the study setting in order to assess preparedness for disaster management, and this should be done periodically to monitor any changes, whether positive or negative, in order to take appropriate action.

Implications of the Study

This study findings help in identification of the gaps in awareness of the health team about internal disaster management and the related hospital plan. Based on the results, plans to fill these gaps and to improve staff knowledge could be developed and implemented. Additionally, the results can help decision makers and hospital administration to improve the hospital internal disaster management plan, which would lead to mitigation of losses of resources and save many lives.

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