

## **Effect of Educational Program on Nurses` Knowledge and Awareness of Internal Disaster Management**

**By**

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### **Abstract**

Effective disaster management requires an adequate supply of qualified and competent staff. This can be achieved through appropriate training and education of the healthcare workers in order to impart the necessary competencies required for responding to disasters. **The aim** of this study was to determine the effect of educational program on nurses` knowledge and awareness of internal disaster management. The study was conducted at Al Mabara of Tanta city. That was brought staff nurses from different hospitals at Al Ghrebria Governate using a quasi-experimental design. **Sample** of the study included 36 staff nurse. **Two tools** were used, knowledge questionnaire sheet for assessing subjects` knowledge about internal disaster management and, attributes of hospital disaster management questionnaire for assessing their awareness. **The results** showed a statistical significant improvement ( $P \leq 0.05$ ) was found in nurses' level of knowledge and awareness about internal disaster management on post program. Pre program, majority did not know the content of the hospital disaster management plan, also, minor percent of nurses had good knowledge grades on hospital disaster plan, internal disaster's types, causes, dimensions and phases, concepts, this percent was improved post program. Regarding their awareness, more than half was aware that planning and information, and more than one third not aware that the team work and leadership skills have a role in disaster management this awareness was changed post program. It concluded that pre program nurses' knowledge and awareness about internal disasters and related disaster management plan was generally poor and it significantly improved post program. Therefore, it is **recommended that** periodical testing of nurses` knowledge and performance of disaster management plan is essential to identify their training needs. Conducting of simulation exercises should be done regularly, with full participation of all hospital staff in order to be ready for managing any internal disasters

**Key words:** educational program, internal disaster, disaster management plan

### **Introduction:**

Nurses are the largest healthcare workgroup in most countries and are at the forefront of the healthcare response to disasters. From the work of Florence Nightingale in the Crimean War, nurses historically are linked to the

provision of care during crises. The goal of nursing during disaster is ensuring that the highest achievable level of care is delivered through identifying, advocating, and caring for all impacted populations throughout all phases of a disaster event, including active participation

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in all levels of hospitals disaster planning and preparedness<sup>(1)</sup>. Hospitals constitute the most important centers which accept people during disasters. Hospitals have sophisticated organizations due to their direct contact with human health and diseases; therefore the level of service quality in such organizations is of utmost importance<sup>(2,3)</sup>. A healthcare disaster is defined as a precipitous or gradual decline in the overall health status of a community with which it is unable to cope with adequately without outside assistance<sup>(4)</sup>. Healthcare disasters involve a failure of the normal provision of healthcare. This may be caused by direct damage to healthcare facilities or by the large influx of patients during a disaster that overwhelms the existing healthcare services and requires outside assistance<sup>(1)</sup>.

**Rassin et al. (2007)**<sup>(5)</sup> defines a disaster as an event that causes damage to people's lives, health and or property to an extent that they have no ability to cope, while **Gebhart and Pence (2007)**<sup>(6)</sup> simply define it as an event in which response capabilities are overwhelmed. It 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<sup>(7)</sup>. These two types of disasters are independent, but not mutually exclusive. Internal disasters are isolated to the hospitals and occur more frequently than do external disasters<sup>(8)</sup>. A disaster is unpredictable events that kill and affect people, demolish properties and disrupt environment<sup>(9)</sup>. The unpredictable occurrence of disasters consequently makes it uncontrollable and inevitable. Further, its devastating impact on human life and properties necessitates man's preventive and collaborative efforts to manage greater damages as it occurs<sup>(10)</sup>.

Disaster Management is the range of activities designed to maintain the control over disaster and emergency situations and to provide a framework for helping persons at risk to avoid or to recover from the impact of disaster. Disaster management deals with the situation that occurs prior to, during and after a disaster occurs<sup>(11)</sup>. It aims to shift the threshold at which an impact becomes a disaster. This is achieved through two main methods: decreasing the amount of damage an impact can cause and; increasing the capability of the hospital's coping resources to deal with any damage that does occur<sup>(12)</sup>.

Disaster management is a cyclical process; the end of one

phase is the beginning of another, although one phase of the cycle does not necessarily have to be completed in order for the next to take place. Timely decision making during each phase results in greater preparedness, better warnings, reduced vulnerability and/or the prevention of future disasters. The complete disaster management cycle includes the shaping of public policies and plans that either addresses the causes of disasters or mitigates their effects on people, property, and infrastructure. The mitigation and preparedness phases occur as improvements are made in anticipation of an event. As the event unfolds, disaster managers become involved in the immediate response and long-term recovery phase<sup>(13)</sup>.

Disaster management includes four phases: mitigation, preparedness, response and recovery<sup>(14)</sup>. Mitigation includes any activity taken to prevent the occurrence of the disaster whenever possible<sup>(15)</sup>. Preparedness is defined as activities and measures taken in advance of an event to ensure effective response to the impact of hazards<sup>(16)</sup>. Response phase is the point at which actions are started to save lives, property, and the environment and to prevent secondary harm<sup>(17)</sup>. During the recovery phase efforts are started to restore the community to normal<sup>(18)</sup>. Ideally, the affected area

should be put in a condition equal to or better than it was before the disaster took place. Response and recovery alone, however, are not an effective means of managing disasters if they are performed in the absence of a comprehensive regimen of preparedness and mitigation activities<sup>(19)</sup>.

Disaster management by nature is an interdisciplinary, collaborative team effort<sup>(20)</sup>. 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<sup>(21,22)</sup>.

A disaster 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 with a view of protecting life, property and the environment<sup>(23)</sup>. An effective hospital disaster plan should have activities aimed at mitigation, preparedness, response and recovery. The hospital emergency preparedness planning process is divided into three phases: pre-disaster phase; disaster phase; post disaster phase. This will ensure that all aspects of the disaster

continuum are included in the plan<sup>(24)</sup>.

The first step in writing the disaster plan is to form a hospital disaster/ emergency committee. This committee should contain representatives from the various departments of the hospital. The committee's task is to write a disaster plan and make sure that all staff members are familiar with the plan. It is not enough to develop policy, assess vulnerability, and write disaster plans without training and educating not only the personnel involved in responding to disasters, but also communities affected by disasters. After planning for emergencies, training and education is prioritized<sup>(25)</sup>.

The importance of disaster training and education in the health sector has given rise to the discipline of disaster medicine, which has come about as a result the "marriage between emergency medicine and disaster management"<sup>(18)</sup>. Effective disaster response requires an adequate supply of qualified and competent staff. This can be achieved through appropriate training and education of the healthcare workers in order to impart the necessary competencies required for responding to disasters. Competencies can be defined as knowledge, skills, abilities, and behaviors needed to carry out a job<sup>(26)</sup>. Although training and

education is an important part of the disaster/ emergency preparedness process, there have been concerns on the lack of an evidence base and standardization of teaching practices<sup>(26,27)</sup>.

Training personnel to cope with disasters can reduce the time of responding to the events and increase the survival of the afflicted people by far. In the complicated world we are living now, education is of great importance. Education is the base of learning. Training personnel and nurturing humanistic potentials have long and rich precedent. It includes activities conducted to enhance the level of qualifications and increase knowledge. It also creates awareness and skill for offering better clinical services<sup>(28)</sup>.

Considering the increasing population density and escalating development in disaster-prone areas, the potential of disasters to impact health care is growing. For this reason, healthcare workers need knowledge, skills, and abilities to manage situations whereby there are multiple casualties during emergencies and disasters<sup>(25)</sup>. Yet, nurses comprise the highest percent of health and medical workforce. So, they should be qualified and skillful and can cover a wide range of roles in preparedness necessary for disaster/emergency situations. Nurses also need to have the basic

knowledge and skills to employ an effective approach to respond to critical situations<sup>(9)</sup>. Thus, the aim of this study is to determine the effect of educational program on nurses' knowledge and awareness of internal disaster management.

**Study aim**

The aim of this study is to determine the effect of an educational program on nurses' knowledge and awareness of internal disaster management through:

Design, implement and evaluate an educational program on internal disaster management.

**Research questions**

What is the effect of educational program on nurses' knowledge and awareness about internal disaster management?

**Subject and Methods**

**Material:**

**Study design**

Quasi-experimental design was used.

**Setting:**

The study was conducted at Al Mabara of Tanta city. That was brought staff nurses from different hospitals in El-Gharbia Governate.

**Subjects:**

The present study included all staff nurses (N=36) whose attending two training session held by the hospitals' training management in the above mentioned setting and willing to participate in the study.

**Tools of the study:**

To achieve the aim of the present study two tools were used.

**Tool one: Knowledge**

**Questionnaire Sheet**

This tool was designed to collect data from staff nurses for the purpose of assessing their knowledge about internal disaster management. The questions were constructed in either the form of true & false, multiple choices, match, or complete. The tool was developed by the researcher after reviewing of related literatures<sup>(8,13,24)</sup>. The tool consisted of two parts as follows;

**Part one**

The first part for data pertaining to the staff nurses' data such as age, years of experience, qualification, and three questions about if they had a plan / program for disaster management – if there anyone responsible for the plan- and do you know the content of hospital disaster management plan?

**Part two**

The second part of the tool contained (50) questions grouped under five headings as follow:

1. Internal Disaster Concepts (5 questions)
2. Internal disaster types, causes, dimensions and, phases (10 questions).
3. Internal disaster management (definition- importance- principles- and team) ( 15 questions)

4. Internal disaster management phases (mitigation – preparedness – response - and recovery) ( 15 questions)
5. Hospital disaster plan (definition- principles – characteristics – purposes - and disaster planning committee) ( 5 questions)

#### **Scoring**

The questions were scored by one for each correct answer and zero for incorrect answer. The total score was 50 grades. Scoring represent varying levels of nurses` knowledge ranging from good  $\geq 75$ , fair  $>60-74$ , and poor  $\leq 60$  points.

#### **Tool two: Attributes of Hospital Disaster Management Scale**

This tool was developed by Eslim (2007)<sup>(29)</sup> and used to assess staff nurses` awareness regarding hospital disaster management attributes. The tool consisted of 53 items, divided into five fields as follow;

- Information field and its role in disaster management (13 items)
- Communications system and its role in disaster management (10 items)
- Leadership skills and its role in disaster management (10 items)
- Establishing team work and its role in disaster management (10 items)

- Planning field and its role in disaster management (10 items)

#### **Scoring**

Participants rated the items on a 5-Point Scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Total responses range from 53 to 265 with higher scores indicating stronger positive awareness.

#### **Methods**

1. Official permission was obtained from the authoritative personnel to conduct the study before starting.
2. After review of recent literature in the study field, tools of the study were developed in Arabic Language.

#### **Validity and reliability:**

3. Pilot study was done before starting data collection to test the clarity of the questions. It was done on 5 % of nurses at Al-Mabara hospital at Tanta city. Subjects of pilot study were excluded from the study sample. Reliability of the tools was tested by using Cronbach coefficient Alpha test, tool (1) 0.724, tool (2) ranged from 0.620 to 0.868. Content validity of the tool was performed by seven experts in the field of administration, and community nursing, based on the experts responses and pilot testing the questionnaire was adjusted and finalized.

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**Field work:**

Construction of Educational program

The program was developed through four phases as follow;

**1- Assessment phase:** the first step in constructing this program was the statement of the instructional objectives. These objectives were derived from the assessed need. Pre-test was used to specify the staff nurses baseline of knowledge and awareness about internal disaster management. Data was collected by using a written exam method. The researcher distributed the questionnaire and collected it after 20 minutes. The researcher was present during collection of data for any needed guidance and clarification. The questionnaire collected immediately after filled.

**2- Planning phase:** after determining the objectives of the program, the content and methods of teaching was selected after careful study of the participants need. The subject materials were organized according to the priority of the need. The selection of teaching methods was carried out according to the subjects and the educational principle. The methods used were lecture and visual aids. Teaching aids used to help for

the attainment of the objectives were handouts, pen and paper and data show projector.

**3- Implementation phase:** an educational program about internal disaster management has implemented for the study subjects. The duration of the program was two days, one session every day, three hours for each session. The program was implemented two times for two training session held by the hospitals' training management, every session was consisted of 18 participants. Data were collected during the period from April to June, 2011.

**4- Evaluation phase:** by the end of the program, data on nurses' knowledge and awareness were collected as pre program (immediate post-test). The evaluation was planned to determine the extent to which they have acquired knowledge and awareness. Evaluation sheets were included

- Pre & post-test questionnaire sheet about internal disaster management knowledge (tool one).
- Pre & post-test attributes of hospital disaster management scale (tool two)

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**Ethical considerations**

- The research was approved by the Insurance of Health Administrators Hospital.
- The purpose of the research was explained to the participants, and oral informed consent was obtained prior to the issuing of questionnaires.
- All the information gathered from the respondents was kept confidential, and their names did not appear on the questionnaires.
- Participation in the study was voluntary and that was explained to the participants.

**Statistical analysis:**

The collected data was organized, tabulated, and statistically analyzed using Microsoft Excel and Statistical Package for the Social Sciences (SPSS) version 16. For quantitative data the range, mean, and standard deviation were used. The difference between two means was statistically analyzed using the student paired (t) test. For qualitative data the number and percent distribution was calculated. Chi square was used as a test of significant. Significant was at  $p < 0.05$  for interpretation of results of tests of significant. Spearman's test was used to test correlation.

**Results**

Subject's characteristics data for the sample is presented in **Table (1)**, along with nursing

staff's characteristics data there is three questions about presence of plan, responsible person, and if there know the content of the disaster management plan. The majority of participants indicated they were between 21-30 years old (61.1%,  $n = 22$ ), the subjects' age were ranged from 20-39 with mean and standard deviation  $28.556 \pm 6.478$ . High percent (44.4%) of subjects had 6-10 years of experience, the mean number of years of experience of all nursing staff was 9.778 years ( $SD = 5.802$ ). Nurses with diploma degree represented 77.8% ( $n = 28$ ) while, only 8.3% ( $n = 3$ ) represented nurses with bachelor degree. Most (72.2% and 61.1%) of nursing staff reported that they had a plan and responsible person about disaster management, on the other hand majority (88.9%) did not know the content of the hospital disaster management plan.

**Table (2)** shows percentages of nurses' knowledge grads about internal disaster management pre & post the educational program. It was observed that there is a significant difference of nurses' knowledge grades pre and post the program (significant  $p \leq 0.05$ ). Majority of nurses (91.7%) at pre program had poor grads in the total knowledge grades while, post program most (77.8%) nurses' total knowledge grades was good and none of them was poor. Pre

program shows that the highest percent (83.3%) of poor nurses' knowledge grade was reported for internal disaster management, followed by internal disaster types, causes, dimensions and phases (80.6%). On the other hand, the highest percentage (13.9%) of good nurses' knowledge grades was reported for hospital disaster plan, followed by equal percent (8.3%) for internal disaster types, causes, dimensions and phases, and disaster concepts respectively, this percent was improved post program and reached 91.7%, 83.3% and 69.4%, respectively.

**Table (3)** shows nurses' mean score and standard deviation of knowledge grades on internal disaster management pre & post the educational program. There is a significant differences on nurses' knowledge mean score pre and post program (significant  $p \leq 0.05$ ). The total nurses' mean knowledge score pre program was 21.583 (SD=4.017) with mean percent 43.2% which changed to 40.25 (SD=4.285) post program with mean percent 80.5%. Pre program, the highest mean percent (47.2%) was for nurses knowledge grades on hospital disaster plan with mean score 2.361 (SD= 1.018), followed by mean percent 45.4% for disaster management phases with mean score 6.056 (SD = 2.137). At post program, there is a significant improvement at  $p \leq 0.05$ ; the

highest mean percent (91.7%, 81.9% & 81.7%) was for hospital disaster plan, internal disaster types, causes, dimensions and phases, and disaster concepts, respectively.

**Table (4)** illustrates number and percentage of nurses according to their levels of awareness regarding the attributes of hospital disaster management pre & post the educational program. As shown, that there is a statistical significant difference on nurses' awareness regarding the attributes of hospital disaster management pre and post program (significant  $p \leq 0.05$ ). Pre program, more than half (61.1% and 55.5%) of nurses agree that planning and information have a role in disaster management, respectively. While, 47.2% and 41.7% of them disagree that the team work and leadership skills have a role in disaster management, respectively. But post program, the nurses' awareness was changed as evidenced by equal percent (97.2%) of nurses were agree that information and communication system have a role in disaster management, and majority ( 88.9%, 86.1% and 80.6%) of them agree that planning, team work and leadership skills have a role in disaster management, respectively.

As shown in **table (5)** pre program the highest nurse's mean average (3.737) was for the role of planning in disaster management,

followed by the role of information (3.50). On the other hand, the lowest mean average (2.850 and 2.961) was for the role of team work and the role of leadership in disaster management, respectively. Post program, this awareness was changed as evidenced by the highest nurses' mean average (4.533) was for the role of information followed by the role of communication system in disaster management (4.438). Also, the rank of the attributes was changed from pre program to post program as obvious in the table, pre program, the planning role took the first rank followed by information, communication system, and the last rank was for team work role, while,

post program the first rank was for the information role followed by communication, and planning and the last rank was for leadership skills role.

**Table (6)** presents correlation between nurses' knowledge mean score and attributes of disaster management pre and post program. Pre program, there is only a statistical significant correlation ( $P \leq 0.05$ ) between nurses' total knowledge on internal disaster management and their awareness on the role of planning in disaster management. Post program, a statistical significant correlation ( $P \leq 0.05$ ) was found between nurses' total knowledge and all attributes of disaster management.

**Table (1):** Subjects characteristics

<b>Dimensions</b>	<b>No ( N=36)</b>	<b>%</b>
<b>Age in years</b>		
• 21-30	22	61.1%
• 31-40	14	38.9%
• 41-50	0	0.00%
Mean $\pm$ SD	28.556 $\pm$ 6.478	
Range	20-39	
<b>Years of experience</b>		
• Less than 5	6	16.7%
• 6-10	16	44.4%
• 11-15	4	11.1%
• More than 16	10	27.8%
Mean $\pm$ SD	9.778 $\pm$ 5.802	
Range	2-19	
<b>Educational Level</b>		
• Diploma degree	28	77.8%
• Associate degree	5	13.9%
• Bachelor degree	3	8.3%
<b>Do you have a plan for disaster management in your hospital?</b>		
• Yes	26	72.2%
• No	10	27.8%
<b>Do you know the content of hospital disaster management plan?</b>		
• Yes	4	11.1%
• No	32	88.9%
<b>Do you have a person who is responsible for disaster plan in your hospital?</b>		
• Yes	22	61.1%
• No	14	38.9%

**Table (2)** Percentages of nurses' knowledge grads about internal disaster management pre & post the educational program

Dimensions	Pre (N=36)			Post (N=36)			Chi-square	
	Poor	Fair	Good	Poor	Fair	Good	X <sup>2</sup>	P
	N %	N %	N %	N %	N %	N %		
1. Disaster concepts	27 75	6 16.7	3 8.3	2 5.6	9 25	25 69.4	24.08	0.000*
2. Internal disaster types, causes, dimensions and, phases	29 80.6	4 11.1	3 8.3	0 0.00	6 16.7	30 83.3	66.49	0.000*
3. Internal disaster management (Definition, importance, principles and, team)	30 83.3	5 13.9	1 2.8	6 16.7	7 19.4	23 63.9	82.74	0.000*
4. Disaster management phases	25 69.4	7 19.5	4 11.1	2 5.6	11 30.5	23 63.9	68.14	0.000*
5. Hospital disaster plan	23 63.9	8 22.2	5 13.9	0 0.00	3 8.3	33 91.7	65.80	0.000*
Total	33 91.7	3 8.3	0 0.00	0 0.00	8 22.2	28 77.8	90.33	0.000*

\* p ≤ 0.05

**Table (3)** Nurses' mean score and standard deviation of knowledge grades on internal disaster management pre & post the educational program

Dimensions	Questions No.	Pre (N=36)		Post (N=36)		Paired t test	
		Mean %	Mean ±SD	Mean %	Mean ±SD	t	p
1. Disaster concepts def.	5	38.3%	1.917±1.156	81.7%	4.083±0.967	-6.58	0.000*
2. Internal disaster types, causes, dimensions and, phases	10	44.4%	4.444±1.843	81.9%	8.194±1.305	-20.16	0.000*
3. Internal disaster management (definition, importance, principles and, team)	15	40.4%	6.056±2.137	75.7%	11.361±2.307	-6.584	0.000*
4. Disaster management phases	15	45.4%	6.806±2.494	80.2%	12.028±2.299	-20.04	0.000*
5. Hospital disaster plan	5	47.2%	2.361±1.018	91.7%	4.583±0.649	-12.31	0.000*
Total	50	43.2%	21.583±4.017	80.5%	40.25±4.285	-32.92	0.000*

\* p ≤ 0.05

**Table (4)** Number and percentage of nurses according to their level of awareness regarding the attributes of hospital disaster management pre & post the educational program

Dimensions	Pre ( N=36)			Post ( N=36)			Chi- square	
	Agree	Unsure	Dis agree	Agree	Unsure	Dis agree	r	p
	N %	N %	N %	N %	N %	N %		
1. The role of planning in disaster management	22 61.1%	6 16.7	8 22.2	32 88.9	1 2.8	3 8.3	22.34	0.000*
2. The role of information in disaster management	20 55.5%	6 16.7%	10 27.8%	35 97.2	0 0.00	1 2.8	15.46	0.000*
3. The role of communication system in disaster management	17 47.2%	7 19.4%	12 33.4%	35 97.2	0 0.00	1 2.8	24.52	0.000*
4. The role of team work in disaster management	13 36.1%	6 16.7%	17 47.2%	31 86.1	1 2.8	4 11.1	34.66	0.000*
5. The role of leadership skills in disaster management	12 33.3%	9 25%	15 41.7%	29 80.6	4 11.1	3 8.3	29.28	0.000*

\* p < 0.05

**Table (5)** Nurses' mean average, mean percent of awareness and rank of the attributes of disaster management pre & post the educational program

Attributes of disaster management	Pre ( N=36)			Post ( N=36)			Paired t test	
	Mean Average	Mean %	Rank	Average Mean	Mean %	Rank	t	p
1. The role of planning in disaster management	3.737	74.7	1	4.286	85.6	3	10.243	0.000*
2. The role of information in disaster management	3.50	69.8	2	4.533	90.6	1	28.590	0.000*
3. The role of communication system in disaster management	3.322	68.3	3	4.438	88.7	2	27.796	0.000*
4. The role of team work in disaster management	2.850	56.8	5	4.125	82.3	4	20.729	0.000*
5. The role of leadership skills in disaster management	2.961	60.1	4	3.486	80.1	5	19.031	0.000*

\* p < 0.05

**Table (6)** Correlation between nurses' knowledge mean score and attributes of disaster management pre and post educational program

Attributes of disaster management	Total nurses' knowledge mean score			
	Pre ( N=36)		Post( N=36)	
	r	p	r	p
1. The role of planning in disaster management	0.922	0002*	0.269	0.002*
2. The role of information in disaster management	0.131	0.623	0.652	0.001*
3. The role of communication system in disaster management	0.052	0.741	0.578	0.005*
4. The role of team work in disaster management	0.016	0.882	0.333	0.005*
5. The role of leadership skills in disaster management	0.196	0.451	7.625	0.000*

\* p < 0.05

### Discussion:

Disaster management is skillful handling of crisis, danger or an unexpected situation demanding instant action which can be handled under a controlled situation in case of a juncture. It is a cycle of activities beginning with planning the disaster management plan, mitigating the vulnerability and negative impacts of disasters, preparedness in responding to operations, responding and providing relief in emergency situations such as search and rescue, etc<sup>(30)</sup>.

The current study results revealed that most nurses reported that they had a plan and responsible person about disaster management. On the other hand, majority of them did not know the content of the hospital disaster management plan **Table (1)**. Along with line **Chimenya (2011)** found that most

of the respondents (63.7%) did not know whether their hospital had a disaster plan or not. And of those who had indicated that the hospital had a disaster plan, 82.4 % of them indicated that they were not familiar with the contents of the plan, while 17.6 % indicated that they were familiar with the content<sup>(25)</sup>.

Similarly, **Abd elazeem Et al., (2011)** revealed the absence of a disaster plan in the study setting<sup>(31)</sup>. 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<sup>(32)</sup>.

Analysis of the results revealed that the majority of nurses at pre program had poor grades in the total knowledge on internal disaster management while, post program most nurses total knowledge grades was good and none of them was poor, with a significant ( $p \leq 0.05$ ) difference of nurses' knowledge grades pre and post the program, **Table (2)**. This result may be due to lack of disaster courses in their curriculums at graduation level and an inadequate emphasis on disaster nursing in undergraduate nursing training. Therefore, cited finding indicates the significance of continuing education on the nurses' knowledge during disaster situations, which implies the need for nurses' participation in trainings and seminars for professional growth and development.

In support to the cited finding and implication, **Slepski, (2007)** cited that basic competency training is essential and systems need to be in place to provide just-in-time training for particular, less common scenarios or problems, given the specifics of the event<sup>(26)</sup>. Further, **Bruley (2008)** stated that continuous integration, coordination, and training of all community members are the keys to the reduction of injury and death

in any disaster and the nurse can play a crucial role in providing for the physical and emotional needs of a given population over an extended period of time<sup>(33)</sup>. Along this line, **Piercey (2002)** averred the significance of training and continuing education in the nurses' further acquisition of professional competencies. As professionals who solve problem for service in their particular discipline, nurses should continue striving for professional growth and development through enhancement of technical or specialized knowledge and skills<sup>(34)</sup>.

Pre program the study results showed that the highest percent of poor nurses' knowledge grade was reported for internal disaster management, followed by internal disaster types, causes, dimensions and phases. On the other hand, minor percent of them had good knowledge grades reported for hospital disaster plan, followed by internal disaster types, causes, dimensions and phases, and disaster concepts respectively, this percent was improved post program **Table (2)**. This result may be due to that those nurses did not know the content of hospital disaster management plan (**Table 1**). These results reflected the importance for appropriate and adequate training and education of healthcare workers, as they are the first contact with patients during

disasters. They can do this during training or orientation programs, or by offering refresher courses on disaster management.

Along with this study results, **Sandmann (2009)** found that no participant scored all items correctly (100%) or all items incorrectly (0%) about emergency and disaster preparedness, he stated that only 33.3% (n=17) of nurses surveyed had knowledge about disaster preparedness<sup>(35)</sup>. On the other hand, **Moabi, (2008)** found that the participants in her study were quite knowledgeable about what a disaster is, what disaster plan is, where to find the plans, what disaster preparedness, what drills are and what their functions during drills are<sup>(8)</sup>.

Management of disasters requires efficient and effective techniques and strategies<sup>(10)</sup>. As cited by **Landesman (2006)** nurses during disasters are organized according to specific functions and professional qualifications. Systematic procedures are necessarily followed to avoid overlapping of functions and responsibilities. thus, the process of organizing groups of nurses also requires evaluation of nurses' professional qualities, working experience, area of specialization and other matters deemed essential in managing nurses and organizing varied activities<sup>(36)</sup>.

Pre program, the study results illustrated that the highest mean percent (nearly one half) of nurses' knowledge grades was for hospital disaster plan, followed by disaster management phases. At post program, there is a significant improvement at  $p \leq 0.05$  the highest mean percent was for hospital disaster plan, internal disaster types, causes, dimensions and phases, and disaster concepts, **Table (3)**. The low scores of nurses regarding hospital disaster plan and management phases indicate that training for care nurses may be indicated. This education must be comprehensive and include not only basic classes reviewing disaster content, but application of knowledge, planning, and disaster management phases. Along with, **Chimenya (2011)** revealed that majority (91.7%) of participants indicated that healthcare workers needed training and education on how to manage emergencies and disasters<sup>(25)</sup>.

This implication suggest that there may be a need for consistent training in different types of disaster scenarios with hospital emergency planning in order for nurses to feel more confident in their abilities to respond to an actual event. **Wynd (2006); Gebbie&Qureshi (2002)** cited that nurses have been involved in disaster preparedness and response

for as long as nursing has existed. However, it has been acknowledged that nursing knowledge and competencies related to mass casualties should be defined, so that all can be assured that nurses know what they are doing during a catastrophic event<sup>(37,38)</sup>. As a whole, preventing, preparing for, responding to, and recovering from disasters and emergencies has become a priority role not only for nurses but for everyone as well<sup>(10)</sup>.

Recent world events have increased awareness about the limits of the response capabilities to meet the challenge of disasters and of the emergency need to prepare for catastrophic events. The approach to preparing for and dealing with major incidents has had to be rethought<sup>(39)</sup>. **The Mattox (2001)** provides new information, and points out new threats, new information systems, new communication opportunities and new detection methodologies<sup>(40)</sup>. **Sandmann (2009)** also, stated that over the past 10 years many devastating events have brought increased awareness about disaster and emergency preparedness. Nurses should hold themselves accountable and make sure that they know the policies that specifically affect them regarding this topic<sup>(35)</sup>.

The present study results illustrated that there is a significant

difference on nurses' awareness regarding the attributes of disaster management pre and post program (significant  $p \leq 0.05$ ), **Table (4)**. Ronald & Michael, (2003) averred that there is a general lack of awareness of the literature on planning for disasters on the part of elected officials, policy actors and law enforcement officials who direct much of the plan construction<sup>(41)</sup>. This could be indicated that there was lack provision of in-services refreshing education or training opportunities that expand the staff knowledge, skills and change their awareness. Education is the base of learning. Training personnel and nurturing humanistic potentials have long and rich precedent. It includes activities conducted to enhance the level of qualifications and increase knowledge. It also creates awareness and skill for offering better clinical services<sup>(42)</sup>.

Constant with this result, **Baack (2011)** found that out of the approximately 25% that answered the question, 70% stated that more education regarding disaster management was needed. These responses for education varied in education type and included mock-drills, classroom education, continued review, on-site practice, more consistent education, emotional preparation, and requirement of annual competencies, and incorporation of

disaster preparedness education in nursing schools<sup>(43)</sup>.

Also, **Baack (2011)** indicated that most nurses reported a perception of low to average competence in responding to a major disaster event and were not very familiar<sup>(43)</sup>. Most scores were consistently below the mid-point; these findings are consistent with nursing research literature of overall preparedness<sup>(38, 44, 45)</sup>. The findings indicated that nurses need opportunities to engage in disaster planning, mock drills, and/or actual events when possible to increase their awareness in disaster situations, confidence in abilities and to increase familiarity with disaster preparedness.

Indeed, planning is one of the most important areas of management. Without plans, there could be no better realization of activities. This only shows that in order to come up with a rich management for disaster, planning ahead of time is one of the most important aspect nurses should be prepared for. Disaster plans for nursing have focused on fires and weather events such as floods, storms, etc. In this era, disaster planning needs to be expanded to include new potential threats. These include disruption of multiple services to the facility, such as power, telephone, etc.; disruption of mass transit or closure of highways used by staff to

commute to work; release of bioterrorism agents in surrounding community with potential impact on residents, staff; and the possible role of triage and emergency care provider in a mass casualty event<sup>(10)</sup>.

Pre program study results revealed that only more than half of nurses agreed that planning and information have a role in disaster management. While less than half of them disagree that the team work and leadership skills have a role in disaster management, **Table (4)**. This results was supported by the highest nurse's mean average was for the role of planning in disaster management, followed by the role of information. On the other hand, the lowest mean average was for the role of team work and the role of leadership in disaster management, **Table (5)**. But, post program, the nurses' awareness was changed as evidenced by majority of nurses were agree that information and communication system have a role in disaster management, followed by planning, team work and leadership skills role **Table (4)**. This results supported by the highest nurses' mean average was for the role of information followed by the role of communication system in disaster management **Table (5)**. These results were surprising finding because more nurses reported they have a plan and responsible person

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about disaster management plan, **Table (1).**

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<sup>(31)</sup>. 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<sup>(46)</sup>. Meanwhile, very early, 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<sup>(47)</sup>.

In contrary, **Moabi, (2008) and Chimenya (2011)** found that the participants' attitude towards disaster was good. They believed that they needed to have insight on disaster management. This includes that the plans be regularly updated, that staff should be trained and simulation should occur frequently in the hospital. They agreed that management should be adequately prepared should a disaster occur and that every member of staff should know their role should a disaster occur. They also agreed

that drills should be conducted in the hospital. If drills are frequently done, impending problems can be picked up early and addressed in time<sup>(8,25)</sup>.

An important element in the maintenance of a high level of hospital preparedness is the maintenance of an adequate staff compliment as well as the knowledge and capabilities<sup>(25)</sup>. The need for effective evidence based disaster training of healthcare staff at all levels, including the development of standards and guidelines for training in the multi disciplinary health responses in major events, has been designated by the disaster response community as a high priority<sup>(27)</sup>. In the study undertaken by nurses in Hong Kong, the conclusion was that nurses are not adequately prepared for disasters, but are aware of the need for such preparation. Also, that disaster management training should be included in the basic education of nurses<sup>(48)</sup>.

Communication is one of the main problems in case of major disaster. Information has to be reduced to the most important facts. Wire and radio contacts as well as messengers have to be integrated into the communication concept. It also has to be taken into account that any system may fail. Appropriate marking of the staff in charge is also an important part of communication. Designated

communication offices are needed<sup>(8)</sup>. **Nates (2004)** stated that the interruption of external and internal communications seriously threatens any disaster plan and is in itself a disaster<sup>(49)</sup>. Proper planning and guidance, good leadership, and frequent evaluation of the staff, are virtues of the manager that define the effectiveness of an action plan at times of disaster<sup>(8)</sup>.

The present study results showed that the rank of the attributes was changed from pre program to post program as obvious in **Table (5)**, pre program, the planning role took the first rank followed by information, communication system, and the last rank was for team work role, while, post program the first rank was for the information role followed by communication, and planning and the last rank was for leadership skills role. As indicated by Baack (2011) most nurses are not confident in their abilities to respond to major disaster events in a multitude of scenarios, populations, and settings<sup>(43)</sup>.

A major message from these results is that training for nurses must be a consistent on-going aspect of their careers and should be commensurate with the possibilities of both human-induced and natural disaster events. Nurses must understand their role in the planning, mitigation, response and recovery aspects of disasters and

make a national contribution by creating awareness, and participating (volunteering) in national disasters events and trainings<sup>(43)</sup>. Nurses' perceptions of disaster relate to their awareness of vulnerability to unpredictable events and affects how prepared nurse should be<sup>(44)</sup>.

Analysis of the present results revealed a presence of pre program statistical significant correlation ( $P \leq 0.05$ ) only between nurses' total knowledge and their awareness on the role of planning in disaster management. But post program there was statistical significant correlation ( $P \leq 0.05$ ) between nurses' total knowledge and attributes of disaster management (**Table, 6**). This means that the implemented of the program acted as an instrument in developing nurses' knowledge and awareness regarding disaster management. Training and education is one of the important components of the emergency preparedness process. This is because training and education enables emergency management personnel to carry out the tasks allocated to them<sup>(50)</sup>. Healthcare workers may have the knowledge and skill in the day to day management of trauma victims, but they also need knowledge, skills, and abilities to manage situations whereby there are multiple casualties during emergencies and disasters<sup>(25)</sup>.

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**Conclusion and recommendation:**

On the basis of the study findings, it is concluded that Insurance Hospitals nurses' knowledge and awareness about internal disasters and related disaster management plan was generally poor at baseline. But knowledge scores significantly improved and their awareness positively changed after the educational program related to internal disaster management was introduced to the staff nurse. But still minor percent of nurses were had low level.

**Based on the findings of this study, it is recommended that**

1. Add information in nurses' curriculum about disaster management, disaster nursing, and emergency preparedness.
2. Periodical testing of nurses' knowledge and performance of disaster management plan is essential to identify their training needs. Every member of staff should know their roles and function during a drill. Training of all management should be instituted and the disaster committee should ensure that this happens.
3. Conducting of simulation exercises should be done regularly, with full participation of all hospital staff in order to be ready for managing any internal disasters.
4. Nurses should be proactive in disaster preparedness legislation and policies by keeping informed and serving in consultant roles when discussions on disaster response occur.
5. Disaster plans should be placed in an area where they are accessible to all staff members. They should be readily available when needed.
6. The Disaster Committee should ensure that all plans are maintained and regularly updated. Meetings should to be held on a regular basis. The management should take responsibility of ensuring that the hospital is adequately prepared should a disaster occur.
7. Communication and information system is very important. An updated list of addresses and telephone numbers of all staff involved in the plan should be available to the switchboard. During the course of a disaster, joint coalition is vital. Drills should also include mock communication procedures.

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