

## The Effect of Internal Disaster Management Intervention Program on Nursing Staff Knowledge and Skills

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### Abstract:

**Background:** Disaster is unforeseeable event that destroys lives and affects people, ruins possessions and disturbs environment. Nursing staff play a vital role in dealing with the victims of such events, so, it is essential for nursing staff to be prepared in facing the consequences of disasters. **Aim:** Identify the effect of internal disaster management intervention program on nursing staff knowledge and skills. **Design:** A quasi- experimental design was used. **Setting:** The study was conducted at Tanta Emergency Hospital, Tanta University. **Subject:** sample of 35% of total nursing staff (n = 175) were included. **Tool:** nursing staff knowledge regarding internal disaster management was used included part I: Characteristics data of nursing staff, part II: Nursing staff knowledge regarding internal disaster management, and part III: Nursing staff perceived skills about procedures dealing with internal disaster management. **Results:** Preprogram, majority of nursing staff had poor knowledge, while post program, more than two-thirds of nursing staff had good level of knowledge with statistical significant improvement on nursing staff levels about internal disaster management pre than post program. As well as, preprogram, more than half of nursing staff had low level of perceived skills, while, post program about two-thirds of nursing staff had high level of perceived skills with statistical significant improvement in nursing staff skills dealing with internal disaster management pre than post program. **Conclusion:** Nursing staff knowledge and skills was improved after implementation of disaster program. **Recommendation:** Nursing staff need continuous courses and training for disaster management and incorporate emergency care and disaster management skills into undergraduate curricula.

**Keywords:** Internal disaster management, Intervention program, knowledge and skills, Nursing staff.

## Introduction

A disaster is a situation or event which overwhelms local capacity necessitating a request to a national or international level for external assistance. Hospitals and other health care facilities classify disasters as either internal or external.<sup>(1)</sup> Internal disasters cause disruption of normal hospital functions due to injuries or deaths of hospital personnel or damage. External disasters are those that do not affect the hospital infrastructure but do tax hospital resources due to numbers of patients or types of injuries. An effective response to disaster begins with effective planning and programming, but must include many other steps. Each of these steps depends on the strength of other links in the disaster management chain.

An important goal of disaster management is building a culture of awareness that preparation is not only possible, but also, will greatly reduce the consequences from disasters in terms of human and economic loss.<sup>(2)</sup> Internal disaster management is based upon four distinct phases: mitigation, preparedness, response and recovery.<sup>(3)</sup> First: Mitigation phase is the action taken to reduce both human suffering and property loss resulting from extreme natural phenomena.<sup>(4)</sup> This phase is focused on taking precautionary measures before an actual disaster or

emergency takes place to reduce its scope. Mitigation includes the process of danger identification, assessment of life and property threat in order to limit potential causalities, and adverse impact of natural and technological hazards.<sup>(5)</sup>

Second: Preparedness phase is targeted on preparing activities to be taken when a disaster occurs i.e. planning preparedness measures proper maintenance and training of emergency services, developing and exercise of emergency population warning methods combined with emergency shelters and evacuation plans, stocking piling of supplies and equipment.<sup>(6)</sup> Third: Response phase includes activities during and immediately following the disastrous event. It is a period of triage, stabilization, emergency care and evacuation.<sup>(7)</sup> Fourth: recovery phase which aims to ensure hospital activities and systems return to normal functioning. Disaster management phases are complimentary phases to prevent, prepare, respond and recover from effects of disaster.<sup>(8)</sup>

It is evidence that there is a lack of written emergency hospital plans, as a result many nursing staff are not aware of their responsibilities and roles during disasters and therefore confusion is bound to arise. Thus, hospital preparedness plan should be a part of every hospitals fundamental operational plan as it can prepare the

hospital and its nursing staff for small and large scale accidents and humanitarian disasters.<sup>(9)</sup>

## **Significance of the study**

Nursing has always been a profession that required currency of knowledge and clinical skills through continuing education input, because of the rapidly changing knowledge base and innovative treatment regimens. An intervention program was developed, implemented and evaluated to inform the education of nursing staff about disaster preparedness and response and to gauge their willingness to volunteer in a disaster before and after the intervention program. The intervention program utilized a pre- and post-survey method to evaluate the effect of the education on nursing staff. These changes are occurring at an increasingly rapid rate, particularly in disaster care.<sup>(10)</sup> Nursing staff need to be educated in potential disasters.<sup>(11)</sup> It is essential to ensure that all nursing staff understand the implications of disasters.<sup>(12)</sup> The warning system may be the only difference between stocking up on needed supplies and protection and facing the disaster wholly unprepared. Nursing staff warning and alert system has immense value to a disaster management system. It provides nursing staff with awareness of an impending hazard event before it occurs and allows them to prepare themselves

fully or even avoid the disaster altogether.<sup>(13)</sup>

## **Aim of the study**

**The aim of the study was to:-**

Identify the effect of internal disaster management intervention program on nursing staff knowledge and skills.

## **Research hypothesis:**

Nursing staff attended internal disaster management intervention program expected to had knowledge and skills regarding internal disaster management.

## **Subjects and Method**

### **Subjects**

### **Research design:**

A quasi- experimental study design was used in the present study.

### **Setting:**

The study was conducted at Tanta Emergency Hospital, Tanta University. Tanta Emergency Hospital capacity 465 beds.

### **Methods**

1. **Official permission** to conduct the study was obtained from responsible authorities.
2. **Ethical consideration:** Nursing staff informed consent was obtained after explaining of the nature and purpose of the study. Confidentiality of the information was maintained and the right to withdrawal is reserved.

3. After reviewing of the related literature and different studies in this field, the study tool was developed and translated into Arabic.
4. Tool was reviewed with the supervisors and then was presented to a jury of 5 Experts to check content validity of its items. The experts were three: one Professor and two Assistant Professor of Nursing Services Administration Faculty of Nursing, Tanta University. One Professor of Nursing Services Administration and One Assistant Professor of Nursing Services Administration in Menoufia University.
5. The experts responses were represented in four points rating scale from ranging from (4-1);4=strongly relevant 3=relevant 2=not relevant 1=strongly not relevant. Necessary modifications were done including; clarification and simplifying work related words. The content validity value for part II was 93.21% and for part III was 94.23% **(appendix III)**
6. **A pilot study** was conducted on 10% of nursing staff (n= 18). They were excluded from the subject. It was done to test tool's clarity and applicability. Then needed correction was done. The estimated time needed to complete the questionnaire items was approximately 20-30 minutes.
7. **Reliability of tools** was tested using Cronbach's Alpha which was its value 0.936 & 0.854.

8. **Data collection:** Program sessions for nursing staff on usable knowledge for part II and perceived skills for part III of internal disaster management was implemented.

### **The intervention program:**

- The intervention program about internal disaster management was designed by the researcher after reviewing recent relevant literature and based on assessed need
- This program was conducted in four phases: Assessment phase, development of the educational intervention phase, implementation of the educational intervention phase, and finally evaluation phase.

**Aim of the educational intervention was to** evaluate the effect of internal disaster management intervention program on knowledge and skills of nursing staff.

### **Objectives of the educational intervention:**

At the end of the sessions nursing staff have to be able understand knowledge and demonstrate skills regarding internal disaster management as follow:

- Disaster concepts and plan.
- Internal disaster and internal disaster management.
- Phases of disaster management
- Dealing with procedures of fire, explosion, gas leakage. Infection and food poisoning

Results

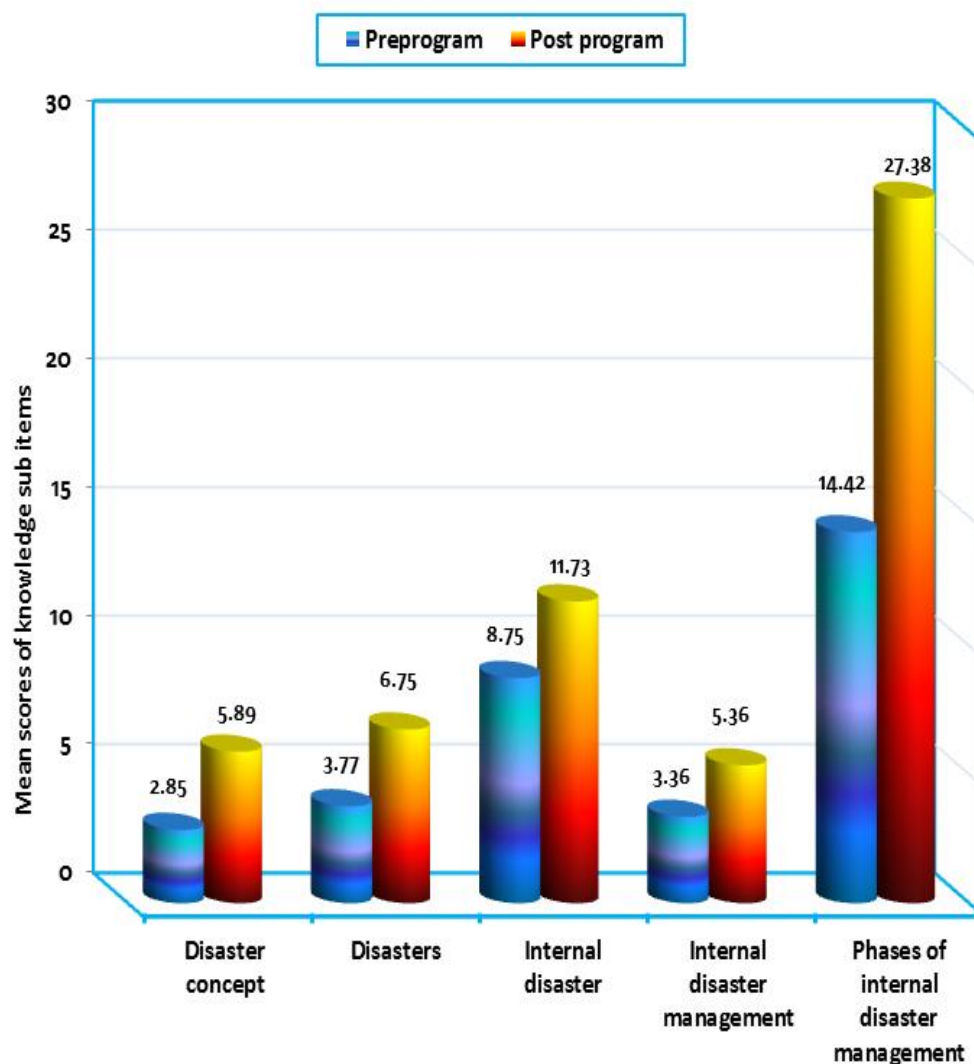
**Table (1): Percentage distribution of nursing staff according to personal characteristics (n=175)**

Variables personal characteristics items	The studied nursing staff (n=175)	
	N	%
<b>Age in years:</b>		
20-30	63	36.0
30-40	76	43.4
>40	36	20.6
<b>Gender:</b>		
Male	8	4.6
Female	167	95.4
<b>Qualification:</b>		
Diploma degree in nursing	80	45.7
Technical Institute of nursing	61	34.9
Bachelor degree in nursing	34	19.4
<b>Experience in years:</b>		
0-5	41	23.4
5-10	25	14.3
10-15	26	14.9
>15	83	47.4
<b>Job title:</b>		
-Staff nurse	141	80.6
-Head nurse	29	16.6
- Nurse supervisor	5	2.9
<b>Attending training courses:</b>		
Yes	24	13.7
No	151	86.3
<b>If yes, name of courses:</b>		
- Fire courses.	10	41.7
- Courses of emergency, infection control and CPR.	3	12.5
-Courses of CPR and infection control.	9	37.5
-Courses of infection control ,fire courses and poisons types.	2	8.3

CPR=Cardiopulmonary resuscitation

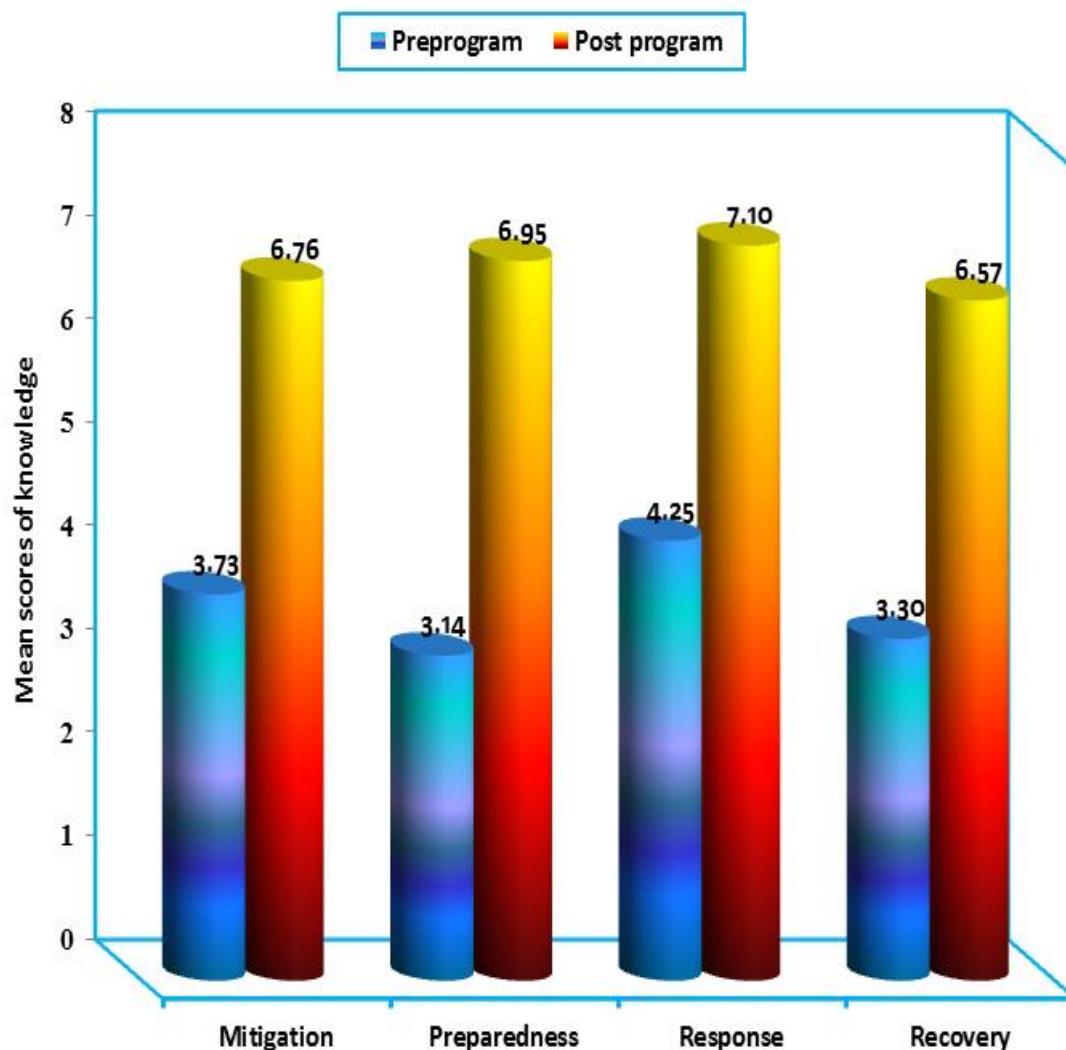
**Table (1)** shows percentage distribution of nursing staff characteristics. More than forty (43,3%) of nursing staff were from age 30-40 years old, while, more than one-fifth (20.6%) of them aged 40 or more years old. Majority (95.4%) of nursing staff were female. More than forty (45.7%) of nursing staff had diploma degree in nursing, and more than one-third (34.9%) of them had technical institute of nursing while, minority (19.4%) of nursing staff had bachelor degree in nursing.

As regard years of experience, more than forty (47.4%) of nursing staff had more than 15 years experiences. Majority (80.6%) of nursing staff were staff nurses. Majority (86.3%) of nursing staff were not attend training course, from those attended courses, more than forty (41.7%) of nursing staff attended training courses about fire and more than one -third (37.5%) of them had training courses in CPR and infection control, while, minority (8.3%) of them were attend infection control, fire and poisons training courses.



**Figure (1):** Mean scores of nursing staff knowledge about internal disaster management pre and post program intervention (n=175)

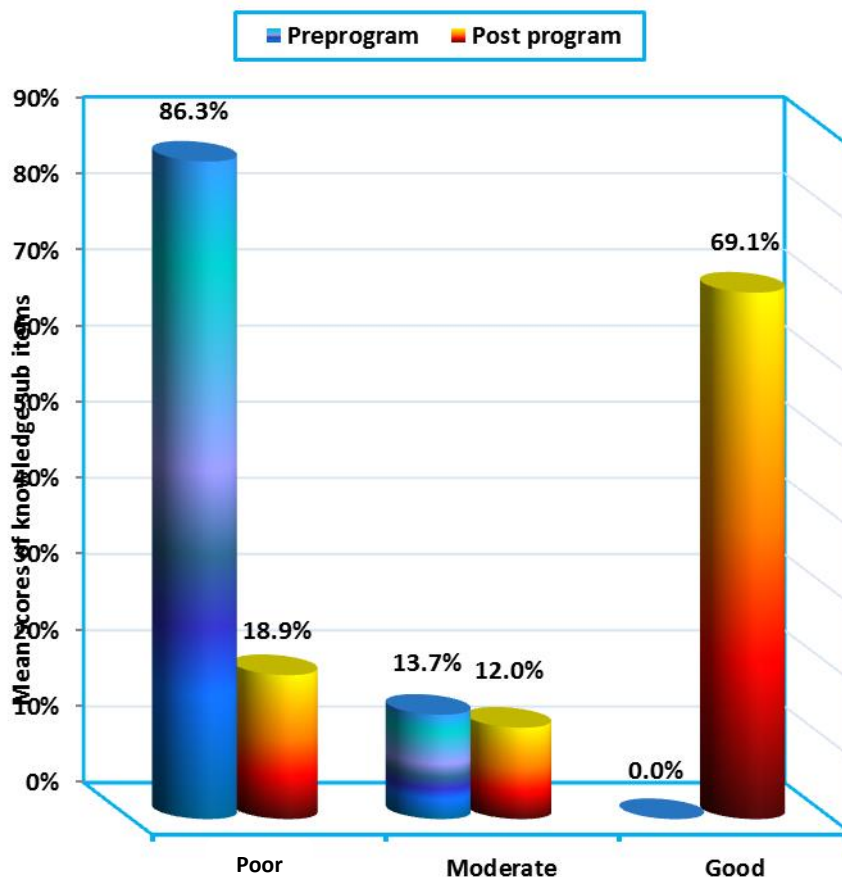
Figure (1) show mean scores and mean percent of nursing staff knowledge about internal disasters management pre and post program intervention. There were statistical significant differences on nursing staff knowledge mean scores pre than post program ( $p=0.0001$ ) as evidence in the table. The total nursing staff mean score knowledge preprogram was  $33.15 \pm 8.37$  with mean percent 46.04% which increased to  $57.11 \pm 13.1$  post program with mean percent 79.3%. Preprogram, the highest mean percent (62.5%) was for nursing staff knowledge in internal disaster types, coding system and initial identification with mean score  $8.75 \pm 2.30$  followed by internal disaster management (definition-importance-process-team) (48%) with mean score  $3.36 \pm 1.50$ . Post program the highest (84.4%) mean percent was for nursing staff knowledge on disaster types, causal factors, plan, dimensions with mean score  $6.75 \pm 1.55$  followed by concepts of disaster (84.1%) with mean score  $5.89 \pm 1.51$



**Figure (2):** Mean scores of nursing staff knowledge about phases of internal disaster management pre and post intervention program (n=175)

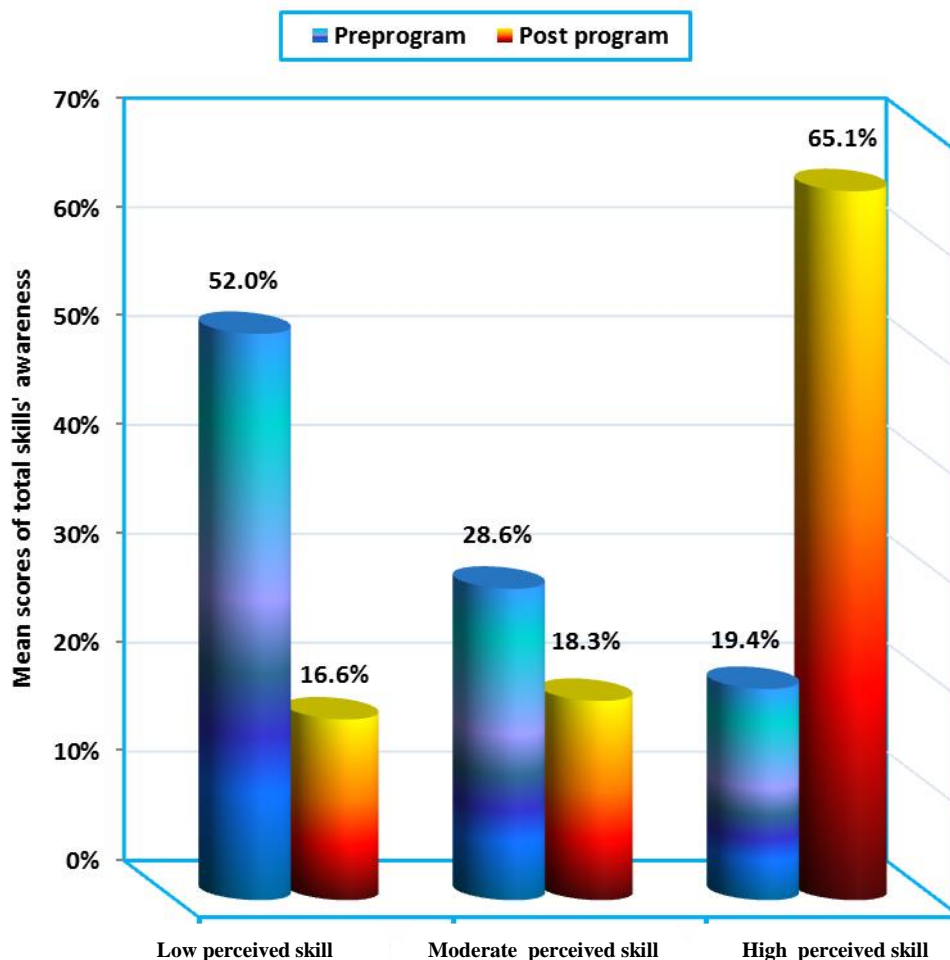
Figure (2) show mean scores and mean percent of nursing staff knowledge about internal disasters management pre and post program intervention. Response phase was scored the highest (47.2%) with mean score  $5.00 \pm 1.68$  but the lowest (34.9%) nursing staff knowledge about phases was for preparedness while, post program response phase was scored the highest (78.9%) with mean percent  $9.30 \pm 2.59$ .





**Figure (3):** Distribution of nursing staff total levels of total knowledge about internal disaster management pre and post intervention program (n=175)

Figure (3) shows distribution of nursing staff levels, change and improvement of total knowledge about internal disaster management pre and post program intervention. Preprogram, majority (86.3%) of nursing staff had poor knowledge, while post program, more than two-thirds (69.1%) of nursing staff had good level of knowledge with statistical significant improvement (84.14%) on nursing staff levels about internal disaster management pre than post program( $p=0.0001$ ).



**Figure (4):** Distribution of nursing staff levels of total perceived skills about procedures dealing with internal disaster management pre and post program intervention (n=175).

Figure (4) illustrates distribution of nursing staff levels, change and improvement percent of total perceived skills about internal disaster management pre and post program intervention. There were statistically significant differences on nursing staff levels and mean scores of perceived skills about procedures for dealing with internal disaster management pre than post program ( $p < 0.05$ ) as evidence in the table.

Preprogram, more than half (52%) of nursing staff had low level of perceived skills, while post program about two-thirds (65.1%) of nursing staff had high level of perceived skills about dealing with internal disaster management with statistically significant improvement (35.36%) in nursing staff perceived skills dealing with internal disaster management pre than post program ( $p < 0.05$ ).

**Table (2): Relationship and correlation between nursing staff levels of total knowledge and total perceived skills regarding internal disaster management pre and post program intervention(n=175)**

Total nursing staff perceived skills	Levels of total knowledge of nursing staff preprogram				$\chi^2$	P		
	Poor (n=151)		Moderate (n=24)					
	N	%	N	%				
<b>Levels of awareness about skills:</b> Low perceived skill Moderate perceived skill High perceived skill	81	53.6	10	41.7	14.598	0.001*		
<b>R</b>	-0.123							
<b>P</b>	0.106							
Total nursing staff skills	Levels of total knowledge of nursing staff post program						$\chi^2$	P
	Poor (n=33)		Moderate (n=21)		Good (n=121)			
	N	%	N	%	N	%		
<b>Levels of perceived skills:</b> Low perceived skill Moderate perceived skill High perceived skill	5	15.2	6	28.6	18	14.9	2.692	0.611
<b>R</b>	0.021							
<b>P</b>	0.787							

\*Significant (P<0.05)

Table (2) shows relationship and correlation between nursing staff levels of total knowledge and total perceived skills regarding internal disaster management pre and post program intervention. Preprogram, there was statistically significant difference between level of nursing staff total knowledge and total perceived skills (P= 0.0001). More than half (53.6%) of nursing staff who had poor level of total knowledge also had low level of perceived skills regarding internal disaster management, while more than half (58.3%) of nursing staff who had moderate level of total knowledge had moderate level of perceived skills. Post program, more than two thirds (66.9%) of nursing staff had good level of knowledge and high level of perceived skills, followed by 63.6% of nursing staff who had poor knowledge with high perceived skills, while, more than half (57.1%) of nursing staff who had moderate level of total knowledge had high perceived skills on internal disaster management.

## Discussion

Internal 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, avoid or recover from the impact of the disaster.<sup>(14)</sup> Disaster management is an integrated process of planning, organizing, coordinating and implementing measures that are needed for effectively dealing with its impact on people.<sup>(15)</sup>

### Nursing staff knowledge about internal disaster management

Preprogram, analysis of the present results revealed that the majority of nursing staff had poor total knowledge about internal disaster management. In fact, majority of nursing staff had wrong answers to concepts of disaster, disaster types, causal factors, plan and dimensions in preprogram (table 2,3&4). These results reflect the absence of training courses regarding disaster management as evidenced in (table 1), majority of nursing staff not attended training courses. **Berhanu (2016)**<sup>(16)</sup> found that a considerable number of professionals had limited opportunities for training.

In the same line with the present result **Jeanne(2017)**<sup>(17)</sup> who revealed that nurses do not possess the necessary knowledge disaster and hospital disaster preparedness.

**Diab and Mabrouk (2015)**<sup>(18)</sup> revealed that the nurses had poor knowledge regarding disaster and hospital disaster preparedness at pretest. Also, **Abo-gad (2014)**<sup>(19)</sup> found that majority of nurses had poor knowledge about internal disaster management at preprogram. Similarly, **Chimenya and Ncube (2011)**<sup>(20)</sup> found that majority of had poor knowledge about disaster management. Meanwhile, **Sandmann (2009)**<sup>(21)</sup> revealed that majority of nurses had poor knowledge regarding disaster preparedness.

Preprogram, nurses' knowledge on concepts of disaster, disaster types, causal factors, plan and dimensions. Present study results revealed that nurses had low mean percent because majority of nurses gave wrong answers to concepts of disaster, disaster types, causal factors, plan and dimensions (table 2,3&4). This result is confirmed with **Abo-gad (2014)**<sup>(19)</sup> **Abd Elazeem et al.,(2011)**<sup>(22)</sup> who revealed that there was a lack of knowledge about the disaster plan, and its related items is quite alarming.

Post-program, the current study result revealed that the majority of nursing staff had good knowledge about concepts of disaster, disaster types, causal factors, plan and dimensions of internal disaster management (table 2,3 &4) with high mean percent. This result reflects the effect

of the intervention program about internal disaster management since, the majority of nursing staff gave correct answers to its items in the post program. Education can help nurses adopt preparatory measures by improving their knowledge of the relationship between preparedness and disaster risk reduction. Moreover, educated nurses have better understanding of what preparedness measures to take.

The current study result is confirmed by **Hoffmann and Muttarak (2017)**<sup>(23)</sup> who mentioned that education can enhance the acquisition of knowledge about disaster, values and priorities, as well as, the capacity to plan for the future and to allocate resources efficiently. Also, **Diab and Mabrouk (2015)**<sup>(18)</sup> found that there was statistical significant improvement in knowledge of nurses regarding disaster after application of the guidance booklet post-test compared to pre-test. As well as, **Abo-Gad (2014)**<sup>(19)</sup> who revealed that most nurses had good total knowledge on internal disaster management post-program.

### **Nursing staff perceived skills about procedures dealing with internal disaster management pre and post program**

Preprogram, present study result revealed that more than half of nursing staff perceived skills about all procedures

dealing with internal disaster management were low (table 11). Possible explanation of this result may be that because nursing staff perceived themselves as not well-prepared and had low level of knowledge regarding disaster management. So that, the result may enable the organizations and their staff to review their existing plans and make improvements where required.

In the same line with the present results was **Shabbir and Afzal (2017)**<sup>(24)</sup> **Jeanne (2017)**<sup>(17)</sup> who found that practices of the majority of participants in study were very poor regarding the emergency and disasters situations and preparedness. Also, **Diab and Mabrouk (2015)**<sup>(18)</sup> revealed that the studied nurse had unsatisfactory awareness regarding disaster and hospital disaster preparedness at pretest. As well as, **Alice and Olivia (2014)**<sup>(25)</sup> found that there was a lack on awareness of disaster preparedness and responses among Hong Kong nurses. Moreover, **Burnrock (2014)**<sup>(26)</sup> results indicated that nursing students had low response to engage in preparedness, and not to be willing to respond pre course. **Sandmann**<sup>(21)</sup> (2009) found that nurses had lack of awareness related to disaster preparedness and management.

Present study results revealed that about two-thirds of nursing staff had high level of perceived skills about total procedures

dealing with internal disaster management post-program (Table 11). It is an important issue to determine nurses' disaster preparedness level as well as factual information about the occurrence of disasters in creating disaster awareness. This results reflects that the intervention program to nursing staff helped them know how to deal with internal disaster and subsequently increase their ability to face any procedure.

Along with the present results, **Pinar (2017)<sup>(27)</sup>** who showed that creating disaster awareness and encouraging positive behaviors in every part of the organization is one of the ways of being least affected by the threats that may occur and minimizing the loss of life and property. Also, **Abo-Gad (2014)<sup>(19)</sup>** who revealed that nurses awareness improved post program. As well as, **Moghaddan et al., (2014)<sup>(28)</sup>** showed that continuous education could affect nursing practices effectively and that disaster aid education can decrease mortality rates, improve health indices, and decrease disaster expenses.

### **Conclusion**

The acquired results of the present study and mean score for each subset revealed that there were statistically significant improvement on nursing staff knowledge and perceived skills about internal disaster

management post than pre-program. Preprogram, majority of nursing staff had poor knowledge regarding internal disaster management, while post program, more than two-thirds of nursing staff had good level of knowledge with statistical significant improvement on nursing staff levels about internal disaster management pre than post program. As well as, preprogram, more than half of nursing staff had low level of perceived skills about internal disaster management, while post program about two-thirds of nursing staff had high level of perceived skills with statistical significant improvement in nursing staff skills dealing with internal disaster management pre than post program.

### **Recommendations**

**On the basis of the findings that have been established, the following recommendations are made:**

#### **For nursing management:**

- Developing policies for disaster management and pay more attention to the problem of internal disaster and prepared for its management
- Establishing continuous education and training for nursing staff in disaster care to respond in effective and rehearsed manner.

## **For faculty:**

- Incorporate mass casualty care and disaster management skills into under graduate curricula, as student nurses have served as first responders to disasters even at the risk of personal sacrifice.

## **For nurses:**

- Every member of nursing staff needs to know their roles, responsibilities and their functions through participating in hospital's drill.
- Ensured developing a plan is the key for ensuring that efforts in preparedness, response, and relief of disaster. So, involve staff nurses in developing plans and previously existing plans updated in light of experience gained in the disaster.

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