

Research article

Utilization of work environment safety measures among nursing staff: its relation to their performance

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Abstract

Creating a healthy work environment not only is the proper thing to do, but it also benefits for the employer, accidents results from two broad causes: unsafe work condition (physical and environmental) and unsafe work behavior. **Aim:** to assess utilization of work environment safety measures among nursing staff: Its relation to their performance. **Design:** Descriptive co-relational design was used. **Settings:** The study was conducted at Menofia University Hospitals and Nasser Institute Hospital at critical care units and general departments. **Subjects:** A convenience sample of (100) staff nurses (50 from the Menofia University Hospitals and 50 from Nasser Institute Hospital) and all head nurses (12) worked in the study setting. **Tools:** Observation checklist for work environment safety measure. And observational Checklist for nursing staff performance regarding utilization of safety work environment measures. **Results:** Both hospitals were located in the category (B) in hospital safety index. Additionally, the level of nursing staff performance in the study setting was low throughout the observation period. And also, nursing staff performance score regarding utilization of work environment safety measure at Nasser Institute Hospital was better than Menofia University Hospitals. **Conclusion:** At both hospitals, utilization of work environment safety measures is positively affect nursing staff performance. **Recommendations:** Management should provide and maintain at the workplace, adequate plant and system of work that are safe and without risk to health.

Key words: safe working environment, utilization of safe work environment measure, and nursing performance.

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1. Introduction

The environment in which individual works and in general work performance has been an area of interest for most occupational health professionals. The status of the nursing environment affects the nurse's performance. Healthy environments are workable settings for nurses but unhealthy environments create discomfort that undermines the abilities of even the best nurses. This can be attributed to the mental, emotional, and physical demands of the workplace.

Nurses have cited long working hours, poor relationship with supervisors, and lack of proper medical equipment as factors contributing to an unhealthy work environment. Additionally, such unhealthy working environments are associated with increased mental illnesses among nurses [1].

Healthy work environments for nurses be distinct as practice settings that improve the health and benefit of the nurse, quality patient outcomes, organizational performance and societal outcomes [2]. Health and safety are one of the nurse interests as a key to improving the general state of well-being, for example, their good health and comfort as well as their stability and success. Thus the function of maintaining nursing staff health and safety should be being a part of the important function of providing for nurse interests.

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Nurse interests were beforehand used to include the employees' physical working circumstances, e.g. services related to cleanliness, canteens, bars, vending machines, sports clubs, dispensaries, shortening of working hours, and any other initiatives of job satisfaction and development of quality of work life in the places of work [3].

On contract, Poor and unsafe workplace environment, cause major sufferers for workers, their families, and national economy. A conducive workplace environment that aids the performance of work automatically improves performance [4]. Hospital is among the highly important and susceptible work environments as the performance of employees in its workplace is connected with the lives of a great number of people. Some studies have indicated that lack of safety in hospitals. The hazards and incidents in this environment include: fire outbreak, electrical shock and burning as a result of it, burn injuries because of spill of acid on hands, skin or respiratory allergy to various chemicals used in hospitals, oxygen cylinder explosion as a result of overfilling, falling down and fractures of limbs or death of employees after falling from height, falling of patients out of their beds, burning in the operation room because of cautery device, busting of unprotected fluorescent light bulbs, and other frequent minor and major events [5].

Safety is a culture, not a Program. The combined commitment and participation of the whole organization is necessary to generate and sustain an effectual safety culture. Every person in the organization, from the top management of the corporation to the most recent employee, is responsible and accountable for preventing injuries. Management's responsibility is to guide the safety effort in a regular and consistent way, establishing safety goals, serious accountability for safety performance, and providing the resources necessary for a safe workplace. Managing safety is the responsibility of every supervisor, from the first line supervisor to the executives [6].

Performance defined as the accomplishment of particular tasks measured against predetermined or identified standards of accuracy, completeness, cost, and speed. Employee performance can be manifested in development in production, easiness in using the new technology, highly motivated workers [7]. Good performance indicates good-quality practice, and that comparing performance among providers and organizations will push the best performance [8].

Significance of the study

A healthy work environment is important for both the employees and the administrators. It creates a culture of safety, which is vital for performance Oliver , [9]. Staff nursing is exposed to a lot of challenges, including health and safety challenges so it is more important to generate an environment of safety inside the

organization. This in sequence helps to generate a patient-centered team that performs with a sense of professionalism, involvement, effectiveness, precision, and accountability. So this study was constructed to assess utilization of work environment safety measures among nursing staff: its relation to their performance

Aim of the study:

The aim of this study was to assess the assess utilization of work environment safety measures among nursing staff: Its relation to their performance at, Menofia University Hospital and Nasser Institute Hospital.

Research question:

- 1- What are the types of work environment safety measures used in the study settings?
- 2- What is the level of nursing staff performance regarding utilization of work environment safety measures in the study setting?
- 3- What is the relation between work environment safety measures and performance among nursing staff?

2. Subject and methods

Research design: - Descriptive co-relational design was used in conducting this study

Settings:

The study was conducted at, Menofia University Hospitals and Nasser Institute Hospital at critical care units and general departments.

Subjects

The study sample consisted of two different groups of nursing staff they were; **Group I:** included a convenience sample of staff nurses (100) who had at least one year experience and agree to participate in the study in different units/departments at the two different hospitals under the study; (50 from, Menofia University Hospitals and 50 from Nasser Institute Hospital). **Group II:** All head nurses (12) worked in the two different hospitals under the study. The sample distribution by the units/department was illustrated in the following table:

Hospital/units	Staff nurses	Head nurses
Menofia University Hospitals		
<i>A) Critical care units:</i>		
Intensive Care Units	8	1
Operating Units	8	1
Haemodialysis Unit	8	1
Emergency Units	8	1
<i>B) General departments:</i>		
Medical Department	9	1
Surgical Department	9	1

Hospital/units	Staff nurses	Head nurses
Total	50	6
Nasser institute Hospitals		
<i>A) Critical care units:</i>		
Intensive Care Units	8	1
Operating Units	8	1
Haemodialysis Unit	8	1
Emergency Units	8	1
<i>B) General departments:</i>		
Medical Department	9	1
Surgical Department	9	1
Total	50	6

Data collection tools

The tool I: Observation checklist for work environment safety measure:

The observational checklist was adopted by Hassan, [10]. It consisted of (93) items about the work

environment safety measure. These (93) items under the main (7) categories as the following arrangement: Biological work environment safety measures (38) items, Electrical work environment safety measures (10) items, Mechanical work environment safety measures (16) items, Chemical work environment safety measures (3), items Psychological work environment safety measures (8) items, Physical work environment safety measures (8) items, and Other type of work environment safety measures (10) items.

Scoring system:

The response for each question was measured on a three-point Likert scale, each item was assigned a score of (2) if the action was "completely occur", (1) if the action is "partial occur", and "zero" (0) if it is "not occur". The score was converted into a percentage score. A maximum percentage score was 100%. Safety Index score places a health facility into one of three categories of safety Pan American Health Organization [11].

Safety index	Classification	What should be done?
0- 0.35	C	Urgent intervention measures are needed. The hospital's current safety levels are inadequate to protect the lives of patients and hospital staff during and after a disaster.
0.36- 0.65	B	Intervention measures are needed in short- term. The hospital's current safety levels are such that patients, hospital staff, and its ability to function during and after a disaster are potentially at risk.
0.66- 1	A	It is likely that the hospital will function in case of a disaster. It is recommended, however, to continue with measures to improve response capacity and to carry out preventive measures in the medium – and long- term to improve the safety level in case of disaster.

Tool II: Observational Checklist for nursing staff performance regarding utilization of safety work environment measures.

The aim of this tool was to observe nursing staff performance regarding utilization of safety work environment measures at the hospitals under the study. This observational checklist was adopted from Hassan [10] and (Satishchandra [12]. It consisted of (71) items under the main (7) categories as the following arrangement: Utilization of biological safety measures(28)items, Utilization of electrical safety measures(10) items, Utilization of mechanical safety measures(11) items, Utilization of Chemical safety measures(5) items, Utilization of psychological safety measures(7) items, Utilization of physical safety measures(4) items ,and Utilization of other hazards safety measures(6) items.

Scoring system

Each item was assigned a score of (2) if the action was "completely done", (1) if the action is "sometimes done",

and "zero" (0) if it is "not done". Nursing staff whose score of (71 or less) were considered having low performance, nursing staff whose score range from (71 to 142) were considered having moderate performance, and nurses whose score range from (142 to 213) were considered having high performance. These scores were converted into a percent score for facilitating comparison across domains. The researcher made three observations of staff nurse performance and scored each item as a "yes" if 2 of the 3 incidences met the criteria and as a "no" if no or only once incident occurred.

Validity and reliability:

A bilingual group of five experts was selected to test the content and face validity of tools. Necessary modifications and deleting of some questions were done to reach the final valid version of the tools. Tools were considered valid from the experts' perspective. Also, the

tools were tested for reliability by measuring their internal consistency using Cronbach's alpha coefficient method. This turned to be ($\alpha = (87\%)$ for nursing staff performance tool; ($\alpha = 89.5\%$.) for the work environment safety measure tool. Thus indicates a high degree of reliability for the study tools.

Pilot study:

A pilot study was conducted after the development of the tool and before starting the actual data collection. The pilot study was done on 10 % of the sample who were not included in the main study sample. Based on the results of the pilot study, rephrasing of some questions was done to ensure clarity of the questions and to be easily understood by staff nurses. The time required for the researcher to fill the observation checklist was estimated to be 10-15 minutes. Modification of some questions was done based on the results of the pilot study.

Fieldwork:

Data was collected upon five months started from February 2016 and ended on 30 June 2016. The researcher observes the work environment safety measure and nursing staff performance regarding utilization of safety measures at the hospitals under the study. The appropriate time for data collection was determined according to the workload of each unit. Data were collected in the morning and afternoon shifts. The average time needed to complete the questionnaires (I) ranged between (15-20 minutes), and the second tool ranged between (10-15 minutes). The researcher made three observations and scored each item as a "yes" if 2 of the 3 incidences met the criteria and as a "no" if no or only once incident occurred.

Administrative and ethical considerations:

Written approval was obtained from the Dean of the Nursing College, Menofia University to collect data from the study settings. Another written approval to conduct the study in the study setting was obtained from the medical and nursing directors of Menofia University Hospitals and Nasser Institute hospital. The objectives and content of the questionnaire were explained to the head nurses to permit for the researcher for data collection. The study was conducted with careful attention to ethical standards of research

Statistical design:

The data collected were tabulated and analyzed by SPSS (statistical package for social science) version 18. Quantitative data were expressed as the mean & standard deviation (X+SD) and analyzed by applying student t-test for comparing the means of two groups of normally

distributed variables. Pearson correlation (r) was used to detect an association between quantitative variables). Tests were used as tests of significance at $P < 0.05$.

3. Results

Table No 1: Distribution of studied subjects according to hospitals, units, and departments (N = 112)

Hospital, Units, and Departments		No.	%
Hospitals names:-	Shebin Elkom University Hospital	56	50
	Nasser Institute Hospital.	56	50
Units and Departments:-	Critical care units	72	64.2
	General departments	40	35.8

Table 1 Represents distribution of studied subjects according to hospitals, units, and departments. This table showed that the studied subjects were distributed between two hospitals equally. These hospitals were Menofia University Hospital and Nasser Institute Hospital. The studied subjects were distributed in the study settings between critical care units and general departments. As shown the highest percentage of the studied subjects were from critical care units.

Table No 2: Demographic characteristic of the studied sample.

(N= 112)

		Number	%
Qualifications:-	BSc. In nursing	28	25
	Associated degree in nursing	25	22.3
	Diploma nurses	59	52.7
Job Position:-	Staff nurses	100	89.2
	Head nurse	12	10.8
Years of experiences:-	1 to < 5 years	21	18.8
	5 to < 10 years	32	28.6
	10 to < 15 years	29	25.9
	≥ 15 years	30	26.8

Table 2 represents socio-demographic characteristics of the studied sample. The highest percentage of the studied subjects was, diploma nurses and was five to less than ten years of experience

Table No 3: Achievement of work environment safety measures in the study settings per each type of work environment safety (units' number =12).

Types of environment Safety	The study settings		T-test	P-value
	Nasser Institute Hospital (Units' N= 6).	Shbine Elkom Hospital (Units' N= 6).		
	(%)	(%)		
Biological Safety	56.6	48.9	1.6	0.23
Electrical Safety	60.0	45.6	0.44	0.69
Mechanical Safety	48.6	40.6	0.55	0.63
Chemical Safety	50	50	--	--
Physical Safety	49.3	49.3	--	--
Psychological Safety	53.5	41.7	1	0.42
Other Occupational Safety (violence, fire, and catastrophes exposure)	46.7	46.7	0.27	0.80

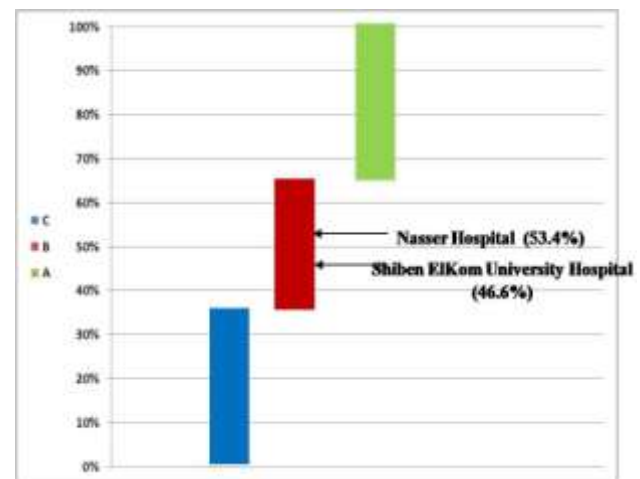
Table 3 Show achievement of work environment safety measures in the Study Settings per each type of work environment safety. As indicated from this table there was no statistically significant difference between the study settings regarding maintenance of work environment Safety Measures. As showed, at Menofia University Hospital the high utilization of work environment safety measure was chemical measure while the lowest at mechanical hazards. In contrast, at Nasser Institute Hospital, work environment safety measures were psychological measure while the lowest was the other type of safety measures.

Table No 4: Total means score and percentage of work environment safety measures at the studied settings (Units' Number =12).

Work Environment Safety Measures	Units' Number	Means \pm S.D	%	T	P-value
Shebin ElKom university Hospital	6	141.1 \pm 9.4	46.6	1.213	.3489
Nasser Institute Hospital	6	161.6 \pm 5.39	53.4		
Total	12	151.4 \pm 12.9	50.0		

Table 4 Total means to score and percentage of work environment safety measures in the Studied Settings. AS

indicated from the table, both hospitals, Nasser Institute Hospital & Menofia university hospital had a nearly equal percentage and mean score regarding the achievement of work environment safety measures in different units at both hospitals. At the same time, Nasser Institute Hospital had a slightly high percentage (53.4%) than Menofia university hospital (46.6%) regarding Work Environment safety measures



*Category (C):0- 0.35

*Category (B):0.36- 0.65

*Category (C):0.66-1

Figure No 1: Level of safety work environment in the study settings as Indicated in the Hospital Safety Index

Figure (1): Shows Level of safety work environment in the study settings as Indicated in the Hospital Safety Index. This index indicated that hospitals can be classified into three categories or grades according to their degree of the safe work environment. These categories or grades are: category A: is for facilities deemed able to protect the life of their occupants and likely to continue functioning in disaster situations. While category B: is assigned to facilities that can resist a disaster but in which equipment and critical services are at risk. And category C designates a health facility where the lives and safety of occupants are deemed at risk during disasters. This figure also indicated that both hospitals were located in the category (B) in hospital safety index.

Table No 5: Means score of nursing staff performance regarding utilization of work environment safety measures by the study hospitals (N= 112).

Study Settings	Nursing Staff Performance					
	No	Mean	Sd	%	T	P-value
Shebin Elkom university Hospital	56	87.7	8.9	41.18	5.278	0.000*
Nasser institute Hospital	56	95.5	6.5	44.85		

Table 5 Shows means score of staff Performance's in the study Settings. As indicated by the table that nursing staff performance scores at Nasser Institute Hospital was

some extent better than nursing staff performance score at Menofia University Hospital.

Figure No 2: Percentage of the studied sample performance regarding utilization of safety (N= 112).

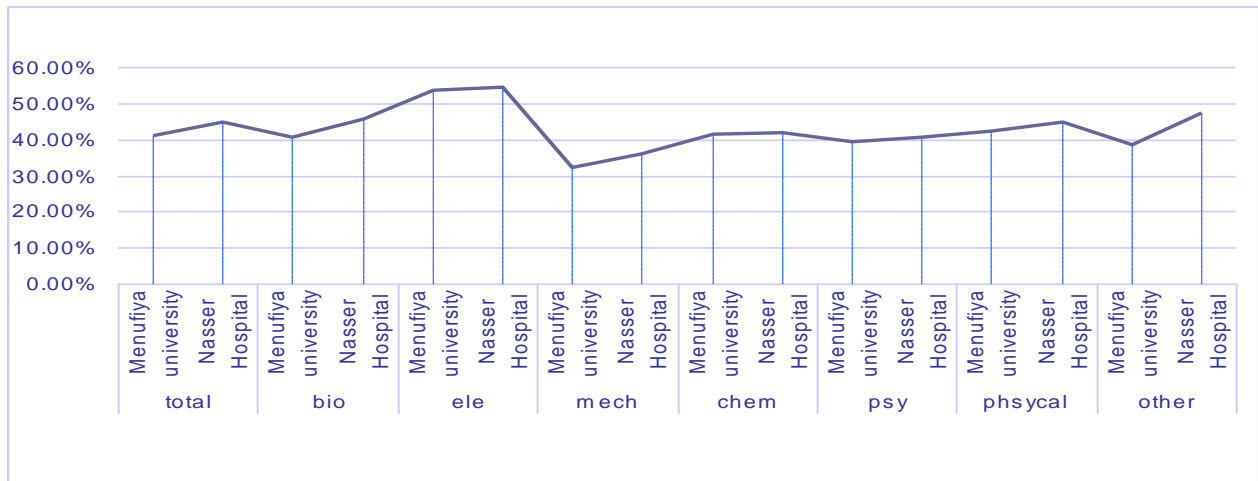


Figure 2: Presents percentage of the studied sample performance regarding utilization of safety measure throughout the observation period. It showed that the level of nursing staff' performance at Nasser Institute Hospital and Menofia University Hospital was low throughout the observation period.

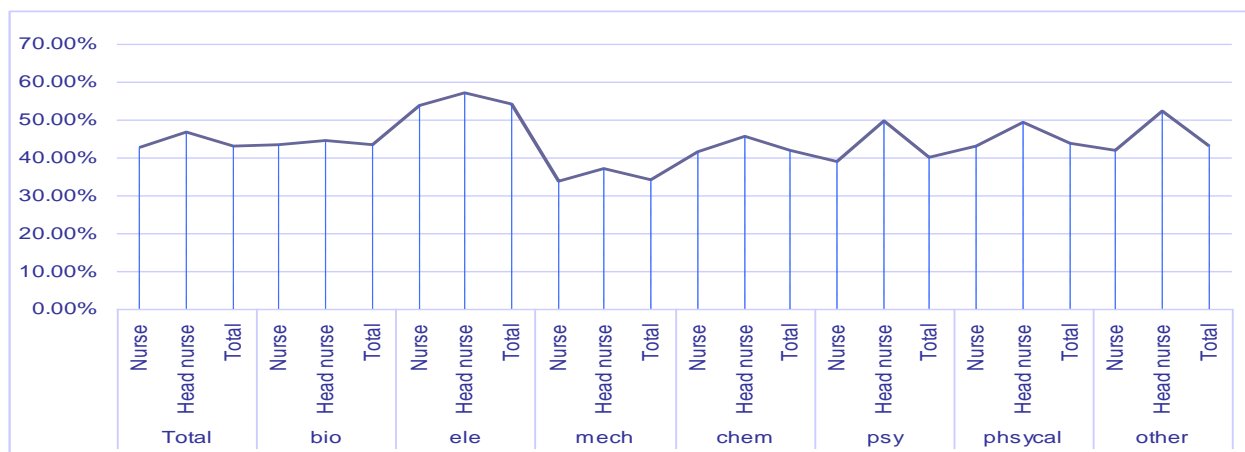


Figure (3): Percentage of the studied sample performance regarding utilization of safety measures regarding their job positions (N= 112)

Figure 3 Shows Percentage of the Studied Sample Performance regarding utilization of work environment safety measures throughout the observation time regarding their Job Positions (N= 112). As this figure indicated head nurses performance was better than staff nurses performance regarding utilization of work environment safety measures. Otherwise, the highest performance of nursing staff was to utilize electrical safety measure. While the lowest nursing staff performance was regarding utilize mechanical measure.

Table No 6: Pearson's correlation between nursing staff performance and work environment safety measure.

Study variables	Work environment safety measure	
	P-value	R
Nursing staff performance	0.001**	0.6

(*) statistically significant at $p < 0.05$

Table 6: Shows Pearson's correlation between staff Performance's and work environment safety. This table showed that there was a high correlation between nursing staff performance's score and utilization of work environment safety measure

4. Discussion

Creating a safe working environment is reasonably acceptable. In contrast, neglecting safety in the workplace can cause a lot of damage and injury to the workforce. A lot of injuries attributable to the absence of or insufficient safety in the workplace will not only direct to the financial losses, but also to the loss of valuable human resources of the organization. It is, therefore, much more attention be paid to safety and work-related health [13]

Therefore, the aim of the present study was to assess the utilization of work environment safety measures among nursing staff: its relation to their performance at, Menofia University Hospitals and Nasser Institute Hospital. Three questions were answered in the present study. The first question was what are the types of work environment safety measures used in the study settings? The second was what is the level of nursing staff performance regarding utilization of work environment safety measures in the study setting? The third was what is the relationship between work environment safety measures and performance among nursing staff?

Before discussing the results related to answering the study questions, the light should be directed to socio-demographic characteristics of the studied subjects which were answered in tables 1 and 2. Personnel characteristics indicated that the present study was conducted at two hospitals namely Menofia University Hospital and Nasser Institute Hospital. The subjects were distributed among these hospitals equally. The studied sample was distributed in the study settings including critical care units and general departments. The highest percentage of the studied subjects was from critical care units and they were staff nurses. Also, the highest percentage of the subjects was diploma nurses and has five to less than ten years of experience.

The results regarding work environment safety measures at the study settings, it was founded that both hospitals have many defects in its work environment safety measures and also both hospitals were located in the category (B) in hospital safety index. And also the level of nursing staff's performance at Nasser Institute Hospital and Menoufia University Hospital was low throughout the observation period. From the researcher point of view, this caused by increase in patient flow with staff shortage thus defect in the safety environment measure lead to bad level of nursing staff's performance. Regarding biological safety at the study settings, the lowest maintained biological safety work environment measures' at both hospitals were: cleaning beds daily with cotton with alcohol; presences of separate workers

bathroom and prevention of patient home food. While the highest maintained biological safety work environment measures' at both hospitals was the presence of clearly marked baskets. These results were incongruent with [14]. Who stated that occupational accidents connecting to biological fluids in health care workers are among the most recurrent and the most severe accidents, which can cause the development of different diseases? Occupational exposure among these workers, more particularly among nurses, can be attributed to numerous direct or indirect factors, such as essential and direct care to patients, administering medication and dressing wounds, cleaning and sterilization of surgical supplies, equipment and various instruments, extreme workload, and inappropriate environment for carrying out the work process

Regarding electrical safety measures, the present study indicated that both hospitals have many defects in work environment regarding maintaining safe electrical work environment. These defects were: absences of electrical danger signs beside electricity source, electrical plugs away from furniture, a routine check of plugs and cord, and lack of electrical maintenance. From the researcher point of view, these may be the causes of the presences of electrical hazards in the study settings. This result of the present study was in the same line with [15] who concluded that violations of standards directing the use of electrical equipment were the most frequently cited causes of electrical fires. Comprehensive electrical maintenance records should be kept, and significant effort should be devoted to electrical safety, particularly in areas where patient care is concerned.

Regarding mechanical safety measures, the present study revealed that there are many defects in mechanical safety measures at both hospitals. These defects were: nearly about 10% of the studied units and department the doors open to the outside direction and this in Nasser Institute Hospital (intensive care unit) and this impaired easily movement outside and inside the units and departments. Stairs were not completely intact and were not completely supplemented with side rails, and the lights along stairs were not completely maintained. These results were not in the same line with [16] which indicated that every workplace and the furniture, furnishings, and fittings should be kept clean and it should be possible to keep the surfaces of floors, walls, and ceilings clean. Cleaning and the removal of misuse should be carried out as necessary by an effective method. Misuse should be stored in appropriate receptacles.

Regarding chemical safety measures, the present study revealed that there are many defects in chemical safety measures at both hospitals. These defects were storage areas of chemical substances were neither fir neither protected nor good ventilated. From the researcher point of view, these defects can lead to increase the chance of exposure to chemical risks among nursing staff. This result was in the same line with [17] that concluded

exposure to toxic chemicals can dangerously affect the health. On the other hand, if appropriate precautions are taken, these chemicals can be handled safely. There are various methods which provide protection from such exposures. The design of the workplace, the work practices and hygiene practices followed and the protective equipment worn may all be vital to control the exposure to toxic substances.

Regarding physical safety measures, the results of the present study revealed that there are many defects in physical safety measures at both hospitals. These physical defects as absences of keeping quite please in all units and departments at both hospitals under the study, low percent of the presence of air conditions and good ventilation (60%) and crowding (about 80%) in both hospitals under the study. The result of the present study was strongly agreed with [18] who stated that accidents at the workplace results from two broad causes: unsafe work condition and unsafe work behavior. Unsafe physical conditions include imperfect equipment, inadequate machine guards, and deficiency in protective equipment. Examples of unsafe environmental conditions are noise, radiation, dust, fumes, and stress.

Regarding the psychological safety measure, the result of the study was revealed that there were many defects in the work environment in the study settings. These defects were: low percentage of suitable resting areas, low chance of job vacations (50%), and low presence of garden attached to the hospital (50%) and low satisfied work schedule (50%). This result was in the same line with [19] that concluded that psychological work environment was, directly and indirectly, influences organizational health.

Regarding the other type of occupational safety measures: (violence, fire, and catastrophes) exposure in the study settings. The result of the present study reflected that both hospitals did not have any special alarm if their nursing staff was exposed to violence or catastrophes, also the locations of fire extinguishers were not clearly marked for easily accessible in case of fire. The result of the present study was in the same line with [20] who concluded that nurses are at particularly high risk for workplace violence. There are wide-ranging types of controlling measures for violence at work includes work environment control, security equipment and personnel, employee training and administrative police based practices.

Finally, Employers did not concern with the health and environmental safety of their employees at work. An employee was not provided with safety and health equipment and s/he risked getting hurt at work anytime s/he goes about his/her duties. The present study revealed that a high correlation among nursing staff performance's score and work environment safety measure. This result was congruent with [21] that which predicted higher levels of safety climate (i.e., lower PPR) would be linked to higher safety performance. At

the same line [22] who stated that there is a significant relationship between the safety of the hospital and each of the factors affecting the staff performance?

Conclusion

In the light of the present study findings, it can be concluded that both hospitals have many defects in its work environment safety measures and also were located in the category (B) in hospital safety index. Additionally, the level of nursing staff performance at Nasser Institute Hospital and Menofia University Hospital was low throughout the observation period. And also, nursing staff performance score regarding utilization of work environment safety measure at Nasser Institute Hospital was better than nursing staff performance score at Menofia University Hospital

Recommendations

Based on the findings of the present study, recommendations include: Management should organize regular training, workshops, seminars on health and safety for staff, publish materials on safety and many other steps to instruct safety consciousness in the minds of workers. Management should provide and maintain at the workplace, adequate plant and system of work that are safe and without risk to health. There should be regular servicing of machines, plants, and equipment to make them safe for use at the work place. Nurse Manager should perform a periodical review and close supervision of nursing staff to assure that they comply with Universal Precautions.

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