

## Effect of Environmental health and safety Measures Guidelines on Nurses' Knowledge and Practice

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### Abstract

**Background:** Environmental health and safety (EHS or HSE) is the department in a hospital or any health organization tasked with ensuring that the work undertaken by the hospital does not cause undue environmental damage, put the workers' health and safety at high risk, complies with applicable legislation, and follows best practices. EHS aims to prevent and reduce accidents, emergencies, and health issues at work, along with any environmental damage that could result from work practices.

**The aim of the study:** was to evaluate effect of environmental health and safety measures guidelines on nurses' knowledge and practice.

**Design:** One group pre-posttest quasi-experimental research design was utilized to achieve the aim of the current study.

**Setting:** conducted in the general pediatric surgical and medical unit in Cairo University Specialized Pediatric Hospital (CUSPH).

**Sample:** A Convenient sample of 30 nurses who were cared children in the general pediatric surgical and medical unit in Cairo University Specialized Pediatric Hospital (CUSPH). Those participants considered as control and study group.

**Data collection tool:** developed and collected by researchers, it included **Structured interview questionnaire** was to assess personal data for the nurse, **Nurses' Knowledge Assessment questionnaire** was to assess nurses' knowledge about environmental health and safety measures and **Nurses' practice checklist Sheet** to assess nurses' practice when environmental health and safety measures applied.

**Results:** the study results revealed that there were statistically significant differences between mean score of nurses' knowledge before and after receiving the environmental health and safety measures guidelines. As well as, nurses who received the environmental health and safety measures guidelines had higher mean score of practice.

**Recommendation:** Raising the awareness of nurses about Environmental health and safety Measures Guidelines through educational training sessions.

**Keywords:** Environmental Health and Safety Guidelines - Nurses' Knowledge and Practice

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### I. Introduction

Environmental health and safety (EHS or HSE) is the department in a hospital or any health organization tasked with ensuring that the work undertaken by the hospital does not cause undue environmental damage, put the workers' health and safety at high risk, complies with applicable legislation, and follows best practices. EHS aims to prevent and reduce accidents, emergencies, and health issues at work, along with any environmental damage that could result from work practices (Hopwood, Mellor & Brien 2017).

Environmental health and safety departments take a systematic and empirically informed approach to preventing accidents and injuries. They oversee a range of hazards, including ergonomic hazards, exposure to carcinogens, falls from height, and heavy machinery. The work undertaken by EHS is motivated by a number of concerns as the protection of workers, their health, and the natural environment; compliance with legal requirements and regulatory standards; and the increase in productivity, profit, and morale that comes with a safe and healthy workforce (Azadeh, Nouri & Mohammad 2017).

The formation of the U.S. Environmental Protection Agency (EPA) in the 1970s initiated environmental management requirements. Soon after, the EPA regulations were followed by other regulatory systems at the state levels. The Occupational Safety and Health Act of 1970 imposed additional regulatory

requirements on employers. International EHS standards have been set by ISO 14001 and OHSAS 18001 (Cadieux, Roy, & Desmarais 2016)

Registered nurses and other healthcare workers face many health occupational risks in the workplace, including the potential exposure to communicable and infectious diseases; exposures to blood or body fluids through needle sticks, other sharps injuries, and splash injuries; and exposure to chemicals, such as chemotherapeutics or cleaning agents to name a few. Because health care is a high-risk occupation, it is important that the healthcare worker be knowledgeable and informed about the risks he or she may encounter on the job. Each healthcare worker must be proactive in mitigating those risks and must be as prepared as possible to protect his or her own health. Healthcare workers and their employers are partners in creating a healthcare safety culture (Hockenberry & Wilson, 2018)..

The Occupational Safety and Health Administration (OSHA), created in 1970 with the mission to prevent work-related injuries, illnesses, and deaths, set some standards for workplace safety. In addition, the department of health in each state may offer guidelines to healthcare organizations concerning requirements for healthcare workers, such as necessary immunizations. Other organizations can also influence standards for healthcare workers; for example, The Joint Commission accredits and certifies healthcare organizations. Some standards include the review of plans of the healthcare organization impacting healthcare workers and children such as the exposure control plan (Hopwood, Mellor & Brien 2017).

Environmental Hazards for the nurse as a Worker are affected their health. Nursing is a uniquely hazardous occupation. (Cadieux, Roy, & Desmarais 2016)summarized some of the major hazards nurses may face on-the-job, and provided statistics for illnesses and injuries among pediatric nurses associated with working conditions. The Bureau of Labor Statistics (2015) reports that there are 1,859,000 nurses employed in the United States pediatric hospitals and suffered from infectious diseases, toxic substances.

In 2017, the rate of occupational injury and illness for pediatric nurses in health care settings was 18.6% per 100 full-time workers (18.2% accounted for injuries). This is higher than for hazardous occupations such as heavy construction where the rate of occupational injury and illness is 13.8% per 100 full-time workers or mining where the total is 7.5% per 100 full-time workers (Azadeh, Nouri & Mohammad 2017).

Nurses confront potential exposure to infectious diseases, toxic substances, back injuries, and radiation. They also are subject to hazards such as stress, shift work, and violence in the workplace. These typically fall under the broad categories of chemical, biological, physical, and psychosocial hazards (Hopwood, Mellor & Brien 2017).

The risk of infections is present not only in hospitals but in other settings where nurses are employed such as pediatric nursing units as dialysis centers, workplace health centers, or pediatric health clinics. In hospitals high risk areas include pediatric areas, infectious disease wards, emergency rooms, and ambulatory care facilities. Hepatitis B (HBV) is the most prevalent work-related infectious disease in the United States. Although blood is the major source of the virus, it may also be present in saliva, semen, and feces. Hepatitis A poses a risk for workers in settings such as institutions for the retarded where personal hygiene may be poor (Hockenberry, & Wilson, 2018). The use of good hand washing techniques is most effective preventive measure for this virus. The majority of cases of Hepatitis C is associated with IV drug use or is idiopathic in origin. The disease has rarely been transmitted to health care personnel via percutaneous exposure. Additional research is needed to determine the extent of this disease as an occupational hazard. Pediatric nurses in many settings may be exposed to infectious diseases such as measles, mumps, rubella, and influenza. Immune status should be determined when feasible for employees with direct patient care responsibilities and appropriate immunizations should be offered ( Azadeh, Nouri & Mohammad 2017)..

Back injury ranks second among all causes of occupational injuries for all occupations. It is reported that 40,000 nurses report back related injuries annually (Cadieux, Roy, & Desmarais 2016). Pediatric nursing activities such as lifting children in bed, helping children out of bed, transferring children from the bed, and carrying equipment weighing 30 pounds or greater are the most frequent causes of back pain. Back injuries in hospital nursing personnel account for greater than half the total compensation payments for back injury and it is estimated that greater than 764,000 lost work days are incurred each year ( Azadeh, Nouri & Mohammad 2017). The activities performed by pediatric nursing personnel at extended care facilities place them at greater risk for back injuries. Frequent lifts and assists for children who tend to be weak, debilitated, and elderly increase the risk of back injuries in those who provide their care. Registered nurses, licensed practical nurses, and nurse's aides are among the health care workers most frequently affected by this type of injury.

Exposure to ionizing radiation is associated with mutagenic and teratogenic properties leading to an increased risk of miscarriage, stillbirth, and other adverse reproductive outcomes, as well as cancers such as myelogenous leukemia, bone, and skin cancer. Pediatric nurses have potential exposure to ionizing radiation while holding children who are undergoing radiographs, and during direct care of children undergoing nuclear medicine tests and implants (2016). Personnel in departments where portable x-rays are performed (i.e., emergency room, surgical areas, intensive care units) are often inadvertently exposed to radiation. Although

researchers differ over quantifying the amount of radiation that is hazardous, there is evidence that low levels can cause biological damage (Hockenberry, & Wilson, 2018)..

Nurses who work with terminally and chronically ill children, and nurses who work in the intensive care units, emergency room, burn unit, or operating room are at particular risk for stress related symptoms. The early signs of stress include irritability, loss of appetite, ulcers, migraine headaches, emotional instability, and sleep disturbances ((Cadieux, Roy, & Desmarais 2016)). Workplace factors that may contribute to stress include dealing with life-threatening illnesses and injuries, demanding children, overwork, understaffing, difficult schedules (i.e., rotating shifts or working multiple shifts), specialized equipment, the hierarchy of authority, lack of control and participation in planning and decision making, and patient deaths. In many hospitals, the nurse may feel isolated, fatigued, angry, and powerless due to a sense of depersonalization created by a large bureaucratic system. When the signs of stress are not recognized and treated, burnout may result. Stress-related symptoms can lead to some bad habits. The worker's attitude and behavior may be adversely affected, leading to decreased job performance, and increased absenteeism ( Azadeh, Nouri & Mohammad 2017)..

Methods for coping with stress include regularly scheduled staff meetings; development of a stress management program and adequate coping mechanisms; availability of an employee assistance program; flexibility and worker participation in development of work schedules; appropriate training and educational sessions; creation of an organized and efficient work environment (to the extent that this can be accomplished); recognition and proper action on legitimate complaints; and group therapy/support groups for staff who deal with difficult professional problems (Hockenberry, & Wilson, 2018)..

### **Significance of study:**

Environmental Hazards for the nurse as a Worker are affected their health. Nursing is a uniquely hazardous occupation. (Cadieux, Roy, & Desmarais 2016) summarized that some pediatric nurses may face many environmental hazards which affected their health, and provided statistics for illnesses and injuries among pediatric nurses associated with working conditions. The Bureau of Labor Statistics (2015) reports that there are 1,859,000 nurses employed in the United States pediatric hospitals and suffered from infectious diseases, toxic substances ( Azadeh, Nouri & Mohammad 2017)..

In 2017, the rate of occupational injury and illness for pediatric nurses in health care settings was 18.6% per 100 full-time workers (18.2% accounted for injuries). This is higher than for hazardous occupations such as heavy construction where the rate of occupational injury and illness is 13.8% per 100 full-time workers or mining where the total is 7.5% per 100 full-time workers ((Hockenberry, & Wilson, 2018)..)

Scars research studies were conducted nationally to help nurses caring for children in pediatric surgical and medical units. Hence, the current study is undertaken to evaluate effect of environmental health and safety measures guidelines on nurses' knowledge and practice. Eventually, the results of the current study might generate an attention and motivation for further researches in the field of pediatric nursing. As well as providing guidance and recommendations that should be reflected in pediatric nursing education, practice and research.

### **The aim of the study:**

The aim of the current study was to evaluate effect of environmental health and safety measures guidelines on nurses' knowledge and practice.

### **Research Hypotheses:**

H1: Nurses who receive the environmental health and safety measures guidelines will have higher mean score of knowledge than before.

H2: Nurses who receive the environmental health and safety measures guidelines will have higher mean score of practice than before.

## **II. Subjects And Methods**

### **Research design:**

One group pre-posttest quasi-experimental research design was utilized to achieve the aim of the current study. A quasi experimental design is one type of experimental design that is very similar to the true experimental design except there is lose one criteria as randomization (**Polit & Beck, 2017**).

### **Setting:**

The study was conducted in the general pediatric surgical and medical unit in Cairo University Specialized Pediatric Hospital (CUSPH). It receives children from all over Egypt. The general pediatric surgical unit includes general pediatric surgeries as abdominal, plastic, renal surgeries and others. The general pediatric medical unit includes general pediatric medical problems as renal, blood, respiratory medical problems and

others. Each unit involves four rooms, each room occupied by three patient's beds, and one large room contains fourteen beds.

**Subjects:**

A Convenient sample of 30 nurses who were cared children in the general pediatric surgical and medical unit in Cairo University Specialized Pediatric Hospital (CUSPH). The sample size was calculated based on formula. Those participants considered as control and study group.

**Inclusion criteria**

- Nurses in work.
- Nurses in shift.
- Nurses who were cared children in in the general pediatric surgical and medical units.

**Exclusion criteria**

- Supervisor nurses in shift.

**Data collection tools:**

The required tools developed and collected by researchers after reviewing the related literature through the following tools:

- 1- **Structured interview questionnaire:** It included the following one part to assess personal data for the nurse as: age, level of education, occupation, experience in years, and place of residence.
- 2- **Nurses' Knowledge Assessment questionnaire:** It included the following one part to assess nurses' knowledge about environmental health and safety measures regarding to definition, functions, types, complications, component, support and applications.
- 3- **Nurses' practice checklist Sheet:** It will include one part to assess nurses' practice when environmental health and safety measures applied.

**Scoring system:**

Scoring system for **Nurses' Knowledge Assessment questionnaire and Nurses' practice checklist Sheet** were 100 scores. Fifty scores were for each nurse's knowledge about environmental health and safety measures and each nurse's practice when environmental health and safety measures applied. Each complete answer took two scores, incomplete one took one score and the wrong answer or no response took zero. The total score will be converted to 100% (100 score), and then categorized as following: the total score less than 50% (less than 50 score) was considered as unsatisfactory while score of 50% and more (50 score) was considered as satisfactory level.

**Validity and reliability:**

The tools reviewing by 5 experts in pediatric nursing to test the content validity of tools. Reliability of the tools was performed to confirm its consistency tools. The reliability coefficients' alpha between questions was 0.72.

**Pilot study:**

Pilot study was conducted on 5 nurses who were cared children in in the general pediatric surgical and medical unit to ensure the clarity of content of tools and to assess the time needed to fill the tools. Minor modifications were done such as restate some wards. Based on the results of the pilot study, nurse who participated in the pilot study was included in the total study sample.

**Procedure:**

Official permissions from Cairo University Specialized Pediatric Hospital (CUSPH) obtained. Nurses who met the inclusion criteria invited to participate in the study. The purpose and the nature of study explained to each mother individually. An oral consent obtained from each nurse to get her acceptance as well as to gain her cooperation. The interview conducted for all nurses to fill structured interview questionnaire which covered personal data about nurse: age, level of education, occupation, experience in years, and place of residence. At the same time, the researchers obtained nurses' knowledge about environmental health and safety measures regarding to definition, functions, types, complications, component, support and applications **and filled the nurses' Knowledge Assessment questionnaire by nurses as pretest ,before receiving** knowledge about environmental health and safety measures regarding to definition, functions, types, complications, component, support and applications. This interview took place in the waiting area in the medical or surgical unit as a first interview (20 - 30mins). At the second interview, the researchers observed the participated nurse in the medical

or surgical unit to fill **the nurses' practice checklist Sheet as a first time before receiving** knowledge about environmental health and safety measures regarding to definition, functions, types, complications, component, support and applications. At the same time, the researchers gave one session about environmental health and safety measures regarding to definition, functions, types, complications, component, support and applications for participated nurse (20 - 30mins).

At the third interview, the researchers observed the participated nurse in the medical or surgical unit to fill **the nurses' practice checklist Sheet as a second time after receiving** knowledge about environmental health and safety measures regarding to definition, functions, types, complications, component, support and applications. At the same time, the researchers **filled the nurses' Knowledge Assessment questionnaire as posttest** from the participated nurse (30 – 45 mins).

Data collection started at January 2017 and finished December 2018. The researchers prepared Arabic teaching instructions in form of flayer and gave it to the nurses who participated in the study after finishing the data collection. It included simple information about environmental health and safety measures regarding to definition, functions, types, complications, component, support and applications.

### **Ethical Considerations:**

The oral consent obtained from the nurses after complete description of the purpose and the nature of the study. Nurses were informed that participation in the study is voluntary. The research investigator informed the nurses about their rights to withdraw from the study at any time without giving any reason and without any effect on their work. Confidentiality assured to each nurse.

### **Statistical Analysis:**

A compatible personal computer (PC) was used to store and analyze data. The Statistical Package for Social Studies (SPSS), version 11.0 was used. Data were coded and summarized using mean, standard deviation and crosstabs for quantitative variables, and percent for qualitative variables. The collected data tabulated, and summarized. Data was computerized and analyzed using appropriate descriptive and inferential statistical tests. Qualitative data were expressed as frequency and percentage. A comparison between qualitative variables carried out by using parametric Chi square test. Comparison of means was performed using paired-sample t-test. Correlation among variables was done using Pearson correlation coefficient. Level of significance at  $p < 0.05$ , 0.001 were used as the cut of value for statistical significance.

## **III. Results**

**Figure (1) Percentage Distribution of Nurses Agein Medical and Surgical unit**

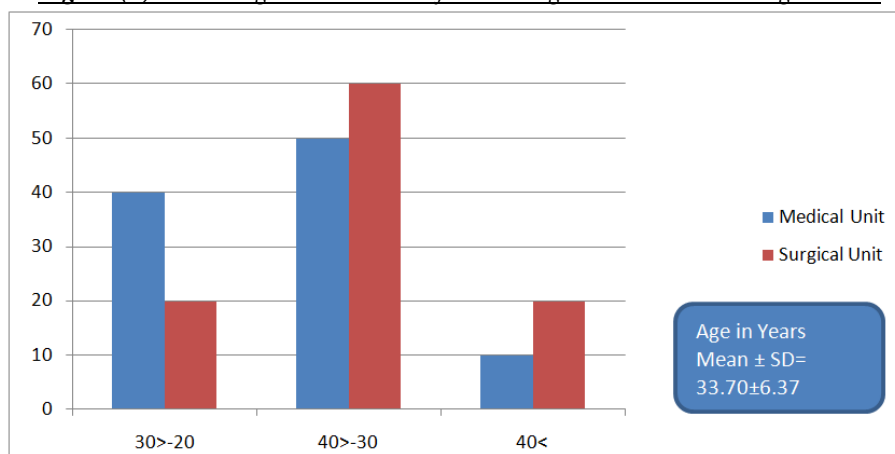


Figure (1) clarified that more two thirds of nurses their age ranged from 30 to less than 40 years also half of nurses worked in medical and more than half of them worked in surgical word. Two fifth of nurses their age ranged from 20 to less than 30 worked in medical compared to 20% of them worked in surgical unit and the mean age  $33.7 \pm 6.37$ .

**Figure (2) Percentage Distribution of Nurses Gender in Medical and Surgical unit**

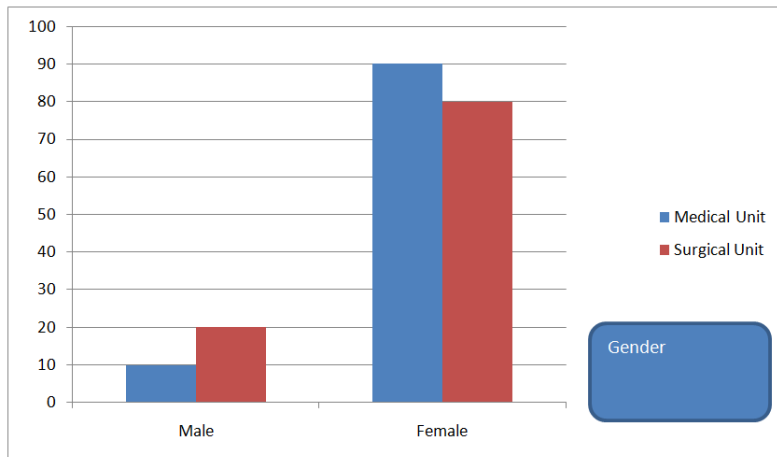


Figure (2) indicated that the majority (90% & 80%, respectively) of nurses in study groups were females in the both medical and surgical compare to (20% & 10% respectively) of them in the study group were male.

**Figure (3) Percentage Distribution of Nurses Education Degree in Medical and Surgical unit**

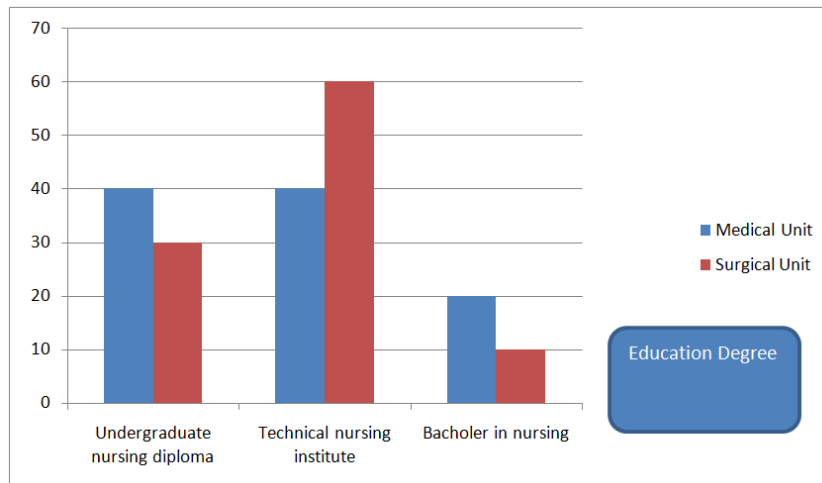


Figure (3) clarified that nurses qualifications nearly two thirds (60%) of nurses worked in the surgical unit compared to 40% of them worked in medical unit were graduated from the technical institute of nursing. In relation to (40% & 30%, respectively) of them in both medical and surgical word were diploma nurses.

**Figure (4) Percentage Distribution of Nurses Years' Experience in Medical and Surgical unit**

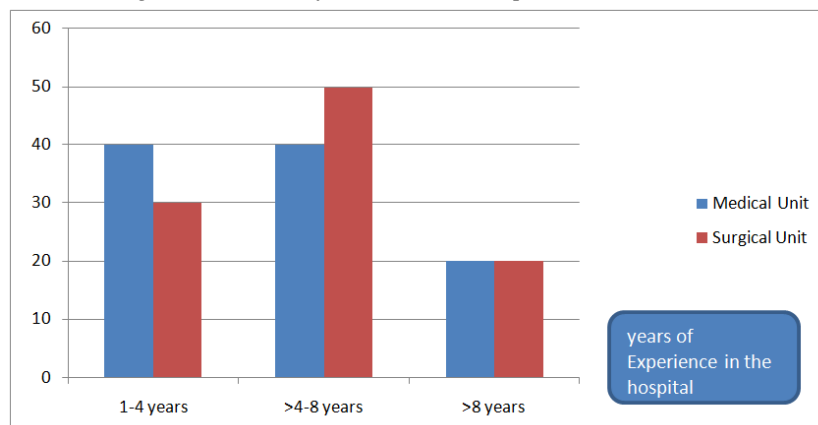


Figure (4) clarified that (50% & 40%, respectively) of nurses had more than 4 to 8 years' experience in both surgical and medical unit. Two fifth (40%) of them worked in medical unit had experience from 1 to 4 years compared to more than one quarter (30%) of them had the same experience in surgical unit.

**Figure (5) Percentage Distribution of Nurses Place of Residence**

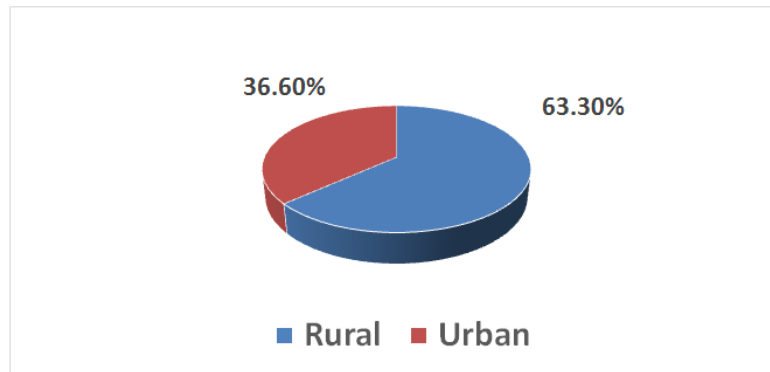


Figure (35) illustrated that 63.3% of nurses in the study groups live in rural area and 36.6 % of them live in urban areas.

**Table (1) Comparison between Total Mean Score of Nurses' Knowledge Before and After Receiving environmental health and safety measures guidelines (n=30).**

Items	Before environmental health and safety measures guidelines	After environmental health and safety measures guidelines	t-test	P value
	Mean ± SD	Mean ± SD		
definition(20 marks)	11.4±2.1	14.3±3.2	0.73	0.01*
functions (20 marks)	9.1±1.7	11.2±1.2	0.61	0.02*
types(10 marks)	6.3±2.5	7.3±3.6	0.55	0.062
complications(20 marks)	11.3±1.4	14.2±1.2	0.88	0.02*
component(10 marks)	6.3±1.1	7.3±3.2	0.9	0.07
support (10 marks)	3.9±1.7	7.2±1.4	0.56	0.02*
applications(10 marks)	5.3±2.1	7.3±3.2	0.93	0.01*

\* Statistical significant at P ≤ 0.05

Table (1) highlighted that, the total mean scores of nurses knowledge before getting the teaching instructions were 11.3±2.1, 9.1±1.7, 6.3±2.5, 11.3±1.4, 6.3±1.1, 3.9±1.7 and 5.3±2.1 respectively as regards nurses' knowledge before receiving environmental health and safety measures guidelines regarding to definition, functions, types, complications, component, support and applications. While, after receiving the teaching instructions the total mean scores of nurses knowledge increased to 14.3±3.2, 11.2±1.2, 7.3±3.6, 14.2±1.2, 7.3±3.2, 7.2±1.4, 7.3±3.2 respectively. There were statistically significant differences were detected between total mean score of nurse's knowledge before and after receiving the guidelines at (p < 0.05).

**Table (2) Comparison between Nurses Level of Knowledge Before and After Receiving environmental health and safety measures guidelines (n=30).**

level of knowledge	Before environmental health and safety measures guidelines		After environmental health and safety measures guidelines		X <sup>2</sup>	P value
	No	%	No	%		
Satisfactory	11	36.6	17	56.6	0.29	0.05*
	<b>50.3±1.1</b>		<b>58.3±2.9</b>			
Unsatisfactory	19	63.3	13	43.3	0.33	0.03*
	<b>33.3±2.7</b>		<b>47.2±1.2</b>			

\* Statistical significant at P ≤ 0.05

Table (2) indicated that, 63.3% of nurses had unsatisfactory level of knowledge before receiving guidelines compared to 36.6% of them had satisfactory level of knowledge before guidelines. 43.3% of nurses had unsatisfactory level of knowledge after getting guidelines compare to more than half (56.6%) of them had satisfactory level of knowledge after receiving guidelines. There was statistically significant difference was detected between nurse's level of knowledge before and after receiving guidelines at (p < 0.05). There was

statistically significant difference before and after satisfactory and unsatisfactory level of knowledge between environmental health and safety measures guidelines ( $X^2= 0.29$ ,  $p= 0.05$ ,  $X^2= 0.33$ ,  $p= 0.03$ ).

**Table (3) Correlation between Nurse's Age and their Total Mean Score of Satisfactory Knowledge**

Items	Age( in years)Mean ± SD= 33.70±6.37	r	P
Mean ± SD Before environmental health and safety measures guidelines	50.3±1.1	0.170	0.905
Mean ± SD After environmental health and safety measures guidelines	58.3±2.9	0.036	0.801

Table (3) highlighted that there were no statistically significant correlation between nurse's age and total mean score of satisfactory knowledge before and after environmental health and safety measures guidelines.

**Table (4) Comparison between Nurses ' Practice before and after Receiving environmental health and safety measures guidelines (n=30).**

Score of Nurses ' Practice	Before environmental health and safety measures guidelines		After environmental health and safety measures guidelines		X <sup>2</sup>	P value
	No	%	No	%		
Satisfactory	4	13.3	10	33.3	0.23	0.05*
	<b>50.1±1.1</b>		<b>57.3±3.9</b>			
Unsatisfactory	26	86.6	20	66.6	0.73	0.03*
	<b>27.3±2.7</b>		<b>43.2±1.2</b>			

\* Statistical significant at  $P \leq 0.05$

Table (4) demonstrated that, 86.6% of nurses had unsatisfactory level of practice before receiving guidelines compared to 66.6% of nurses had unsatisfactory level of practice after getting guidelines. The results demonstrated that, 13.3% of nurses had satisfactory level of practice before guidelines compare to one third (33.3%) of them had satisfactory level of practice after receiving guidelines. There was statistically significant difference was detected between nurse's level of practice before and after receiving guidelines at ( $p < 0.05$ ). There was statistically significant difference before and after satisfactory and unsatisfactory level of practice between environmental health and safety measures guidelines ( $X^2= 0.23$ ,  $p= 0.05$ ,  $X^2= 0.73$ ,  $p= 0.03$ ).

#### IV. Discussion

The results of the current study indicated that, more two thirds of nurses their age ranged from 30 to less than 40 years also half of nurses worked in medical and more than half of them worked in surgical and the mean age  $33.7 \pm 6.37$ . These results were congruent with Victor, Joshi, Vasanth, Raghavan and Gopichandran (2016) who studied Effect of In-Service Education Workshop on Occupational Health and Safety and concluded that majority of nurses (75.7%) were more than 30 years with the mean age and range  $37.2 \pm 7.7$ .

Regarding to nurses gender, the majority (90% & 80%, respectively) of them in study groups were females in the both medical and surgical word compare to (20% & 10% respectively) of them in the study group were male. From the researcher view this may be due to the dominance of females in the nursing profession and recent involvement of male in nursing career. In a qualitative study held by Alavi et al, on 24 pediatric nurses to study their perception of factors associated with caring self-efficacy, the results Two thirds of nurses who participated in the current study were males.

The results of the current study indicated that, nearly two thirds (60%) of nurses worked in the surgical unit compared to 40% of them worked in medical unit were graduated from the technical institute of nursing. In relation to (40% & 30%, respectively) of them in both medical and surgical word were diploma nurses. These results were contradictory with Ali (2018) who studied quality of life for nurses and reported that, their educational level varies between Diploma, Bachelor representing (37%, 62%, respectively). From the researcher view this may be due to the number of educational institutions and schools graduating diploma nurses are more than the number of faculties graduating bachelor degree nurses.

Concerning nurses' years of experience, 50% & 40%, respectively of nurses had more than 4 to 8 years' experience in both surgical and medical unit. These results were contradictory with Kim and Yeom (2018) who studied that the nurses burnout among intensive care unit and stated that found majority of nurse's participants had job experience less than 5 years which can affect knowledge of nurses. As well as, a higher level of burnout was significantly associated with younger age of nurses.

Regarding to place of residence for nurses, 63.3% of nurses in the study groups live in rural area and 36.6 % of them live in urban areas. This result congruent with Charles (2014) stated that inadequate sleep



resulting to fatigue and can affect a registered nurse's ability to deliver optimal patient care and this indicted to most of nurses worked in different hospital form rural area.

The results of the current study indicated that, there were statistically significant differences were detected between total mean score of nurse's knowledge before and after receiving the guidelines regarding to definition, functions, types, complications, component, support and applications at ( $p < 0.05$ ). This result corresponding with Kumari, (2018) majority (74%) of samples were having excellent practice and safety of the work environment and had significant differences were detected between knowledge and practices ( $p = < 0.05$ ). On the same line. Amadhila's (2017) concluded that most (76%) of the registered nurses have knowledge on the ways that they can be exposed to occupational hazards in the following areas: such as handling of sharp instruments, lifting of patients, exposure to psychological problems due to frustrations, and exposure airborne diseases.

It was evident from the current study that indicated that, 63.3% of nurses had unsatisfactory level of knowledge before receiving guidelines compared to 36.6% of them had satisfactory level of knowledge before guidelines. 43.3% of nurses had unsatisfactory level of knowledge after getting guidelines compare to more than half (56.6%) of them had satisfactory level of knowledge after receiving guidelines. This result corresponding with Jenniffer (2016) reported that, 86.77%. Nurses from the National University Hospital displayed both Dimensions that garnered the highest positive perceptions in safety culture were organizational learning and teamwork.

It was evident from the current study that, there were no statistically significant correlation between nurse's age and total mean score of satisfactory knowledge before and after environmental health and safety measures guidelines. These results were contradictory with Asadollah et al, (2015) reported that work experience had a significant relationship with the satisfactory level of knowledge for nurses. Ghadamgahi et al (2016) concluded that significant relationship between age and level of knowledge for nurses at ( $r = 0.25$ ,  $P = 0.001$ ).

In relation to recording of nurse's level of knowledge before and after receiving guidelines, there was statistically significant difference was detected between nurse's level of knowledge before and after receiving guidelines at ( $p = < 0.05$ ). This result agreement with Turk (2014) who studied knowledge, attitude and safe behavior of nurses handling cytotoxic anticancer drugs showed that, service training is a very effective tool to increase the level of knowledge for nurses at ( $p = < 0.01$ ). Also.

## V. Conclusion

The current study results concluded that nurses who received Environmental health and safety Measures Guidelines had higher total mean score of knowledge regarding to definition, functions, types, complications, component, support and applications. As well as, nurses who received the environmental health and safety measures guidelines had higher mean score of practice.. These results support the proposed study hypotheses.

## VI. Recommendations

Based on the results of the current study, it was recommended that:

- Raising the awareness of nurses about Environmental health and safety Measures Guidelines through educational training sessions.
- Simple Arabic illustrated booklet about Environmental health and safety Measures Guidelines should be available and distributed to nurses in pediatric surgical and medical units.

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