Assessing Occupational Health Hazards Associated with Nursing Practice among Critical Care Nurses

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Abstract

Background: Health professionals are challenged with physical, chemical, and psychological hazards. The major areas in which nurses perform hazardous tasks, patient care, bed making, cleaning and dressing of wounds, medication administration, and performing operations. **Aim:** to assess the occupational health hazards among critical care nurses. **Research design**: A descriptive exploratory research design was used in this study. **Setting:** this study was conducted at internal medicine intensive care unit affiliated to Ain Shams University hospitals. **Subjects**: A convenient sample of all nurses (50) recruited in previous mentioned setting and accepted to participate in this study. **Tools for data collection: Tool (I):** Nurses self-administrated questionnaire. **Tool II:** Assessment of Nurses' knowledge about occupational hazards in the intensive care unit. **Tool III** Self-reported nurses questionnaire regarding preventive measures for occupational health hazards among critical care nurses in the intensive care unit. **Results:** 58.0% of them have low exposure to physical hazards, 50.0% of the studied nurses have low exposure to psychological hazards**.** 32.0% of the studied nurses have moderate exposure to social hazards. **Conclusion:** There was highly statistically significant positive correlation between total exposure to physical hazards and total psychological hazards, total social hazards and total knowledge. There are a statistically significant relations existed between physical hazards and qualification. Also a statistically significant relations existed between psychological hazard and their gender. As well, a statistically significant relations are exist are between social hazards and age. **Recommendations:** Guidelines, sufficient booklets and posters regarding health hazards and protective measures should be provided and distributed to all medical departments periodically, so that all nursing staff will be able to read and follow it.

Key wards: Key wards: Critical care, Health, Hazard, Nursing Practice, Occupational

Introduction

A lot of attention has been paid to improve occupational safety and health (OSH). OSH relates to health, safety and welfare issues in the workplace. Laws, standards and programs related to OSH aim to make the workplace better for workers, co-workers, family members, customers and other stakeholders as well as nurses who are a crucial component of the healthcare system. They are an integral part of clinical services. Additionally they have primary responsibility for a significant proportion of patient care in most health care settings **(Okechukwu & Chizoba, 2022).**

Nurses are the workforce in the ICU and are mostly involved in complex work tasks, such as medication management, organizing the ICU environment, coordinating the work tasks between nursing staff and direct contact with patients while providing care, as well. Nurses are responsible for tasks related to patient care directly, inasmuch as they are the members of the ICU team that are most exposed to the physical workloads. The work environment in the ICU setting poses many occupational hazards. Thus, the occupational hazards and challenges for female members of the ICU team must be considered during the risk assessment, hazard prevention and training processes as they might face higher risks **(El-Sayed et al., 2020).**

Occupational hazards are risks associated with working in specific occupations. The Occupational Safety and Health Administration (OSHA) describe five categories of occupational hazards: physical safety hazards, chemical hazards, biological hazards, physical hazards, and ergonomic risk factors. Physical safety hazards include anything that could lead to injury in a workplace accident. This could be slipping hazards, the operation of machinery, electrical

hazards, or any other potentially dangerous condition that could exist in a workplace **(Legal Information Institute (LII), 2020).**

The latter four hazards are described as OSHA as health hazards. Unlike physical safety hazards, they describe risks of injury after cumulative exposure to a harmful condition or substance rather than a singular accident. Chemical hazards include solvents, adhesives, paints, toxic dusts, among other potentially toxic fumes or acids. Biological hazards include infectious diseases, molds, toxic or poisonous plants, or animal materials. Physical hazards include excessive noise, elevated or low temperatures, or radiation. Ergonomic risk factors include repetitive actions, such as heavy lifting or the use of tools with significant vibration**. (Legal Information Institute (LII), 2020).**

Nursing staff face a broad range of occupational hazards exposure than other health care workers because of the nature of nursing responsibilities concerning twenty-four interactions care with the patients, performing invasive and noninvasive nursing procedures such as drug administration, hygienic care positioning, turning and walking patients, etc. Furthermore, nurses being the largest category of health care workers have a critical role to play in the healthcare delivery system. They are at the highest risk of exposure to occupational health hazards among healthcare workers. They routinely come into contact with blood and body fluids, chemicals, radiations, etc. which are very hazardous to their health **(Sabra & Morsy, 2020).**

Therefore, the most ideal approach to protect nurses from occupational hazards is to identify and manage them and take reasonable safety measures to prevent their potential to harm, control occupational hazards and eliminate or decrease the risk. Occupational health hazards have a harmful effect on the individual's health and safety as well as organizational effectiveness, while occupational safety describes a comprehensive concept for the protection of workforce from health risks in the workplace, which results from the job-related activity, biological, chemical and physical effects **(Jyoti, 2018).**

Significance of the study:

Critical care nurses are at potential risk of harm from exposure to numerous hazardous agents encountered in their workplace. The most recent and visible example is the ongoing COVID-19 pandemic, which has showcased the vulnerability of Critical care nurses and demonstrated the importance of ensuring their safety **(Prajwal, et al., 2021).**

Nurses continue to report high levels of job-related injury and illness. Working environment, responsibilities, and duties of nurses put them in the frontline of numerous occupational hazards. According to a National health Survey on occupational hazards 68.2% of ICU health workers in an Egyptian study reported moderate burnout and over 50% of nurses had high level of emotional exhaustion in 2023. Moreover according to a National Survey on occupational hazards in the United States, the incidence rate of occupational injury and illness for the medical and healthcare organization was as high as6.6% and ranked fourth out of 56 services in 2012, reported more incidents of back strain, dermatitis, infectious hepatitis, infectious diseases, psychological disorders, eye diseases and toxic hepatitis, substantial morbidity and mortality among healthcare workers inevitably lead to loss of skilled personnel and adversely impact health care services which are already strained in low and middle-income countries **(Amr and Elsyed, 2019).**

Hospitals have many unique hazards that can potentially affect the health of employees. Exposures to occupational hazards throughout hospital departments are highly variable. Hence, this study was conducted to identify types of health hazards perceived by a critical nurse in Intensive care unit. Exposure of the critical care nurses to occupational health hazards has many multiplying effects of injuries and diseases among nurses include economic loss, physical loss and psychological disorders such as depression and stress. These have negative effect on the nurses, their families and the nation at large. Consequently, this study was conducted to assess occupational hazards among critical care nurses.

Aim of the Study

The aim of the current study is to assess the occupational health hazards among critical care nurses through:

1- Assessing physical hazards associated with nursing practice among critical nurses.

2- Assessing psychological hazards associated with nursing practice among critical care nurses.

3- Assessing social hazards associated with nursing practice among critical care nurses

4- Identifying the relationship between occupational health hazards and demographic data among critical care nurses.

Research questions

1- What are the physical occupational health hazards associated with nursing practice among critical care nurses?

2- What are the psychological occupational health hazards associated with nursing practice among critical care nurses?

3- What are the social occupational health hazards associated with nursing practice among critical care nurses?

4- What is the relationship between occupational health hazards and demographic data among critical care nurses?

Subjects and Methods

The subject and methods was portrayed under the four main designs as follows:

I- Technical design:

The technical design includes setting, subjects and tools for data collection.

-Research design:

A descriptive exploratory research design was used in this study.

Setting:

This study was conducted at internal medicine intensive care unit affiliated to Ain shams University hospitals which consists of 2 basic rooms, each room include 17 beds, each bed is equipped with cardiac monitor and ventilator. This unit received patient with different diagnosis like strokes, respiratory failure and kidney disease and nurses exposed to highly workload and exposed to highly risk of occupational health hazards that the causing of selecting this setting for data collection.

Subjects:

A convenient sample of all nurses (50) recruited in previous mentioned setting and accepted to participate in this study.

Tools for data collection:

Tool (I): Nurses self-administrated questionnaire

It was developed in an Arabic language to assess demographic characteristics of nurses under study and assess health hazards associated with nursing practice among critical care nurses. It consists of the following parts:

- **Part I:** was concerned with demographic characteristics of nurses under study and include age, gender, marital status, qualification, years of experience in nursing and years of experience in critical care nursing.
- **Part II:** It was adapted from **Elbilgahy (2019)** and modified by researcher, concerned with assessment health hazards that the critical care nurse exposed to using work-Related Symptom Scale (WRSS) it is classified into three sections
- Sect**ion I:** it was concerned with the assessment of physical hazards, among critical care nurses it was including: physical symptoms as; fatigue, headache, leg pains, backache and arthritic pain … etc. It was included (17item), mechanical hazards as musculoskeletal injuries such as ruptured / herniated disc, spinal injuries, Full accident and osteoporosis. It was included (4 items), biological hazards as exposure HCV, HBV and HIV infection. It was included (5 items), chemical hazards as exposure to chemical fluids from use of detergents and disinfectants and exposure to latex allergy, it was included (2 items) and radiological hazards as exposure to X-ray radiation it was included (1 items)

- **Section II:** it was concerned with the assessment of psychological hazards among critical care nurses as emotional instability, loss in self-confidence, loss of self-control, crying for no apparent reason and feeling of guilt. It include 11 items
- **Section III:** it was concerned with the assessment of social hazards among critical care nurses as social isolation, disturbed social life, insensitivity towards others and job dissatisfaction. It was included 8 items.

Scoring system

Each nurse was asked to respond against 3-point Likert scale. Responses included never, sometimes and always. Each item was scored as (0) for never, (1) for sometimes and (2) for always. The total score (48 items= 96 grades) was calculated, summed and changed into percentage. It was categorized to three exposure as: high hazard exposure if the nurse got >70% (>67 grades), moderate hazards exposure if the nurse got 50 to 70% (48 to 67grades) and low hazard exposure if the nurse got <50% (< 48 grades).

Part II: Assessment of Nurses' knowledge about occupational hazards in the intensive care unit.

It was developed by the investigator based on recent and related literature **(Abdelwahab, et al.,2019; Elbilgahy et al., 2019; Rayan et al.,2021)** to assess knowledge regarding occupational hazards it included MCQ and true and false question covering knowledge about occupational hazards including definition of occupational health hazards (2 items), causes of the occupational health hazards (6 items), types of occupational health hazards (4 items), symptoms of occupational health hazards (3 items)**,** preventive measures to reduce occupational health hazards among intensive care unit nurses (19 items).

Scoring system

Each question was scored as (1) for a correct answer and (zero) for incorrect answer. While the total knowledge score was (34 grades) calculated, summed and changed into percentage. The total items was 34 with total scores 34 grades, it was categorized as the following; if the nurse got <75% (less than 25 grades) it was considered unsatisfactory, and if the nurse got ≥75% **(25 grades or more**) it was considered satisfactory level of knowledge.

Tool II: Self-reported nurses questionnaire regarding preventive measures for occupational health hazards among critical care nurses in the intensive care unit. It was developed by the investigator based on recent and related literature **(Sabita et al.,2018; Amr and Elsyed, 2019;)** to assess preventive measures regarding occupational health hazards among critical care nurses in the intensive care unit it included true and false question. It was classified into the following parts: general preventive measures (4 items), preventive measures regarding physical hazards (3 items), preventive measures regarding mechanical hazards (6 items), preventive measures regarding biological hazards (10 items), preventive measures regarding chemical hazards (6 items), preventive measures regarding psychological hazards (4 items) and preventive measures regarding social hazards (5 items).

Scoring system

Each item was scored as (1) for yes answer, (0) for no answer. Total score was 38 items (38 grades) it was categorizes as the following: if the nurse got ≥70% (28 or more grades) considered adequate prevention measure, while if the nurse got < 70% (less than 28 grades) considered inadequate prevention measure.

II- Operational design:

The operational design includes preparatory phase, validity and reliability, Pilot study and field work.

Preparatory phase:

It included reviewing of related literature, and theoretical knowledge of various aspects using books, articles, internet, periodicals and journals to develop the study tools for data collection. During this phase, the researcher also visited the selected places to get acquainted with the personnel and the study settings. Development of the tools was under supervisors' guidance and experts' opinions were considered

Validity and reliability:

Tools validity and reliability:

Validity of tools done by using face and content validity. Face validity aimed at inspecting the items to determine whether the tools measure what supposed to measure. Validity was established to determine whether the content of the tools cover the aim of the study. The professors of medical surgical nursing and critical care nursing department, Faculty of Nursing, Ain Shams University reviewed the tools for clarity, relevance, comprehensiveness, simplicity and applicability.

Testing reliability:

Reliability was measured by Cronbachs Alpha test was used to measure internal consistency of the tools used in the study.Alpha test (tool I: Nurses self-administrated questionnaire work-related symptoms scale) the value was.819.The reliability test for (Tool II: Nurses' knowledge regarding occupational hazards questionnaire) was.804. The reliability test for (Tool III: Self-reported nurses questionnaire regarding preventive measures for occupational health hazards)was.895. which indicated good reliability of study tools.

Pilot study:

It was carried out on 10%(5nurses) of nurses in intensive care unit. In order to test the applicability of the constructed tools and the clarity of the included questions. The pilot has also served to estimate the time needed for each subject to fill in the questions. No modification were done after pilot study, so the nurses under pilot study were included in the main study sample.

-Field work:

An approval was obtained from hospital director and nursing director of internal medicine hospital affiliated to Ain shams university hospitals. The purpose of the study was simply explained to the nurses who agree to participate in the study prior to any data collection. Assessment of occupational health hazards among nurses by using self-administered questionnaire work related symptoms scale. Data was collected by the researcher three days per week during morning and afternoon shifts. Data collection started from October to December 2021. The interviewing questionnaires were distributed and filled by the nurses after explaining the aim of the study and questionnaires items its took 30 to 45 minutes to be fullfilled. Assessment of Nurses' knowledge about occupational hazards in the intensive care unit; the researcher was distribute questionnaire to studied nurses after divided to groups to assess knowledge regarding occupational hazards., the investigator help studied nurses when had any difficulties to answer the questionnaire, it filled by nurses which take 10-15 minutes. Preventive measures taken 10 minutes to be fulfilled. The researcher taken 5 nurses every day of data collection from 9 AM to 2 PM or from 3 PM to 9PM, morning and afternoon shifts

Ethical considerations:

Research approval was obtained from the scientific research Ethical Committee before starting the study. The researcher was clarified the objectives and aim of the study to nurses included in the study before starting. Verbal approval was obtained from the nurses before their participation in the study; a clear and simple explanation was given according to their level of understanding.

The researcher assured maintaining anonymity and confidentiality of subjects' data. The subjects were informed that they are allowed to choose to participate or not in the study and they have the right to withdrawal from the study at any time without any consequences. Also, Ethics, values, culture, and beliefs were respected

III-**Administrative** design:

An approval of ethical committee of faculty of nursing of Ain Shams University was obtained. An official permission to conduct the study obtained from the nursing director of Ain Shams hospital. The researcher met the hospital nursing director and explained the purpose and the methods of the data collection.

IV-Statistical design:

The collected data was coded and entered into the statistical package for social sciences (SPSS) (SPSS Inc; version 24; IBM Corp., Armonk, NY, USA). After completing entry, the data was explored to detect any errors. Then, it was analyzed by the same program for presenting frequency tables with

percentages. Qualitative data was presented as a number and percent. Furthermore, quantitative data was described as mean or standard deviation, as appropriate. The Chi-square probability distribution is particularly useful in analyzing categorical variables. Pearson Correlation coefficients are used to measure the strength of the linear relationship between two variables. The results were considered statistically significant at $P < 0.05$ and highly significant at $P < 0.01$**.

Results

Table (1) Regarding the demographic characteristics of the studied nurses this study is conducted on 50 nurses. 58% of the studied nurses are between ages from 20 to less than 30 years old with mean 29.14±6.69 years. Also, 58.0% of the studied nurses are females and 56.0% of them are single. As regard to their qualification, 50% of the studied nurses are technical institute of nursing. Regarding years of experience in nursing, 44.0% of the studied nurses have less than 5 years with mean 6.58±1.41 years, whilst 56.0% of the studied nurses have more than 5 years of experience in critical care nursing. It was found that 86% of the studied nurses didn't attend training programs about occupational health hazards, but 100% of them haven't a manual guide for occupational hazards prevention.

Table (2) Regarding relationship between demographic characteristics of studied nurses and their total physical hazards associated with nursing practice, illustrates that a highly statistically significant relations are found between physical hazards and demographic characteristics of studied nurses regarding their age (P=.005) and years of experience in nursing (P=.009). Additionally, a statistically significant relation are exist between physical hazards and their gender, qualification and years of experience in critical care nursing (P=.017), (P=.021) and (P=.027) respectively.

Table (3) Concerning relationship between demographic characteristics of studied nurses and their total psychological hazards associated with nursing practice, represents that a highly statistically significant relations are found between total psychological hazards and their years of experience in critical care nursing (P=.002). In addition, a statistically significant relations exist between psychological hazard and their gender (P=.032).

Table (4) According to the relationship between demographic characteristics of studied nurses and their total social hazards associated with nursing practice, reveals that a highly statistically significant relations are found between social hazards and demographic characteristics of the studied nurses regarding their qualification, years of experience in nursing and years of experience in critical care nursing (P=.005), (P=.003) and (P=.001) respectively. As well, a statistically significant relations are exist are between social hazards and their age (P=.012*).

Table (5) Correlation between the studied nurses' total knowledge and total exposure to physical, psychological and social hazards shows highly statistically significant positive correlations between their total exposure to physical hazards and their total psychological hazards (r=.721, p=0.000**), total social hazards (r=.768, p=0.000**) and total knowledge (r=.774, p=0.000**). Additionally, highly statistically significant positive correlations are found between their total exposure to psychological hazards and their total social hazards (r=.514, p=0. 001**) and total knowledge (r=.556, p=0.001**). As well highly statistically significant positive correlation exists between their exposure to social, physical, psychological hazards and total knowledge (p=0. 000**).

Figure (1) shows Percentage distribution of the studied nurses according to their total exposure to physical hazards associated with nursing practice at ICU, it was found 58.0% of them have low exposure to physical hazards, while 32.0% of them have moderate exposure and only 10.0% of them have high exposure to physical hazards associated with nursing practice.

Figure (2) shows percentage distribution of the studied nurses according to their total exposure to psychological hazards associated with nursing practice at ICU, the finding reveals that 50.0% of the studied nurses have low exposure to psychological hazards, while 36.0% of them have moderate exposure while 14.0% of the studied nurses have high exposure to psychological hazards.

Figure (3) shows percentage distribution of the studied nurses according to their total exposure to social hazards associated with nursing practice at ICU ,the finding revealed that 40.0% of the studied nurses have low exposure to social hazards associated with nursing practice, 32.0% of the studied nurses have moderate exposure while 28.0% of them have high exposure to social hazards.

Figure (4) shows that, 60.0% of the studied nurses have satisfactory level of total knowledge regarding occupational hazards in ICU, while 40.0% of them have unsatisfactory level.

Figure (5) shows that, 56% of the studied nurses have inadequate level of total preventive measures regarding occupational hazards in ICU, 44% of them have adequate level of total preventive measures regarding occupational hazards in ICU.

Table (1): Number and percentage distribution of the studied nurses according to their demographic characteristics (n= 50).

Demographic characteristics	n	%
Age (years)		
20-<30	29	58.0
30-< 40	16	32.0
≥ 40	5	10.0
Mean ± SD 29.14±6.69 years		
Gender		
Male	21	42.0
Female	29	58.0
Marital status		
Single	28	56.0
Married	22	44.0
Qualification		
Nursing Diploma	10	20.0
Technical institute of nursing	25	50.0
Bachelor of nursing	14	28.0
Post graduate	1	2.0
Years of experience in nursing		
<5	22	44.0
5-<10	17	34.0
10-<15	7	14.0
≥ 15	4	8.0
Mean ± SD 6.58±1.41 years		
Name of the department		
ICU (Medicine1)	26	52.0
ICU (Medicine 2)	24	48.0
Years of experience in critical care nursing		
<3	10	20.0
3-<5	12	24.0
≥ 5	28	56.0
Mean ± SD 7.24±6.62 years		
Attendance of training programs regarding occupational health hazards		
Yes	7	14.0
No	43	86.0
Availability of manual guide for occupational hazards prevention in ICU		
No	50	100

Table (2): Relationship between demographic characteristics of studied nurses and their total physical hazards associated with nursing practice at ICU (n=50).

Items		Total physical hazards						X^2	P-Value
		High N=5		Moderate N=16		Low N=29			
		N	%	N	%	N	%		
Age	20-<30	0	0	3	18.8	26	89.7	8.907	.005**
	30-< 40	1	20.0	12	75.0	3	10.3		
	>40	4	80.0	1	6.2	0	0		
Gender	Male	1	20.0	2	12.5	18	62.1	4.822	.017*
	Female	4	80.0	14	87.5	11	37.9		
Marital status	Single	2	40.0	10	62.5	16	55.2	1.368	.057
	Married	3	60.0	6	37.5	13	44.8		
Qualification	Nursing Diploma	2	40.0	7	43.7	1	3.4	4.310	.021*
	Technical institute	3	60.0	6	37.5	16	55.2		
	Bachelor of nursing	0	0	3	18.8	11	37.9		
	Post graduate	0	0	0	0	1	3.4		
Years of experience in nursing	<5yrs	0	0	4	25.0	18	62.1	6.844	.009**
	5-<10yrs	0	0	6	37.5	11	37.9		
	10-<15yrs	1	20.0	6	37.5	0	0		
	>15yrs	4	80.0	0	0	0	0		
Years of experience in critical care nursing	<3yrs	0	0	0	0	10	34.5	4.256	.027*
	3-<5yrs	1	20.0	5	31.2	6	20.7		
	>5yrs	4	80.0	11	68.8	13	44.8		
Attendance of training programs	Yes	2	40.0	1	6.2	4	13.8	1.102	.089
	No	3	60.0	15	93.8	25	86.2		

*Significant at p ‹0.05. **Highly significant at p ‹0.01. Not significant at p>0.05

Table (3): Relationship between demographic characteristics of studied nurses and their total psychological hazards associated with nursing practice at ICU (n=50).

Items		Total psychological hazards						X^2	P-Value
		High N= 7		Moderate N= 18		Low N= 25			
		N	%	N	%	N	%		
Age	20-<30	3	42.9	9	50.0	17	68.0	1.278	.069
	30-< 40	3	42.9	6	33.3	7	28.0		
	>40	1	14.2	3	16.7	1	4.0		
Gender	Male	2	28.6	3	16.7	16	64.0	3.567	.032*
	Female	5	71.4	15	83.3	9	36.0		
Marital status	Single	4	57.1	11	61.1	13	52.0	1.199	.061
	Married	3	42.9	7	38.9	12	48.0		
Qualification	Nursing Diploma	4	57.1	5	27.8	1	4.0	1.586	.071
	Technical institute	1	14.3	9	50.0	15	60.0		
	Bachelor of nursing	2	28.6	4	22.2	8	32.0		
	Post graduate	0	0	0	0	1	4.0		
Years of experience in nursing	<5yrs	2	28.6	8	44.4	12	48.0	1.392	.052
	5-<10yrs	4	57.1	6	33.3	7	28.0		
	10-<15yrs	1	14.3	3	16.7	3	12.0		
	>15yrs	0	0	1	5.6	3	12.0		
Years of experience in critical care nursing	<3yrs	6	85.7	4	22.2	0	0	9.879	.002**
	3-<5yrs	1	14.3	9	50.0	2	8.0		
	>5yrs	0	0	5	27.8	23	92.0		
Attendance of training programs	Yes	2	28.6	3	16.7	2	8.0	1.274	.057
	No	5	71.4	15	83.3	23	92.0		

*Significant at p ‹0.05. **Highly significant at p ‹0.01. Not significant at p>0.05

Table (4): Relationship between demographic characteristics of studied nurses and their total social hazards associated with nursing practice at ICU (n=50).

Items		Total social hazards						X^2	P-Value
		High N= 14		Moderate N= 16		Low N= 20			
		N	%	N	%	N	%		
Age	20-<30	10	71.4	14	87.5	5	25.0	4.338	.012*
	30-< 40	4	28.6	1	6.25	11	55.0		
	>40	0	0	1	6.25	4	20.0		
Gender	Male	6	42.9	6	37.5	9	45.0	1.224	.060
	Female	8	57.1	10	62.5	11	55.0		
Marital status	Single	9	64.3	9	56.2	10	50.0	1.458	.084
	Married	5	35.7	7	43.8	10	50.0		
Qualification	Nursing Diploma	7	50.0	3	18.8	0	0	7.985	.005**
	Technical institute	6	42.9	10	62.5	9	45.0		
	Bachelor of nursing	1	7.1	2	12.5	11	55.0		
	Post graduate	0	0	1	6.2	0	0		
Years of experience in nursing	<5yrs	11	78.6	10	62.5	1	5.0	9.698	.003**
	5-<10yrs	3	21.4	5	31.25	9	45.0		
	10-<15yrs	0	0	1	6.25	6	30.0		
	>15yrs	0	0	0	0	4	20.0		
Years of experience in critical care nursing	<3yrs	8	57.1	2	12.5	0	0	10.879	.001**
	3-<5yrs	4	28.6	6	37.5	2	10.0		
	>5yrs	2	14.3	8	50.0	18	90.0		
Attendance of training programs	Yes	1	7.1	3	18.8	3	15.0	1.542	.067
	No	13	92.9	13	81.2	17	85.0		

*Significant at p ‹0.05. **Highly significant at p ‹0.01. Not significant at p>0.05

Table (5): Correlation between the studied nurses' total knowledge and total exposure to physical, psychological and social hazards

Variables		Physical	Psychological	Social	Knowledge
1. Total physical hazards	r				
	p				
2. Total psychological hazards	r	.721			
	p	.000**			
3. Total social hazards	r	.768	.514		
	p	.000**	.001**		
4. Total knowledge	r	.774	.556	.814	
	p	.000**	.001**	.000**	

(**) Highly statistically significant at p<0.01. r Pearson correlation

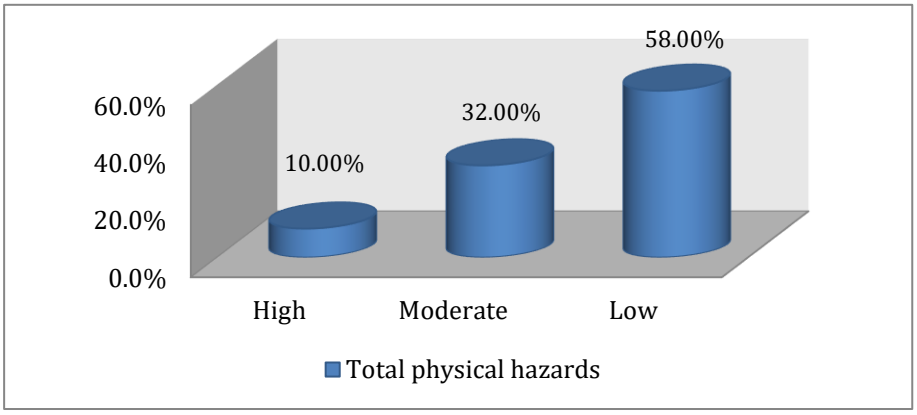


Figure (1): Percentage distribution of the studied nurses according to their total exposure to physical hazards associated with nursing practice at ICU (n=50).

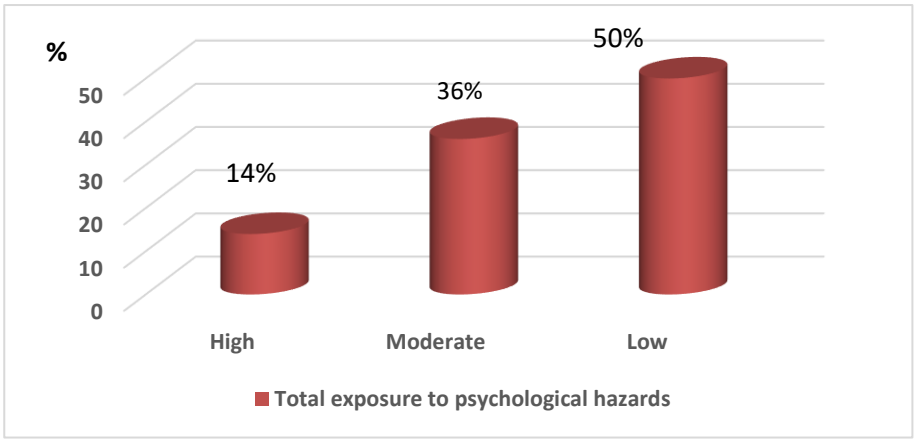


Figure (2): Percentage distribution of the studied nurses according to their total exposure to psychological hazards associated with nursing practice at ICU (n=50).

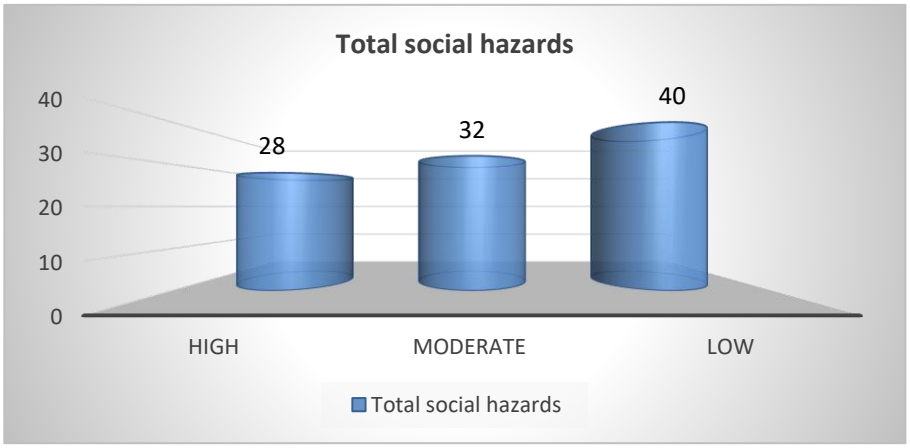
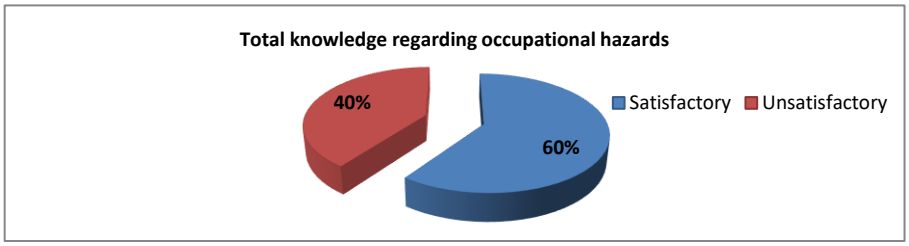


Figure (3): Percentage distribution of the studied nurses according to their total exposure to social hazards associated with nursing practice at ICU (n=50).

%

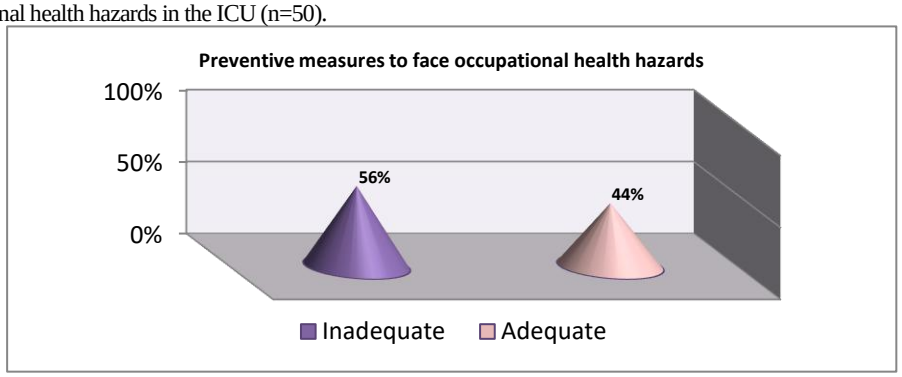
Figure (4):



Percentage distribution of the studied nurses according to their total knowledge about occupational hazards associated with nursing practice in the ICU (n=50).

<75 unsatisfactory ≥75% satisfactory level of knowledge.

Figure (5): Percentage distribution of the studied nurses according to their total preventive measures to face occupational health hazards in the ICU (n=50).



Discussion

Occupational health hazards are very common in developing countries where work place hazards are more severe. Still occupational diseases and accident are the most important causes of injuries and death among workers each year as the number of deaths of about two million people each year among all workers in the world **(Rayan et al., 2021)**. So the current study aimed to assess the occupational health hazards among critical care nurses.

As regard to age of the studied nurses, the current study was conducted on 50 nurses; more than half of the studied nurses were between age group from 20 to less than 30 years old with mean age slightly less than thirty. The present study result goes in the same line with **Denge& Rakhudu, (2022)** who applied study entitled "Perceptions of nurses on occupational health hazards and safety practices in Ditsobotla public hospitals" and

found that, highly percentage of the studied nurses their ages were between 20–29 years.

Regarding gender of the studied nurses, the present study result showed that more than half of the studied nurses were females and single. This might be due to most of nurses in nursing career are females. This finding was accordance with **Setiyadi et al., (2022)** who conducted study entitled "Knowledge and Perception of Nurses about Occupational Hazard with Nurse Characters" and found that more than half of the studied nurses were females

As regard to qualification of the nurses under study, the present study result presented that half of the studied nurses were graduated from technical institute of nursing, while minority of the studied nurses had post graduate. This might be due to many bedside nurses in governmental hospitals graduated from the nursing technical institute. The present study result was in the same line with **Shimizu et al., (2010)** who conducted study entitled "Occupational health hazards in ICU nursing staff" and reported that about half of the studied nurses had technical institute of nursing Regarding years of experience in nursing, the present study result showed that more than two fifths of the studied nurses have less than 5 years with mean years six and half years, whilst more than half of the studied nurses have more than 5 years of experience in critical care

nursing with mean years more than seven years. This might be due to more than half of the studied nurses were between ages group from 20 to less than 30 years old and half of the studied nurses were graduated from technical institute of nursing. In the same line, **Ilo et al., (2022)** who applied study entitled "Knowledge and practice of preventive measures for occupational health hazards among nurses working in a teaching hospital in Enugu" found that more than half of the studied nurses had 1-10 years of experience

Regarding attendance of training programs about occupational health hazards, the current study result mentioned that most of the studied nurses didn't attend training programs about occupational health hazards, and all of them mentioned no availability of manual guide for occupational hazards. This might be due to most of studied nurses were females with family commitments, lack of time, and workload in the intensive care unit may also be the reason behind. This in addition to lack of hospital in services training programs regarding occupational health hazards and safety of personal. The present study result was supported with **Rayan et al., (2021)** who applied study entitled "Assessment of Nurse Interns Knowledge and Practice and Attitude regarding Occupational Health Hazards" and reported that, highly percentage of the studied nurses didn't attend training programs about occupational health hazards.

As regard to studied nurses' total exposure to physical hazards associated with nursing practice at ICU as their self-report more than half of them reported low exposure to physical hazards. This result may be due to the following of safety measures regarding occupational hazards and compliance to their practice. This finding was contrasted with **Shamkh et al., (2022)** who conducted study entitled "Occupational Hazards among Nurses at Primary Health Care Centers in Al-Amara City/Iraq" and found that, exposure of occupational hazard among nurses was within the low level.

As regard to total exposure of the studied nurses' to psychological hazards associated with nursing practice at ICU, the present study result showed that half of them had low exposure to psychological hazards, while more than one third of them had moderate exposure and more than one tenth of them had high exposure to psychological health hazards. This may be due to support and work relationship between staff and supervisor.

The previous result was supported with **Ahmed,(2018)** who conducted study entitled " Types of Occupational Hazards and Its Contributing Factors As Perceived By Nursing Staff At Kidney Dialysis Units" and reported more than half of nursing staff had low level of perceived level of exposure to psychological hazards. While this result was contrasted with **Amare et al.,(2021)** who found that, about two thirds of the studied nurses had fear of occupational hazards related to psychological hazards..

As regard total social hazards of the studied nurses associated with nursing practice, the present study result revealed that two fifths of the studied nurses had low exposure to social hazards associated with nursing practice, and less than one third of them had moderate exposure while more than one quarter of them had high exposure to social health hazards. This might be due to the nursing face change in some procedure technique compared with what they learned also they loaded with much more tasks in hospital beside the nature of nursing profession which requires dealing with intense emotional situation or bereaved family and caring with unconscious, irritable and dying patient.

The present study result was disagreed with **Branco et al., (2010)** who applied study entitled "Occupational Health Hazards in ICU Nursing Staff" and found more than one tenth of the studied nurses had low level of social hazards.

Concerning total unsatisfactory level of knowledge regarding occupational hazards in the ICU, the present study result showed that two fifths of the studied nurses had total unsatisfactory level of knowledge regarding occupational hazards in ICU, while three fifths of them had satisfactory level of knowledge regarding occupational hazards. This might be due to highly percentage of the studied nurses have more than 5 years experience in critical care nursing.

The finding above were goes in the same line with **Joseph et al., (2021)** who applied study entitled " Assessing the nurse's knowledge regarding occupational hazards, its pre-disposing and preventive factors" found highly percentage of the participants had good

knowledge regarding occupational health hazards.

Hence, these results was contrasted with **Awan et al.,(2017)** who applied study entitled "Assessment of knowledge, attitude and practices regarding occupational hazards among Nurses at Nawaz Sharif Social Security Hospital Lahore Pakistan" and identified the level of knowledge was unsatisfactory among the studied nurses.

Concerning total preventive measures to face occupational health hazards in the ICU, the current study result showed that more than half of the studied nurses had inadequate level of total preventive measures regarding occupational hazards in ICU. This result may be due to lack of time, forgetfulness, influences of equipment of nursing skills, uncomfortable equipment, skin irritation, lack of training, the conflict between the need to provide care and self-protection, and distance to necessary equipment or facility were most commonly reported.

This result was contrasted with **Sabita et al., (2018)** who showed that one quarter of the studied nurses had poor level of preventive practice on occupational hazards. also in disagreement with **Ilo et al., (2022)** who showed that the studied nurses had good level of preventive measures of occupational health hazards.

Concerning relationship between demographic characteristics of studied nurses and their total physical hazards associated with nursing practice, the current study result illustrated that a statistically significant relation are exist between physical hazards and their gender, qualification and years of experience in critical care nursing. While there was no statistically significant relation is found with their demographic characteristics as regard marital status and attendance of training programs. This might be due to that years of experience and educational level play a major role of professional experience for prevention and avoidance of occupational hazard.

This result in the same line with **Al-Sarraji et al., (2017)** who applied study entitled " Assessment of occupational hazards on nurses who working in the operative room at AL-Amarah City Hospitals" and showed that there was a high significant relationship between occupational hazard and their socio-demographic characteristics of age, level of education, and years of experience while contrasted in relation to gender; there was non-significant relationship between occupational hazard and their gender.

As regard to relationship between demographic characteristics of studied nurses and their total psychological hazards associated with nursing practice at ICU, the current study result represented that there was a statistically significant relations are exist between psychological hazard and their gender. While there was no statistically significant relations between psychological hazard and their demographic characteristics as regard marital status. This might be due to stress in their working or that females by nature are more sensitive so they can be easily hunted emotionally.

This result was in accordance with **Nehad and Mohamed, (2018)** who applied study entitled " Relationship between organizational climate and occupational safety and health for nurses" and found that there was statistically

As regard to relationship between demographic characteristics of studied nurses and their total social hazards associated with nursing practice at ICU, the present study result revealed that there was a statistically significant relations between social hazards and their age and years of experience in nursing. While there was no statistically significant relations with their demographic characteristics as regard gender, marital status and attendance of training programs.

Also this result was supported with **Drbohlay and Dzúrová(2018)** who applied study entitled " Social Hazards as Manifested Workplace Discrimination and Health' and found that there was associations between social hazards in the workplace and age, while contrasted in relation to marital status; there was association between social hazard and marital status and gender.

Regarding correlation between the studied nurses' total knowledge and total exposure to physical, psychological and social hazards, the present study result showed that there was highly statistically significant positive correlation between their total exposure to physical hazards and their total psychological hazards, total social hazards and total knowledge. Additionally, highly statistically significant positive correlations are found between their total exposure to psychological hazards and their total social hazards and total knowledge. As well highly

statistically significant positive correlation exists between their exposure to social, physical, psychological hazards and total knowledge.

This result might be due to high satisfactory level of knowledge among staff nurses regarding occupational health hazards, which reflect positively on their exposure to occupational health hazards

This result was similar with **Sabra and Morsy, (2016)** who found that there is positive correlation between psychological hazards and physical hazards, between social hazards and physical Hazards. In addition to there is highly significance differences between psychological and physical hazards, also there was highly significance differences between social hazards, physical hazards and psychological hazards.

Conclusion

In the light of the current study findings, it can be concluded that,

Regarding to exposure to physical hazards, more than half of the studied nurses had low exposure to physical hazards, and only one tenth of them had high exposure to physical hazards associated with nursing practice. Meanwhile half of the studied nurses had low exposure to psychological hazards, more than one tenth of them had high exposure to psychological hazards. Moreover two fifths of the studied nurses had low exposure to social hazards associated with nursing practice; while more than one quarter of them had high exposure to social hazards. Also, less than two thirds of the studied nurses have satisfactory level of total knowledge. Also there are a statistically significant relations existed between physical hazards and gender, qualification and years of experience in critical care nursing. Also statistically significant relations existed between psychological hazard and their gender. As well, a statistically significant relations are exist are between social hazards and age.

Recommendations

Based on the current study finding the following recommendations were proposed:

- ✓ Continues in-service educational courses should be held periodically to increase health awareness among nurses to prevent occupational health hazards.
- ✓ Guidelines, sufficient booklets and posters regarding health hazards and protective measures should be provided and distributed to all medical departments periodically, so that all nursing staff will be able to read and follow it.
- ✓ Developing organizational guidelines and rules about hazards assessment and identification.
- ✓ Training program about occupational hazards and especially about protective measures.
- ✓ Nurse manager should be develop policies and guidelines of safety practices.
- ✓ Head nurse should be rise nursing staff awareness regarding social hazards

Further researches

- ✓ Further prospective studies are recommended to identify the effects of occupational hazards on nurses' health condition.
- ✓ Further studies need to be applied on the large sample size of nurses in ICU to ensure generalize of result.

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