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OCCUPATIONAL HAZARDS TRAINING: ITS EFFECT ON STAFF NURSES KNOWLEDGE AND PRACTICE RELATED TO SAFETY MEASURES

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Abstract

Background: Work is considered a basic part of one's life experience. Every type of work brings with its' risks and health hazards. **Aim of study**: This Study aimed at evaluating the effect of implementing occupational hazards training on the knowledge and practice related to safety measures among staff nurses. **Subject and method:** this study was conducted at Egypt air hospital for Research and treatment. It is affiliated to Ministry of Civil aviation using a quasi-experimental one group pre- posttest design on 185 staff nurses. Data were collected by using two tools namely, self -administered knowledge questionnaire and observation checklist for staff nurses' practice regarding safety measures. **Results:** revealed, that 31% of studied staff nurses had satisfactory of total knowledge at pre intervention phase, So, there was highly statistically significant improvement in staff nurses' total knowledge in the phases of post 71% and the follows up80%, total practice was low at pre- intervention phase, slightly more than 51% of studied nurses had adequate total practice. So, there was highly statistically significant improvement in staff nurses in all areas and total practice in the post 88% and follows up phases 89%, there a highly statistically significant moderate positive correlation between all knowledge categories', that there was highly statistically significant moderate positive correlation between all practice areas, additionally there was a statistically significant weak positive correlation between knowledge and practice. **Conclusion**: The study concluded that there was statistical significant improvement in nurses' knowledge and practice after implementation of the program. Also there was weak positive correlation between nurse's knowledge and Practice. **Recommendation**: Enhancing knowledge and skills of safety measures through the orientation for newly staff nurses as well as, continuous in-services training. And hospital management must establish safe environment through adequate infrastructure, equipment, and facilities.

Keywords: occupational hazards, staff nurses, safety measures.

INTRODUCTION

Health and Wellbeing of employees in the work place are important concerns that should continue to receive attention in any organization. ***(*Pascarella etal., 2021**) **(Afshar, etal., 2020.)** Occupational hazards refer also to any activities that have the possible cause or increase the risk in workplace of occupational health and safety .Also, Occupational hazard is the "potential risk to the health of a nurses emerging from an unhealthy environment, which is a significant public health issue ***(*Torabi, etal. 2022), *Chuah et al., 2020,* Amadhila et al., 2017, Auwal, *et al.,* 2015;).**

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Physical hazards, is defined as bodily pain and biological disturbances such as; sleep disturbances, leg pain, back pain, body pain, circulatory disturbances, arm pain, shifts in appetite, digestive disturbances**.** Musculoskeletal injury is a major occupational health problem and it contributes to about 40% of all costs towards the treatment of work-related injuries **Nyambi, et al., (2021)**. Chemical hazards are a general term that includes substances, products and preparations composed of elements, compounds or mixtures. Chemicals may exist as solids, liquid or gases (**Mossburg et al., 2019).**

Biological hazards are infectious agents transmitted to others via contact with infectious patients or their bodily fluids (e.g., bacteria, viruses, and fungi) which include wounds, cuts, sharp related injuries, and direct contact with infected specimens/bio hazardous materials, and nosocomial infection, (***Amr et al., 2021***). However, Violence by both patients and nurses are one of the social hazards for health care workers, all violence that hospital staffs experience isn't physical, Verbal violence is a common form of violence, which is due to inadequate staffing, ease of hospital entry, presence of money & drugs, frustrated family members**(Pascarella et al., 2021**, **Rayan et al., 2020) .**

Psychological hazards, is referred to passive self-perception, negative view on life in general, and shifts in mood such as; irritation, with anything, loss of self-confidence, feeling of emptiness, loss of self-control, feeling of bitterness, feeling of defeat, crying for no visible reason, willingness to give everything up, long-standing feeling of despair, passive image of self and difficulties to concentrate ***(Amr et al., 2021, Narsh, etal., 2018).***

Factors and barriers that effect on safety protective measures and that interfere with the safe practice of care include: absence of role model, and the high work load or lack and inaccessibility of sinks. Additionally, hazards and risks might results from poor supervision, lack of time and knowledge, forget fullness, lack of means, negative influence of the equipment on nursing skills,, and lack of training, insufficient experience on the job, conflict between the need to provide care and self-protection (**Amadhila et al., 2017, Aliyu & Auwal,2015;).**

Several protective safety measures must be taken to reduce exposure to occupational hazard. Engineering control strategies, which are designed to modify or eliminate the exposure source, include the provision of safer needle-stick devices and needle disposal containers, safety protective measures such as hand washing, good hygiene, and utilization of lifting assistive devices, work place monitoring, vaccination, uses of protective equipment and clothes as gloves, mask, gown, and eye protection (**Faryabi, etal., 2022, Afshar, etal., 2021).**

Aim of the study

This Study aimed at evaluating the effect of implementing occupational hazards training on the knowledge and practice related to safety measures among staff nurses.

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Significance of the study

The researchers observed that staff nurses suffering from occupational hazards at work setting and complain from its effects. Also, they observed that nurses performance affected by this hazard and decrease productivity and quality of work. The International Labor Organization (ILO) estimates that 160 million people from the world's workforce suffer from work-related diseases such as musculoskeletal diseases, while 270 million had fatal and non-fatal work-related accidents results in over 350, 000 casualties and over two million suffer from work-related deaths each year which are all attributable to occupational hazards **(Mahmood et al., 2018).**

Research hypothesis

Implementing occupational hazards training will affect staff nurses' knowled**ge** and practice related to safety measures

Subject and methods

Research design*:* A quasi experimental one group pre- posttest design was used to carry out this study; it is defined as a powerful design for testing hypotheses of causal relationship among variables (Chiang et al., 2015)*.*

Setting: The study was conducted at Egypt Air hospital for Research and Treatment. This hospital is affiliated to Ministry of Civil Aviation and it serves inpatient and outpatient services to all categories of the community, the bed capacity (350) and it divided into five separate buildings included different critical units as Intensive care units (ICU), coronary care unit (CCU), operating theaters, pediatric intensive care units, and pre mature Intensive care unit, advanced surgery, gyna and obstetric department, orthopedic and medical department, catheterization unit, Chemo therapy and kidney dialysis unit

Subject: The subjects of the study was including 185 staff nurses from total number 500 staff nurses working at aforementioned setting, they were selected using simple random sampling technique.,

Sample size: The required sample size turned to be 185 staff nurses from total number 500 (117 females and 68 males). The sample size was calculated by adjusting the power of the test to 80% and the confidence interval to 95% with margin of error accepted adjusted to 5%

The sample size calculated according to the following equation:

$$n = \frac{N}{1+n(e)2}$$

n=sample size

N=population size

e=co-efficient factor

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(Ryan, 2013).

Sample Technique:

The sample size was selected by simple random sampling technique,

Tools of data collection

Data were collected using two tools namely, self -administered knowledge questionnaire and observation checklist for staff nurses' practice regarding safety measures

First tool: self -administered knowledge questionnaire

This tool adapted from Hassan (2004) and was modified by researchers; it was divided into four parts,

Part I: demographic data

It was consisted of information of the demographic characteristics of the studied nurses' as: name, age, gender, educational level, and attendance of training course.

Part II: Frequency of exposure to occupational hazards

This part included two items ,the first item used for assessing Awarance regarding medical and work-related data it was involved four multiple choices questions.

The second item used for assessing frequency of exposure regarding occupational hazards among studied staff nurses, it was involved four multiple choices questions.

Part III: Occupational hazards

It was used for assessing nurse's knowledge regarding occupational hazards in the workplace. It was included questions which consisted of close- ended questions and multiple choices questions under the following categories: physical hazards, Biological hazards, Psychological hazards, chemical hazards and social hazards, each category include 4 MCQs with total (20)

Part IV: Universal precaution and measures

It was used for assessing nurse's knowledge regarding universal precautions and measures used by nurses. It was included (four) multiple choices questions

Scoring system

For each question, a correct response scored 1 and incorrect scored zero. The scores of the items summed- up for the total scale, and divided by number of the items given a mean score. These scores converted into percent scores and mean and standard deviations computed. Staff nurses' knowledge considered satisfactory if the percent score was 60% or higher and unsatisfactory if less than 60%.

Second tool: observation checklist for staff nurses practice regarding safety measures

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This tool adapted from Hassan, (2004) and was modified by researchers. It aimed to assessing the actual practice of staff nurses related to different safety measures and precautions. It was consisted of (7) areas of observation and total (53) items as following:

Table (1): Categories of observation checklist for Staff Nurses practice regarding Safety Measures

Categories	No, of items	Example
1-Hand washing	8	-Brush along the sides of finger and hands
2-Gloving	7	-Remove all jewelries
3-Eyes cover	4	-Prepare clean cover
4-Masking	8	-Inspect the Respirator
5-Gowning	5	-Remove of all personal items (watch, rigs, all jewelers, and artificial nails.)
6-Instrument, equipment processing: a-Cleaning	4	-Immerse instrument in cidex2% for 20-30 min
b-Autoclave	4	-Remove instrument from autoclave by using sterile forceps
c-Use sharp container	6	-Not left overfilled more than 2/3
7-Body mechanics	7	-Turn body in one plane

Scoring system:

Items checked done and not done that were scored 1 and zero respectively. The scores of the items summed- up for the total scale and divided by number of the items given a mean score. These scores converted into percent scores and mean, and standard deviations computed. Staff nurses' practice level considered high if the percent score was 60% or higher and low if less than 60%

Tools validity and reliability

These tools tested and evaluated for their face and content validity by jury group. The six experts from faculty members in the nursing field with specialties of Nursing Administration, to ascertain relevance, clarity, and completeness of the tools. Experts elicited responses were either agree or disagree for the face and content validity. The required corrections and modifications were done. The items on which 95% or more of the experts have agreed were included in the proposed tools, the reliability of the tools that was assessed through measuring their internal consistency by determining Cronbach alpha coefficient as following:

Tools	Cronbach Alpha Coefficient		
	Scale reliability	Face validity	Statistical validity
Knowledge questionnaire	0.86	0.93	0.92
Observation checklist	0.88	0.95	0.93

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Pilot study

Upon developing the data collection tools, a pilot study was started from November 2021 till December2021 to examine the applicability of the tools, and the clarity of language and their suitability for application. It helped in identifying any potential obstacles or problems that might be encountered during the period of data collection. It also served to estimate the time needed to complete the questionnaires by each participant. It was applied on 10% of the study sample (15 nurses) are selected randomly. Questionnaire sheet was distributed to nurses; the time consumed for filling the questionnaire was ranged from 30 to 40 minutes. Then actual practice observed by researchers through using observation checklist to observe their actual practice related to safety measures, Data obtained from Pilot study was analyzed and no modifications were made in the questions. So, study sample in the pilot study was included in the main study sample

Field work:

The Field work of the study lasted for Nine months from beginning of December2021 to August 2022; the study was involved five phases (knowledge /practice) assessment, program designing phase, training program implementation phase, Evaluation phase and follow-up Phase**).**

Knowledge and Practice assessment Phase *(two months)*

This phase started from beginning of December 2021 till the end of January 2022, this phase involved assessing study nurses knowledge**,** the researchers met with all nurses to explain the purpose and nature of the study and get their consents to participate in the study. Then, they were given questionnaire along with instructions in how to fill it. The researchers were present during the form filling to respond to pre any queries. The filled forms were handed back to the researchers to check for completeness. The collected data was considered as the baseline or pretest; the researchers also, observed studied staff nurses 3 times through observation checklist for their practice regarding safety measures in their work setting.

Program designing phase (one month)

This phase was conducted from beginning of February,2022 to March 2022, after completing the data collection in the previous assessment phase, the content of the training program was constructed by the researchers after review of the current and past literature, using textbooks, scientific articles, periodicals, refrences, and internet search. In addition to the results of the pretest assessment, also different instructional strategies were selected for each session, as lectures, group discussions, brain storming and exercise and role play situations, teaching aids were selected as, presentations, videos and PowerPoint, program book handout prepared and distributed to all studied nurses, evaluation methods prepared as, feedback, posttest procedures in their clinical areas.

Training program implementation phase (one month)

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This phase conducted from beginning of March 2022to beginning of April 2022, this training program was implemented for nurses in 10 groups (each group include 18 nurse) during 31 sessions, each session divided into (two hours theory and two hour practice), for four days per week, data collected in morning shift from 10 am to 2 pm, during the program researchers used flipchart, power point, videos and data show, the teaching strategies were group discussion, lectures and role play ,at the beginning of the first session, an orientation about the training program and its aim, procedures were provided by the researchers.

Evaluation phase:

This phase started from April till May and conducted immediately after the end of each theoretical session, researchers evaluate the effects of the training on nurses knowledge through feedback, written pre-posttest and interactive discussion, also researchers evaluate nurses practice at the end of each practical session through observation of all steps of procedures through check list in their clinical area (observe practical procedures for 3 times in each procedure for each nurse), the evaluation of programme as a whole was done by using the same data collection tool and posttest implemented as previously in last day of program for knowledge and one month later for practice (3times of observation**)** **Follow-up phase (**one month)

A follow-up, the same process was repeated after three months, conducted during August 2022, the same data collection tools, the aim is to assess the retained knowledge and practice ,also after 3 observations for each nurse as mentioned before, the researchers collected data for four days/week, data collected in morning shift from 10 am to 2 pm. **(III) Administrative Design**

Before any attempt to collect data, an official approval to conduct the study was obtained from medical and nursing directors of Egypt air hospital for research and treatment. This was achieved through letters addressed from the Dean of the Faculty of Nursing, Ain Shams University, clarifying the aim of the study and its procedures. Moreover, the researchers met with them to explain the aim of the study, and to arrange for the time of data collection and program implementation to gain their approval and cooperation.

Ethical considerations

The study protocol was approved by the Scientific Research Ethics Committee of the Faculty of Nursing, Ain Shams University. The researchers clarified the aim of the study and its procedures to all nurses, along with their rights to accept or refuse. Oral informed consents were obtained from each participant. They were reassured about the anonymity and confidentiality of any obtained information. The study implementation could not lead to any harmful effect on participants

(IV) Statistical Design

Data entry and statistical analysis were done using SPSS 20.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for quantitative variables. **Cronbach** alpha coefficient calculated to assess

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the reliability of the tools through its internal consistency. Quantitative continuous data compared using the non-parametric t- test and ANOVA. Spearman rank correlation was used for assessment of the inter-relationships among quantitative variables and ranked ones. In order to identify the independent predictors of knowledge and practice scores, multiple linear regression analysis was used and analysis of variance for the full regression models was done. Statistical significance was considered at p-value<0.05

Results:

Table 1: Demographic characteristics of staff nurses in the study sample (n=185)

Characteristics	**No.**	**Percent**
Age:		
<22	48	26
22<37	104	56
37+	33	18
Range 20.0-40 **Mean ± SD 32.45±6.93** **Median 33.0**		
Gender:		
Male	68	37
Female	117	63
Nursing educational level:		
Diploma of technical institute of nursing	118	63.8
Bachelor of nursing	50	27
Master of nursing	14	7.5
doctorate of nursing	3	1.7
Work departments/units:		
Surgical	23	12.4
Medical	24	13
Obstetric	20	10.8
ICU	38	20.5
CCU	21	11.4
Operating rooms	24	13
Chemo therapy unit	16	8.6
Emergency unit	19	10.3

Table (1): Shows that, slightly more than half (56%) of studied staff nurses had age range between (20.0- 40.0), and median 33.0. slightly less than two third of them were female and 63%had diploma of technical institute in nursing,

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Figure 1: Attendance of studied staff nurses on training courses related to work hazards

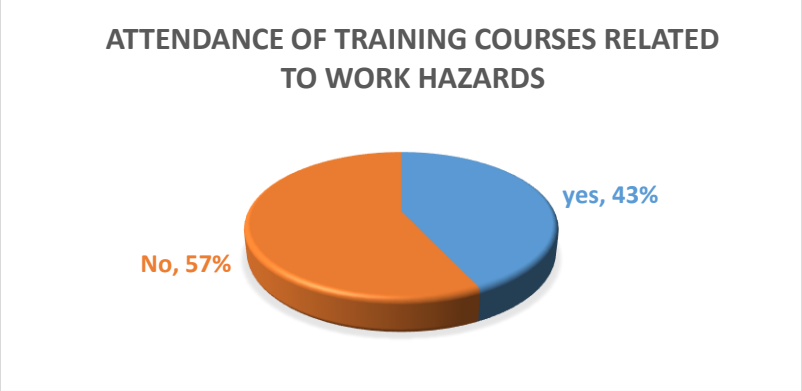

Figure 1: Show that slightly more than half 57% of studied staff nurses hadn't attendance of training courses related to work hazards.

Figure 2: Attendance of studied staff nurses on training courses related to safety measures

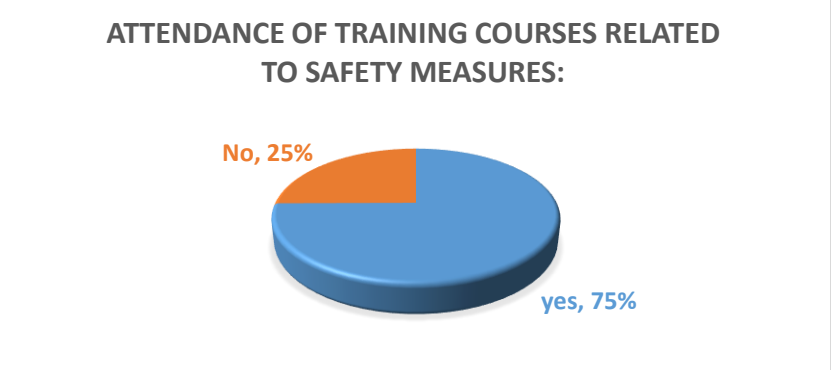

Figure 2: Shows that three quarters 75% of studied staff nurses attend on training courses related to safety measures.

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Table (2): Staff Nurses' total knowledge categories throughout intervention phases (n=185)

Satisfactory knowledge (60%+)	Time						X^2 (p-value Pre-post)	X^2 (p-value Pre-FU)
	Pre		Post		Follow Up			
	No.	%	No.	%	No.	%		
Occupational hazards	43	23.3	137	74	156	84.4	47.05 (<0.001**)	67.63 (<0.001**)
Universal precautions and measures	53	28.6	129	69.7	150	81.1	30.43 (<0.001**)	49.58 (<0.001**)
Total:								
Satisfactory (60%+)	57	31	148	80	131	71	28.81 (<0.001**)	45.68 (<0.001**)
Unsatisfactory (<60%)	128	69	37	20	54	29		

(**) Highly statistically significant p<0.01

Table (2): Shows that staff Nurses' total knowledge was low at pre-intervention phase. Slightly less than 31% of studied staff nurses had satisfactory of total knowledge at pre intervention phase. So, there was highly statistically significant p<0.01 improvement in staff nurses' total knowledge in the phases of post(71%) and the follows up(80%) as compared to the pre intervention phase.

Figure 3: Studied staff nurses total awareness regards medical and work-related data throughout intervention phases (n=185)

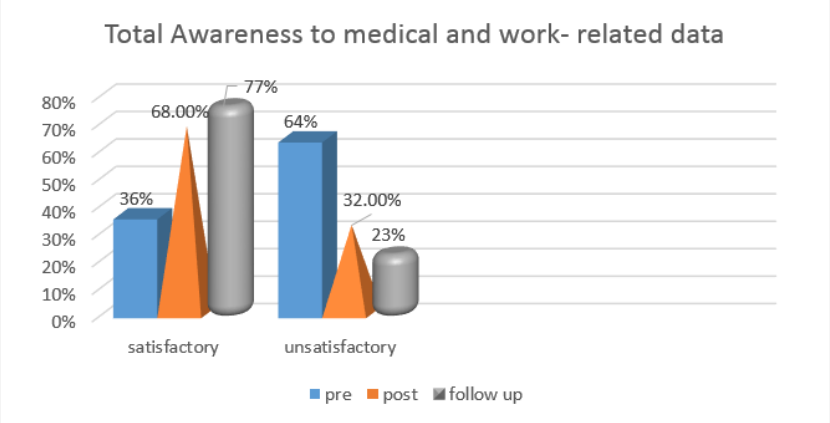

Figure 3: represent that studied staff nurses' total awareness regards medical and work-related data was low at pre-intervention phase. It shows that slightly more than one third 36% studied staff nurses had satisfactory awareness to medical and work-related data at pre intervention phase. So, there was awareness improvement in the post (68%) and follow up (77%) phases as compared to the pre intervention phase.

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Table (3): Staff Nurses' total practice of safety measures throughout intervention phases (n=185)

practice of safety measures	Time						x^2 (p-value) Pre-post	x^2 (p-value) Pre-follow-up
	Pre		Post		Follow Up			
	No	%	No	%	No	%		
- Hand washing	109	58.9	170	92.2	156	84.4	27.7 (<0.001**)	14.47 (<0.001**)
- Gloving	80	43.3	152	82.2	150	81.1	29.12 (<0.001**)	27.32 (<0.001**)
- Eyes cover	105	56.7	162	87.8	160	86.7	21.71 (<0.001**)	19.95 (<0.001**)
- Masking	109	58.9	170	92	158	85.6	27.07 (<0.001**)	15.95 (<0.001**)
- Gowning	103	55.6	154	83.3	156	84.4	16.36 (<0.001**)	17.88 (<0.001**)
Total: Adequate (60%+) Inadequate (<60%)	 96 88	 52.4 47.6	 164 20	 88.6 11.4	 164 20	 88.6 11.4	 29.12 (<0.001**)	 29.12 (<0.001**)

Table (3): Shows that staff Nurses' practice areas of safety measures was low at pre-intervention phase. The percentages having adequate practice of safety measures ranged between43.3% for gloving to 58.9% for hand washing and masking. It shows that the total practice of safety measures slightly more than half 52.4% at pre intervention phase. So, there was highly statistically significant $p<0.01$ improvement in all areas and total practice of safety measures of staff Nurses' in the post 88.6% and follows up 88.6% phases as compared to the pre intervention phase.

Table (4): Staff Nurses' total practice areas throughout intervention phases (n=185)

Total practice of	Time						x^2 (p-value) Pre-post	x^2 (p-value) Pre-follow-up
	Pre		Post		Follow Up			
	No	%	No	%	No	%		
- Safety measures	111	60	170	92	164	88.6	23.03 (<0.001**)	14.13 (<0.001**)
- Instrument and equipment processing	75	40.5	153	82.7	151	81.6	20.99 (<0.001**)	10.12 (<0.001**)
- Body mechanics	105	56.7	162	87.5	160	86.7	16.82 (<0.001**)	6.77 (0.009**)
Total:								

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Adequate (60%+)	94	51	166	89.7	164	88.6	26.28	24.22
Inadequate (<60%)	91	49	19	10.3	21	11.4	(<0.001**)	(<0.001**)

(**) Highly statistically significant p<0.01

Table (4): Shows that staff Nurses total practice areas was low at pre- intervention phase. it shows that slightly more than half 51% of studied staff nurses had adequate total practice. so, there was highly statistically significant p<0.01improvement in staff nurses in all areas and total practice in the post and follows up phases as compared to the pre intervention phase

Table (5): Correlation matrix of practice areas scores

Practice areas	**Spearman's rank correlation coefficient**	
	practice to safety measures	**practice to instrument and equipment processing ,body mechanics**
practice to safety measures		
practice to instrument and equipment processing	.678**	
Body mechanics	.675**	.660**

(**) Highly statistically significant p<0.01

Table (5): Shows that there was highly statistically significant moderate positive correlation between all Practice areas scores p<0.01

Table (6): Correlation matrix of total knowledge and total practice scores

Scores	**Spearman's rank correlation coefficient**	
	Total Knowledge	**Total practice**
Total Knowledge		
Total practice	.107	

(**) Highly statistically significant p<0.01

Table (6): Shows that there was statistically significant weak positive correlation between knowledge and practice.

Table (7): Correlation between staff nurses' scores of total knowledge, total practice and their age and Nursing educational level

	Spearman's rank correlation coefficient	
	Knowledge	**Practice**
Age	-.053	-.060
Nursing educational level	.065	.137*

(*) Statistically significant at p <0.05

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Table (7) shows that there was a statistically significant weak positive correlation between nursing educational level and their practice p<0.05, while there was no statistically significant correlation between nursing educational level and their knowledge. There was no statistically significant correlation between staff nurses' ages and their knowledge and practice.

Table (8): Best fitting multiple linear regression model for the knowledge score

	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value	95% Confidence Interval for B	
	B	Std. Error				Lower	Upper
Constant	92.94	33.71		2.757	0.006	26.57	159.31
Intervention	20.61	2.12	0.62	9.729	<0.001	16.44	24.78
Age	-3.07	1.45	-0.11	2.121	0.035	-5.91	-0.22
Attendance of training courses related to safety measures	13.26	3.51	0.24	3.772	<0.001	-20.17	-6.34

R-square=0.32 Model ANOVA: F=32.18, p=0.001

Variables entered and excluded gender, educational level, work department, attendance of training courses related to work hazards,

Table (8) Best fitting multiple linear regression model shows that increasing age and gender as a female scores as the positive independent statistically significant predictors of high practice score of studied staff nurses

Table (9): Best fitting multiple linear regression model for the practice score

	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value	95% Confidence Interval for B	
	B	Std. Error				Lower	Upper
Constant	73.13	3.77		19.152	<0.001	64.71	79.54
Intervention	6.00	1.41	0.28	4.257	<0.001	3.22	8.77
Age	-6.44	2.03	-0.18	3.178	0.002	-10.43	-2.45
Gender as a female	0.12	0.04	0.18	2.742	0.007	0.03	0.20

R-square=0.16 Model ANOVA: F=17.57, p=0.001

Variables entered and excluded, educational level, work department, attendance of training courses related to work hazards attendance of training courses related to safety measures .

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In multivariate analysis table (9), best fitting multiple linear regression model shows that increasing age and gender as a female scores as the positive independent statistically significant predictors of high practice score of studied staff nurses

DISCUSSION

Healthcare institution like other high risk work settings characterized by a high level of exposure to hazardous agents, which dramatically endangers the health and life of healthcare workers **(Abidoye et al., 2016)**. Therefore, **(WHO,2018)**, stated that, stress on the primary prevention of workplace hazards, particularly due to the highest incidence of occupational injuries occurs in hospitals, compared to the construction and manufacturing industries (**OSH,2013**). The Study aimed at evaluating the effect of implementing occupational hazards training on the knowledge and practice related to safety measures among staff nurses.

The present study concerning to the working department which revealed that Majority of studied nurses were working in critical care units due to a lot of nurses want to working in special ward as intensive care units than working in general ward due to availability of personal protective equipment than in general ward and, price of shift is double in intensive care and emergency units than general ward. This is in line with, **pascarella, etal, (2021),** which entitled " Risk analysis in healthcare organizations: Methodological framework and critical variables". Who revealed that majority of the nurses were staff nurse, only third of total sample of nurses was from critical care unit and least of the nurses were from emergency.

The study findings indicated only that, slightly more than half of studied staff nurses hadn't attended of training courses related to work hazards, this due to loss of motivation for attending of training courses, and work over load, This is in agreement with, **Chua et al. (2020)** which study that around half of the sample not receives safety and health training which, leads to unavailability of occupational safety and health policy in place. Similarly, this Study results were contradicted with **Pascarella et al. (2021)**, which reported that few nurses attended training programs about occupational health and safety.

The present study findings regarding to studied staff nurse's total awareness regards medical and work-related data revealed low level at pre-intervention phase. It shows that slightly one third from studied staff nurses had satisfactory awareness to medical and work-related data at pre intervention phases, due to lack of training, meanwhile there was awareness improvement in the post and follow up phases as compared to the pre intervention phase, because their attendance to training courses and improve knowledge.

The study findings are congruent with, **Sayami & Tamrakar ,(2020),** which revealed that, Majority of the nurses have knowledge about post exposure prophylaxis however, regarding the post exposure prophylaxis for HIV should be started within three days ,over half of the total number of nurses were aware about it , this were dis agree with, **Shahi Mandira, et al., (2018)**, in study entitled by, / (Knowledge and Preventive Practice of Occupational Health Hazards among Nurses in different Teaching Hospitals) revealed

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that, increase awareness among health care workers of the dangers of sharp injuries and other types of disease transmission.

The present study findings concerning by staff Nurses' total practice areas which revealed that, total practice areas was low at pre- intervention phase. It shows that slightly more than half of studied staff nurses had adequate total practice. So, there was highly statistically significant improvement in staff nurses in all areas and total practice in the post and follows up phases as compared to the pre intervention phase. Due to, lack of knowledge, experience and inadequate training, and work overloaded and may be lack of some of facilities,

This study results are consistent with **Asmer et al. (2021**), who clarified that there was poor compliance to aseptic procedure, and revealed that,, most of the nurses had poor practice related to wearing protective clothes (mask, gloves, eye covering), reviewing and following special regulation and safety measures at pre-program, due to lack of experience and they haven't any training about occupational work hazards and safety protective measures.

The present study findings concerning to total practice and body mechanics which revealed that, there was highly statistically significant improvement in staff nurses' total practice in the post and follows up phases as compared to the pre intervention phase due to, lack of knowledge, experience inadequate training, and work overloaded.

This results are agreement with a study of, **Karkis et al.,(2018),** which entitled "Knowledge and Preventive Practice of Occupational Health Hazards among Nurses in different Teaching Hospitals" and revealed that fifty percent of the nurses give attention to correct body mechanics and disagree with ,**Petrovic (2021)** on the knowledge and practice of body mechanics shows majority of the subjects had average practice of body mechanics, followed by minority of nurses had good practice of body mechanics.

The present study findings concerning to correlation matrix of knowledge categories scores related to body mechanics, which, **r**evealed that, there was highly statistically significant strong positive correlation between all Practice areas as body mechanics,

This study agree with study of**, Karkis et al.,(2018),** Which entitled by," Knowledge and Preventive Practice of Occupational Health Hazards among Nurses in different Teaching Hospitals "which find the similar results that nurses less than half percent of nurses had given attention to correct body mechanics. this study result contradicted with, **Wu, Y., Zheng, et.,al, (2018)**on the knowledge and practice of body mechanics shows majority of the subjects had average practice of body mechanics, followed by twelve percentage of nurses had good practice of body mechanics.

The present study result concerning with, best fitting multiple linear regression models which revealed, that increasing attendance of training courses related to safety measures scores as the positive independent statistically significant predictors of high knowledge score of studied staff nurses, due to motivation for attendance from lecturer who teach safety measures but other lecturers not motivate trainee

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This study result is in line with a study of **Mossburg etal.,(,2019**),which study entitled, " Occupational hazards among healthcare workers in Africa: a systematic review. Annals of global health " and result revealed that, significant difference in the practice score was observed between age groups , Multiple linear regression analysis showed that the participants' educational status (Ph.D.) was a predictor of high knowledge scores. Male gender and divorced status were predictors of low practice scores, and aged around fifty till sixty years old, private-sector jobholders, and students were predictors of the high practice scores.

CONCLUSION:

This study was undertaken aimed at evaluating the effect of implementing occupational hazards training on the knowledge and practice related to safety measures among staff nurses. There was highly statistically significant improvement in staff nurses' total knowledge and practice regarding safety measures in the post and follows up phases as compared to the pre intervention phase, there was highly statistically significant moderate positive correlation between all Practice areas, there was statistically significant weak positive correlation between knowledge and practice.

Finally, , best fitting multiple linear regression revealed Increasing attendance of training courses related to safety measures scores as the positive independent statistically significant predictors of high knowledge score of studied staff nurses. Conversely, their age was a negative predictor, and increasing age and gender as an increasing age and gender as female scores as the positive independent statistically significant predictors of high practice score of studied staff nurses, this result confirmed the research hypothesis which were Implementing occupational hazards training will improve staff nurses' knowledge and practice.

Recommendations:

In the light of findings obtained from the present study, the following points are recommended:

- Conduct training of staff nurses regards to occupational hazards and safety measures either in the form of workshops or seminars.
- Enhancing knowledge and skills of safety measures through the orientation for newly staff nurses as well as, continuous in-services training.
- Hospital management must establish safe environment through adequate infrastructure, equipment, and facilities.
- Further research is needed to investigate the effect of training intervention on knowledge and practices of safety measures of staff nurses at deferent clinical setting.
- Apply orientation program for newly nurses related to occupational hazards and safety measures

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