

Promoting Knowledge and Safety Measures Practice towards Occupational Hazards among Critical Care Nurses Working Long Shifts: The Effect of an Intervention Study

Abeer Mohamed Fakhry⁽¹⁾, Magda Abd El Hamid Abd El Fattah⁽²⁾

Mamdouh Mouhamed El- Bahnaswy⁽³⁾ & Mohamed Mansour Gwely⁽⁴⁾

(1) Master degree - Lt. Colonel - Military Medical Academy- Cairo, (2) Assist. Professor - Nursing Administration Department- Faculty of Nursing - Cairo University, (3) Major General -Military Medical Academy-Cairo, (4) Professor of Public Health -Faculty of Medicine – Ain Shams University

Abstract:

Background: Critical care nurses are at risk of occupational hazards as they working longer shifts, overtime, and extra shifts with some even extending to 24 consecutive hours shifts.

Aim of the study: To assess the effect of an intervention study on knowledge and safety measures practice towards occupational hazards among critical care nurses ' working long shifts.

Research Design: A quasi-experimental, repeated measures design with a one-group Pretest/posttest was selected to test participants at 3 pre-specified time points (initial, immediately after training, and at 3months later after training).

Setting: The study was conducted in a Military hospital.

Subject: A purposive sample consisted of (56) critical care nurses Working long shifts who accepted to participate in the research and met the inclusion criteria was included in the study.

Tools of data collection: Three tools were designed specifically to collect data of the present study ,the first tool composed of three main parts of self-administered questionnaire as follows: 1) demographic characteristics data, 2) educational needs assessment, 3) knowledge test (pre / post-test), second tool titled Safety measures practices observational checklist and third tool titled Participants' reactions questionnaire

Results: A significant improvement in the studied participants' total knowledge and safety measures practice towards occupational hazards score was found in the post educational intervention phases both immediate post intervention and follow up after three months later in comparison to the pre- educational intervention.

Conclusion: The intervention tested in this study shows promise of being an effective approach to promot knowledge and safety measures practice towards occupational hazards among critical care nurses ' working long shifts.

Recommendation: Mandatory regular educational intervention must be planned to overcome the weak points of knowledge and safety measures practice regarding all occupational hazards of critical care nurses, based on their needs, expectation.

key words: Occupational Hazards; Long Shift Work Hours; Knowledge; Safety Measures Practice; Critical Care nurses

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Introduction:

Undoubtedly, healthcare organizations often have to provide patient care around the clock.⁽¹⁾

Working hours, in both their length and their structure, are one of the clearest and most important aspects of an entire class of occupational hazard exposures involving the work process itself, the way in which work is structured and organized at the level of the work site.⁽²⁾

In fact, traditional eight-hour shifts for hospital nurses are becoming a thing of the past .Extended work shifts of twelve hours or longer are common and even popular with hospital staff nurses.⁽³⁾ Clearly, to meet the increased demand of the higher acuity

of patients' often needs nurses working longer shifts, overtime, and extra shifts with some even extending to 24 consecutive hours shifts. For decades, nurses have worked long hours—many of them never giving a second thought to their own fatigue. In many hospitals, staffing guidelines routinely offer 12-hour shifts as the norm, with some nurses filling in shortfalls and working 16 hours or more.⁽⁴⁾

Although the majority of hospital staff nurses (75 percent) now work 12-hour shifts, some nurses report being scheduled to work for periods as long as 20 consecutive hours.⁽⁵⁾ Nurses working on specialized units such as

surgery, dialysis, and intensive care are often required to be available to work extra hours (on call), in addition to working their regularly scheduled shifts. Twenty-four-hour shifts are becoming more common, particularly in emergency rooms and on units where nurses self-schedule. ^(6,7)

The number of studies examining long work hours is less extensive, but a growing number of findings suggest possible adverse effects. As the prevalence of shiftwork has increased, attempts have been made to examine the relationships between shiftwork and health. Shift work is related to both acute and chronic health problems. ⁽⁸⁻¹⁰⁾ In general, shift work defined as work hours that are scheduled outside of daylight. ⁽¹¹⁾

For the purpose of this study, working long shiftwork hours operationally defined as the extended work shifts that generally taken to mean working more than 48 hours a week. According to a recent report of the National Institute of Occupational Safety and Health (NIOSH) ⁽¹²⁾, working more than 40 hours per week (overtime), working extended shifts (more than 8 hours), and working both extended shifts and overtime can have adverse effects on worker health. Extended shifts have been associated with increased musculoskeletal injuries, the development of hypertension. Another Studies have shown that accident rates rising after 9 hours, doubling after 12 consecutive hours. ⁽¹³⁻¹⁶⁾

Alarming though, studies show that when an individual has been worked straight long shifts their cognitive and psychomotor performance deteriorates on the job, obesity, injuries, and a wide range of chronic diseases. In addition, fatigue-related errors could harm patients. Fatigued nurses also endanger others during their commute to and from work. ⁽¹⁷⁻¹⁸⁾

Undoubtedly, working in a safe and healthy environment is the fundamental right of every critical care nurses who working long shifts

hours. ⁽¹⁹⁾ Occupational health hazards may contribute to work force shortages by prompting nurses to leave the profession. ^(20,21)

For instance, the hazardous nature of nursing is well documented, in a studies conducted in North America and Europe, less is known about effective methods for delivering safety messages regarding management of job hazards, improving the organizational safety climate, enhancing nurses' perceived competence to manage occupational exposures. Furthermore, these existing scientific studies indicated the need to identify, the factors causing hazards, as well as strategies to avoid them, so that the health of these workers is not affected especially in critical care areas. ⁽²¹⁻²³⁾

It has been documented in the literature that an occupational health hazard refers to the potential risks to health and safety for those who work outside the home. ⁽²⁴⁾ Furthermore, it has been documented in the literature that more than 500,000 nurses worldwide are practicing in intensive and critical care units. ⁽²⁵⁾ Indeed, the presence of healthy nurse contributing to positive patient outcomes, reduces morbidity, mortality, complications, errors, and reduces overall costs. ^(26,27)

Looking specifically at the key safety risks impacting critical care nurses, it includes mainly blood and other potential infectious material these risks might be due to: ineffective exposure control plan; no follow-up made available after a needle stick/sharps injury; lack of information necessary to adequately implement blood borne pathogens program; exposure to unsafe needle devices and improper handling and disposal of needles. In addition, to fire hazards as well as electrical hazards. ⁽²⁸⁾

It is acknowledged in the literature that one of the measures that can be taken to reduce exposure to occupational health hazards is training. Employers should provide training in occupational safety for their workers as part of their responsibility;

to strengthen the culture of occupational health hazards prevention and to ensure a healthy and safe workplace.⁽²⁹⁾

Significance of the Study:

Critical care nurses are at risk of occupational hazards as they perform their clinical activities in work setting. In addition, both shift work and long work hours have been associated with health and safety risks.⁽³⁰⁾ The Bureau of Labor Statistics (BLS)⁽³¹⁾ notes that, while workplace injuries and illness declined overall, the rate for registered nurses (RNs) increased 5% from 2008 to 2009; further, nursing is one of seven occupations where the injury/illness rate per 10,000 workers is greater than 300. Therefore, failure to institute adequate health and safety measures in work place to protect nurses from these hazards and risks will leads to avoidable deaths and ultimately lead to loss of staff. Thus, the importance of this study can be seen in diverse ways, the piece of work will intended to contribute to the current body of literature regarding also provide the opportunity for staff nurses, critical care units' management to identify their specific respective roles in health and safety issues. The work will be used as reference material for hospital management in making decisions concerning the future health and safety practices training and its relevant policies development.

Aim of the study:

The current study was conducted to assess the effect of an intervention study on knowledge and safety measures practice towards occupational hazards among critical care nurses ' working long shifts in a Military hospital.

Research Hypotheses:

The research hypotheses were proposed as follows:

1. There will be statistical significant improvements in knowledge scores of critical care nurses ' working long shifts, immediately after

implementation of the intervention study and three months later.

2. There will be statistical significant improvements in safety measures practice towards occupational hazards scores of critical care nurses ' working long shifts, immediately after implementation of the intervention study and three months later.

Subjects and Methods:

Research design:

A quasi-experimental, repeated measures design with a one-group Pretest/posttest was selected to test participants at 3 pre-specified time points (initial, immediately after training, and at 3months later after training).

Study setting:

The study has been undertaken in seven critical care units at a Military hospital. The hospital provides services to Military personnel and their families as well as civilian people.

Study subjects:

The sample procedure used was a purposive sample (no. 56) of the studied participants who were engaged in working long shift work hours at their respective hospital, which accepted to participate in the research and met the inclusion criteria were included in the study. The inclusion sampling criterion was accomplished as those critical care nurses who were provided direct nursing care, able to attend the educational intervention and to complete both pre-posttest and after having been out of the interventional study for at least three months. Meanwhile, the exclusion criteria were consisted of those who had less than one year of experience and withdrawal from the educational program.

Tools of data Collection:

Data of the current study were collected through two tools which designed specifically to collect data of the present study.

Tool (1): Composed of three main parts of self-administered questionnaire as follows:

- **Part One:** Demographic Data Questionnaire (DDQ) sheet : The DDQ was used to gather data related to age, sex, working departments, qualifications, years of experience in nursing, shift time, and rank..... etc.).
 - **Part Two: A designed self-administered questionnaire** titled "the felt educational needs assessment was used to determine the educational needs of the studied participants. The questionnaire, consisting of 42 questions which divided in two dimensions as follows: first dimension titled "Prevalence of occupational hazards ". it was designed to identify the most common prevalent of 'occupational health hazards among critical care nurses working long shiftwork hours for setting a priorities among educational needs according to their relative importance , which comprised of twenty seven different questions which divided into six dimensions as follows : shift work related health hazards (17 items), accidents and physical hazards (2 items), chemical hazards (2 items), biological hazards (2 items), ergonomic hazards (2 items), psychological hazards (2 items) as for the scoring system of the dimension , the prevalence was evaluated through giving score of "1"for each positive complaint, and zero for each negative complaint. For each subscale, the score of the items were summed-up and the total divided by the number of items, giving a mean score for the subscales. Second dimension was consisted of (15 items) on previous training, desire to attend the educational program, best time for the program, best duration for the program, best place for the intervention..... etc.) . As for the scoring system of this dimension, each item had two responses as follow: Yes took score= 2 and No took score = 1.
 - **Part Three : Knowledge Test (Pre / Post-Test):** This (Pre / Post-Test) aimed to collect data related to knowledge regarding occupational health hazards and its safety measures among the studied participants working long shift work hours before, immediately after the educational intervention implementation and 3 months later. knowledge was assessed through seventy different questions, as follows; shift work hazards and its safety measures (11 questions), accidents hazards and its safety measures, encompassing (5 questions), physical hazards and is comprised of (3 questions), chemical hazards and its safety measures and is comprised of (2 questions), biological hazards and its safety measures and is comprised of (28 questions), ergonomic hazards and its safety measures and is comprised of (6 questions), psychological hazards and its safety measures, encompassing (15 questions). As for scoring system, scoring procedure was arbitrarily considered. Score '1' (one) was awarded to correct responses and score '0' (zero) was awarded to incorrect response .these scores were converted into a percent score.
- Tool (2): Safety measures practice regarding occupational health hazards observational checklist:** this observational checklist aimed to assess the studied participants 'safety measures practice regarding occupational health hazards and is comprised of 124 items before, immediately after the educational intervention implementation and 3-months later. The checklist covers the following dimensions; first dimension titled: work safety measures practices which divided into four sub-dimensions as follows: hand washings (16 items), personal protective equipment (PPE) (16 items), personal hygiene (8 items), and body mechanics (12 items), and

instrument & equipment processing (15 items). Second Dimension titled: work place safety hazards monitoring by nursing staff which divided into the eight sub dimensions as follows: general work place hazards inspection (9 items), housekeeping (11 items), safe employee's facilities (14 items), fire protection (10 items), material handling & storage safety measures (4 items), electric safety (9 items). As for scoring system, each item was checked as done was scored one or not done was scored zero. These scores were converted into a percent score.

Validity and Reliability:

The developed questionnaires and the designed educational intervention content ' validity was reviewed and confirmed by three experts in the field of nursing administration, education and public health administration. In terms of questionnaires, the experts examined all questions and focused on specific aspects of the questionnaire, including: question order, number of response categories and their semantic anchors, reference period length, and question wordings. Questions were continuously revised, as needed, throughout the expert review process. So, questionnaires and training educational intervention were edited according to experts' suggestions.

The reliability test was done by using Cronbach's alpha analysis. The results showed good consistency in the replies, indicating that the nurses had been logical in their answers. The reliability coefficients were generally high for all questionnaires, and suitable for scientific purposes. The reliability coefficients for each questionnaire as follow: educational needs assessment: 0.72, knowledge test (pre / post-test) (0.76), safety measures practices regarding occupational hazards (0.78) and participants' reactions questionnaire (0.73).

Field Work:

The study was implemented

through assessment, planning, implementation, and evaluation phases. Actual fieldwork started at the beginning of Jan /2012 to the end Jun / of 2012.

- **Assessment Phase:** Before going on to conduct the educational program, an official permission was obtained from the hospital director to collect data before, during the training educational intervention and three months later. A master list of staff nurses' names was taken from the department of nursing at the hospital to identify total number and type of long shiftwork hours critical care nurses ' working. The participants who met the inclusion criteria was identified and asked for participation in the study. The purpose, benefits, and ethical considerations of the study and the component of the data collection questionnaire were explained to them. Before the implementation phase of the program, the participants who agreed to the terms of participation were asked to complete the educational needs questionnaire and knowledge test (pre –test) to identify their knowledge level, their previous training and their desire to attend an educational intervention on safety measures practice regarding occupational health hazards. Moreover, the participants safety measures practice regarding occupational health hazards was assessed by using a designed schedule to observe them equally and randomly during their working long shiftwork hours for three times by using intermittent observation. Intermittent observation was carried out by the fieldwork researcher with the average 2-3 participants / shift work. The total observations average hours were 6 hours per long shift work hours.
- **Planning Phase:** Based on the learning needs assessment, the knowledge test (pre- test), and

observation of participants' safety measures practice results as well as extensive review of related literature, accordingly the educational intervention content that cover knowledge and skills related to safety measures practice regarding occupational health hazards was developed. The educational intervention objectives were to promote knowledge and safety measures practice on occupational hazards among critical care nurses' working long shifts in a Military hospital.

- **Implementation Phase:** in this phase, a schedule of the sessions was made after the arrangement with the head nurses of each unit. At the beginning of the first session, an educational intervention orientation was done by using a PowerPoint presentation, which contained information about its purpose, the duration and sessions place. Each session was started by setting the objectives of the new topic. At the end of the each session nurses' question was answered. Twelve sessions were the total number of the educational program. It was difficult to gather all (56) at one time, because the nurses were working long shiftwork. So, the studied group of participants were divided into four groups each group consists of 14, and the educational intervention was implemented for each group separately for successive (8) weeks. One hour per day before starting a working long shiftwork. The duration of each session ranged from 8.30 AM to 9.30AM according to the topics.
- **Evaluation Phase:** At the end of the educational program, the participants' knowledge tests and safety measures practice on occupational hazards was assessed immediately after educational intervention implementation and 3-months later was done. Also, the studied group

were evaluated the educational program from their viewpoints.

Pilot Study:

Once the permission was granted the pilot study was carried out on 10% of the study sample (6 nurses) with the same inclusion and exclusion criteria for the purpose of assessing the feasibility, applicability of the study, test the adequacy and internal consistency of the study questionnaires, educational intervention content and to assess applicability of the methodological approach of the study. According to the result of this pilot study, some modification was done in the questionnaire and educational intervention content before the training educational intervention implementation. The pilot study participants were not eligible to participate in the study. Data from the pilot was not included in the study's data pool.

Administrative and ethical considerations:

Once the permission was granted by the pertinent authorities to conduct the educational intervention study, aim of the study was clarified to the nursing director of the hospital. Verbal consents were taken from each participant before the study. Each nurse was informed about the nature and purpose of the study, and took full right to refuse participation or withdraw at any time.

Further, they were reassured that the information collected would be used for the scientific research only and would be treated with confidentiality. To address the issue of potential bias, coercion, or influence on participants in the study, the hospital chosen for the study, was one where the researchers had not previously been employed. The authority at the selected hospital gave their approval for the study including permission to gain access to a range of hospital documents.

Statistical analysis:

The data collected in the pre

intervention, immediately (post-intervention), and three months after implementation (follow-up), were organized, categorized, tabulated in tables using numbers and percentages, mean percentage and standard deviation. In addition, qualitative categorical variables were compared using chi-square test. The statistical package for social sciences (SPSS version) was used for statistical analysis.

Results:

Analysis of the demographic data collected has demonstrated that a total of (no.56) participants had so far participated in the emerging educational intervention at the time of the study. Of the 56 (51.8%) was of age ranging from 21 to less than 31 years. In terms of gender, all the participants in this study were females, just over half the sample (53.6%) were married. An examination of the participants' educational preparedness showed that (64.3%) were held diploma degree in nursing, (44.6%) was working for 6 to 10 years.

Figure (1): Shows that the most common prevalent of 'occupational health hazards as reported by critical care nurses working long shifts work hours for setting a priority among educational needs according to their relative importance were headache (80.3), followed by fatigue (71.4%), lower back pain (57.1%), sleepiness (41.1%). Furthermore, (21.4%) nurses reported a history of spontaneous abortion followed by (17.9%) reported late in pregnancy. Figure 2, displays that ergonomics hazards were the most prevalent (84.1%) followed by psychosocial hazards (70.7%). As shown in figure (3), with regard to previous studies regarding safety measures practice on occupational hazards as reported by the studied participants, an overwhelming percentage of respondents (94.3%) didn't study any topics of occupational health and safety hazards. Almost all the studied participants reported no previous study of occupational hazards such as physical hazards

(96.4%), psychological hazards (96.4%), ergonomic hazards (94.6%), environmental and mechanical hazards (92.9%), and safety measures practices (96.4%).

Figure (2): It can be seen that ergonomics hazards were the most prevalent (84.1%) followed by psychosocial hazards (70.7%).

Figure (3): With regard to previous studies regarding safety measures practice on occupational hazards as reported by the studied participants, an overwhelming percentage of respondents (94.3%) didn't study any topics of occupational health and safety hazards. Almost all the studied participants reported no previous study of occupational hazards such as physical hazards (96.4%), psychological hazards (96.4%), ergonomic hazards (94.6%), environmental & mechanical hazards (92.9%), and safety measures practices (96.4%).

Table (1): Illustrated that all of the studied participants reported that they didn't attend any training programs about health hazards and they would like to attend actual programs for health hazards; mainly to improve practice (44.6%) and raise awareness (35.7%). More than half of the studied participants (55.4%) see that two weeks are enough to provide good educational intervention about hazards, as regard the best time for providing intervention 78.5% choose morning shift as the best one, compared to (17.9%) and (3.6%) in afternoon and night shift. For the best place 89.3% of the studied participants preferred inside the hospital.

Figure (4): Shows that educational intervention achieved significant improvement in knowledge level. The highest knowledge level in pre-test was in biological hazards (17.9%), while least was in chemical and psychological hazards (3.6%). Post-test shows a significant improvement in knowledge level in all hazards mainly biological (98.2%) and ergonomic hazards (96.4%). Meanwhile, in the follow up test after

three months later, a significant improvement in knowledge level in both ergonomics (71.4%) and psychological hazards (66.1%), while minimal a significant improvement in knowledge level in physical (37.5%) and chemical hazards (39.3%).

Figure (5): Demonstrates that nurses' Work safety measures practice towards occupational hazards throughout the educational intervention improved significantly in all aspects. Work safety measures practice increased markedly in the post educational intervention phases either immediate post or follow up after three months later in comparison to the pre- educational intervention phase. Highest work safety measures practice in pre- educational intervention evaluation was noticed in personal hygiene aspects (42.9%), while lowest one was in both hand washing. Maximum work safety measures practice in the immediate post- educational intervention evaluation was noticed in body mechanics (92.9%).

Figure (6): Displays that work place safety hazards supervision by the studied participants throughout the program, work place safety hazards supervision was improved significantly in all aspect, mainly employees' facilities and general safety measures. Work place safety hazards supervision was markedly improved in both the post educational intervention phases (immediate post and follow up after three months later) in comparison to the pre- educational intervention phase. In particular, the highest level in pre- educational intervention implementation was noticed in aspects of material handling and storage and general safety measures (32.1%). Significant improvement in immediate post- educational intervention evaluation was noticed in general safety measures (92.9%). General safety measures succeed in continual improvement in follow up evaluation after three months later (60.7%), while, supervising physical

environment cleaning and organization unfortunately (32.1%) was the least.

Discussion:

The use of extended work shifts and overtime has escalated as hospitals cope with a shortage of registered nurses. In fact, the use of mandatory overtime to cover staffing shortage and vacancies is a controversial and potentially dangerous practice. However, the health and safety issues associated with shift work in general shift work can have an impact on well-being of nurses. The existing scientific studies indicate that shift work affects both sleep and waking by disrupting circadian regulation, familial and social life. ⁽³²⁻³⁴⁾

In terms of the studied participants' personal characteristics, all the studied participants were females; most of those were held diploma degree in nursing. The educational qualifications of the respondents in this study confirm the notion that the curriculum and educational experiences should prepare graduates to become competent, in terms of knowledge and skills, which are required for safety measures practice on occupational hazards. The high percentage of them was working in the nursing field for 6 to 10 years, the lowest percentage of participants were worked for less than 5 years.

Indeed, nurses need a healthy work environment that gives a merit of continuing education. Continuing education is essential for maintaining competency and for individual professional growth. ^(35,36) As it has been reported in previous studies, nurses are ready to know more about anything related to their field of work, and they are also interested in attending continuing educational programs related to their workplace issues. ⁽³⁷⁾

Obviously, no training activity has potential for success without an adequate training need assessment effort, which narrows the gap between

what is taught in the training sessions and what is required to improve job performance.⁽³⁸⁾ Training Needs Assessment (TNA) includes inquiries regarding the physical work environment, departmental culture, performance capabilities and the personalities of the employees. However, conducting (TNA) is a crucial initial step that can substantially influence the overall effectiveness of training program.⁽³⁹⁾

To identify the most common prevalent of occupational health hazards among critical care nurses working long shift work hours for setting a priorities among educational needs according to their relative importance. The results revealed that, highest prevalence of occupational hazards was for headache, followed by fatigue and lower back pain. Briefly it can be concluded that lower back pain was very prevalent. A possible explanation for this might be that the amount of physical effort put into patient care, which has not been reduced with the use of technology. High frequency of headache may be explained by stressful work conditions and prolonged shifts. Pain not only affects nurses negatively but it affect the quality of the delivered care to patients and markedly lead to shortage of staff nurses. In accordance with these results Meier⁽⁴⁰⁾ found that back injuries and low back pain was the most frequent (43%) due to lifting patients. Moreover, Adler⁽⁴¹⁾ mentioned that nurses are among the professionals with the highest rates of work-related low back pain, and every year about 12% of nurses leave the profession as a result of back injury. In addition, Lorenz⁽⁴²⁾ classified fatigue as one of the most important occupational hazards facing nurses' leads to shortage in number and bad quality of patient care. Dement et al.,⁽⁴³⁾ illustrated that with a shortage of nurses, long shifts have become a regular part of the job. Back to back shifts lead to lack of sleep, inevitably causing nurse fatigue.

Only over twenty percent of the

studied participants reported a history of abortion followed by late of pregnancy. Pregnant nurses may be more prone to many occupational hazards, little is known about the effects of disturbed circadian rhythms on reproductive health. A prospective cohort study done by Pompeii, *et al.*⁽⁴⁴⁾ found that working at night increased a woman's risk of preterm delivery. Also, these findings of the current study are consistent with those of Whelan, *et al.*⁽⁴⁵⁾ who found night work and long work hours have also been associated with an elevated risk of spontaneous abortion. Also a significant association was found between preterm births and prolonged standing, shift and night work. Due to all of the previous reported hazards Zaman⁽⁴⁶⁾ recommended some job modification to minimize exposure of pregnant nurses to certain drugs, patient populations, gases, and solvents.

The results revealed that ergonomics hazards are the most prevalent among nurses followed by psychosocial hazards. A possible explanation for this might be that absence of proper ergonomic safety measure in most of hospitals in addition to lack of awareness about risk of ergonomics hazards. Moreover, stressful conditions either in work or social life makes psychosocial hazards come next. In accordance with these results Nelson *et al.*⁽⁴⁷⁾ found that psychosocial and ergonomic hazards represent more than 90% of total hazards to which nurses exposed. In contrast to these findings, Nsubuga and Jaakkola⁽⁴⁸⁾ mentioned biological hazards and accidents are the most frequent among nurses. While, Scott, Hwang and Rogers⁽⁴⁹⁾ reported that stress and exposure to blood as the most frequent exposure among nurses.

Almost all participants reported no previous study of physical, psychological, ergonomic, environmental and mechanical hazards and work safety measures practice regarding occupational

hazards. High level of knowledge about biological hazards may be explained by available information about such hazards since nursing study, moreover these hazards are usually in focus.

Lack of knowledge leads to lack of compliance with safety standards. Individual health beliefs, perceptions of the value of precautions, perceived risks from known hazards, and organizational cultural factors affect compliance. Several studies document nurses' lack of knowledge about workplace safety regulation and lack of awareness of OSHA guidelines in general.⁽²³⁾

Results of the statistical analysis provided evidence to support the hypothesis that there will be a statistical significant improvements in knowledge scores of critical care nurses ' working long shifts, immediately after implementation of the interventional study and three months later after training as compared with the pre intervention . The statistical analysis provided evidence that there was significant improvement in the studied participants ' total knowledge score in post- test as compared to that in pre- test. Significant improvement was mainly on the knowledge regarding biological and ergonomic hazards. This indicates that the educational intervention was effective as there was a significant knowledge was gained. These findings of the current study are in consistent with those of findings in studies conducted by Orji et al.,⁽⁵⁰⁾ and Siddharthan et al.,⁽⁵¹⁾ who found that after application of training educational intervention the marked improvement was in ergonomic hazards. Another study performed by Tabak, Shiaabana and Shasha⁽⁵²⁾ they noticed the highest improvement after the educational intervention was in chemical and biological hazards.

Results of the statistical analysis provided evidence to support the hypothesis that there will be a statistical significant improvements in safety measures practice towards

occupational hazards scores of critical care nurses ' working long shifts, immediately after implementation of the interventional study and three months later as compared with the pre intervention . This indicates that the educational intervention was effective as there was a significant improvement in the observed results of safety measures practice was gained. The observed results of safety measures practice increased markedly in the post educational intervention phases both immediate post and follow up after three months later in comparison to the pre- educational intervention fieldwork observation. Highest safety measures practice in pre- educational intervention fieldwork observation was noticed in personal hygiene aspects. This may be explained by continual restricted observational measures for personal hygiene, while lowest one was in both hand washing and eye covering. This may be explained by poor application of infection control measures. Significant improvement in safety measures practice in immediate post-educational intervention was noticed in body mechanics; It seems possible that these results are due to hands-on training for different aspects of body mechanics as lifting.

As regards, follow up evaluation after three months later, body mechanics safety measures practice had got the highest percentage among the studied participants. Meanwhile, hand washing safety measures practice had got the lowest percentage among the studied participants. in accordance with these results, Trinkoff et al.,⁽²⁶⁾ Nsubuga and Jaakkola⁽⁴⁸⁾ found that personal hygiene measures was the highest level of performance among staff nurses. In contrast to these results, Stone et al.,⁽⁵³⁾ found that the highest level of nurse safety measures practice and even improved after educational intervention implementation was for using protective measures including gloves, facemasks, aprons, gowns, boots and

goggles as shown in the results a significant improvement in the nurses' safety measures practice levels was found in posttest as compared to that in pretest. Which give an indicator about effectiveness of the training program.

There is no doubt that suitable environment and availability of safety measures help and encourage in creating a culture of safety and making the practice of healthy behavior more easy and sustainable.⁽⁵⁴⁾ Workplace safety hazards monitoring markedly improved in the post educational intervention phases, both (immediate post and follow up after three months later in comparison to the pre-educational intervention phase. A high level in pre- educational intervention evaluation was noticed in aspects of material handling and storage and general safety measures. This may be explained by inadequate pre-employment training for the studied participants about different environmental aspects of the hospital. The marked improvement was in the immediate post- educational intervention evaluation as noticed in general safety measures. General safety measures succeed in continual improvement in follow up evaluation after three months later. This result may be explained by the fact that safety measures and material handling may be easy to be applied and to be available for nurses. This finding is in agreement with, Kingma⁽⁵⁵⁾ who found that availability of safe environment, especially protective equipment and emergency measure markedly decreases the occupational hazards facing nurses. Well-trained staff are not only able to perform better in their roles by enhancing productivity, but will also be more motivated and less likely to leave their current job and join another organization.⁽⁵⁶⁾

Conclusion:

The intervention study has been shown a promise of being an effective approach to promote knowledge and safety measures practice towards

occupational hazards, where there was a significant improvement mainly on the studied participants' knowledge regarding biological and ergonomic hazards. In addition, the observed results of safety measures practice towards occupational hazards was increased markedly in the post educational intervention phases, both immediate post and follow up after three months later in comparison to the pre- educational intervention fieldwork observation, especially in the application of protective measures and body mechanics throughout the educational intervention phases.

Recommendations:

- Shift schedules should be designed according to some ergonomic criteria, recognized to be suitable to lessen stress and limit adverse effects on health and well-being by avoiding or minimizing circadian disruption and accumulation of sleep deficits and fatigue.
- Assessment of fitness to shift work also should be taken into account .Moreover, the circadian adjustment (or mal-adjustment) of nurses complaining of significant health troubles should be assessed.
- Implement mandatory regular educational intervention to overcome the weak points of knowledge regarding all occupational hazards of critical care nurses nurse, based on their needs, expectations.
- Orientation programs are recommended to provide newly appointed nurses with enough information and training relevant to safety measures practice to control the occupational hazards
- Establishment of occupational health department which follows the rules and regulations of Occupational Safety and Health Act (OSHA) such as: evaluating personnel for existing infection, administering vaccines, managing occupational health hazard exposures and educating employees

- The study should be extended beyond the critical care units to inpatient floors, outpatient, oncology, operating rooms theaters and emergency room settings
- Provide periodic medical checkup with regular with vaccination for all nurses especially critical care nurses to avoid acquiring of any health hazards
- Egyptian syndicate should take the lead in setting the standards that will protect nurses' health and safety both in and out of the workplace.
- Use material safety data sheets (MSDSs) to provide accurate and understandable information to help nursing staff to know what Personal Protective Equipment (PPE) is needed.

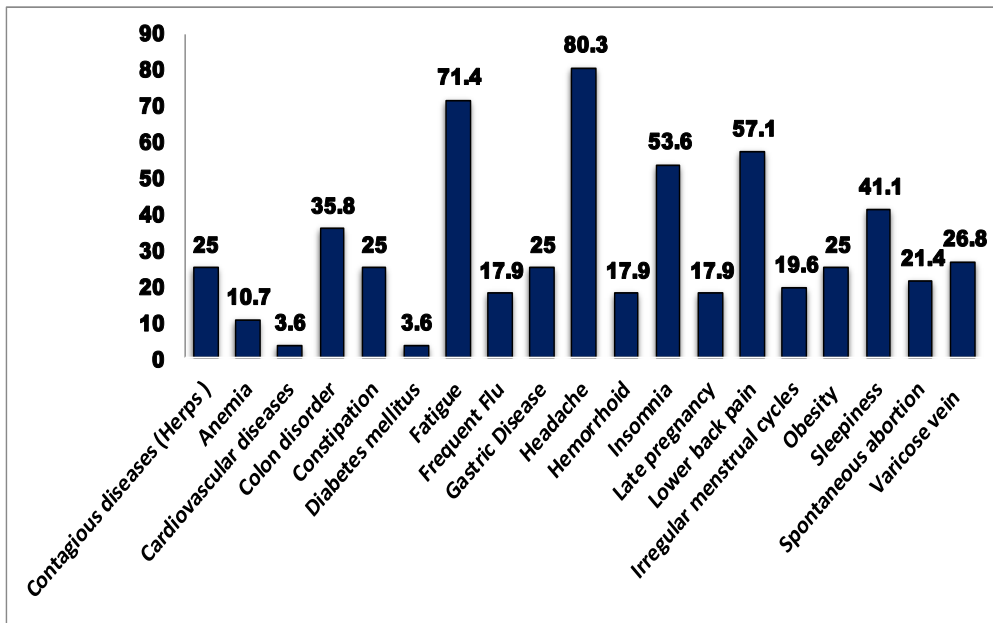


Figure (1): Percent Score of Health Hazard As Reported By Staff Nurses Working Long Shifts

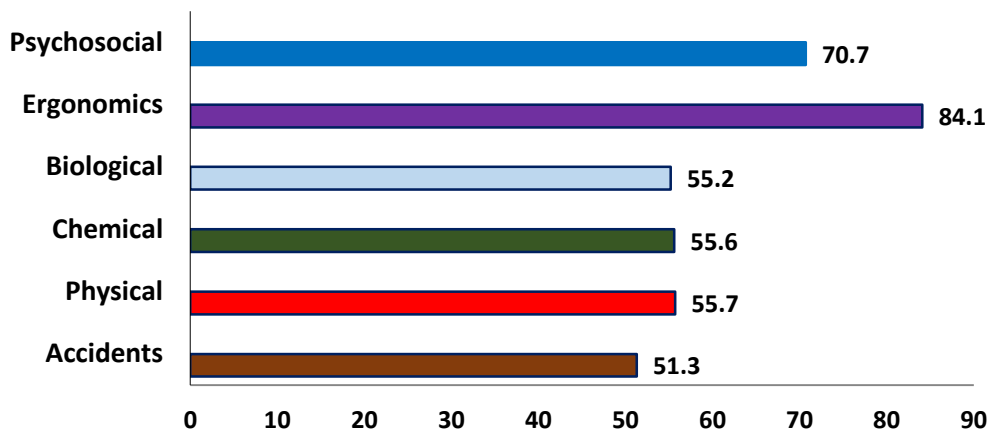


Figure (2): Percentage Score of Prevalent of Occupational Health Hazards as Reported by Critical Care Nurses Working Long Shifts

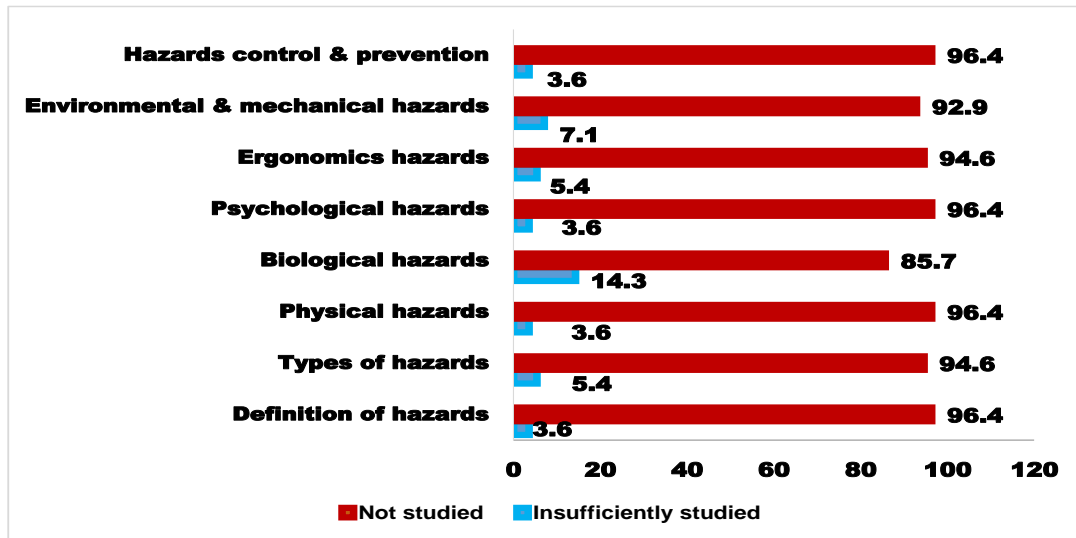


Figure (3): Studied Participants’ Self Report Regarding Their Previous Study of Suggested Educational Program.

Table (1): Studied Participants’ Self-Report on Their Needs to Attend a Training Program, Best Duration, Time and Place for the Educational intervention To Be Held

Items	Frequency	%
Previous Actual Training About Health Hazards		
▪ Yes	00	00
▪ No	56	100
Need To Attend An Occupational Training Program		
▪ Yes	56	100.0
▪ No	0	0.0
Main Reasons For Need Of Attendance Program		
▪ Raise awareness	20	35.7
▪ Improve practice	25	44.6
▪ Avoid Occupational Hazards	11	19.6
Best Duration For The Program		
▪ One week	25	44.6
▪ Two weeks	31	55.4
Best Time For The Program		
▪ Morning shift	44	78.5%
▪ Afternoon	10	17.9
▪ Night shift	2	3.6
Best Place For The Program		
▪ Inside the Hospital	50	89.3
▪ Outside the Hospital	6	10.7
Total	56	100.0

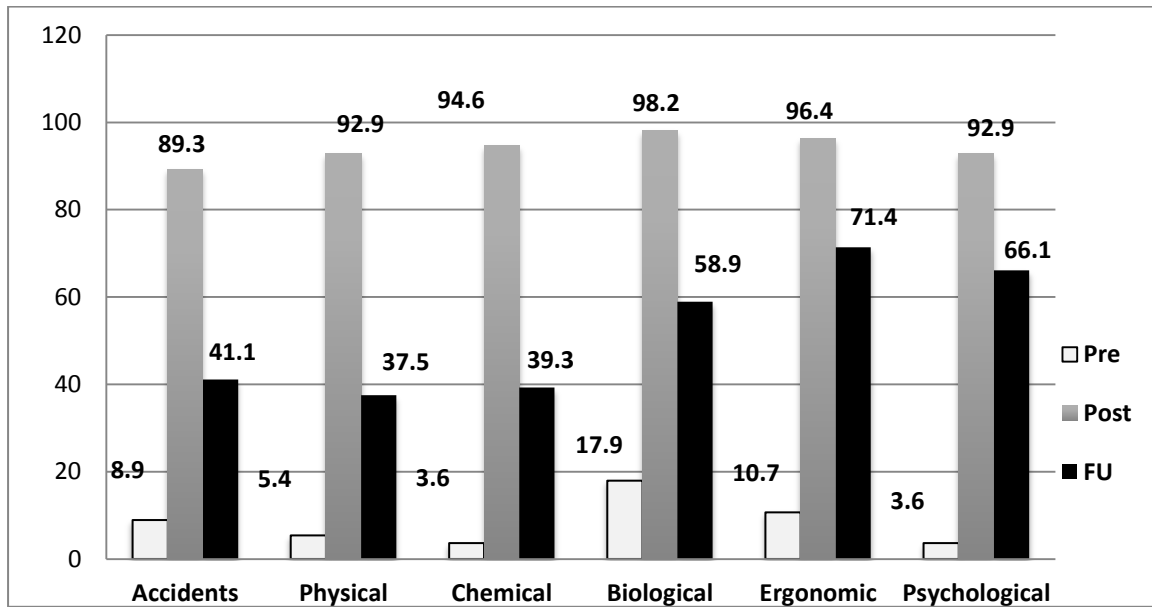


Figure (4): Comparison between Studied Participants' Knowledge throughout the Program

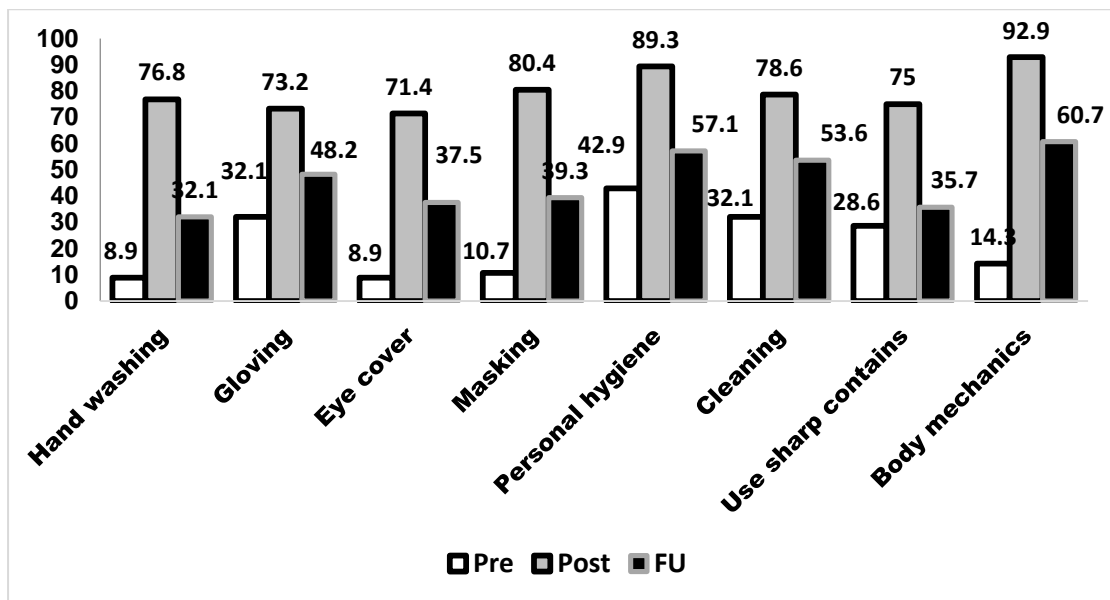


Figure (5): Critical Care Nurses ' Work Safety Measures Practice towards Occupational Hazards throughout the Program

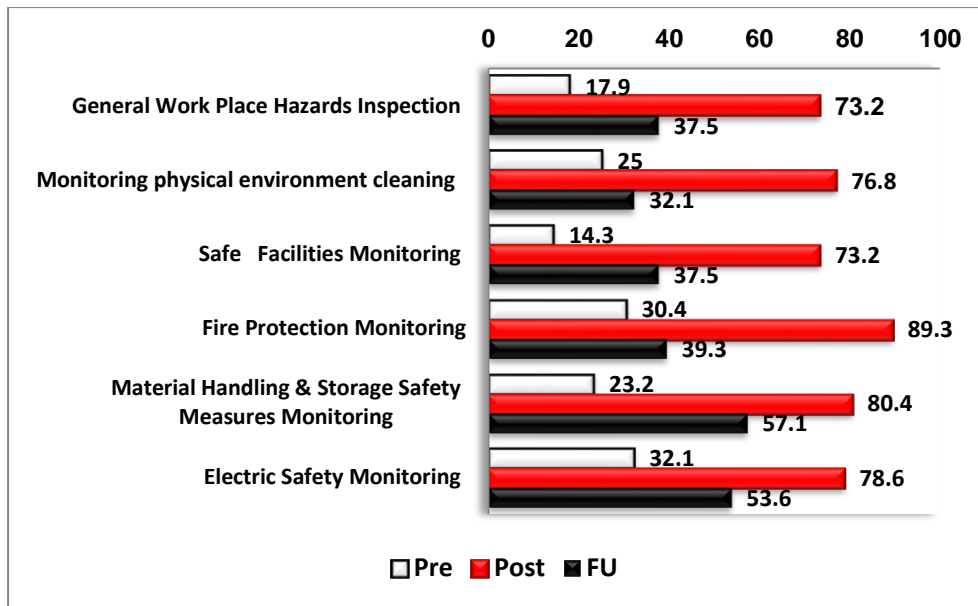


Figure (6): Supervision of Work Place Safety Hazards by Critical Care Nurses throughout the Educational Intervention

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تعزيز مستوى المعرفة و ممارسة تدابير السلامة فيما يتعلق بالمخاطر المهنية لدى ممرضات رعاية الحالات الحرجة العاملات بالنوبات الطويلة : تأثير دراسة تداخلية

عبير محمد فخرى^(١)، ماجدة عبد الحميد عبد الفتاح^(٢)، ممدوح محمد البهنساوى^(٣)، محمد منصور جويلي^(٤)

^(١) ماجستير- مقدم - الأكاديمية الطبية العسكرية- القاهرة،^(٢) أستاذ مساعد -قسم إدارة التمريض- كلية التمريض - جامعة القاهرة،^(٣) لواء طبيب -الأكاديمية الطبية العسكرية- القاهرة،^(٤) أستاذ الصحة العامة - كلية الطب - جامعة عين شمس.

مقدمة:

تتعرض ممرضات رعاية الحالات الحرجة للأخطار المهنية عندما تعملن نوبات طويلة او نوبات إضافية قد تمتد إلى ٢٤ ساعة متتالية. الممرضات اللاتي تعملن في الوحدات المُتَخَصِّصَة مثل الجراحة، غسل الكلي، والعناية المركزة يتطلبن منهن في أغلب الأحيان أن تعملن الساعات الإضافية (تحت الطلب) و التي قد تصل إلى أربع وعشرون في بعض الاحيان وهي الأكثر شيوعاً، خصوصاً في الطوارئ. وذلك يتطلب توفير بيئة صحية آمنة خالية من المخاطر المهنية.

الهدف من الدراسة:

هدفت الدراسة الحالية إلى تحسين مستوى المعرفة وممارسة تدابير السلامة فيما يتعلق بالمخاطر الصحية لدى ممرضات رعاية الحالات الحرجة العاملات بالنوبات الطويلة.

التصميم البحثي:

تم استخدام تصميم شبه تجريبي.

مكان الدراسة:

أجريت الدراسة الحالية في وحدات رعاية الحالات الحرجة بإحدى المستشفيات العسكرية.

عيّنة الدراسة:

تألّفت عيّنة الدراسة من عيّنة هادفة من ٥٦ ممرضة عاملة ممن وافقن على المشاركة في الدراسة وتوافرت لديهن معايير الإنضمام والتي تمثلت في موافقة الممرضات على المشاركة في البرنامج التعليمي واستكمال الممرضات للاختبار القبلي عند بداية البرنامج التعليمي، وإكمال البرنامج التعليمي ثم تلقى الاختبار البعدي بعد الخروج من البرنامج بـ ٣ أشهر على الأقل.

أدوات جمع البيانات:

تم تجميع البيانات الخاصة بهذه الدراسة باستخدام اثنين من الأدوات وهي:

١. الأداة الأولى متكوّنة من ثلاثة أجزاء رئيسية كالتالي:

▪ استبيان البيانات الشخصية: المستخدمة لتجميع البيانات المتعلقة بالعمر والنوع وأقسام العمل والمؤهلات وسنوات الخبرة في مجال

التمريض والحالة الإجتماعية وزمن المناوبات والرتبة.

▪ استبيان تقييم الاحتياجات التعليمية: المقسمة إلى جزأين:

(أ) استبيان تقييم المخاطر الصحية: وتم استخدامه لتجميع البيانات المتعلقة بانتشار وتكرار المخاطر المهنية والتي تم تقسيمها إلى ٦ فئات (الحوادث والمخاطر الفيزيائية والكيميائية والبيولوجية والتلاؤمية والنفسية).
(ب) استبيان للتعرف على الدورات التدريبية السابقة: ورغبتهم في حضور برنامج تعليمي عن المخاطر الصحية داخل وحدات العناية المركزة وأيضاً التي لم يتم تلبيتها لدى فريق التمريض والمتعلقة بالوقاية من المخاطر المهنية داخل وحدات العناية المركزة

▪ اختبار المعرفة القبلي والبعدي: لتقييم المستوى المعرفي لدى فريق التمريض فيما يتعلق بالمخاطر المهنية قبل وبعد البرنامج مباشرة ثم لاحقاً بعد ٣ أشهر من تنفيذ البرنامج.

٢. الاداة الثانية : قائمة الملاحظات لتقييم ممارسات الممرضات في مجال الوقاية والتحكم في المخاطر المهنية قبل وبعد البرنامج مباشرة ثم بعد تنفيذ البرنامج بـ ٣ أشهر .

النتائج:

أشارت نتائج الدراسة إلى ما يلي:

- ما يزيد على نصف الممرضات قد تعرضن إلى إصابات مهنية (أثناء العمل) تمثلت أكثر المشاكل الصحية انتشاراً بين الممرضات العاملات في وحدات رعاية الحالات الحرجة في الصداع، يليه آلام العضلات والإرهاق. في الوقت ذاته، كانت آلام الفقرات القطنية أقل المشكلات الصحية انتشاراً.
- أظهرت كافة الممرضات رغبتهم في حضور برنامج تعليمي عن المخاطر الصحية التي تتعرض لها الممرضات داخل وحدات العناية المركزة.
- وجود تحسن في مستوى المعرفة بعد تنفيذ البرنامج عنه قبل تنفيذ البرنامج.

- وجود تحسن في ممارسات الممرضات خاصةً في تطبيق الإجراءات الوقائية وفي ميكانيكية الجسم في كافة مراحل البرنامج.
- تحسن البيئة داخل وحدة العناية المركزة.

الخلاصة:

اثبتت الدراسة التعليمية التداخلية بأنها فعالة لتعزيز تعزيز مستوى المعرفة و ممارسة تدابير السلامة فيما يتعلق بالمخاطر المهنية لدى ممرضات رعاية الحالات الحرجة العاملات بالنبوات الطويلة.

التوصيات:

- توصى الدراسة بعمل برامج التوجيه لتعزيز مستوى المعرفة و ممارسة تدابير السلامة فيما يتعلق بالمخاطر المهنية لدى ممرضات المعينين حديثا برعاية الحالات الحرجة و العاملات بالنبوات الطويلة للسيطرة على المخاطر المهنية
- يجب إعداد برنامج تعليمي منتظم وإلزامي للقضاء على نقاط الضعف في المعرفة فيما يتعلق بكافة المخاطر المهنية التي تتعرض لها الممرضات العاملات في وحدات العناية المركزة، اعتماداً على احتياجاتهن وتوقعاتهن مع وضع خطة تدريبية تتناسب مع المهام الفعلية للممرضات.
- إجراء عمليات الفحص الطبي الدوري والتطعيم المنتظم لكافة الممرضات خاصة العاملات في وحدات العناية المركزة لتجنب الإصابة بأى من المخاطر الصحية.