Effect of Ergonomics Training Program on Nurses' Knowledge and Safety Practice

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Summary

Health members are exposed to occupational hazards as a result of poor safety knowledge, using medical equipment improperly, failing to follow basic task-accomplishing procedures, or management failing to provide enough safety standards and resources for employees (El Far et al. 2020). Poor health and safety practices cause illnesses, accidents, and a major financial burden on the organization. Unsafe and unhealthy working conditions affect service delivery quality and health worker productivity and retention. Nurses from specialized area are more vulnerable to these hazards due to the nature of jobs—handling patients or examining a client's illness. A lack of healthcare workers is another factor that places a heavy burden on healthcare providers (El Far et al. 2020; Yang et al. 2019).

Ergonomics is the science of modification and optimization of the environment, jobs and equipment in a manner that is consistent with human limitations and capabilities. The application of ergonomics principles, including consideration of many factors that affect how people react effectively to the environment, this environment may be a work tool or piece of equipment or the spatial surroundings in which work is conducted (Ali & Abdel-Hakeim, 2018).

Knowledge about ergonomic postures can enhance ergonomic habits and lessen musculoskeletal, visual, and related workplace injuries (Mokarami et al., 2021). Educational interventions studies have shown that education may improve knowledge,

foster more positive attitudes, alter ergonomic practices, and ultimately reduce injuries among healthcare workers (Sanaeinasab et al., 2018).

The current study was conducted to evaluate the effect of ergonomics training program on nurses' knowledge and safety practices in intensive care unit. To fulfill the aim of the study the researcher hypothesized that H1: The Nurses' ergonomics Knowledge test score will be higher during the periods of testing after implementation of the program (immediately after implementation, 3 months and 6 months after) than before implementing the program. H2: The Nurses' ergonomics safety practice score will be higher during the periods of testing after implementation of the program (immediately after implementation 3 months and 6 months after) than before implementing the program.

A quasi-experimental design with one group pretest-posttest was utilized in this study to achieve the aim of the current study. A convenient sample of staff nurses who are working in the intensive care unit at Qena General Hospital was included in the study sample. Their number was (30). The study was carried out at the intensive care unit at Qena General Hospital affiliated to ministry of health.

Data have been collected by using two tools: 1) Nurses' Ergonomics Knowledge Questionnaire, used to assess nurses' knowledge regarding ergonomics. It includes two parts: Part 1: Personal characteristics and work related data, it includes: Age, gender, level of education, and years of experiences in intensive care unit and attendance of previous training, shift type, work related complaint and intention to leave.

Part 2: Nurses' ergonomics Knowledge questionnaire: the questionnaire consists of 30 multiple choice questions grouped into 5 subgroups to assess nurses' knowledge regarding the following: concept and purpose of ergonomics (8 questions), principles of ergonomics (7 questions), lifting and moving techniques (6 questions), positioning and transferring techniques (4 questions), and ergonomics principles at work place environment (5 questions). 2) Nurses' Ergonomics Practices Observational Checklist: to assess nurses' ergonomics practices in intensive care unit. It includes two parts: Part 1: It includes 55 practice steps to assess nurses' application of ergonomics principles at manual handling techniques and it was distributed as following: general principles (21 steps) , positioning and transferring patient(5 steps), lifting and moving techniques (15 steps) , pushing and pulling techniques (9 steps), and prolonged standing(5 steps). Part 2 : It includes 49 items , that was used to assess application of ergonomics principles at work place environment, such as Space , flooring and doors (12 items) , material storage (6 items),work station and chairs (7 items), equipment and facilities (14 items), physical environment (4 items) and Welfare facilities (6 items).

The study was conducted as follows: Once an approval from the research ethical committee at faculty of nursing- Cairo University and the official permissions from the medical and nursing manager of Qena General Hospital were obtained, all nurses of the selected intensive care unit were invited to participate in the study. The purpose and nature of the study was explained to participants and the procedure was carried out in the following phases:

- Preparatory phase: Involved extensive reviewing of the recent related literatures to develop tools for data collection. The previous ergonomics knowledge and practice was measured using previously mentioned tools as Nurses' Ergonomics Knowledge Questionnaire was used to assess nurses' knowledge regarding ergonomics to identify learning needs. As well as nurses ergonomics practices were measured by the researcher utilizing the ergonomics practices observational checklist at August 2020. The results obtained from the initial assessment of staff nurses knowledge and ergonomics practices were analyzed and then the training needs were delineated, then the training program was designed by the researcher accordingly.
- Implementation phase: include program implementation; each training session lasted for 2 hrs. , twice per week, and was repeated when they need. The training program was carried out in September 2020.
- Evaluation Phase: Evaluation of the immediate effect of the training program on staff nurses through knowledge questioner and ergonomics practice observational checklist (post-test) for three times considered as intermittent observations, and it was carried out at October 2020.
- Follow up Phase: To measure program validity, knowledge and safety practices were tested after three months and six months of program implementation by using the previous tools, and it was carried out at January and April 2021.

Findings of the present study revealed that the majority of study participant were female, aged between twenty to thirty years old, most of them have an associated degree

of nursing, and had less than five years of experience, the majority of them were working in the long shift. The majority of the study participants did not attend ergonomics-training program. Moreover, the majority of the staff nurses' has a work related complaint, and about two thirds of them suffered from low back pain that prevented the majority of them from doing daily activities, and more than half of them were seen by physiotherapist or doctor due to the pain. Finally, most of the study participants were absent from work due to the pain and more than half of them have the intention to change or leave job.

There were statistical significant differences and marked improvement in mean scores of staff nurses' ergonomics knowledge regarding general ergonomics principles, positioning and transferring techniques, ergonomics principles at workplace environment and total ergonomics knowledge during different periods of assessment. There was no statistical significant difference in staff nurses' knowledge test scores regarding concept and purpose of ergonomics and lifting and moving techniques during different periods of assessment respectively.

There were statistical significant differences with marked improvement in all dimensions of ergonomics safety practice immediately post program, three and six months post program implementation compared to before. As they had the highest mean scores immediately post program and after three and six months compared to preprogram.

There was no statistical significant relationship between staff nurses' total ergonomics knowledge and all their personal characteristics. There was no statistical

significant relationship between staff nurses' ergonomics safety practices and their personal characteristics except for work related complaint of pain, location of pain, whether the pain prevented them from doing normal activities, whether they consulted a doctor due to the pain, and whether they need time off work due to the pain.

There was a statistical significant positive correlation between staff nurses' total ergonomics knowledge and their safety practices at three and six months post program implementation, while there was no statistical correlation between the nursing staff total ergonomics knowledge and their safety practices at immediately post program implementation.

The study findings recommended that the ergonomics program should be included in the annual training plan of the hospital continuous education department and include attending ergonomics sessions in the periodic evaluation sheet of staff nurses.

Conclusion

There was a positive effect of ergonomics training program on nurses' knowledge and safety practices at intensive care unit, as the findings of the present study concluded that there were statistical significant differences and marked improvement in mean scores of staff nurses' ergonomics knowledge regarding general ergonomics principles, positioning and transferring techniques, ergonomics principles at workplace environment and total ergonomics knowledge during different periods of assessment. As they had the highest mean scores immediately post program, three and six months later compared to before program implantation.

There was no statistical significant difference in staff nurses' knowledge test scores regarding concept and purpose of ergonomics and lifting and moving techniques during different periods of assessment respectively.

There were statistical significant differences with marked improvement at all dimensions of ergonomics safety practice immediately post program, three and six months post program implementation compared to before. As they had the highest mean scores immediately post program and after three and six months compared to preprogram.

There was no statistical significant relationship between staff nurses' total ergonomics knowledge and all their personal characteristics. There was no statistical significant relationship between staff nurses' ergonomics safety practices and their personal characteristics except for work related complaint of pain, location of pain, whether the pain prevented them from doing normal activities, whether they consulted a doctor due to the pain, and whether they need time off work due to the pain.

There was a statistical significant positive correlation between staff nurses total ergonomics knowledge and their safety practices at three and six months post program implementation, while there was no statistical correlation between the staff nurses total ergonomics knowledge and their safety practices at pre- program and immediately post program implementation.

Recommendations

Based on the findings obtained from the present study, the following recommendations are deduced:

At health care organization level. Ensure that:

- The hospital's continuous education department includes an ergonomics program in its annual training plan and includes attendance ergonomics sessions in the periodic evaluation form of nursing staff.
- Incorporating an ergonomics training courses into the orientation program for all newly hired staff.
- Develop policies for safe patient's handling as (no lift policy); and guidelines for using good body mechanics and ergonomics practices to prevent any occupational health hazards.
- Encourage staff meetings and monthly safety committee meetings to provide an opportunity to improve reporting of workplace injuries and complaints, through encouraging open discussions about significance of reporting injuries.
- The opinions of nurses should be taken into account by hospital management when making decisions about workplace ergonomics.
- Hospital administration should deploy more efforts in improving the workplace ergonomics; this includes the work setting, equipment, as well as the physical and psychological work environment.

- Improve nurses' awareness of ergonomics by making and distributing simple brochures that explain the issue and its guiding principles to every department.

At educational level. Include ergonomics as a science in the nursing curricula at nursing faculties.

At research level. Generalization of research is needed on a broader scale of nurses on different hospital sectors.

- Future studies should look into the relationship between ergonomics and other factors including productivity and work life quality.
- Creating an easy-to-read, comprehensive brochure with ergonomics tips and instructions for proper handling and lifting procedures.
- Guidelines, sufficient booklets and posters regarding occupational work hazards and safety should be provided and distributed to all the units/departments periodically, so that all nurses will be able to read it.