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Bioscience Research

Print ISSN: 1811-9506 Online ISSN: 2218-3973

Journal by Innovative Scientific Information & Services Network



RESEARCH ARTICLE

BIOSCIENCE RESEARCH, 2018 15(4):3833-3837.

OPEN ACCESS

Effect of educational program on health team member's awareness regarding occupational radiological hazards in cardiac catheterization units in Egypt.

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New health technologies and medical devices using ionizing radiation have led to major improvements in the diagnosis and treatment of human disease. However, inappropriate or unskilled use of such technologies and devices can lead to unnecessary or unintended exposures and potential health hazards to patients and staff. Aim of the study improves awareness related to radiological hazards among health team members. Design quasi experimental design was utilized to conduct the education program for health team members. Sample convenient sample of health members they were four physicians, two bachelor nurse, nine technical nurses and eight radiologists in cardiac catheterization unit. Setting two cardiac catheterization units at Cairo university hospitals. Tools of data collection occupational radiological health hazards questionnaire was used. Results of study total awareness score pre program was moderate level of awareness (mean=17.5 SD±2.64) while post implementing the program was high (mean=22.0 SD±1.27) level of awareness. There was highly statistical significant differences ($p<0.000$) between health team members awareness pre and post conducting education program. Conclusion improves health team members' awareness regarding occupation radiological hazards after attending educational program. Recommendation continues effective education program regarding occupation hazards and safety practices to health team members in different units.

Keywords: Education, Radiological hazards, Awareness, Occupational hazards

INTRODUCTION

New health technologies and medical devices using ionizing radiation have led to major improvements in the diagnosis and treatment of human disease. However, inappropriate or unskilled use of such technologies and devices can lead to unnecessary or unintended exposures and potential health hazards to patients and staff. (WHO, 2018). It is important to communicate that risks can be controlled and that benefits can be maximized by selecting an appropriate procedure

and using methods to reduce patient exposure without reducing clinical effectiveness. (Ndejjo R. and Musinguzi G., 2015; Ghosh T., 2013)

An occupational hazard is any source of potential damage, harm, or adverse health effects on someone under certain conditions at work. The International Labour Organization (ILO) estimates that 160 million people across the world suffer from work related diseases such as musculoskeletal diseases and mental health problems, whereas 270 million fatal and nonfatal

work related accidents result in over 350,000 casualties and over 2 million work related deaths each year which are all attributable to occupational hazards.(CCOHS,2016; ILO,2016)

Work related hazard source or situation with the potential to cause injury or ill health Hazards can be: Physical (e.g., radiation, temperature extremes, constant loud noise, spills on floors or tripping hazards, unguarded machinery, faulty electrical equipment);Ergonomic (e.g., improperly adjusted workstations and chairs, awkward movements, vibration); Chemical (e.g., exposure to solvents, carbon monoxide, flammable materials, or pesticides);Biological (e.g., exposure to blood and bodily fluids, fungi, bacteria, viruses, or insect bites. (ILO, 2001; ILO, 2017; ISO, 2018; OSHA, 2018)

A variety of different procedures are now available in the cardiac catheterization laboratory (CCL). These include, but are not limited to hemodynamic evaluation, coronary and bypass graft angiography, abdominal and thoracic aortography, percutaneous coronary intervention (PCI), peripheral angiography and intervention, cervico-cerebral angiography and interventions and interventions for structural heart disease. Depending on local needs, some laboratories may be used for electrophysiology diagnostic and therapeutic procedures with device implantation plus other non-vascular interventional procedures. (ACE, 2011; OSHA, 2017)

MATERIALS AND METHODS

Aim of the study to improve level of awareness to occupational radiological hazards among health team members in cardiac catheterization units.

A convenient sample of four physicians, two bachelor nurse, nine technical nurses and eight radiologists who meeting the inclusion criteria which spent at least one year of experience in cardiac catheterization unit and accept to participate in study.

Tool of data collection by occupational radiological health hazards questionnaire. Developed by (Hassan, Abdelwahab, Abdelfattah 2015). The scoring system: - The scale included identifiers awareness of participants had three points Likert scale distributed to assess the level of awareness as follow: Aware (3), not sure (2), and not aware (1). The total score was 24 as 8-14 score was low awareness level, 15-20 score moderate while more than 21 score was high level of awareness

Procedure was conducted on the following five phases:

Preparatory phases, assessment, planning, implementation and evaluation phase.

Preparatory phases

After explanation the aim and the objectives of the study official administration permissions was obtain from medical directors of cardiac catheterization units to collect the data. After get administrative approval letter met the health team members to explain the purpose and importance of the study.

Assessment phase

Self administered questionnaire related to awareness to occupational radiological hazards was completed through health team members, to assess their awareness level to identify the area of weakness.

Planning

Based on the assessment results related to participant awareness level, the researcher was developed education program related to occupation radiological hazards.

Implementation phase

The educational program was composed of twelve hours conducted in 3 sessions conducted in one week; every session lasted 4 hours per day. It cover main dimensions as type of radiations, uses of radiations, doses, measures and revised radiation doses, protective equipments, complication and hazards from radiation exposure. Teaching methods that the investigator was used in program are lecturer, group discussion, brain storming; education media that used during program was data show, lap top computer. Supportive material for each session such as power point slides, videos and pictures were helpful in educational sessions

Evaluation phase

Effectiveness of educational program was evaluated immediately post program by using the same questionnaire to assess differences in their awareness.

RESULTS

Fig. (1) Shows that technical nurse present the highest percentage (39%) from participant followed by radiologist (34.8%), while bachelor nurses constitute the lowest percentage (8.7%).

Table (1) shows that the highest mean score

(mean 20.0, SD± 2.8) for bachelor nurses pre-teaching program while radiologist was the lowest mean score (Mean=16.7 SD±2.1). The highest mean score (mean 22.2, SD± 1.2) for physician post-teaching program while radiologist was the

lowest mean score (Mean=21.7 SD± 1.1). There was high statistical significance differences (p<0.000) between health team members awareness regarding occupational radiological hazards pre and post education program.

Figure (1) frequency distribution of participants' occupation

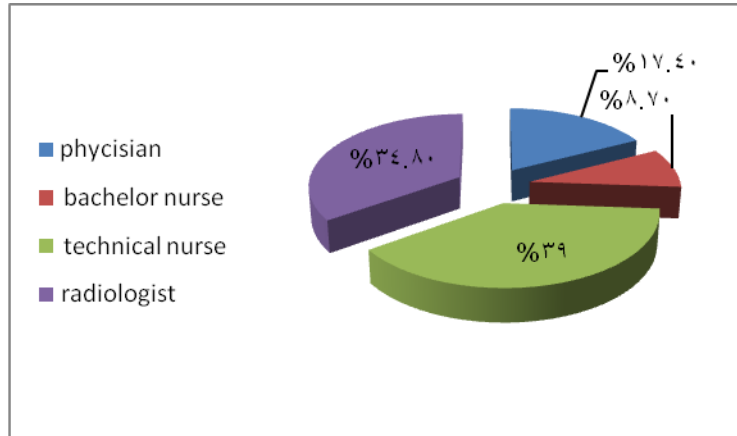


Table (1) awareness level differences among health team member's pre and post education program

Awareness level Occupation	Mean Awareness level Pre education		Mean Awareness level post education		t	p
	Mean	SD	Mean	SD		
Physician	18.7	1.8	22.2	1.2	-3.656	0.035
Bachelor nurse	20.0	2.8	22.1	2.8	-3.000	0.045
Technical nurses	17.2	3.1	22.0	1.2	-4.450	0.002
Radiologist	16.7	2.1	21.7	1.1	-5.401	0.001
Total	17.56	2.64	22.0	1.27	-7.751	0.000

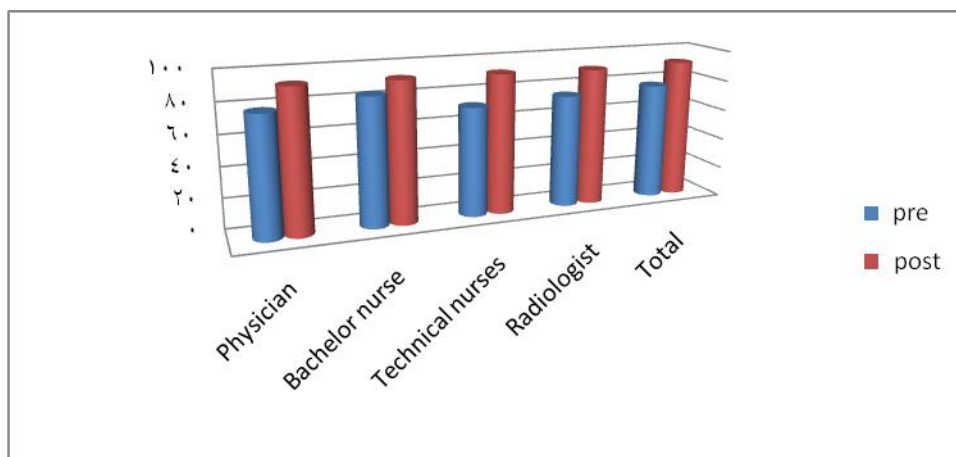


Figure (2) shows that mean percentage differences in awareness to occupation radiological hazards among health team members post-education program was higher than pre education program

Also show that health team member's awareness was moderate pre educational program while the level was high post implement educational.

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DISCUSSION

Education and training was basic requirement and needs for any organization to maintain high level of quality and up data there team knowledge regarding new techniques or knowledge related to their specialty.

This agree with study conducted in South Africa by Olaiifa et al., (2018) the study resulted highlighted that Appropriate training and supervision in health care worker management as well as relevant and ongoing in-service training is needed to ensure appropriate knowledge, attitudes and safe practice among all members of staff. As poor practices have been reported on a number of occasions from different hospitals in South Africa, relevant training must also be introduced or improved at undergraduate level.

Health team members with low level of awareness was exposed to occupation hazards in their work place, this result supported with study conducted by Ndejjo and Musinguzi, et al., in Kampala, Uganda (2015) about occupational Health Hazards among Healthcare Workers, the study concluded that half study sample exposed to occupation hazards, more than one third of them exposed occupational hazards related their low of awareness with occupation hazards in place of work.

This result supported with study conducted in Iran by Shabani et al., (2018) the study title was Radiation Protection Knowledge, Attitude, and Practice (KAP) in Interventional Radiology results the study declare that health professionals have low level of awareness with occupation radiation hazards and poor compliance to safety practices so the result of study concluded to government to develop plan for training and education program for health professionals and make a checkup for personnel of interventional radiology departments.

In study conducted in KSA University of Tabuk by Saleh, Alhawiti et al.,(2017) the study explore the awareness and knowledge of newly graduated physicians regarding radiation and its hazardous impact on human health. The results of study show that most of the medical student's

Interns have weak knowledge about ionizing radiation and radiation protection.

In study conducted in Iran (2017) by Alavi, Dabbagh, et al., titled was Medical radiation workers' knowledge, attitude, and practice to protect themselves against ionizing radiation in Tehran Province, concluded that health team members in radiation units have poor level of awareness related to the radiological hazards and they need to attend e service training and Participation in in-service training programs to improve they awareness level.

The results of conducted study revealed that awareness to occupational radiological hazards among health team members was improved from moderate level to high level after attending educational program. Health team member's awareness was moderate pre program related to the fear from the severity of radiation exposure complication as malignancy. Also the awareness level was improved to high related to adding knowledge and updated their knowledge.

On other hand Dhingra and Panday (2017)in study conducted in State of Utrkhand in India the results of study proved their were the perception and knowledge related radiological hazards and its safety in post test was higher than pretest after conducting education program to imparting systematic knowledge to professionals in medical care center.

The previous results supported also with study conducted in Australia by Pryor, (2016) the study aimed to development and implementation of the occupation health and safety to improve body of Knowledge to health professionals the results of study show that the body of knowledge post was higher than pre education program.

CONCLUSION

Improve health team members' awareness to occupational radiological hazards after conducting educational program.

CONFLICT OF INTEREST

The authors declared that present study was performed in absence of any conflict of interest.

ACKNOWLEDGEMENT

The study was approved by ethical committee of Faculty of nursing, Cairo University. The authors would like to thank all health team members for participating in this study.

AUTHOR CONTRIBUTIONS

AAH Create research idea, collect data,

conducted training program, construct the results, discussion and abstract; EAA, FAA Write the research methodology, construct training program and write introduction, EB Review the results.

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