

The Knowledge, Attitude and Practice about Ionizing Radiation among Nurses Working In Orthopaedic Theatres in a Tertiary Care Centre in Sri Lanka

Kalaventhana P^{1*}, Dishanth S¹, Kogulan T¹, Irshad MIN², Bopitiya DMCLB³, Jayarathne ASN³ and Vimalarajan R³

¹Department of Medicine, University of Colombo, Sri Lanka

²Departments of Orthopaedic Surgery, Teaching Hospital, Batticaloa

³Department of Consultant Orthopaedic Surgeon, Teaching Hospital, Batticaloa, Sri Lanka

Corresponding Author: Kalaventhana P, Department of Medicine, University of Colombo, Sri Lanka, Tel: 94719643073; E-mail: m29085@cmb.ac.lk

Received: February 18, 2022, Manuscript No. IPMCRS-22-11876; **Editor assigned:** February 21, 2022, PreQC No. IPMCRS-22-11876 (PQ); **Reviewed:** March 07, 2022, QC No. IPMCRS-22-11876; **Revised:** March 11, 2022, Manuscript No. IPMCRS-22-11876 (R); **Published:** March 18, 2022, Invoice No. IPMCRS-22-11876

Citation: Kalaventhana P (2022) The Knowledge, Attitude and Practice about Ionizing Radiation among Nurses Working In Orthopaedic Theatres in a Tertiary Care Centre in Sri Lanka. J Med Res Health Educ Vol:6 No:2

Abstract

Objective: This study is to assess the knowledge, attitude and practice about ionizing radiation among nurses who are working in Orthopaedic theatres in Teaching Hospital-Batticaloa, Sri Lanka.

Methods: A descriptive cross-sectional study included all nursing officers working in Orthopaedic theatres. A self-administered, pretested, content validated questionnaire has been used to collect the data. After the initial data collection, a health education program was organized for the participants and again the same questionnaire was distributed and the responses were recorded. Data analysis was performed using SPSS (v23).

Results: Female comprises 76.2% of participants. The majority of them (61.9%) had been assisted more than fifteen cases per month. 85.7% of participants did not obtain any training program in radiation safety. Though the usage of certain radiation protection gears was poor initially, there is a significant increase in usage noted after the intervention (p=0.0534). The knowledge of the ALARA principle significantly improved after the health education programme (p=0.0474). In addition to that, awareness of the adverse effects of radiation also has been significantly enhanced after the intervention (p=0.0253).

Conclusion: Radiation safety awareness is poor among nursing officers. Frequent studies in various institutions will help to identify the deficit properly. Simple interventions like health education programmes will assist to help to enhancing the knowledge and the quality of service.

Keywords: Radiation protection gears; Ionizing radiation; Occupational hazard; Safe dose; Teratogenicity

Introduction

The usage of fluoroscopy during orthopaedic procedures has increased in several folds recently due to increased number of trauma, increased reconstructive procedures and increased awareness about the minimally invasive procedures [1–4]. The ionizing radiation is like a “double-edged sword”. Like its benefits, it has its effects. The maximum safe dose is 0.5 mSV for a year [3]. The risk of radiation-induced hazard is a collective effect that increases with time [4,5]. Potential health risks due to ionizing radiation depend on the type of radiation, duration of exposure, age of the recipient and the tissue which got exposed [3,6]. Effects of radiation are degenerative disorders, developmental anomalies, mutations and cancer formation [7–10]. Though hazardous effects are known to all health care professionals, awareness about radiation protection and adherence to it is proved to be poor in several studies [6,11]. Reduced level of knowledge in this subject not only risks their health but also increase the risk to patients as well [12]. International Commission on Radiological Protection (ICRP) stated that understanding radiation protection is of utmost importance to health care professionals [6]. To reduce the risks of occupational radiation protection, knowing and adhering to the ALARA (As Low as Reasonably Achieved) principle is mandatory. In our country, there are no accredited courses or health education programmes included in the curriculum of health care professionals and there is no such study to assess the knowledge about radiation protection among them during their professional life. This study is to assess the knowledge, attitude and practice about ionizing radiation among nurses who are working in Orthopaedic theatres in Teaching Hospital Batticaloa (Tertiary care centre), Sri Lanka.

Materials and Methods

This study was a descriptive cross-sectional design that included all nursing officers working in Orthopaedic theatres at Teaching hospital Batticaloa, Sri Lanka. The ethical review permission has been obtained from the Postgraduate Institute of

Medicine, University of Colombo, Sri Lanka. An online self-administered pre-tested content validated questionnaire that contained 20 questions was used to collect the data to maintain anonymity. The questions were divided into demographic data, experience profile and their knowledge towards radiation protection. After the initial data collection, the online portal was closed for further response. A health education program was arranged for all the nurses who are working in the theatre including the effects of radiation, the importance of knowledge in radiation protection, ALARA principles and safety practices. The same questionnaire was circulated again among the same group and the responses were recorded and compared with the pre-intervention results. All data were stored and analysed in the password-protected personal computer using SPSS (v23). The student T-test was used to compare the pre-intervention and post-intervention results. The p-value less than 5 were considered to be significant.

Results

Forty-two participated in this study, among them majority are female (76.2%, n=32). The majority of them (61.9%, n=26) assisted more than 15 orthopaedic surgeries per month which needed fluoroscopy assistance (Figure 1)

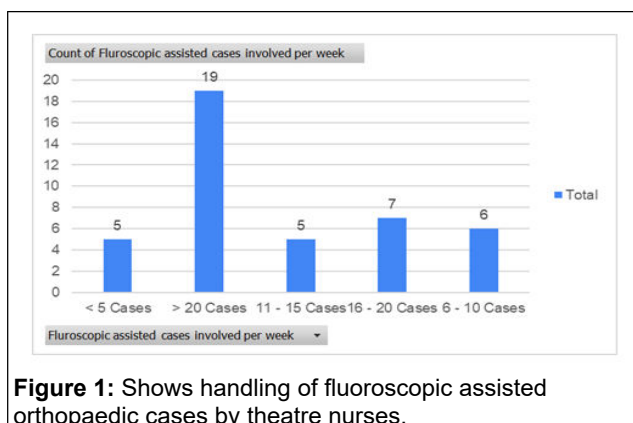


Figure 1: Shows handling of fluoroscopic assisted orthopaedic cases by theatre nurses.

Table 1: Shows the score differences before and after the intervention.

Components	Percentage of correct answer before intervention	Percentage of correct answer after intervention
Usage of protection gears for fluoroscopy	100%	100%
Protection gears which are used	100%	100%
Chest cover	100%	100%
Waist cover	100%	100%
Thyroid cover	54.8%	83.3%
Cap	23.8%	83.3%
Goggles	7.1%	14.3%
Gloves	19%	59.5%
Lead shield		
Reason for not using the protection gear	88.9%	85.3%
Unavailability of protection gears	21.4%	2.4%

85.7% (n=36) of them disclosed that they had no prior training in radiation protection.

All of them said that they are wearing protection gears during the surgery using fluoroscopy.

Though all of them wear chest covers, waist covers and thyroid guards but other radiation protection gears were used at lower rates.

Such as goggles (23.8%, n=10), cap (54.8%, n=23), gloves (7.1%, n=3) and lead shield (19%, n=8). 88.9% (n=24) were revealed certain protective gears which were underutilized, not available in the setup.

Interestingly 33.3% (n=9) think the radiation protective gears impede during surgery.

The majority of them (76.2%, n=32) would like to participate in a training program in radiation protection.

92.7% (n=38) of them did not know about the dosimeter and the majority of them revealed that dosimeters are not available in the theatre to use.

The image intensifier part and the radiation tube of the C-Arm device were correctly identified by 25 nurses. 90.5% of them were not aware of the ALARA principle.

No one in this study did not answer correctly about the components of ALARA principles. Risk reduction measures were not known to many participants.

Healths issues are caused by ionizing radiation were not known to the majority of the participants.

Especially about degenerative conditions caused by ionizing radiation (Table 1).

Think the protection gears impedes surgery		
Willingness to be trained in radiation protection	76.2%	100%
Identification of parts of C-Arm device	65.2%	95.2%
Image intensifier	62.5%	90.5%
Radiation tube / Xray tube		
Dosimeter	19%	95.2%
Knowledge about the dosimeter	7.3%	7%
Usage of dosimeter		
Awareness about ALARA principles	9.5%	95.2%
Knowledge on components of ALARA principles	0%	73.8%
Awareness of effects of radiation	16.7%	71.4%
Organs that are sensitive to radiation	16.7%	59.5%
Adverse effects caused by ionizing radiation	11.9%	100%
Degenerative disorders	92.9%	100%
Hair loss	45.2%	100%
Cataract	97.6%	100%
Carcinogenesis		
Teratogenicity		
Subfertility/Infertility		

Following the health education program the usage of radiation protection caps, goggles, gloves and lead shields increased significantly ($p=0.0534$). The number of participants who had the thought that the radiation protection gears may impede the procedure changed their minds in the second survey (21.4% vs. 100%). Following the initial awareness program participants (76.2% vs. 100%) would like to participate in educational/training programs. Though the usage of dosimeter has not increased due to unavailability, awareness about the dosimeter has increased (19% vs. 95.2%). Awareness about the ALARA principle has increased (95.2% vs. 9.5%) and the knowledge on the ALARA principle has increased (73.8% vs. 0%). The knowledge of ALARA principles significantly increased after the intervention ($p=0.0474$). The knowledge on adverse effects caused by ionizing radiation especially on degenerative conditions has significantly increased among participants of this study ($p=0.0253$).

Discussion

The health care field consists of several occupational health risks. Among this radiation exposure is an important occupational hazard. For this reason, health care workers should have sound knowledge of radiation protection. According to the

analysis of this study, participants were shown a good attitude in using certain radioprotective gears such as chest, waist and thyroid covers even before the health education program. But the usage of other radiation protection gears such as lead caps, goggles was poor among nurses before the intervention. The usage has been increased following the health education program. The results are similar in previous studies [13], in which thyroid shields and goggles [14] were underutilized. These radiation protection gears were underutilized as they were not available in the theatre like in our study. The reason for poor usage of gloves, goggles and lead shields even after the intervention due to unavailability. It is also shown in international surveys in other countries [14]. Most importantly the main misconception was clarified in this study that is 21.4% of participants thought that the protective gears impede the surgery and it has been reduced to 2.4% after the intervention and following the health education program increased number of participants (76.2% vs. 100%) would like to participate similar educational programmes in this regard. A similar misconception also noted in a study conducted in Turkey [14], revealed poor usage of lead gloves thought to impede the surgery. Participants of our study show increased knowledge about the usage of dosimetry. But the usage of dosimetry has not increased after the intervention due to its unavailability. Only 9.5% of participants were aware of ALARA

principles. Their awareness has improved to 95.2% after the intervention. The knowledge on components of the ALARA principle was very poor (0%) and it has increased to 73.8%. The knowledge on adverse effects of radiation was increased to 88.5% from 46.8% after the intervention.

Conclusion

The results of the study strongly suggest that studies like this will help to assess the deficits in knowledge about occupational hazards and simple interventions like health education programmes will increase the knowledge, practice and attitude of participants.

References

1. Bhatt CR, Widmark A, Shrestha SL, Khanal T, Ween B, et al. (2008) Occupational radiation exposure monitoring among radiation workers in Nepal
2. Badawy MK, Health M, Deb P (2017) Radiation protection education and training process from classroom to clinics
3. Hossain A, Talab D, Mahmodi F, Aghaei H, Jodaki L, et al. (2016) Evaluation the effect of individual and demographic factors on awareness, attitude and performance of radiographers regarding principles of radiation protection
4. Maharjan S, Parajuli K, Sah S, Poudel U (2020) Knowledge of radiation protection among radiology professionals and students: A medical college-based study. *Eur J Radiol Open* 1:7
5. Alzubaidi MA, Al Mutairi HH, Alakel SM (2017) Assessment of Knowledge and Attitude of Nurses towards Ionizing Radiation during Radiography in Jeddah City. *Egypt J Hosp Med* 69:2906–2909
6. Alghamdi A, Alsharari Z, Almatari M, Alkhalailah M, Alamri S, et al. (2020) Radiation Risk Awareness Among Health Care Professionals: An Online Survey. *J Radiol Nurs* 1;39:132–138
7. Seifi D, Hasanzadeh H, Bitarafan-Rajabi A, Emadi A, Bokharaeian M, et al. (2019) Knowledge, attitude and practice of nuclear medicine staff towards radiation protection. *Iran J Nucl Med* 1;27:39–46
8. Khani T, Hasanzadeh H, Bitarafan-Rajabi A, Emadi A, Bokharaeian M, et al. (2017) Assessment Radiation Protection Knowledge, Attitude and Practice in Dental Radiography Staff. 4-4
9. Hasanzadeh H, Pursamimi M, Jadidi M, Mirmohammadkhani M, Bitarafan-Rajabi A, et al. (2018) Assessing the Knowledge, Attitude and Practice of Mammography Staffs about the Principles of Protection against Ionizing Radiation. *Front biomed technol* 5-5
10. Kumar R, De Jesus O (2021) Radiation Effects on the Fetus. *Stat Pearls*
11. Mynalli S, Biradar BN, Shenoy Basti R, Vernon Braggs A. Evaluation of Awareness on Radiation Protection and Hazards among Paramedical Personnel Working in Radiology Department of a Teaching Hospital. *Int J Contemp Med Rech* 2-2
12. Review S, Bwanga O, Kayembe RM (2020) Medical reviews Awareness of Nurses to Radiation Protection in Medicine. *Int J Med Rev* 7:78–84
13. Mohd Ridzwan SF, Bhoo-Pathy N, Isahak M, Wee LH (2019) Perceptions on radioprotective garment usage and underlying reasons for non-adherence among medical radiation workers from public hospitals in a middle-income Asian setting: A qualitative exploration. *Helicon* 1-5
14. Kurtul S (2018) The Level of Knowledge about Radiation Safety and the Frequency of the Use of Protective Equipment among Healthcare workers exposed to Radiation in Different Units. *Turkish J Oncol* 33