
INTERNATIONAL JOURNAL OF CURRENT RESEARCH IN BIOLOGY AND MEDICINE

ISSN: 2455-944X

www.darshanpublishers.com

DOI:10.22192/ijcrbm

Volume 3, Issue 1 - 2018

Original Research ArticleDOI: <http://dx.doi.org/10.22192/ijcrbm.2018.03.01.019>

Knowledge of the principles of protection in the radiology ward of hospitals

Vida sargazi¹, Zeynabyazdisotoodeh², Ali Jafarikhilalabadi^{*3}¹ MD of medical physics, Department of Radiology, Faculty member of Paramedicine, Zahedan University of Medical Sciences, Zahedan, Iran² MSC of medical Imaging, Department of Radiology, Faculty member of Paramedicine, Zahedan University of Medical Sciences, Zahedan, Iran³ Radiology student, Student Research Committee, Zahedan University of Medical Sciences, Zahedan, Iran***Corresponding author: Ali Jafarikhilalabadi**

Radiology student, Student Research Committee, Zahedan University of Medical Sciences, Zahedan, Iran

Abstract

Introduction

Wilhelm Conrad Rontgen, the German physicist, discovered X-ray on November 8, 1895. (3) X-ray belongs to a group of electromagnetic radiation. Electromagnetic emission is a form of energy transfer in space, resulting from the combination of magnetic and electric fields (4). X-ray is a type of electromagnetic radiation with a wavelength of about 0.01 to 10 nm, equivalent to 30 peta-hertz to $30 \times 10^3 \times 10^3 \times 10^3 \times 10^3 \times 10^3$ Hz, and energy between 100 eV and 100 kV.

Methodology

This research was carried out with the aim of informing the personnel of the radiation protection staff in the radiology department of the hospitals of Zahedan in 2018. To do this research, a researcher-made questionnaire was developed, using the rules of the Atomic Energy Organization in the field of ionizing radiation protection in three areas of individual protection, protection of radiology and patient protection whose validity was confirmed by relevant experts and its reliability was confirmed by Alfa Cronbach to be 85%; then, the questionnaires were delivered to the staff under the permission of hospital head.

Findings

Out of 91 studied radiologists, 35 were male and 56 were women. In terms of academic education, 51 (56%) subjects had associate degree, 38 (47.8%) had BS, and 2 subjects (1.2%) had MS degree' the minimum years of service turned out to be 2 years and the maximum was 258 years.

Conclusion

Performing any kind of X-ray diagnostic radiology process requires deep knowledge and awareness of the radiologists about the biological effects of ionizing radiation; on the other hand, the availability of radiation protection equipment is indispensable to ensure that the staff of the department, according to their knowledge, provide appropriate protection for patients in need of radiation.

Keywords: Knowledge, the radiology ward, principles

Introduction

Wilhelm Conrad Rontgen, the German physicist, discovered X-ray on November 8, 1895. (1) X-ray belongs to a group of electromagnetic radiation. Electromagnetic emission is a form of energy transfer in space, resulting from the combination of magnetic and electric fields (2). X-ray is a type of electromagnetic radiation with a wavelength of about 0.01 to 10 nm, equivalent to 30 peta-hertz to $30 \times 10^3 \times 10^3 \times 10^3$ Hz, and energy between 100 eV and 100 kV (3). Electromagnetic radiation is of a dual nature, sometimes functioning as a particle and sometimes as a wave (4). In case of an emergency or when it is possible to carry the patient to the imaging chamber for any reason, it is used to imaging portable radiographic equipment. These devices are available in both types of radiography and fluoroscopy, and can be used in various places, including the site of the accident, the patient's room, the recovery room, the intensive care unit, the outpatient clinics and even the hospital's yard. In portable radiograms, standard radiograph films and pages containing special detectors for digitizing the image can be used to display the computer screen. Radiation protective clothing is usually used to protect patients and staff from direct and indirect radiation during imaging in hospitals, clinics and dental offices (5). Historically, since lead is quite thin, it is used in radiation protection. However, advances in the technology of radiation protection have led to the creation of two substitute substances, lead compounds and lead-free protective materials (6). Currently, medical professionals have a variety of options to choose their radiation protection clothing. The lead protector has several types, such as lead glasses, thyroid strap, gonad strap lead, lead protective clothing. Considering the potential risks of ionizing radiation in patients

Relationship between degree and years of service

| | |
|-------------------------|-------|
| Less than 10 years | 32% |
| Between 10 and 20 years | 46% |
| Between 20 and 30 years | 2.62% |

There is a correlation between the response rate of personnel and their years of service ($p < 0/05$). The higher the years of service, the higher their response rate is. There is a correlation between the degree of education and the percentage of respondents who have a degree; the higher the degree, the more respondent they get.

referring to the radiology department of the hospital, it is necessary for those in this section to try and reduce the risks and side effects of ionizing radiation as a radiological technician.

Methodology

This research was carried out with the aim of informing the personnel of the radiation protection staff in the radiology department of the hospitals of Zahedan in 2018. To do this research, a researcher-made questionnaire was developed, using the rules of the Atomic Energy Organization in the field of ionizing radiation protection in three areas of individual protection, protection of radiology and patient protection whose validity was confirmed by relevant experts and its reliability was confirmed by Alfa Cronbach to be 85%; then, the questionnaires were delivered to the staff under the permission of hospital head. After collecting questionnaires, the data was analyzed using SPSS 18. According to the type of research, the independent t-test was used to analyze and describe the data; this test was, also, used to assess the relationship between the student's degree of education and the level of knowledge of the radiation protection principles and the relationship between the age of radiation staff and awareness of the principles of radiology was used.

Findings

Out of 91 studied radiologists, 35 were male and 56 were women. In terms of academic education, 51 (56%) subjects had associate degree, 38 (47.8%) had BS, and 2 subjects (1.2%) had MS degree' the minimum years of service turned out to be 2 years and the maximum was 258 years.

Discussion

In radiology, in some methods (such as CT scans, mammography, and conventional radiographic methods), the distribution of X-ray transmitted beams on film screens or counterparts and digital imaging receivers is represented. However, in some other methods (such as MRI, ultrasound, and optic interpolation), non-ionizing beams are used (7).

In case of an emergency or when it is not possible to carry the patient to the imaging room for any reason, portable radiographic equipment is used for imaging. These devices are available in both types of radiography and fluoroscopy, and can be used in various places, including the site of the accident, the patient's room, the recovery room, the intensive care unit, the outpatient clinics and even the hospital's yard (8). In portable radiography devices, standard radiograph films and pages containing special detectors for digitizing the image can be used to display the computer screen. Without doubt, the use of ionizing radiation in medicine is one of the most useful applications of these beams. However, the use of these beams in medicine has made it possible for people to get the most radiation from all sources of artificial sources of radiation (9). Undoubtedly, after the discovery of X-rays in the nineteenth century, almost instantaneous use was made of medical diagnostic methods (10). X-rays is used in craniofacies and photographing internal organs of the body and taking pictures of solid objects as one of the nondestructive testing methods to detect defects. There were 35 men (38.46%) and 56 women (61.53%) participating in the present study. Mehdi Pour et al reported that subjects participating in their study were 57.9% women and 33.1% men (11); 53% of personnel were male and 47% were women in Amirzadeh et al study (12). According to the results obtained in this study, the percentage of responding to questions regarding personnel personal protection was 32.5%, patient protection was 75.5% and radiation protection was 63.8%. The results of a study by Amirzadeh et al, entitled "Awareness of the principles of radiation protection in workers working in hospitals of Shiraz" which was conducted in Shiraz in 2006, stated that the number of employees in the radiology and radiotherapy departments in the Shiraz hospitals and then the number of samples was determined according to statistical calculations; a questionnaire was used to collect required data (13). The knowledge of protecting different parts of the room was more than 70%, and the knowledge of using badge film was more than 85%. The level of knowledge of and familiarity with personal protective equipment was more than 92%. The degree of knowledge of the Atomic Energy Agency's survey of 54% and the degree of familiarity with the long-term and short-term risks were 98% and 95%, respectively. There was a significant relationship between education level and knowledge of the maximum amount of radiation for staff ($p < 0.0007$). Also, there was a significant relationship between education level and employees' knowledge about observance of protective principles

($p < 0.003$). In the end, it was concluded that, based on the information obtained regarding the use of badge film, there is a relatively good level of awareness, but in the other cases, the level of awareness was not acceptable and it seems that the level of education of the staff has increased; additionally, short term courses are held at appropriate intervals. In other cases, such as visitation of atomic energy inspectors and leakage and protection full information is provided for all personnel (14). In another study by Noahi Ganjani in Kerman, it was stated that more than 82 percent of the staff knew the rules of radiation protection (15). The results of Mehdi Pour et al study, entitled 'The level of awareness and practice of radiology technologists in Rafsanjan health centers in relation to radiation protection of patients referred to the radiology department in 2010', stated that descriptive statistics of all technicians, specialists and experts of radiology centers in 2010 were evaluated by census method. The level of knowledge and practice of radiology technologists was determined by a researcher-made questionnaire whose validity was confirmed by the relevant specialists and its reliability was confirmed by Cronbach alpha to be 86%. Data analysis was performed using descriptive statistics and SPSS. Of the 19 technologists studied, 59.7% were female, 47.4% had an undergraduate degree, and less than years of service was the most frequent service years category, (52.6%). The results showed that 78.5% of technologists had a poor awareness, 11% had a moderate awareness and 10.5% had good knowledge. The performance of these individuals was 73.8% at a weak level and 26.3% was in the moderate level. The relationship between level of awareness or performance with demographic variables was due to the limited volume of samples. In the end, it was concluded that due to the poor level of knowledge and performance of the technologists studied and the importance of protecting patients from ionizing radiation and the key role of radiologists in this important category, the need for training classes in the field of radiobiology and radiation protection, and providing necessary knowledge in regard with various facilities and methods for radiation protection is of paramount importance (16).

Conclusion

Performing any kind of X-ray diagnostic radiology process requires deep knowledge and awareness of the radiologists about the biological effects of ionizing radiation; on the other hand, the availability of radiation protection equipment is indispensable to

ensure that the staff of the department, according to their knowledge, provide appropriate protection for patients in need of radiation (17).

References

1. Draft national care standards for independent hospital. A consultation paper. Scotland; The Scottish commission for the regulation of care: 2002 Sep. Available from: <http://www.scotland.gov.uk>
2. Memarnia Z. The evaluation of radiology department performance management in Tehran University of Medical Science. Tehran: Tehran University of Medical Science; 2007; 18-23.
3. Almen A, Tingberg A, Mathson S. Influence of different technique factors on image quality of lumbar spine radiographs as evaluated by establisher CEC image criteria. Br J Radiol 2000; 73(875): 1192-1199.
4. Philip W. Ballinger. Merrill Atlas book of Radiographic Positions and Radiologic procedures.2012.
5. Mehdipour LA, Sabbagh B, Afzali F, Saijadi A, Abbasian H. Evaluation of the knowledge and performance status of the radiology technologists of Rafsanjan radiology centers about protection against irradiation of patients in radiology departments during 2010. Community Health Journal. 2009 Oct 15;4(1):7-12.
6. Behzadmehr R, Keikhaie KR, Pour NS. International journal of pharmacy & life sciences.
7. Behzadmehr R, Keikhaie KR, Pour NS. The Study of Pregnant Women's Attitude toward Using Ultrasound in Pregnancy and its Diagnostic Value based on the Demographic Features in Amir-al-Momenin Hospital of Zabol. Int J Adv Res Biol Sci. 2017;4(6):58-63.
8. Behzadmehr R, Keikhaie KR, Pour NS. Investigating the Attitude of Pregnant Women on the Efficacy of Ultrasound in Diagnosing Pregnancy based on Level of Education and Number of Pregnancies in ZabolAmiralmomenin Hospital during 2015-2016. International Journal of Pharmacy & Life Sciences. 2017 Jul 1;8.
9. Mahmoodi Z, Keikhaie KR, Salarzai M, Havasian MR. The incidence of different kinds of cardiac arrhythmia after myocardial infarction in smokers and opium abusers hospitalized in Imam Ali Hospital, Zahedan, 2016. Journal of Pharmaceutical Sciences and Research. 2017;9(7):1243-5.
10. Kahkhaie KR, Keikhaie KR, Vahed AS, Shirazi M, Amjadi N. Randomized comparison of nylon versus absorbing polyglactin 910 for fascial closure in caesarean section. Iranian Red Crescent Medical Journal. 2014 Apr;16(4).
11. RezaieKeikhaie K, Ghorbani S, Hosseinzadeh Z, Hassanshahian M. Antimicrobial activity of methanol extract of Citrulluscolocynthis against antibiotic-resistant Staphylococcus aureus. Advanced Herbal Medicine. 2017 Jul 1;3(3):1-6.
12. Kahkhaie KR, Keikha F, Keikhaie KR, Abdollahimohammad A, Salehin S. Perinatal Outcome After Diagnosis of Oligohydramnios at Term. Iranian Red Crescent Medical Journal. 2014 May;16(5).
13. Hourdakakis CJ. A national survey: performance of medical fluoroscopic x-ray system in Greece. Radiat Protect Dosim. 1999; 81(3): 205-19.
14. Yoshizumi TT. Radiation safety and protection and of neonates in radiological examinations. Radiol Technol. 1987; 58(5): 405-8.
15. Zakova M. Occupational exposure in angiography (Prague workplace). RadiatProt Dosimetry.2001; 94(1-2): 129-32.
16. Takavar A, Saghari M, General concept of ionizing radiation, First edition, Tehran, 1990, 1:11
17. Martin, C.J., 2015. *Practical radiation protection in healthcare*. Oxford University Press, USA.

Access this Article in Online



Quick Response
Code

Website:

www.darshanpublishers.com

Subject:

Medical Sciences

How to cite this article:

Vida sargazi , Zeynabyazdisotoodeh, Ali Jafarikhililabadi. (2018). Knowledge of the principles of protection in the radiology ward of hospitals. Int. J. Curr. Res. Biol. Med. 3(1): 133-136.

DOI:<http://dx.doi.org/10.22192/ijcrbm.2018.03.01.019>