INDIAN JOURNAL OF SCIENCE AND TECHNOLOGY

RESEARCH ARTICLE

A Study on Radiation Safety Awareness amongst the Healthcare Professionals of Private Hospital in Vadodara

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OPEN ACCESS

Received: 16.07.2021
Accepted: 03.09.2021
Published: 25.10.2021

Citation: Thakkar M, Wadhwa M, Desai B, Singh A, Panchal J, Shrivastava A, Meena M, Patel M (2021) A Study on Radiation Safety Awareness amongst the Healthcare Professionals of Private Hospital in Vadodara. Indian Journal of Science and Technology 14(34): 2761-2765. https://doi.org/10.17485/IJST/v14i34.1312

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Funding: None

Competing Interests: None

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Published By Indian Society for Education and Environment (iSee)

ISSN
Print: 0974-6846
Electronic: 0974-5645

Abstract

Background/Objective: The study aimed to assess the level of awareness of radiation safety amongst the Healthcare Professionals in the Private Hospital of Vadodara. Radiation protection tries to avoid the detrimental effects of ionizing radiation by reducing unnecessary radiation exposure. With the increased utilization of radiological investigations, it is essential for referrers to be aware of the harms associated with ionizing radiation to avoid unnecessary exposure for Healthcare Professionals. **Methods/Statistical Analysis:** This descriptive cross-sectional study in nature where the Healthcare Professionals who are willing to participate will be included in the study. In evaluating the level of awareness 62 Healthcare professionals we used close-ended structured questionnaire which include 8 statements was used for evaluating radiation safety status. The questionnaires used included personal and general questions and its validity and reliability had been confirmed. **Findings:** A total of 62 healthcare professionals participated in the study. The majority of individual participants whose age is between 20-30 Years, their awareness regarding radiation safety is very well. The participants whose experience between 1-5 years having more knowledge about radiation safety as compared to the other groups whose experience is less than 6 months and greater than 5 years. 90% of the participants were aware about the radiation safety policy of the hospital so it can be stated that the p values of the Chi-square Test are higher than the significant value of 0.05. **Novelty/Applications:** The study addresses an important aspect which is related to the operational quality of the hospital. Radiation safety is an area of concern because of the safety threats faced by the staff, patients and patient relatives. Assessing the level of awareness among the staff will help in better and planned preparedness of hospital with respect to radiation safety.

Keywords: Radiation Safety; Awareness; Healthcare Professionals; Hospital

1 Introduction

Natural radiation comes from many sources including more than 60 naturally-occurring radioactive materials found in soil, water and air. Radon, a naturally-occurring gas, emanates from rock and soil and is the main source of natural radiation. Every day, people inhale and ingest radionuclide from air, food and water [(1)]. Radiology plays a prominent role in modern medicine. Many of the diagnostic and interventional radiology procedures involve exposure to ionising radiation. Radiation exposure, on the other hand, poses a risk to both patients and healthcare professionals [(2)]. Healthcare workers at hospital should ensure As Low as Reasonably Achievable (ALARA) principle to protect themselves and the patients from unnecessary radiation dose. All health professionals who are exposed to ionizing radiation must adhere to the radiation protection guidelines when they request and attend radiology procedures.

The doctors and intern doctors underestimated real radiation doses [(3)]. These days, the most common human-made sources of ionizing radiation are medical devices. To know radiation safety is essential for health care workers. However, very limited data were available on awareness re radiation safely among health care workers.

Radiation protection tries to avoid the detrimental effects of ionizing radiation by reducing unnecessary radiation exposure [(4)]. The International Radiation Protection Association (IRPA) has developed certain standards to minimize the dosage received by HCWs, which are reviewed on a regular basis to prevent radiation adverse effects [(5)].

The aim of the study is to assess the level of awareness of radiation safety amongst the Healthcare Professionals in the Private Hospital of Vadodara.

Hypothesis: H_0: There is no significance association between demographic and other factors of Healthcare Professionals

H_1: There is a significance association between demographic and other factors of Healthcare Professionals

2 Materials and Methods

The study used a descriptive, cross-sectional methodology using self-administered questionnaires to measure the degree of radiation safety awareness and attitude in the private hospital of Gujarat's Vadodara district. The questionnaire was provided to the study population, which included 62 healthcare professionals, who completed a closed-ended questionnaire based on their observations of the equipment and suppliers. The questionnaire included statements for healthcare professionals which determine their awareness of radiation safety based on their observations.

The assessed item was either provided (yes) or not provided (no). A right response got one mark, whereas an erroneous answer or omission received a 0 mark. The total of all checklist item scores reflected the overall safety outcome. The questionnaires utilized in this study contained personal and generic inquiries, and their validity and data collecting were carried out impartially using completed checklists. Statistical reliability had been confirmed Cronbach's alpha is 0.720 for Healthcare Professionals. In the beginning, the legal procedures and hospital manager's consultation were performed. The analyses were performed using SPSS version 21.0 (Chicago, IL, USA). The data was analyzed by inferential statistics and the Chi-Square test. The P values were set at < 0.05.

3 Result and Discussion

Out of 97 total Healthcare Professionals, 62 had returned their questionnaires. The demographic characteristics of these participants are provided in Table 1. As shown in Table 1 only 6 (9.7%) participants reported below 20 Years of age and 22 (35.5%) reported above 30 years of age. The majority of Participants (54.8%) age reported between 20-30 Years. Also, the overall experience of the participants was only 8 (12.9%) whose experience is less than 6 months, other all participants experience is between 1-5 years or more than 5 Years.

Table 1. Frequency distribution of the Healthcare Professionals

Demographic Factors	Options	Frequency	Percentage
Gender	Female	60	96.8
	Male	2	3.2
Age	< 20 Years	6	9.7
	20-30 Years	34	54.8
	>30 Years	22	35.5
Experience	0-6 Months	8	12.9
	1-5 Years	37	59.7
	More than 5 Years	17	27.4

Table 2 shows the cross-tabulation between Age and Healthcare Professionals were the participants between the age of 20-30 Years and > 30 Years, whose awareness regarding radiation safety is better than the age of < 20 Years group. Hence it can be stated that there is no significance awareness regarding radiation safety amongst all age groups of healthcare professionals. From the analysis, it can be stated that the p values of the Chi-square Test are higher than the significant value of 0.05. So, the null hypothesis (H_O) i.e "There is significance between the age groups of the healthcare professionals is failed to reject the null hypothesis.

Table 2. Cross Tabulation and the output of Chi Square Test of Healthcare Professionals with Age

Statement	Age	Yes	No	Total	Chi Sq (P Value)
Are you aware about any radiation safety policy used by the hospital?	< 20 Years	6	0	6	0.034
	20-30 Years	30	4	34	
	>30 Years	14	8	22	
	Total			62	
Do you know that training is required for radiation practices?	< 20 Years	0	6	6	0.194
	20-30 Years	3	31	34	
	>30 Years	5	17	22	
				62	
Are you aware about the ALARA principle?	< 20 Years	0	6	6	0.117
	20-30 Years	14	20	34	
	>30 Years	10	12	22	
				62	
Are you aware that ionizing radiation used CT, Mammography is harmful?	< 20 Years	5	1	6	0.799
	20-30 Years	27	7	34	
	>30 Years	19	3	22	
				62	
Does the hospital have CT technology for automatic radiation dose reduction?	< 20 Years	0	6	6	0.158
	20-30 Years	13	21	34	
	>30 Years	6	16	22	
				62	
Is the hospital having dose-limiting software for imaging equipments?	< 20 Years	1	5	6	0.228
	20-30 Years	18	16	34	
	>30 Years	9	13	22	
				62	
Does the hospital have a shielding policy for female patients of childbearing age?	< 20 Years	6	0	6	0.663
	20-30 Years	30	4	34	
	>30 Years	20	2	22	
				62	
Is hospital is having any specific radiation safety policies for pregnant patients?	< 20 Years	1	5	6	0.000
	20-30 Years	31	3	34	
	>30 Years	15	7	22	
				62	

Table 3 shows the cross-tabulation between Experience and Healthcare Professionals were the participant's experience between 1-5 Years and More than 5 Years, whose awareness regarding radiation safety is better than the experience of less than 6-month group. Hence it can be stated that there is no significance awareness regarding radiation safety amongst all healthcare professionals due to different experiences. From the analysis, it can be stated that the p values of the Chi-square Test are higher than the significant value of 0.05. So, the null hypothesis (H_O) i.e "There is significance between the experiences of the healthcare professionals is failed to reject the null hypothesis.

Table 3. Cross Tabulation and the output of Chi Square Test of Healthcare Professionals with Experience

Statement	Experience	Yes	No	Total	Chi Sq (P Value)
Are you aware about any radiation safety policy used by the hospital?	< 6 months	8	0	8	0.002
	1-5 years	33	4	37	
	> 5 years	9	8	17	
	Total			62	
Do you know that training is required for radiation practices?	< 6 months	0	8	8	0.464
	1-5 years	5	32	37	
	> 5 years	3	14	17	
				62	
Are you aware about the ALARA principle?	< 6 months	1	7	8	0.238
	1-5 years	15	22	37	
	> 5 years	8	9	17	
				62	
Are you aware that ionizing radiation used CT, Mammography is harmful?	< 6 months	5	3	8	0.270
	1-5 years	31	6	37	
	> 5 years	15	2	17	
				62	
Does the hospital have CT technology for automatic radiation dose reduction?	< 6 months	2	6	8	0.910
	1-5 years	12	25	37	
	> 5 years	5	12	17	
				62	
Is the hospital having dose-limiting software for imaging equipments?	< 6 months	2	6	8	0.087
	1-5 years	21	16	37	
	> 5 years	5	12	17	
				62	
Does the hospital have a shielding policy for female patients of childbearing age?	< 6 months	8	0	8	0.106
	1-5 years	31	6	37	
	> 5 years	17	0	17	
				62	
Is hospital is having any specific radiation safety policies for pregnant patients?	< 6 months	2	6	8	0.001
	1-5 years	33	4	37	
	> 5 years	12	5	17	
				62	

According to results of this investigation, radiation safety awareness is adequate amongst the staff of the hospital. There are plenty of studies done on occupational exposure to radiation [(2–4)]. Radiation is a constant concern in modern medicine, as it is related to dangerous health effects. So many studies have shown that imparting of radiation safety information in the medical imaging professionals is an inadequate. Moreover, patients' attitudes toward undergoing a radiological imaging are often biased or based on inappropriate information. Therefore, healthcare professionals have a commitment to their patients.

4 Conclusion

Radiation diagnostics is an important and broadly used part of the therapeutic process; protection-related issues are usually addressed in a rather offhand manner. According to the result of this study, radiation safety awareness is adequate amongst the healthcare professionals of the private hospital in vadodara. A better knowledge of radiation protection issues becomes an important element of professional expertise of not only radiologists and radiation therapists, but also other specialists as well as medium-level or auxiliary staff. The same result were found in number of studies. According to previous study there is no significant relationship between job experience and safety awareness was seen. However radiologist with job experience more than 5 Years, were observed to have a poor awareness than junior radiologist. Limitation of this study is that the healthcare

professionals schedule is very busy so difficult to collect the data in time.

Acknowledgment

The authors would like to thanks all the participants in this study for spending their time. Before starting the study the legal procedure and the hospital manager's permission were take. The authors declare that there is no conflict of interest in the study.

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