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Radiology

TO ASSESS THE LEVEL OF RADIATION SAFETY AWARENESS AMONG NON-RADIOLOGY STUDENTS, UTTAR PRADESH, INDIA

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ABSTRACT To review the awareness level of radiation risk or radiation protection among health care or non-radiology students. **Methodology:** Our database consists of the level of radiation safety awareness among non-radiology students those who work in non-radiology departments such as operation theater technician, medical laboratory technician, physiotherapy, cardiology, optometry, and such non-medical at different centers, were asked survey questions prepared by ourselves. In the analysis of the data obtained from the questionnaire. **Result:** A total of 84 non-radiology participants ranging in age from 17 to 30 years with mean age years were involved in the survey from different centers. **Conclusion:** In this study, we have been observed that most non-radiology students are familiar with radiation, but many participants believed that they did not ever observe the harmful effects of radiation, and those who have done the harmful effects Observation, they believe that the harmful effect of radiation happens within a year. After that, we have concluded from this study that most of the participants knows about the radiation protection, and one problem was that according to this study most of the participants didn't ever use any radio-protective equipment, and out of these participants those who used any radio-protective equipment, most of them they use a lead apron. The results show that the majority of non-radiology students are at a level of sufficient knowledge of basic radiation knowledge and risks, but insufficient knowledge about radiation protection.

KEYWORDS : Non-Radiology, Radio-protective, Radiation protection, Gray/Year, Lead Apron, Non-ionizing Radiation, and Electromagnetic Radiation

INTRODUCTION.

Radiation safety can be defined as the protection of people and the environment against ionizing radiation beams. In other words, it is to protect against the harms of ionizing radiation in practices where radioactive substances and similar sources of radiation are being used. Hospitals and medical institutions contain lots of risk factors. One of these risks is radiation exposure. This matters to employees, patients, and their relatives. There are publications on having unnecessary tomographic scans one after another, and it is emphasized that these examinations have a role in increasing cancer risk. Recently, there have been studies showing that low-dose radiation applications used for diagnosis may influence human health negatively. The dose absorbed by the first radiologist is estimated at 1Gy/year.

Radiation is the emission of energy or transmission in the form of waves/particles, which can penetrate the substance and human being. Radiation divides into two groups Ionizing Radiation and Non-Ionizing Radiation due to their effect on the substance. Non-ionizing radiation consists of electromagnetic waves that have low frequency and lower energy that's why they can't generate ions so its effects on the body remain at the molecular level. This type of electromagnetic wave covers a wide frequency range that is propagated from transformers, high voltage lines, mobile phones and base stations, and microwave ovens. Ionizing radiation causes ionization by breaking apart an electron from an atom or molecule.

Today, many radiology and non-radiology students working in hospitals in clinical trials, oral and dental health hospitals, and the veterinary field are exposed to radiation in some medical procedures. It is estimated that millions of healthcare students worldwide are working with radiation-related practices, and half of them are exposed to human-made artificial radiation and ionizing radiation.

Healthcare institutions or hospitals have to take precautions to protect those who are exposed to radiation because of professional reasons while abiding by the regulations. Working in a hospital and medical institute (not a job) has effects on the personnel's health. In the early period of radiation diagnostics, no one suspected that ionizing radiation, despite its indisputable advantage, might have some adverse effects on living organisms. The pioneers of radiology were exposed to high doses of radiation, leading to various dermatoses problems, hematological disorders, cataracts, or cancer diseases. The occurrence of the adverse effects of x-rays had triggered scientific research in radiation protection. As a result, personal radiation protective equipment was introduced and legislation was passed that defined the limit values and established regulations for radiological protection of the medical staff or non-radiology students and the patients. Good knowledge of equipment specifications and those characteristics are essential for the effective optimization of radiation protection. Occupational doses can be reduced by reducing patient doses.

Lack of awareness and improper radiation protection can lead to hazards known as occupational hazards caused by improper negligence. In pandemic infectious diseases like cancer and cell damage, non-radiology students are at a much greater risk of infection from radiation than the general population due to their contact with the radiation-contained machines. Our primary aim of the survey is to raise awareness of radiation risk or radiation protection among health care or non-radiology students.

To determine this survey is to assess the knowledge of radiation protection during radiographic imaging among the non- radiology students.

To assess the level of understanding of radiation and radiation safety among non-radiology students.

METHOD OF METHODOLOGY

In this study planned as descriptive, the medical staff, who work in non-radiology departments such as operation theater technicians, medical laboratory technicians, physiotherapy, cardiology, optometry, and such are non-medical at different centers, were asked survey questions prepared by ourselves. There are some different sections in the questionnaire, which are socio-demographic features, basic knowledge about radiation, and training levels regarding protection ways from radiation were questions with surveys.

“The level of radiation safety awareness among non-radiology

students" questionnaire consists of 28 questions which are divided into 3 sections, the first section is for demographic information have 5 questions the second section is for basic knowledge about radiation have 11 questions and the last section is for Radiation protection have 12 questions which was used as the data collection tool. In the analysis of the data obtained from the questionnaire, descriptive statistical methods were used by using the Statistical Package for the Social Sciences (SPSS) 15 package program, and the chi-square test was used in the analysis of qualitative data. Differences between groups were examined with a chi-square test.

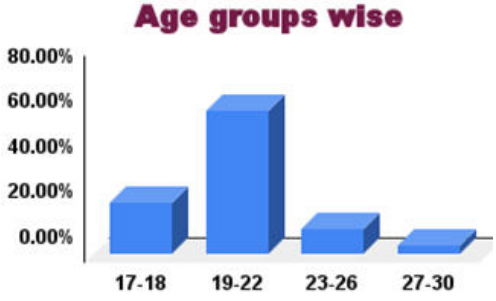
RESULT

A total of 84 non-radiology students were involved in the survey from different centers, 53 of which (64%) were male, 31 of which (36%) were female.

Figure.1- gender-wise distribution

According to the age group, the participants were distributed into four groups. The mean age of the members was 38.6 years, 17 years was the minimum and 30 years was the maximum.

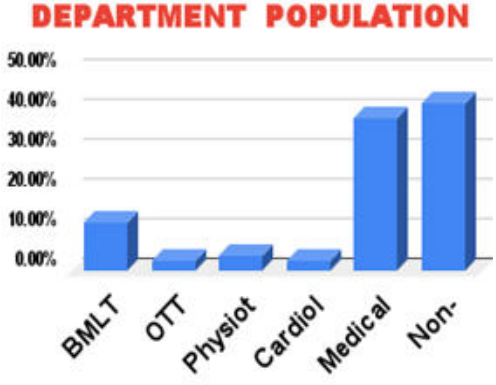
Group-I: 17-18 YR in which 22.6% were involved.
Group –II: 19-22YR in which 63.1% were involved.
Group –III: 23-26YR in which 10.7% were involved.
Group –IV: 27-30 YR in which 3.6% were involved



Graph 1- Age group v/s frequency

Age group (years)	Frequency		Mean	Range
	N	%		
17-18	18	22.6	38.6	17-30 years
19-22	53	63.1		
23-26	9	10.7		
27-30	4	3.6		

The percentage of the population included in the survey consist of 11.9% in BMLT, 2.38% in OTT and Cardiology, 3.57% in Physiotherapy, 38.1% in the students related to other medical studies, and 41.7% in the non-medical students.



Department	Frequency		Mean	Range
	N	%		
BMLT		11.9%		
OTT and Cardiology		2.38%		
Physiotherapy		3.57%		
other medical		38.1%		
non-medical students		41.7%		

Table 2 shows the distribution of responses to some information questions about the basic knowledge of radiation.

Are you familiar with radiation	Yes	60.7%	n- 51
	No	39.3%	n- 33
Have you ever gone for a radiographic examination	Yes	34.5%	n- 29
	No	50%	n- 42
	May be	15.5%	n- 13
Which examination have you gone	X-ray	33.3%	n- 28
	CT scan	9.5%	n- 8
	MRI scan	6%	n- 5
	No examination	51.2%	n- 43
Have you observed any harmful effects from radiation	Yes	21.4%	n- 18
	No	59.5%	n- 50
	Don't know	19%	n- 16
Which harmful effect do you have	Effects on skin	21.4%	n- 18
	Hair loss	17.9%	n- 15
	Epilation	2.4%	n- 2
	Any other effects	58.3%	n- 49
In which period did you get harmful effects observed	Within a week	27.4%	n- 23
	Within a ½ month	16.7%	n- 14
	Within a month	16.7%	n- 14
	Within a year	58.3%	n- 33

There are only 51 participants (60.7%), who are familiar with radiation. However, 33 attendants (39.3%) aren't familiar with radiation. After this we asked the attendants whether you have ever done any radiographic examination or not. 34.5% (n- 29) had done the radiographic examination and 50% (n- 42) of the attendants never took the radiographic examination. And when we asked the attendants which radiographic examination they had done, 33.3% (n- 28) of them had an X-ray, 9.5% (n- 8) had a CT scan, 6% (n- 5) had an MRI scan, and 51.2% (n- 43) never did any radiographic examination. After all these basic questions, we have asked questions about some harmful effects which are caused by radiation. And in this, 18 participants (21.4%) have observed that there are harmful effects from radiation, and 50 participants (59.5%) gave their answer no, that they didn't observe any harmful effects from radiation, and at last 19% of participants didn't know about the harmful effects from radiation. We took information about the harmful effects from 21.4% of the participants who had observed harmful effects, in them, 21.4% of participants had skin effects, 17.9% of participants had hair loss problems, 2.4% of participants had epilation problems, and 58.3% participants had observed any other effects from radiation.

After all this information, there were also some questions regarding radiation protection. 60.7% of participants (n- 51) know about radiation safety. In this data, only 34.5% of participants (n- 29) have been ever done any radiographic examination and out of them only 34.5% of participants (n- 29) had used radiation protective equipment, out of the 52.4% of participants (n- 44) have been used lead apron and 47.6% (n- 40) participants have been used a lead shield. This was followed by a question about the purpose of the lead apron and lead shield and out of the approx. 60.7% and 56% of participants gave their opinion that they provide us with harmful radiation, and 39.3% and 44% of participants gave their opinion that they protect us from radiation exposure.

Table 3 shows the distribution of responses to some information questions about the protection of radiation.

Do you know how to do Radiation safety	Yes	60.7%	n- 51
	No	39.3%	n- 33
By which, you can do Radiation safety	By using a Lead apron	59.5%	n- 50
	By using Lead shield	40.5%	n- 34
Have you ever used Radiation protective equipment	Yes	34.5%	n- 29
	No	44%	n- 37
	Don't know	21.4%	n- 18

Which equipment have you ever used for a radiologic exam	Lead apron	52.4%	n- 44
	Lead shield	47.6%	n- 40
What is the purpose of a lead shield	Protection from harmful Radiation	60.7%	n- 51
	Protection from exposure to radiation	39.3%	n- 33
What is the purpose of a lead apron	Protection from harmful Radiation	56%	n- 47
	Protection from exposure to radiation	44%	n- 37

CONCLUSION AND DISCUSSION

This survey to review the awareness level of radiation risk or radiation protection among health care or non-radiology students differs according to some demographic variables (gender, educational status, age, occupational type, in-service training). According to the findings obtained for this purpose, the gender variable is not a decisive factor in the radiation safety knowledge levels of non-radiology students. Some studies supported this result (Renata Rodrigues Madrigano, Karen Cristine Abrão, and Rodrigo Regacini, Radiol Bras. 2014 Jul-Aug; 47(4): 210–216. published in 2016). Contrary to these studies, some investigations have found that the gender variable does not affect the radiation safety knowledge level (Amanda Partap, Ryan Raghunanan, Kimani White,) Published on April 29, 2019). According to the obtained results, occupational experience does not influence radiation safety knowledge level. In the same way, Ozel et al. (2015), examined the effect of the occupational time on correct answers and found no statistically significant difference in their study. However, Kahraman et al. (2016), reported that the knowledge level of employees with a total working period of 12 years or less was statistically higher than that of those with a working period of 13 years or more, in their analysis of the employee safety information level by the total working year. In this study, it has been established a relationship with being more sensitive to developments in the work environment of employees with a total working time of 12 years or less. In the study, the knowledge levels of healthcare workers were investigated according to the in-service training status and no meaningful result was found. The study stated that there was no significant difference correlation in the level of awareness about radiation protection. A significant difference has been ascertained between the educational status variable and the knowledge levels of radiation safety of the healthcare workers.

In this study, we observed that most non-radiology students are familiar with radiation, but many participants believed that they did not ever observe the harmful effects of radiation, and those who have done the harmful effect Observation, they believe that the harmful effect of radiation happens within a year. After that, we have concluded from this study that most of the participants know about the radiation protection, and one problem was that according to this study most of the participants didn't ever use any radio-protective equipment, and out of these participants those who used any radio-protective equipment, most of them they use a lead apron.

The results show that the majority of non-radiology students are at a level of sufficient knowledge of basic radiation knowledge and risks, but insufficient knowledge about radiation protection.

Limitations of our study were determined as the data limitations because of the small number of non-radiology students working or observing at the institutes and hospitals located in the city, and some of the questions were left blank by participants.

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