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Awareness About Radiation Hazards And Knowledge About Radiation Protection Among Health Collages Students

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Abstract:
Background: *Radiation is being used more frequently to diagnose and treat patients. As a result, health college students should be adequately cognizant of radiation hazards in order to safeguard themselves and their patients from the adverse effects of radiation in the future. We examined radiation hazards and radiation protection knowledge in this study.*
Materials and Methods: *Health college students were asked to complete a validated questionnaire. The survey asked questions about demographics and radiation awareness. A multiple-choice questionnaire was employed to evaluate participants' understanding of radiation safety protocols across four key domains: fundamental principles of protection, proper personal equipment usage, maintaining safe distances from radiation sources, and identifying sensitive tissues.*
Results: *One hundred and thirty students participated in the survey and received an email and questionnaire asking them to respond. 47.7% of respondents responded. A total of 12 participants were female, 19.4%; the average age of the sample was 18.8 years, whereas the average age of the males was 18.5 years. The majority of participants (68.3%) rated radiation exposure as very hazardous while (31.7) rated radiation exposure as not dangerous; 56.5% , 62.9 % and 45.2% reported that when working in a radiation-exposed environment they will always wear a lead apron, a lead goggle, and a thyroid shield. The mean score for knowledge about radiation hazards and protection was 7.5 ± 2.3 (maximum possible score = 15). Therefore, health collage students' knowledge about radiation protection should be improved, especially in terms of wearing lead goggles and limiting radiation dose.*
Conclusion: *According to the present findings, people are aware of radiation risks and protection in the future, but are relatively ignorant about radiation hazards. Radiation hazards and protection should therefore be addressed in continuing medical education.*
Keyword: *radiation hazards; Health college student; awareness; occupational health*.

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I. Introduction

Radiation is a form of energy that travels through the air in energizing waves or particles[1]. There are different types and sources of radiation, including natural and human-made sources, and some kinds of radiation cause damage to biological tissues[2, 3].

Radiology uses non-invasive imaging to diagnose patients' conditions and low doses of radiation to create detailed images of the affected area, including diagnostic radiographs (x-rays, computed tomography, ultrasound, magnetic resonance imaging, nuclear medicine examinations)[4]. To identify a wide range of problems such as bone fractures, heart disease, blood clots, gastrointestinal diseases, physicians can use diagnostic radiology to monitor a patient's body response to a specific treatment. They can also detect multiple types of cancer using these techniques[5, 6].

Infertility, cataracts, bone marrow suppression, birth deformities, and several types of cancer are all associated with medical radiation exposure, according to several studies[7, 8, 9].

Radiation-related diseases have different threshold doses. According to some studies, exposure to 50 rad causes cataracts-4, while 10–20 rad causes cancer and teratogenic effects[9].

To shield healthcare workers from harmful radiation, they must be aware of the risks and understand how to protect themselves. The International Commission on Radiological Protection (ICRP) lays out a key principle: minimize radiation exposure whenever possible ("as low as reasonably achievable," or ALARA), and only use it when truly necessary and justified[10].

There are contradictory studies on this subject, including those who said that radiologists, radiation therapists, and dentists show satisfactory levels of knowledge about the dangers of radiation and the use of personal protective equipment[11]. The ALARA test, which assesses knowledge about radiation protection, revealed that only 27% of participants answered correctly[12]. In another study, medical and dental practitioners were interviewed in depth, and the results revealed poor awareness of radiation hazards[13]. One study found that nonradiologists had a significantly poorer understanding of radiation protection than general practitioners, internists, and radiologists. There was, however, a substantial difference between what was expected and what radiologists knew. A difference in study samples may be responsible for this.

There have been a large number of studies focusing on radiology, a subspecialty of medicine. While health college students are likely to be exposed to radiation frequently in the future, no studies have yet been conducted on this group. Consequently, the primary objective of this study was to examine how college students are aware of radiation hazards and how they protect themselves from radiation.

Studies have primarily concentrated on a variety of radiology-related fields. Although radiation may be exposed frequently by health college students in the future, no studies have been conducted among them. Recognizing the potential gap in early knowledge, this study aimed to assess health college students' understanding and awareness of both the risks associated with radiation and the measures for radiation protection.

II. Material And Methods

Students in one of the Arab universities participated in this questionnaire-based cross-sectional study. Researchers consulted experts and medical physicists to validate the questionnaire.

There were three sections to the questionnaire: demographic information, knowledge of radiation hazards, and awareness of radiation protection practices.

The course began by collecting participant demographics, including age, gender, college affiliation, academic year, level of study, and prior experience with radiation hazards and protection. Subsequently, participants answered questions gauging their understanding of radiation hazards and personal protective practices in radiation-exposed environments. This section assessed both awareness of radiation risks and adherence to routine safety measures.

Computing descriptive statistics enabled the participants' demographic characteristics to be investigated. Due to the normal distribution of the scores, parametric tests were conducted.

III. Result

One hundred and thirty students from Healthy collage were emailed and invited to complete the questionnaire; the response rate was 47.7% (N = 62). Approximately 18.8 years of age (18–20 years) were the average age of participants. Participants in the survey were predominantly male (80.6%) and students in the Faculty of Pharmacy (66.1%).

EXCEPT for a medical physics course, which included one chapter about radiation and contained a very brief knowledge of radiation hazards, all participants (100%) had never received any radiation safety training.

In 68.3% of the participants, radiation exposure was considered to be very hazardous, while in 31.7%, radiation exposure was considered to be moderate hazardous. (Table 1). According to their reports, 56.5%, 62.9 %, and 45.2% of them will always wear a lead apron, lead goggles, and a thyroid shield respectively in radiation environments (Figure 1).

Table no 1 : Awareness of radiation hazard.

Variable	Percentages
Willing to join the training about radiation hazard	
Yes	61.3 %
Not sure	35.5 %
No	3.2 %
Biological radiation hazard	
Very hazardous	68.3 %
Not much hazard	31.7 %
No hazard	0 %

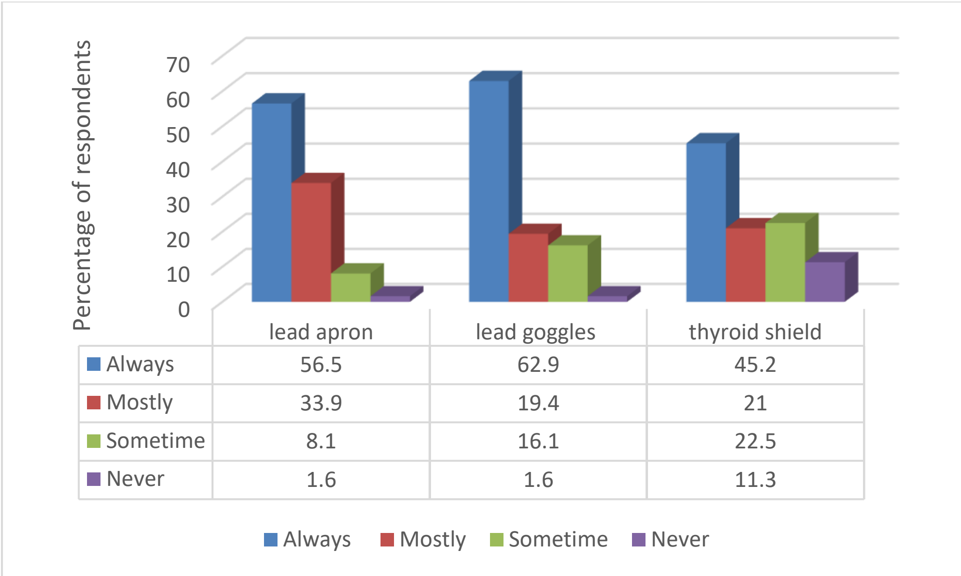

Figure 1. Based on the participants' views on personal radiation protection, including lead aprons, lead goggles, and thyroid shields.

The majority (61.3%) of respondents identified ALARA as the general radiation protection principle, moreover the maximum radiation hazards and protection scores was 12 from 15, mean was 7.5+2.3, median was 8 and mode was 9, and range was 0 to 12 (Figure 2).

Two-thirds of participants were able to correctly answer all the questions related to dose limits and major sources of radiation effects.

Over six out of ten participants (61.77%) demonstrated a good understanding of dosimeter usage, with over half (54.8%) correctly identifying the safe working distance from radiation machines. Additionally, just over half (50.3%) displayed complete mastery of shield usage principles.

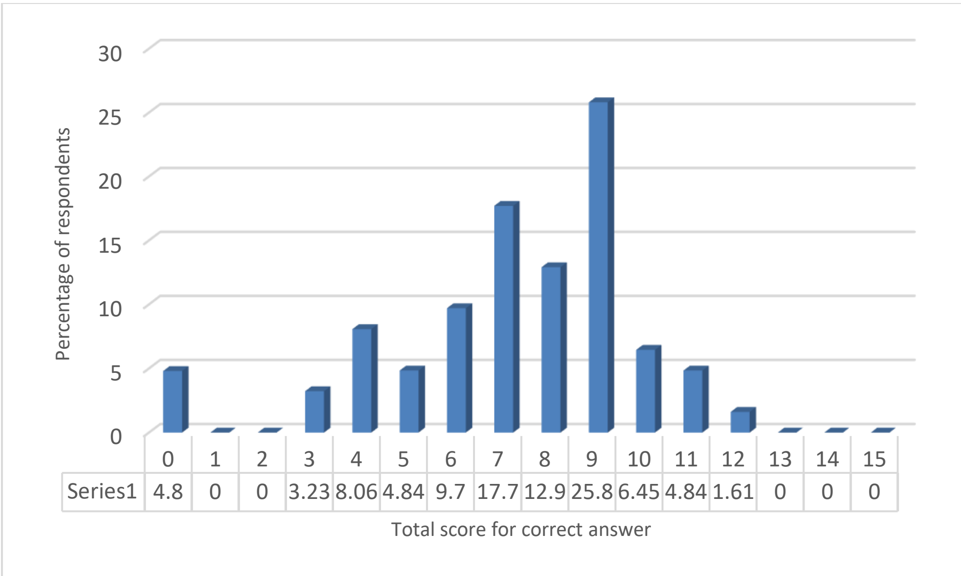

Figure 2. Participants are distributed based on their scores.

IV. Discussion

We believe this is the first study to examine students' knowledge and awareness about radiation hazards. Based on the results of this study, most participants regarded radiation exposure as extremely hazardous. When working in radiation-exposed environments, most participants reported wearing lead goggles, lead aprons, and thyroid shields. As far as knowledge of radiation hazards and protection is concerned, a mean score of 7.5+2.3 was obtained.

Radiation was considered very harmful by most participants (68.3%) in this study. While lead glasses, lead aprons, and thyroid shields will wear by most students, only 62.9 %, 56.5%, and 45.2% will do every day. Low compliance rates may be attributed to radiation shielding information.

In order to encourage students to wear lead apron, lead glass and thyroid shield regularly, we need to educate them about the adverse consequences of not wearing them and make lead apron, lead glass and thyroid shield more readily available at work. Students at health colleges can benefit from annual radiation protection courses provided by radiology departments and integrated into their undergraduate education.

The present findings contrast with those of 92 health care staff members, including technicians, nurses, and doctors, who reported 42.4% and 21.7% to have no knowledge of radiation hazards and considered common radiologic studies to be moderately safe, respectively[14]. Radiation exposure was of great concern to 78.2% of Chinese orthopedic surgeons[15]. Anesthesia staff and surgical subspecialists have conducted studies[16], indicate that they lack adequate knowledge about radiation protection, with 96.7 percent of respondents believing radiation is very harmful or harmful, but only 86.4% of respondents always wearing a lead apron and 78.5% wearing a thyroid shield at work.

The ALARA principle was correctly answered by most participants (61.3%) of this study, a fundamental principle that enhances radiation protection knowledge.

This principle should be known by everyone who works in an environment that exposes them to radiation. Overall, the average knowledge score was only 7.45 + 2.3 (maximum score = 15), and most of the participants scored slightly above the median (i.e. 7). The results of our study indicate that health college students' knowledge of radiation hazards and protection needs to be further improved, their insufficient knowledge in radiation protection may be due to the lack of formal training they had in radiation protection, EXCEPT medical physics courses.

Most participants provided incorrect answers to all of these questions, despite the fact that it is important for Health College students to know the answers to all of these questions. Particularly evident was this for questions pertaining to radiation dose limits and major sources of radiation exposure. A total of 21.8% of participants correctly answered these questions and 37.1% incorrectly. To reduce occupational hazards, Health College students need to be educated about many topics pertaining to radiation protection (such as radiation usage and protective equipment). Medical personnel can gain a better understanding of radiation risks and how to protect themselves against them through online courses and educational courses[17].

Medical radiation is hazardous, and healthcare workers should be aware of this and take precautions to protect themselves and society.

V. Conclusion

Occupational roles, training levels, and nationalities of healthcare professionals may affect radiation awareness and knowledge. Based on the results of the present study, it was found that the present sample exhibited most participants reported using protective shields and dosimeters and a high level of awareness about radiation hazards but demonstrated insufficient knowledge about radiation hazards.

As a result of these findings, Health College students should be more aware and educated about radiation hazards by medical physicists and radiation protection experts.

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