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Original Research

Evaluation of Awareness on radiation protection and hazards among Medical Imaging students and Faculty Members: A college based study

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ABSTRACT:

Background: Radiation protection is the key component of radiography for safe radiation-based imaging practice. This study aims to determine the knowledge of radiation protection among medical imaging students and faculty members in a college of Punjab. Material and methods: A questionnaire survey was carried out among 131 radiology staff and students at Desh Bhagat University (DBU), Mandi Gobindgarh, Punjab, India. The questionnaire survey consisted of 4 questions related to general information and 17 question related to radiation protection that are multiple choice questions (MCQ). Result: Out of total 131 participants, 79.4% were male and 20.6% were female, 99.2% with age group between 18-30 years and 0.8% with 30-40 years. Taking academic qualification 90.8% were graduate and 9.2% was having diploma. There was not statistical significance of knowledge score by gender and age groups. About 48.1% of the participants claimed that magnetic resonance imaging does not work on x-rays. 49% of the participants stated that there is no radiation when CT machine is off. About 43.5% participants claimed that for pregnant females magnetic resonance imaging is safe. From mammogram, CT scan, chest x-ray and Ultrasound 93.9% state that Ultrasound is safe for pregnant women. 35% participants claimed that chest is a part which is least effected by the diagnostic radiation. Serum creatinine was the required test to undergo any procedure in radiology that include IV is claimed by 55.7% participants. 40.5% claimed that there is no risk of developing cancer in future with radiation dose of single chest x-ray. 85.5% state that extra caution should be taken by pregnant female/reproductive age group in radiology department. 93.9% participants have basic knowledge about material used in lead and 81% have basic knowledge about symbols related to radiation protection. 74.8% participants have knowledge regarding TLD badge and 92% state that lead apron, SID, Shielding is responsible for radiation protection. 81.7% claimed that they have studied about radiation protection in university/classes and 60% claimed they have average knowledge about radiation protection._Conclusions: Though participants (students) have good knowledge, but there's need to improve their awareness of radiation protection. Regular training courses for both diploma and undergraduate students as well as for working staff must be considered in order to assure radiation safety during radiological examination. Main messages:

- Both diploma and undergraduate students should improve their knowledge on radiation protection issues.
- For increasing awareness and knowledge specific action must be taken.
- All participants should attend radiation protection courses/workshops on a regular basis.

Keywords: Radiation protection. Radiation awareness.

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INTRODUCTION

Wilhelm Conrad Roentgen in 1985 discovered xrays, in the field of medicine use ofx-rays has been rapidly increasing and this is attributable to recent advances in imaging and this is promising in solving wide range of clinical problems (1, 2). Among the common imaging modalities used in diagnostic are radiography (x-rays), fluoroscopy, mammography and computed tomography (CT). The utilization of ionizing radiation in these tools have caused potential risk to patients (2). Ionizing radiation revolutionized the radiation field (3). A model was established to study the high level of radiation and linear-nothreshold, according to which if radiation dose is above 0 produce risk to some extent (4). Some think that the linear-no-threshold based risk estimation is wrong and only contributing to the unnecessary fear among public, also expenses on safety measures and still it is a basis for regulation of radiation (5, 6).

Some recent studies shows cancer causing potential of low dose ionizing radiation from imaging (medical) (8). Therefore optimized use of radiation is most important (9) this will be achieved through collective efforts of health care workers who are indirectly or directly linked with imaging and patient himself (10). One should always ensure that ionizing radiation is justified that means radiation benefits should exceed the risk (11). This is properly checked whether examination is required or not and it is the duty of radiologist and radiographers (12). As they are educated so they are supposed to have strong knowledge on safety measures (10). It is their responsibility to spread awareness regarding radiation among staff, students and general public (10). Therefore radiation awareness is must to ensure cogent use of ionizing radiation (13).Field of radiology in term of academics is strongly growing. According to AERB it is compulsory for each nation to have radiation and nuclear safety authority to prevent consequences arising from radiation safety issue from one country another (15). Radiation awareness among radiation workers and general public plays a very strong role in conditions where there is no regulatory body. Many studies have done worldwide which shows that healthcare staff/radiation worker doesn't meet the standards of radiation protection (16, 17, 18, 19), whereas few studies shows radiation worker have great level of knowledge (20,21). Aim of this survey based study was to determine knowledge of radiation protection among students, staff of radiology department of one the university in Punjab.

METHODS

QUESTIONNAIRE

A questionnaire survey was performed to obtain knowledge of radiation protection among students and faculty members. This survey is consist of demographic characteristics like age, gender, qualification and multiple choice questions (mcq) related to radiation protection. The questionnaire was conducted at the department of radio-imaging department of Desh Bhagat University, Mandi Gobindgarh, Punjab, India.

DATA COLLECTION

All students and staff of the department of radioimaging participate in the survey. The data was collected from 1st to 20th may 2020. Google form was shared with participants and were requested to complete. Each correct answer give one score and there is no negative marking.

DATA ANALYSIS

A descriptive analysis was performed. Less the 60% inadequate, 60-80% adequate and 80-100% excellent on this basis knowledge is categorized.

RESULT Fig 1: Out of total 131 participants, 79.4% were male and 20.6% were female.





Fig 2: Our of total 131 participants 99% are from age group of 18-30 years whereas 1% are from 30-40 years.

Fig 3: Out of 131 participants 90% having bachelors whereas 10 having diploma.





Fig 4: Out of 131 participants 1% was faculty and 99% was students.





Fig 6: Out of 131 participants 44% claimed that radiation is on only when CT scanner is on.





Fig 7: Out of 131 participants 44% said that pregnant patient is safe to undergo MRI.

Fig 8: Out of 131 participants 94% said USG is a safe modality for pregnant ladies.





Fig 9: Out of 131 participants 30% claimed that chest is least affected by diagnostic radiation.





Fig 11: Out of 131 participants 30% claimed that there is no effect of a single chest x-ray for developing cancer in future.



Fig 12: Out of 131 participants 86% said that pregnant females should be extra cautions in radiology department.





Fig 13: Out of 131 participants 94% claim that lead is used in protective clothes.

Fig 14: out of 131 participants 75% claimed that TLD is use to assess amount of radiation.





Fig 15: Out of 131 participants 92% state that SID, collimation. Lead apron and shielding is important for radiation protection.

DISCUSSION

Aim is to assess the knowledge of radiation protection among radiology students and faculty members in a University. This study highlight awareness of radiation protection in a private university of Punjab. In this study the mean radiation protection awareness was 66.98% this is adequate. The level of knowledge in diploma students was 50% that means more awareness is required diploma students. Regular training courses should be designed at regular interval of time it may be at university level, national and international level (24). Radiation protection can only be handled by radiographers. Lack of knowledge in radiographers may lead to irradiate patients with unnecessary radiation dose (21). No one can forget that hazards of radiation was recognized within one year after x-ray discovery. Many radiation protection bodies has been established to set guidelines and to ensure justified use of radiation (15). With time technologies have been improved to monitor and control radiation exposure to radiation workers, patients and general public. Only radiation work is responsible for radiological procedure and misuse of radiation.

Regular workshops, training, seminar and conference raise awareness on radiation protection and guidelines and legal laws of proper practice of radiation should be imposed. This is not the first study performed regarding awareness of radiation protection in Punjab but we can assume this study will play a crucial function in improving present situation of radiation protection in Punjab, considering study was conducted in private university. The result demonstrate adequate knowledge but improvement of knowledge in diploma students is required by adding radiation protection modules in their curriculum.

LIMITATIONS OF THE STUDY

This study was conducted in a single university with small sample n=131, so cannot be considered as representative of whole nation. Result can be enhanced by a large sample from different institutes. In future many more studies should be carried out among doctors, dentists, physicians, and nurses etc. to assess total knowledge regarding radiation protection hospitals, clinics or institutes who are indirectly or directly linked to radiation.

CONCLUSION

We recommend that training related to radiation protection/ safety should be mandatory for students.Modules related to radiation protection should be added to curriculum. Regular workshops/webinars/seminars should be organized. Every health worker should join hands to raise awareness.

ABBREVIATIONS

CT: - computed tomography SID: - Source to image distance MRI: - magnetic resonance imaging AERB: - atomic energy regulatory board.

AUTHORS CONTRIBUTION

Ms. Sumreen Kosar has a contribution in research conceptualization, research design, data analysis, result interpretation, writing. Mr. Karanveer helps in data collection.

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