

Perception of Radiation and their Associated Risk among Medical Students

Radiation and their Risk among Medical Students

Zaheer Hussain Memon¹, Jawad Mumtaz Sodhar², Shomail Saeed Siddiqui³,
Umair Ali Soomro⁴, Hina Mawani⁵ and Aftab Abbasi⁶

ABSTRACT

Objective: To determine the perception of radiation and its risk among medical students.

Study Design: A cross-sectional study

Place and Duration of Study: This study was conducted at the Shahida Islam Medical and Dental College, Lodhran, Punjab for duration of six months from 01.01.2021 to 30.06.2021.

Materials and Methods: A self-administered questionnaire was given to them to fill after taken informed and written consent as well as being assured of the anonymity of the inclusion. Data was analyzed using SPSS Version 21.0, with Chi-square test being applied and the level of significance being kept at ≤ 0.05 .

Results: A total of one hundred and fifty questionnaires were received in which the mean age of the participants were 23.45 ± 0.23 . Ninety-three (62%) students were females, and fifty-seven (38%) were males. An increase in awareness and knowledge were seen in increasing years, with final year students having most knowledge. Statistically significance varied from question to question. Significant difference (P-value: ≤ 0.024) was seen when students were asked if they have a great understanding of the radiology subject and its use in medicine.

Conclusion: Overall knowledge of radiation is inadequate and must be reinforced in students and early clinical integration must be done so that they can protect themselves and the patients as well as make rational decision will be ordering imaging for radiation of radio therapy in the future.

Key Words: Radiation, Medical Students, Exposure, Risk

Citation of article: Memon ZH, Sodhar JM, Siddiqui SS, Soomro UA, Mawani H, Abbasi A. Perception of Radiation and their Associated Risk among Medical Students. Med Forum 2021;32(9):15-18.

INTRODUCTION

Radiation has become a very significant tool in modern health care profession. Throughout the vast world of medicine, radiation has more or less left its mark. The most common use of radiation is in radiation therapy and diagnostic imaging. Diagnostic imaging helps the practitioner in diagnosing various illnesses, conditions, and tumors that other clinical or biochemical tests may be deemed inconclusive. Diagnostic imaging that uses radiation includes X-ray, MRI, CT-Scan, and more¹⁻⁴. Furthermore, radiotherapy has also now become a vital treatment modality in the treatment of a wide array of cancers throughout the body.

Radiotherapy is a very unique and specific treatment method that kills specific malignant cells, however, it must be noted that different cancers of the body respond differently to treatment through radiation⁵. Although radiation utilization in modern medicine is a breakthrough, it comes with its risks. Healthcare workers are frequently at the risk of radiation exposure. Medical imaging alone in 1980 accounted for 15% of the average annual radiation exposure received by the US population, however, most concerning is the fact that this percentage reached to 50% in 2006⁶. Protection from radiation is an essential aspect in medicine practice, proper guidelines, protocols, and techniques must be taken care of while performing any procedure which requires radiation albeit even if it is at the smallest of dose⁷. Failure to limit radiation exposure, or have knowledge regarding the protocols and techniques while using radiation equipment can lead to serious side effects⁸⁻¹⁰. Medical students are taught about radiation and its vast utilization in the field of medicine. They are also exposed to radiation during their clinical rotations in general wards. It is necessary that students of medical sciences who are in their clinical years must have ample knowledge about radiation and its associated risk so that they can take the necessary precautions and protect themselves as well as their batch mates. Keeping this in mind, a cross-sectional study was conducted to assess the perception of radiation and their associated risk in medical students.

¹. Department of Medicine / Pharmacology² / Pathology³ / Haematology⁴ / Anatomy⁵, Indus Medical College, Tando Muhammad Khan.

⁶. Department of Anatomy, Isra University, Hyderabad.

Correspondence: Jawad Mumtaz Sodhar, Associate Professor of Pharmacology, Indus Medical College, Tando Muhammad Khan.

Contact No: 0335-3906299

Email: dr.jawadsodhar@gmail.com

Received: July, 2021

Accepted: August, 2021

Printed: September, 2021

MATERIALS AND METHODS

After taking the necessary steps of acquiring Institutional review board (IRB) approval, a cross-sectional study was conducted on the MBBS students of Shahida Islam Medical and Dental College, Lodhran, Punjab for duration of six months. A total of one hundred and fifty students from third, fourth, and fifth year were taken in this study. A questionnaire was particularly designed for this study. All of the students were randomly selected and were informed about the study, and only after informed and written consent were they included in the study. All the students were assured of their anonymity during the study. After data was collected from the students, data was analyzed using SPSS Version 21.0. Frequency of students was calculated and the Chi-Square test was applied for statistical significance, the P-value was set at ≤ 0.05 .

A total of one hundred and fifty questionnaires were received, ninety-three students were female, while the remaining fifty-seven were males. The mean age of the students in the study was 23.45 ± 0.23 . Figure 1.1 shows the percentage of male and female that took part in the study.

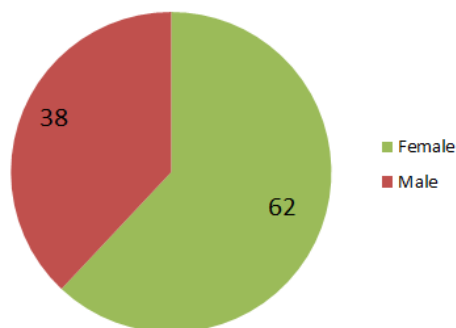


Figure No.1: Percentage of gender distribution among the patients

RESULTS

Table No.1: Shows the results of the questionnaire filled by the medical students of the respective years.

		3 rd Year			4 th Year			5 th Year			P-value
		Agree	Neutral	Disagree	Agree	Neutral	Disagree	Agree	Neutral	Disagree	
1	I have a great understanding of the radiology subject and its use in medicine	4	6	40	10	10	30	25	5	20	0.024
2	I have a good knowledge of medical physics	8	10	32	12	8	30	29	6	15	0.745
3	I am totally aware about the multiple fields of diagnostics concerning radiology	22	8	20	33	2	15	40	4	6	0.064
4	I am well educated about the preventive measures and compliance for radiation protection	12	8	30	25	10	15	37	5	8	0.004
5	I am well aware about the modalities using radiology	10	7	33	24	6	20	40	3	7	0.0541
6	I am well educated about the hazards of radiation exposure	22	10	18	27	6	17	38	4	8	0.021
7	I have a complete knowledge of medical ethics, which should be incorporated in radiology	19	6	25	24	10	16	42	2	6	0.043
8	I have a knowledge about the modalities that are responsible for the most radiation dose	11	5	34	19	2	29	30	6	14	0.05
9	I have a strong understanding of radiation and their risk factors	23	9	18	31	4	15	41	3	6	0.021
10	I know how to prepare the patients for different radiological procedures without causing any harm to the patient	12	4	34	35	5	10	38	7	5	0.075
11	I am aware of the side effects of radiation exposure	14	7	29	33	7	10	42	4	4	0.056

Chi-square test applied

DISCUSSION

The medical community has an oath to serve and provide services to the community. Radiation is important in health and disease, possibly with proper

use and prevention of misuse of overuse¹¹. Doctors, paramedical staff, and the medical students all need to be aware of the associated risks when it comes to radiation. Recent studies have demonstrated lack of understanding of medical radiation among different

groups of health care providers¹². We conducted a similar study to the ones mentioned; however, this was carried out among medical students. Results showed an increase in knowledge concerning radiation from third year students to final year students; this finding is similar to another study which showed the same trend¹³. Final year students had the most knowledge concerning radiation and their associated risk. This finding is different to another study that showed that overall medical students had a low knowledge of radiation dosage and its associated risks¹⁴. Variation in the level of significance was seen in question, with some being statistically significant whereas others having no significant difference. However, it can be confirmed that final year students possess the most knowledge. This seems very obvious due to them acquiring more training and being in the senior most year of medicine and studying more than others. Overall if we consider the results, albeit final year have more knowledge of radiation and its risks, the overall results if spanned across all groups show that the knowledge is very limited. Similar finding was seen in a study conducted on fourth year and final year students in a private medical college of Karachi, which showed that the majority of the students have limited knowledge of aspects of radiation, its sources, risk factors involved, and the protection deemed from it¹⁵. This is a cause for concern as other studies have also proved the limited know how and depth of understanding of radiation in students¹⁶⁻¹⁷. Efforts must be put in place to find a solution to tackle this lack of information. More teaching needs to be carried out in the subject of radiology early on in the medical education of these students, so that they can develop rich knowledge from an early stage¹⁸. There is a strong need for educating the medical students about radiation exposure and risk; this can be done through presentation and particular seminars focusing only on radiation. Clinical integration must also be started in the early years so that better understanding of the equipment, dosing, protection, and ethics can be enforced in the students. This implementation of early on teaching of radiation will cement the importance of radiation among students, who as future doctors will be of the dangers of radiation exposure, risk of multiple medical imaging, and can be able to make careful decision while ordering tests that utilizes radiation¹⁹.

CONCLUSION

Overall the perception of radiation and its risk is the highest among final year students, however, if taking all the participants it is still low. Further efforts are needed to expand the knowledge of radiation and its risks to doctors and patients.

Author's Contribution:

Concept & Design of Study: Zaheer Hussain Memon

Drafting: Jawad Mumtaz Sodhar, Shomail Saeed Siddiqui
 Data Analysis: Umair Ali Soomro, Hina Mawani, Aftab Abbasi
 Revisiting Critically: Zaheer Hussain Memon, Jawad Mumtaz Sodhar
 Final Approval of version: Zaheer Hussain Memon

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Lundervold AS, Lundervold A. An overview of deep learning in medical imaging focusing on MRI. *Zeitschrift für Medizinische Physik* 2019; 29(2):102-27.
2. Bruhn AM, Newcomb TL, Tolle SL. Ensuring safe practice in dental radiology. *Dimensions of Dental Hygiene* 2015;13(12):30-3.
3. Makaju S, Prasad PW, Alsadoon A, Singh AK, Elchouemi A. Lung cancer detection using CT scan images. *Procedia Computer Sci* 2018;125:107-14.
4. Deschênes S, Charron G, Beaudoin G, Labelle H, Dubois J, Miron MC, Parent S. Diagnostic imaging of spinal deformities: reducing patients radiation dose with a new slot-scanning X-ray imager. *Spine* 2010;35(9):989-94.
5. Citterio G, María Ferreri AJ, Reni M. Current uses of radiation therapy in patients with primary CNS lymphoma. *Expert Review of Anticancer Therapy* 2013;13(11):1327-37.
6. Salvatori M, Lucignani G. Radiation exposure, protection and risk from nuclear medicine procedures. *European journal of nuclear medicine and Molecular Imaging* 2010;37(6):1225-31.
7. Holmberg O, Czarwinski R, Mettler F. The importance and unique aspects of radiation protection in medicine. *Eur J Radiol* 2010;76(1): 6-10.
8. Giordano BD, Grauer JN, Miller CP, Morgan TL, Rehtine GR. Radiation exposure issues in Orthopaedics. *JBJS* 2011;93(12):e69.
9. Jain S. Radiation in medical practice & health effects of radiation: Rationale, risks, and rewards. *J Family Med Primary Care* 2021;10(4):1520.
10. Brady SL, Frush DP. Biologic effects of ionizing radiation on children. In: Kliegman RM, St. Geme JW, Blum NJ, Shah SS, Tasker RC, Wilson KM, editors. *Nelson Textbook of Pediatrics*. 21st ed. Philadelphia, PA: Elsevier; 2020.p.14578–609.
11. Jacob P, Stram DO. Late health effects of radiation exposure: new statistical, epidemiological, and biological approaches. *Int J Radiation Biol* 2013;89(8):673-83.
12. Hobbs JB, Goldstein N, Lind KE, Elder D, Dodd III GD, Borgstede JP. Physician knowledge of

- radiation exposure and risk in medical imaging. *J Am Coll Radiol* 2018;15(1):34-43.
13. O'Sullivan J, O'Connor OJ, O'Regan K, Clarke B, Burgoyne LN, Ryan MF, et al. An assessment of medical students' awareness of radiation exposures associated with diagnostic imaging investigations. *Insights into imaging* 2010;1(2):86-92.
 14. Kada S. Awareness and knowledge of radiation dose and associated risks among final year medical students in Norway. *Insights into imaging* 2017; 8(6):599-605.
 15. Mubeen SM, Abbas Q, Nisar N. Knowledge about ionising and non-ionising radiation among medical students. *J Ayub Med Coll Abbottabad* 2008; 20(1):118-21.
 16. Hagi S, Khafaji M. Medical student's knowledge of ionizing radiation and radiation protection. *The Saudi Med J* 2011;32(5).
 17. Enabulele JE, Igbinedion BO. An assessment of dental students' knowledge of radiation protection and practice. *J Educ Ethics Dentist* 2013;3(2):54.
 18. McCusker MW, de Blacam C, Keogan M, McDermott R, Beddy P. Survey of medical students and junior house doctors on the effects of medical radiation: is medical education deficient? *Irish J Med Sci* 2009;178(4):479-83.
 19. Ricketts ML, Baerlocher MO, Asch MR, Myers A. Perception of radiation exposure and risk among patients, medical students, and referring physicians at a tertiary care community hospital. *Canadian Assoc Radiologists J* 2013;64(3):208-12.