Dentistry
ISSN: 2161-1122

Rela, Dentistry 2019, 9:1
DOI: 10.4172/2161-1122.1000530

Research Article Open Access

Knowledge, Attitude and Practice of Radiation Protection Protocols amongst Students of a Dental College

Rathi Rela*

Patna Medical College Hospital, Patna, Bihar, India

***Corresponding author:** Rathi Rela, Senior Resident, Patna Medical College Hospital, Flat No 101, SN Mehra Apartment, Rose Bud Office Lane, Patna, Bihar, 800015, India, Tel: 917070520015; E-mail: dr.rathirela@gmail.com

Received date: December 02, 2018; **Accepted date:** January 09, 2019; **Published date:** January 15, 2019

Abstract

Objective: To assess the knowledge, attitude and practice of radiation protection among dental students in a dental college in eastern India.

Background: Radiation hazard is one of the major challenges of modern dental practices. Reliance on radiation imaging has increased tremendously during recent years. The effect of radiation on human being is very negative. Knowledge and awareness regarding radiation protection during dental training is crucial for ensuring better radiation protection practice after training.

Materials and Methods: A cross sectional survey was conducted among 107 dental students comprising of undergraduate students, dental interns and post-graduate students in teaching dental institute in capital city in eastern Indian state.

Results: 56% of the participants were aware about the harmful effects of radiation exposure. Only 27% students overall were aware about symbol of radiation hazard. 77% of UG students and 52% of interns were aware about ideal distance to stand during radiography. Overall 88% students which included all PG students, 94% of interns and 77% of UG students were aware about personal protective equipments. Almost all dental students (97%) were using lead apron in designated area for protection from radiation exposure. Overall 82% of students were using the personal protection badge.

Conclusion: Based on results of this finding, the overall knowledge, Awareness and Practice regarding radiation protection among dental student was not uniformly good.

Keywords: Radiation protection; Awareness; Dental students

Introduction

The effect of radiation on living organisms is very negative and range of these effects may vary depending on the dose and the duration of exposure [1]. Many medical or dental procedures are totally dependent on radiological tools such as radiography, fluoroscopy and Computed Tomography (CT). All these procedures utilize ionizing radiation. Therefore, it is better to use the minimum possible dose to achieve the optimum quality image of radiological imaging [2]. The international authorities such as International Council of Radiation Protection (ICRP) and national authorities such as National Council of Radiation Protection (NCRP) in India issues guidelines about the limits of radiation doses and ways to minimize radiation exposure. However, the dose limits permitted by international authorities often exceed [3]. Therefore, it is extremely important to consider the safety of patients as well as the medical professionals performing the procedure by balancing the risk to radiation exposure. It is generally considered that risk from diagnostic procedure using X-rays are small and therefore; health risks to individuals are also small. However, the growing number of people exposed to X-ray radiation makes low-level of X-ray radiation also a major cause of concern [4].

One of the mainstays of diagnosing any oral disease is radiograph. The modalities at the disposal of dentists range from intraoral radiography to cone beam computed tomography. According to Schauer and Linton in the past two decades there was significant increase in demands for radiologic imaging procedures in health care services to help in medical decision making [5]. The same is also true to dental practice. Although the radiation hazard posed by the dental radiographs is of low intensity but accumulation of such low-level radiation in human body over a long time period can pose a threat to the overall health of the individual [4]. During the course of medical or dental training, most of the health-care personnel are trained regarding radiation hazards and requisite safety measures. It has been observed that the awareness of radiation hazards among clinicians can be improved by improving their knowledge and awareness during medical studies [3]. However, the sincerity with which the matter is considered needs to be assessed from time to time. There are few studies that has assessed awareness about radiation hazards among medical students. In a study done by Kings, et al. it was observed that physicians and other health professionals need to be aware of radiation hazards and protection techniques in order to get the required benefits from radiation while minimizing the associated risks [6]. In another study conducted in Mangalore city in India, 25.3% of the respondents had undergone training in radiation protection, 98.9% perceived a need to spread awareness, and 94.3% were willing to improve their

knowledge. Similarly, prior training showed a significant correlation with age, sex, and duration of practice. Attitude was significantly correlated with education and type of practice and knowledge scores displayed a significant correlation with type of practice [7]. In another study conducted in Trivandrum in India, only 11.7% of them were following all the necessary steps while 6.7% clinicians were not using any safety measure in their clinic, and with respect to patient safety, only 9.7% of practitioners were following the protocol [8]. Considering the impact of imparting knowledge about radiation protection during dental training on awareness and practice, it is imperative to understand the extent of knowledge and awareness about radiation protection among dental students in different settings. This type of understanding will support in improving the knowledge, awareness and practice among dental practitioners. Therefore, the current study was conducted with following objective.

Material and Methods

A cross sectional survey was conducted during the period of February through March 2017 among the undergraduate (UG) dental students, dental interns (Intern) and dental postgraduate students (PG) undergoing training in a teaching Dental Institute located at state capital city in one of the largest states in eastern India. In total 107 UG, intern and PG students participated in the study.

A pre-designed, pre-tested, semi-structured questionnaire was used for the purpose of data collection. The questionnaire consists of basic demographic details of student, 17 structured questionnaires to understand the knowledge about radiation safety and open-ended questions to understand awareness and practices. Written informed consent was taken before commencement of interviews. Out of total 120 students consulted, 107 provided consent for participating in the study. All the interviews were conducted by the lead researcher.

The data collected were entered electronically in EPI info version 7.2.2.6 software. Statistical analysis was also done using same software. Ethical approval to conduct the study was taken from Institutional Ethics Committee of the concerned institute. Permission from the head of institute was also taken before commencement of the study.

Result

Out of 107 students who participated in the study, 49 were males and 58 females. Among all study participants 44 were UG students (20 male and 24 female), 52 were interns (22 male and 30 female) and 11 PG students (4 male and 7 female) (Figure 1). The mean age of study participants was 23.4 years.

Knowledge and attitude regarding radiation protection

Overall 56% of the participants were aware about the harmful effects of radiation exposure. 25% of UG students, 40% of interns and 82% of PG students were aware about harmful effect of radiation protection. More than three fourth participants were aware about the criteria for need of radiograph for clinical decision making. While 100% of PG students and 96% of interns were aware about the criteria to order radiograph, only 55% of UG students were aware about this.

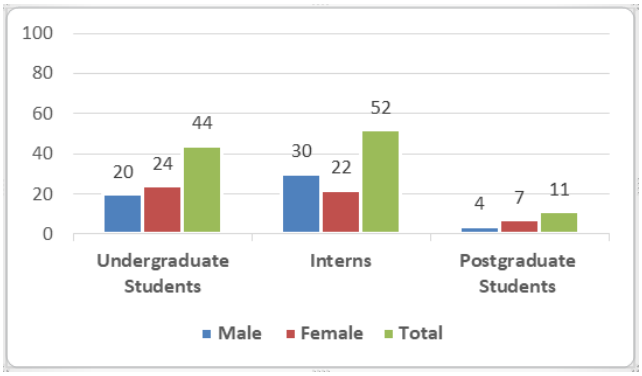

Figure 1: Sex Distribution of study participants.

Regarding the condition when to order radiograph for pregnant women, 64% of participants were aware about the conditions for the same. 82% of PG students, 87% of interns and 32% of UG students were aware about the criteria for advising dental radiograph to pregnant women. Very few students were aware about the recommendations of IRCP and NRCP. Out of total, 63% students were aware about As Low as Reasonably Allowable (ALARA). 73% of PG students and equal proportion of interns were aware about ALARA. Surprisingly only 27% students overall were aware about symbol of radiation hazard. Although majority of PG students were aware about radiation hazard symbol but only around one fourth of UG and interns knew about this (Table 1).

	Undergraduate Students (n=44) n (%)	Interns (n=52) n (%)	Postgraduate students (n=11) n (%)	Overall (n=107) n (%)
Harmful effects of radiation exposure	11 (25)	40 (77)	9 (82)	60 (56)
Criteria for decision on radiography	24 (55)	50 (96)	11 (100)	85 (79)
Advising dental radiograph to pregnant women	14 (32)	45 (87)	9 (82)	68 (64)
IRCP/NRCP recommendations	0 (0)	3 (6)	2 (20)	5 (5)
Application of ALARA	21 (48)	38 (73)	8 (73)	67 (63)
Awareness about radiation hazard symbol	11 (25)	12 (23)	6 (55)	29 (27)

Table 1: Knowledge and attitude regarding radiation protection.

Knowledge and attitude about operational aspects of radiography

Majority of the students were aware about the ideal distance to stand during radiography. All PG students, 77% of UG students and 52% of interns were aware about ideal distance to stand during radiography. Only 8% of students were aware about the type of speed film to be used for radiography. Only 6% of students were aware of the fact the increasing the speed of radiography reduce the risk of radiation exposure. Similarly, only 19% of the students were aware that

digital radiograph requires less exposure as compared to conventional and 39% of students were aware about techniques to reduce radiation exposure. Regarding correct use of personal and patient's protection equipments, overall 88% students which included all PG students, 94% of interns and 77% of UG students were aware about this. Most of the students were aware about the use of personal protection badge (Table 2).

	Undergraduate Students (n=44) n (%)	Interns (n=52) n (%)	Postgraduate students (n=11) n (%)	Overall (n=107) n (%)
Ideal distance to stand during radiography	34 (77)	27 (52)	11 (100)	72 (67)
Type of speed film to be used	3 (7)	5 (10)	1 (10)	9 (8)
Increased speed reduce exposure	1 (2)	3 (6)	2 (18)	6 (6)
Digital radiograph requires less exposure compared to conventional	3 (7)	11 (21)	9 (82)	10 (19)
Techniques to reduce exposure	20 (45)	19 (37)	3 (27)	42 (39)
Correct use of personal and patient's protection equipments	33 (77)	49 (94)	11 (100)	94 (88)
Correct use of personal protection badge	34 (77)	49 (94)	11 (100)	98 (92)

Table 2: Knowledge and attitude about operational aspect of radiography.

Practice of radiation protection

Almost all dental students (97%) were using lead apron in designated area for protection from radiation exposure. Overall 82% of students were using the personal protection badge. Lowest use of personal protection badge was reported among PG students (72%). Around 60% of the students were using correct method of holding X-ray. Among three categories of dental trainees, maximum interns reported correctly holding the X-ray. Overall adherence to radiation protection practice was reported by 94% of the students (Table 3).

	Undergraduate students (n=44) n (%)	Interns (n=52) n (%)	Postgraduate students (n=11) n (%)	Overall (n=107) n (%)
Use of lead apron	43 (97)	50 (96)	11 (100)	107 (97)
Use of personal protection badge	34 (77)	46 (88)	8 (72)	88 (82)
Correct holding of X-ray	10 (23)	47 (90)	7 (64)	64 (60)
Adherence to protocol during practice	38 (86)	52 (100)	11 (100)	101 (94)

Table 3: Practice of radiation protection.

Discussion and Conclusion

Knowledge imparted during student life shapes attitude and practice regarding clinical behaviour among any medical or dental professionals. Recently, the use of radiography for dental diagnosis is growing very significantly. Two factors are responsible for this; advancing imaging technology and over reliance on imaging for establishing diagnosis. This had led to improved accuracy of diagnosis and better treatment. But, at the same time this had exposed the dental practitioners to harmful effects of radiation hazard. As evident from available literature; knowledge acquired during dental graduation and post-graduation study is very crucial, our assessment throw fresh light to evidence about knowledge, awareness and practice about radiation protection among dental students in eastern India. This study finds that the majority of dental students aware about the criteria for ordering radiograph, when to order radiograph for pregnant women, harmful effects of radiation and application of ALARA. Surprisingly, the knowledge about symbols of radiation protection was found to be absent among majority of students. This finding is similar to findings of study conducted among dental students in Nepal by Garg D et al., [9] and Binal A et al., also found similar results in a study conducted in Mangalore India. In this study a significant correlation was also found between training received during dental course and effect on subsequent practice of radiation protection during dental practice [7]. Our study found that overwhelming majority of students were aware about the ideal distance to stand while shooting radiograph, about the personal and patient's protection equipments, and also about the personal protection badges. But most of the students were not aware about the techniques to reduce radiation exposure while using radiation protection. Behaviour regarding safe practice of radiation protection was present among majority of the students.

Overall, this study throws interesting light to the fact about knowledge, attitude and practice of radiation protection among dental students in an area where no such evidence was available. The finding of study shows a mix picture and thus indicate need to introduce targeted training programme for awareness about radiation protection among dental students.

References

1. Brenner DJ, Doll R, Goodhead DT, Hall EJ, Land CE, et al. (2003) Cancer risks attributable to low doses of ionizing radiation: assessing what we really know. Proc Natl Acad Sci 100: 13761-13766.
2. Alhasan M, Abdelrahman M, Alewaidat H, Khader Y (2016) Radiation dose awareness of radiologic technologists in major Jordanian hospitals. Int J Radiat Res 14: 133-138.
3. Ravikant R (2018) Awareness of ionizing radiation and its effects among clinicians. World J Nucl Med 17: 1-2.
4. Yurt A, Cavusoglu B, Gunay T (2014) Evaluation of awareness on radiation protection and knowledge about radiological examinations in healthcare professionals who use ionized radiation at work. Mol Imaging and Radionucl Ther 22: 48-53.
5. Smith-Bindman R, Lipson J, Marcus R (2009) Radiation dose associated with common computed tomography examinations and the associated lifetime attributable risk of cancer. Arch Intern Med 169: 2078-2086.
6. Faraz N (2014) Survey of radiography, radiographic equipment and radiation protection in Jeddah, Saudi Arabia. J Oral Maxillofac Radiol 2: 44-51.
7. Binnal A, Rajesh G, Denny C, Ahmed J, Nayak V (2013) Insights into the state of radiation protection among a subpopulation of Indian dental practitioners. Imaging Sci Dent 43: 253-259.

8. Aravind BS, Joy ET, Kiran MS, Sherubin JE, Sajesh S, et al. (2016) Attitude and awareness of general dental practitioners toward radiation hazards and safety. J Pharm Bioallied Sci 8 (Suppl 1): S53-S58.

9. Garg D, Kapoor D (2018) Awareness level of radiation protection among dental students. J Nepal Med Assoc 56: 800-803.