

ATTITUDE OF DENTAL SURGEONS REGARDING RADIATION PROTECTION IN TEACHING DENTAL HOSPITALS OF PESHAWAR

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ABSTRACT

Objective: To determine attitude of dental surgeons regarding radiation protection in teaching dental hospitals of Peshawar.

Materials and Methods: It was a cross sectional study, carried out in all the teaching dental hospitals of Peshawar. A self-administered questionnaire was distributed amongst all the house officers who were present and willing to participate in the study. The questionnaire included both open and close ended questions regarding radiation protection. Descriptive data was analyzed using frequency tables and categorical variables was analyzed using chi-square test.

Results: Majority of house officers reported that they remain in the room with the patients while taking the radiographs, most of them belonging to a public dental college i.e. (74%). Only 7% from the public sector dental hospital reported that they wear protective lead apron as compared to private dental teaching hospitals i.e. Private teaching hospital A, (35%) and B (37%). Regarding ALARA guidelines for radiation safety, none of the participant from the public dental college was aware, while less than 10 % of participants from the private dental hospitals were aware. Majority of the participants were unsatisfied with the radiation protection measures provided at their institutes.

Conclusion: This study concluded that attitude regarding radiation protection standards amongst house officers in teaching dental hospitals of Peshawar requires marked improvement to prevent radiation related hazards.

Keywords: Radiation Protection, Oral radiology, dental hospitals, House officers

INTRODUCTION

The usage of radiograph in dentistry becomes much more important than any other field for the diagnosis and further treatment of the patient.¹ Radiation modalities need to be used cautiously because of the perilous effects of radiation for the patient, dentist and health care worker.² Radiation in general is known as the transmission of energy through space

and matter it can be in two forms electromagnetic radiation and particulate. The philosophy of radiation protection can be described under the term ALARA (as low as reasonably achievable).³ Intraoral radiograph exposure is much minimum compared to full body radiation however slight exposure to the radiation sometimes induce a stochastic (including leukemia and certain tumors) effects.⁴ There are different guidelines present for the protection of the dentist, patient and general population like exposure technique, the radiographic equipment. Still there is lack of compliance among the dentists towards the dose reduction technique.⁵ There is a major

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difference between practicing dentist and that of a medical colleague as he himself exposes, processes and interprets the radiograph. For the equal protection of dental surgeon the International commission of radiation protection (ICRP) formed in 1928 has laid down the norms of radiation protection at international level.⁶ As a dental professional it should be our first priority to achieve optimum quality image using minimum possible dose, however the dose limits may exceed in some cases. Therefore, it is very important to deliberate safety of both the dental practitioner and patient.⁷ For the proper awareness and protection from radiation we need to assess the (KAP) knowledge, attitude and practice of dental imaging and appropriate radiographic protection.⁸ The individuals who operate dental X-ray equipment must have a basic knowledge of the inherent health risks associated with radiation and must have demonstrated familiarity with basic rules of radiation safety. The aim of radiation protection in dentistry is to obtain the desired clinical information with minimum radiation exposure to patient, dental professional and general public. Radiation protection of the dental professional and patient is directly related to the time exposed, distance and available shields. Hazards of radiation exposure can be considerably controlled if the international protocol is being followed. This study will reveal the pros and cons of radiation protection among house officers in teaching hospitals of Peshawar.

MATERIALS AND METHODS

A Cross sectional study was carried out. One study population were all house officers from one public and two private teaching hospitals of Peshawar, having sample size of 142 while. Sampling was done through purposive sampling.

Selection criteria was all house officers present at duty hours.

Data collection tool: A self-formulated questionnaire composed of 17 questions was circulated among house officers of all teaching hospitals of Peshawar.

Data collection procedure: An informed written consent was taken from the institute before administration of the questionnaires. The questionnaires were collected about an hour after.

Data analysis: Data was analyzed using SPSS 16. Frequency charts and tables were analyzed using descriptive statistics.

RESULTS

A total number of 142 house officers participated in the study with 41 males and 101 females. Mean age of the participants was 23.9 (1.25).

A Maximum exposure to radiation of 2-3 times per day was reported. Most of the house officers were not aware of any of the information regarding the type of x-ray machine or the x-ray processing.

DISCUSSION

There was no use of personal monitoring devices for house officers at all during the radiograph taking. In comparison the article to Chennai questionnaire, their answers also showed that they had no use of personal monitoring devices at all and were clearly unaware of it.¹ Another article in Saudi Arabia showed that more than a half percent 68% didn't wore any personal monitoring devices at all.⁹ Most of the house officers were not aware of any of the information regarding the type of x-ray machine or the x-ray processing.

It was asked whether or not the dental practi-

Table: 1

	Public Dental college	Private Dental college A	Private Dental college B	P-Value
I am present with the patient in the same room while radiograph is being taken	32 (74.4%)	40 (69%)	5 (13.2%)	0.00
I follow the distance and position rule?	9 (20.9)	10 (16.9)	15 (38.5)	0.043
I do come across patients who questions me about radiograph safety.	11 (25.6%)	23(39.7%)	25(65.8%)	0.001
I do use lead aprons and thyroid collars to cover my patients during radiograph.	3(7%)	21(35.6%)	14(36.8%)	0.02
I am aware of the term ALARA principle.	0 (0%)	5 (8.5%)	2(5.1%)	0.150

Table: 2

If you are not wearing any protective barrier, how far do you stand away from patient during radiograph taking?				Total	P-Value
	Public Dental College	Private Dental College A	Private Dental College B		
5 steps	28 (66.7%)	29 (49.2%)	15 (40.4%)	72 (52.2%)	0.257
10 steps	9 (21.4%)	15 (25.4%)	13 (35.1%)	37 (26.8%)	
15 steps	5 (11.9%)	11 (18.6%)	7 (18.9%)	23 (16.7%)	
20 steps	0 (0%)	4 (6.8%)	2 (5.4%)	6 (4.3%)	
	42 (100%)	59 (100%)	37 (100%)	138 (100%)	

Table: 3 Do you think it's safe to take radiograph of a pregnant patient?

	Institute			Total	P-Value
	Public Dental College	Private Dental College A	Private Dental College B		
Yes	0 (0%)	7 (11.9%)	6 (15.4%)	13 (9.2%)	0.004
No	35 (81%)	28 (47.5%)	20 (51.3%)	83 (58.9%)	
Sometimes	8 (19%)	24 (40.7%)	13 (33.3%)	45 (31.9%)	
Total	43 (100%)	59 (100%)	39 (100%)	141 (100%)	

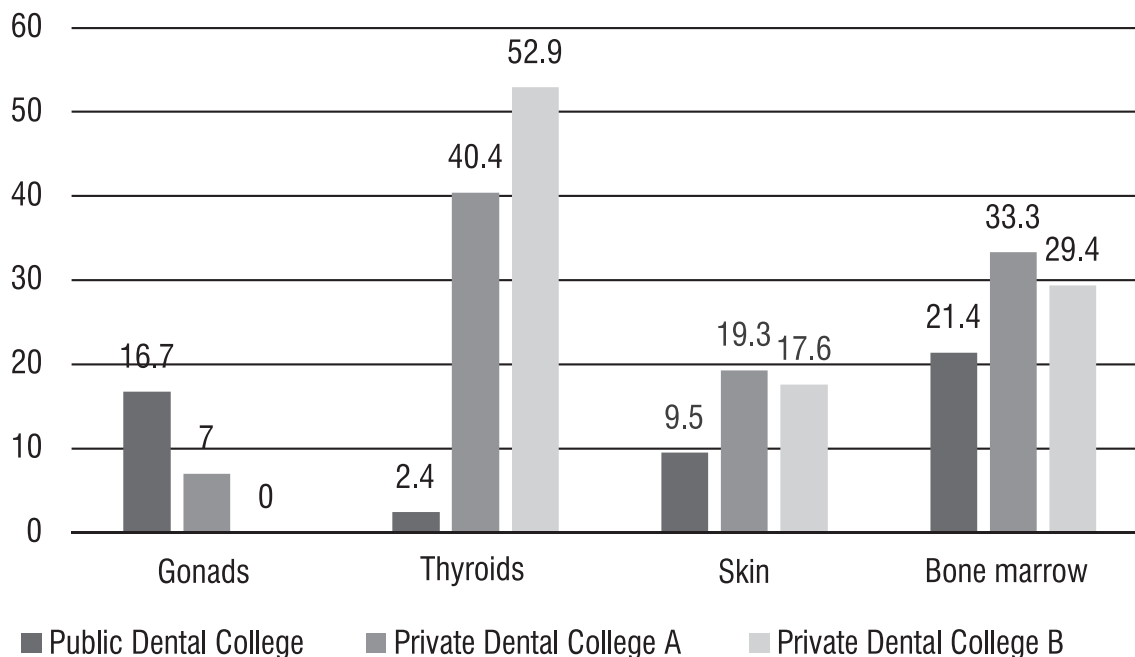


Fig 1: What is the most important organ that must be protected during radiation exposure?

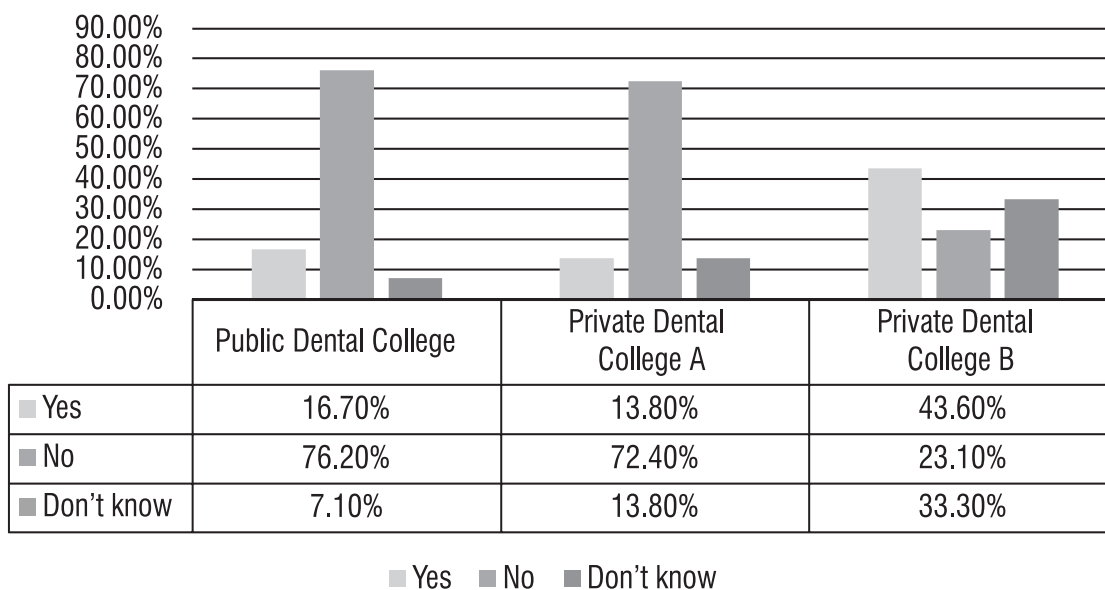


Fig 2: Do you feel that radiograph department of your institute is adequately protected from radiation protection?

tioner is present with the patient in the same radiographic room while radiograph is being taken to which more than half marked with yes answer with majority of House officers (74.4%) from a public dental college. In comparison, an contrast with the article from Sudan, the results seem much different, as 84% dentists replied that they use to stand behind the protective barrier while radiograph is being taken.²

It was asked if the dentist follows the distance and position rule while radiograph taking and the answer was only 24.1%. In compare and contrast with the other research article in Chennai , its believed that the answers were pretty much similar, only 19.1% marked with a YES option that they followed distance and position rule while radiograph taking. 9 While another article in India showed 77.91% dentist who were not following distance and position rule and neither had they owned a lead barrier or lead apron. Most dentists stood at the same spot in dental clinic irrespective of the position of X-ray tube head.¹⁰

Question was asked about the radiation protection whether or not lead aprons and thyroid collars are given to the patient before every radiograph taking to which only 27.1% marked a YES. The least percentage of negligence of radiation protection was from a public dental college (7% only). In compare

to another study, their answer was a 34% YES and 66% NO.¹¹

Minority of House officers (5%) knew about the ALARA principle for radiation protection and none from the public dental college knew about it. In comparison, another study reported that 73% of the house officers knew of the term ALARA principle and also applied it practically.¹² Another article showed nearly one third of the respondents (36.5%) were aware of ALARA principle.¹³

To a question regarding the x-ray processing used in the institute, 58.9 % house officers in total marked with a DON'T KNOW answer, only 17% answered it correctly. In comparing our answer to the study of Binal A. Rajesh J, Ahmad G and Denny C, conventional radiography was the most commonly used form of X-ray source, while 21% were using digital radiographic equipment. These results were consistent with the reports of Shahab et al and Chaudhry et al¹⁴

There is no practical use of X-ray film holders while taking an intra-oral radiograph in all of the teaching hospitals of Peshawar, all of them tell their patient to hold the film with their fingers. While comparing our answer the other article in which most of the dentists (71%) instruct their patients to hold the intraoral periapical (IOPA) film with their

fingers while carrying out the radiographic exposure and only 16.7% were using holders in their practice¹⁵

More than half of the House officers reported that they stand less than 5 step from the patient while taking radiographs and without any radiation protection. It was asked if the patient questions them about radiation risk or benefit to which almost more than a half percent of dentists replied in negative. In comparison to a study conducted in Korea, 30.2% of respondents had not experienced patients' asking about radiation safety at all. While 32.0% of the general dentists had no experience explaining radiation risk/benefit to patients, even 14.8% of specialists had no such experience.¹⁶

When asked whether or not radiation risk or benefit is explained to the patient before acquiring radiograph to which 44.3% dentists marked NO, 41.1% marked as SOMETIMES and only 14.3% marked as a YES option.

There is a very limited number of lead aprons in the radiograph ward in all teaching hospitals of Peshawar and no thyroid collar at all. In comparison to a study on Indian dentists, result seemed pretty much similar as 70.8 % of dental practitioners did not have the lead aprons and 84.7% of the practitioners, who had the lead aprons, did not wear the aprons at all.¹⁷

Regarding protection of pregnant women, 58.9% house officers marked the answer as NO it's not safe, 31% marked it as SOMETIMES and only 9.2% marked the YES answer. The answer obtained was somewhat near to the research carried out by Katarzyna Z Furmaniak et al who reported that 54.74% dentists believed that radiograph in pregnancy is not considered as a safe procedure.¹⁸

Regarding the general knowledge it was asked about the most important organ to be protected during radiograph taking to which correct answer was Thyroid. Nearly half of the respondents, (47.4%) answered correctly. In comparison to another study, the answers were pretty much mixed as 60% of the answers marked correctly. A study from Sweden reported an increased association between diagnostic x-rays and the risk of thyroid cancer.¹⁹

The respondents were asked if the Radiology department of your institute is adequately protected from radiation protection nearly 60% house officers marked with a NO answer (a high percentage of 76.2

% from a public dental college while 17.3% marked as if they aren't sure.

CONCLUSION

This study concluded that teaching dental hospitals of Peshawar are still striving to follow the minimal radiation protection measures. Lack of awareness amongst the house officers regarding the minimum standards in radiation protection may put both patients and staff at great risk of radiation hazards.

REFERENCES

1. Tha TP, Kumar J. To study about radiation protection among dental students of Chennai-A questionnaire based study *Int J Pharma Bio Sci* 2017 Jan; 8(1): B 542-551 DOI: <http://dx.doi.org/10.22376/ijpbs.B542-551>.
2. Elmukhtar YM. knowledge and attitude of dentists regarding radiation safety in government dental clinics in Khartoum, Sudan September 2015 (<http://hdl.handle.net/11394/5037>)
3. Takarji B, Koppolu P, Swapna LA, Al-maweri SA, Velpula N, Chappidi V, Ch L knowledge on radiation protection and practice among dental students, *British journal of medicine and medical research* 19(7): 1-7, 2017; Article no.BJMMR.30761 ISSN: 2231-0614, NLM ID: 101570965 DOI: 10.9734/BJMMR/2017/30761
4. Furmaniak KZ, corresponding author Kołodziejska MA, Szopinski KT Radiation awareness among dentists, radiographers and students *Dentomaxillofac Radiol.* 2016 Oct; 45(8): 20160097. Published online 2016 Nov 23. doi: 10.1259/dmfr.20160097.
5. Binnal A, Rajesh G, Ahmed J, Denny C. Factors determining Radiation Protection Practices among Indian General Dental Practitioners: An Explorative Study. *World J Dent* 2017; 8(1):14-20.
6. Javali R, Dantu R. Attitude and Awareness about Radiation Protection among Dental Surgeons in North Karnataka: A Questionnaire Study. *Journal of Indian Academy of Oral Medicine & Radiology* 2018 30(2);116-120 DOI: 10.4103/jiaomr.JIAOMR_2_17
7. Yurt A, Çavuşoğlu B, Günay T. Evaluation of Awareness on Radiation Protection and Knowledge About Radiological Examinations in Healthcare Professionals Who Use Ionized Radiation at Work. *Mol Imaging Radionucl Ther.* 2014 Jun; 23(2): 48–53. Published online 2014 Jun 5. doi: 10.4274/mirt.00719
8. Takarji B, Koppolu P, Swapna LA, Al-maweri SA, Velpula N, Chappidi V, Ch L. Knowledge on radiation protection and practice among dental students, *British journal of medicine and medical research* 19(7): 1-7, 2017; Article no.BJMMR.30761 ISSN: 2231-0614, NLM ID: 101570965 DOI: 10.9734/BJMMR/2017/30761.

9. Faraz N. Survey of radiography, radiographic equipment and radiation protection in Jeddah, Saudi Arabia. *J Oral Maxillofac Radiol* 2014;2:44-51
10. Agrawal B, Dosi T, Hazari A, Maheshwari C, Rajput R, Yadav N Evaluation of Radiation Protection Awareness amongst General Dental Practitioners of Western Rajasthan in India *Journal of International Oral Health* 2015; 7(12):51-55
11. Javali R, Dantu R. Attitude and awareness about radiation protection among dental surgeons in North Karnataka: A questionnaire study. *J Indian Acad Oral Med Radiol*, 2018 [cited 2019 Feb 5]; 30:116-20. Available from: <http://www.jiaomr.in/text.asp?2018/30/2/116/236722>
12. Rela R Knowledge, Attitude and Practice of Radiation Protection Protocols amongst Students of a Dental college, *Dentistry* 2019, 9:1 DOI: 10.4172/2161-1122.1000530.
13. Kumar P. P, Pandian P, Karuppaiah M, Sangeeta and Umesh. Effectiveness of a health education tool in assessing the knowledge, attitude and practice of radiation protection among dental practitioners in Madurai city *International Journal of Recent Advances in Multidisciplinary Research* Vol. 05, Issue 09, pp.4081-4086, September, 2018
14. Binnal A, Rajesh G, Ahmed J, Denny C. Factors determining Radiation Protection Practices among Indian General Dental Practitioners: An Explorative Study. *World J Dent* 2017;8(1):14-20
15. Aravind BS, Tatu Joy E, Kiran MS, J. Sherubin E, S. Sajesh, and Dhas Manchil PR Attitude and awareness of general dental practitioners toward radiation hazards and safety *J Pharm Bioallied Sci.* 2016 Oct; 8(Suppl 1): S53–S58. doi: 10.4103/0975-7406.191969
16. Lee BD and Ludlow JB Attitude of the Korean dentists towards radiation safety and selection criteria *Imaging Sci Dent.* 2013 Sep; 43(3): 179–184. Published online 2013 Sep 23. doi: 10.5624/isd.2013.43.3.179
17. Math SY, Murugesappa DG, Annigeri R, Kalra D. Compliance of Indian dentists with oral radiology safety measures. *J Oral Maxillofac Radiol* 2013;1:104-10
18. Furmaniak KZ, Kołodziejska MA and Szopiski KT Radiation awareness among dentists, radiographers and students *Dentomaxillofacial*. The Authors. Published by the British Institute of Radiology DOI: 10.1259/dmfr.20160097
19. Anjum Memon, Sara Godward, Dillwyn Williams, Iqbal Siddique & Khalid Al-Saleh Dental x-rays and the risk of thyroid cancer Pages 447-453 | Received 02 Nov 2009, Accepted 15 Feb 2010, Published online: 16 Apr 2010 <https://doi.org/10.3109/02841861003705778>