

Perception of Radiation Protection among Dentist in South Chennai, Tamil Nadu

V Balaji¹, K Ranjith², P Buvanewari³

¹Senior Assistant Professor, Department of Dental Surgery, Government Villupuram Medical College and Hospital, Villupuram, Tamil Nadu, India, ²Department of Public Health Dentistry, Chettinad Dental College and Research Institute, Chennai, Tamil Nadu, India, ³Assistant Professor, Department of Corporate Secretaryship, Bharathidasan Government College for Women, Puducherry, India

ABSTRACT

Aims and Objectives: This study aims to assess the attitude and awareness of radiation protection among dental surgeons in South Chennai.

Materials and Methods: The study participants comprised 150 dental practitioners (general and specialty) in South Chennai. The information was collected from each participant through structured questionnaires regarding attitude and awareness toward radiation protection. Pearson's correlation coefficient test was used to assess the validity and reliability of questionnaire, and any $P \leq 0.05$ was considered as statistically significant.

Results: Of all the 150 dentists enrolled in the study, 69% of dental surgeons considered X-ray films as an image receptor. However, majority of the dentists (73%) failed to acquire informed consent of the patient before prescribing dental radiograph. While majority of dentists were unaware of position and distance rule (54%) and 46% were aware of the rule, it was also found that 59% of dental surgeons did not use film-holding device and only 41% used film-holding device. Majority of them (59%) were aware of the Atomic Energy Regulatory Board (AERB) certification and 41% were unaware of AERB, 15% of them hold the cone during exposure.

Conclusion: The current study shows the utmost need for further implementation of radiation protection principle among dental surgeons in South Chennai. Majority of them did not practice radiation protection procedures. Emphasis on radiation safety is mandatory for continuing professional education and the development of radiographic selection criteria should be recommended.

Key words: Attitude, Awareness, Dental surgeons, Radiation protection

INTRODUCTION

Radiation hazards evaluation is very important in justifying and ensuring protection. With such evaluation, safe limits of radiation can be evaluated. Radiation exposure limits were introduced by the International Commission on Radiological Protection, which was founded in 1928. In India, the Atomic Energy Regulatory Board (AERB) is the competent authority. It implements safety provision by the Atomic Energy Act, 1962. It should be constantly monitored if the radiation protection comes foremost in radiography. The goal of radiation protection procedure is to minimize the exposure of the operator, office personnel, and patient during radiographic examination. In dentistry, it is mainly used for diagnostic purposes, and in a dental set-up, usually, the practicing dentist exposes, processes, and interprets the radiograph. Even though such

exposure is less, it is critical to reduce exposure to the dental personnel and patients to prevent the harmful effects of radiation.^[1]

Biological hazards are classified based on occurrence probability into non-stochastic and stochastic effect.^[2] The radiographic examination carried out in all fields of medical services and dental services contribute to the promotion of health, both individually and nationally. In dental practice, radiographic examination plays an essential part though certain amount of radiation is delivered inevitably to the patients. It should be as low as reasonably achievable. The practicing dentist differs from medical colleagues as he exposes, processes, and interprets the radiograph. Although exposure is minimal, it is very important to reduce radiation to avoid the accumulated dose to the dentist in their lifetime.

CORRESPONDING AUTHOR:

Dr. K Ranjith,
Department of Public Health Dentistry, Chettinad Dental College and Research Institute, Chennai, Tamil Nadu, India.
E-mail: dranjith84@gmail.com

Submission: 09-2019; Peer Review: 10-2019; Acceptance: 11-2019; Publication: 12-2019

MATERIALS AND METHODS

A questionnaire study was carried out among 150 dental surgeons in South Chennai. A specially prepared structured questionnaire was used to assess the attitude and awareness of radiation protection among dental surgeons in South Chennai. The questionnaires could be returned by mail or in person. The dentists were informed about the anonymous processing of the questionnaires. A total of 15 questions were included in the study. Statistical analysis was performed using Pearson's correlation coefficient test to know the validity of the questionnaire and any $P \leq 0.05$ was considered statistically significant.

RESULTS

Of all the 150 dentists enrolled in the study, 69% of dental surgeons considered X-ray films as an image receptor [Figure 1]. It was observed that 63% of dental surgeons made <5 exposure per day [Figure 2]. Majority (45%) of them use X-ray to view the periapical region [Figure 3]. Majority of dental surgeons sent the patient for computed tomography (CT) or cone-beam CT to view extension of cyst and tumor (34%), implant planning (30%), and endo and ortho treatment (26%) [Figure 4].

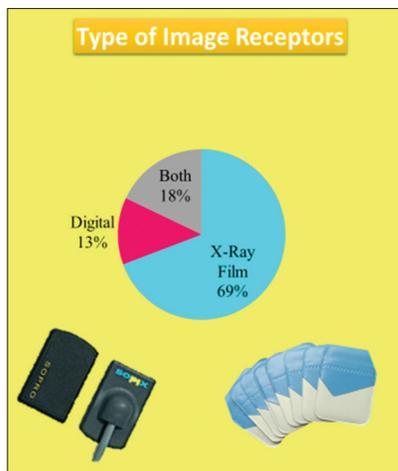


Figure 1: Responses on type of x rays

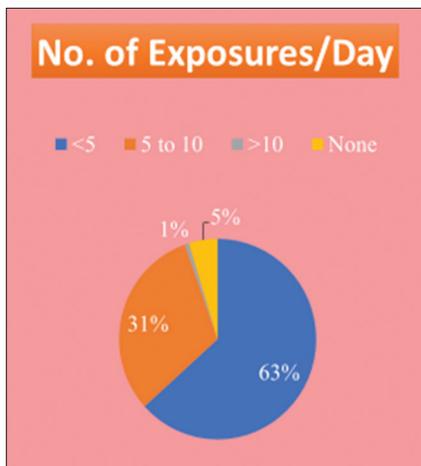


Figure 2: Responses on exposure/day

However, majority of the dentists (73%) failed to acquire informed consent from the patient before prescribing dental radiograph. Majority of dentist were unaware of position and distance rule (54%) and 46% were aware of the rule. While 59% of dental surgeons did not use film-holding device, only 41% use film-holding device. Many dentists were aware of AERB certification (59%) and 41% were unaware of AERB. About 15% of the dentists hold the cone during exposure [Figure 5].

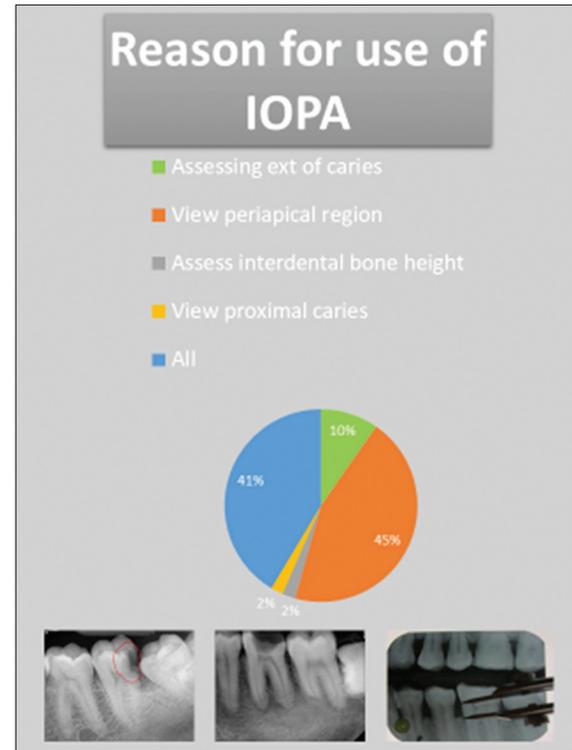


Figure 3: Responses on iopa uses

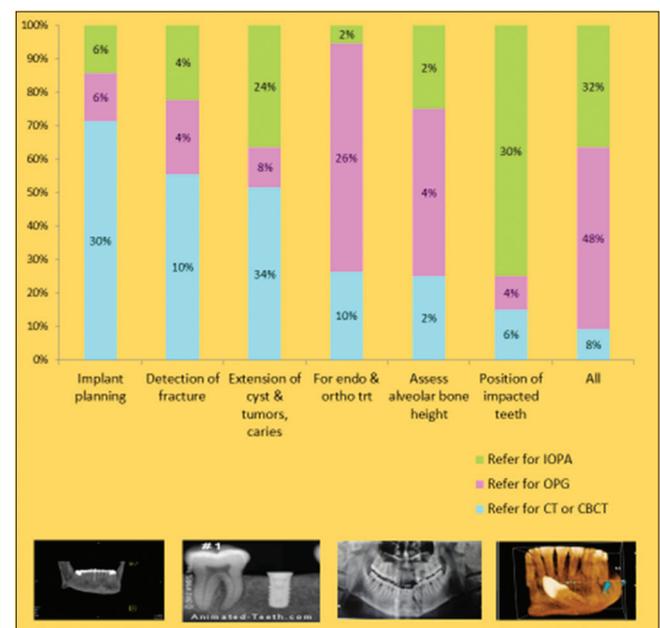


Figure 4: Responses on diseases identity

Majority of dental surgeons (51%) were aware of the most commonly protected organ which was the thyroid gland during dental X-ray exposure [Figure 6]. A less percentage of dentists (44%) used lead aprons and thyroid collars to cover their patients during radiographic examination while 50% did not use any protective measure during exposure [Figure 7] and also less percentage of dentist (23%) use thermoluminescent dosimetry badge as a personal monitoring device during X-ray exposure [Figure 8].

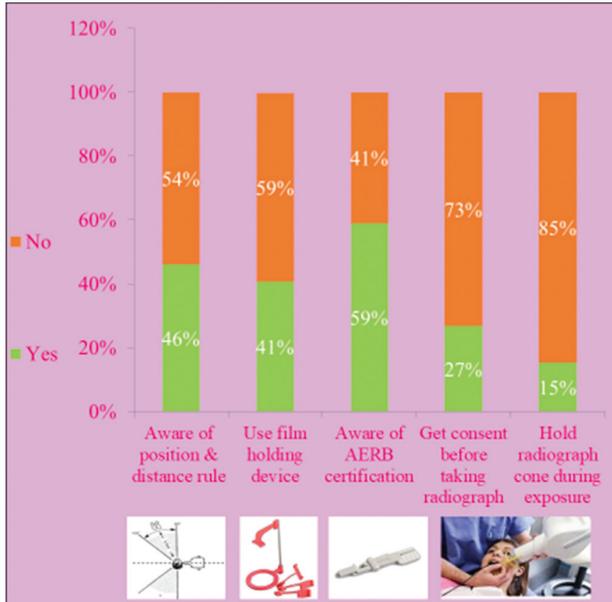


Figure 5: Responses on AERB and cone exposure

DISCUSSION

The effect of ionizing radiation on living system is well known and well documented. The biologic interaction between ionizing radiation and living organism leads to changes in the electron level immediately within a fraction of seconds of exposure and persists for varied period of time. Practitioners who administer



Figure 7: Responses on exposure of radiation meas



Figure 6: Responses on awareness of radiation

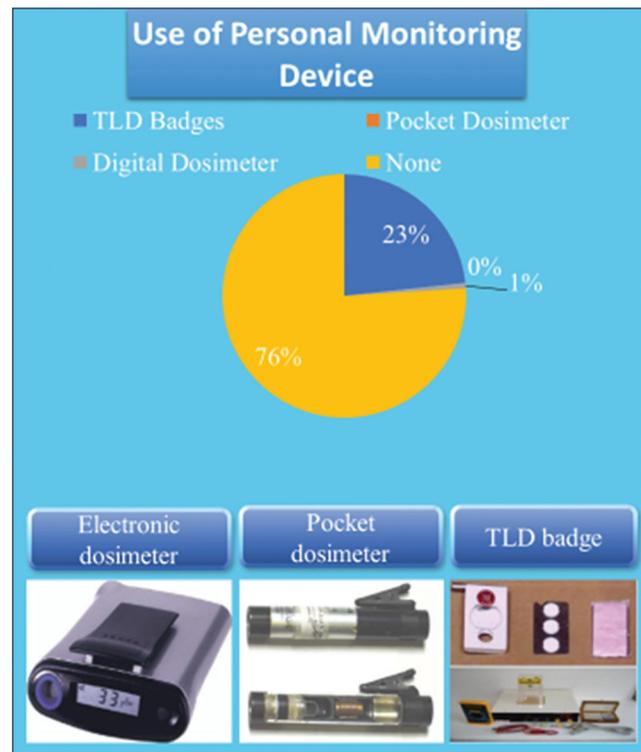


Figure 8: Responses on device monitoringguring tools

ionizing radiation must be familiar with the magnitude of radiation exposure encountered in dentistry, the possible risk that such exposure entails, and the methods used to reduce doses. This information provides the necessary background for explaining the concerned patients the benefits and possible hazards involved with the use of X-rays.^[3]

In our present study, majority of dental surgeons were using X-ray film as an image receptor only 13% of them were using digital sensor, which was consistent with the other studies conducted by Ilgüy *et al.*,^[4] Math *et al.*,^[5] and Kaviani *et al.*^[6] About 73% of dental surgeons did not take informed consent before taking radiographs because majority of them were unaware of the importance of explaining the radiation risk and hazards to the patient.

The American Dental Association strongly recommends lead apron and thyroid collar because lead aprons should be used to minimize patient exposure to radiation, but in our study, only 44% of dental surgeons use lead apron in their day-to-day practice. Similar study conducted by Asha *et al.*, in Coorg, India,^[7] showed 40% of dental surgeons wearing lead apron and in other study conducted by Amanpreet *et al.*,^[8] in Lucknow, 38.6% of dentists were using lead apron.

Personal monitoring device was used to measure the exposure of operator or associated personal as a protective measure, but 76% of dental surgeons did not use any personal monitoring device which is not in accordance with the study done by Math *et al.*^[5] and Kaviani *et al.*,^[6] A strict adherence to what has been termed the position and distance rule is required to reduce the X-ray exposure to the dental surgeons according to which the operator should stand 6 feet from the patient at an angle of 90°–135° to the central X-ray of the X-ray beam, but 46% of dental surgeons were aware of position distance rule in our study, other similar studies conducted by Asha *et al.*^[7] showed 34.4% of dental surgeons following this rule.

Film-holding device should be used because they improve the alignment of film, thereby decreasing the unnecessary exposure and retake of film, but 41% of dental surgeons were

only using film-holding devices similar to the study conducted in Lucknow and Coorg, India.^[7,8]

CONCLUSION

The current study shows the utmost need for further implementation of radiation protection principles among dental surgeons in South Chennai. Majority of them did not practice radiation protection procedures. Emphasis on radiation safety is mandatory for continuing professional education and the development of radiographic selection criteria should be recommended.

REFERENCES

1. Praveen BN, Shubhasini AR, Bhanushree R, Sumsum PS, Sushma CN. Radiation in dental practice: Awareness, protection and recommendations. *J Contemp Dent Pract* 2013;14:143-8.
2. Amout EA, Jafar A. Awareness of biological hazards and radiation protection techniques of dental imaging a questionnaire based cross sectional study among Saudi dental students. *J Dent Health Oral Disord Ther* 2014;1:23-8.
3. White SC, Pharoah MJ. White and Pharoah. *Oral Radiology Principles and Interpretation*. 5th ed. Missouri: Elsevier Publishers; 2004. p. 55-65.
4. Ilgüy D, Ilgüy M, Dinçer S, Bayirli G. Survey of dental radiological practice in Turkey. *Dentomaxillofac Radiol* 2005;34:222-7.
5. 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.
6. Kaviani F, Esmaeili F, Balaji E, Pourfattollah N. Evaluation of X-ray protection methods used in dental offices in Tabriz in 2005-2006. *J Dent Res Dent Clin Dent Prospect* 2007;1:49-52.
7. Asha S, Veena SN, Krupashankar R, Kavitha AP, Shobha R, Jijin MJ, *et al.* Awareness towards radiation protection measures among dental practitioners in Coorg district: A questionnaire study. *Int J Dent Health Sci* 2015;2:1460-5.
8. Amanpreet K, Neeta M, Deepak U, Kumar GC, Singh P. Awareness of radiation protection measures of dental imaging among private dental practitioners in Lucknow city a questionnaire survey. *Int J Maxillofac Imaging* 2015;1:1-5.

HOW TO CITE THIS ARTICLE:

Balaji V, Ranjith K, Buvanewari P. Perception of Radiation Protection among Dentist in South Chennai, Tamil Nadu. *Int J Prevent Public Health Sci* 2019;5(2):14-17.