

Awareness towards radiation protection safety among the dental health workers in Odisha: A poll study

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Abstract: Objective: This study focused on the evaluation of the knowledge and x-rays of specific dental professionals with highlight in view of education on these regular radiographic practices.

Materials and methods: A poll was conveyed among 500 dentists of Odisha, India, which were based demographic details including the use of radiographic intraoperative devices.

Results: All private experts were utilizing conventional X-ray machines. 85% said that dental X-ray beams were hurtful. 92% knew about NCRP/ICRP, 71% aware of ALARA principle, while just 56% knew about AERB rules. Yet, certain radiation protective estimates like utilizing lead apron, lead barriers and position distance rule were not followed by the greater part of the private specialists.

Conclusions: The current study shows that majority of dentists in Odisha didn't practice rehearse Methods for radiation safety to restrict patients' excessive contact to radiation. To improve the overall dentists' radioactive knowledge-dose control procedure, efforts must be made and technical education.

Keywords: Radiograph, radiation, awareness, exposure, radiology

1. INTRODUCTION:

With progression in diagnostic systems, use of radiological assessment has ascended to numerous creases over the most recent two decades. Dentists use radiographs more regularly as compare to other physicians. According to the report generated by UNSCEAR in 2008, about 48 crores of radiology diagnosis was done by dentistry and it decreases 15 % annually. For this explanation, consistence to as short as sensibly attainable (ALARA) standards gets significant in the exercise so as to decrease the ionizing radiation to the patients.^{2,11} Radiation awareness for different physician has been concerned in many studies but it can be noticed that no satisfactory research has been conducted for radiology awareness among dental radiological examinations. Now a days it can be observed that effect of ionizing radiation in dental radiography is increasing.

According to a report by European Commission, around one third of total radiological examinations performed in dental radiology in Europe. This survey shows that dental radiology have more significance as compare to other radiological examinations. Optimization and justification of radiography is more significant for dental experts. Therefore, a special focus need to be taken care for the radiation awareness for dental practices.⁴

Utilization of appropriate lead apron, right collimation and suitable techniques is more essential for reducing the radiation exposure at the time of radiation examinations.⁵ Every radiographic exposure should be clinically justified and expected to provide benefit of a diagnosis. Among all radiography examinations dentistry are one of the most regular radiography procedure and one of the essential concern for public health. It is because of the radiation hazards caused during the X-ray. Due to this reason, a radiograph ought to be recommended uniquely for the patients when the detection of disease is most required which could compensate the danger of harm from X-ray.⁶

For increasing the radiation safety in case of dentists, many steps can be taken. Radiography guidelines have been recommended by many organizations like ADA, US FDA and the EC for individual assessment and limited use of contact of radiation.⁷ Here in this study we have investigated the radiation safety awareness for two different types of dentist (Private clinicians and Academics) having experience of 1 to 40 years.

2. MATERIALS AND METHODS

This survey done in the Institute of Dental Science (IDS), Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar, India. A total 30 questions were asked to the dentists as presented in Table 1. This questionnaire was pilot tested on 500 dentists registered under Indian Dentist Association (IDA). Generally the dentists are from Odisha, India.

The poll correlated with natural or biological hazards of dental radiographs and radiation convention as numerous decisions or options were given to every member.

Table No- 1

Question Number	Name of the Question	Description
1	Age in years	Dentist need to provide their age
2	Type of dentist	Academics or Private Clinicians
3	Years of experience	Dentist need to provide their experience as dentist
4	Are Dental X-rays unhealthy?	Yes or No
5	Can X-ray beams return back from the walls of room?	Yes or No or Don't Know
6	Are you mindful of NCRP/ICRP rules?	Yes or No

7	Are you mindful of the radiation risk symbol?	Yes or No
8	Are you well aware of the treatment of diagnostic radiology of collimators as well as filters or streams?	Yes or No
9	Will rectangle collimator aid to minimize visibility of the patient?	Yes or No
10	Diminishes tissue volume visibility in the customer's FSFD gap?	Yes or No
11	Are you mindful of deterministic impact & stochastic impacts?	Yes or No
12	Are you mindful of ALARA principle?	Yes or No
13	Does digital or computerized radiographs require less radiation than traditional radiography?	Yes or No
14	Do high speed films reduce patient tolerant?	Yes or No
15	Are you choose to hold the films with normal hand at the time of test?	Yes or No
16	Will you ask to hold	Yes or No
	the film with normal hand at the time of test to the patients?	

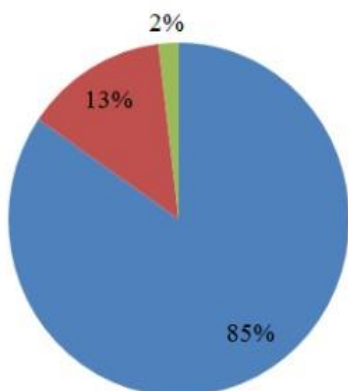
17	Are you have faith in utilizing intraoral radiographs to carry X-ray film cameras on patients?	Yes or No
18	Dental radiographs are completely contraindicated in pregnant patients?	Yes or No
19	Will you obey the radioactivity safety procedure in your upcoming private clinic?	Yes or No
20	Does the perpendicular angle technique have a more realistic image and reduces the gland glass and eyelid radiation exposure?.	Yes or No
21	Need to use lead aprons frequently?	Yes or No
22	Should redundancy of x-ray beam/film be limited designed for patient?	Yes or No
23	Should floating The patient will be dissented during examination from the X - ray source?	Yes or No
24	ARB recommendations on safety of contact to radiation areas?	Yes or No
25	Administrator should be wear personal monitoring badges?	Above the lead apron, Beneath the lead apron, Don't matter

26	Why are you not utilize lead apron frequently?	Non- accessibility of apron, Because of the weight of the apron, Commonly used by everyone, Follow the Position distance rule,
27	The perfect distance an administrator should stand during the test?	4ft 900-1350, 4ft &600-900, 6ft&900-1350, 6ft &600-90
28	When you "do not conform" in your family practice to the radiation security procedures in future, select a justification from underneath?	Rest on on the available area, Due to financial reasons, Personal clinical arrangement has less radiation exposure, Others
29	DO you think CBCT & RVG are better than conventional radiographic technique	Yes or No
30	Number of Radio-graphs per day , you are taking	0-1, 2-4, 5-7, >7

3. RESULTS:

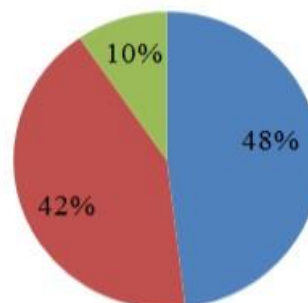
Are Dental X-rays harmful? Can X-rays be reflected from the walls of room?

■ YES ■ NO ■ DON'T KNOW



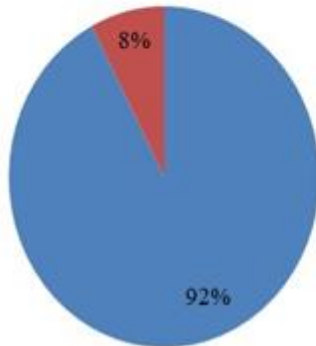
Can X-rays be reflected from the walls of room?

■ YES ■ NO ■ DON'T KNOW



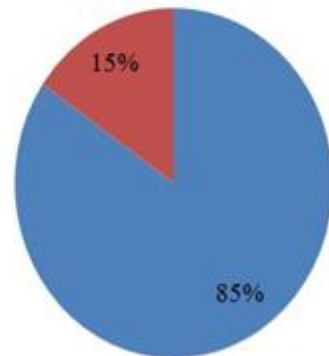
Are you aware of NCRP/ICRP (National council on radiation protection and measurement/ International commission on radiological recommendations)?

■ YES ■ NO



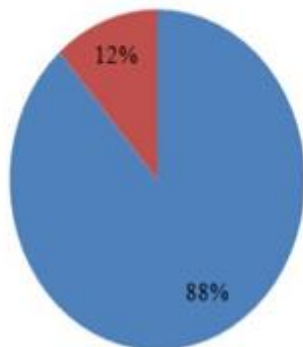
Are you aware of the radiation hazard symbol?

■ YES ■ NO



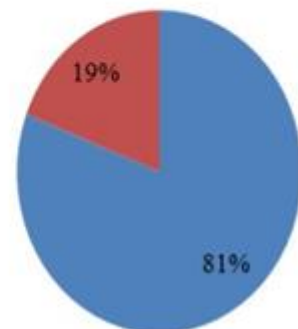
Are you aware of usefulness of collimators and filters in dental radiography?

■ YES ■ NO



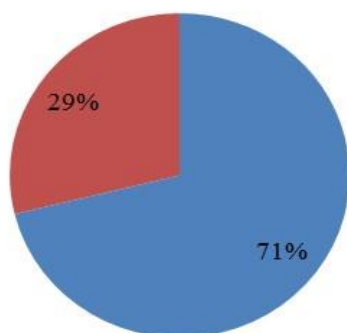
Does Rectangular collimator help in reducing the patient's exposure?

■ YES ■ NO



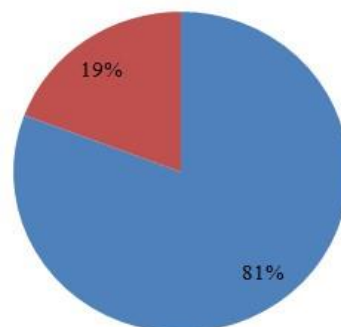
Are you aware of ALARA principle?

■ YES ■ NO

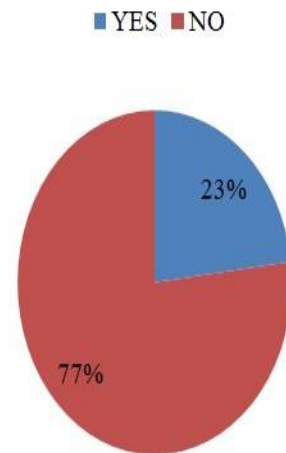
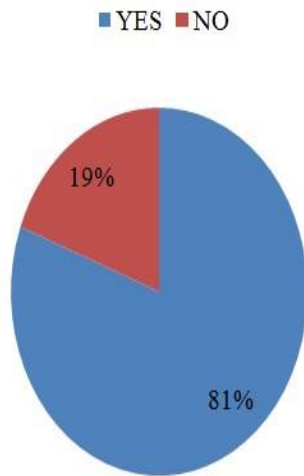


Does digital radiography require less exposure than conventional radiography?

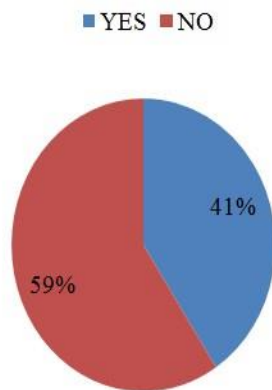
■ YES ■ NO



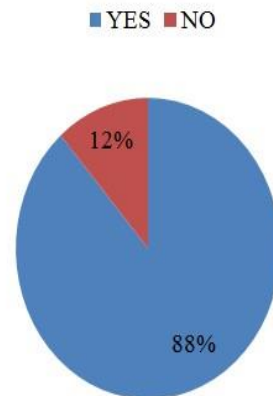
Do high speed films reduce patient exposure? Do you prefer to hold the films with your hand during exposure?



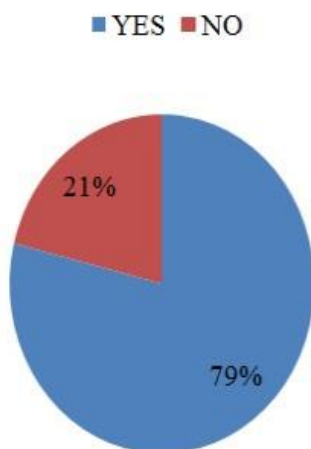
Will you ask the patient to hold the film with their hand during exposure?



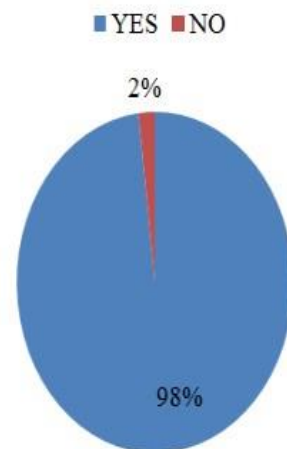
Are you confident in using X-film holding devices for taking intraoral radiographs on patients?



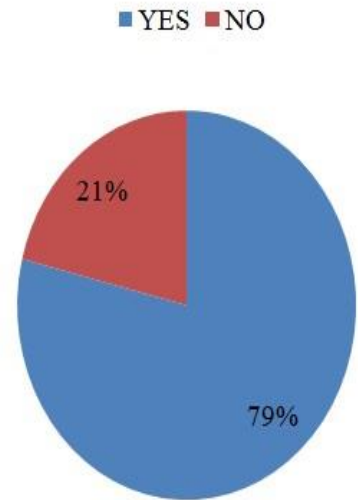
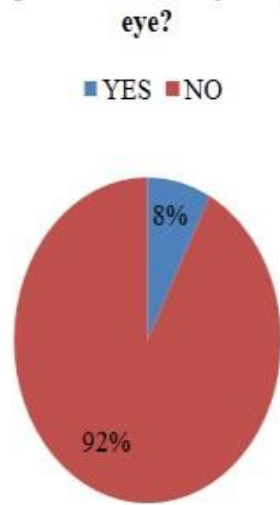
Dental radiographs are absolutely contraindicated in pregnant patients?



Will you adhere to radiation protection protocol at the time of your future private clinical practice?

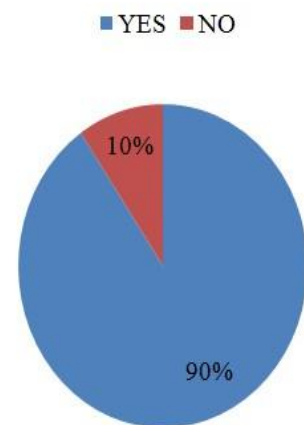
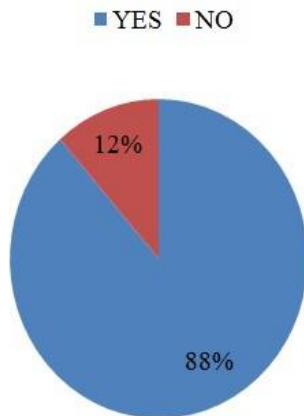


Does paralleling angle technique gives more accurate image and lowers the exposure dose to thyroid gland and lens of eye? **Do you prefer to regularly use lead Aprons?**



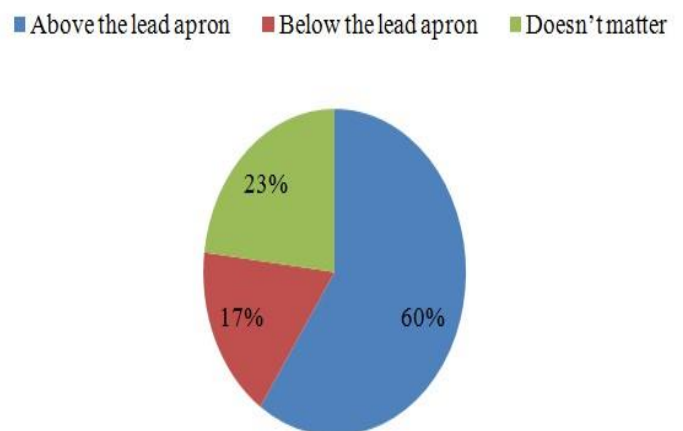
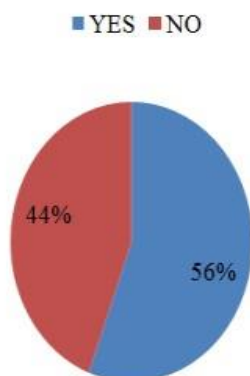
Should repetition of x-ray film/exposure be minimized for the patient?

Should drifting of the x-ray tube or patient should be avoided during exposure?

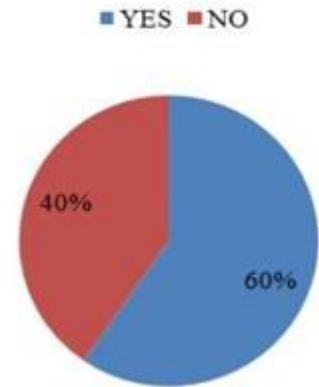
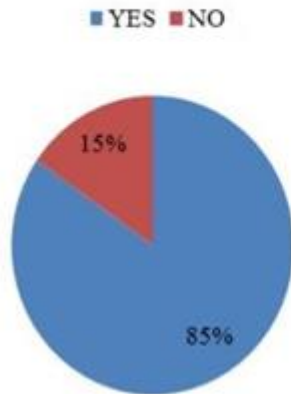


Are you aware of (Atomic Energy Regulatory Board) AERB guidelines for Radiation exposure room shielding?

Personal monitoring badges should be worn by the operator?

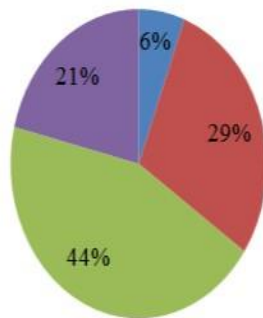


Does Long Focal spot film distance (FSFD) reduce the tissue volume exposure of the patient? Are you aware of deterministic effects & stochastic effects?



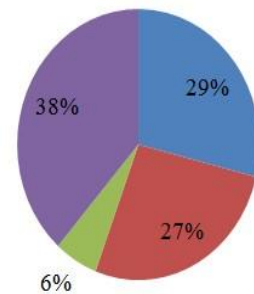
Indicate why- you are not using lead apron regularly?

- Common apron for all
- Due to weight of the apron
- Due to weight of the apron
- Will follow Position distance rule

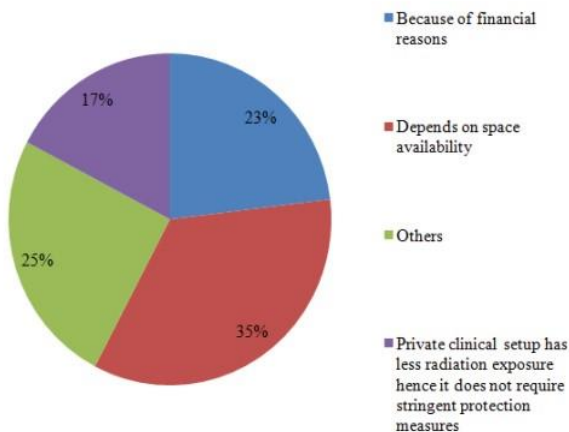


The ideal distance an operator should stand (position distance rule) while performing dental radiographic exposure is

- 4 feet and 600-900
- 4 feet and 900-1350
- 6 feet and 600-90
- 6 feet and 900-1350

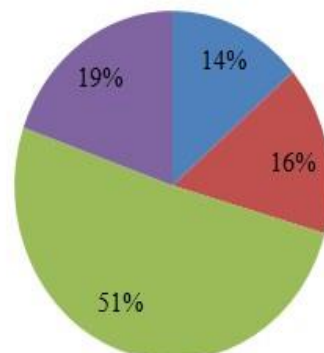


If you are "not adhering" to radiation protection protocol in your private practice in future, pick a reason from below?

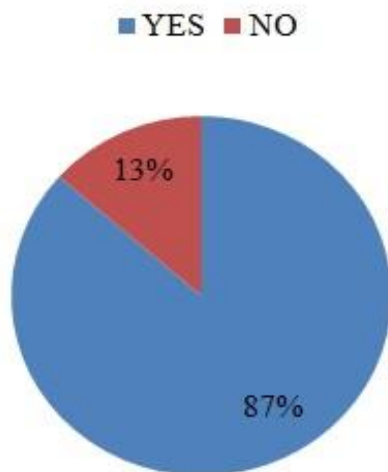


Number of Radio-graphs per day, you are taking

- >7
- 0-1
- '2-4
- 5-7



DO you think CBCT & RVG are better than conventional radio-graphic technique



In this study, 85% of dental specialists said that the minimal exposure of radiation beams were hurtful, 48% realize that radiations could be reflected from the dividers of the room, 79% answered that the minimal exposure to radiations also completely unhealthy for the pregnant ladies .

92% of dentists were aware of NCRP/ICRP recommendation, 77% of the responder preferred to not hold the films with the normal hand during radiology and 79% were preferred to regularly use lead apron. A question asked to every dentists that why they were not using lead apron regularly and 73% of them answered that the weight of the apron is too heavy, 21% answered that they would follow position distance rule & 6% answered that the lead apron were common for all.

85% dentists said that they knew about the radiation danger image, 88% said that they knew about 81 percent replied that rectangle collimators lead to the reduction in the visibility of the individual, 71% showed that they were aware of ALARA principle, 81% said that advanced radiography requires less presentation than customary radiography & 91% said that high speed films diminish patient's exposure. 87% said that CBCT & RVG were better than conventional radiographic technique.

FSFD decreases patient access to skin density by 85%. Their clinical symptoms and stochastic influence have proven 60 percent conscious. 59% of dentists will not allow the patient to keep the image through the presentation on their hands. 88% have said they have faith with utilizing X-Film retention systems for intraoral radiography on individuals, while 98% responded that even at the period of their own clinical operations, they would adhere to the conventions about radiation protection in future..

92% said that paralleling angle technique did not give increasingly exact picture and brings down Thyroid gland activation dosage and eye concentration. The substitution of the x - ray source also for individual replied by 85% of dentists had to be minimized, whilst the patient needed to be stopped moving from the x-ray tube during treatment had replied by 90%. AERB Recommendations for contact to radiation protection were stated by 56 per cent to be conscious. 60 percent of dentists have said the supervisor wants to wear patient reporting badges over the lead tab.

The perfect distance an administrator should stand while performing dental radiology is 6 feet

and 900-1350msaid by 38% of the participants. A question was like this "If you aren't In the future personal work, please follow the radiation safety policy" and

almost 35% choose that 'depend on space availability while 25% choose 'because of financial reason'.

As per the study the number of photographs taking per day were >7 is 14% , 0-6 is 16% , 2-4 is 51% which is highest and 5-7 is 19% .

4. DISCUSSION:

To ensure the radiation wellbeing of the patient and administrator, conventions, standards and rules were given to accomplish with the radiation exposure portion for the patient to minimized the Sensibly Conceivable (ALARA). In India numerous investigations don't give emphasize on the radiation protection. The inclination to the particular peri-apical visualization in initial visits were viewed as per the examination done by Sahab et al. A large number of dental specialists utilized conventional or traditional radiography, comparative perceptions were made in another study done in Mumbai.⁸ It was seen that an exceptionally modest number of dental specialists got intermittent test of X-ray machines and comparable discoveries also seen in an investigation led in states of Punjab and Haryana.⁵ The regular checking of X-ray machine was important to reassure proper radiation exposure with no leakage of harmful rays. Majority of the dentists could not preferred to take photographs in pregnant lady. This finding was a favourable one as according to the suggestions given by Praveen 2013.⁹ It has been found in An investigations directed in Puducherry, Punjab, Noida and Haryana and it was found that a large number of dental specialists utilized round collimators and E-speed exposure/films.^{5,10-12}

60% of the skin exposure was reduced by the utilization of rectangular open ended PID than the rounded.⁹ E-speed film/beams decrease the radiation dose to the half when contrasted with the D-speed pictures and utilization of F-speed films further decrease the radiation dose by 20%. At the point when the participants were interrogated regarding their attention to deterministic and stochastic impact, 60% were said yes. That implies rest 40% were unconscious of the likelihood of presence of radiation natural harm that by equal or more estimation of radiation biological risk impacts.¹³ Position distance rule was followed by only 21% of dentists. The rest were not aware of the potential hazard by the X-rays by not following the proper position distance rule. About 21% of them not use lead apron. A result show that less than 33% of dentists utilized lead apron and also thyroid collars to cover the patients at the time of radiographic test.¹⁴ Another investigation indicated that lone 44% of dental specialists utilized lead apron during radiology which was less than 50%.¹⁵ Education of dentist in this aspect is most essential.

The quality of the image produced depends on the optimal exposure parameters and the periodic calibration of the machine.¹⁶ In this study we found that dentists were not service their

machines in a periodic manner. A result show that 65% of the computerized clients take more

photographs to get more noteworthy assurance about the treatment or to accomplish better diagnosis.¹⁷ But in this study it is found that 87% of them thought CBCT & RVG were better option than conventional radiographic technique.

5. CONCLUSION:

It is essential to follow the rules to limit the radiation exposure however though in dentistry exposure to radiation is minimal. An exceptional emphasis was made on individual observing

as well the working condition according to National council on radiation protection and measurements (NCRP) following International Commission for Radiation Protection (ICRP) and AERB rules while building the radiological unit and checking the individual exposure is valuable in radiation security. Current study emphasizes on the requirement for additional execution of radiation protection standards among dentists in Odisha. Consequently, experts ought to know about the conceivable potential risks associated with utilization of X-rays or radiations and should make a decent attempt to actualize the different defensive measures into practice.

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