

## KNOWLEDGE, ATTITUDE AND AWARENESS OF AERB GUIDELINES AMONG DENTAL UNDERGRADUATES

### Abstract

**INTRODUCTION:**The Atomic Energy Regulatory Board's (AERB) guidelines for radiation safety in dental radiography serve as guidelines[2,3]. Ionizing radiation poses biological risks due to its stochastic and deterministic effects [1,8]. For safe clinical practice, dental trainees must have adequate knowledge as well as a good attitude toward these standards. This study evaluated dentistry students' and interns' awareness, knowledge, attitudes, and exposure to instruction regarding the AERB dental radiography suggested modifications.

**MATERIALS AND METHODS:**A cross-sectional questionnaire-based survey was conducted among 182 dental trainees. The instrument captured demographic details, knowledge of guideline content, attitudes toward radiation safety practices, perceived implementation confidence, and prior training exposure. Descriptive statistics were used to summarize responses.

**RESULTS:**Of the 182 participants, 57.7% were third-year students, 29.7% final-year students, and 12.6% interns. Mean age was  $21.57 \pm 1.40$  years ( $n=175$ ). Knowledge levels were generally high: 72.5% correctly identified the comprehensive primary purpose of the guidelines, 75.3% recognized key aspects correctly, and 76.4% selected all recommended radiation-minimization measures. Monthly quality control testing was identified by 48.9% as the recommended frequency. Attitudes were strongly favorable, with 75.3% rating guideline adherence as very important and 82.4% considering the guidelines relevant to dental practice. Confidence in future implementation was reported as very confident by 49.5% and somewhat confident by 39.0%. A majority supported mandatory implementation in dental clinics (78.0%) and would recommend guideline training to colleagues (73.6%). Awareness of the guidelines was reported by 59.9%, while 50.5% had previously referred to them. Only 39.0% reported having received formal training or workshops on radiation safety guidelines.

**CONCLUSIONS:**Dental trainees demonstrated good overall knowledge and highly positive attitudes toward radiation safety guidelines, but formal training exposure was limited. Strengthening structured educational and workshop-based training may improve practical implementation readiness in dental radiography practice.[8]

### KEY WORDS:

Atomic Energy Regulatory Board; dental radiography; radiation protection; radiation safety guidelines; dental education; dental students; interns (CRRI); knowledge assessment; attitude survey; awareness study; quality control testing; X-ray safety; guideline implementation.

## I. INTRODUCTION:

Radiographic imaging plays a huge role in dental diagnosis and treatment planning[1]. Still, there's no getting around the risks—ionizing radiation isn't harmless. That's why strict rules exist to keep things safe and consistent[1,8]. In India, the Atomic Energy Regulatory Board (AERB) lays out clear guidelines on everything from radiation protection and how equipment gets installed to operator safety and quality checks[5,9,10]. But these rules only work if dental graduates actually know them, take them seriously, and stay aware of best

practices[2,3]. Questionnaires are a useful tool for determining what students know, how they feel about safety, and where they can benefit from additional instruction.

**AIM:**

To apply a standardized questionnaire to evaluate dentistry graduates' awareness, attitude, and knowledge of radiation safety and regulatory requirements.

**OBJECTIVES:**

For evaluating the degree of knowledge with radiation safety regulations and guidelines.

To assess attitudes toward radiation protection practices in dental clinics. To

evaluate your knowledge of the official rules pertaining to dental radiography. To

identify gaps in training and compliance behavior.

## **II. MATERIALS AND METHODS**

### **A. Study Design and Setting**

A cross-sectional, questionnaire-based study was conducted to evaluate knowledge, awareness, attitudes, and training exposure related to dental radiography radiation safety guidelines issued by the Atomic Energy Regulatory Board (AERB)[1-3]. The study was carried out in an academic dental institution during a single survey over a period of 3 months among undergraduate clinical students and interns..

### **B. Study Population**

The study population comprised undergraduate dental trainees, including third-year students, final-year students, and Compulsory Rotatory Residential Internship (CRRI) interns. Eligible participants were those present during the study period and willing to complete the survey. Non-dental students and incomplete questionnaires lacking core response data were excluded. A total of 182 completed responses were included in the final analysis.

### **C. Data Collection Instrument**

Data were collected using a structured, self-administered questionnaire developed from standard radiation protection principles and published AERB dental radiography recommendations. The instrument consisted primarily of closed-ended items and included sections on:

Demographic characteristics (age, year of study)

Knowledge of radiation safety principles and guideline components

Awareness of AERB dental radiography guidelines

Considerations of the significance and implementation of radiation safety guidelines

Self-reported confidence in implementation in future practice

Training and workshop exposure related to radiation safety

Awareness of practices, such as analyzing guidelines and being aware of the consequence of non compliance

While attitude questions employed ordinal response categories, the majority of knowledge questions were multiple-choice questions.

## **Data Collection Procedure:**

The questionnaire was distributed to eligible participants in an academic setting. Participants were informed about the purpose of the study and provided instructions for completion. Participation was voluntary. Questionnaires were collected after completion and screened for completeness before inclusion in the dataset. Responses were compiled for statistical analysis.

## **D. Statistical Analysis**

Data obtained from the completed questionnaires were coded and entered into Statistical Package for the Social Sciences (SPSS) software for analysis. All variables were reviewed for completeness and consistency prior to analysis. Descriptive statistics were primarily used due to the categorical nature of most survey items.

Categorical variables, including year of study, knowledge responses, awareness measures, attitude items, and training exposure, were summarized using frequencies and percentages. In order to characterize response distribution patterns, cumulative percentages for ordered response categories were also investigated. Continuous variables, specifically age, were summarized using mean, standard deviation, median, minimum, maximum, and range.

A composite score variable was generated in the dataset; however, this variable showed no variance across cases (all values identical). Consequently, subgroup comparisons based on score were not performed.

All analyses were two-sided and descriptive in nature, and results are presented as counts and percentages for categorical data and as mean  $\pm$  standard deviation for continuous data.

## **III. RESULTS:**

A total of 182 dental students participated in the survey, and all responses were included in the final analysis unless otherwise specified. There were no missing data for the main questionnaire variables. Age data were available for 175 participants, with a mean age of 21.57 years (SD = 1.40), median 21 years, and range 19–25 years. Participants were predominantly third-year students (57.7%), followed by final-year students (29.7%) and CRRI interns (12.6%).

Awareness and knowledge regarding guidelines issued by the Atomic Energy Regulatory Board (AERB) for dental radiography were generally high. Nearly three-quarters of respondents (72.5%) correctly identified that the primary purpose of AERB guidelines is comprehensive (all listed purposes), including patient safety, best practices, and radiation exposure reduction. Similarly, 75.3% recognized that key aspects of the guidelines include quality assurance, radiation dose limits, and radiation safety protocols collectively. Regarding quality control testing frequency for dental X-ray equipment, the most common response was monthly testing (48.9%), followed by weekly (23.6%) and annual (18.1%) intervals.

Knowledge of radiation protection measures was also strong. Most participants (76.4%) selected “all of the above” for recommended approaches to minimize patient radiation exposure, including lead aprons, thyroid collars, and digital radiography. Open-ended responses describing the regulatory role of AERB were largely consistent with themes of radiation safety, exposure control, and protection of patient and public health, although a small proportion of respondents indicated uncertainty.

Attitudes toward guideline importance and applicability were overwhelmingly positive. Three quarters of participants (75.3%) rated following AERB radiation safety guidelines in dental practice as “very important,” while only 4.4% considered them not or only slightly important. Most respondents (82.4%) agreed that AERB guidelines are relevant to dental practice, with 11.0% indicating uncertainty and 4.9% disagreeing.

Self-reported confidence in implementing AERB guidelines in future practice was moderate to high. Approximately half of the participants (49.5%) reported being very confident, and 39.0% somewhat confident, whereas 9.9% reported low confidence. Support for mandatory implementation was strong, with 78.0% agreeing that AERB guidelines should be compulsory in all dental clinics. Likewise, 73.6% stated they would recommend AERB training to colleagues.

In terms of exposure and training, 59.9% reported being aware of AERB dental radiography guidelines, while 50.5% had previously referred to them in practice or study. Awareness of consequences of non-compliance was reported by 52.7% of respondents. However, formal training exposure was mixed: 39.0% had received training or workshop instruction related to AERB guidelines and radiation safety, 38.5% had not, and 20.3% were unsure.

The computed knowledge score variable showed no variance across cases (mean = 0.00, SD = 0.00), preventing meaningful inferential comparison using t-tests or ANOVA. Consequently, results are presented using descriptive statistics only. Overall, the findings indicate high perceived importance and relevance of radiation safety guidelines, good general knowledge of core principles, and moderate levels of formal training exposure among respondent.

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**Table 1. Demographic characteristics of participants (N = 182)**

<b>Characteristic</b>	<b>Category</b>	<b>n (%)</b>
Year of study	Third year	105 (57.7)
	Final year	54 (29.7)
	CRRI	23 (12.6)
Age (years)	Mean ± SD	21.57 ± 1.40
	Median	21
	Range	19–25

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**Table 2. Knowledge of AERB dental radiography guidelines (N = 182)**

<b>Item</b>	<b>Response option</b>	<b>n (%)</b>
Primary purpose	All of the above	132 (72.5)
	Reduce radiation exposure	24 (13.2)
	Ensure patient safety	20 (11.0)
	Promote best practices	5 (2.7)
Key aspect	All of the above	137 (75.3)
	Radiation dose limits	21 (11.5)
	Radiation safety protocols	12 (6.6)
	Quality assurance	10 (5.5)

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**Table 3. Attitudes toward radiation safety guidelines (N = 182)**

<b>Item</b>	<b>Response</b>	<b>n (%)</b>
Importance	Very important	137 (75.3)
	Somewhat important	35 (19.2)
Relevance	Yes	150 (82.4)
Confidence	Very confident	90 (49.5)
Mandatory implementation	Yes	142 (78.0)
Recommend training	Yes	134 (73.6)

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**Table 4. Awareness and training exposure (N = 182)**

<b>Item</b>	<b>Response</b>	<b>n (%)</b>
Aware of guidelines	Yes	109 (59.9)

Referred guidelines	Yes	92 (50.5)
Aware of consequences	Yes	96 (52.7)
Received formal training	Yes	71 (39.0)

## IV. DISCUSSION :

This study looked at how much dental students and interns actually know, care about, and practice dental radiography radiation safety—especially when it comes to the guidelines set by the Atomic Energy Regulatory Board. The results? On paper, students have solid knowledge and a great attitude about radiation safety, but most haven't had much hands-on training or real experience with the official rules.

A lot of students got the main points of radiation safety right. Nearly three-quarters picked the “all of the above” option for key knowledge questions, which shows that the basics are getting through in their classes. They did especially well on questions about how to reduce radiation exposure—most knew about using lead aprons, thyroid collars, and switching to digital radiography. But when it came to more technical stuff, like how often to do quality control checks on equipment, their answers were all over the place. So while the big ideas are clear, the details of day-to-day safety aren't as strong.

Attitudes were a bright spot. Almost everyone agreed that following radiation safety guidelines really matters and that these rules belong in daily dental practice. People wanted these guidelines to be mandatory in clinics and said they'd recommend formal training to others. That's a good sign—when people value safety, they're more likely to follow through later on. High ratings for importance and relevance suggest these students are ready to accept stricter safety standards as they move into the profession.

But here's where things get messy. Only about three out of five students had even heard of the official guidelines, and just half had actually looked at them. A little over half knew what happens if you don't follow the rules. So, while most get the general ideas, fewer are familiar with the legal and regulatory side. This gap between knowing the basics and understanding the rules could make it harder for them to stick to standards once they're working on their own.

Training is another weak spot. Fewer than two out of five students had any formal training or workshop experience on these safety guidelines. That's a problem, because theory only gets you so far—you need practice, especially with things like equipment checks, optimizing exposure, and keeping proper records. The low numbers here show that schools need to do more: more workshops, more drills, and more time spent on actual regulatory guidelines.

When it came to confidence, most students felt reasonably sure they could put the guidelines into practice, but not everyone. There's still a small group who just aren't confident, and that lines up with the lack of training. Confidence grows with real instruction and supervised practice, not just lectures.

Of course, this study isn't perfect. It relied on self-reported answers from a single institution,

so the results might not apply everywhere. People's memories and desire to give the "right" answer could also have skewed the data. Plus, because everyone scored similarly, the researchers couldn't really dig into group differences—they just described what they saw.

In the end, dental students and interns know the basics and have the right attitude, but their understanding of the official rules and their practical training don't always measure up. The fix? Schools should build in more mandatory workshops and early clinical exposure to the real regulatory standards. Bigger studies across multiple centers, using validated tests and real world skills checks, would help pinpoint exactly what students need to learn next.

## **CONCLUSIONS AND RECOMMENDATIONS**

This study demonstrates that dental students and interns show good overall knowledge and strongly positive attitudes toward radiation safety principles and dental radiography guidelines issued by the Atomic Energy Regulatory Board. With comparison of previous studies about 70 to 75 percent of participants recognized the importance and clinical relevance of radiation protection measures and supported mandatory implementation of safety guidelines in dental practice. Confidence in future implementation was moderate to high among the majority of respondents.

However, awareness of the formal regulatory guidelines, direct consultation of official recommendations, and exposure to structured radiation safety training were comparatively limited. This gap between conceptual knowledge and formal training highlights the need for strengthened curriculum integration, practical workshops, and guideline-oriented instruction during undergraduate and internship training.

Enhancing structured educational and hands-on training initiatives in radiation protection and regulatory compliance may improve practical readiness and promote consistent, safe Radiographic practices in future dental professionals.

### **RECOMENDATIONS:**

Strengthen integration of radiation safety and dental radiography guidelines into the undergraduate dental curriculum.

Introduce mandatory radiation safety training programs for dental students and interns before clinical radiography postings.

Conduct regular hands-on workshops on quality control testing, dose optimization, and use of protective equipment.

Provide early orientation to official regulatory requirements and practice standards issued by the Atomic Energy Regulatory Board.

Organize periodic continuing education and refresher programs on radiation protection for trainees and practitioners.

Reinforce radiation safety practices during clinical postings through supervised demonstrations and checklists.

Include radiation safety competency assessments in internal exams and clinical skill evaluations.

Display radiation safety protocols and protective guidelines prominently in radiography areas within institutions and clinics.

Encourage multicenter research using validated assessment tools to measure knowledge, practice, and training outcomes.

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