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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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CORRELATION BETWEEN RADIATION SAFETY TRAINING AND COMPLIANCE WITH RADIATION PROTECTION PRACTICES: A CROSS-SECTIONAL STUDY

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Abstract.

Background: Dentists use different imaging methods in the diagnosis and treatment of dental diseases, but exposures to ionizing radiation is associated with health risks. Education and structured training are widely regarded as essential strategies for improving radiation safety behavior.

Objective: To evaluate the correlation between radiation safety training and adherence to radiation protection practices among radiology personnel.

Methods: A cross-sectional analytical study was conducted among 402 professionals of dental staff who perform dental intraoral imaging in different dental centers in Tbilisi. Participants were categorized into trained (n = 156) and untrained (n = 246) groups based on prior radiation safety training. Seven radiation protection practices were assessed using dichotomous variables. Bivariate analysis was performed using the Chi square (χ^2) test. Effect size was assessed using Cramer's V, and odds ratios (OR) were calculated to estimate the strength of associations.

Results: Statistically significant associations were observed between radiation safety training and all evaluated radiation protection practices ($p < 0.001$). Strong associations were found for dosimeter use ($\chi^2 = 97.53$, Cramer's V = 0.46, OR ≈ 9.0) and compliance with distance rules ($\chi^2 = 103.00$, Cramer's V = 0.53, OR ≈ 11.75). Very strong correlations were identified for providing lead aprons to patients ($\chi^2 = 197.65$, Cramer's V = 0.71, OR ≈ 38.6). Moderate correlations were observed for exposure parameter optimization and updating radiological history.

Conclusion: Radiation safety training has a significant and meaningful impact on adherence to radiation protection practices. Regular and mandatory training programs are strongly recommended to enhance occupational and patient safety in radiology departments.

Key words. Radiation safety, training, radiology personnel, Chi square test, odds ratios, radiation exposure.

Introduction.

Ionizing radiation is widely used in diagnostic imaging and interventional procedures, providing substantial clinical benefits while posing potential health risks to both patients and healthcare workers [1].

Dental practitioners rely on radiographic imaging for the diagnosis and management of oral diseases more frequently than any other group of healthcare professionals [2]. According to estimates from the European Commission, dental radiographic examinations account for approximately 32% of all conventional radiography procedures performed in Europe, with an average of 352 dental X-ray examinations per 1,000 individuals annually [3,4].

Radiation protection in diagnostic imaging is based on three fundamental principles: justification, optimization, and dose limitation. All radiographic procedures must comply with these principles to ensure patient safety [3].

Much of the ongoing advancement in X-ray technology and radiation protection protocols has been driven by legitimate concerns regarding patient and staff safety. These improvements are largely informed by the work of international bodies such as the ICRP, UNSCEAR, and other authoritative organizations. Low levels of radiation, like those employed in diagnostic procedures, are also naturally present in the environment and everyday life. Although the actual risk associated with such low doses remains debated, the principles of ALARA, ALADA (As Low as Diagnostically Acceptable), and ALADAIP (As Low as Diagnostically Acceptable, being Indication-oriented and Patient-specific) continue to guide clinical practice, emphasizing a balance between the diagnostic value of X-ray imaging and minimizing radiation exposure. When appropriately justified, the benefits of diagnostic radiography generally outweigh the potential risks from low-dose radiation [5,6].

When appropriately prescribed and properly conducted, dental radiographic examinations offer substantial diagnostic benefits; however, exposure to ionizing radiation is not entirely without risk. Prolonged or inappropriate exposure to ionizing radiation is associated with deterministic and stochastic effects, emphasizing the need for strict adherence to radiation protection principles [3,7].

Intraoral and extraoral dental imaging techniques generally involve relatively low radiation doses, they may still contribute to the development of stochastic effects [8]. These effects are believed to have no threshold dose, in accordance with the linear non-threshold model. Consequently, even minimal radiation exposure may increase the probability of adverse effects, with the likelihood rising proportionally to the absorbed dose, while the severity of the outcome remains dose-independent [1].

In Georgia, dental radiographic procedures are performed by dentists, dental assistants, and radiographers under the supervision of a dentist. In most dental facilities, dentists bear primary responsibility for radiographic practices and radiation safety management.

International guidelines highlight the importance of education and continuous professional training in minimizing radiation exposure and promoting safe radiological practice [9-11].

Despite established recommendations, studies continue to report suboptimal compliance with radiation protection measures, particularly in dental radiology settings [7,12].

Our previous study assessing the attitude of dental staff toward radiation safety in Georgia found low levels of formal training and inconsistent compliance with protective measures, highlighting a critical gap in radiation safety awareness among healthcare personnel [12]. Radiation safety training aims to improve knowledge, risk perception, and practical skills related to dose optimization, personal protective equipment, and procedural safeguards [9,11]. However, evidence regarding the extent to which training translates into consistent clinical behavior remains limited [13].

The present study investigates the correlation between radiation safety training and adherence to key radiation protection practices among dental staff who perform dental intraoral imaging, building on prior findings in the dental sector, with the aim of providing evidence based recommendations relevant to clinical practice and policy development [10,12].

Materials and Methods.

Study Design and Population:

A cross-sectional analytical study was conducted among dental staff working in different dental centers in Tbilisi and who take dental radiology. A total of 402 participants were included in the analysis. The respondents were aged 22-66 years.

In this study, a total of 402 standardized anonymous questionnaires were distributed among dental personnel involved in performing intraoral dental imaging, including dentists, dental assistants, radiographers, and other healthcare professionals. The questionnaire consisted of 15 items and was administered anonymously to encourage honest and unrestricted responses. Participants were not informed about the identity of the study authors.

The participants were asked about radiation protection of patients and dental staff, attitudes and behaviors regarding radiation protection. The questionnaire also included questions about the socio-demographic characteristics of the participants and the management of radiographic waste.

Participants were classified as «trained» who have completed postgraduate training certified by a certificate, attestation, or other official administrative document and «untrained» participants, defined as having never undergone postgraduate radiation protection training.

Participants were divided into two groups according to self reported completion of radiation safety training: trained (n = 156) and untrained (n = 246).

Data Collection:

Data were collected using a structured standardized anonymous questionnaire assessing adherence to radiation protection practices. The following practices were evaluated as binary variables (yes/no): dosimeter use, optimization of exposure parameters (kV/mAs), updating patient X ray history, compliance with distance rules during exposure, avoidance of film holding and provision of lead aprons to patients.

Statistical Analysis:

Data analysis was performed using SPSS software. Descriptive statistics were used to summarize frequencies and proportions.

Bivariate associations between radiation safety training and each radiation protection practice were assessed using the Chi square (χ^2) test of independence.

Effect size was estimated using Phi coefficient/Cramer's V.

Odds ratios (OR) were calculated to quantify the strength of associations. Statistical significance was set at $p < 0.05$.

Results.

Participant Characteristics:

Of the 402 participants, 156 reported having completed postgraduate radiation safety training certified by a certificate, attestation, or other official administrative document-«trained» group. 246 participants have never received postgraduate radiation protection training-«untrained» group.

Correlation between postgraduate radiation protection Training and Radiation Protection Practices:

A statistically significant association was observed between postgraduate radiation protection training and all assessed radiation protection practice $p < 0.001$ (Table 1).

Dosimeter use was reported by 69% of trained participants compared with 20% of untrained participants ($\chi^2 = 97.53$, $p < 0.001$), indicating a strong association (Cramer's V = 0.46). Trained participants were approximately nine times more likely to use dosimeters than their untrained counterparts (Table 2).

Compliance with distance rules showed a similarly strong correlation with training status ($\chi^2 = 103.00$, $p < 0.001$, Cramer's V = 0.53), with nearly twelve-fold higher odds among trained personnel.

Very strong associations were observed for providing lead aprons to patients ($\chi^2 = 197.65$, $p < 0.001$, Cramer's V = 0.71).

Moderate but statistically significant associations were identified for optimization of exposure parameters ($\chi^2 = 16.87$, $p < 0.001$, Cramer's V = 0.21) and updating radiological history ($\chi^2 = 13.67$, $p < 0.001$, Cramer's V = 0.19) (Table 2).

Discussion.

The present study demonstrates a strong and statistically significant correlation between postgraduate radiation protection training and adherence to radiation protection practices among dental staff [11]. These findings reinforce the critical role of structured education in translating radiation protection principles into routine clinical behavior [9,13].

These results are consistent with our previous study evaluating the attitude of dental staff toward radiation safety in Georgia, which reported low postgraduate radiation protection training participation and suboptimal compliance with protective measures [12]. By extending the investigation to radiology personnel, the present study provides quantitative evidence that structured radiation safety postgraduate radiation protection training significantly improves adherence to protective practices [13].

Table 1. *Distribution of Radiation Protection Practices by Training Status.*

Practice	Trained (%)	Untrained (%)	Total (N)
Dosimeter use	69	20	402
kV/mAs optimisation	64	43	402
X-ray history updating	68	49	402
Distance rules compliance	86	34	402
Film holding avoidance	57	14	402
Lead apron use for patient	89	17	402

Table 2. *Bivariate Analysis of Training and Radiation Protection Practices.*

Practice	Chi-square (χ^2)	p-value	Odds Ratio (OR)	Cramer's V
Dosimeter use	97.53	<0.001	9.0	0.46
kV/mAs optimisation	16.87	<0.001	2.36	0.21
X-ray history updating	13.67	<0.001	2.19	0.19
Distance rules compliance	103.00	<0.001	11.75	0.53
Film holding avoidance	84.01	<0.001	8.28	0.42
Lead apron use for patients	197.65	<0.001	38.6	0.71

In contrast, moderate correlations for exposure parameter optimization and updating radiological history suggest that institutional factors such as equipment availability, workload, and standardized protocols may also influence compliance [4].

Practices requiring consistent behavioral discipline—such as dosimeter use and adherence to distance rules—showed particularly strong correlations with training status [13].

The very strong association observed for patient lead apron use underscores the role of postgraduate radiation protection training in fostering a patient centred radiation safety culture. The exceptionally low lead apron utilization rate of 17% in the «untrained» group is a striking and potentially troubling result that warrants critical examination. While this disparity may reflect insufficient knowledge of radiation protection principles due to the absence of formal postgraduate training,

Furthermore, the term “untrained” encompasses a heterogeneous population, and the observed difference may be influenced by confounding factors such as years of clinical experience, workplace safety culture, availability of protective equipment, or institutional enforcement of radiation safety protocols.

The use of lead aprons in dental radiology remains a fundamental component of patient radiation protection, particularly in intraoral imaging, where repeated exposures may occur over time. Although the radiation dose associated with dental radiographic procedures is generally low, the cumulative effect of ionizing radiation should not be underestimated, especially in vulnerable populations such as children, pregnant patients, and individuals requiring frequent radiographic follow-up. Lead aprons serve to reduce unnecessary exposure to radiosensitive organs located outside the primary beam, thereby reinforcing the principle of dose optimization and adherence to the ALADAIP concept.

Despite ongoing debate regarding the routine necessity of lead apron use in modern dental radiology—given advances in digital imaging systems, rectangular collimation, and improved beam filtration—international radiation protection guidelines continue to emphasize its role as an additional protective measure, particularly when thyroid shielding is not routinely applied or when equipment and procedural standards are suboptimal. Importantly, consistent use of lead aprons also reflects a culture of safety and professional responsibility, reinforcing patient trust and ethical standards in clinical practice.

The low utilization of lead aprons observed in this study therefore raises concerns not only regarding gaps in radiation protection knowledge but also regarding compliance with established safety practices. This finding highlights the need for reinforced postgraduate education, clear institutional protocols, and regular auditing of radiation safety measures to ensure uniform implementation across dental settings.

Mandatory, recurrent postgraduate radiation protection training programs supported by institutional policies and regular audits are therefore essential to sustainably improve occupational and patient safety.

Limitations.

This study relied on self-reported data, which may be subject to reporting bias. In addition, the cross-sectional design does not allow causal inferences.

Conclusion.

This study demonstrates a significant correlation between radiation safety training and adherence to recommended radiation protection practices among dental staff. These findings highlight the critical role of structured educational programs in improving compliance with safety protocols and reducing occupational and patient radiation exposure. Promoting regular training and reinforcing institutional policies may strengthen this positive correlation, ultimately fostering a culture of radiation safety within dental practices. Particular emphasis should be placed on the justification and optimization of dental radiological procedures to avoid unnecessary exposure to ionizing radiation.

Accordingly, the academic preparation, professional postgraduate radiation protection training, qualifications, and

competence of healthcare professionals are fundamental to ensuring radiation safety in dental practice.

Author's Note.

The standardized questionnaire was administered anonymously; therefore, participants were not aware of the identity of the authors or the investigators conducting the study, which minimized the risk of «desirable responses».

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