An Assessment on the Knowledge, Attitude & Practice Towards Using of Advanced Radiographic Techniques & Radiation Safety Measures Among Dental Professionals in Santosh Dental College, Ghaziabad, Delhi NCR

Bhawana joshi [1], Dr Ashish Kumar Shukla[2], Neelam rao [3], Anjali Jain [4], Ashish kumar [5]
[1,2,3,4,5]*Santosh deemed to be university*

Abstract—**This study aims to evaluate the knowledge, attitude, and practices (KAP) of dental professionals toward the use of advanced radiographic techniques and radiation safety measures in Santosh Dental College, Ghaziabad. A cross-sectional descriptive questionnaire-based approach was adopted among dental interns, postgraduate students, and faculty members. A total of 362 participants were assessed to determine their awareness, application, and perception of radiation safety guidelines and advanced imaging modalities such as digital radiography, panoramic imaging, and Cone Beam Computed Tomography (CBCT). The study revealed moderate awareness levels, with significant gaps in radiation safety practices and inconsistent adherence to ALARA (As Low As Reasonably Achievable) principles. The findings emphasize the need for structured radiation protection training and standardized protocols to promote safer radiographic practices among dental professionals.**

Index Terms—**Radiation safety, Dental radiography, Cone Beam CT, Digital imaging, KAP study, Radiation protection, Santosh Dental College**

I. INTRODUCTION

Dental radiography plays an essential role in diagnosis and treatment planning within dentistry. With advancements such as digital radiography and CBCT, diagnostic accuracy has improved, but so has the need for radiation protection. The principle of ALARA (As Low As Reasonably Achievable) is fundamental in minimizing unnecessary exposure to patients and operators. In India, dental radiography represents a significant fraction of diagnostic imaging, yet awareness and adherence to radiation safety protocols remain inconsistent. This study aims to explore the current knowledge, attitudes, and practices among dental professionals regarding advanced radiographic techniques and safety standards. To address these issues systematically, the Knowledge, Attitude, and Practice (KAP) model serves as a valuable framework for evaluating the educational and behavioral readiness of healthcare professionals concerning radiation safety. This review applies the KAP approach to assess the current state of awareness and implementation of radiographic safety practices among undergraduate students, postgraduate trainees, and faculty members at Santosh Dental College, Ghaziabad. The aim is to identify existing strengths and shortcomings in knowledge dissemination and to propose strategic interventions to enhance the overall culture of radiation safety in dental education and practice.[3]

Through this institutional case study, the paper seeks not only to contribute to the academic discourse on dental radiology and safety but also to support the development of policy recommendations and training modules that ensure responsible use of radiographic technology in alignment with global standards.

II. AIM AND OBJECTIVES

**Aim: ** To assess the knowledge, attitude, and practice regarding advanced radiographic techniques and radiation safety among dental professionals.

**Objectives: **

1. Evaluate the knowledge level of dental professionals regarding advanced imaging techniques.
2. Assess their attitude toward radiation protection and dose minimization practices.

3. Identify gaps in practice and recommend safety improvements.

III. RESEARCH METHODOLOGY

A descriptive cross-sectional study was conducted among dental professionals at Santosh Dental College, Ghaziabad, Delhi NCR. Participants included interns, postgraduate students, and faculty involved in clinical radiographic procedures. A total of 362 participants were recruited using convenience sampling. The study period spanned from August 2023 to June 2024.

A validated questionnaire was distributed electronically and manually, covering demographic data, awareness of advanced radiographic modalities, and compliance with radiation protection measures. Data were analyzed using SPSS software to determine knowledge scores and correlations between qualification level, experience, and adherence to safety protocols.

IV. RESULTS

Of 362 participants, 54% were female and 46% male. Postgraduate students formed the majority (60%), followed by interns (25%) and faculty members (15%). Digital radiography was used by 72%, and CBCT by 45%. However, only 40% routinely used protective devices such as thyroid collars or lead aprons. 65% demonstrated good theoretical understanding of radiographic principles, while 35% lacked sufficient awareness of radiation protection. Although 80% recognized the importance of radiation safety, only 38% applied the ALARA principle in routine clinical practice.

A positive correlation was observed between educational level and safety compliance. The results indicate an urgent need for enhanced training and consistent monitoring of radiological safety standards in dental institutions.

V. DISCUSSION

The study identified gaps between awareness and practice among dental professionals concerning radiation protection. Even though most participants acknowledged the importance of radiological safety, actual implementation was inconsistent. Similar trends have been reported globally, where lack of continuous education and poor enforcement of safety policies contribute to suboptimal compliance.

Institutional programs focusing on radiation safety audits, ALARA reinforcement, and periodic hands-on training are necessary. Integrating structured radiological protection modules into the curriculum could significantly improve awareness and long-term adherence to safe imaging practices.

VI. CONCLUSION

This research concludes that while awareness of advanced radiographic techniques among dental professionals is moderate, adherence to radiation safety standards remains inadequate. Mandatory inclusion of radiation protection training in academic programs and regular professional workshops can strengthen safe imaging culture in dental practice.

VII. RECOMMENDATIONS

1. Integrate radiation safety modules in undergraduate and postgraduate curricula.
2. Conduct regular workshops and CDE programs on radiation protection.
3. Implement strict compliance monitoring for radiation safety guidelines.
4. Provide adequate protective gear in all dental radiographic setups.
5. Encourage research on dose optimization and safety enhancement.

REFERENCES

[1] Examinations DR. Recommendations for patient selection and limiting radiation exposure. AMERICAN DENTAL ASSOCIATION-Council on Scientific Affairs. REVISED. 2012. 2.
[2] Panwar A, Gupta S, Nagaraju K, Malik S, Goel S, Sharma A. Awareness of radiation protection among dental practitioners in UP and NCR region, India: A questionnaire-based study. Journal of Oral and Maxillofacial Radiology. 2022 Jan 1;10(1):13-8.
[3] Tsapaki V. Radiation protection in dental radiology–Recent advances and future directions. Physica Medica. 2017 Dec 1;44:222-6.
[4] Leitz W, Grøn P, Servomaa A, Einarsson G, Olerud H. Nordic working group for medical x-

ray diagnostics: Diagnostic reference levels within x-ray diagnostics–experiences in the Nordic countries. Radiation protection in the 2000s–Theory and practice. 2002 Aug 25:256.

[5] Lewis R, Plowman PN, Shamash J. Malignant disease. In: Feather A, Randall D, Waterhouse M, editors. Kumar & Clark's clinical medicine. 10th ed. London: Elsevier; 2021. p. 95-136.

[6] Vandenberghe B, Jacobs R, Bosmans H. Modern dental imaging: a review of the current technology and clinical applications in dental practice. European radiology. 2010 Nov;20:2637-

[7] International Atomic Energy Agency (IAEA). Implementation of the International Code of Practice on Dosimetry in Diagnostic Radiology (TRS 457): Review of Test Results. Vienna; 2011.

[8] Mahasneh AM, Al-Mousa DS, Khabour OF, Al-Sa'di AG, Alakhras M. Attitudes and knowledge of dental radiography amongst students of dentistry and related fields. European Journal of Dental Education. 2022 Nov;26(4):801-11.

[9] Sujatha P, Kanitkar AA, Ranjeri S, Annu A, Patil A, Biradar J, Biradar Sr JM. Assessment of Knowledge and Attitude Regarding Teledentistry Among Dental Professionals: A Cross-Sectional Study. Cureus. 2024 Mar 11;16(3).

[10] Balsaraf SV, Chole RH. Knowledge, awareness, and attitude among practicing dentists about teledentistry in Indore, Central India. Journal of Indian Association of Public Health Dentistry. 2015 Oct 1;13(4):434-7. 79

[11] Yurt A, Ayrancıoğlu C, Kılınç G, Ergönül E. Knowledge, attitude, and behavior of Turkish dentists about radiation protection and radiation safety. Dentomaxillo facial Radiology. 2022 Jan 1;51(1):20210120

[12] Knowledge, attitude, and practice of general dentists toward cone-beam computed tomography and dental radiology. Journal of Datta Meghe Institute of Medical Sciences University. 2019 Jul 1;14(3):226-31.

[13] Galav A, Borah M, Sugandhi C, Rathod R, Satija N, Chauhan M. Attitude and practice of dental professionals towards using of advance radiographic technique: a cross-sectional descriptive study. J. res. dent. 2016:134-9.

[14] Hasan A, Khan JA, Ali B, Afshan Z, Shakir MN, Shah SY. Practices of Dentists about Digital Techniques in Dental Radiology and Radiographic Safety. Journal of the Pakistan Dental Association. 2019 Oct 1;28(4).

[15] Mahabob MN, Alabdulsalam M, Alabduladhem A, Alfayz S, Alzuriq A, Almomin AM. Knowledge, Attitude and Practice about radiation safety among the undergraduates in Eastern province dental college. Journal of Pharmacy and Bioallied Sciences. 2021 Nov 1;13(Suppl 2):S1442-7.

[16] Gowda PB, Lilly BK, Sushanth VH, Prabhu C A, Prakash VH, Basavraj SP. Knowledge, Attitude, and Perception (KAP) of Dental Undergraduates and Interns on Radiographic Protection in Davangere City: A Questionnaire-based Cross-sectional Study. CODSJournal of Dentistry. 2023 Oct 3;14(2):52-6.

[17] Gowda PB, Lilly BK, Sushanth VH, Prabhu CA, Prakash VH, Basavraj SP. Knowledge, Attitude, and Perception (KAP) of Dental Undergraduates and Interns on Radiographic Protection in Davangere City: A Questionnaire-based Cross-sectional Study. CODSJournal of Dentistry. 2023 Oct 3;14(2):52-6.

[18] Hasan A, Khan JA, Ali B, Afshan Z, Shakir MN, Shah SY. Practices of Dentists about Digital Techniques in Dental Radiology and Radiographic Safety. Journal of the Pakistan Dental Association. 2019 Oct 1;28(4).

[19] Arnout 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 May;1(1):1-7.

[20] Gowda PB, Lilly BK, Sushanth VH, Prabhu CA, Prakash VH, Basavraj SP. Knowledge, Attitude, and Perception (KAP) of Dental Undergraduates and Interns on Radiographic Protection in Davangere City: A Questionnaire-based Cross-sectional Study. CODSJournal of Dentistry. 2023 Oct 3;14(2):52-6. 21. Ali SD, Hussein LM, Twair AM. Knowledge, attitude, and perception of dental undergraduates and interns on radiographic protection in Iraq. 80

[21] American Dental Association Council on Scientific Affairs. The use of dental radiographs: update and recommendations. The Journal of the American Dental Association. 2006 Sep

1;137(9):1304-12. 23. Torresan TT, Rodrigues IC, Poletto MC, Bringmann DR, Flores IL, Gamba TD. Radioprotection in dentistry: knowledge and practices. Research, society and development. São Paulo. Vol. 10, no. 14 (2021), e583101422429, 14 p.. 2021.

[22] Liappis E, Adamopoulou MR, Angelopoulou N, Diakaki N, Vafeidou I, Papadeli C. Dentists' perceptions and Methods regarding the radiographic examinations and radiation protection: A 2022 research in Thessaloniki, Greece. Balkan Journal of Dental Medicine. 2023;27(3):167-75.

[23] Hussein RE, Hashim NT, Awooda EM. Knowledge, awareness and practice of sudanese dentists towards oral radiology and protective guidelines. IOSR J Dent Med Sci. 2016;15(10):79-83.

[24] Ali SD, Hussein LM, Twair AM. Knowledge, attitude, and perception of dental undergraduates and interns on radiographic protection in Iraq. American Dental Association Council on Scientific Affairs. The use of dental radiographs: update and recommendations. The Journal of the American Dental Association. 2006 Sep 1;137(9):1304-12.