

Awareness of Radiation protection measures of Dental Imaging among Private Dental practitioners in Lucknow City- A Questionnaire Survey

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Abstract

Background: *Dental Imaging is a helpful aid in the diagnosis of maxillofacial lesions. The dentists have to assess benefits against its hazards and be aware of different radiation protection measures.*

Aim and Objective: *The aim of this study was to determine the dentist's knowledge and practice about dose reduction technique and quality of dental radiographic measures among private dental practitioners in Lucknow city.*

Material and Methods: *The survey was performed on 100 private dental practitioners from Lucknow city, India. Information about radiation protection taken up by them in their dental clinics, radiographic equipment, technique & processing they used was obtained with a questionnaire survey. A written questionnaire was distributed by visiting each dental clinic among 100 private dental practitioners. Dentists were explained about the purpose of the research. A second follow up was carried out to collect the completed questionnaire.*

Result: *The results show that the dentist's behavior regarding oral radiology safety standards are not satisfactory in Lucknow population.*

Conclusion: *Attempts should be made to minimize any unnecessary radiation and to improve dentist's knowledge about radiation dose reduction technique. Continuing educational programs can help to improve the radiation safety for the operators.*

Key Words: *Dental imaging, Awareness, Radiation protection, Survey.*

Introduction

We live in a sea of radiations. We are constantly exposed to naturally occurring ionizing radiation i.e., background radiation and also exposed to ionizing radiation from manmade sources, mostly through medical procedures. On an average, doses from a diagnostic X-ray are much lower, in dose effective terms, than the natural background radiation.^[1]

Radiation has become a part of modern living, reaching every segment of our society. The primary risk from dental radiography is radiation induced cancer. The literature on possible harmful effects of professional diagnostic exposure for dentists is not consistent. The risk involved with dental radiography is certainly small in comparison with many other risks that are a common part of everyday life. However, no basis exists to assume that it is zero. Also, the biologic effects of ionizing radiation absorbed during dental radiography are uncertain.^[2,3]

The radiographic examination used in all fields of medical services and contributes to the promotion of the health, both individually and nationally. Radiographic examination plays an essential part of dental practice. Certain amount of radiation is inevitably delivered to patients, it should be as low as reasonably achievable (ALARA). Dental practice has its own way of radiation exposure. The practicing dentist differs from medical colleagues as he exposes, processes and interprets the radiograph. Though the exposure is minimal it is very important to reduce the radiation to avoid the accumulated dose to the dentist in their lifetime.

International Commission for Radiation Protection (ICRP) is the regulatory body which lays down norms for radiation protection at the international level. In India, it is the Atomic Energy Regulatory Board (AERB) which provides the norms for radiation protection.

AERB recommends norms for permissible doses of radiation from X-ray tubes, the shielding required for the walls of an X-ray tube room, the

lead equivalent shielding apparel to be worn by radiation workers and lays down safe dose limits for radiation workers and for the general public.^[5]

Before undertaking any radiological examination, it is important that the provider understands the potential risks and the benefits of radiation. The risks can be stochastic (of which probability increases with dose) and deterministic (of which severity increases with dose).^[1] Cancer induction and genetic effects are stochastic effects and cataracts, blood dyscrasias and impaired fertility are examples of deterministic effects.

Principles of radiation protection

The current radiation protection standards are based on 3 general principles: Justification of a practice, optimization and dose limitation.^[5,6]

Although the radiation dose levels in dental practice are relatively low, one should consider the cumulative effect of repeated exposures. There should be a striving for radiation protection measures in the private dental offices.

With this background, we performed a survey in the private dental offices to gain insight in the attitude of the Lucknow dentists towards radiation protection.

Aim and Objective

To determine to what extent dentists in Lucknow comply with commonly accepted measures to reduce radiation dose to patients as well for the operators.

Inclusion Criteria: Dentists running their own private dental clinic (General Practitioner or Specialist)

Exclusion Criteria: Dentists who don't run their private dental clinic

Materials and Methods

The survey was performed on 100 dental practitioners from Lucknow City, India.

A questionnaire consisting of 26 questions were prepared with the following sections:

- Radiographic equipment and techniques
- Method of the patient and personnel protection
- Processing methods

A written questionnaire was distributed by visiting each dental clinic among 100 private dental practitioners. Dentists were assured about the anonymous processing of the questionnaire, explaining the purpose of the research. A second follow-up was carried out to collect the completed questionnaire.

Results

- **Age:** In our study respondents 44.4% below 30 years and 34% were above 30 years and 14.1% above 35.
- **Gender:** The present study shows among 100 respondents, 75.8% were Females 44.4% and 24.2% were males.
- **Duration of Practice:** In the present study 44.4% had practiced dentistry for 3-4 yrs. 23.2% had 5-6 years of practice and 14.1% had practiced for >6 years.
- **Film Holders:** The present study revealed Film holders are being used by 70.5% of dentists.
- **Lead Apron:** In our study only 38.6% reported the use of lead apron.
- **Separate Radiographic Room:** In our study, 60.9% of dental practitioners have separate radiographic room.
- **Monitoring Radiation Exposure:** Our study shows, 18.2% of the dentist used badges for monitoring radiation exposure.

Discussion

- **Age:** In our study respondents 44.4% below 25-30 years and 34% were above 30-35 years and 14.1% above 35. [Graph 1] Similar study conducted by **S Shahab et al** respondents 80% were aged 25-45 years, 45% of them were aged 38 years and 55% were aged >38 years.
- **Gender:** The present study shows among 100 respondents, 75.8% were Females 44.4% and 24.2% were males. [Graph 1] Similar study conducted by **S Shahab et al** where 56% were males and 44% were females.
- **Duration of Practice:** In the present study 44.4% had practiced dentistry for 3-4 yrs 23.2% had 5-6 years of practice and 14.1% had practiced for >6 years. [Graph 2] Similar, study conducted by **S Shahab et al** where the 57% had practiced dentistry for <10 years, 26% had 10-20 years of practice and 17% had practiced for >20 years.
- **Film Holders:** The present study revealed

Film holders are being used by 70.5% of dentists. [Graph 3]

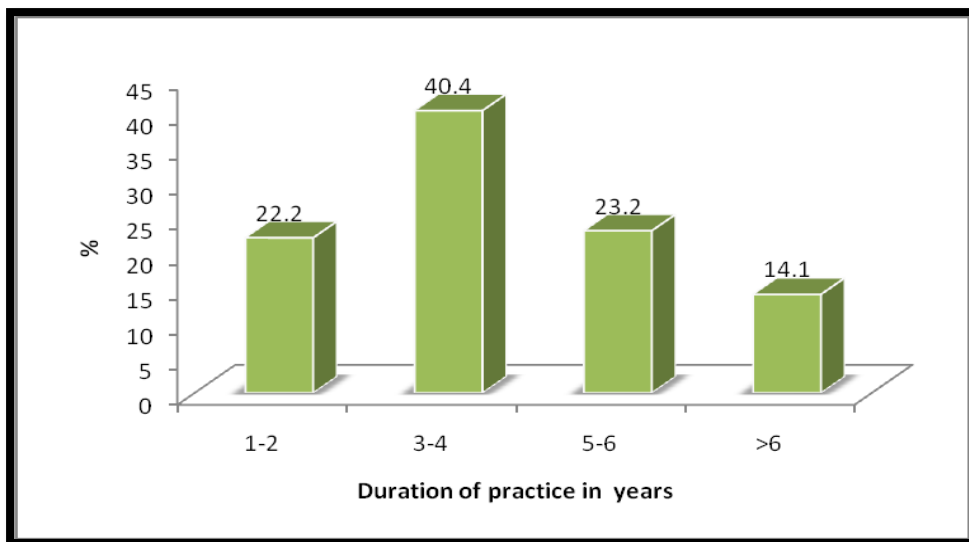
Similar study was conducted by **Swarna Y M et al** and **S Shahab et al** showed 45% and 43% of the dental practitioners used film holders.

- **Lead Apron:** In our study only 57% reported the use of lead apron [Graph 3] whereas study conducted by Swarna Y M et al and Najla F et al reported that 88% and 46% did not wear a lead apron.
- **Separate Radiographic Room:** In our study 60.9% of dental practitioners have separate

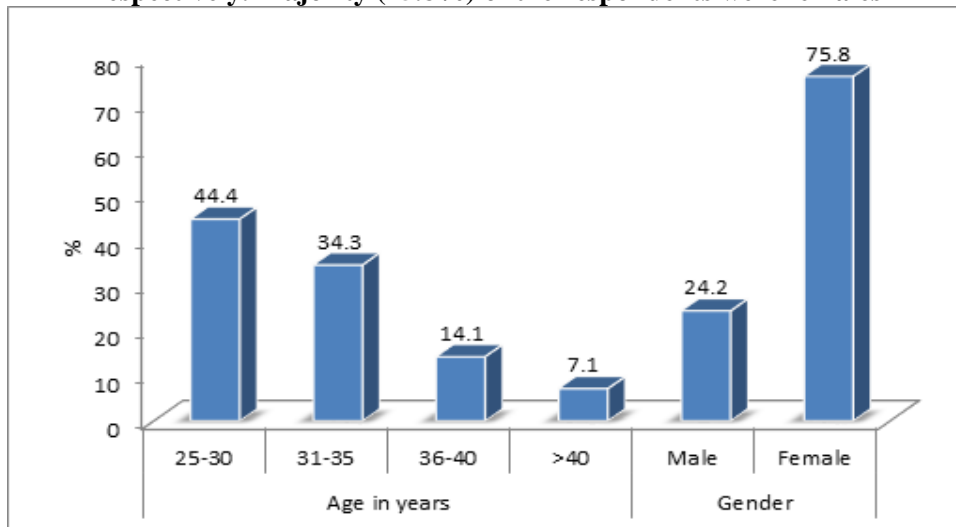
radiographic room[Graph 4] and similar study conducted by G. Sitra M et al showed that 40% of the dentists have separate radiographic room.

- **Monitoring Radiation Exposure:** Our study shows 18.2% of the dentist used badges for monitoring radiation exposure. [Graph4]
However, study conducted by **Swarna Y M et al** and **Najla F** stated that 40% and 32% of the dental practitioners used systems such as film badges for monitoring radiation exposure to personnel.

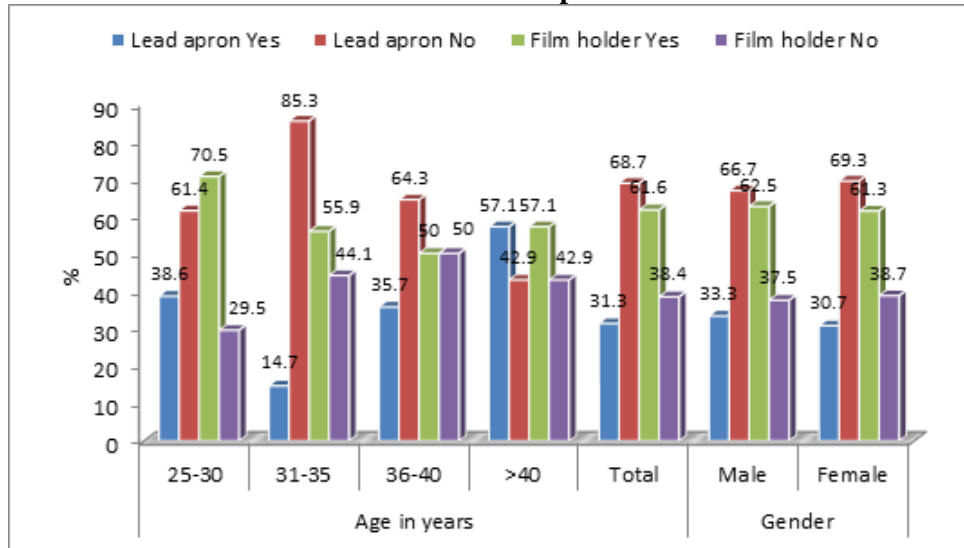
Graph 1: More than one third (40.4%) of the respondents were practicing for 3-4 years followed by 5-6 (23.2%) years, 1-2 (22.2%) years and > 6 (14.1%) years



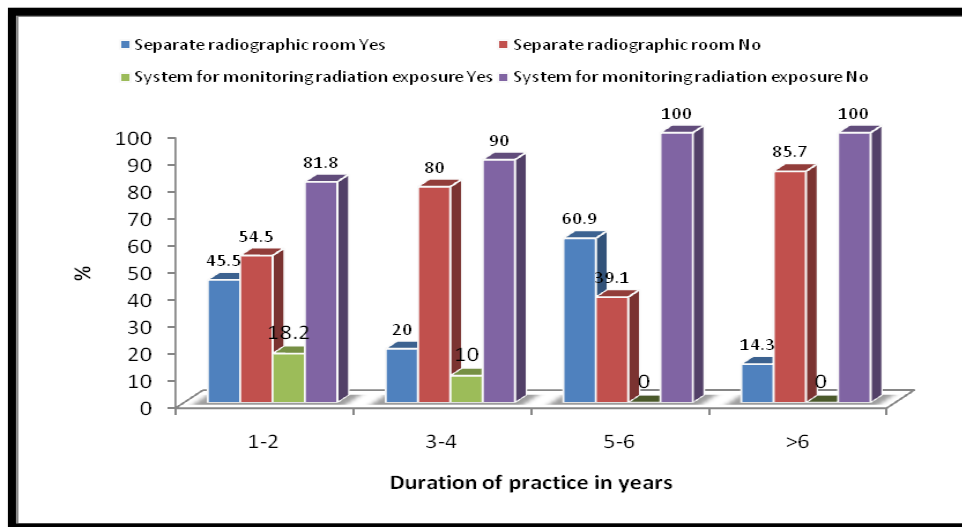
Graph 2: More than third of the respondents were in the age groups 25-30 (44.4%) years and 31-35 (34.3%) years. However, 14.1% and 7.1% were in the age 36-40 years and above 40 years respectively. Majority (75.8%) of the respondents were females



Graph 3: The lead apron was higher among the respondents of age above 40 years (57.1%) than 25-30 years (38.6%), 36-40 (35.7%) and 31-35 (14.7%) years. The practice of leading apron was almost similar between male (33.3%) and female (30.7%) respondents. The practice of film holding was among 61.6% of the respondents and was insignificantly higher among the age group 25-30 years than other age groups. There was no significant difference in the practice of film holding between male and female respondents



Graph 4: The use of separate radiographic room was higher among the respondents who have been practicing for 5-6 years (60.9%). The system for monitoring radiation exposure was higher among the respondents who have been practicing for >6 years



CONCLUSION

Though exposure to radiation in dentistry is minimal, it is very important to follow the guidelines to minimize the radiation exposure. Following the AERB guidelines while constructing the radiological unit and monitoring the individual exposure is very useful in radiation protection. The current survey emphasizes on the need for further implementation of radiation

protection principles among general dental practitioners in the private dental offices in Lucknow. So, practitioners should be aware of the possible hazards involved with use of X-rays and should strive hard to implement the various protective measures into practice.

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