

Radiation awareness among anaesthesiology trainees in a rural tertiary care hospital

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ABSTRACT

Anaesthesiology trainees, particularly those in interventional radiology settings, face elevated risks. Ionizing radiation is essential in medical practice, but even small doses can have severe consequences. This study seeks to gauge their knowledge and attitudes toward radiation hazards and safety measures.

Materials and methodology: This questioner based cross-sectional study was conducted in two rural tertiary care units. A total of 65 anaesthesiology residents were included from two different institute in the study. The demographic data and answers pertaining to questions of radiation exposure was collected.

Results: Out of 65 trainee, 35 (54%) were from the Maharashtra and 30 (46%) were from Karnataka. The males were 40 (61.5%) and females were 25 (38.5%). Among 65 trainees who responded 28 (43%) trainees were in first year, 12 (18.5%) were in second year and 25 (38.5%) were in third year. 60(92.3%) trainees responded that no one has trained or educated them about the radiation. All 65 (100%) trainees responded that they use the protective measure for the radiation in operation theatre.

Conclusion: Anaesthesiology trainees in our institution exhibit a notable lack of awareness concerning the dangers linked to ionizing radiation. This research underscores the necessity for adequate protection measures among anaesthesiology trainees. It advocates for the integration of radiation dose, risks, and safety protocols into the fundamental curriculum of medical colleges.

Keywords: anesthesia trainee, awareness, knowledge, operation theatre, radiation

INTRODUCTION

In rural tertiary care hospitals, where medical resources may be constrained and specialized services are limited, the awareness and understanding of radiation hazards among healthcare professionals, particularly anaesthesiology trainees, assume paramount importance [1]. With the increasing reliance on radiological procedures in medical diagnosis and treatment, anaesthesiology trainees in these settings face unique challenges in navigating the risks associated with ionizing radiation exposure. This introduction explores the landscape of radiation awareness among anaesthesiology trainees in such rural tertiary care hospitals, highlighting the significance of this issue and the potential implications for patient safety and healthcare delivery [2, 3].

Anaesthesiology trainees play a crucial role in patient care, often working in diverse clinical environments, including operating rooms, interventional radiology suites, and critical care units. In rural tertiary care hospitals, where comprehensive medical services may be limited, anaesthesiology trainees are frequently involved in a broad spectrum of procedures, including those utilizing ionizing radiation. However, despite the increasing utilization of radiological imaging and interventional techniques in modern medicine, there remains a notable gap in the understanding and awareness of radiation hazards among healthcare professionals, particularly among trainees.

Rural tertiary care hospitals, while essential for providing healthcare services to underserved populations, often face challenges in resource allocation, infrastructure, and access to specialized training programs [4]. Consequently, anaesthesiology trainees in these settings may receive limited exposure to formal education and training regarding radiation safety and protection measures. This deficiency in knowledge and awareness regarding radiation hazards poses significant risks not only to the health and safety of anaesthesiology trainees themselves but also to the quality of patient care provided in these settings.

The rural context adds further complexity to the issue of radiation awareness among anaesthesiology trainees. Limited access to specialized expertise and resources may hinder the implementation of comprehensive radiation safety protocols and practices [5]. Additionally, rural healthcare facilities may encounter logistical challenges in procuring and maintaining radiation monitoring equipment, further exacerbating the risk of

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inadequate radiation protection for healthcare workers.

Given the critical role of anaesthesiology trainees in patient care and the increasing prevalence of radiological procedures in medical practice, addressing the gap in radiation awareness and education becomes imperative in rural tertiary care hospitals. By enhancing the knowledge and understanding of radiation hazards among anaesthesiology trainees, healthcare institutions can mitigate risks to both personnel and patients, thereby improving overall safety and quality of care delivery in these underserved settings. This study aims to investigate the current level of radiation awareness among anaesthesiology trainees in a rural tertiary care hospital, with the ultimate goal of informing targeted interventions to enhance radiation safety education and practices in similar healthcare settings.

MATERIALS AND METHODOLOGY

After obtaining institutional ethical clearance, this questioner based cross-sectional study was conducted in two rural tertiary care units. A total of 65 anaesthesiology residents were included from different institute in the study. The questions were related to the demographic data and answers pertaining to questions of radiation exposure was collected. A total of 10 questions were included in the questioner as shown in Table 1. All the questions were sent via google form and asked to attempt mandatorily. A digital consent was obtained while filling google form from all the residents. The anaesthesia trainees of two rural tertiary care units, one from Maharashtra and one from Karnataka were included.

S.N	Question asked
1	You belong to which state?
2	What is your gender?
3	You are in which year of training?
4	Have you worked in a place where X-ray machine/ CT scan is used?
5	How frequently you get exposed to radiation?
6	Has anyone taught you about the prevention from radiation exposure?
7	Do you know the protective measures are available in operation theatre?
8	Do you wear dosimeter?
9	Do you wear thyroid or brain shield?
10	Do you know the recommended maximum dose limit of radiation per year in mSv?

RESULTS

Out of 65 trainee, 35 (54%) were from the Maharashtra and 30 (46%) were from Karnataka Figure 1. The males were 40 (61.5%) and females were 25 (38.5%) as shown in Figure 2. Among 65 trainees who responded 28 (43%) trainees were in first year, 12 (18.5%) were in second year and 25 (38.5%) were in third year Figure 3. 58 (89.2%) trainees answered that they have actually worked in a place where the x-ray machine or CT scan is used as a part of the procedure. 42 (64.61%) trainees responded that they

are exposed to at least once in a week. 10 (15.38%) trainees responded that they are exposed once in fortnight and the remaining 13 (20%) trainees responded that they are exposed to radiation once in a month. 60 (92.3%) trainees responded that no one has trained or educated them about the radiation. All 65 (100%) trainees responded that they use the protective measure for the radiation in operation theatre. All 65 (100%) trainees responded they do not use dosimeter. 60 (92.3%) trainees confirmed that they do not use thyroid and brain shield. 58(89.23%) trainees do not know how much maximum dose of radiation can get exposed in a year.

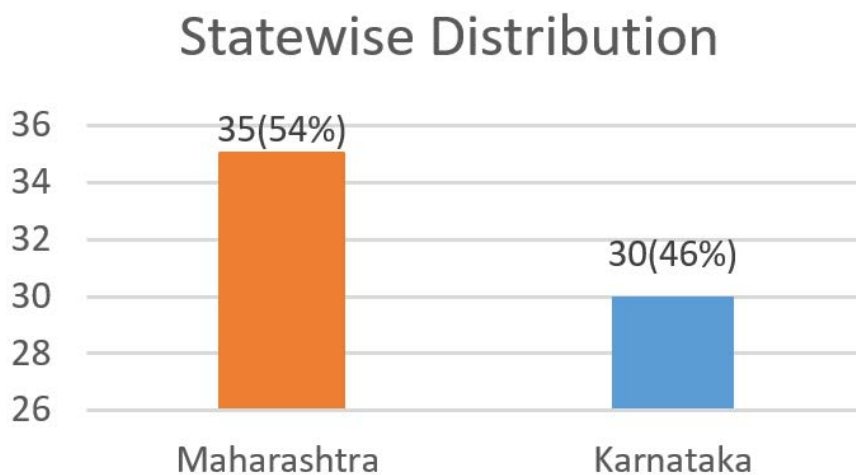


Fig. 1. State wise distribution

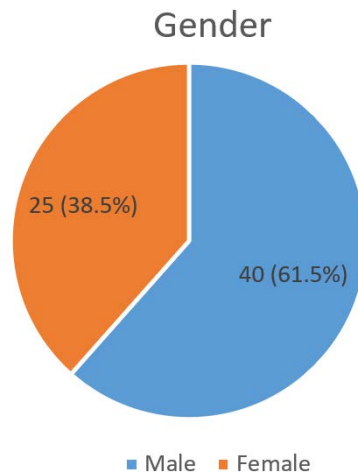


Fig. 2. Gender distribution

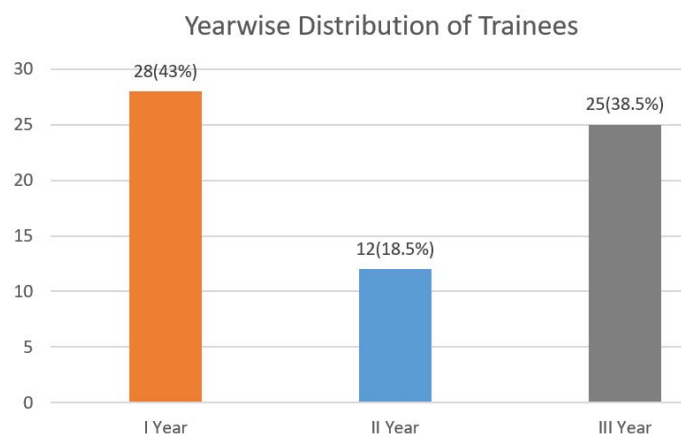


Fig. 3. Yearwise distribution of trainees

DISCUSSION

This cross-sectional study was conducted in two distinct rural tertiary care setups located in Karnataka and Maharashtra, serving as a pilot project to assess the situation in these regions. A notable observation was the higher participation of male trainees, possibly reflecting a trend where more males choose anaesthesiology as a specialty. Participation levels were relatively balanced between the two states, with noteworthy engagement from first-year and third-year trainees, although statistical significance was not observed.

Across all operation theatres, trainees were consistently exposed to radiation, with orthopaedic, urology, and neurosurgery theatres showing the highest exposure rates. Additionally, radiation exposure was observed in areas outside the operation theatres, such as the cathlab, critical care unit, and CT scan centers, where trainees were regularly assigned as part of their training curriculum. A majority of trainees, over 50%, reported weekly exposure to radiation, often as part of rotational duties lasting at least one month and including emergency responsibilities.

Despite this frequent exposure, an alarming finding was that more than 90% of trainees had not received any information regarding occupational radiation exposure. This lack of education is particularly concerning given the potential hazards of working in such environments [6, 7]. Incorporating radiation exposure education into orientation programs and theory papers is crucial to ensuring trainees understand the risks associated with radiation exposure

and how to protect themselves effectively [8, 9].

Moreover, the study revealed that while trainees reported using radiation protective gowns (100%), none used dosimeters to monitor their radiation exposure levels. This oversight is especially critical in high-risk areas like orthopaedic theatres and cathlabs, particularly in tertiary care teaching hospitals with heavy patient loads [10]. The study also highlighted the prevalence of thyroid-related problems among those exposed to radiation, underscoring the importance of using protective shields and providing adequate education on acceptable levels of radiation exposure.

A study conducted by the Awosan et al on dental staff showed the protection used was less when almost all staff were having adequate knowledge of radiation. However, our study has different results showing that even though the radiation related knowledge is less all the trainees are using atleast some protective measures. This may be because the tradition which is going on radiation suits and in the operation theatre are followed by the resident [11].

Furthermore, the study noted that heavy radiation exposure can lead to various health issues, including burnout, depression, fatigue, infertility, and an increased risk of cancers [12, 13]. Addressing these concerns through comprehensive education and implementation of safety measures to safeguard the well-being of anaesthesia trainees and ensure optimal patient care in the long run.

In light of these findings, it is recommended that the National Medical Commission include radiation and its ill effects on the human body as a mandatory part of the postgraduate curriculum

for those at risk of exposure. This proactive approach will help raise awareness and equip trainees with the knowledge and skills necessary to protect themselves and their patients from the potential dangers of radiation in medical settings.

LIMITATIONS

In this study we did not ask about the side effects which they are facing. Ideally this study should also include education about radiation exposure and its ill effects on the trainees.

CONCLUSION

Trainee anaesthesiologists in both institutes had limited awareness of radiation related risks. National Medical Commission must include radiation and its ill effects on the human body as a part of post graduate curriculum by default to those who are at risk to get exposed. Regular monitoring of radiation exposure is essential, particularly for anaesthesia personnel in high-risk radiological environments.

REFERENCES

1. Ali MA, Salim B, Siddiqui KM, Khan MF. Attitudes and knowledge of anaesthesiology trainees to radiation exposure in a Tertiary care hospital. *Saudi J Anaesth.* 2020;14:459-463.
2. Larson DB, Johnson LW, Schnell BM, Goske MJ, Salisbury SR, et al. Rising use of CT in child visits to the emergency department in the United States. *Radiology.* 2011;259:793-801.
3. Durack DP, Gardner AI, Trang A. Radiation exposure during anaesthetic practice. *Anaesth Intensive Care.* 2006;34:216-217.
4. O'Hanlon CE, Kranz AM, DeYoreo M, Mahmud A, Damberg CL, et al. Access, Quality, And Financial Performance Of Rural Hospitals Following Health System Affiliation. *Health Aff (Millwood).* 2019;38:2095-2104.
5. Younger DS. Health Care in India. *Neurol Clin.* 2016;34:1103-1114.
6. Khamtuikrua C, Suksompong S. Awareness about radiation hazards and knowledge about radiation protection among healthcare personnel: A quaternary care academic center-based study. *SAGE Open Med.* 2020.
7. Halder R, Shamim R, Mondal H, Kannaujia AK, Mishra P, et al. A survey on knowledge, attitude, and practices of workplace radiation safety amongst anaesthesiology personnel in northern Indian tertiary care institutes. *Indian J Anaesth.* 2022;66:137-147.
8. Dagal A. Radiation safety for anesthesiologists. *Curr Opin Anaesthesiol.* 2011;24:445-450.
9. Anastasian ZH, Strozyk D, Meyers PM, Wang S, Berman MF. Radiation exposure of the anesthesiologist in the neurointerventional suite. *Anesthesiology.* 2011;114:512-520.
10. Bashore TM. Radiation safety in the cardiac catheterization laboratory. *Am Heart J.* 2004;147:375-378.
11. Awosan KJ, Ibrahim MT, Saidu SA, Ma'aji SM, Danfulani M, et al. Knowledge of radiation hazards, radiation protection practices and clinical profile of health workers in a teaching hospital in Northern Nigeria. *J Clin Diagn Res.* 2016;10:7-12.
12. Shetti AN. Battling Burnout: A Comprehensive Exploration of The Impact on Anaesthesiologists and Strategies for Resilience. *Jour Med Dent Fron.* 2024;1:5-15.
13. Gudaityte J, Dvylyys D, Simeliunaite I. Anaesthetic challenges in cancer patients: current therapies and pain management. *Acta Med Litu.* 2017;24:121-127.