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Analysis of X-Ray Radiation Exposure Safety in the Radiology Installation of Panti Nugroho Hospital Sleman

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Introduction: Radiology plays a vital role in early diagnosis and risk assessment through real-time imaging. However, ensuring radiation safety is essential to protect patients, healthcare workers, and the public from excessive ionizing radiation exposure. This study aims to analyze the safety of X-ray radiation exposure in the Radiology Installation of Panti Nugroho Hospital, Sleman. **Methods:** This research used a mixed-methods approach with an explanatory design conducted from August 2024 to January 2025. Quantitative data were obtained by measuring radiation levels at 10 points, each measured three times. The results were calculated using standard formulas and compared to the dose limits set by BAPETEN Regulation No. 5 of 2016. Qualitative data were gathered through interviews with a radiation protection officer who also serves as the unit head. **Results:** The highest radiation exposure from the conventional X-ray unit was found at Point 5 (operator glass) with 0.33 $\mu\text{Sv/h}$. For the panoramic unit, the highest value was also at Point 5 with 0.03 $\mu\text{Sv/h}$. Safety procedures such as room management, provision of PPE, routine exposure testing, TLD usage, equipment maintenance, and health monitoring have been implemented consistently. **Conclusions:** Radiation exposure levels remain within safe thresholds ($\leq 2.28 \mu\text{Sv/h}$ for workers and $\leq 0.11 \mu\text{Sv/h}$ for the public). Operating two modalities in the same room does not significantly increase radiation levels if not used simultaneously. Continued monitoring and periodic evaluation of room layout are recommended to ensure ongoing safety and efficiency.

Keywords: radiation exposure, radiation workers, public safety, dose limit, risk assessment