

ABSTRACT

The use of portable X-ray equipment in tuberculosis screening programs in open areas provides flexibility in healthcare services; however, it also poses potential exposure to scatter radiation for radiation workers and the general public. This study aims to analyze the distribution of scatter radiation based on variations in angle and distance, determine the minimum safe distance, and evaluate patient radiation dose using the Entrance Surface Dose (ESD) parameter. Scatter radiation measurements were conducted using a survey meter at angles of 0°, 45°, 90°, 135°, and 180°, with distance variations ranging from 1 to 5 meters. The results show that the highest scatter radiation exposure occurs at 90°, while radiation intensity decreases as the distance increases in accordance with the inverse square law. At a distance of 5 meters, the radiation exposure remains above the safety limit for the general public; therefore, further estimation using a theoretical approach indicates that the safe distance ranges from 17 to 22 meters. Meanwhile, the patient radiation dose obtained, approximately 0.060 mGy, is still below the Diagnostic Reference Level (DRL), indicating that the principle of radiation protection optimization has been achieved.

Keywords: Scatter Radiation, Portable X-ray, ESD, Radiation Protection