

ABSTRACT

Nuclear medicine examinations using SPECT require optimal radiopharmaceutical dose management to ensure diagnostic quality while minimizing radiation dose, maintaining image quality, and ensuring physician acceptance. This study aimed to determine the Diagnostic Reference Level (DRL) for Renal Scan, Thyroid Scan, and Whole-Body Scan (WBS) at the Nuclear Medicine Department of Dr. Sardjito Hospital. Patient medical records were analyzed, categorized by examination type and age group, and used to determine DRL values. The results were compared with national and international standards, and the correlation between body mass index (BMI) and injection dose activity was evaluated. The findings indicate that the DRL values for WBS Scan, pediatric Renal Scan, adult Renal Scan, and Thyroid Scan were 747.4 MBq, 129.5 MBq, 222 MBq, and 111 MBq, respectively. The DRL values for WBS and Thyroid Scan were within national standards, whereas the DRL for adult Renal Scan exceeded the national reference level. Compared to other countries, the DRL values at Dr. Sardjito Hospital were generally lower, except for pediatric Renal Scan, which was higher than in Madinah. The correlation between body mass and injection dose in pediatric Renal Scan was strong, whereas BMI showed a weak correlation in adult Renal Scan and WBS Scan, with no significant correlation in Thyroid Scan. The effective radiation dose for pediatric Renal Scan was (2.2 ± 0.0) mSv for patients under 1 year, (1.6 ± 0.2) mSv for ages 1–5 years, (1.4 ± 0.2) mSv for ages 6–10 years, and (1.1 ± 0.2) mSv for ages 11–15 years. Radiation dose administration for adult patients should be evaluated to ensure compliance with IDRL. Additionally, the effective dose received by pediatric patients requires further assessment, considering body mass and age factors in dose determination.

Keywords: Diagnostic Reference Level, Thyroid Scan, Renal Scan, SPECT, WBS Scan