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## BACKGROUND

Computed Tomography (CT) radiation dose is relatively greater than other diagnostic modalities so that it is epidemiologically significant at increasing the risk of cancer induction, especially in pediatrics than adults because of different body sizes during life developmental stage. CT radiation exposure is influenced by the patient size and therefore, the size-specific dose estimates (SSDE) using tissue attenuation metrics ( $D_w$ ) has been introduced by the American Association of Physicists in Medicine (AAPM) as attenuation metrics for establishing DRLs as an optimization tool. AIM This study aims at determining Patient Radiation doses for common pediatric CT examinations using  $SSDE_{D_w}$  in Nigeria

## MATERIALS AND METHODS

Patient-specific scan parameters and patient size from the DICOM images were obtained for a cross-sectional study of 197 pediatric patients from 0 to 15-year-olds who underwent head and abdomen-pelvis CT scans. Patients were classified based on the European guidelines for establishing DRLs were the mean, median, and the 75<sup>th</sup> percentile values were estimated.  $D_w$ ,  $SSDE_{D_w}$  were estimated using the Indose CT 20b software based on patient-specific information. Patient ages were classified based on 0-1, 1-5, 5-10, and 10-15 years-old.  $CTDI_{vol}$ ,  $DLP$ ,  $D_w$ ,  $SSDE_{D_w}$  and ED were evaluated for each category of Examination and age group.



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## RESULTS

The median and the 75<sup>th</sup> percentile values of  $SSDE_{D_w}$  for Head examinations for the four age categories were 54.92, 47.37, 47.13, and 45.46mGy; 54.92, 59.58, 49.63 and 57.55mGy. For abdomen-pelvis were 52.84, 37.59, 39.33, and 39.26mGy; 52.84, 50.50, 41.24 and 46.55mGy. Also, strong positive linear correlation was observed between  $SSDE_{D_w}$  and ED ( $R=0.732$ , and  $0.875$ ) for both examinations. This implies that  $SSDE_{D_w}$  is a good indicator for patient attenuation metrics that can be used for establishing DRLs.

## CONCLUSION

The institutional DRLs for pediatric CT examinations using  $SSDE_{D_w}$  reveals the underestimation of patient medical exposure which may be attributable to non-consideration of patient size, age and other related factors.

## KEYWORDS

Size-specific dose estimates, Computed Tomography, Pediatric, Tissue attenuation metrics, DRL

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