

International Conference on **Pediatrics & Gynecology**

Entrance surface dose measurement in pediatric patients undergoing common diagnostic x-ray examinations in black lion and yekatit 12 hospital Addis Ababa, Ethiopia

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Background: Early childhood exposure carries an enhanced radiation risk and estimated that the probability of induction of cancer especially leukemia is about two to three times as high as in adults. Hence, dose measurement is mandatory for optimization in radiation protection to comply with international reference levels.

Objectives: To estimate pediatric patient's radiation dose arising from common diagnostic x-ray examinations by measuring Entrance Surface Dose, thereby, to compare the results from established reference values and other published studies.

Material and Methods: A cross-sectional study was conducted on pediatric patients under 15 years of age in Black Lion and Yekatite 12 Hospitals on May and August, 2009 respectively. Exposure factors used for commonly performed x-ray examinations like; chest, skull, abdomen, pelvis and spine were obtained from each Hospital. For each examination, four age groups 0–1, 1–5, 5–10 and 10–15 years were studied. Entrance Surface Dose in air was measured using dositime dx X-ray Digital Dosimeter and Exposure Time Meter. The obtained data were analyzed using statistical software.

Result: In Black lion hospital, the lowest and the highest calculated mean Entrance Surface Doses in μGY were 104 and 2482 for chest Anteroposterior (0-1) years and lumbo-sacral lateral (10 -15) years, respectively. In Yekatit 12 hospital, the lowest and the highest calculated mean Entrance Surface Doses in μGY were 200 and 3570 for chest antrioposterior (0-1) years and lumbo-sacral lateral (10 -15)years, respectively. Wide variations of doses for the same type of examination and projection have been detected in each hospital.

Conclusion: The wider dose variation suggests that there is a pressing need to seek dose optimization to children in order to reduce the detriment caused by the unnecessary high doses imparted to them.