Gender-wise Variation in the Delivered Radiation Dose during Common X-ray Procedures. A Preliminary Study

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The increased radiosensitivity in women compared to men is a greater concern in diagnostic radiology, which uses ionization radiation for the purpose of diagnosis. However, radiation protection authorities, such as the international commission on radiation protection (ICRP) have only focused on the average adult when giving radiation protection recommendations, such as diagnostic reference levels (DRL). The present study aimed to evaluate the gender wise variation in delivered radiation dose during common X-ray projections. The dose area product (DAP) values of six X-ray projections were recorded for 658 adult patients (393 male and 265 female) of same age range of 18 to 83 years who underwent routine X-rays at two hospitals. A gender wise comparison between the resultant average DAP values showed that the females received a higher mean dose than the males during abdomen anteroposterior (AP) (230.0 $\mu Gy.m^2$), kidney-ureter-bladder (KUB) (323.8 $\mu Gy.m^2$) and pelvis AP (268.3 $\mu Gy.m^2$). In addition, males also received higher doses of 124.1 $\mu Gy.m^2$, 388.0 $\mu Gy.m^2$ and 16.3 $\mu Gy.m^2$ respectively for lumbar spine AP, lateral and chest posteroanterior (PA). However, these differences were significant only in chest PA and lumbar spine lateral projections (P=0.000 and 0.001). Therefore, the authorities should focus on subpopulations rather than consider an average adult when providing dose recommendations and guidelines on radiation protection. However, in-depth and large-scale studies are required to support the idea of gender-based DRLs in the future.

Keywords: *X-ray procedures, radiation dose, gender difference, dose area product, DAP, DRL*