

Modelling of the pelvic surface dose during chest radiography in female paediatric patients at a selected hospital

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Two hundred chest X-ray examinations in female patients of paediatric age group (below 12 years) were studied. An electronic pocket dosimeter was used to measure the surface scattered radiation dose to the pelvis. It was placed immediately above the symphysis pubis. The direct radiation dose to the chest area was also measured. A pre-coded data sheet was used to collect data. The explanatory variables, age, Body Mass Index (BMI), milli Ampere (mA), kVp, average thickness of the body, inverse of square distance between the lower border of the primary beam and the sensitive region of the dosimeter, direct surface radiation dose to chest area and scatter surface radiation dose to the pelvic area were collected in the four month period. The correlation between the explanatory variables was analyzed statistically by using Pearson correlation. The aim of the study was to develop a model to incorporate scatter surface radiation dose to the pelvic area from explanatory variables.

The mean patients' age was 3.96 years ($\pm 2.956SD$) and mean value of BMI was 15.7815 (± 0.7694). The mean values of mA was 397.60 ($\pm 68.187SD$), direct surface radiation dose to chest area was 13.14 μSv ($\pm 3.530SD$) and scatter surface radiation dose to the pelvic area was 0.834 μSv ($0 \pm .4514SD$). According to results, the pelvis surface radiation dose during the chest radiography in female paediatric imaging was less than 1 μSv . It is evident that multiple regression model was inscribed inverse of square distance between the lower border of the primary beam ($\beta=0.271$), mA ($\beta=0.262$), and the direct surface radiation dose to the chest area ($\beta=0.482$) in the predicting scatter surface radiation dose to the pelvic area ($R_{Adj} = 0.319$). There were markedly positive linear regressions to the scatter surface radiation dose with direct surface radiation dose and mA, but it was negative with the kVp.