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ASSESSMENT OF EXCESS LIFETIME CANCER RISK FROM GAMMA RADIATION LEVELS IN EFFURUN AND WARRI CITY OF DELTA STATE, NIGERIA

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Abstract

The study of the terrestrial BIR levels to estimate the excess lifetime cancer risk in Warri city have been carried out, using a digilert 100 nuclear radiation monitor and geographical positioning system (GPS) for GIS mapping. The monitoring of the terrestrial BIR levels was carried out between May 2014 and June 2015 by delineated the city into eight zones. Measured average exposure rate ranges from 0.006mRh^{-1}(0.51$mSvy^{-1}$) to 0.029mRh^{-1}(2.49$mSvy^{-1}$) with overall mean value of 0.016±0.006mRh^{-1}(1.37±0.47$mSvy^{-1}$). The estimated mean outdoor absorbed dose rate for the zones ranged from 121.90±25.32 ηGyh^{-1} in Ajamogha zone to 190.16±51.60 ηGyh^{-1} in the industrial zone with a mean value of 141.30±31.31 ηGyh^{-1}. The mean annual effective dose equivalent (AEDE) calculated is 0.17±0.04 $mSvy^{-1}$, while the mean excess life cancer risk (ELCR) is (0.61±0.14) x10^{-3}mSvy^{-1}. The dosage to organs received shows that testes have the highest dose of 0.11mSvy^{-1}, while liver have the lowest dose values of 0.06mSvy^{-1}. The GIS maps of the study area revealed that of the 94 sampling locations, 64 sampling sites exposure levels (68.1%) exceeded the World ambient standard levels of 0.013mRh^{-1}(1.0$mSvy^{-1}$) recommended by UNSCEAR, and these values obtained are higher compare to values reported in literature. But these values may not constitute any immediate health risk to the resident of Warri city. The calculated Excess Lifetime Cancer Risk values indicates that the chance of contacting cancer by residents of the study area is not probable and the effective dose to the adult organs investigated is insignificant from the present exposure rate.

Keywords: Assessment, gamma radiation, excess lifetime cancer risk, Warri city

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