Assessment of indoor radon concentration levels and annual effective doses in houses near the uranium depost in Bahi district, Dodoma

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Bahi Makulu and Bahi Sokoni villages are the areas in Dodoma, Tanzania with high levels of background radiation. The main objective of this study was to assess the indoor radon concentration levels and annual effective doses in houses near the uranium deposit in Bahi district, Dodoma. In this study, 29 traditional (tembe) houses and 31 modern houses were selected from Makulu and Sokoni villages where the uranium deposit is reported to exist. The indoor radon-222 concentrations were measured from February to March 2017 using Alpha Guard radon monitor. The results show that 83.3% of the examined houses were found to have mean concentration radon-222 levels above the reference level of 100 Bq/m^3 set by WHO. The highest value (619 ±59 Bq/m^3) was found in a traditional house in Makulu village. Student T-test to compare the mean concentration of radon-222 in traditional and modern houses showed significantly higher ($p<0.01$) mean concentration for traditional than for modern houses. Additionally, the radon-222 mean value was higher ($p <0.01$) in Makulu village (361.6 ±21.7 Bq/m^3) which is nearest to the deposit than Sokoni village which is about 7 km from the deposit (180.6 ±20.7 Bq/m^3). The calculated dose rates due to radon-222 in Bahi Sokoni and Makulu as shown in Table 11 were found to be higher than the dose limit of 1 mSv/y set by IAEA. Therefore, the results in this study indicate that, people at Bahi Makulu and Bahi Sokoni are exposed to high concentration of radon-222 (above 100 Bq/m^3) set by WHO as a reference level which might be detrimental to their health.