EVALUATION OF INDOOR AND OUTDOOR NATURAL GAMMA RADIATION LEVELS IN PUBLIC SCHOOLS OF EASTERN TURKISH CITY OF ELAZIG

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Background and aim: Although many people are concerned about the risks to their health from medical or occupationally expose to x-rays or gamma rays, natural background radiation in the environment may pose a greater risk of causing genetic damage and cancer to the public including children. Since the levels of natural radiation can vary greatly between regions, the aim of this study was to determine the indoor and outdoor natural gamma radiation levels in the public schools of the Turkish city of Elazig.

Methods: Gamma-ray dose rates in outdoor (play area in the school grounds) and indoor (a sample class on the basement and teacher's room) were measured in all public elementary schools of Elazig region, located in the upper Euphrates (Firat) region of Turkey, by using a portable radiation monitoring system based on sodium iodide detectors. To better estimate the dose to children, the gamma ray doses were calculated from ground and at one meter from the ground level.

Results: The total gamma-ray dose rate was found to vary from 3.60 μR/h to 10.80 μR/h with a mean of 7.8±1.5 μR/h (n=66) for the outdoor environment, whereas for indoors it varied from 1.60 μR/h to 12.00 μR/h with a mean of 8.2±1.7 (n=66) μR/h in class and varied from 4.80 μR/h to 12.00 μR/h with a mean of 8.1±1.6 (n=66) for teacher's room, respectively. The mean effective dose equivalent per term, when the duration of indoor exposure of the school children are considered, was 35.0 ±7.2 μSv. When measurements of the variation of the dose rates showed that there were no significant differences between the rural schools in rural areas and city center except for the teacher's room.

Conclusion: The results from the present study indicate that the annual dose to children in school environment in this Turkish area is well below the US National Council on Radiation Protection's guideline. But, the fact should be considered that this gamma dose is in addition to doses received from other sources of natural radiation, particularly from the presence of radon gas.