Impact of natural background radiation on chromosomes in female residents of high background radiation area of Kerala

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High levels of natural radiation areas are found in different parts of the world like Yangjiang in China, Guarapari in Brazil, Ramsar in Iran and Kerala in India. These areas are considered as appropriate places for the study regarding health risks as a result of continuous exposure to elevated level of radiation, if any, on the inhabitants there. Karunagappally, lying on the south west coast of Kerala in India is known for HBR due to natural deposit of monazite sand containing thorium (8-10%), uranium (0.3%) and its decay products. The present study analysed the chromosomes in peripheral lymphocytes from the female inhabitants of HBRAs of Karunagappally and compared their results with female inhabitants of adjacent normal background radiation areas (NBRAs). Peripheral blood samples from 110 female inhabitants of HBRA of Karunagappally and 100 samples from NBRAs were collected in heparinized vials and cultures were set up employing standard microculture techniques, slides were prepared, coded and stained with giemsa. Well spreaded metaphases were analysed for chromosome aberrations. Fluoroscence *in-situ* hybridization (FISH) using whole chromosome probe (WCP) 1, 2, 4 and X was performed in representative samples. The frequencies of chromosomal aberrations in HBRAs and NBRAs were 5.85±3.7 and 0.27± 0.58 per hundred cells respectively. All statistical analysis were done using SPSS version 21 to assess the Group statistics in experimentals for mean age, mean cumulative dose and chromosomal aberration frequency. FISH does not reveal any translocation among the chromosomes 1, 2, 4 and X. Background radiation had effect on the frequencies of chromosomal aberration in the inhabitants of HBRA and was found significant compared to inhabitants from NBRAs. The lack of any stable aberrations/translocations in chromosomes can be considered as one of the reasons for not having any serious ill effects or increased cancer incidence due to the radiation exposure in the area.

Keywords: Chromosomal aberrations, Dicentrics, FISH, HBRAs, Ring chromosome