Cancer and Non-Cancer Health Risks from Carcinogenic Heavy Metal Exposures in Underground Water from Kilimambogo, Kenya

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Abstract

Water is very crucial for man, animals and plants because of its health implications in case it is polluted. Water has many uses like drinking for man and animals, domestic use and for agricultural use. The concentration levels of Cd, Ni and Pb in borehole water of Kilimambogo region were measured using the atomic absorption spectrometer (AAS). pH was measured on site using a digital pH standard meter. The use of fertilizers and chemicals from the neighboring small scale farms and the large pineapple farms could easily contaminate the water table. The mean heavy metal concentration for Cd, Ni and Pb were found to be 6.4, 6.9 and 42.0 ppm respectively. The mean hazard quotients (HQ) were 26.2, 1.4 and 57.0 for adults and 12.9, 0.69 and 27.9 for children for the corresponding elements. The mean carcinogenic risks for Cd, Ni and Pb were 4.9×10^{-2}, 1.2×10^{-2} and 7.3×10^{-3} for adults and 1.1×10^{-2}, 2.8×10^{-2} and 1.6×10^{-3} for children respectively. The mean metal pollution index (MPI) and heavy metal evaluation index (HEI) were 10 and 934, higher than the set critical threshold value of 100. Therefore, the borehole sources are enriched with heavy metals and should be periodically monitored.

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