HEAVY METAL HEALTH RISK ASSESSMENT THROUGH GROUNDWATER CONSUMPTION ALONG THE HATTAR INDUSTRIAL ESTATE, KHYBER PAKHTUNKHWA, PAKISTAN.

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Abstract

This study aimed to assess the groundwater quality and human health risk potential in Hattar Industrial Estate, district Haripur, Khyber Pakhtunkhwa, Pakistan. Groundwater samples (n = 40) were collected from different drinking water source like bore well, tube well and dug well in the study area. Samples were analyzed for heavy metal (Zn, Ni, Cr, Pb, and Cd) concentration through atomic absorption spectrophotometer (Perkin Elmer, AAS-PEA-700), and compared with World Health Organization (WHO) guideline values for drinking water. The mean metal concentration (µg/L) in groundwater samples were found in the order of Ni > Zn > Cr > Pb > Cd. Since, heavy metal are toxic, non-biodegradable, accumulate in environment and food chain. This contamination pose a risk to the environment and human health. Furthermore, chronic daily intake (CDI) and hazard quotient (HQ) were also calculated for adult and children who consume groundwater. Results revealed that the mean CDI value (µg/Kg-day) of heavy metal was found in the decreasing order: Ni > Zn > Cr > Pb > Cd both for adult and children. The HQ value were found > 1 for Cd, Ni, and Pb, suggesting that the exposed human beings could be at chronic risk. This could be attributed with the discharge of effluents and solid wastes from the existing industrial estate into the groundwater of the study area. Therefore, serious measures such as drinking water treatments and contamination controlling policies are needed to avoid the hazardous effects of toxic heavy metal in this industrial area.