

Risk Assessment of Exposure to Toxic Metals via Drinking Water: a Study in Some CKDu Endemic Areas, Sri Lanka

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Heavy metal pollution becomes increasingly severe in Sri Lanka with intensive agriculture and the shortage of clean, freshwater resources. Monitoring water quality is important because the enhanced concentrations of heavy metals in portable water is a threat to human health. Therefore, this research aims to analyze the heavy metal concentrations and assess the quality of drinking water using Heavy Metal Pollution Index (HPI) in CKDu endemic regions including the Wewalketiya Grama Niladhari Division (GND) in the Anuradhapura district, Ambagaswewa GND in the Polonnaruwa district, Naminigama GND in the Matale district and Buddhangala GND in the Ampara district (reference area). Replicated water samples were randomly collected from thirty drinking water wells from each GND and heavy metals (Cadmium, Lead, Chromium, and Arsenic) were analyzed by Inductive Coupled Plasma Mass Spectrometry. In Wewalketiya Cd (3.440 ± 0.072), Pb (5.422 ± 0.687), Cr (11.510 ± 8.360) and As; 0.00 in ppb levels. Heavy metal concentrations in Amabagaswewa GND were Cd (0.178 ± 0.162), Pb (1.229 ± 0.537), Cr (0.203 ± 0.023) and As (0.336 ± 0.014), respectively in ppb levels. Cd, Pb, Cr and As concentrations in Naminigama GND were 0.050 ± 0.006 , 0.120 ± 0.016 , 0.550 ± 0.077 and 0.330 ± 0.043 , respectively in same units. HPIs for Wewalketiya, Ambagaswewa, Naminigama, and Buddhangala GNDs were 91.907, 21.989, 7.267 and 19.423, respectively. The HPI shows the overall quality of water with respect to the content of heavy metals and its critical value is 100. Ambagaswewa and Wewalketiya GNDs have higher HPI values compared to the reference and Naminigama GND. Therefore, the-long term exposure to heavy metal via drinking water may be the major risk factor for renal failures. The differences in HPIs can be attributed to the variations in concentrations of the heavy metals in drinking water and this study has relevance to designing control measures and action plans for reducing pollutants in drinking water in North Central region of Sri Lanka.

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