

OP 14**Assessment of Health Risk using the Daily Intake of Nephrotoxic Trace Metals via Drinking Water: A Case Study in Rideemaliyadda-South, CKDu Endemic Area, Sri Lanka**

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Background: Chronic kidney disease of uncertain aetiology (CKDu) has been reported in Sri Lanka for more than two decades. Although it has been a significant health burden, this is not associated with any known factors of CKD such as hypertension, diabetes, and illegal drug abuse.

Objectives: To assess the health risk of the intake of potential nephrotoxic elements via drinking water using the chronic daily intake (CDI) of selected metals in Rideemaliyadda-South, a CKDu endemic area, Sri Lanka.

Methods: Drinking water samples (n=30) were collected from Rideemaliyadda-South GN division, Badulla district, Sri Lanka. Cd, Pb, Cr and Cu concentrations of the water samples were analyzed using Inductively Coupled Plasma Mass Spectrometry (ICPMS-Agilent-7800). All the analyses were done in triplicates. Mean CDI, Hazard Quotient (HQ), Hazard Index (HI) for an adult human (oral) were measured using the concentrations of selected nephrotoxicants.

Results: The mean concentrations obtained for Cd, Pb, Cr and Cu were 0.12 ± 0.02 , 0.45 ± 0.07 , 0.16 ± 0.00 and 1.95 ± 1.17 $\mu\text{g/L}$, respectively. All the mean values of selected nephrotoxic elements complied with the maximum permissible levels recommended by WHO. The mean CDI values ($\mu\text{gkg}^{-1}\text{day}^{-1}$) for Cd, Pb, Cr and Cu were 4.4×10^{-6} , 1.65×10^{-5} , 5.87×10^{-6} , 7.15×10^{-5} and the calculated HQ values were ranged as 4.4×10^{-6} , 4.71×10^{-6} , 1.96×10^{-6} , 1.79×10^{-5} , respectively. The calculated HQ and HI values for all the selected nephrotoxic elements were below 1.0 (1.29×10^{-5}) and were within the acceptable level recommended by WHO.

Conclusions: The nephrotoxic element concentrations, HQ, and HI values were within the recommended values, indicating no potential harmful health risks to the residents in the study area. However, long-term use of water may pose a hazard to human health. Therefore, it is recommended to regularly monitor the water quality for contaminations before using for drinking purposes.

Keywords: CKDu, Hazard index, Hazard quotient, Nephrotoxic, Oral daily intake