

ARSENIC AND HARDNESS IN GROUND WATER FROM CHRONIC KIDNEY DISEASE OF UNKNOWN ETIOLOGY (CKDU) PREVALENT AREAS AND NON-CKDU PREVALENT AREAS IN SRI LANKA

S. Fonseka¹, C. Jayasumana², K. Jayalath¹, M.Amarasinghe¹, K. Senanayake¹, C.Wijewardhane³, D.Samarasinghe⁴, K.Dahanayake⁵, P. Mahamithawa², P.Paranagama^{1*}

¹*Faculty of Science, University of Kelaniya, Sri Lanka*

²*Faculty of Medicine, Rajarata University of Sri Lanka, Anuradhapura, Sri Lanka*

³*Padavi SriPura Government Hospital, Padavi Sripura, Sri Lanka*

⁴*Karawanella Base Hospital, Karawanella, Sri Lanka*

⁵*Monaragala District General Hospital, Monaragala, Sri Lanka*

Increasing hardness and deteriorating quality of groundwater, the primary source of potable water, has been the general observation of inhabitants of areas where chronic kidney disease of unknown etiology (CKDu) is prevalent. Present study was conducted during 2011, to determine the groundwater hardness and presence of arsenic in Padavi-Sripura, Polpithigama, Moneragala, Thanamalwila in the dry climatic zone and in Pasagoda in the wet zone. Total hardness of the water samples collected from dug wells and tube wells was measured using EDTA titration (EPA 130.2) and arsenic content was measured using GF-AAS after filtration and acid digestion (EPA 7060A). Highest average groundwater hardness (466 ± 34 mg l⁻¹) was observed at Padavi-Sripura (n= 28) and the values ranged from 270 ± 54 – 820 ± 62 mg l⁻¹. Arsenic content in water ranged from 21.07 ± 3.54 to more than 100.91 ± 12.31 µg l⁻¹. The second most hardwater was found from Polpithigama area (n= 16) which ranged 90 ± 8 – 615 ± 47 mg l⁻¹. Arsenic content in water ranged 2.49 ± 0.61 – 60.55 ± 7.21 µg l⁻¹. The lowest hardness in groundwater among the test sites was observed at Moneragala (n=38), where the hardness ranged 10 ± 2 – 340 ± 31 . The arsenic content ranged 2.14 ± 0.84 – 52.47 ± 6.71 µg l⁻¹. Groundwater at Thanamalwila (n=19) recorded hardness value, i.e. 279 ± 26 mg l⁻¹ with a range 170 ± 8 - 500 ± 24 mg l⁻¹ and the arsenic content in water ranged 39.37 ± 5.21 - $>100.42 \pm 9.45$ µg l⁻¹. Groundwater at Pasagoda, the control site of this study, was not hard (60 ± 5 mg l⁻¹) and arsenic was not detected. Statistical analyses reveal that a positive correlation exists between total hardness of groundwater and the arsenic content in it.

Acknowledgement: University of Kelaniya and HETC of the UGC provided the financial support.