

Determination of water quality and suitability in a chronic kidney disease of unknown etiology (CKDu) prevalence area, Sri Lanka

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Chronic Kidney Disease of unknown etiology (CKDu) is a global health obstacle that is presenting as kidney disease in patients who do not show common causative factors, such as diabetes or hypertension. Although the causative factors and major causes for CKDu prevalence are still in debate, most of the external factors which affect the disease are associated with drinking water. Therefore, this study investigated the water quality and suitability of drinking water in a CKDu prevalence area to assess its suitability for human consumption. The water samples were collected from 30 dug wells in Girandurukotte Grama Niladhari Division (GND), Badulla District which reported the highest number of CKDu patients and from Buddhangala GND in Ampara District (as reference sampling site) in dry season. Dissolved Oxygen (DO), Electrical Conductivity (EC) and Fluoride (F) were analyzed as on-site measurements. Calcium (Ca), Magnesium (Mg), Cadmium (Cd), Arsenic (As) were determined using Inductive Coupled Plasma Mass Spectrometry. Sulphate, Nitrate and Chlorides were analyzed using Ion Chromatography. Each analysis was performed in triplicates. The Water Quality Index (WQI) was calculated using standards of drinking water quality recommended by the World Health Organization (WHO). According to the results, pH, DO, EC, F, Ca, Mg, Cd, Cr, Pb, As, total hardness, sulphate, nitrate and chloride values in Girandurukotte GND were 7.03 ± 0.08 , 4.8 ± 0.8 mg/L, 396.9 ± 9.1 μ S/cm, 1.64 ± 0.04 mg/L, 1.05 ± 0.90 mg/L, 202.85 ± 5.60 mg/L, 0.124 ± 0.074 μ g/L, 54.75 ± 0.54 μ g/L, 0.20 ± 0.05 μ g/L, 30.64 ± 8.60 μ g/L, 83.60 ± 4.02 , 60.28 ± 5.62 mg/L, 20.56 ± 8.62 mg/L and 122.65 ± 10.36 mg/L respectively. The results obtained for WQI in Girandurukotte and Buddhangala were 71.84 (51-75 poor) and 42.67 (26-50 good) respectively. Results indicate that water samples analyzed from Girandurukotte are not safe for human consumption and other domestic purposes while the water samples in reference site are safe for human consumption. Therefore, taking all necessary precautionary measures before the consumption can be recommended to avoid adverse health impacts.

Keywords: CKDu, Drinking water, Water quality index

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