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Investigation of Risk Factors of Drinking Water Related to Chronic Kidney Disease of Unknown Aetiology in a CKD Prevalence Area in Matale District**Chandrasoma S.D.I.A.* , Perera W.P.R.T., Liyanage J.A.***Department of Chemistry, University of Kelaniya, Kelaniya, Sri Lanka
*induanushi@gmail.com***Abstract**

Environmental conditions are likely to play an important role towards the spread of the Chronic Kidney Disease of unknown aetiology (CKDu) in certain areas of Sri Lanka. In that respect the composition of drinking water in CKDu affected areas were studied. According to the hospital data obtain from Ministry of Health, Sri Lanka, an endemic area (Naminigama with 90% patients) and a low prevalence area (Sulugunewith 0% patients) were selected from the Wilgamuwa divisional secretarial area and 30 drinking water samples were collected and analysed from each area. Concentrations of Mg, Ca, Pb, As and Cd (using ICP-MS), pH, conductivity and dissolved oxygen (DO) in drinking water samples were analysed. The average pH, Conductivity and DO of Naminigama were 6.82 ± 0.38 , 602.81 ± 350.65 $\mu\text{S/cm}$ and 5.63 ± 0.90 mg/L. The average pH, Conductivity and DO of Sulugune were 6.15 ± 0.24 , 188.06 ± 115.13 $\mu\text{S/cm}$ and 4.29 ± 1.68 mg/L. pH and Conductivity of Naminigama were significantly higher than that of Sulugune ($p=0.0008$, $p=0.0002$) while the DO levels were not significantly different ($p=0.055$). The Ca^{2+} and Mg^{2+} levels were also compared in two areas. The average Mg, Ca, Pb, As and Cd of Naminigama were $7,091.75 \pm 1293.5$, $29,035.00 \pm 6072$, 0.12 ± 0.016 , 0.55 ± 0.076 , 0.33 ± 0.043 , 0.0 ± 0.0055 ppm. The average Mg, Ca, Pb, As and Cd of Sulugune were $3,394.43 \pm 382.789$, $1,004.315 \pm 90.85$, 0.48 ± 0.1 , 0.08 ± 0.013 , 0.05 ± 0.0075 ppm. Ca, Mg and As of Naminigama were significantly higher than that of Sulugune ($p=0.0400$, $p=0.0080$, $p=0.0006$). A significantly higher conductivity and pH in the drinking water from CKDu affected area was observed than the unaffected area. This can be due to the higher presence of metal ions in the CKDu affected area. Correlations between these factors were also statistically analysed. Linear correlations between Ca and Mg was found at Naminigama as well as Sulugune (Pearson correlation coefficients of 0.726 and 0.957). However a linear correlation between pH and conductivity was only found in Naminigama with respect to Sulugune (Pearson correlation coefficients of 0.801 and 0.578). Significantly higher presence of Ca and Mg also found in CKDu affected area, which indicates that the hardness of drinking water in the area is high. More studies are required to establish a connection between the presence of CKDu and the hardness, pH and the Conductivity of the drinking water.

Keywords: CKDu, Drinking water analysis, Hardness, Conductivity, pH