

Analysis of Drinking Water Quality Related to Chronic Kidney Disease of Unknown Etiology (CKDu) of a Disease Prevalent Area in Polonnaruwa District

Ruwan T. Perera¹, Janitha A. Liyanage²

Chronic Kidney Disease of unknown etiology (CKDu) is a burning issue in the Sri Lanka over past 20 years. In those endemic areas, majority of CKDu patient's drinking water source was well-water. According to the environmental and other collected data from the Medirigiriya where CKDu prevalent area in Polonnaruwa district and Buddangala reference area in Ampara district, both have similar environmental conditions and agricultural habits. But in endemic are high number of CKD patients have been reported and none of CKD patients have been reported in selected reference area. Hence, drinking water quality analysis was carried out in both areas.

According to the hospital data obtained from the health service in north central province Ambagaswewa grama niladhari division in Medirigiriya divisional secretariat area, drinking water quality analysis was carried out. Because of highest number of reported CKD patients since 2001. Then Buddangala GN area was selected as reference site for this analysis. Thirty drinking water samples were collected from the drinking water sources of the CKD patient's residential places in Ambagaswewa GN area and 30 drinking water samples were collected from the Buddangala area. According to the results obtained from this analysis, average Ca and Mg concentration values in both areas were not exceeded than the permissible level defined by SLS in drinking water as well as conductivity of water was also reported high in water samples. Moreover, in Ambagaswewa area, average pH value was 6.65 while Buddangala area it was reported as 7.20 average value. In addition to basic water quality parameters, Pb, Cd, Cr, Ni, Zn, Mn, As, Cu, Fe, Na, K, Al, F⁻, SO₄⁻², NO₃⁻, PO₄⁻³ concentrations were analyzed in collected water samples with the aid of ICP-OES and Ion chromatography instruments. Before the ICP analysis, samples were filtered using nylon Sylinger filters (0.2 micro meters). According to the results, average concentration of Fluoride which suspected to be toxic to the kidney function, has exceeded the permissible levels defined by SLS in Ambagaswewa area, 1.32ppm (± 0.73), but in reference area those values were not exceeded the permissible limits, 0.44ppm (± 0.24). Average Cd concentration in the endemic area was 3.99 ppb (± 2.87) while reference area is 0.15ppb (± 0.07). (LOD of Cd-0.07). As and Pb concentrations were reported below the SLS permissible limits in both areas. Further concentrations of other species in both areas were not exceeded the permissible limits defined by SLS. According to the results, it can be reported that fluoride and Cd content in the drinking water may contribute to CKD. Finally, it concludes that drinking water quality can be a very significant reason for the prevalence of the CKDu in the endemic areas.

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¹ Department of Chemistry, University of Kelaniya, Sri Lanka; ruwantharangaperera@gmail.com

² Department of Chemistry, University of Kelaniya, Sri Lanka