

Poster presentation: 123

Assessment of selected water quality parameters in well water samples from Chronic Kidney Disease of unknown etiology (CKDu) affected Unagaswewa area

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Chronic Kidney Disease of unknown etiology (CKDu) is a serious condition of kidney failure and is not associated with conventional risk factors. The disease is increasingly spreading over many areas of Sri Lanka. The exact causative factors and etiology of CKDu are not yet completely understood. However, based on observations of previous research, there are strong evidences to show that CKDu has a profound relationship with the quality of drinking water. Therefore, this research study was conducted to evaluate the water quality of well water samples from Unagaswewa area and thus to assess the suitability of well water for drinking purpose, with respect to the World Health Organization guidelines and Sri Lanka Standards of drinking water quality. Unagaswewa grama niladari division of Medawachchiya divisional secretariat was taken as the study area of the research. Random stratified sampling method was used for sample collection. A clinical survey was performed to find the number of patients and non-patients living in a household and other necessary background information were also collected. Fifteen water samples were collected from well water sources and two Reverse Osmosis (RO) filtered water samples were used as a tentative reference. The water quality parameters such as pH (5.56 - 7.53), electrical conductivity (EC) (15.13 - 2540.00 $\mu\text{S}/\text{cm}$), total dissolved solids (6.94 - 1290.00 mg/L), concentrations of Calcium (0.00 - 111.00 mg/L) and Potassium (0.00 - 5.08 mg/L), total hardness (2.00 - 1080.00 mg/L) and total alkalinity (40.00 - 546.00 mg/L) were measured by averaging the triplicated results. The samples were analyzed using different analytical techniques and instruments such as multi parameter analyzer (HACH: HQ 40d multi), flame photometer (Jenway PFP7) and titrimetric methods. Based on all the measured water quality parameters in the study area, RO filtered water samples were identified as suitable for drinking purposes except that the pH is slightly below the recommended values, which can be predicted due to an ion exchange during the filtration. Among the well water samples collected from Unagaswewa area, more than 85% of the samples were identified as not suitable for drinking. Based on the measured parameters, it can be stated that, well water in Unagaswewa area can be used for drinking purposes upon RO filtration, which will be further confirmed by the completion of the analysis.

Keywords: Chronic Kidney Disease of unknown etiology (CKDu), Medawachchiya, toxicity, Unagaswewa, water quality analysis

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