



COMPARISON OF FLUORIDE AND HARDNESS LEVELS IN GROUNDWATER RESOURCES OF CKDU PREVALENT MEDAWACHCHIYA AREA & CKDU NON PREVALENT HURULUWEWA AREA

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The dry zone of Sri Lanka has comparatively high fluoride and hardness levels than other areas. Rock types play significant role in elevating the concentration of these parameters in groundwater. Chronic Kidney Disease of uncertain etiology (CKDu) is prevalent in several areas in Sri Lanka and scientist argue that fluoride(F-) or hardness or combine effect of both may be one of a causative factor to the disease. Therefore, this research is focused on assessing the fluoride and hardness levels in twostudy areas. Medawachchiya is as CKDu prevalent area and Huruluwewa is considered non-prevalent area. There were 29sampling sites from Madawachchiya and 27 From Huruluwewa. Source of groundwater include dug wells and tube wells.Each area was divided into thirty quadrates and dug well and tube well closest to the center of quadrate was selected as groundwater source.

F-was determined by SPAND spectrophotometric method using HACH 2700DM Spectrophotometer and hardness was analyzed with titrimetric method.The study was carried out from September 2013 to September 2014. Data were comparedusing Paired T-test and interpolated maps were generated by Arc GIS 10.1.

F-concentrations of Medawachchiya area ranged from 0.06 mg/L to 1.51 mg/L where Huruluwewa was from 0.11mg/L to 1.93mg/L. Hardness concentrations in Medawachchiya ranged from 100.0mg/L to 600.0mg/L where Huruluwewa was from 50.0mg/L to 830.0mg/L. 0.27% of groundwater sources tested exceeded the WHO drinking water standards of F-in Medawachchiya area where as 9.41% in Huruluwewa area. 0.27% of wells exceeded the WHO drinking water guidelines of hardness in Medawachchiya area and 5.29% in Huruluwewa area. According to the paired t-test there was no significant different between the means of fluoride ($p=0.644$) and hardness (0.134).

Therefore, it can be concluded that the levels of concentration of F- and hardness in both areas are not different from each during the research period. The threshold levels have to be adjusted according to water quality status

of the country. It cannot conclude that two elements are not effect to the CKDu in the study region. Further, investigation on screened locations compared with other water quality parameters is needed.

Keywords: *Medawachchiya, Huruluwewa, Ground water, Fluoride, Hardness*