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Evaluation of calcium, magnesium and pH levels of the water consumed by renal stone patients selected from Teaching Hospital, Jaffna, Sri Lanka

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Background: Renal stone disease is a significant health concern in Jaffna Peninsula, where groundwater is the primary drinking water source. The region's limestone geology contributes to high calcium and magnesium levels in water.

Objective: To evaluate the Calcium, Magnesium and pH levels of the water consumed by renal stone patients selected from Teaching Hospital, Jaffna and analyse the association with residential areas, water source, and water consuming methods.

Methods: A hospital-based observational study was conducted among renal stone patients attending the Urinary Clinic, Teaching Hospital Jaffna. Drinking water samples (n=58) were collected from residential sources (open-wells, tube-wells, and tap water) of the patients from Valikamam, Vadamarachchi, and Thenmaradchchi areas. Calcium and Magnesium concentrations were measured using O-Cresolphthalein Complexone and Xylidyl Blue Complex methods and pH with digital pH meter. Data was analysed with descriptive statistics and one way ANOVA.

Results: The mean Calcium and Magnesium concentrations of the water samples were 88.3(±57.2) and 10.1(±8.70) mg/L with the mean pH of 7.26(±0.31). Residential areas and water sources showed no significant differences in Calcium (p=0.904, p=0.093), Magnesium (p=0.603, p=0.119) concentrations and pH (p=0.385, p=0.986) value. However, considering the consumption methods (boiling & cooling, filtered by Reverse Osmosis and freshly fetched) significant differences were observed in Calcium (p<0.001), Magnesium (p=0.007) and pH (p=0.030) values. Consuming methods showed highly significant variation in Calcium in all residential areas (p<0.001), while the Magnesium level showed significant variation in Vadamarachchi (p=0.045) and the pH value in Valikamam areas (p=0.009).

Conclusions: Ca and Mg concentrations, and the pH levels of water samples consumed by the patients showed no direct correlation with the prevalence of renal stone. Future study could determine the impact of these parameters on renal stone formation based on the type of stones formed as well as by considering more number of samples.