

7.1.4 TOXIC LEVELS OF ARSENIC IN HAIR AND URINE SAMPLES OF PATIENTS OF CHRONIC KIDNEY DISEASE OF UNKNOWN AETIOLOGY (CKDu) IN SRI LANKA

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Introduction: Chronic Kidney Disease of unknown aetiology (CKDu) is the main cause of deaths in at least 10 divisional secretarial divisions in Anuradhapura, Polonnaruwa, Mulative, Vavuniya and Badulla Districts.

Objectives: To determine the level of arsenic(As) in hair and urine samples of CKDu patients in Padaviya (Anuradhapura district) Sripura (Trincomale district) and Welioya (Mulative district) divisional secretarial areas and compare that with the values obtaining from non CKDu individuals from same region.

Study design, setting and methods: Case control study has been conducted. Cases were already diagnosed CKDu patients. (n=100) Control group (n=102) were selected from those individuals from the study area who have not been diagnosed to have CKDu. Hair and urine samples were collected from both CKDu patients and controls. Chemical analysis for As was carried out using atomic absorption spectrometer with graphite furnace (EPA 7060A) at University of Kelaniya and Water resources board separately.

Results: Hair and urine samples of CKDu patients were detected to contain 0.72 ± 0.20 mg kg⁻¹ to 8.75 ± 1.06 mg kg⁻¹ and 18.6 ± 5.8 µg L⁻¹ to 94.50 ± 10.2 µg L⁻¹ arsenic respectively. In Control group, the respective values of arsenic were 0.12 ± 0.08 mg kg⁻¹ to 4.35 ± 0.92 mg kg⁻¹ and 9.0 ± 3.2 µg L⁻¹ to 44.35 ± 7.9 µg L⁻¹.

Conclusion: Toxic level for arsenic in hair is 1mg/kg and 35 µg/L for urine. Findings of the present study reveal that hair and urine samples of 59 (59%) and 64 (64%) of the CKDu patients and 35 (34.3%) and 29 (28.4%) of the subjects in the control group respectively contained toxic levels of arsenic.. As there is no evidence for mass scale acute or sub acute arsenic toxicity in the region, chronic accumulation may be the source of arsenic in biological samples. If arsenic is presumed to play a role in the aetiology of the disease, toxic levels of arsenic in urine and hair samples from individuals of the control group indicate that being inhabitants of the same area, majority of the population has already bio-accumulated arsenic, nevertheless to a lesser extent than those who have been diagnosed as CKDu patients. This also implies that these individuals are of high risk in acquiring CKDu in near future. Furthermore, as it is not a deliberate self poisoning, Medico-legal referrals should be done for these cases for subsequent legal action.