Potential link between ground water hardness, arsenic content and prevalence of CKDu

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Highest prevalence of CKDu occurs in the largest rice farming areas in Sri Lanka and it is reported that approximately 99 % of CKDu patients are farmers[1]. It was reported that source of drinking water of CKDu patients are obtained from dug wells (92 %) and tube wells (08 %)[2]. Age of majority of the CKDu patients are between 30 – 40 years and they are heavily exposed to agrochemicals as very little attention is given to hazardous effects on human health[2]. Our preliminary investigations revealed that significantly higher percentage of CKDu patients ($p<0.05$) showed spotty pigmentations on their soles and palms. However it was also confirmed that it is different from characteristic pigmentations observed among people in Bangladesh due to chronic arsenic toxicity (fig. 1)[4]. This was the main reason to concentrate our work on investigation of arsenic content in urine and hair of CKDu cases[4-6]. Analysis of urine and hair of 348 subjects in the study area (CKDu, n=125; controls from endemic area, n = 180; controls from nonendemic area, n = 43) indicated that approximately 72.5 % of CKDu patients had urine arsenic levels > 21 μg/g creatinine and significantly high concentration of arsenic has been observed in high keratin containing tissues such as hair and nails among the CKDu cases ($p<0.05$)[5]. Analysis of organ samples of deceased CKDu patients from the study area also have shown about ten-fold increase of arsenic in comparison to that of kidneys of an unexposed individual[6].

In an attempt to investigate source of arsenic in population of the study area, arsenic content in water, most abundant trees, terrestrial and aquatic herbaceous plants and soil samples in the study area were analyzed. The results revealed that arsenic is present in noteworthy amounts in the flora of the study area and their capacity to retain arsenic differs largely from one species to another as well as from roots, bark, flowers and leaf, i.e. in the bark of *Azadirachta indica* (Kohomba) (753 $\pm$ 4.2 μg kg^{-1}), in roots of *Terminalia arjuna* (Kumbuk) (815±2.4 μg kg^{-1}) and bark of of *Terminalia arjuna (*115±2.4 μg kg^{-1}). The aquatic floating plant, *Eichhornia crassipes* (553.5± 2.4 μg kg^{-1}) as well as flowers and roots of *Nelumbo sp.*(Lotus) (1101± 10.2 μg kg^{-1}) were found to contain excessive amounts of arsenic. These data hence indicate their relative capacity of phytoremediation for arsenic[7-8]. Rice (*Oryza sativa* L.) is one of the major food crops in many countries and it is one of the dominant sources of arsenic and cadmium. Presence of arsenic in rice samples (n=75) collected from various parts of the country were evaluated and reported that the