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Investigation of Multiple Drivers and their Impact on Chronic Kidney Disease Unidentified - A Case Study in Padaviya Divisional Secretariat, Sri Lanka

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Abstract

Starting in the mid 1990s, Chronic Kidney Disease of Unknown aetiology (CKDu) was discovered among the rice paddy farmers in the North Central Province (NCP) of Sri Lanka in Anuradhapura and Polonnaruwa Districts. The disease has now spread to neighboring districts in the North Western, Eastern, and Uva as well as the Central and Northern Provinces. The CKDu prevalent area covers approximately 17,000 km with a predominantly rural population of 2.5 million. There is scientific consensus that this fatal disease in Sri Lanka is not related to known causes commonly identified with kidney disease, such as, diabetes, hypertension, obesity, or other factors such as snake bite. Many studies are ongoing to find the causative factor/s to this disease. This study was conducted with the intention of finding single/multiple causative factors which contributes to the disease incidence in the North Central Province with special reference to Padaviya Division which was identified as a high intense division for the disease by Ministry of Health. From the 15 Grama Niladhari (GN) Divisions 4 divisions were selected for the study (Sudarshanagama, Ruwanpura, Buddangala and Parakramapura) based on their relatively high disease prevalence. 30% of the households were selected from each GN Division randomly and a questionnaire was administered. In addition to this key informant surveys were carried out with priests of temples, Grama Niladhari, School teachers and Principals, leaders of farmer organisations, shop owners and keepers selling agrochemicals etc. Water samples were collected from selected wells for analysis of heavy metals. The results showed that similar trends were prevalent in the causative factors in all the GN Divisions although the percentage of disease incidence varied slightly (Parakramapura-33%; Sudarshanagama-35%; Ruwanpura-16%; Buddangala-40%). Of the respondents having the disease 94% had used well water for drinking prior to the disease and had been using it for more than 20 years. 88% of the affected persons used aluminum utensils for their cooking. The age of the affected ranged from 37 to 83 years with the median of 63. Significant difference was not seen among the gender. About 82% of the affected personnel were farmers who had used agrochemicals in their farming practices. A significant relationship was shown between the income level and disease incidence (82% were drawing less than Rs. 10,000/month). Persons who had hypertension were more prone to the disease while prior diabetes conditions did not show a relationship. People consuming alcohol and tobacco were more prone to the disease. Those who had snake bites previously were not shown to be susceptible while usage of ayurvedic drugs showed a weaker relationship. The well water samples taken from the affected areas showed elevated concentrations of Cadmium and Lead compared with the drinking water standards stipulated by the Sri Lanka Standards Institution. It can therefore be concluded that multiple factors contribute to the prevalence of CKDu such as occupation, income level, drinking water source, type of utensils used and personnel habits but the most prominent ones were drinking water quality, utensils used for cooking and farming occupations using agrochemicals.

Keywords: Chronic Kidney Disease of Unknown, Agrochemicals, Cadmium, Lead