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Spatial and Temporal Analysis for Identifying the Movement of Chronic Kidney Disease (CKDu) Hotspots; in Reference to River Basins in North Central Province, Sri Lanka

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In recent years, Sri Lanka has experienced a high prevalence of chronic kidney disease (CKDu) in certain regions, especially in the North Central Province (NCP). The etiology of this disease is not yet clearly understood, although several hypotheses involving environmental and occupational factors have been proposed. To better understand the patterns of CKDu incidence and its potential relationship to environmental factors, a spatial and temporal analysis was conducted using geographic information system (GIS) tools. In this study, we identified the geographical hotspots of CKDu incidence over a period of eleven years (from 2010 to 2020) in the NCP, of Sri Lanka. The analysis was done for the districts of Anuradhapura and Polonnaruwa in NCP. Furthermore, we analysed the temporal trends of CKDu incidence by comparing the disease burden between different years. Finally, we examined the association between river basins and CKDu incidence by overlaying the spatial layers of the disease incidence and river basins. Our results showed that there were significant spatial and temporal variations in CKDu incidence in the region over the study period. The disease is characterized by a fluctuating trend. Also, the number of hotspots has decreased over time, and the number of CKDu-affected patients has also decreased. Similarly found that CKDu hotspots were concentrated around the mainly 4 river basins in the region, indicating a possible link between water resources and the disease. By identifying CKDu hotspots and understanding the disease's movement over time, public health officials can target their efforts more effectively, reducing the disease's impact on affected communities. This study provides important insights into the spatial and temporal patterns of CKDu and suggests the need for further research to investigate the potential environmental risk factors contributing to this disease.

Key Words: Chronic Kidney Disease of Unknown Etiology (CKDu), Hotspots Analysis, Spatial and Temporal Variation, Geographical Information System (GIS)

