

A GIS-based Spatiotemporal Analysis of Chronic Kidney Disease/Chronic Kidney Disease of Unknown Etiology in the North Central Province, Sri Lanka (2010-2020)

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Chronic Kidney Disease (CKD)/CKD of Unknown Etiology (CKDu), has become a significant public health concern in North Central Province (NCP), Sri Lanka over the last decade. This study aims to analyse the spatiotemporal patterns of CKD/CKDu in the NCP from 2010 to 2020, focusing on hotspots and their correlation with the population over 60 years, the age group with the highest prevalence. The NCP, located in the dry zone, covering 10,472 km², is the largest province in Sri Lanka that has over 3,000 tanks and a population of 1.3 million, with more than 65% engaged in agriculture-related activities. Data collection relies on the Annual Health Bulletin-2020 for CKD/CKDu cases per 100,000 population, demographic data from the Humanitarian Data Exchange and previous research studies. The analysis focused on 03 time phases; 2010-2013, 2014-2016, and 2017-2020 employing multi-temporal mapping, hotspot analysis, and correlation analysis using ArcGIS 10.8.2 and Excel. The study revealed that, from 2010-2013, hotspots were concentrated in Padaviya and Kebithigollawa in the northern Anuradhapura district, and during 2014-2016, this concentration shifted to Madavachchiya and Rambewa. From 2017-2020, hotspots moved to Elahera and Tamankaduwa in the west of Polonnaruwa, areas not previously identified as hotspots. Remarkably, the southern of Anuradhapura has consistently been a coldspot over the past decade. In Horowpothana, Kahatagasdigiliya, Maha Vilachchiya, Padaviya, Lankapura, and Elahera, high incidences of CKD/CKDu correlate with a high elderly population. Conversely, areas such as Galnewa, Kekirawa, Ipalogama, Palagala, and Thambuttegama have a high elderly population but fewer reported cases of CKD/CKDu. Access to drinking Reverse Osmosis (RO) water projects, improved health infrastructure, CKD/CKDu screening and awareness programs influenced the CKD/CKDu hotspot dynamics in the NCP. Identifying these spatiotemporal changing patterns and their correlation with demographic factors provides insights for public health interventions and resource allocation to address the CKD/CKDu burden in the region.

Keywords: Chronic Kidney Disease, CKD of Unknown Etiology, Hotspots, North Central Province, Geographic Information System