

A Study on Geographical Distribution of Chronic Kidney Disease of Unknown Origin in Sri Lanka Using GIS and GPS Mapping

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An alarmingly high incidence of an apparently new form of chronic kidney disease of unknown aetiology (CKD-U) was noticed in some parts of Sri Lanka in the early nineties and a steady increase has been observed within the last twenty years. Histopathological studies have revealed a tubulo interstitial nephritis at early stage of the disease which is suggestive of a toxic aetiology. Researchers who investigated the disease proposed a number of risk factors including high level of fluoride in ground water, leaching of heavy metals such as cadmium from agrochemicals into water sources, exposure to inorganic pesticides and usage of aluminium containers for cooking. However, the lack of sufficient epidemiological studies made the identification of the aetiological agent difficult.

The aim of the present study was to investigate the geographical distribution of CKD-U using modern GPS and GIS mapping. Information of 11630 patients were used for GIS mapping using ARC 9.2 software and GPS mapping.

GIS mapping indicated five high prevalent areas in the region, namely, Medawachchiya (identified 20 yrs ago), Padaviya (identified 18 years ago), Girandurukotte (identified 12 years ago), Medirigiriya (identified 8 years ago) and Nikawewa (identified five years ago). Low prevalence of the disease was noted in communities who consume water from natural springs for drinking. All the high prevalent areas are clustered around reservoirs of the irrigation system. In all five areas, the distribution is related to stagnant irrigated water. GPS mapping showed most of the cases were located below the level of some reservoirs and some were related to the irrigation canals.

The epidemiological data on geographical distribution infers that while older foci of CKD-U are persisting, there is an emergence of new foci of CKD-U with time. The presence of the affected villages located below the level of the reservoirs and canals indicated the possibility of irrigated water draining to the shallow wells of households which is the source of drinking water. A similar pattern of distribution of endemic nephropathy was described in Balkan region along the Danube river in low altitude areas where water stagnates.