# 3.10 A PRELIMINARY REPORT ON CHRONIC KIDNEY DISEASE OF UNKNOWN AETIOLOGY –SRI LANKA

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## CHRONIC KIDNEY DISEASE OF UNKNOWN AETIOLOGY - SRI LANKA

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### Background

- Chronic Kidney Disease (CKD) is an emerging health problem and it is often combined with poor health outcomes and high economical cost and burden on patient, family, community and health system.
- In Sri Lanka, 4.6% of the annual health budget was spent on management of CKD patients and this was amount to 350 million rupees (Health Ministry).
- The hospital morbidity rate for diseases of urinary system has gone up from 727 cases in 1980 to 1,155 cases / 100,000 population in 2005. They were the 7$^{th}$ leading cause of hospitalization in 2005 (Annual Health Bulletin 2005).
- The hospital mortality rate for diseases of the genitourinary system has doubled during the period 1980 – 2005 i.e. 3.1 to 6.5 deaths / 100,000 population. At national level, they were the 11$^{th}$ leading cause of hospital deaths in 2005. However, this group of diseases was the 1$^{st}$ leading cause of deaths in Vavuniya, 3$^{rd}$ leading cause in Anuradhapura, 4$^{th}$ leading cause in Polonnaruwa, 6$^{th}$ leading cause in Jaffna, 7$^{th}$ leading cause in Trincomalee and 8$^{th}$ leading cause in Badulla district (Annual Health Bulletin 2005).
- According to the statistics available, a significant increase of CKD cases has been observed in recent years in the North Central Province (NCP), which consists of Anuradhapura and Polonnaruwa districts. In 2003, in Anuradhapura District there were 1098 cases and 143 deaths while in Polonnaruwa, 291 cases and 55 deaths i.e. NCP contributed 22% of cases 17% of deaths at national level. It should be noted that population of the province was only 6% of the total population of the country. In 2005, Teaching Hospital Anuradhapura alone reported 742 live discharges and 140 deaths due to CKD.
- Interest in CKD in Sri Lanka has been stimulated by the finding that for most of the CKD cases reported from NCP and its surroundings, the **aetiology is not known**.

**Disease profile - CKD of unknown aetiology**

- The disease is slowly progressive, asymptomatic during most part of the disease course and there were no specific clinical features.
- Haematological and biochemical profiles of the patients have not shown any specific characteristics. Histological findings were that of tubulo-interstitial disease, which is more in favour of a toxic nephropathy.
- The disease onset is in adolescence, and the proportion of cases developing chronic renal failure increases with age indicating the progressive nature of the disease.

**Profile of North Central Province**

The North Central Province situated in the dry zone of the country. The capital of the province, Anuradhapura is located 200 km away from Colombo, towards the North. The NCP, largest province in the country, has a land area of 9,741 sq km i.e. 16% of total area of the country, but the population density was only 119 per sq km (national 314) in 2005. According to the labour force survey conducted in 2003, about 55% of the employed were engaged in agriculture, forestry and fishing (at national level 34%). The vast majority of the population depends both on untreated groundwater (shallow wells) and surface water (tanks) sources for their domestic water supplies.

**Aetiology**

Aetiology of the CKD is still remains a mystery. The existing evidence (based on studies conducted during 2000 - 2006) suggests that,

- For most of the cases prevalent in NCP and its surroundings, the aetiology was uncertain
- It has a strong regional bias
- There is a tendency for male preponderance
- Paddy farmers were at high risk
- CKD of unknown etiology appears to be a new disease entity

Although CKD gains epidemic dimensions worldwide, it is rarely directly caused by environmental factors. The aetiology varies between countries, but diabetes and hypertension are usually dominant factors, followed by glomerular and vascular causes. However, the regional clustering of cases seen in Sri Lanka strongly suggests some

environmental factors. The aetiology of CKD seen in areas other than that of the dry zone of Sri Lanka is similar to that described in most part of the world. As shown in the table below, all CKD cases studied in a different province had diabetes, long standing hypertension or both.

**Summary of the findings of population-based studies**

| **Proteinuria (as a disease marker for CKD)** | **North Central Province 2001 (n = 4107)** | **Central Province 2004 (n = 253)** |
|---|---|---|
| Prevalence among > 18 years old | 4.8% | 3.2% |
| Percentage with uncertain aetiology | 95% | 0% |

The geo-environmental and socioeconomic characteristics of the North Central Province are unique in many aspects. High fluoride content in the groundwater is a common finding in the dry zone, particularly in the NCP. Agriculture being the main occupation, invariably the community gets exposed to high concentrations of agrochemicals such as pesticides and fertilizers. In addition to the direct exposure, the water sources get contaminated with these chemicals. Due to the scarcity of drinking water in the province, the community has to collect water from distance and in the process of collection and storage of water, utensils made out of substandard quality aluminum are generally used.

Presence of high levels of fluoride, agro-chemicals and heavy metals (e.g. cadmium) in soil and water sources could be postulated as the geo-environmental factors contributing to the high prevalence of CKD in the NCP, particularly because of the fact that the food and water are obtained mostly from the terrain itself.

**Public Health Issue**

CKD of unknown aetiology meets the criteria for consideration as a public health issue, because

- Disease burden is high. It is experienced in terms of premature mortality and morbidity, quality of life, and cost and is perceived as a threat by the public;
- It is distributed unfairly. There is a regional clustering of cases and the prevalence is high among comparatively young male farmers;

- There is evidence that upstream preventive strategies - strategies that target socioeconomic and environmental factors could substantially reduce the burden of this condition;
- The evidence shows that such preventive strategies are not yet in place.

**Prevention**

**Primary prevention:** Though the aetiology is still not clear in this case, pesticides, fluoride and heavy metals are known nephrotoxic agents. The messages such as good management of hypertension and diabetes, proper use of pesticides and safe water could be taken to the masses as a part of the national campaign for prevention and control of CKD in the country.

**Secondary prevention:** The progress of the disease can be delayed by early diagnosis and treatment. In this regard, screening is a useful tool for secondary prevention, because:

- There is a recognized latent / early asymptomatic stage
- There is a test that can detect CKD before the onset of symptoms
- Facilities available for confirmation of diagnosis
- Early detection and treatment reduce morbidity and mortality

**Tertiary prevention:** There are issues of grave concern such as lack of treatment facilities (for dialysis & renal transplantation) and rehabilitation programmes. About 11 state hospitals around the country provide dialysis and only about 100 machines are available both in the state and private sectors for this purpose. It was grossly inadequate considering the fact that at least 2000 patients in a year need dialysis.

**Recommendations**

- Seek broad input and develop network of partners e.g. Epidemiology Unit, Directorates of NCD, E & OH, MRI, WHO, development partners, NGOs etc.
- Develop communication materials for advocacy and awareness
- Map possible risk factors e.g. chemical content of water sources
- Develop capacity and infrastructure for behaviour, risk factor and disease surveillance
- Establish a screening programme at the community level

- Establish a database at regional level including disease registries
- Promote research - comprehensive scientifically sound studies by interdisciplinary teams of experts to unravel the aetiology, epidemiology, disease pathogenesis, disease markers, economic burden, cost-effectiveness of interventions etc.

[This report was prepared to facilitate further discussion on formulation of strategies and interventions for the prevention and control of CKD of unknown aetiology]

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## Conceptual Framework