

## Air Quality Assessment of Highly CKDu-Affected Areas of the Anuradhapura District

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North Central Province (NCP) reports the highest number of chronic kidney disease (CKD) patients in SL, with 10% of the adult population affected by this disease. Of them, 27% have been related to unknown causes associated with CKD (CKDu). Although numerous studies have revealed that prolonged exposure to high concentrations of air pollutants, especially PM<sub>2.5</sub>, can cause kidney failure, limited studies have been conducted locally, particularly in the highly CKDu-prone northern part of the Anuradhapura District. This study aimed to monitor and compare the air quality of the highly CKDu-prone Medawachchiya area (epidemic) with less CKDu-affected Anuradhapura town (non-epidemic). Then, air quality data is assessed using local and international standards. The air quality monitoring program used AEROQUAL Series 500 portable air quality monitoring devices with sensors to record PM<sub>2.5</sub>, PM<sub>10</sub>, and Carbon Monoxide (CO). Considering traffic and other human activities, the busiest 4 hours (10 am-2 pm) of the day were conducted after a long dry period. According to the data, the 4\_h average PM<sub>10</sub> levels of Medawachchiya and Anuradhapura are 5.0 µg/m<sup>3</sup> and 4.3 µg/m<sup>3</sup>, and the average PM<sub>2.5</sub> levels are 8.3 µg/m<sup>3</sup> and 7.2 µg/m<sup>3</sup> respectively. All these results are well below the SLS limits (24\_h average) of 50 µg/m<sup>3</sup> and 100 µg/m<sup>3</sup> for PM<sub>2.5</sub> and PM<sub>10</sub>, respectively. 4\_h average CO levels of Medawachchiya and Anuradhapura were 0.89 ppm and 0.77 ppm and well below the SLS limit of 9 ppm (8\_h average). However, all the parameters of Medawachchiya are slightly higher than that of Anuradhapura. Based on a considerable number of studies, out of many pollutants, long-term exposure to PM<sub>2.5</sub> >12 µg/m<sup>3</sup> significantly increases the risk of CKDu. Though the fine particulate matter was within permissible range, it is recommended that the composition of the particulate matter be investigated further since most of the environmental toxins present are attached to fine particulate matter.

**Keywords:** Air Quality, CKDu, Particulate Matter, PM<sub>2.5</sub> and PM<sub>10</sub>

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