Prevalence of abnormal urinary cadmium and risk of albuminuria as a primary bioindicator for kidney problems among a healthy population

ABSTRACT

Background. The prevalence of chronic kidney disease is increasing globally, ranking 27th as the cause of death in the 1990s, rising to 18th in 2010 and 10th in 2019. Non-communicable diseases such as diabetes and hypertension have been identified as the common contributing factors, while there is also evidence linking environmental pollutants, especially cadmium, to kidney disease. This study aimed at investigating the level of urinary cadmium and its relationship to albuminuria as an early indicator of kidney problems in the Kepong community. Methods. Respondents were surveyed as part of several health-related programs organized by the Kepong District Health Office involving local communities in and around the district from April 2019 to December 2019. Urinalysis of two urine samples was carried out using a Mission reagent strip and an Inductively Coupled Plasma Mass Spectrometry (ICP-MS) test to detect the presence and level of urinary cadmium. Results. A total of 240 respondents were enrolled from April 2019 to December 2019. Urinalysis of two urine samples was carried out using a Mission reagent strip and an Inductively Coupled Plasma Mass Spectrometry (ICP-MS) test to detect the level of urinary cadmium. The respondents' average age was 41-year-old (±13.23). Among them, 49.6% were male, 85.0% Malay, 5.8% Chinese and 8.3% Indian. 55.0% had background of tertiary, 39.6% secondary and 5.4% primary level of education. 52.1% were categorized in B40, 34.6% in M40 and 13.3% in T20 based on monthly household income category. 26.7% were hypertensive, 6.7% diabetic, 4.2% had dyslipidemia, 51.7% had urinary cadmium above the alert level, and 27.1% had albuminuria. Discussion. Risk factors for albuminuria that have been identified are age with adjusted odds ratio (AOR) 3.53 (1.41–8.83; $p < 0.05$), highest educational level with AOR 2.18 (1.14–4.17; $p < 0.05$), diabetes with AOR 3.36 (1.07–10.52; $p < 0.05$), and urinary cadmium with AOR 4.72 (2.33–9.59; $p < 0.001$), with future screening programs placing greater attention to those at risk and further research is required to determine the cause of exposure to cadmium.