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Lung Function, Urinary Heavy Metals And ITS Other Influencing Factors Among Community In Klang Valley

Authors : Ammar Amsyar Abdul Haddi, Mohd Hasni Jaafar

Abstract : Heavy metals are elements naturally presented in the environment that can cause adverse effect to health. But not much literature was found on effects toward lung function, where impairment of lung function may lead to various lung diseases. The objective of the study is to explore the lung function impairment, urinary heavy metal level, and its associated factors among the community in Klang valley, Malaysia. Sampling was done in Kuala Lumpur suburb public and housing areas during community events throughout March 2019 till October 2019. respondents who gave the consent were given a questionnaire to answer and was proceeded with a lung function test. Urine samples were obtained at the end of the session and sent for Inductively coupled plasma mass spectrometry (ICP-MS) analysis for heavy metal cadmium (Cd) and lead (Pb) concentration. A total of 200 samples were analysed, and of all, 52% of respondents were male, Age ranging from 18 years old to 74 years old with a mean age of 38.44. Urinary samples show that 12% of the respondent (n=22) has Cd level above than average, and 1.5 % of the respondent (n=3) has urinary Pb at an above normal level. Bivariate analysis show that there was a positive correlation between urinary Cd and urinary Pb (r= 0.309; p<0.001). Furthermore, there was a negative correlation between urinary Cd level and full vital capacity (FVC) (r=-0.202, p=0.004), Force expiratory volume at 1 second (FEV1) (r = -0.225, p=0.001), and also with Force expiratory flow between 25-75% FVC (FEF25%-75%) (r= -0.187, p=0.008). however, urinary Pb did not show any association with FVC, FEV1, FEV1/FVC, or FEF25%-75%. Multiple linear regression analysis shows that urinary Cd remained significant and negatively affect FVC% (p=0.025) and FEV1% (p=0.004) achieved from the predicted value. On top of that, other factors such as education level (p=0.013) and duration of smoking(p=0.003) may influencing both urinary Cd and performance in lung function as well, suggesting Cd as a potential mediating factor between smoking and impairment of lung function. however, there was no interaction detected between heavy metal or other influencing factor in this study. In short, there is a negative linear relationship detected between urinary Cd and lung function, and urinary Cd is likely to affects lung function in a restrictive pattern. Since smoking is also an influencing factor for urinary Cd and lung function impairment, it is highly suggested that smokers should be screened for lung function and urinary Cd level in the future for early disease prevention.

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