



Article

Higher Lead and Lower Calcium Levels Are Associated with Increased Risk of Mortality in Malaysian Older Population: Findings from the LRGS-TUA Longitudinal Study

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Abstract: The main objective of this study is to determine the association of various trace elements' status with the 5-year mortality rate among community-dwelling older adults in Malaysia. This study was part of the Long-term Research Grant Scheme—Towards Useful Ageing (LRGS-TUA). The participants were followed up for five years, and their mortality status was identified through the Mortality Data Matching Service provided by the National Registration Department, Malaysia. Of the 303 participants included in this study, 34 (11.2%) participants had died within five years after baseline data collection. As compared to the survivors, participants who died earlier were more likely ($p < 0.05$) to be men, smokers, have a lower intake of total dietary fiber and molybdenum, higher intake of manganese, lower zinc levels in toenail samples, lower calcium and higher lead levels in hair samples during baseline. Following the multivariate Cox proportional hazard analysis, lower total dietary fiber intake (HR: 0.681; 0.532–0.871), lower calcium (HR: 0.999; 95% CI: 0.999–1.000) and higher lead (HR: 1.309; 95% CI: 1.061–1.616) levels in hair samples appeared as the predictors of mortality. In conclusion, higher lead and lower calcium levels are associated with higher risk of mortality among community-dwelling older adults in Malaysia. Our current findings provide a better understanding of how the trace elements' status may affect older populations' well-being and mortality rate.

Keywords: calcium; lead; mortality; older adults; trace elements



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1. Introduction

Global shifting toward aging populations is one of the main issues in the 21st century [1]. The proportion of the older population is increasing mainly due to the reduction in fertility rate and increase in life expectancy, and this phenomenon is more evident in developing compared to developed countries. The improvement in life expectancy is partly due to reducing mortality against infectious diseases. Meanwhile, non-communicable diseases and geriatric syndromes (e.g., cognitive decline and physical frailty) have become the major health threats among the older population, probably due to lifestyle changes, including diet [2]. Consequently, there are higher numbers of older people experiencing illnesses, disabilities, and dependency, posing a significant burden on global health. Preventive medicine and reducing impairments and disabilities due to diseases are the leading solutions to reduce social and health burdens [3].

The predictors and risk factors associated with mortality in older populations have been determined in many studies. Age and sexes are well-known unmodifiable risk factors