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Health Risk Assessment after Exposure to Aluminium in Drinking Water between Two Different Villages

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Author(s)

M. S. Qaiyum, M. S. Shaharudin, A. I. Syazwan, A. Muhaimin

ABSTRACT

A cross-sectional study was conducted at Mukim Parit Lubok (MPL) and Parit Raja (PR), Batu Pahat, Malaysia. The main objective of this study was to determine the aluminium concentration in drinking water and to perform health risk assessment prediction among respondents from these two residential areas. A total of 100 respondents were selected from the study areas based on inclusive and exclusive criteria. Two duplicates of treated water samples were taken from each respondent's house using 200mL high-density polyethylene (HDPE) bottles and 0.4 mL (69%) pure concentrated nitric acid were added as a preservative. Aluminium concentrations were analyzed using a Lambda 25 UV/V spectrophotometer. The result showed that aluminium concentration in drinking water from MPL was 0.18 ± 0.022 mg/L and 0.22 ± 0.044 mg/L for PR. Statistical analysis showed that 14 (28%) water samples collected from MPL and 35 (70%) from PR recorded concentration of aluminium above the standard limit set by the Ministry of Health, Malaysia for drinking water guideline (0.2 mg/L). The mean value of Chronic Daily Intake (CDI) of aluminium in drinking water from PR (0.00707 mg/kg/day) was significantly higher compared to MPL (0.00164 mg/kg/day). Hazard Index (HI) calculation showed that all respondents had "HI" of less than 1. In conclusion, there was an unlikely potential for adverse health effects from aluminium intake in drinking water from both study areas. However, it was necessary for some actions to be taken in order to reduce aluminium levels found in drinking water for both locations.

KEYWORDS

Aluminium, Drinking Water, Health Risk Assessment, Chronic Daily Intake (CDI), Hazard Index (HI)

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