

Long-term arsenic exposure and incidence of non-insulin-dependent diabetes mellitus: a cohort study in arseniasis-hyperendemic villages in Taiwan

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Abstract

Diabetes prevalence in arseniasis-hyperendemic villages in Taiwan has been reported to be significantly higher than in the general population. The aim of this cohort study was to further evaluate the association between ingested inorganic arsenic and the incidence of non-insulin-dependent diabetes mellitus in these villages. A total of 446 nondiabetic residents in these villages were followed biannually by oral glucose tolerance test. Diabetes is defined as a fasting plasma glucose level ≥ 7.8 mmol/L and/or a 2-hr post-load glucose level ≥ 11.1 mmol/L. During the follow-up period of 1499.5 person-years, 41 cases developed diabetes, showing an overall incidence of 27.4/1,000 person-years. The incidence of diabetes correlated with age, body mass index, and cumulative arsenic exposure. The multivariate-adjusted relative risks were 1.6, 2.3, and 2.1 for age ≥ 55 versus < 55 years, a body mass index ≥ 25 versus < 25 kg/m², and a cumulative arsenic exposure ≥ 17 versus < 17 mg/L-years, respectively. The incidence density ratios (95% confidence intervals) between the hyperendemic villages and the two nonendemic control townships were 3.6 (3.5-3.6), 2.3 (1.1-4.9), 4.3 (2.4-7.7), and 5.5 (2.2-13.5), respectively, for the age groups of 35-44, 45-54, 55-64, and 65-74 years. The findings are consistent with our previous cross-sectional observation that ingested inorganic arsenic is diabetogenic in human beings.