

Dose-response Relationship Between Arsenic in Drinking Water and Urinary Cancers in Taiwan

How-Ran Guo

Professor, National Cheng Kung University, Taiwan

Ya-Ling Chung

National Cheng Kung University, Taiwan

Ming-Hsien Lin

National Cheng Kung University, Taiwan

Yung-Po Liaw

Chung Shan Medical University, Taiwan

Abstract:

While arsenic has been recognized as carcinogenic to the urinary system, uncertainties remain regarding the dose-response relationship, and data on its effects on the prostate are limited. To assess dose-response relationships between arsenic ingestion and urinary cancers, including prostate cancer, conducted a study in Taiwan. Using the death registry data from 1971 to 2000, we calculated the age-standardized mortality rates (ASMRs) with the 1976 world standard population as the reference group. We used the data from a 1974–1976 census survey of wells on the arsenic levels in drinking water conducted by the government to assess exposure levels. The survey divided the arsenic levels into three groups: < 0.05 ppm, 0.05–0.35 ppm, and > 0.35 ppm. We analyzed the data were using multiple linear regression models and geographical information system. We found increases in the ASMRs of all urinary cancers combined and bladder and kidney cancers in both sexes at the level of > 0.35 ppm, but not at the level of 0.05–0.35 ppm. As to prostate cancer, there were no significant associations between the arsenic level in drinking water and the ASMRs.

Keywords:

Arsenic, Bladder Cancer, Dose-Response Relationship, Renal Cancer, Prostate Cancer, Urinary Cancer.