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Correlation between Fluoride Level in Drinking Water and the Prevalence of Hypertension: an Ecological Correlation Study

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Excessive intake of fluoride is associated with a wide range of adverse health effects.¹⁻⁴ In a study from China, there was a higher risk of hypertension (HTN) in those resided in areas with relatively higher water fluoride concentrations.⁵ In another study from Iran, a significant positive correlation was found between the mean concentration of fluoride in the groundwater and the mean systolic blood pressure of men.⁶ In this ecological correlation study, We examined the relationship between fluoride level of drinking water with the prevalence of HTN in people living in villages of Bushehr Province, southern Iran.

Fluoride concentration in drinking water and the prevalence of HTN were collected for 91 villages in Bushehr Province, southern Iran. These villages were home to 160 150 inhabitants (80 661 males and 79 489 females). The prevalence of HTN was calculated by dividing the number of patients with HTN by the total population in each village (all ages) that were extracted from the provincial health center surveillance system. The standard SPADNS method was used for the analysis of fluoride level in the drinking water of each

village.

The studied villages though were almost similar in terms of cultural issues, were home to a wide range of population from a minimum of 21 to a maximum of 12 097 people. The median (interquartile range [IQR]) fluoride level in drinking water in the studied villages was 0.8 (0.9) mg/L; there were significant ($p=0.04$) difference among the studied villages. The HTN prevalence ranged from 0.3% to 30.3%. Using a weighted least square linear regression analysis with HTN prevalence as the dependent variable, water fluoride level as the independent variable, and inverse of squared standard error of the mean ($1/SEM^2$) of the HTN prevalence as the weight, we found a significant negative correlation between the HTN prevalence and water fluoride level (Fig 1).

Unlike, previous studies that report positive correlation between fluoride level in water and the risk of HTN, we found a negative correlation. Considering the controversial results on the effect of fluoride on cardiovascular system, it seems reasonable to conduct further studies on this important issue.

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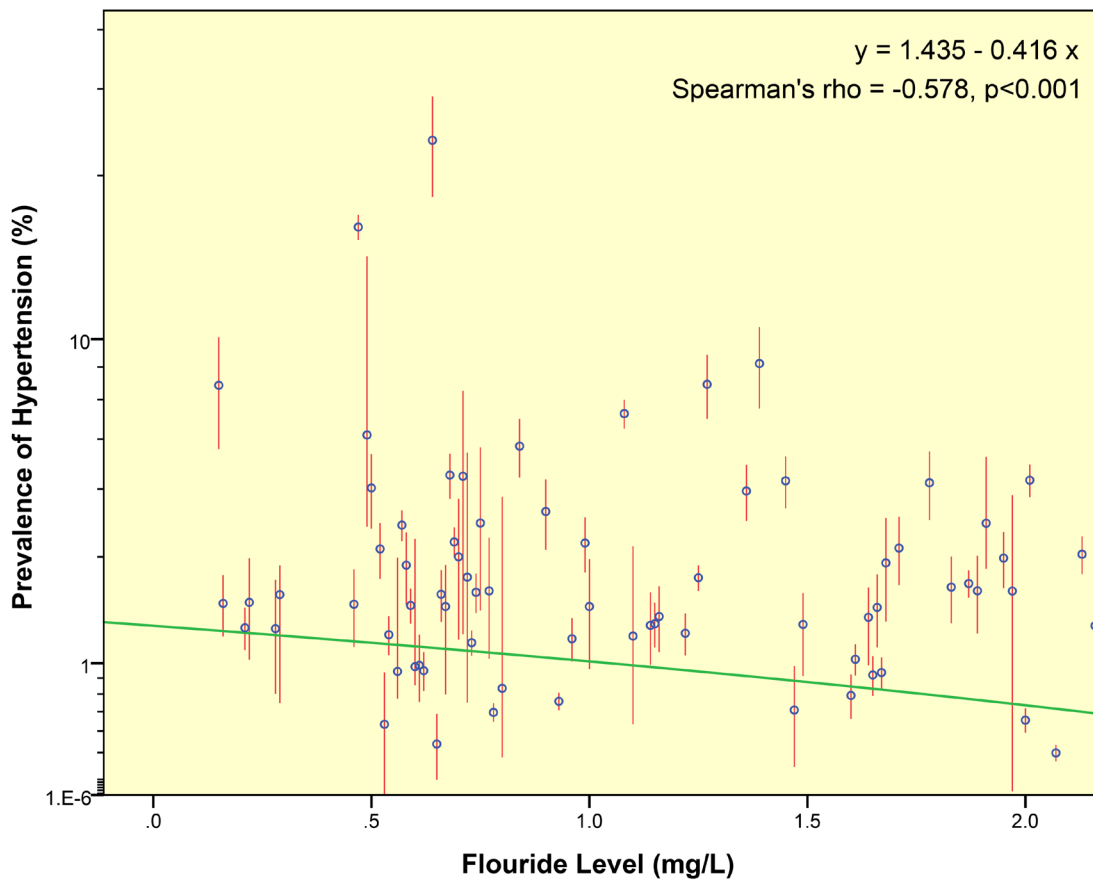
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Figure 1: Association between the prevalence of HTN and fluoride level in drinking water in 91 villages of Bushehr, southern Iran. Error bars represent SEM.

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