

HEALTH DAMAGE RELATED TO THE CONSUMPTION OF HIGH CONCENTRATIONS OF FLUORIDE AND ARSENIC IN DRINKING WATER

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ABSTRACT

Fluoride and arsenic are among the twenty most common elements in the earth's crust. Their presence in water may be due to infiltration and dissolution of these elements from soil and rocks. Because of this, they are frequently found in the underground water supplies. In the Guadiana Valley (The city of Durango and its surroundings, Mexico), the drinking water supply comes from underground wells and is characterised by a high content of these elements.

Mottled teeth have identified the valley's inhabitants for a long time. However, the problem goes beyond the cosmetic, because the identified contents of drinking water are several times higher than the 1.5 mg/L value established by national and international regulations. The presence of arsenic in this region has been recently identified, being determined in some well concentrations as above the 0.05 mg/l allowed by regulations.

In this study, a quantitative diagnostic of health effects in the school age population (6-12 years) was made in the Guadiana valley through a multistage sampling per conglomerates of the population. The damage caused by fluoride was quantified using the DEAN index. Skin damage was considered a clinical indicator of the damage caused by arsenic. Both parameters were associated with fluoride and arsenic concentrations in drinking water. Study results showed a high association between the degree of damage evaluated through the index and the fluoride concentration in drinking water. In the part of valley with fluoride concentrations higher than 12 mg/l, all the children interviewed showed dental fluorosis and 35% of them had suffered serious damage. We also observed a high linear correlation between the DEAN index and the frequency of broken bones. It was not possible to identify signs of hydroarsenism in the population with the chosen indicator; better indicators are needed to identify a relationship between health damage and arsenic in drinking water. It is possible that arsenic concentrations, although high, are insufficient to reach the threshold of clinical manifestations.

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