

**Research on the Intellectual Ability of 6-14 Year Old Students in an Area with
Endemic Fluoride Poisoning**

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Using Chinese comparative testing, an investigation of the intellectual abilities of students at Hongwu Elementary School (Ankang city, Shaanxi province) was carried out; with the subjects coming from an area that has drinking water-related endemic fluoride poisoning, and the control selected from among students who live in non-endemic areas but who go to the same school.

The endemic area is at the outskirts of the city, a single village consisting of 1000+ residents whose water comes from a deep well and has a fluoride content of 7.00 ppm; the neighboring areas show no sign of fluoride poisoning, each having less than 0.8ppm of fluoride in their water. There are 403 students at the school, 204 of them live in the endemic area, and the rate of dental fluorosis among these students is 93.6%, while there are no dental fluorosis sufferers among the 199 students from neighboring areas who also go to the school. Not only are two areas similar in terms of culture, standard of living, lifestyle, and access to medical services and transportation, but the classes are mixed, and all the students are Han Chinese and the children of farmers.

This study investigated the IQs of 379 students in total, including 198 students from the endemic region with IQs ranging from 68 to 105 and average IQ of 85.15 as well as 181 students for the non-endemic region with IQs ranging from 60 to 107 and an average IQ of 84.90, ($t = 0.79$, $p > 0.05$); there were no significant statistical differences due to age or gender. The grades of the students showed a direct correlation with the IQ measured (endemic area, $r = 0.5199$, $p < 0.001$, non-endemic area, $r = 0.5012$, $p < 0.001$), and the results also matched up with the appraisals provided by their teachers. The IQs of adults from the areas were also measured, and the intellectual ability and even the life expectancy of people from the endemic region appeared to be higher than the non-endemic region, indicating that the effect of fluoride poisoning on intellectual ability is negligible. Both the endemic and non-endemic areas show no signs of endemic goiter; since 1968 the region has been supplied regularly with iodinated salt. However this region is economically and culturally underdeveloped with life here difficult, and the results suggest that the intellectual development of all the children studied is poor; both areas show only average or below average IQs, with 28.29% and 29.28% of children in the "low" category in the endemic and non-endemic regions, respectively, and there was no "excellent" students in either area; even the 100-110 range had only 5.10% and 6.63% of students within that range, respectively. These results suggest nutritional deficits and social, economic, and cultural underdevelopment are the primary factors in low intellectual ability seen in both the subjects and the control, but further research should be done to determine if the excess zinc or manganese found in grains consumed in the region may also be playing a role.

(Translation by Julian Brooke, 3/30/07)