FLUORIDE-ASSOCIATED BIOCHEMICAL AND BEHAVIORAL CHANGES IN ADULTS IN RAJASTHAN, INDIA

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SUMMARY: Fluoride (F) toxicity is a burgeoning problem worldwide including in Rajasthan, India, where almost all the districts have high-Fdrinking/ground water sources, with up to 18.0 ppm, and approximately 11 million of the population are at risk of fluorosis. Several clinical and experimental studies have reported that the F induces changes in cerebral morphology and biochemistry that affect neurological function.In the present study, 105 males, aged 54.5 ± 9.8 yr, were selected from the high-F region of the eastern regions of Jaipur, Rajasthan, India, where the water F is 5.5 ± 1.2 ppm., and age-matched controls, aged 55.8 ±8.7 yr, were selected from a low-F part of the Jaipur district where the waterF level was less than 1.5 ppm. The serum F and acetylcholinesterase (AChE) levels were estimated and the Mini Mental State Examination (MMSE) was used to assess behavioral changes in the subjects and the controls. The activity of AChE was found to be significantly reduced ($p<0.001$) in the high-F region subjects and it was directly correlated with the scores on the MMSE test. On the basis of these results, we concluded that F exposure promotes adeterioration in sympathetic and parasympathetic neurons with reduced AChE activity and cognitive impairment.

Key Words: Acetylcholinesterase; Cognitive decline; Fluoride; MMSE.

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