DENTAL FLUOROSIS AMONG CHILDREN IN LAXMISAGAR VILLAGE, BANKURA DISTRICT, WEST BENGAL, INDIA

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SUMMARY: A survey was conducted in the remote area of Laxmisagar village of Simlapal Block, Bankura District, West Bengal, India, of the fluoride (F) concentration in ground water and dental fluorosis in children, 66 boys and 83 girls, aged 6 – <8 yr, 8 – 10 yr, and >10 yr. The ground water F concentration range was 0.25–9.30 mg F/L and the mean 2.02 mg F/L. Using Dean’s Index, the severity of dental fluorosis tended to increase with age, particularly for girls but the result was not significant (boys: r=0.474, p=0.893; girls: r=0.949, p=0.146). In the >10 yr groups, severe dental fluorosis was present in 15.79% of boys and 35% of girls.

Keywords: Bankura District, West Bengal, India; Dental fluorosis; Deans’ index; Fluoride in water; Ground water pollution; Laxmisagar.

INTRODUCTION

High ground water fluoride (F) has long being linked to the occurrence of skeletal and dental fluorosis1-3 with the most sensitive period for development of dental fluorosis being during the enamel formation.4 In the present study, the F concentration of ground water in Laxmisagar village, Simlapal Block, Bankura District, West Bengal, India and the occurrence of dental fluorosis in children were studied.

MATERIALS AND METHODS

Twenty-seven ground water samples were collected from different locations in Laxmisagar village, 22° 55’ 24” N to 22° 55’ 47” N and 87° 00’ 09” E to 87° 00’ 55” E, and the F concentration estimated by using an Orion Star A214 electrode. (Figure 1).

Dean’s Index5,6 was used to for assessing visually the presence of dental fluorosis in 149 children, (66 boys and 83 girls, age

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groups: 6 – <8 yr, 8 – 10 yr, and >10 yr) from the respective villages for dental fluorosis study. The six gradations identified (normal, questionable, very mild, mild, moderate and severe) were given weights of 0, 0.5, 1, 2, 3 and 4 respectively.

The descriptive analysis of the tested variables along with regression analysis was carried out using MINITAB 16.0 statistical software.

RESULTS AND DISCUSSION

*F concentration in water:* The range of F concentration in the ground water was 0.25–9.30 mg/L with a mean of 2.02 mg/L, moderately higher than the permissible limit of 1.5 mg/L\(^1\text{,}^4\text{,}^7\) (Table 1).

<table>
<thead>
<tr>
<th>Total number of samples</th>
<th>Mean (mg/L)</th>
<th>Maximum (mg/L)</th>
<th>Minimum (mg/L)</th>
<th>Number of samples with F&gt;1.5 mg/L (%)</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>2.02</td>
<td>9.30</td>
<td>0.25</td>
<td>19 (70)</td>
<td>±1.82</td>
</tr>
</tbody>
</table>

*Dental fluorosis:* In boys, severe dental fluorosis (Dean’s Index = 4) was commonest in the >10 yr group (15.79%) while normal teeth (Dean’s Index = 0) were most frequent in the 6 – <8 yr group (22.22%), Figure 2.

![Figure 2. Severity of dental fluorosis in boys measured by Dean’s Index in the age groups 6 – <8 yr, 8 –10 yr, and >10 yr.](image)

Similarly for girls, severe dental fluorosis (Dean’s Index = 4) was commonest in the >10 yr group (35%) and less common in the 8 – 10 yr (16.67%) and the 6 – <8 yr (0%) groups (Figure 3).
The linear regression analysis showed that the severity of dental fluorosis tended to increase with age, particularly in girls, but the result was not significant (boys: \( r=0.474, p=0.893 \); girls: \( r=0.949, p=0.146 \), Table 2).

**Table 2.** Regression analysis for dental fluorosis in male and female children aged 6 – <8 yr, 8 – 10 yr, and > 10 yr

<table>
<thead>
<tr>
<th>Sex</th>
<th>Regression equation for Dean’s Index Score (DIS)</th>
<th>Correlation coefficient ( (r) )</th>
<th>Coefficient of determinants ( (R^2) )</th>
<th>Significance level ( (p) )</th>
<th>Durbin-Watson statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>DIS = 0.54 ( -0.009 ) (6–&lt;8) ( + 0.025 ) (8–10) ( + 0.057 ) (&gt;10)</td>
<td>0.474</td>
<td>0.225</td>
<td>0.893</td>
<td>0.549</td>
</tr>
<tr>
<td>Female</td>
<td>DIS = (-0.245) ( -0.0356 ) (6–&lt;8) ( + 0.0808 ) (8–10) ( + 0.0745 ) (&gt;10)</td>
<td>0.949</td>
<td>0.900</td>
<td>0.146</td>
<td>2.984</td>
</tr>
</tbody>
</table>

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REFERENCES


