Serum Total Homocysteine Concentrations in Children and Adolescents in Jos, Nigeria

Summary

Background: Although the elevation of circulating total serum homocysteine (tHcy) concentration in a fasting state is associated with an increased risk of occlusive vascular disease in adults, the levels in children in Nigeria are not known.

Aim: The goals of this study were to describe the distribution of tHcy among a representative sample of children and adolescents in Jos, Nigeria, and to test for differences in tHcy among sex and age categories.

Methods: The sampling scheme, which included persons aged 10 to 19 years, was a stratified, multistage probability design. This cross-sectional study involved 182 school children drawn from secondary schools in Jos, Nigeria between January and July 2003. Fasting venous samples were collected and assayed for tHcy, Total protein and Albumin. Anthropometric measurements were taken.

Result: The mean tHcy concentrations were 2.7 ± 2.4 (95% CI 2.4–2.9), 3.5 ± 3.2 (3.3–3.8) and 3.6 ± 3.2 (3.3–4.1), 4.1 ± 3.6 (4.0–4.4) μmol/l for the girls and boys aged 10–14 and 15–19 years, respectively. Albumin levels correlate positively with plasma total homocysteine, tHcy (r = 0.45, P = 0.03).

Conclusion: This study provided age-specific data regarding tHcy among a representative sample of children and adolescents in Jos, Nigeria, and to test for differences in tHcy among sex and age categories.

Key words: children, adolescent, albumin, homocysteine, age-specific.

Subjects and Methods

Subjects were secondary school pupils within the Jos town of the Plateau state of Nigeria. They were 182 in number and selected through a stratified, multistage probability design and aged 10–19 years. Consent was obtained from the parents and the research and ethical committee of the Jos University Teaching Hospital, Jos.

Result

The results obtained after analyses are as shown in the tables below.

Discussion

The results show that tHcy concentrations increased with age and higher in boys than girls within the same age range (Table 1, Fig. 1). The increase in tHcy with age is observed throughout the age range and more so in the 19°–23 years age group school children in Jos, Nigeria. This finding is in agreement with those of Must, et al. where children aged 4–19 years were studied [2]. Beynum, et al. also established from 234 white Dutch children between 0–19 years that tHcy increased with age [3]. This finding was also observed in the study of tHcy in children in Taiwan [4]. Going through the report of Reddy while establishing reference ranges for children in 1996, one can also see that there is an increase in tHcy with age [5]. Not only were there increases in mean tHcy but these investigators also observed a higher level in males than females in all the age groups studied [2–4, 6]. Atabek, et al. [6] found the mean plasma level of Hcy to be 5.6 ± 2.9 μmol/l among controls aged 6–19 years in a study in Turkey and the result of this study (3.3 ± 3.0 μmol/l) is a favourable one comparatively (Fig. 2).

Table 1

<table>
<thead>
<tr>
<th>Sex</th>
<th>Age (years)</th>
<th>Numbers(n)</th>
<th>Mean(μmol/l)</th>
<th>2SD</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>10–14</td>
<td>28</td>
<td>3.2</td>
<td>3.0</td>
<td>0.57</td>
</tr>
<tr>
<td></td>
<td>14°–19</td>
<td>50</td>
<td>3.6</td>
<td>3.6</td>
<td>0.51</td>
</tr>
<tr>
<td>Female</td>
<td>10–14</td>
<td>28</td>
<td>2.7</td>
<td>2.4</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td>14°–19</td>
<td>60</td>
<td>3.5</td>
<td>3.2</td>
<td>0.41</td>
</tr>
<tr>
<td></td>
<td>19°–23</td>
<td>8</td>
<td>5.1</td>
<td>4.2</td>
<td>1.48</td>
</tr>
</tbody>
</table>
The age specific mean values from this study compares favourably with those of other cited references [2–4, 6]. Plasma level of tHcy correlated positively with plasma albumin level ($r = 0.45, P = 0.03$).

Knowing the age specific tHcy of children and adolescents will go a long way in improving the prediction of hyperhomocysteinaemia induced or associated diseases in this age group. These individuals could be followed up every 5–10 years thus facilitating early corrective or positive intervention whenever indicated.

This study has provided age specific mean levels of tHcy within the 10–19 years age group in Nigeria and the measurement is advocated in all age groups (Table 2).

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**Table 2**

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Numbers(n)</th>
<th>Hcy (µmol/l)</th>
<th>2SD Albumin (mg/dl)</th>
<th>2SD SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>10–14</td>
<td>56</td>
<td>3.2</td>
<td>3.2</td>
<td>37</td>
</tr>
<tr>
<td>14+–19</td>
<td>110</td>
<td>3.3</td>
<td>3.0</td>
<td>36</td>
</tr>
<tr>
<td>Total (10–19)</td>
<td>166</td>
<td>3.3</td>
<td>3.0</td>
<td>36</td>
</tr>
</tbody>
</table>

This table shows the relationship between age, Hcy and albumin.

**References**


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