Research Letters

Screening for hypothyroidism in schools for children with learning difficulties in Southeastern Nigeria

Congenital hypothyroidism (CHT) is a leading cause of preventable mental impairment worldwide, and newborn screening programmes have been adopted by many countries as a means of early detection and treatment of infants with CHT [1]. In Nigeria, there are no screening programmes for CHT and no prevalence studies on hypothyroidism and its contribution to neurodevelopmental problems. Our aim was to establish whether thyroid dysfunction was a common problem in children attending schools that included healthy and learning impaired children.

Children <18 years old attending two schools for the learning disabled located in Enugu and Abakaliki (SE Nigeria) underwent measurement of thyroid-stimulating hormone (TSH) and thyroxine (T4). Enugu and Abakaliki are two of the major towns in the southeastern part of Nigeria, with an estimated population of 900,000. Schooling is integrated and so healthy and learning disabled children learn together. Intelligence was assessed using the Draw-A-Person Test as validated for Nigerian children [2]. A Draw-A-Person Quotient (DAPQ) score of <75% is considered learning disabled. Biochemical analysis was by a time-resolved fluorimunoassay (AutoDELFIA) neonatal TSH and neonatal T4 kit. The intra-assay variation for TSH and T4 was 6.1% and 14.9%, respectively, whereas the inter-assay variation was 9.0% and 10.0%, respectively. The cutoff value for a normal TSH was taken as <10 mU/l, whereas the cutoff for a normal T4 was taken as >1.6 μg/dl [3].

The study was approved by the ethics committee of the Ebonyi State University Teaching Hospital Abakaliki and written informed parental consent obtained.

A total of 117 pupils (63 male) aged 3–18 years from the two schools were studied, and none was already on T4 therapy. Thirty-three children were considered to be healthy, with the remaining children having autism (8), cerebral palsy (13), Down syndrome (16), learning disability (15) and mental retardation (32). The patient characteristics and biochemistry are detailed in Table 1. The mean height of healthy children was greater than the other children (p = 0.02). No patient had either an elevated TSH or a low T4, although the mean TSH level was higher in healthy children without an underlying diagnosis (p = 0.002). Children with a higher IQ (DAPQ > 75%) had a significantly higher TSH (1.22 mU/l) compared with those with an IQ < 75% (0.82 mU/l) (p = 0 < 0.01), and the mean T4 of those with an IQ > 75% (3.67 μg/dl) was higher than that of those with an IQ < 75% (2.93 μg/dl) (p < 0.01).

The finding that none of the screened children in these special schools had hypothyroidism (including Down syndrome) suggests that hypothyroidism is not a prominent cause of learning disability in Nigeria and supports the previously reported low prevalence of CHT among blacks, including African Americans [4]. The limitations of this study include the small sample size, and a larger study is recommended before a definitive conclusion about screening for CHT in Nigeria is reached. The reason for the lower TSH and T4 in children with an underlying diagnosis is unclear, although it is possible that there is a contribution from non-thyroidal illness.

<table>
<thead>
<tr>
<th>Problems</th>
<th>Autism</th>
<th>CP</th>
<th>DS</th>
<th>LD</th>
<th>MR</th>
<th>Normal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender(M/F)</td>
<td>5/3</td>
<td>6/7</td>
<td>8/8</td>
<td>8/7</td>
<td>18/14</td>
<td>18/15</td>
<td>63/54</td>
</tr>
<tr>
<td>Mean T4 (μg/dL)</td>
<td>3.25 ± 0.6</td>
<td>2.81 ± 0.7</td>
<td>2.59 ± 0.9</td>
<td>2.91 ± 0.9</td>
<td>3.17 ± 0.8</td>
<td>3.69 ± 0.6</td>
<td>p = 0.97</td>
</tr>
<tr>
<td>Mean TSH (mU/l)</td>
<td>0.61 ± 0.2</td>
<td>0.77 ± 0.4</td>
<td>1.04 ± 0.8</td>
<td>0.89 ± 0.6</td>
<td>0.78 ± 0.6</td>
<td>1.25 ± 0.7</td>
<td>p = 0.01</td>
</tr>
<tr>
<td>IQ test (&lt;75%)</td>
<td>7 (88%)</td>
<td>13 (100%)</td>
<td>16 (100%)</td>
<td>12 (80%)</td>
<td>29 (90%)</td>
<td>2 (6%)</td>
<td>p = 0.00</td>
</tr>
<tr>
<td>IQ test (&gt;75%)</td>
<td>1 (13%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>3 (20%)</td>
<td>3 (9%)</td>
<td>31 (94%)</td>
<td>p = 0.00</td>
</tr>
<tr>
<td>Mean height SD</td>
<td>0.01 ± 1.2</td>
<td>−0.58 ± 1.3</td>
<td>−1.02 ± 2.1</td>
<td>0.04 ± 1.2</td>
<td>−0.68 ± 4.1</td>
<td>0.48 ± 1.3</td>
<td>p = 0.02</td>
</tr>
<tr>
<td>Mean weight SD</td>
<td>0.34 ± 1.1</td>
<td>0.16 ± 1.7</td>
<td>0.97 ± 0.4</td>
<td>−0.09 ± 0.9</td>
<td>0.39 ± 1.9</td>
<td>−0.09 ± 1.5</td>
<td>p = 0.24</td>
</tr>
</tbody>
</table>

CP = Cerebral Palsy, DS = Down syndrome, LD = Learning Disability, MR = Mental Retardation.
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Status of Iodine Deficiency Among Children in
National Capital Territory Of Delhi—A
Cross-sectional Study

Summary
Iodine deficiency disorder is a public health prob-
lem in NCT of Delhi. The present study was

conducted in NCT of Delhi to assess the current
iodine nutrition status among school age chil-
dren (6–11 years). Thirty clusters (schools) were
selected by utilizing the population proportionate
to size (PPS) cluster sampling methodology. A total of 1393 school age children were
included. Urine samples were collected and
tested for urinary iodine excretion (UIE). The
Median UIE was found to be 200 μg/L. The
salt samples collected from study subjects
revealed that 87% of salt samples had stipulated
level of iodine of 15 ppm and more. In order to
eliminate IDD, there is a need to sustain the
supply of iodized salt and monitor its iodine con-
tent regularly.

Key words: Iodine deficiency disorders, urinary
iodine excretion, iodized salt, Delhi.

The National Capital Territory (NCT) of Delhi is a
known iodine deficiency endemic area [1, 2]. A recent
survey conducted in 1995 in school-age children
(SAC) aged 8–10 years reported a total goiter rate
(TGR) of 8.6% and median urinary iodine excretion
(UIE) level of 170 μg/l [3]. Another study conducted
in the year 2002 among SAC aged 6–11 years
reported a TGR of 6.2% and UIE level of 200 μg/l
[4].

To ensure adequate availability and use of iodized
salt, the government of the NCT of Delhi issued a
ban on the sale of non-iodized salt for human
consumption in March 1989. Under this, iodized
salt with a minimum of 30 ppm iodine at the manu-
facturer’s level and 15 ppm iodine at the consumer
level should be available in the state [1].

The present cross-sectional study was conducted
during July–October 2012. The World Health
Organization (WHO) recommends that UIE level
should be used as the criteria for assessing the
iodine nutritional status in a population. The present
study was conducted with the objective of assessing
the current iodine nutrition status among SAC (aged
6–11).

The school enrollment of primary classes was
>90%; hence, the school-based approach was
adopted for survey. The 30 clusters studied were
identified by using population proportionate to
size sampling (PPS) methodology recommended by
WHO/United Nations International Children’s
Emergency Fund/International Council for the
Control of Iodine Deficiency Disorders. All the pri-
mary schools in the district with their total enroll-
ment were enlisted, and the schools were selected
for the detailed study using the PPS cluster sampling
methodology [5].

The sample size of children to be surveyed was
calculated with the anticipated prevalence of iodine
deficiency as 20%. Confidence level of 95%, absolute