Elimination of iodine deficiency in the Republic of Georgia

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Background
Georgia, a country of 4 million inhabitants, is situated in the south Caucasus bordering Russia, Azerbaijan, Armenia and Turkey. Iodine deficiency disorders (IDD) were endemic in the Republic of Georgia secondary to low iodine levels in the water and soil. Cases of giant goiter and cretinism were described in the book “Goiter in Svanetia” (the historical region of Georgia) published in the beginning of the last century. An endemic goiter control program was implemented in Georgia, then a republic of the former USSR, in 1955-1986, including salt iodization and distribution of iodine tablets to vulnerable groups.

Since 1996, efforts have been made by the government of Georgia and international partners, such as UNICEF, to implement universal salt iodization (USI). These have included a 1996 Presidential decree requiring salt iodization, establishing the National IDD Council, a 1997 tax exempt policy for iodized salt imports, and elaboration of national standards for iodized salt in 1998. A breakthrough was the law on the “Prevention of iodine, other microelement and vitamin deficiencies” that was passed in February 2005, banning the import and sale of non-iodized salt.

Salt importation
All iodized salt in Georgia is imported, primarily from Ukraine, but with small amounts from Greece, Azerbaijan, Russia, and Turkey. Current regulations mandate iodization at 40 +/- 15 ppm. Over 40,000 tons of salt were imported in 2005, of which 90% was classified as iodized.
2005 national survey

A national school-based cluster survey of 970 children aged 6–12 years was conducted in November 2005 to measure the impact of the recent law on salt iodization. Urinary iodine (UI) excretion was measured in 900 selected children by an accredited Belgium laboratory. Goiter prevalence was assessed by palpation of 200 children per school by endocrinologists. The 970 selected children were asked to bring a salt sample from their homes to school the following day. They were also asked to note the manufacturer and expiration date of the salt. Compliance was 98.7%. Household salt iodine content was measured in the field using MBI rapid testing kits (for both KI and KIO3). Approximately 20% of samples were randomly selected for WYD (portable spectrophotometry) testing, as well as for iodometric titration (for only KIO3). Results of the survey (1) showed that median (range) UI was 321 (29-9034) µg/L. Only 4% of samples were less than 100 µg/L, while 41% were in the range of 100 to 299 µg/L and 55% were above 300 µg/L.

The goiter rate by palpation is presented in Table 1. The frequency of goiter decreased with increasing household salt iodization. Female gender and increasing age were associated with a higher prevalence of goiter. The high frequency of goiter in Georgia likely reflects longstanding iodine deficiency, rather than current iodine status. Thyroid size decreases in response to increases in iodine intake, but goiter rate may not return to normal for months or years after correction of iodine deficiency primarily due to persisting goiter in older children [2].

Field testing of salt samples for iodine (n=957) showed that 81.5% of samples were fortified with KIO3, 14.4% with KI, and 4.1% were not iodized. Five samples of iodized salt (only KIO3 tested, n=136) were randomly selected from each cluster and tested by iodometric titration. Median iodine concentration was 40.2 ppm (range 9.5 – 74.1), and 94.1% of samples were adequately iodized (>15ppm).

Figure 1 summarizes the success of Georgia’s efforts to eliminate IDD.

<table>
<thead>
<tr>
<th>Goiter Grade</th>
<th>Number (%)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3092 (67.6%)</td>
<td>62.5-72.8</td>
</tr>
<tr>
<td>1</td>
<td>1284 (31.0%)</td>
<td>26.3-35.6</td>
</tr>
<tr>
<td>2</td>
<td>44 (1.4%)</td>
<td>0.5-2.3</td>
</tr>
<tr>
<td><strong>Total goiter rate (Grade 1 + 2)</strong></td>
<td><strong>1328 (32.4%)</strong></td>
<td><strong>27.2-37.5</strong></td>
</tr>
</tbody>
</table>

While only 8% of salt was adequately iodized in 1999 and only 67% was iodized in 2003, over 90% of salt samples were adequately iodized in 2005. Similarly, there has been improvement in iodine nutrition. In 1998, 80% of urine samples had and iodine concentration less than 100 µg/L; in 2005, only 4% of samples were under 100 µg/L. Goiter rates are also decreasing. In 2003, goiter prevalence was 39%, whereas in 2005, goiter prevalence was 32%.

Conclusions

With the passage of the 2005 law banning the import and sale of non-iodized salt, Georgia now meets the primary WHO/UNICEF/ICCIDD criteria for elimination of iodine deficiency: more than 90% of households are using adequately iodized salt, median UI is above 100 µg/L and only 4% of population has UI levels <100 µg/L. Although goiter rates are still high, they should continue to decrease with sustained consumption of iodized salt. Continued enforcement of legislation on salt iodization will be essential for sustaining IDD elimination in the Republic of Georgia.