Iodized salt in processed foods in Armenia

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Located in the South Caucasus, Armenia was historically affected by endemic goiter that was virtually eliminated in early 1970s as part of effective salt iodization strategy in the USSR. Iodide deficiency returned in 1991 when Armenia became independent after dissolution of the Soviet Union. However, starting from 1999, production of iodized salt was resumed by sole national salt producer “Avansalt”. In 2004 the government passed decree No. 353-N making production and import of iodized salt mandatory as well as its use at household level and for food processing. A national survey was conducted in Armenia in 2005 showing that 97.2% of households were using adequately iodized salt while median UIC among 8-10 year-old children was slightly above 300μg/L, most likely due to a relatively high level (50 ± 10 mg/kg) of iodine content in salt [1]. Subsequently, this was reduced to 40 ± 15 mg/kg. The most recent survey (2016), confirmed that the country’s population has adequate iodine nutrition with median UIC of 242μg/L in school-age children and 226 μg/L in pregnant women [2].

A recent WHO STEPS survey revealed that adult population (18-69 years) consumes around 10 g of salt per day and the percentage of people who always or often eat processed foods high in salt is over 31% [3]. In Armenia, as many other middle-income countries, a significant part of salt intake comes from processed foods (70–80%) but the contribution of industrially-processed food salt to population iodine intake remained uncertain. To fill in this gap, in 2019 the National Working Group (NWG) on IDD led by the National Institute of Health of the Armenian Ministry of Health, with technical and financial support from IGN, used new Guidance [4] to assess the main sources of dietary iodine and the contribution of industrially-processed food salt to population iodine intake. According to Armenia Statistical Agency reports, a wide range of processed foods, including key salt-containing products, such as bread, cheese, processed meats, and pickled vegetables, are produced and largely consumed within the country. National regulation requires that only iodized salt can be used in foodstuffs produced for domestic supply, except for cases when the use of iodized salt is not allowed by production technology. In fact, only a few soft cheeses are exempt from USI requirements.

It was agreed to develop two models: one for the general (adult) population group and another for pregnant and lactating women. No modeling was possible for children under the age of 2 years and those aged 2 to 18 years, given the absence of food consumption data.

**FIGURE 1** Contribution to % daily RNI iodine (150 μg/day) from iodized salt from estimated per capita consumption of selected processed foods in adults in Armenia: 1 = Potential iodine intake if 100% of salt is iodized, 2 = Current iodine intake based on 93.4% of household iodized salt use, 82% for bakery salt, 7% for cheese salt, 83% for salt for meat products, 44% for pickles salt, 5% pasta salt, 0% for other foods, 3 = Potential iodine intake after 30% salt reduction.

**FIGURE 2** Contribution to % daily RNI iodine (250 μg/day) from iodized salt from estimated per capita consumption of selected processed foods in pregnant women in Armenia: 1 = Potential iodine intake if 100% of salt is iodized, 2 = Current iodine intake based on 93.4% of household iodized salt use, 82% for bakery salt, 7% for cheese salt, 83% for salt for meat products, 44% for pickles salt, 5% pasta salt, 0% for other foods, 3 = Potential iodine intake after 30% salt reduction.
The NWG looked into three potential scenarios: (1) potential iodine intake if 100% of food grade salt is iodized; (2) estimated iodine intake based on current 93.4% household coverage with iodized salt, 82% use of iodized salt in bakeries, 7% for production of cheese, 83% for meat products, 44% for pickled/preserved vegetables, 5% for pasta, and 0% for others; and (3) potential iodine intake after 30% salt reduction if current salt iodization levels are maintained.

**Results**

The modeling allowed to estimate the contribution of most important processed foods and household salt to iodine intake for Armenian population (Figures 1 and 2).

- Mean per capita daily salt intake from household salt and major salt-containing foods is 10.6 g, of which 4.0 g originates from household salt, 4.3 g from bread and 2.3 g from all other key salt containing foods combined.
- The modelling showed that in Scenario 1, 196% and 118% of the daily RNI for iodine in adults and pregnant women, respectively, could be met.
- Under Scenario 1, an estimated 149% and 90% of the current daily RNI for iodine for adults and pregnant women, respectively, would be covered by the use of iodized salt in about 93.4% of households and the selected industrially-processed foods.
- In the Scenario 3, in case of 30% salt reduction, 105% and 62% of the daily iodine RNI for adults and pregnant women, respectively, could be met.

**Discussion**

Results of the modeling show that, at the current level of iodized salt use at household level and in bakeries combined, 136% of RNI for iodine in adults and 82% of the RNI in pregnant women are covered while other processed foods provide a significantly smaller share of iodine. Obviously these two sources are largely responsible for maintaining adequate iodine nutrition of the Armenian population as confirmed by 2016 Iodine survey [2]. In Armenia, bread is the leading staple food with high per capita consumption (more than 300 g/day) that is similar to many countries of the East Mediterranean Region.

Dietary patterns in Armenia are shifting towards increased consumption of processed foods; the latter are known worldwide to be a major source of salt in people’s diets. Armenia is also confronted with excessive sodium (salt) consumption making salt reduction strategies extremely relevant. The current modeling yielded an average intake of 10.6 g salt from household salt and key salt-containing foods, whereas the Armenia’s 2016 STEPS Survey [3] found a mean salt intake of 9.8 g/day in adults (11 g/day for men and 8.4 g/day for women) based on sodium excretion measured in 24 hour urine samples. In a spin-off of the 2016 Iodine Survey, sodium was measured in spot urine samples of adult women and, based on urinary Na/Creatinine ratios, average sodium intake was calculated at 5.5 g/day, equivalent to salt consumption of 13.9 g/day [2]. Under current modelling, 30% reduction in salt intake would result in optimum (105% of RNI) iodine intake in adults and potentially inadequate (62% of RNI) in pregnant women. Clearly, more studies are needed to assess salt intake in the Armenian population before developing and implementation of salt reduction policy.

Based on results of this assessment of the main sources of iodine in the diet and the contribution of industrially-processed food salt to population iodine intake, the Armenian NWG updated the national action plan and suggested several steps to strengthen the salt iodization strategy aiming to ensure sustainability of adequate iodine nutrition in Armenia.

**References**

4. IGN Programme Guidance on the Use of Iodised Salt in Processed Foods, 2019