Revived salt iodization in Lebanon ensures adequate iodine during pregnancy
A transformed and renewed salt iodization program in Lebanon ensures pregnant women have adequate iodine intakes during pregnancy

History of iodine nutrition in Lebanon

Iodine is an essential nutrient for healthy pregnancy and normal growth and development. A deficiency in iodine induces many detrimental health effects in populations, termed the “Iodine Deficiency Disorders” (IDD). As part of ongoing efforts to reduce IDD, salt iodization programs have been implemented worldwide. In Lebanon, iodine deficiency was identified as a serious health problem following a series of studies in 1960s, in which a high prevalence of poor iodine nutrition was reported across all age groups, along with high goiter rates in children (1-3).

In 1971, The Lebanese government approved a law (178/1971) for salt iodization that mandates the addition of 10–200 mg of iodine per kg of table salt. However, the salt iodization program was put on hold due to conflicts in Lebanon and IDD remained a problem. A study in 1993 found 25% of 7–16 year old children had goiter, and mean urinary iodine concentration (UIC) was only 60 μg/L (4). It was not until 1995 that the law for salt iodization was first implemented.

Subsequent studies showed improvement in iodine status in the Lebanese population, with an increase in the mean UIC of children to 95 μg/L in 1997 (5). Additionally, surveys done in 1996 and 2004, reported that 90% of Lebanese households were consuming adequately iodized salt, with 82% of salt in the market containing more than 15 ppm of iodine in 2004. In 2011, the law 178/1971 was amended and the range of iodization was modified to 60–80 mg of potassium iodide or potassium iodate (35.6-47.4 ppm of iodine) for salt fortification.

However, data from a national survey in 2014 conducted by the American University of Beirut (AUB), supported by the Swiss Federal Institute of Technology (ETH) Zurich and IGN, alarmingly showed declining iodine intakes, with the median UIC of school aged children falling to 66 μg/l (the level close to pre-iodization), indicating iodine deficiency. At the same time, iodine analysis of salt samples from the market in 2015 showed little or no iodine content, indicating a poor compliance to the salt iodization law. More than a half (56%) contained less that 15 ppm of iodine, and 68% contained less than 35.6 ppm, the minimum amount required by Lebanese law. Similarly, a survey at that time conducted by Lebanese Ministry of Public Health (MOPH) reported only 1 out of 38 salt samples were adequately iodized.
Renewed commitment to iodized salt
In response, AUB, IGN and UNICEF sponsored several activities to address the problem. Discussion was initiated with the stakeholders, e.g. the MOPH, salt factories, and other NGOs. Salt factories were provided with potassium iodate, trained on the proper iodization procedure, and supplied with iCheck machines to monitor the quality of salt iodization. Internal monitoring and quality control checks were conducted regularly to ensure continuous appropriate iodization levels. An external monitoring system also took place at the production level, with frequent visits to salt factories carried out to test iodine levels in random salt batches and ensure adequate iodization.

National study of pregnant women
To assess the impact of the reinvigorated salt iodization program, the American University of Beirut, with support of IGN and the ETH Zurich, Switzerland conducted a cross-sectional study of pregnant women at four monitoring sites throughout Lebanon in 2018-19. After signing the informed consent form, each woman was asked to provide a spot urine sample, for measurement of urinary iodine concentration and urinary creatinine concentration, and a dried blood spot sample to measure thyroid hormones. For every 3rd participant of the study, a second urine sample was collected a week after the first collection. Spot urine samples and dried blood spots were shipped to ETH Zurich for analysis.

Sample collection took place in four hospitals from different regions to obtain a diversified sample population. The sites are shown in the map (Figure 1) and included:
- Haykal Hospital in Tripoli, North Lebanon
- Mayyas Hospital, Chtoura, Bekaa governorate
- Makassed General Hospital, Beirut
- AUB Medical Center, Beirut

Samples were collected from about 400 pregnant women from these regions (Figure 1) revealed a median UIC of 183 μg/L, above the 150 μg/L threshold of UIC indicating adequate iodine intake for pregnant women. By region, median UIC was also adequate in the different regions: 187 μg/L in North Lebanon, 188 μg/L in the Bekaa region, and 178 μg/L in the Beirut region.

A clear improvement is also noted when examining iodine in salt samples collected from households in 2020 (Figure 1), with only 20% found to have less than 15 ppm of iodine. In addition, 41% of salt samples collected were found adequately fortified with iodine with levels above 35.6 ppm. In salt samples gathered from South Lebanon (25 samples) and the Bekaa region (31 samples), the mean iodine content was 30.5 ppm and 38.8 ppm, respectively.

The future: sustaining the achievement
Clearly, the renewed commitment to salt iodization by the Government and the salt industry, with the support from AUB, UNICEF and IGN, has reinvigorated the Lebanese iodized salt program. The program is now supplying adequate iodine to pregnant women, a key target group. The goal now is to sustain these achievements, ensuring a steady supply of iodine to the population, so that future generations of Lebanese children can achieve their full potential.

References