Sentinel surveys in northern Algeria assess iodine intake in women

Endemic iodine deficiency has been described previously in Algeria’s mountainous northern regions. In the early 1990s, a study in six villages of the Bordj Bou Arreridj province reported cretinism (1.1%), transient neonatal hypothyroidism, and a high prevalence of goiter (51%) in the general population, linked to severe iodine deficiency (1,2). A median UIC of only 27 µg/L was reported in school-age children (2).

In areas affected by goiter, sale of iodized salt had been compulsory since 1967. Following the global call to adopt universal salt iodization to combat iodine deficiency disorders, Algeria replaced the decree with a nationwide mandatory law in 1990 (3). In 2013, UNICEF estimated that around two-thirds (67.3%) of households consumed iodized salt in Algeria, ranging from 24% in the central highlands to 85% in the central northern regions (4). Iodized salt coverage varied by only 10% between rural and urban households (61% and 71%, respectively). Yet, the socio-economic divide was much more pronounced, with coverage ranging from 82% in wealthiest to only 54% in poorest households.

Despite these evident gaps, iodine status has been monitored infrequently and mostly through focal surveys in areas with a suspected iodine problem. In 2006–2009, a small case-control study investigated iodine status in a group of 1st trimester pregnant women (PW) and their age-matched non-pregnant controls recruited at prenatal clinics and maternity units in Oran province (400 km west of Algiers). The authors recorded a median UIC of 204 µg/L in PW and 227 µg/L in controls, both in the optimal range (5-6). In another prospective study, conducted at a gynecology center of a central military hospital in Algiers between 2009 and 2012, pregnant women from different regions of the country had adequate iodine intakes before the 20th week of pregnancy, with a median UIC (IQR) of 180 µg/L (10, 500; n=276) (7).

In 2010, a study enrolled 82 school-age children in the north-western province of Sidi Bel Abbes, a province 70 km to the south of Oran, to better understand the causes of goiter in the local population (8). However, the reported median UIC of 166 µg/L suggested that iodine deficiency was not a likely etiology.

Addressing knowledge gaps with a sentinel study

Our sentinel study was designed to assess the current iodine status and thyroid function of WRA and PW in Algiers (an urban area),...
and Tizi Ouzou (a rural town) in northern Algeria. We recruited healthy WRA and PW from two hospital centres, one in Algiers and in Tizi Ouzou. We took a morning spot urine sample, and a blood sample for measurement of thyroid hormones (TSH, T4), thyroglobulin, and antibodies (anti-TPO). UIC was measured at the Human Nutrition Laboratory of the ETH Zürich, Switzerland. In WRA, the median UIC (IQR) in Tizi Ouzou was 253 µg/L (167, 341; n=150) and in Algiers, 256 µg/L (166, 354; n=151). In the pregnant women, the median UIC was 233 µg/L (157, 326; n=172), indicating optimal iodine intakes. Considering the uneven national coverage of iodized salt, the selective and varied nature of the available iodine studies (see also Box), it is unclear whether the reported iodine intakes can be fully explained by consumption of iodized salt, nor if they reflect the national situation. Since iodine intakes are frequently higher in school-age children than in their mothers, it would be important to assess iodine status in this age group, in particular to evaluate the risk of adverse health outcomes in case of iodine excess. Although most of the studies discussed above assessed biomarkers of thyroid function, the findings are not conclusive. Further, the etiology of goiter in Algeria warrants more investigation. Finally, to ensure that optimal iodine intakes can be achieved and sustained across all populations in Algeria, it will be important to monitor periodically the quality of salt iodization in addition to estimating household coverage.

**Iodine status of Saharawi refugees in Tindouf**

In 1975, tens of thousands of Saharawi refugees started arriving in the harsh desert area of Tindouf, in the West of Algeria, fleeing from the Western Sahara war (9). For the first ten years, the refugees received aid from the Algerian government. In 1986, given the protracted character of the conflict, assistance from the international community was requested. In 2011, WFP and UNHCR estimated that the camps were a permanent home to around 90,000 refugees. The protracted refugee, the extremely harsh climate, and remoteness of the area have forced the settlers to rely on humanitarian assistance for their survival. Yet, the camps have strong internal governance, with little need for outside interference.

Local studies in the 1990s detected high levels of iodine in groundwater (which may be related to the region’s proximity to the Mediterranean Sea): 724 µg/L in the camps of Rabuni, 934 µg/L in El Ayoun, and 259 µg/L in Dahlia (10), steeply above the typical range of 0.01–70 µg/L (11). In 2007, high iodine concentrations were also confirmed in domestic animal milk (12). Consequently, iodine intakes among the refugee populations have been excessive: a median (IQR) UIC in SAC of 565 µg/L (357, 887; n=417) (12), and 466 µg/L (294,725; n=394) in WRA (13) have been reported. Iodine excess is believed to be a factor contributing to the high goiter rates persisting in these populations: 86% in SAC and 22% in WRA (12, 13).

Within refugee populations that are dependent on food aid, iodine status would be typically dependent on the iodine content of the food ration. In many such cases, basic food aid items such as cereals, pulses, oil, blended cereal foods and salt are supplied by WFP and complementary food items may be supplied by UNHCR. The iodine content of these commodities is expected to be low except in the case of salt or US-manufactured fortified blended cereal foods, which are fortified with iodine (14). In Tindouf, the standard cereal blend was replaced with an “iodine free” formula in April 2010 (9) to better meet the needs of the local population.

**References**