Guest Editorial

Iodine Nutrition Requirements During Pregnancy

The recommendations of the American Thyroid Association (ATA) for iodine nutrition during pregnancy have been reviewed by the ATA’s Public Affairs Committee in this issue of Thyroid (1). The members of this committee are highly distinguished thyroidologists whose extensive experience brought together can only be equaled by the length of their individual professional careers (incidentally, I feel no longer that young myself).

What have they done?

- They reviewed the different sources of dietary iodine in the population of the USA and Canada (salt, dairy products, vitamin/mineral preparations, etc.).
- They delineated the recommended daily iodine intake for non-pregnant (and non-lactating) adults and infants: 150 μg of iodine/d for adults; 110 μg of iodine/d for 0–6 month olds and 130 μg of iodine/d for 7–12 month olds.
- They reviewed the recommended iodine intake for pregnant and lactating women. Following a Technical Consultant’s panel meeting held at the headquarters of W.H.O. (Geneva) in January 2005, it was recommended to increase the iodine intake of pregnant and lactating women to 250 μg/day (range: 200–300 μg/day).
- They assessed the available information on iodine excretion levels in the US, keeping in mind that a urinary iodine concentration (UIC) of ~100 μg/L is considered to represent a daily iodine intake of ~150 μg. Successive National Health and Nutrition Examination (NHANES) surveys in the USA have clearly identified a marked decrease in UIC from a median value of 321 μg/L in 1971–1974 to 145 μg/L in 1988–1994, and a stabilization thereafter: 161 μg/L in 2000 and 168 μg/L in 2001–2002.
- Concerning women in the child bearing age and pregnant, the two most recent NHANES surveys showed that the median urinary iodine excretion levels were adequate, i.e., 127 and 141 μg/L, respectively, in 1988–1994, and 132 and 173 μg/L, respectively, in 2001–2002.
- Despite overall adequacy of iodine nutrition in the US population, it is important to note that 11–12% of the general population had a UIC <50 μg/L. Furthermore for women of reproductive age (15–44 years), the prevalence of this target population excreting less than 50 μg of iodine/L reached 15.3% in 1988–1994 and increased slightly to 16.8% in 2001–2002. The same trend was observed for the pregnant women who were included in the surveys, with 6.9% of them excreting less than 50 μg of iodine/L in 1988–1994 and 7.3% in 2001–2002.

What are their conclusions for the general population?

- America’s diet appears to be generally sufficient in overall iodine, although highly variable from food to food, and even among foods within the same category (dairy products, for instance).
- There are likely to be some outliers where iodine intake may be insufficient for some people and potentially excessive for others. One of the weaknesses of the NHANES surveys is that their design (with total anonymity) did not allow to pinpoint the geographical regions or socio-economic sections of North America where these ‘outliers’ may be more prevalent.
- The current data do not lead to a recommendation of iodine fortification in the diet for the population as a whole.

What are their main recommendations for the specific cases of pregnant and lactating women?

- To encourage manufacturers to include 150 μg of iodine in all vitamin/mineral preparations labeled for use during pregnancy and lactation.
- To continue monitoring iodine nutrition in the US population, including larger sampling of pregnant women.
- To encourage continuing studies of nutritional sources of iodine for the US population by the FDA and the USDA.
- The committee came to the conclusion that until additional physiologic outcome data become available, supplementation of pregnant and lactating women with 150 μg of iodine per day is in keeping with the current international recommendations and appears safe.

To evaluate the adequacy of iodine nutrition in a population, the best single parameter is provided by measurements of urinary iodine excretion levels (UIE) in a representative sampling of the population. However, although UIE is highly useful for public health estimations of iodine intake in a population, UIE alone is not a valid diagnostic criterion in individuals. To assess the adequacy (i.e., the long term sufficiency) of iodine nutrition in an individual, the best single parameter would be to estimate the amount of iodine stored within the thyroid gland, corresponding to ~10–20 mg of stable iodine. This parameter is, however, not measurable in practice. Therefore in a given pregnant woman, the best surrogate is to evaluate those thyroid parameters that have been shown to be sensitively altered when a pregnancy takes place in iodine-deficient women. Iodine restriction during pregnancy results in a significant lowering in serum free T4 as....
well as a rise in serum TSH, a progressive increase in serum 
TG, an elevation of the total molar T$_3$/T$_4$ ratio, and finally 
an increase in thyroid volume that may lead to goiter for-
mation in both the mother and fetus (2). During pregnancy, 
several physiologic changes take place in maternal thyroid 
economy which, together, lead to an increase in thyroid hor-
mone production of ~50% above the preconception baseline 
hormone production. In order to achieve the necessary in-
crement in thyroid hormone production which begins al-
ready in early gestation and is maintained throughout, the 
iodine intake needs to be increased during pregnancy (3). 
The Recommended Nutrient Intake (RNI) for iodine during 
pregnancy has recently been re-evaluated by an interna-
tional expert committee under the auspices of the World Health 
Organization. The consensus reached by the panel was that 
the RNI for iodine during pregnancy should range between 
200–300 $\mu$g/day, with an average of 250 $\mu$g/day. During 
breast-feeding, the physiology of thyroid hormone produc-
tion and urinary iodine excretion returns to normal but io-
dine is efficiently concentrated by the mammary gland to be 
excreted in breast milk. Since breast milk provides approxi-
ately 100 $\mu$g of iodine per day to the infant, it was also rec-
ommended that the breast-feeding mother should continue 
to take 250 $\mu$g/day of iodine (4).

For the implementation of iodine fortification during 
pregnancy, several epidemiological situations must be dis-
tinguished. In countries with a longstanding and well-es-
established universal salt iodization (USI) program, pregnan-
cies are not at risk of having iodine deficiency. Therefore, no 
systematic dietary fortification needs to be organized in these 
populations. It can however be recommended individually 
to pregnant women to use vitamin/mineral tablets specifi-
cally prepared for the needs of pregnancy and containing io-
dine supplements, since it has been shown that, even in such 
apparently satisfactory iodine intake conditions, a fraction of 
pregnant women may still have an insufficient dietary io-
dine intake. In countries without an efficient USI program, 
or an established USI program where the coverage is known 
to be only recent and/or partial, complementary approaches 
are required to reach the RNI for iodine. Such approaches 
include the use of iodine supplements in the form of potas-
ium iodide (100–200 $\mu$g/day) or the inclusion of KI (125–150 
$\mu$g/day) in vitamin/mineral preparations specifically manu-
factured for pregnancy requirements. Finally in areas with 
severe iodine deficiency and generally no accessible USI pro-
gram and difficult socioeconomic conditions, it is rec-
ommended to administer iodized oil orally as early during ges-
tation as possible.

The overall purpose of editing “recommendations” is de-
batable. Some would argue that recommendations tend to 
set obligations and thereby block the freedom of medical 
practice, and also reject novel approaches that wouldn’t fit 
with the established dogma. Others would argue that, on the 
contrary, recommendations are an extremely useful tool 
because they help broadly set the scene of a medical issue 
and also provide helpful guidelines to care providers. Recom-
mendations present an intrinsic difficulty, similar (con-ceptually, at least) to what can be observed in the field of 
economy when confronting macro-economic and micro-
economic resources. For instance, a given country may have 
a good foreign trade exchange balance as well as a dimin-
ishing public internal debt (two obvious elements of macro-
economic success) and, nevertheless, face a high rate of un-
employment among the young and low earnings for retirees 
two obvious elements of a not-so-sound micro-economic sit-
uation). Similarly in medicine, there is a difficulty in ex-
trapolating public health data (i.e., iodine excretion levels in 
abundance (a population) to the care of a single individual (i.e., the 
amount of iodine that a healthy woman with a normal preg-
nancy should receive), especially in the context of pregnancy 
which is—and should remain—considered a physiologic and 
hopeful event. There is no easy way to bridge this gap. 
Thus, the efforts of the scientific community ought to 
base recommendations on the best available evidence-based 
information, processed by known experts in the field, who 
and can then propose guidelines that are acceptable by all, until 
new evidence is obtained to modify our views. This is the 
challenge the ATA’s Public Affairs committee succeeded in 
doing.

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of iodine deficiency in pregnant and lactating women and in 
children less than two years old: Conclusions and recom-


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