SUMMARY



IODINE AND THYROID

QANUILIRPITAA? 2017

Nunavik Inuit Health Survey

The thyroid is a gland that is part of the endocrine system and is located at the bottom of the neck. The thyroid synthesizes and releases hormones that affect all bodily systems, including the cardiovascular and nervous systems, and are key in regulating metabolism. The thyroid releases two hormones: triiodothyronine (T3) and thyroxine (T4). In their available form, they are known as free T3 (fT3) and free T4 (fT4). Their release is regulated by the pituitary gland's thyroid-stimulating hormone (TSH). An imbalance in these hormones can lead to disorders and a vast range of negative health outcomes. Because thyroid disorders can have an impact on most of the body's systems, these hormones are important to public health. Thyroid disorders are conditions that relate to the thyroid and imbalances of its hormones. The prevalence of thyroid disorders is known to be greater in older individuals and in women. The main disorders are hyperthyroidism and hypothyroidism. In hyperthyroidism, the thyroid overproduces hormones whereas in hypothyroidism, the thyroid underproduces hormones. These disorders can be classified into two categories: clinical and subclinical. In the clinical definition, both TSH and fT4 or fT3 are in abnormal ranges. In the subclinical definition, only TSH is abnormal whereas fT4 and fT3 are in normal ranges.

Iodine is an essential nutrient to thyroid health as it is a key building block of thyroid hormones. The World Health Organization (WHO) considers a population's median urinary iodine concentration of 100 to 199 µg/L to be adequate with less than 20% of the population having concentrations below 50 µg/L. During pregnancy, iodine concentrations between 150 and 249 µg/L are considered adequate to meet the needs of both the mother and the fetus, as iodine is essential for brain development and growth. Many country foods are rich in iodine, including seaweed, mollusks, and other marine foods. Both an excess and a deficiency in iodine can lead to both types of thyroid disorders. Another cause of thyroid disorders is thyroid auto-immunity, a condition that is highly influenced by genetics.

The main objectives of this report were to study the prevalence of thyroid disorders in Nunavik and evaluate the iodine status of the population.

THYROID DISORDERS

Most Nunavimmiut (87.9%) were considered euthyroid, that is, their measured hormones were found to be in the normal range. More men than women were in this range (92.3% vs 83.3%), which was expected. Further, a greater percentage of Nunavimmiut were in the euthyroid range in Hudson Strait and in Ungava Bay than in Hudson Bay (90.5% and 91.9% vs 83.1%). These regional differences were found for both sexes. Of those who were not in this euthyroid range, more were suspected of having hyperthyroidism (10.7%) than hypothyroidism (1.6%). More Nunavimmiut were suspected of having subclinical than clinical hyperthyroidism (8.6% vs 2.2%). More women than men were suspected of having subclinical hyperthyroidism (11.8% vs 5.5%). Regional differences in the prevalence of subclinical hyperthyroidism were only observed in women, with more women in Hudson Bay suspected of having subclinical hyperthyroidism than in Hudson Strait or Ungava Bay (19.6% vs 7.5% and 5.9%). More Nunavimmiut were suspected of having clinical than subclinical hypothyroidism (1.4% vs 0.4%). These patterns of thyroid disorder prevalences were similar in Nunavik and Inuit in Greenland. Only 4.9% of Nunavimmiut had high concentrations of thyroid auto-immunity biomarkers. These levels were similar to those of Inuit in West Greenland.

The geometric mean concentrations of thyroid biomarkers were each in the normal range. Overall, the geometric mean of TSH was 0.82 µIU/mL, that of fT4 was 14.07 pmol/L, and that of fT3 was 5.02 pmol/L. Each of these concentrations in 2017 was lower than those in the previous Qanuippitaa? Nunavik Inuit Health Survey in 2004, however, as mentioned, their means remain in the normal range. Compared to the general Canadian population, TSH and fT4 levels were lower in Nunavik in the 16-to-49 age group. No significant differences in thyroid hormone levels were observed among those older than 50 years.

IODINE STATUS

The median urinary iodine concentration of the general population was 79.8 µg/L and 91.9 µg/L in pregnant women. Each of these is below the concentration range for adequate iodine nutrition of 100-199 µg/L for adults and 150-249 µg/L for pregnant women established by the WHO. Further, about 20% of Nunavimmiut had iodine concentrations below 50 µg/L. The population in Nunavik would thus be considered mildly iodine deficient. Only Nunavimmiut in Ungava Bay were considered to have adequate iodine nutrition with a median iodine concentration of 103.6 µg/L and 15.6% of the population having concentrations below 50 µg/L. Women had higher median iodine concentrations compared to men (89.8 µg/L vs 72.1 µg/L). Nunavimmiut aged 30 to 49 had lower concentrations of iodine compared to those aged 16 to 29 and those older than 50 years (70.4 µg/L vs 85.2 µg/L and 80.9 µg/L). Compared to the general Canadian population, median urinary iodine concentrations were significantly lower in Hudson Strait and Hudson Bay but were similar in Ungava Bay. The crude prevalence of mild and moderate iodine deficiency was higher in Nunavik compared to the general Canadian population (39.2% vs 22% and 12.4% vs 7%).

CONCLUSIONS

In summary, most Nunavimmiut had adequate thyroid hormone levels. Of those whose thyroid hormones were not in the normal range, hyperthyroidism was more prevalent than hypothyroidism in Nunavik in 2017. Furthermore, overall Nunavik's population was considered mildly iodine deficient at that time, though Ungava Bay was considered iodine sufficient. Iodine deficiency was also prevalent among the 32 pregnant women involved in the survey, which can have an impact on brain development and growth of the fetus.

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Qanuilirpitaa? 2017 is a population health surve carried out in Nunavik from August to October 2017. A total of 1 326 Nunavimmiut aged 16 and over from all villages participated to this survey.

Nakurmiik to all Nunavimmiut who contributed to this important health survey!

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