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Iodine nutrition in Albania

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Abstract:-

Objective:- Adequate iodine intake is required for the synthesis of thyroid hormones that are important for normal fetal and infant neurodevelopment. IDD s remain a public health problem in Albania in the recent past, Albania had severe iodine deficiency disorders, as shown by severe data. This study aims to describe urinary iodine excretion during pregnancy in women living in of the Central - South East area of Albania that resulted with middle and severe IDD prevalence, and low level of iodine content in salt (National IDD survey 2006).

Methods:- Cross-sectional study conducted in pregnant women. Pregnant women, from first to second trimesters, attending health care centers for mothers and children in their living areas were enrolled. Urinary iodine excretion and the iodine in salt in household level were measured in 137 women.

Results:- The median urinary iodine concentration was 159.4 µg/l, indicating non iodine deficiency, but 48,5 % of the urine samples examined showed iodine insufficiency, 29,4% sufficient iodine and 22% excessive iodine. Iodine content was found to be adequate in 73.7 per cent of salt samples. The median iodine concentration of salt samples was 29.6 mg/l.

Conclusions:- The data showed a good progress, but Albanian pregnant women are still iodine insufficient. Findings of this study call for further attention to iodine intake during pregnancy. The currently recommended intake of iodine through universal salt iodization may not be adequate for pregnant and lactating women, and supplementation during pregnancy and lactation should be further considered in light of the latest recommendations.

Keywords: Iodine deficiency disorders, iodine, pregnant women**.**

I. INTRODUCTION

Iodine is an essential micronutrient required for thyroid hormone synthesis, to maintain homeostasis. Its role in fetal and early childhood brain development is emphasized by studies showing iodine deficiency in pregnancy associated with stunted growth and neuromotor, intellectual, behavioral, and cognitive impairment, as well as, cretinism in severe cases.

The outcome indicators of iodine nutrition in a community include the goiter rate and median urinary iodine (MUI) in school children (age 6-12 years), serum TSH in neonates, and thyroglobulin in the general population. The key indicator of population iodine nutrition recommended by the World Health Organization (WHO) and the International Council for Control of Iodine Deficiency Disorders (ICCIDD) is the determination of median urinary iodine concentration in a representative sample of school-aged children. [4] The adequacy of iodine nutrition is defined by the following criteria: A median MUI of at least 100 µg /L (with <20% of the population having MUI <50 µg /L) represents adequate population iodine nutrition; a median MUI between 50 and 99 µg/L represents mild iodine deficiency; and medians of 20-49 µg/L and <20 µg/L represent moderate and severe iodine deficiency, respectively.

Epidemiological criteria based on the World Health Organization, UNICEF, and International Council for Control of Iodine Deficiency Disorders guidelines for assessing iodine nutrition based on the median or range in urinary iodine excretion of pregnant women.

The majority of dietary iodine (>90%) is excreted in the urine. Urine iodine excretion (UIE) is largely a passive process dependent on glomerular filtration rate (GFR). The UIE in a non-pregnant individual on a stable diet represents a dynamic equilibrium between dietary intake, thyroidal iodine extraction, the total body thyroid hormone pool, and GFR. During normal pregnancy, GFR increases within the first month following conception, peaking by the end of the first trimester by approximately 40-50% above pre-pregnant levels. Pregnancy can be expected to result in increased renal iodine loss. Increased ioduria during early pregnancy, resulting from increased GFR is likely to be the explanation for the potential overestimation of iodine nutrition in pregnancy,

using UIE. This has the capacity to conceal the degree of iodine deficiency, which only becomes fully evident in these subjects in the latter stages of pregnancy. The reference ranges recommended in children would not be adequate for optimum iodine nutrition in pregnancy. Taking these physiological changes into consideration, the WHO and the American Thyroid Association have recommended higher pregnancy-specific urinary iodine ranges. Tab. 1

Tab. 1 WHO and the American Thyroid Association have recommended higher Pregnancy-specific urinary iodine ranges.

Median urinary iodine (µg/L)	Iodine intake
<150	Insufficient
150-249	Adequate
250-499	Above requirements
>500	Excessive

UNICEF: United Nation Children's Fund

The median iodine concentration of salt samples was 29.6 mg/l.

II. MATERIALS AND METHODS

Cross-sectional study conducted in pregnant women. Pregnant women, from first to second trimesters, attending health care centers for mothers and children in their living areas were enrolled. Urinary iodine excretion and the iodine in salt in household level were measured in 137 women.

A single morning sample of urine was collected from each participant in a screw capped plastic bottle and stored at 4°C in the laboratory till analysis. Urinary iodine content was estimated by the ammonium persulfate digestion with spectrophotometric dedection based on the Sandell-Koltoff reaction, modified and adopted in our laboratory for urine iodine estimation. [15] The median urinary iodine concentration was defined as a concentration of iodine in a spot urine sample and the results were expressed as micrograms per liter (µg/l). Inter-assay and intra-assay coefficients of variation (CVs) for quality control were 9 and 7%, respectively.

III. RESULTS

Urinary iodine excretion and the iodine in salt in household level were measured in 137 women. The median urinary iodine concentration was 159.4 µg/l, indicating non iodine deficiency, but 48,5 % of the urine samples examined showed iodine insufficiency, 29,4% sufficient iodine and 22% excessive iodine. (Tab.2). Iodine content was found to be adequate in 73.7 % of salt samples. The median iodine concentration of salt samples was 29.6 mg/kg

Tab.2 Frequency distribution of median urinary iodine concentration

Urinary Iodine concentration (µg/l)	**>150 µg/l**	**150-250 µg/l**	**250 – 499 µg/l**	**> 500 µg/l**
Total n = 137	**67 (66.5)**	**40 (40.3)**	**30 (30.1)**	**0**

IV. DISCUSSION

The data showed a good progress, but Albanian pregnant women are still iodine insufficient. Findings of this study call for further attention to iodine intake during pregnancy. The currently recommended intake of iodine through universal salt iodization may not be adequate for pregnant and lactating women, and supplementation during pregnancy and lactation should be further considered in light of the latest recommendations.

Iodine is an essential micronutrient throughout life. During pregnancy, various physiological changes result in increased iodine requirements. Increase in renal blood flow and GFR results in increased urinary iodine excretion, as most iodine is excreted by a passive process in the urine. Increased maternal thyroid hormone synthesis to maintain thyroidism and provide thyroid hormones to the fetus as well as transfer of iodine to the fetus add to the increasing iodine requirements during pregnancy.

Studies on iodine nutrition in pregnancy, based on median urinary iodine excretion, have been far and few. The median urinary iodine concentration in pregnancy in 2006 was been 95.3 µg/l. This study showed a

mild deficiency of the iode in that time and we can underline an visibly improvement in total of the level of the urinary iodine concentration.

The median of the iodine concentration of salt samples was 29.6 mg/kg, but only 73.7 % of the used salt presents an iodine concentration >= 15ppm.

To obtain better results would be opportune that the iodized salt necessary for Albanian population to be domestically produced using the existing plant that produce salt in Vlora or otherwise the Albanian Government should take measures to strengthen the monitoring of important salt ensuring adequately iodized salt at household level.

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