

Evaluation of Status of Iodine Nutrition Among Pregnant Women in a Known Population: An Institutional Based Study

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ABSTRACT

Background: The World Health Organization (WHO) estimated in 2007 that two billion people have insufficient iodine intake causing preventable neurological damage. The present study was conducted to assess the status of iodine nutrition among pregnant women.

Materials & Methods: The study was conducted to assess the status of iodine nutrition among pregnant women. 1400 pregnant women were included in the study. The clinical examination of thyroid of each pregnant women was conducted. The grading of goiter was done according to the criteria recommended jointly by WHO/UNICEF/ICCIDD. Urine samples were collected from the list of pregnant women and analysis was done.

Results: A total of 1400 PMs were selected for the study. The prevalence of Goiter Grade I was found to be 21.28%. The prevalence of Goiter Grade II was found to be 0.64%. The TGR was found to be 21.92%. A total of 1400 urine samples were collected and UIC levels were found to be 100-149 $\mu\text{g/L}$ in maximum patients (35.35%).

Conclusion: The study concluded that the prevalence of Goiter Grade I was found to be 21.28% and Grade II was found to be 0.64%. In maximum pregnant mothers UIC levels of less than 150 $\mu\text{g/L}$ which shows that they had poor iodine nutrition.

KEYWORDS: Goiter, Pregnant Mother, UIC levels, Iodine Nutrition.

INTRODUCTION

Iodine is an essential nutrient used in the synthesis of thyroid hormones that are important for metabolism and the development of the nervous system.¹ Insufficient intake of iodine causes iodine deficiency disorders (IDD) including hypothyroidism.² Thyroid hormones are responsible for a range of functions, from basal metabolism and heart rate to bone growth and development of the central nervous system.^{3,4} During gestation, severe iodine deficiency is related to both maternal and fetal hypothyroidism as well as serious neurological defects in the child.⁵⁻⁷ Nearly, two billion (28%) of the world's population, of whom more than 321 million (39%) are Africans, are at risk of insufficient iodine intake.⁸ All age groups are affected by Iodine deficiency (ID), but growing children and pregnant mothers (PMs) are the most vulnerable as they are sensitive to even marginal ID.⁹ During pregnancy, the requirement of iodine increases to 250 $\mu\text{g/day}$ when compared to normal adult (150 $\mu\text{g/day}$) to meet the higher metabolic demands of thyroxin (T₄) production, transfer iodine to fetus and increased renal iodine

clearance by the mother.¹⁰ Inadequate consumption of iodine by the PM, leads to insufficient production of thyroxin by the fetus resulting in retarded fetal growth. ID increases the risk of still birth, abortions, increased perinatal deaths, infant mortality, and congenital anomalies.¹¹ Children born to iodine deficient PMs often results in reduced intelligence, stunted growth, cretinism and have poor cognitive functions, and delayed psychomotor developments.^{1,2,12} The present study was conducted to assess the status of iodine nutrition among pregnant women.

MATERIALS & METHODS

The study was conducted in the Department of Community Medicine, NRI Institute of Medical Sciences, Sanghivalasa, Visakhapatnam, Andhra Pradesh (India) to assess the status of iodine nutrition among pregnant women. Before the commencement of the study ethical clearance was taken from the Ethical committee of the institute and informed consent was taken from the pregnant women after explaining the

study. 1400 pregnant women were included in the study. The PMs consuming drugs, which could influence their thyroid status, were excluded from the study. The clinical examination of thyroid of each PM was conducted by two trained field investigators. The grading of goiter was done according to the criteria recommended jointly by WHO/UNICEF/ICCIDD (i) Grade 0 - not palpable and not visible (ii) Grade I - palpable but not visible (iii) Grade II - palpable and

visible.¹⁰ The sum of Grade I and II provided the total Goiter rate (TGR) in the study population.

Urine samples were collected from the list of PMs enrolled for clinical thyroid examination. Plastic bottles with screw caps were provided to each PM for the urine samples. The samples were stored in the refrigerator until analysis. The analysis was done within 2 months. The UIC levels were analyzed using the wet digestion method.¹³

Table 1: Prevalence of Goiter

Prevalence of Goiter	N(%)
Grade 0	1093(78.07%)
Grade I	298(21.28%)
Grade II	9(0.64%)
TGR (Grade I+Grade II)	307(21.92%)

Table 2: Urinary iodine concentration (UIC) levels (µg/L)

UIC levels (µg/L)	N(%)
< 50	205(14.64%)
50-99	318(22.71%)
100-149	495(35.35%)
150 and above	383(27.35%)

RESULTS

A total of 1400 pregnant mothers were selected for the study. The prevalence of Goiter Grade I was found to be 21.28%. The prevalence of Goiter Grade II was found to be 0.64%. The TGR was found to be 21.92%. A total of 1400 urine samples were collected and UIC levels were found to be 100-149 µg/L in maximum patients (35.35%).

DISCUSSION

Excess or deficient iodine levels in an individual are characterized with varied pathology; hence, it is important to carefully interpret data to inform the best management approach. A previous publication on iodine status reported that, of the salts sold in the market, only 58% were iodized, with an estimated iodine content of 20 ppm being far below the mandated requirement.¹⁴

A total of 1400 PMs were selected for the study. The prevalence of Goiter Grade I was found to be 21.28%. The prevalence of Goiter Grade II was found to be 0.64%. The TGR was found to be 21.92%. A total of 1400 urine samples were collected and UIC levels were found to be 100-149 µg/L in maximum patients (35.35%).

Earlier studies conducted amongst PMs in Uttaranchal (2003) and Rajasthan (2008) revealed a Goiter prevalence of 15.0% and 3.1%, respectively.^{11,15}

In addition, adequate iodine intake before conception (150 µg per day) is important to ensure adequate maternal iodine stores to support the fetus. The preconception iodine status of the mother is likely to influence the degree of successful maturation of the fetal central nervous system and subsequent neurodevelopment of the child.¹⁶

Noncompliance with the use of iodized salt appears to have a significant influence on the iodine levels of the study participants. This is buttressed by the finding that only few participants using iodized salt had iodine deficiency compared to those not using iodized salt. To prevent iodine deficiency, the American Thyroid Association recommends supplementation containing 150 µg of iodine daily for women of childbearing age during the preconception phase as well as during pregnancy and lactation.¹⁷

Pregnant women and their fetus are likely to suffer more serious consequence of iodine deficiency as compared to other age groups in the population. Hence, there is a

need to establish surveillance mechanism for monitoring the iodine nutrition status of pregnant women. In recent years, utilization of ANC has improved significantly.¹⁸

CONCLUSION

The study concluded that the prevalence of Goiter Grade I was found to be 21.28% and Grade II was found to be 0.64%. In maximum pregnant mothers UIC levels of less than 150 µg/L which shows that they had poor iodine nutrition.

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