(e) ISSN Online: 2321-9599

(p) ISSN Print: 2348-6805

ORIGINAL ARTICLE

Status of iodine among pregnant women

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ABSTRACT:

Background: The study was conducted to assess the status of iodine among pregnant women. **Material and methods**: There were one hundred pregnant women in this study. After being informed about the process, the participants were asked for their consent. Each participant gave samples of their own salt and urine from home. Samples of urine were collected and kept at 4°C in a sterile plastic container. The levels of urinary iodine were measured within fifteen days of the sample being taken. Utilizing the monthly edible salt procurement method, salt intake was calculated. Software called SPSS was used to perform statistical analysis. **Results**: In this study, 20 females belonged to the age group of 18-25 years. 50 subjects belonged to the age group of 25-30 years. 30 women belonged to the age group of 30-35 years. The household salt iodine quantity between 0-4.9 ppm had been observed 11 women, the concentrations between 5-14.9 ppm had been observed in 22 subjects while 15 or more than 15 ppm iodine concentration had been observed in 67 women. Less than 150 ppm urinary iodine concentration had been observed in 10 women, 150-249 ppm urinary iodine concentration had been observed in 4 women, 250-499 ppm urinary iodine quantities had been noticed among 85 women whereas over 500 ppm urinary iodine had been observed in 1 woman only. **Conclusion**: The majority of the females had levels of urine iodine above the recommended limits. Additionally, the majority of the women's household iodine values were 15 ppm or above.

Keywords: iodine, salt, household, urinary, pregnancy

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This article may be cited as: Borkar M. Status of iodine among pregnant women. J Adv Med Dent Scie Res 2014;2(4):272-274.

INTRODUCTION

Iodine deficiency affects more than 2.2 billion individuals worldwide (38% of the world's population). Decreases in maternal T4 associated with even mild iodine deficiency may have adverse effects on the cognitive function of offspring[1,2], and iodine deficiency remains the leading cause of preventable mental retardation worldwide. It has recently been suggested that mild iodine deficiency may also be associated with attention-deficit and hyperactivity disorders in offspring.[3]

Dietary iodine requirements are increased in pregnant women for several reasons. Maternal thyroid hormone production normally increases by about 50% during gestation, starting during the first trimester, due to human chorionic gonadotropin stimulation of the TSH receptor and because high estrogen levels induce an increase in the sialylation of T4-binding globulin (TBG), leading to reduced hepatic TBG clearance and increased concentrations of circulating TBG.[4,5] In addition, the peripheral metabolism of thyroid hormone may be increased, especially in the second half of pregnancy, due to placental deiodination of T4 to the bioinactive reverse T3.[6]

This study was conducted to assess the status of iodine among pregnant women.

MATERIAL AND METHODS

There were one hundred pregnant women in this study. After being informed about the process, the participants were asked for their consent. Each participant gave samples of their own salt and urine from home. Samples of urine were collected and kept at 4°C in a sterile plastic container. The levels of urinary iodine were measured within fifteen days of the sample being taken. Utilizing the monthly edible salt procurement method, salt intake was calculated. Software called SPSS was used to perform statistical analysis.

RESULTS

Table 1: Age-wise distribution of subjects.

Age	Number of subjects	Percentage
18-25 years	20	20%
25-30 years	50	50%
30-35 years	30	30%
Total	100	100%

20 females belonged to the age group of 18-25 years. 50 subjects belonged to the age group of 25-30 years. 30 women belonged to the age group of 30-35 years.

Table 2: Iodine status among pregnant women

Variable	Quantity
Household salt iodine concentration (ppm)	
• 0-4.9	11
• 5-14.9	22
• ≥15	67
Urinary iodine concentration (ppm)	
• <150 (insufficient)	10
• 150-249 (adequate)	04
• 250-499 (above requirement)	85
• ≥500 (excessive)	01

The household salt iodine quantity between 0-4.9 ppm had been observed 11 women, the concentrations between 5-14.9 ppm had been observed in 22 subjects while 15 or more than 15 ppm iodine concentration had been observed in 67 women. Less than 150 ppm urinary iodine concentration had been observed in 10 women, 150-249 ppm urinary iodine concentration had been observed in 4 women, 250-499 ppm urinary iodine quantities had been noticed among 85 women whereas over 500 ppm urinary iodine had been observed in 1 woman only.

DISCUSSION

Iodine requirements are increased ≥ 50% during pregnancy. Iodine deficiency during pregnancy can cause maternal and fetal hypothyroidism and impair neurological development of the fetus. The consequences depend upon the timing and severity of the hypothyroidism; the most severe manifestation is cretinism.[7]

In moderate-to-severely iodine-deficient areas, controlled studies have demonstrated that iodine supplementation before or during early pregnancy eliminates new cases of cretinism, increases birthweight, reduces rates of perinatal and infant mortality and generally increases developmental scores in young children by 10-20%. Mild maternal iodine deficiency can cause thyroid dysfunction but whether it impairs cognitive and/or neurologic function in the offspring remains uncertain.[7]

Two meta-analyses have estimated that iodine-deficient populations experience a mean reduction in IQ of 12-13.5 points. In nearly all regions affected by iodine deficiency, salt iodisation is the most cost-effective way of delivering iodine and improving maternal and infant health.[7]This study was conducted to assess the status of iodine among pregnant women.

In this study, 20 females belonged to the age group of 18-25 years. 50 subjects belonged to the age group of 25-30 years. 30 women belonged to the age group of 30-35 years. The household salt iodine quantity between 0-4.9 ppm had been observed 11 women, the concentrations between 5-14.9 ppm had been observed in 22 subjects while 15 or more than 15 ppm iodine concentration had been observed in 67 women. Less than 150 ppm urinary iodine concentration had been observed in 10 women, 150-249 ppm urinary iodine concentration had been observed in 4 women, 250-499 ppm urinary iodine quantities had been noticed among 85 women whereas over 500 ppm urinary iodine had been observed in 1 woman only.Caldwell KL et al (2013)[8] presented iodine data from National Health and Nutrition Examination Survey (NHANES) and from a sample of pregnant women in the National Children's Study (NCS) Vanguard Study. Urinary iodine (UI) was measured in a one third subsample of NHANES 2005–2006 and 2009–2010 participants and in all 2007–2008 participants age 6 years and older. These measurements are representative of the general U.S. population. UI was also measured in a convenience sample of 501 pregnant women enrolled in the NCS initial Vanguard Study from seven study sites across the United States. NHANES median UI concentration in 2009–2010 (144 μg/L) was significantly lower than in 2007–2008 (164 μg/L). Non-Hispanic blacks had the lowest UI concentrations (131 μg/L) compared with non-Hispanic whites or Hispanics (147 and 148 μg/L, respectively). The median for all pregnant women in NHANES 2005–2010 was less than adequate (129 μg/L), while third trimester women had UI concentrations that were adequate (median UI 172 μg/L). Third trimester women participating in the NCS similarly had an adequate level of iodine intake, with a median UI concentration of 167 μg/L. Furthermore, NCS median UI concentrations varied by geographic location. Dairy, but not salt, seafood, or grain consumption, was significantly positively associated with median UI concentration in women of childbearing age. Pregnant women in their third trimester in the NHANES 2005–2010 had adequate median UI concentrations, but pregnant women in NHANES who were in their first or second trimesters had median UI concentrations that were less than adequate. Non-Hispanic black pregnant women from both the NHANES 2005–20010 and the NCS consistently had lower UI median concentrations than non-Hispanic whites or Hispanics.Grewal E et al (2013)[9] assessed the iodine status of pregnant women, using median urinary iodine concentration (MUI) as the measure of outcome, to document the impact of advancing gestation on the MUI in normal pregnancy. This study assessed the MUI in casual urine samples from 50 pregnant subjects of each trimester and 50 age-matched non-pregnant controls. The median (range) of urinary iodine concentration (UIC) in

pregnant women was 304 (102-859) μg/L and only 2% of the subjects had prevalence of values under 150 μg/L (iodine insufficiency). With regard to the study cohort, median (range) UIC in the first, second, and third trimesters was 285 (102-457), 318 (102-805), and 304 (172-859) μg/L, respectively. Differences between the first, second, and third trimesters were not statistically significant. The MUI in the controls (305 μg/L) was not statistically different from the study cohort. The pregnant women had no iodine deficiency, rather had high median urinary iodine concentrations indicating more than adequate iodine intake. Larger community-based studies are required in iodine-sufficient populations, to establish gestation-appropriate reference ranges for UIC in pregnancy.

CONCLUSION

The majority of the females had levels of urine iodine above the recommended limits. Additionally, the majority of the women's household iodine values were 15 ppm or above.

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