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Original Research

Status of iodine among pregnant women

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ABSTRACT:

Background: Iodine is an essential trace element required for the synthesis of thyroid hormones. During pregnancy, a greater iodine intake is needed due to an increase in maternal thyroid hormone synthesis, iodine transfer to the fetus, and greater urinary iodine loss due to an increased glomerular filtration rate. This research had beencarried out to evaluate the status of iodine among pregnant females. **Material and methods**:In this study, one hundred pregnant females participated. The participants had been asked for their consent after being briefed about the procedure. Every subject provided urine as well as salt samples from their own residences. Urine samples had been taken as well as stored in a sterile plastic container at 4°C. Urine iodine concentrations had been evaluated 15 days after the sample was collected. Salt intake had been computed using the monthly edible salt procurement method. Statistical analysis had been carried out using software known as SPSS. **Results**:In this study, 10 females aged from 18-25 years. 60 females aged from 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 noticed among 15 women, the concentrations between 5-14.9 ppm had been noticed among 26 subjects while 15 or more than 15 ppm iodine concentration had been witnessed among 59 women. Less than 150 ppm urinary iodine concentration had been witnessed among 5 women, 150-249 ppm urinary iodine concentration had been observed among 2 women, 250-499 ppm urinary iodine quantities had been seen among 92 women while over 500 ppm urinary iodine was observed in 1 female only. **Conclusion**: Urine iodine concentrations were higher than recommended in most of the females. Furthermore, almost all of the females had household iodine levels of 15 ppm or higher.

Keywords: iodine, salt, household, urinary, pregnancy

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INTRODUCTION

Iodine is an essential trace element required for the synthesis of thyroid hormones.[1,2] During pregnancy, a greater iodine intake is needed due to an increase in maternal thyroid hormone synthesis, iodine transfer to the fetus, and greater urinary iodine loss due to an increased glomerular filtration rate.[3] Severe iodine deficiency and, consequently, inadequate iodine availability for the fetus during pregnancy cause impaired thyroid hormone synthesis, resulting in an increased risk of maternal goiter, fetal goiter, growth retardation and brain damage.[4-6] Even in countries where effective salt iodization programs are established, several studies indicate that pregnant and lactating women may be at high risk of having inadequate iodine levels.[7,8] Since iodized salt may not be a sufficient source of iodine to meet the minimum requirements of this vulnerable group, several international authorities recommend a daily supplement of 150 µg of iodine for pregnant and lactating women.

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

MATERIAL AND METHODS

In this study, one hundred pregnant females participated. The participants had been asked for their consent after being briefed about the procedure. Every subject provided urine as well as salt samples from their own residences. Urine samples had been taken as well as stored in a sterile plastic container at 4°C. Urine iodine concentrations had been evaluated 15 days after the sample was collected. Salt intake had been computed using the monthly edible salt procurement method. Statistical analysis had been carried out using software known as SPSS.

RESULTS

Table 1: Age-wise distribution of subjects.

Age	Number of subjects	Percentage
18-25 years	10	10%
25-30 years	60	60%
30-35 years	30	30%
Total	100	100%

10 females aged from 18-25 years. 60 females aged from 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	15
• 5-14.9	26
• ≥15	59
Urinary iodine concentration (ppm)	
• <150 (insufficient)	5
• 150-249 (adequate)	2
• 250-499 (above requirement)	92
• ≥500 (excessive)	01

The household salt iodine quantity between 0-4.9 ppm had been observed 15 women, the concentrations between 5-14.9 ppm had been observed in 26 subjects while 15 or more than 15 ppm iodine concentration had been observed in 59 women. Less than 150 ppm urinary iodine concentration had been observed in 5 women, 150-249 ppm urinary iodine concentration had been observed in 2 women, 250-499 ppm urinary iodine quantities had been noticed among 92 women whereas over 500 ppm urinary iodine had been observed in 1 woman only.

DISCUSSION

Pregnancy increases the need for iodine by ≥50%. Pregnancy-related iodine shortage can lead to hypothyroidism in both the mother and the fetus as well as impaired fetal brain development. The intensity and timing of the hypothyroidism determine the consequences; cretinism is the most severe form.[9] Controlled studies have shown that iodine supplementation before or during early pregnancy eliminates new cases of cretinism, increases birthweight, lowers rates of perinatal and infant mortality, and generally improves developmental scores in young children by 10–20% in areas that are moderately to severely iodine deficient. Although thyroid dysfunction can result from mild maternal iodine insufficiency, it is unknown if this causes cognitive or neurological impairment in the kids.[9] This study was conducted to assess the status of iodine among pregnant women. In this study, 10 females aged from 18-25 years. 60 females aged from 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 noticed among 15 women, the concentrations between 5-14.9 ppm had been noticed among 26 subjects while 15 or more than 15 ppm iodine concentration had been witnessed among 59 women. Less than 150 ppm urinary iodine concentration had been witnessed among 5 women, 150-249 ppm urinary iodine concentration had been observed among 2 women, 250-499 ppm urinary iodine quantities had been seen among 92 women while over 500 ppm urinary iodine was observed in 1 female only.Caldwell KL et al (2013)[10] 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. 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.Croce L et al (2022)[11]clarified controversial aspects regarding the need of iodine supplementation in pregnancy as well as to provide guidance on clinical decision-making, even in areas with mild-moderate deficiency. Medline, Embase and Cochrane search from 1969 to 2022 were performed. For the purpose of this review, only studies containing meta-analytic data were selected. A total of 7 meta-analyses were retrieved. Four meta-analyses evaluated the relationship between iodine status during pregnancy and neonatal and maternal outcomes suggesting the existence of a U-shaped correlation between iodine status and several maternal and neonatal consequences, especially if iodine status is evaluated at the beginning of pregnancy. Three meta-analyses evaluating the results of intervention trials failed to provide straightforward conclusions on

the benefits of iodine supplementation in pregnant women in areas with mild-moderate iodine deficiency. Although evidence coming from meta-analyses suggests a role of iodine status during pregnancy in determining maternal and child outcomes, results of meta-analyses of intervention trials are still controversial. Several factors including, degree of iodine deficiency, and pooling studies conducted in areas with different iodine intake, may account for the lack of benefits reported by meta-analyses of intervention trials. More high-quality, randomized, controlled trials including information on timing, dose and regimen of iodine supplementation are needed to further elucidate this issue.

CONCLUSION

Urine iodine concentrations were higher than recommended in most of the females. Furthermore, almost all of the females had household iodine levels of 15 ppm or higher.

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