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Urinary Iodine in Second Trimester Pregnancy: A Cross Sectional Study in District of Pulwama

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Abstract: ***Iodine is important trace element and its deficiency is a common health problem affecting a huge population, particularly pregnant women and children. The physiological role of iodine in the human body is synthesis of thyroid hormones. Thyroxine is approximately 60% iodine by weight. If iodine intake falls below approximately 100µg/day, Thyroid Stimulating Hormone (TSH) secretion is augmented, which increases plasma inorganic iodide clearance. To correlate urinary iodine with serum TSH in the second trimester of pregnant women. 168 subjects were included in the study from tertiary care hospital. A random urine sample was collected. Iodine was estimated by ammonium persulfate method and TSH values were collected from the OBG department of the subjects enrolled. Pearson correlation coefficient was done. Median UI 136.67 (256.80-360.76) µg/L, median TSH 1.68(0.15-9.48) mIU/L. There was no significant correlation between UI and serum TSH with r = (0.076, (p = 0.368). Conclusion: Urinary iodine is a marker for population iodine status. A preferable biomarker is necessary to know the iodine status of individual which include not only nutritional biomarker and also required to organise reference range for TSH.***

Keywords: Urinary Iodine; Pregnancy; ammonium persulfate; TSH

1. Introduction

Iodine is a nutritionally important trace element and its insufficiency is a common health problem affecting a huge population, particularly pregnant women and children (1). Iodine insufficiency during gestation results in several problems similar as revocations, bearings, natural abnormalities, cretinism, goitre, internal deceleration, squinting and mutism (2).

The physiological part of iodine in the mortal body is conflation of thyroid hormones. Thyroxine is roughly 60 iodine by weight. However, Thyroid Stimulating Hormone (TSH) stashing is if iodine input falls below roughly 100µg/day. Augmented, which increases tube inorganic iodide concurrence. TSH also stimulates the breakdown of Thyroglobulin (Tg) for conflation and release of T3 into the blood"(3). There are geographical differences noted in iodine content in drinking water and to some degree in milk. Iodine-deficient soils are common in mountainous areas (e.g., the Alps, Andes, Atlas, and Himalayan ranges) and areas of frequent flooding, especially in South and Southeast Asia (specifically, the Ganges River plain of north eastern India) and colorful parochial areas including central Asia (4). Africa and indeed in Eastern Europe is iodine deficient. Iodine insufficiency may also affect littoral and islet populations (5). As far as India is concerned heavy downfall/ flooding results in mineral reduction and makes the soil iodine deficient.

Labels of nutritive iodine status recommended by World Health Organization (WHO) and International Council for Control of IDD (ICCIDD) are Urinary Iodine attention (UIC), TSH, thyroglobulin and goiter. Median Urinary Iodine attention (UIC) is a crucial index of recent iodine input among the population as recommended by the World Health Organization (WHO) and this was estimated to estimate the iodine nutrition status of the study population. Urine iodine attention (UIC) remains the gold standard in covering iodine nutrition at the population position (6).

Iodine demand increases during gestation. Pregnant women are prone to iodine insufficiency substantially in first trimester (7). The increase input provides 25 to 50 increase of motherly T4 product in euthyroid women. During gestation, there's substantiation for the presence of three thyroid stimulators, the pituitary thyroid stimulating hormone (TSH), the mortal Chorionic Gonadotropin (hCG) hormone and the chorionic TSH (hCT) (8). The high situations of circulating hCG observed in early gestation have been set up to relate negatively with TSH.

Iodine insufficiency diseases (IDD's) are a significant public health problem in 130 countries affecting 740 million people and an estimated one- third of the world's population is presently exposed to threat. As lately as 1990,28.9 of the world's population was at threat of a insufficiency.12.0 of the population displayed goiter,11.2 million people were affected by cretinism and another 43 million existent had some degree of internal impairment caused by iodine insufficiency. Around29.8 of South Asian countries are estimated to have

inadequate iodine inputs (9). Around 71 million are affected due to salutary iodine insufficiency in India. A review of Indian studies revealed significant iodine insufficiency in pregnant women suggesting that UIC monitoring in gestation be a vital element of the National program on control of IDD and pressing the need for public position representative checks (10). Two cross-sectional studies from Rajasthan, revealed median UIC was 127µg/ L and 118µg/ L in pregnant women of 28 weeks of gravidity which indicates insufficiency (11). Another study conducted in New Delhi and Haryana showed acceptable urinary iodine indicating salutary adequacy. The study in Dhaka showed that motherly urinary iodine is negatively identified with their serum TSH (12). Also other study in Thailand showed, there was noco-relation between motherly urinary iodine and TSH (13). The swab iodination program espoused by the Indian Government is said to be acceptable for the general population but inadequate for pregnant and lactating maters (14).

It's suggested that a well- performing iodized swab programme can give acceptable iodine to pregnant women and nonstop monitoring of this critical target group is needed in populations where iodized swab is either not available or not adequately iodized, iodine supplementation during gestation should be considered. The present study was done to see the association between UI with serum TSH in pregnant women. Serum iodine position isn't dependable marker to know the iodine status on other hand UI attention indicates current iodine position in the population.

Aim
To study the urinary iodine level in pregnant women.

Objectives
To estimate urinary iodine in second trimester pregnant women & correlating its value with serum TSH.

2. Materials and Methods

The present study comprised of urine samples. Permission to conduct the study was obtained from all the concerned authorities of Dolphin Institute of Medical Sciences And Technology.

Study Design: A Cross sectional study

Study Period: July 2022 to June 2023.

Sample Size: N=168

Inclusion Criteria:
Second trimester pregnant women, Gravida status both Primigravida and multigravida.

Exclusion Criteria:
Multiple pregnancies, clinical diagnosed hypothyroidism and hyperthyroidism, thyrotoxicosis or previous history of thyroid disease, acute or chronic infection, history of ingestion of certain drugs (steroids, iodine containing dyes) and renal disease.

Method of Analysis:
The urine sample was collected in sterilized 30ml container and iodine concentration was measured by ammonium persulfate (Method A). The instrument used was spectrophotometer.

Procedure for urine collection
- A wide mouthed sterile disposable container was given to each of the subjects.
- The subject was asked to fill the container with mid-stream urine.
- The random urine sample was processed on the day of collection.
- The sample collected was stored at -20°c till further analysis.

3. Results

A cross sectional study was performed to study the urinary iodine level in pregnant women. Urinary iodine was evaluated in second trimester pregnant women & compared its value with serum TSH. Association between urinary iodine and TSH scores in the study by Karl Pearson's correlation coefficient and comparison of groups of urinary iodine (<150 and>150) with TSH scores by independent t test by using the SPSS.

The subject were divided into age wise distribution where 20-25 years were highest (n=87) and least in 30 or above (n=12) and Age mean ± SD was 25.35 ± 4.59 years.As shown in table 1 the median Ul value was 136.67µg/L and TSH was 1.68 mIU/L where maximum and minimum UI was 360.76 and 26.50 µg/L respectively. Similarly maximum and minimum TSH was 9.48 and 0.15 mIU/L respectively.

Table 1: Summary of Urinary iodine and TSH scores

Summary	Urinary iodine (ug/L)	TSH(mIU/L)
Minimum	26.50	0.15
Maximum	360.76	9.48
Mean	148.34	2.56
Median	136.67	1.68
SD	58.69	1.16
SE	6.23	0.15

No significant correlation between urinary iodine and serum TSH value with (r-value= 0.0873), (p-value=0.3756) was shown in Table 2.

Table 2: Correlation between Urinary iodine and TSH scores in the study by Karl Pearson's correlation coefficient

Variables	Correlation between Urinary iodine with		
	r-value	t- value	p-value
TSH scores	0.076	0.778	0.368

Out of 168 pregnant women 87 had <150 with mean TSH 2.04 and ≥150 or morewere 42 with 2.13 mean TSH was shown in table 3.

Table 3: Comparison of groups of Urinary iodine (<150and ≥150) with TSH scores by Independent t test

Urinary Iodine	N	Mean	SD	t-value	p-value
<150	87	2.08	1.25	-0.401	0.697
≥150	81	2.87	1.07		

4. Discussion

Pregnant women are susceptible to iodine insufficiency due to advanced demand. The physiological part of iodine in the mortal body is conflation of thyroid hormones. Thyroxine is roughly 60 iodine by weight. However, Thyroid Stimulating Hormone(TSH) stashing is stoked, which increases tube inorganic iodide concurrence, If iodine input falls below roughly 100µg/ day. The ideal of this cross sectional study was to relate urinary iodine with serum TSH position in alternate trimester pregnant women. 168 alternate trimester pregnant women were enrolled for urinary iodine estimation done by ammonium persulfate system and TSH data was attained from Dolphin Institute of Medical lores And Technology Pulwama.

In the present study association between UI with serum TSH in pregnant women. Serum iodine position isn't a confirmational marker to know the iodine status and Urinary Iodine (UI) attention indicates current iodine nutrition across the populations.
In the proposed study 168 pregnant women of alternate trimester were included. Urinary Iodine and serum TSH were assessed. Median UI136.67 (26.50-360.76) µg/ L, Median TSH1.68 mcIU/ ml (0.15-9.48). There was no correlation between Urinary Iodine and serum TSH (r = 0.076, p = 0.376). Our study is in agreement to study done by Basnet B, et al (1)., which showed no association between urinary iodine and serum TSH position.

A study was carried out by Saha P (3), et.al and in healthy pregnant set up a significant negative correlation between Ul and serum TSH (p<0.01) and Caron Pet.al had significant negative correlation between Ul and serum TSH in pregnant women. According to WHO Ul< 150 pg/ L in a arbitrary sample in pregnant women in a population indicates iodine insufficiency. The NHANES (2) check showed35.5 of pregnant women suffer from mild iodine insufficiency with urinary iodine situations below 100 µg/l.

The use of urinary iodine can be further bettered. So that it can be used for an individual, there are studies which have shown use of 10 successive urine samples or 24 hrs urine sample iodine measured by a specific system can be used to know individualities iodine status.

And this individual iodine status can be used as nutritive biomarkers and is useful for establishing the reference range of TSH.

5. Conclusion

In the proposed study we were not able to establish an association between TSH and urinaryiodine. Urinary iodine is a marker for population iodine status. A better biomarker is needed to know the iodine status of an individual iodine which is not just a nutritional biomarker. It is also need to establish reference range for TSH.

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