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Research Article

Prevalence of Thyroid Dysfunction among Pregnant Women in a Rural Teaching Hospital in Telengana, South India

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Abstract: Thyroid dysfunction is one of the commonest endocrinological problems in pregnanacy and affects both maternal and fetal outcomes. There is a paucity of data available on its prevalence in Indian pregnant women. This study was conducted at Bhaskar Medical College and Hospital situated in a rural/ suburban area near Hyderabad, Telengana, India. The aim of the study was to find out the prevalence of thyroid disease among pregnant women. All consecutive pregnant women from March 2014 to June 2014 were included in the study. Morning samples of serum were tested for T3, T4 and TSH. A total of 322 women were included in the study. 89 pregnant women (26%) had TSH values more than 3.0mIU/L, the cut-of value used for upper limit of normal in this study. Out of these, 76 had normal T4 value, hence labeled as Subclinical Hypothyroidism and 13 had low T4, hence termed Overt Hypothyroidism. Two pregnant women had Overt Hyperthyroidism and one had Subclinical Hyperthyroidism. Prevalence of thyroid disease in pregnancy was found to be higher in out patients, more so the sub clinical hypothyroidism.
Keywords: Pregnancy, Thyroid dysfunction, Overt and Subclinical Hypothyroidism, Hyperthyroidism.

INTRODUCTION

Thyroid disorders in pregnancy affect both maternal and fetal health adversely if remain undiagnosed and uncorrected. Pregnancy is associated with profound changes in thyroid function. HCG values are high in early trimester, α component of which has similarity to TSH, causing partial TSH suppression [1]. Hence the cut-off value taken for upper limit of normal is 2.5 m IU/L in 1st trimester as compared to later 2 trimesters when a higher cut off of 3.0 m IU/L is taken as normal. The thyroid gland itself enlarges by 10% in pregnancy in iodine-sufficient areas and more so in iodine –insufficient areas [2]. Iodine requirement in pregnancy is increased from 150-200mg/day due to increased renal loss caused by increased renal blood flow and increased GFR.

In pregnancy, there are profound modifications in the regulation of thyroid function – the reasons being increased TBG (due to increased estrogen and decreased plasma clearance), altered metabolism of natural thyroid hormones, increased loss of I_2 by kidneys (increased RBF & increased GFR), altered I_2 transfer from placenta [3].

The physiological changes of pregnancy mimic thyroid disease significantly - fatigue, sluggishness, constipation, edema may simulate hypothyroidism; Heat intolerance, wide pulse pressure, tachycardia may mimic hyperthyroidism [4].

The fetus starts to produce thyroid hormones from 8-10 weeks of gestation but provides significant amounts after mid gestation. The maternal thyroid hormones transferred through placenta are the main source for fetal growth and development. Thyroid hormone is critical for normal fetal brain development, neuronal multiplication, migration and structural organization, thus on future intellectual development [5].

Deficiency of thyroid hormone is associated with complications of spontaneous / threatened abortion, preeclampsia, preterm delivery, LBW, IUGR, high perinatal mortality. Neonatal hyperbilirubinemia and hypo- / hyper- thyroidism have been reported too [6]. These children later may develop attention deficit and hyperactivity syndrome [7].

Western literature shows a prevalence of hypothyroidism in pregnancy of 2.5% and hyperthyroidism in pregnancy prevalence of 0.1 to 0.4% [8]. There is paucity of data on prevalence of thyroid disorders in pregnancy in Indian women. A few

reports show a prevalence of 4.8% to 11% amongst Indian pregnant population [9, 10]. A sincere effort was made to find out the prevalence of the various thyroid dysfunctions in pregnancy in our women in this study.

MATERIALS AND METHODS

This observational study was done in the Ob. Gyn. Department at Bhaskar Medical College and Hospital, catering mainly to rural and suburban population near Hyderabad. After clearance from Institutional Ethics Committee, all pregnant women between March to June 2014 in 2nd trimester were included in the study. All patients were subjected to the usual history taking, clinical examination and ante-natal profile of investigations. In addition to these tests, serum T3,T4 & TSH were done – samples were collected at the same time as other investigations between 8AM to 11AM.

The reference ranges of the test values used in this study were as per the 2011 Guidelines of American Thyroid Association for the Diagnosis and Management of Thyroid Disease during Pregnancy and Postpartum [5]. As per Regulation 14.2 of ATA Guidelines, if trimester-specific ranges for TSH are not available in the laboratory, the following normal reference ranges are recommended: 1st trimester – 0.1 to 2.5 m IU/L, 2nd trimester – 0.2 to 3.0m IU/L & 3rd trimester – 0.3 to 3.0 m IU/L.

In pregnancy, serum Total T4 measurement is recommended over direct immunoassay of FreeT4. Because of alterations in serum proteins in pregnancy (raised TBG, TBA, and Prealbumin) FreeT4 assay may yield lower values based on reference ranges established with normal nonpregnant sera [11]. Also method-specific and trimester-specific reference ranges for direct immunoassays of FreeT4 have not been generally established. By contrast, Total T4 increase during the 1st trimester and the reference range throughout pregnancy is 1.5 fold that of the nonpregnant range [12].

RESULTS

The patients were divided into the following groups according to the thyroid function test results:

Table 1: Thyroid function test

	TSH (m IU/L)	T4(mcg/dl)	T3
Euthyroid	0.2 to 3.0	N	N
Subclinical hypothyroidism	>3.0	N	N
Overt hypothyroidism	>3.0	<10	
Subclinical hyperthyroidism	<0.2	N	
Overt hyperthyroidism	<0.2	>10	

Table 2: Distribution of cases as per Gravidity (n =322)

Gravidity	No of pregnant women	Percentage
G1	142	44
G2	116	36
G3 and above	64	20

Table 3: Distribution of cases according to Age (n= 322)

Age group (years)	No. of pregnant women	Percentage
< 20	103	32
20 – 25	138	42
26 – 30	64	20
> 30	17	6

Table 4: Thyroid dysfunction in the pregnant women (n = 322)

Parameter	No. of cases	Percentage
I – Euthyroid	230	73
II – Hypothyroidism – total	89	26
Overt	13	4.02
Subclinical	76	22
III – Hyperthyroidism total	03	1.0
Overt	02	
Subclinical	01	

DISCUSSION

There has been a debate for a long time about the upper limit of normal TSH during pregnancy. Recent guidelines by American Thyroid Association (ATA) and the National Association of Clinical Biochemists have reduced this to 2.5 m IU / L in 1st trimester and 3.0m IU/L in 2nd / 3rd trimesters. This was done because it was seen that in more than 95% of

rigorously screened euthyroid volunteers, the normal range was from 0.4 to 2.5m IU/L [13]. This of course increases the disease frequency of hypothyroidism in pregnancy upto 5 fold.

There is a wide variation in the prevalence of hypothyroidism in pregnancy – 2.5% in the West to 11% in India [14]. It is more in Asian countries as compared to the West [15].There are few published Indian studies on this topic. Sahu *et al*. [10] have done thyroid function in second trimester and reported prevalence of thyroid disorders, especially Overt and Subclinical hypothyroidism to be 6.47 %. Dhanwal *et al*. [16] from Delhi in 2013 reported a hypothyroidism prevalence of 14.3%, with a cut off of 4.5m IU/L as upper limit of normal in a cohort of 1000 pregnant women [16]. Our study has shown a prevalence of 26% at a cut off of 3.0m IU/L as per ATA Guidelines.

Various reasons have been proposed for increased prevalence of hypothyroidism in pregnancy in Asia. Increased iodine intake in diet [17], presence of goitrogens in diet as reported from studies in India [18], deficiency of micronutrients like selenium and iron [19] are some of the reasons ascribed to high Hypothyroidism prevalence in India. An inter-relation of this high prevalence of thyroid disorders with a high prevalence of the other major endocrinopathy - diabetes mellitus, has to be explored further.

Prevalence of hyperthyroidism, both Overt and Subclinical in various studies has been reported to be around 1%. In one study by Sangita Nangia *et al*. in 2013 in two hospitals together in Delhi, a prevalence of 1-2% was found amongst 400 pregnant women [20]. In our study, 3 out of 322 pregnant women had Hyperthyroidism.Our study concludes that there is a high prevalence of thyroid dysfunction in pregnancy in India, majority being Subclinical Hypothyroidism, and universal screening for hypothyroidism is in our country.

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