

# Prevalence of hypothyroidism among 1<sup>st</sup> trimester pregnant women in lower part of Assam: A pilot study

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## **ABSTRACT**

**Objective:** This study was undertaken to know the prevalence of hypothyroidism among pregnant women in lower part of Assam. **Methodology:** The study was an out patient department (OPD) based prospective cohort, observational study. 500 pregnant women in first trimester between the age group of 18 to 35 years who are attending the Ante natal OPD of Fakhruddin Ali Ahmed Medical College, were included in the study. Serum thyroid-stimulating hormone (TSH) estimation was done by the ADVIA Centaur CP/Chemiluminescence assay method. **Results:** 218 (43.6 %) out of 499 pregnant lady in their 1<sup>st</sup> trimester was suffering from hypothyroidism with mean TSH level  $4.22 \pm 2.14$  mIU/ml. No significant correlation between age and TSH were found in hypothyroid population. **Conclusions:** Thyroid disorders are common in pregnancy, and the most common disorder is subclinical hypothyroidism. Looking at the high percentage of abnormal TSH in pregnancies, universal screening should be considered, specially in this part of the country.

**Keywords:** Thyroid-stimulating hormone, 1<sup>st</sup> trimester Pregnancy, hypothyroidism.

**Conflict of interest:** None. **Disclaimer:** Nil.

Hypothyroidism during pregnancy is deleterious to both mother and child. Children born to untreated or undertreated mothers have profound effect on future intellectual development [1]. Thyroid disease is the second most common endocrine condition encountered in women of childbearing age after diabetes.

Most of these conditions are treatable, and may affect mother and fetus adversely if they are not evaluated and managed appropriately [2]. Untreated maternal hypothyroidism can lead to preterm birth, low birth weight, and respiratory distress in the neonate.

The prevalence of hypothyroidism during

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pregnancy is estimated to be 0.3–0.5% for overt hypothyroidism and 2-3% for subclinical hypothyroidism. Recent Endocrine Society guidelines suggested 0.1 to 2.5 mIU/L as the 'normal' range for TSH values in first trimester [3]. The prevalence of any degree of hypothyroidism in pregnancy has varied from 12.3% (Finnish), 15.5% (American) to 35.3% (South American) in these recent studies. In the American study with samples from over half a million pregnant women, there were significant differences in the prevalence of hypothyroid disorders among Asian American women (19.3%) compared to African Americans (6.7%) and Caucasians (16.4%) [4-6]. It seems that prevalence of hypothyroidism is more in Asian countries compared to the West [7]. Another study from Delhi involving 172 normal pregnant women in first trimester revealed that the first trimester range of TSH in Indian women to be between 0.6-5.0 mIU/L [8].

In the study by Dhanwal et al., using the Endocrine Society first trimester cut-off for the diagnosis of Sub Clinical Hypothyroidism (SCH) (>2.5 mIU/L) would have led to over 50% of pregnant women in Delhi being diagnosed with Sub Clinical Hypothyroidism [9]. The Endocrine Society guidelines suggest that all those diagnosed with SCH in pregnancy should be offered treatment regardless thyroid antibody status despite no current evidence of benefits because the risks would be negligible [3].

Looking at these data the purpose of the study was to know the burden of hypothyroidism and whether routine screening would prove to be beneficial in our part of country specially in Lower Assam where very few unreported study found.

### **Materials and Methods**

The study was an out patient department (OPD) based prospective cohort, observational study. 500 pregnant women in first trimester between the age group of 18 to 35 years who were attending the Ante natal OPD of Fakhruddin Ali Ahmed Medical College are included in the study. Known cases of other medical disorders and women who did not give consent for TSH estimation were excluded from the study. Clearance from ethical committee is

also taken.

For the screening of thyroid disorders, we measured only TSH. The extreme values as taken cutoffs for the diagnosis of hypothyroidism were TSH >2.50mIU/ml and the reference values for TSH being 0.10-2.5mIU/ml, in the first trimesters of pregnancy respectively, considering the recent literature [10,11,12]. As per "The Endocrine Society" TSH value > 2.5 to 10 mIU/ml categorized as subclinical hypothyroidism and TSH > 10.0 mIU/ml categorized as overt hypothyroidism. Five milliliters of blood were collected between 0800-0900 h in the morning from patient and analyzed immediately.

Serum TSH (Thyroid Stimulating Hormone) levels were measured in the Central Clinical Laboratory (Biochemistry) of FAA Medical College. The quantification of TSH was carried out with ADVIA Centaur CP/Chemiluminescence which is a two side sandwich immunoassay using direct chemiluminometric technology, which use constant amount of two antibodies. Random Blood Sugar, Serum creatinine, were assayed using principles of dry chemistry with Vitros 350 Autoanalyzer from Johnson & Johnson. The statistical calculation was done by using Medcalc software.

### **Results**

In the study 500 pregnant women in their 1<sup>st</sup> trimester of pregnancy screened for hypothyroidism out of which 218 women found to be hypothyroidism as per Guideline rest 282 were euthyroid. The mean age of women in hypothyroid group was 23.92 yrs with SD= 4.65(fig 1). The mean TSH in hypothyroid group was 4.22 mIU/ml (SD = 2.14 ) ( fig 2), Median of 3.67 , 95 % CI for the mean 3.75 to 4.51 , 95 % CI for the median 3.42 to 4.01. A 24 yrs old 1<sup>st</sup> trimester pregnant lady whose TSH value 106.6 mIU/ml was not included in the statistical analysis as it may influence mean TSH value.

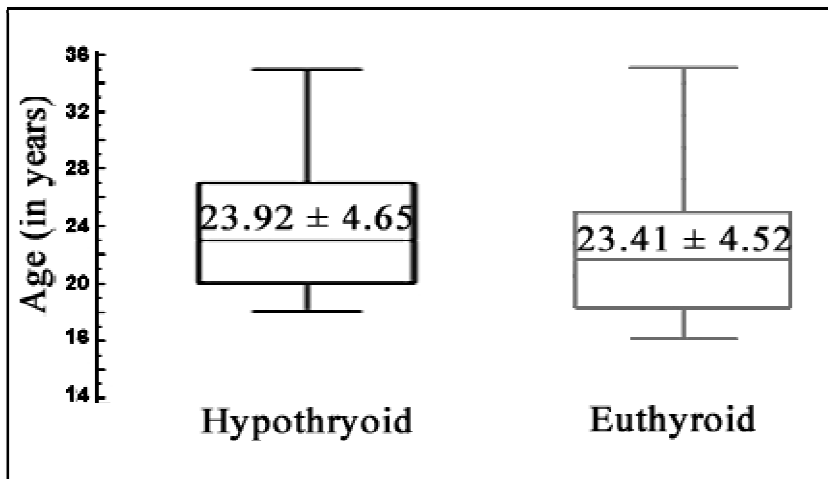
Figure 1 shows the mean-age and distribution of hypothyroid and euthyroid study population.

In euthyroid population mean Age with SD 23.41±4.52 (Figure 1) and TSH ( Mean ± SD)( Table 1) 1.33±0.48.

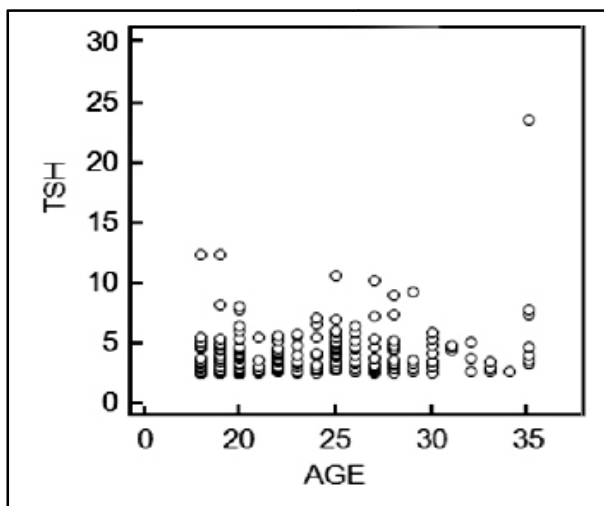
There were no significant correlation between Age and TSH level in hypothyroid population as correlation coefficient  $r = 0.146$ . as shown in Figure 2.

does not seem to be a burden, it is the borderline hypothyroid women, who conceive and come out with sub clinical or overt hypothyroidism. Fetus depends in the first 12weeks on the mother for thyroxine [8-10]. A substantial amount of thyroxine is transferred across the placenta. Placental deiodinases can convert T4 to T3.

Population	Mean $\pm$ SD (mIU/ml)	CI for Mean	Median	Number (N)
Study Population	2.47 $\pm$ 1.93	2.33-2.63	1.94	499
Euthyroid	1.33 $\pm$ 0.48	-	-	282
Hypothyroid	4.22 $\pm$ 2.14	3.75-4.51	3.67	217



**Figure 1. Age distribution between Hypothyroid and Euthyroid study population**



**Figure 2. Correlation between age and TSH**

**Discussion**

Pregnancy is a stress condition to the maternal thyroid gland, due to increase in thyroxine binding globulin, increased demand for iodine and thyroid stimulation by HCG [7]. While for normal euthyroid pregnant women this

Fetus needs thyroxine for brain development, growth and lung maturation. Thus if maternal levels of thyroxine are not well maintained in pregnancy, fetus is at risk. The ATA, after an exhaustive summary of available evidence, concludes that it can neither recommend for or against universal TSH screening at first trimester”, but clearly states that

“universal FT4 screening of pregnant women is not recommended” [4]. But Indian Thyroid Society (ITS) guidelines clearly recommend that “all pregnant women should be screened at 1st antenatal visit by measuring TSH levels”, and highlight that “ideally screening should be carried out during pre-pregnancy evaluation or as soon as pregnancy is confirmed” [6].

The diagnostic threshold for hypothyroidism is lower in pregnancy than in non pregnant individuals. The normal reference values for TSH are 0.1-2.5 mIU/ml in first trimester of pregnancy. The current ITS guidelines do not discuss issues related to FT4 estimation. However, as they clearly recommend universal screening with TSH and treatment of all sub clinically thyroid and overt thyroid woman with pregnancy.

In our study we found that majority of the pregnant lady in their 1<sup>st</sup> trimester was suffering from hypothyroidism; 217 out of 499 (1 patient’s data was removed for being possible outlier)

with mean TSH level  $4.22 \pm 2.14$  mIU/ml. Rest 282 were euthyroid with mean TSH level  $1.33 \pm 0.48$  mIU/ml. No significant correlation between age and TSH found in hypothyroid population.

### **Conclusion**

In our study we found that more 43 % of pregnant women in first trimester were suffering from Hypothyroidism (both subclinical and overt hypothyroidism) which is alarmingly high in comparison to other studies. Thyroid disorders are common in pregnancy, and the most common disorder is subclinical hypothyroidism. Even though universal TSH screening is not yet recommended, it should be considered in view of results shown by different studies. Screening for thyroid dysfunction should be done early in pregnancy. Looking at the high percentage of abnormal TSH in pregnancies, universal screening should be considered, especially in this part of the country.

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