

# Thyroid Hormone Profile in Apparently Healthy Pregnant Women Attending in a Tertiary Care Hospital of Bangladesh

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## Abstract:

**Background:** Thyroid dysfunction is not uncommon in pregnancy. It should be evaluated for better outcome of pregnancy. **Objective:** To observe the thyroid hormone profile in apparently euthyroid pregnant women of any trimester. **Methods:** This cross-sectional study investigated 350 pregnant women irrespective of gestational age [(age 24±4, m±SDyr; 1st trimester = 101, 2nd trimester=111, 3rd trimester=138) for thyroid stimulating hormone (TSH) and for free thyroxine (FT4)] to assess their thyroid function during pregnancy following the criteria of American Thyroid Association (ATA). **Results:** Most of the mothers were housewives (93.1%, 326/350) of whom 46.6% were primigravida. About 63% mother had associated goiter, 58% (204/350) were euthyroid and 41% (142/350) were subclinical hypothyroid (SCH). Frequency of goiter (63% vs. 62%, euthyroid vs. dysfunction) was not significantly different between dysfunction and normal groups. FT4 significantly correlated with gestational age ( $r = -0.131$ ,  $p=0.014$ ) and TSH level ( $r = -0.612$ ,  $p < 0.001$ ). **Conclusion:** It is concluded that many of the apparently euthyroid pregnant mother have dysfunction as defined by ATA reference ranges for TSH and FT4. Simple screening for thyroid function may have greater implication for better pregnancy outcome.

**Key Words:** Apparently healthy, Euthyroid, Subclinical hypothyroid

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## Introduction:

Several studies have shown that thyroid function test results of healthy pregnant women differ from those of healthy non pregnant women. There is strong evidence in the literature that the reference range for TSH is lower throughout pregnancy; i.e., the upper normal limit of serum TSH is decreased by about 1.0 mIU/L and the lower normal limit is decreased by about 0.1–0.2 mIU/L, compared with the customary TSH reference interval of 0.4–4.0 mIU/L of nonpregnant women<sup>1</sup>. During the last decade, it has become apparent that untreated maternal hypothyroidism (overt or subclinical) in pregnancy is associated with adverse fetal and obstetric outcomes<sup>2</sup> which can be ameliorated by adequate levo-thyroxine

therapy<sup>3</sup>. Higher maternal TSH levels even within the conventional normal reference range for nonpregnant adult are associated with an increased risk of miscarriages, fetal and neonatal distress<sup>4</sup> as well as preterm delivery<sup>5</sup>. So considering the impact of thyroid disorders on the course of pregnancy it is obvious that estimation and interpretation of thyroid function test in pregnant women is of utmost importance for maternal, fetal and neonatal health. Bangladesh is considered as an iodine deficient area and thyroid disorders are more common in our population specially in women of child bearing age<sup>6</sup> and there are no standard trimester specific reference values for these hormones in our country. It is in this context the present study intends to determine the frequency of thyroid dysfunctions in apparently healthy pregnant women in light of American Thyroid Association (ATA) recommended trimester specific reference ranges for pregnant women (Table-I).

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**Table-I**

*American Thyroid Association (ATA) recommended trimester specific reference ranges for pregnant women*

Trimester	TSH (mIU/ml)	FT4 (ng/dl)
1st Trimester	0.1-2.5	When trimesterspecific FT4 values are not available, the reference ranges for nonpregnant patients are recommended. (0.8-1.8) ng/dl
2nd Trimester	0.2-3.0	
3rd Trimester	0.3-3.0	

**Methods:**

This cross sectional study was conducted in the department of Endocrinology and department of Obstetrics & Gynecology of Bangabandhu Sheikh Mujib Medical University (BSMMU) from December 2012 to June 2014. Total 350 apparently healthy pregnant women (age group of 18yrs and above), recruited by nonprobability consecutive sampling during their antenatal visit irrespective of gestational age. Pregnant women with known thyroid abnormalities, with chronic systemic disease (eg. Bleeding diathesis, CKD, CLD etc) or history of taking any drug that interfere thyroid function test (e.g. Phenytoin, Lithium, Glucocorticoids etc.) were excluded from the study. Informed written consents were obtained from all subjects. Data definition for apparently healthy state: clinically euthyroid and no history of any systemic illness that interfere thyroid function tests. Measurement of TSH & FT4 was done by chemiluminescent immunoassay in the department of Microbiology & Immunology, BSMMU. Data were analyzed using SPSS (version 13.0) and presented as table and figure. P value  $\leq 0.05$  was considered significant.

**Results:**

Characteristics of the pregnant women shown in table-II.

**Table-II**

*Characteristics of the pregnant women (n=350)*

Characters	Values
Number (n)	350
Age (mean $\pm$ SD, year)	24 $\pm$ 4
Profession n (%)	
Housewife	326 (93.1%)
Service	13 (3.7%)
Student	11 (3.1%)
Menstrual history n (%)	
Regular	342 (97.7%)
Irregular	8 (2.3%)
Parity n (%)	
0	164 (46.9%)
1	98 (28.0%)
2	64 (18.3%)
$\geq 3$	24 (6.9%)
Gravida n (%)	
1	163 (46.6%)
2	98 (28.0%)
$\geq 3$	89 (25.4%)
Trimester wise number n (%)	
1st Trimester	101 (28.9%)
2nd Trimester	111 (31.7%)
3rd Trimester	138 (39.4%)
Goiter n (%)	
Present	219 (62.6%)
Absent	131 (37.4%)

Table-III shows that, about 58% (204/350) subjects were

euthyroid, 41% (142/350) subclinical hypothyroid and only 1% was subclinical hyperthyroid. While there were none to be found as overt hypothyroidism, isolated hypothyroxinemia, nor frank hyperthyroid.

**Table- III**

*Thyroid function of pregnant women (N=350)*

Criteria	Euthyroid		SCH		Subclinical hyperthyroid	
	n	%	n	%	n	%
ATA	204	58.3%	142	40.6%	4	1.1%

SCH = Subclinical Hypothyroid

ATA= American Thyroid Association

Presence of goiter was 63% in euthyroid, and 62% in dysfunction group, having no significant difference between the groups (Table-IV).

**Table-IV**

*Thyroid dysfunction among subjects with or without goiter*

Goiter	Thyroid function		Total	p
	Euthyroid	Dysfunction		
Present	128 (62.7%)	91 (62.3%)	219 (62.6%)	NS
Absent	76 (37.3%)	55 (37.7%)	131 (37.4%)	

Frequencies of various functional subgroups (Table-V) in different trimesters revealed that most of the patients fell into the euthyroid group followed by subclinical hypothyroid and subclinical hyperthyroid in 1st& 3rd trimesters, while with near equal distribution for euthyroid and subclinical hypothyroid in 2nd trimesters.

**Table-V**

*Gestational age group and thyroid function*

Gestation	Euthyroid		SCH		Subclinical hyperthyroid	
	n	%	n	%	n	%
1st Trimester	70	69.3	28	27.7	3	3
2nd Trimester	54	48.6	57	51.4	0	0
3rd Trimester	80	58.0	57	41.3	1	0.7
Total	204	142	4			

$\chi^2 = 15.614$ ;  $p = 0.004$  SCH = Subclinical Hypothyroid

**Table- VI**

*Correlations*

Variables	r	p
Gestational age vs. TSH	0.091	0.091
Gestational age vs. FT4	- 0.131	0.014*
TSH vs. FT4	- 0.612	0.001**
Maternal age vs. TSH	0.036	0.504
Maternal age vs. FT4	- 0.017	0.754

\* $P < 0.05$ , \*\* $P < 0.01$

TSH = Thyroid stimulating hormone,

FT4 = Free thyroxine

### Discussion:

Based on trimester specific range of serum TSH set by ATA about 58% subjects were euthyroid, 41% subclinical hypothyroid and only 1% was subclinical hyperthyroid. Similar study was conducted by Farhana-Akter (2014) in BSMMU using ATA defined TSH and FT4 level, and observed that out of 200 studied subjects in first trimester, 21% (42) subclinical hypothyroid, 0.5% (01) overt hypothyroid, 5% (10) overt hyperthyroid<sup>7</sup>.

Another cross-sectional study by Fatema (2013) showed the overall frequency of hypothyroid was 29.7% (28.1%

subclinical hypothyroid and 1.6% overt hypothyroid) and that of hyperthyroidism was 1.2%<sup>8</sup>. According to Jorge (2002) hypothyroidism in pregnancy is rare, while subclinical hypothyroidism is more commonly encountered. So the number of subjects with thyroid dysfunction detected in this study is consistent with above studies<sup>9</sup>.

Higher percentage of subclinical hypothyroidism is due to proportionately higher number of patient in 2nd and 3rd trimester of pregnancy as because level of TSH increases with the advancement of pregnancy<sup>10</sup>. Bangladesh is considered as one of the countries most affected by iodine deficiency disorders (IDD)<sup>6</sup>. This may have contribution to higher frequency of thyroid dysfunctions in our pregnant population.

In our study about 63% (219/650) mother had associated goiter. Presence of goiter was 63% in euthyroid and 62% in dysfunction group, having no significant difference between the groups ( $c2 = 0.006$ ,  $p = NS$ ). This may be as part of pregnancy related enlargement of thyroid gland which happens commonly to most pregnant ladies in areas of iodine deficiency<sup>11</sup>.

### Conclusions:

This study shows a good number of pregnant women have thyroid dysfunction as defined under ATA criteria. Study involving more pregnant ladies from different areas of Bangladesh with subsequent sequential follow up of each pregnant mother in all trimesters is needed for better conclusion in this context.

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