



## PREVALENCE OF THYROID DISORDERS IN PREGNANCY AND ITS - MATERNAL COMPLICATIONS – A PROSPECTIVE STUDY

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### ABSTRACT

**INTRODUCTION :** Development of thyroid disorders during pregnancy can lead to adverse pregnancy outcomes . Thyroid function tests during pregnancy are also affected by estrogen-mediated increases in the level of thyroxine-binding globulins .

It is well documented that maternal thyroid disorders are associated with adverse outcomes in the mother and fetus, including miscarriage, preterm delivery, pre-eclampsia, and placental abruption . Decreased availability of maternal thyroid hormone may also impair neurological development of the fetus as several studies have reported decreased IQ in infants born to mothers with either hypothyroidism, hyperthyroidism . Hence there is a need for universal screening for thyroid dysfunction during pregnancy

**AIMS & OBJECTIVES :** To study the prevalence of thyroid disorders in pregnancy and its maternal outcome.

**MATERIALS AND METHODS:** The study is an observational study carried on 200 pregnant females attending antenatal clinics in Department of Obstetrics and Gynaecology of Swaroop Rani Nehru and Kamla Nehru Memorial hospital ,Prayagraj from September 2018 to September 2019.

**RESULTS:** It was observed that the maximum numbers of patients were in 21– 30 years (67%) age group. Euthyroid (87%), overt hyperthyroid (1%), subclinical hyperthyroid (2%), overt hypothyroid (2%), and subclinical hypothyroid (8%) cases were detected. In present study incidence of maternal complications like Preeclampsia, Preterm delivery, Abortion, Abruption and Hyperemesis gravidarum was found to be statistically significant in pregnant female with thyroid disorders (p-value=0.04)

**CONCLUSION:** Present study concludes that there is significant association between thyroid disorders and adverse maternal outcome (p-value=0.04).. TSH is the hallmark in detection of hypothyroid as well hyperthyroid so TSH should be included in the list of routine investigations done in all antenatal women in first trimester.

### KEYWORDS :

#### INTRODUCTION

Normal pregnancy is associated with significant changes in maternal thyroid physiology. Development of thyroid disorders during pregnancy can lead to adverse pregnancy outcomes . Thyroid function tests during pregnancy are also affected by estrogen-mediated increases in the level of thyroxine-binding globulins (TBG). Total T3 and T4 levels increase starting in early pregnancy, due to the increased TBG levels, so that the upper limit of normal for total T3 and T4 in pregnancy is approximately 1.5-fold the upper limit of the nonpregnancy reference range.

It is well documented that maternal thyroid disorders are associated with adverse outcomes in the mother and fetus, including miscarriage, preterm delivery, eclampsia, pre-eclampsia, and placental abruption . Decreased availability of maternal thyroid hormone may also impair neurological development of the fetus as several studies have reported decreased IQ in infants born to mothers with either overt hypothyroidism (OH) hyperthyroidism , or thyroid peroxidase antibody (TPO Ab) positivity .Hence there is a need for universal screening for thyroid dysfunction during pregnancy

Most frequent thyroid disorder in pregnancy is maternal hypothyroidism. It is associated with fetal loss, placental abruptions, preeclampsia, preterm delivery and reduced intellectual function in the offspring<sup>[1]</sup> Prevalence of hypothyroidism during pregnancy varies from 2.5% in the west to 11% in India<sup>[2]</sup> Maternal hypothyroidism in pregnancy causes decreased availability of thyroid hormone during the initial phase of normal brain development and is associated with increased rates of abortion and stillbirth, impaired neuropsychological development of fetus ,congenital malformation and increase in perinatal mortality. Hyperthyroidism is much less common than hypothyroidism. It is seen in 0.5–2/1000 pregnancies and if remains untreated is associated with significantly higher frequency of obstetric complications such as preeclampsia, premature labor, low birth weight, fetal and perinatal loss. Sub-clinical hyperthyroidism is seen in around 1.7% of pregnancies and is not associated with adverse outcomes<sup>[3]</sup> Thus, prompt identification of thyroid disorder and timely

initiation of therapy in pregnancy is essential. Therefore, the present study is being carried out to study the prevalence of thyroid disorders in pregnant women and its complications.

#### METHODOLOGY

The study was carried out in antenatal women attending antenatal clinics and their newborn in Swaroop Rani Nehru Hospital, Kamla Nehru Memorial Hospital ,Department of obstetrics & gynaecology and MLN,Medical College Prayagraj from September 2018 to September 2019.

#### INCLUSION CRITERIA

- 1.) All the pregnant women attending antenatal clinics
- 2.) All Pregnant women admitted for delivery (vaginal delivery or caesarean section)

#### EXCLUSION CRITERIA

- 1.) Pregnant women with gestational diabetes and overt diabetes.

An informed consent was taken from all the subjects and thorough general, systemic and obstetrical examination was done.

#### THYROID FUNCTION TEST

Serum Thyroid hormones (S.TSH,S.T3,S.T4) level was assessed by ARCHITECT hormonal assay which is a chemiluminescent micro particle immunoassay (CMIA) for the quantitative determination of thyroid hormones in human serum and plasma. According to the biochemical values those patients were divided into overt hypothyroidism (Abnormally high Serum TSH level and abnormally low thyroxine level),subclinical hypothyroidism (Increased Serum TSH normal thyroxine level),euthyroidism ,overt hyperthyroidism (Abnormally low Serum TSH ,high thyroxine levels),subclinical hyperthyroidism (Abnormally Low Serum TSH,Normal Thyroxine levels) and were given treatment.Serum TSH estimation repeated at 4-6 weeks intervals. Following reference range of Serum TSH were taken into consideration

First trimester 0.1 – 2.5 mIU/ml  
 Second Trimester 0.2 – 3.0 mIU/ml  
 Third Trimester 0.3 – 3.0 mIU/ml  
 Free T4(ng/dl)  
 First Trimester – 0.8-1.2 ng/dl  
 Second Trimester – 0.6-1 ng/dl  
 Third Trimester – 0.5-0.8 ng/dl

All the patients were followed till the end of pregnancy. Normal patients will serve as controls. Pregnancy outcome studied statistically.

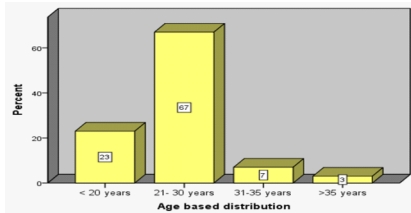
**STATISTICAL ANALYSIS –**

Chi square tests is used to asses comparison with P- Value significance level as 0.05.

**RESULTS**

**TABLE 1 AGE BASED DISTRIBUTION OF STUDY POPULATION**

SN	AGE GROUP	No (%)
1	<20 years	46 (23%)
2	21 – 30 years	134 (67%)
3	31 – 35 years	14 (7%)
4	>35 years	6 (3%)
	Total	200 (100%)

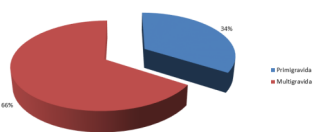


**FIG. -1 : AGE BASED DISTRIBUTION OF STUDY POPULATION**

Maximum patients, 134 (67%) were in the age group between 21 – 30 years, 46 (23%) were less than 20 years, 14 were in the age group between 31- 35 years and 6 (3%) were above 35 years .The average age of the patients was 24 years 5 months.

**TABLE 2 PARITY BASED DISTRIBUTION OF STUDY POPULATION**

SN	GRAVIDITY	No (%)
1	Primigravida	68 (34%)
2	Multigravida	132 (66%)
	Total	200 (100%)

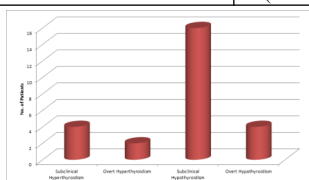


**FIG.-2 : PARITY BASED DISTRIBUTION OF STUDY POPULATION**

Out of total 200 pregnant women involved in the study 68 (34%) were primigravida and 132 (66%) were multigravida.

**TABLE 3 THYROID DISORDER IN STUDY POPULATION ( N=200)**

SN	THYROID DISORDER	No (%)
1	Subclinical Hyperthyroidism	4 (2%)
2	Overt Hyperthyroidism	2 (1%)
3	Subclinical Hypothyroidism	16 (8%)
4	Overt Hypothyroidism	4 (2%)
	Total	26 (13%)



**FIG.-3:THYROID DISORDER IN STUDY POPULATION**

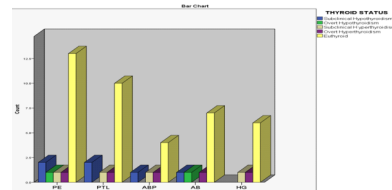
Out of total 26 pregnant women diagnosed with Thyroid Disorder 4 (2%) had subclinical hyperthyroidism, 2 (1%) had overt hyperthyroidism, 16 (8%) cases were of subclinical hypothyroidism and 4 (2%) were diagnosed with overt Hypothyroidism. Overall prevalence rate of thyroid disorder in the present study was 13%.

**TABLE 4 : MATERNAL COMPLICATIONS RELATED TO THYROID DISORDER (N=200)**

Thyroid Status	PE No (%)	PTL No (%)	ABP No(%)	AB No (%)	HG No (%)
Subclinical Hypothyroid n =16	2(12.5%)	2(12.5%)	0	1(6.25%)	0
Overt Hypothyroid n =4	1 (25%)	0	0	1(25%)	0
Subclinical Hyperthyroid n =4	1(25%)	1 (25%)	0	0	1(25%)
Overt Hyperthyroidism n= 2	1 (50%)	1 (50%)	1 (50%)	0	1 (50%)
Euthyroid n=174	13 (7.4%)	10(5.7%)	4 (2.3%)	8 (4.6%)	6 (3.4%)

**P-value 0.04\***

PE-Preeclampsia, AB-Abortion, ABP-Abruption, PTL-Preterm Labour



**FIG.-4: MATERNAL COMPLICATIONS RELATED TO THYROID DISORDER (N=200)**

In the present study, the incidence of maternal complications in the cases of subclinical hypothyroidism was preeclampsia (12.5%), preterm delivery (12.5%), abortions (6.25%) .

In the present study incidence of maternal complications in overt hypothyroidism was preeclampsia (25%) and abortion (25%), and in case of subclinical hyperthyroidism incidence of maternal complications was preeclampsia (25%),preterm labour (25%), hyperemesis gravidarum was (25%)

In the present study, the incidence of maternal complications in the cases of overt hyperthyroidism was preeclampsia (50%), preterm delivery (50%), abruption (50%) and hyperemesis gravidarum (50%). Among 174 Euthyroid antenatal women involved in study incidence of preeclampsia was (7.4%) , Preterm labour (5.7%) abruption (2.3%), abortion (4.6%) and hyperemesis gravidarum was (3.4%) Statistically significant association was found between maternal complications and thyroid disorders in present study (p- value=0.04\*).

**DISCUSSION**

Prevalence of thyroid disorder in pregnancy in the present study was 13% which is comparable to the study conducted by **Weiwei Wang, et al. (2011)<sup>4</sup>** (10.2%), **Ajmani, et al. (2014)<sup>5</sup>**(13.25%).

Present study was comparable to the studies conducted by **Sahu, et al. (2010)<sup>6</sup>** (6.47%) **Weiwei Wang, et al. (2011)<sup>4</sup>** (7.2%), as percentage of the subclinical hypothyroidism in present study is 8%.

Prevalence of overt hypothyroidism in pregnancy according to the present study was 2.0% which was comparable to the studies conducted by **Taghavi, et al. (2009)<sup>7</sup>** (2.4%), **P V Bandela, et al. (2013)<sup>8</sup>** (2.87%).

Prevalence of subclinical hyperthyroidism according to the present study was 2% which was comparable to the study conducted by **Dr Thanuja, et al. (2014)<sup>9</sup>** Prevalence of overt hyperthyroidism according to the present study was 1% which was comparable to studies

conducted by **Ajmani, et al. (2014)**<sup>5</sup> (0.5%)

### MATERNAL COMPLICATION OF THYROID DISORDER

In this study, subclinical hypothyroidism in pregnancy is associated with the complications like PE (12.5%), AB (6.25%), PTD (12.5%).

In a study done by **Sahu MT et al (2010)**<sup>6</sup> the incidence of the complications in pregnant women with subclinical hypothyroidism was PE (9.8%), PTD (10.3%) which is similar to the present study.

In a study done by **Sahu MT, et al (2010)**<sup>6</sup> the complications like PE (20.7%), PTD (4.7%) were seen in the cases of overt hypothyroidism. In the present study incidence of complications like in Preclampsia, Abortion was 25% in each case.

Although hyperthyroidism in pregnancy is uncommon, effects on both the mother and child are critical. In the present study, subclinical hyperthyroidism in pregnancy was associated with complications like PE (25%), PTD (25%), HG (25%). In this study, overt hyperthyroidism was associated with the complication AB (50%), PE (50%), ABP(50%), HG (50%).

Statistically significant association was found in present study between maternal complications and thyroid disorders in pregnancy (**p-.04**)

In a study done by **Robert Negro, et al. (2010)**<sup>10</sup>, hyperthyroidism in pregnant women was associated with complications like gestational hypertension (16.7%), PTD (16.7%) and AB (14%). In the present study, overt hyperthyroid patients were prone to have miscarriage and Preeclampsia (50%) which was significantly high.

### CONCLUSION

The conclusion drawn from the present study were.

- 1.) Majority of the women belonged to 21 – 30 years of age with the mean age of 24 years 5 months.
- 2.) Majority of women involved in study were multigravida (66%).
- 3.) Maternal thyroid disorders, a common endocrine problem during pregnancy are associated with adverse obstetrics, maternal outcomes like Preeclampsia, Preterm labour, Abruption, Abortion and Hyperemesis gravidarum. The present study shows significant association between maternal thyroid disorders and pregnancy outcome. (p=.04)

Due to the immense impact that the maternal thyroid disorder has on maternal and fetal outcome, prompt identification of thyroid disorders and timely initiation of treatment is essential. Thus, universal screening of pregnant women for thyroid disorder should be considered especially in a country like India where there is a high prevalence of undiagnosed thyroid disorder.

### ETHICAL ISSUES:

APPROVED BY INSTITUTIONAL ETHICS COMMITTEE

**FUNDING RESOURCES:** NONE

**CONFLICT OF INTEREST:** NONE DECLARED.

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