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EVALUATION OF THYROID STATUS IN PREGNANCY

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ABSTRACT **Background:** Pregnancy has a significant effect on the thyroid gland and its functioning. Hypothyroidism in pregnancy is defined as an increased TSH level in serum. Furthermore, based on free T4 levels, it is categorized into overt (lower free T4 levels) and subclinical hypothyroidism (normal free T4 levels). The most frequent thyroid disorder in pregnancy is maternal hypothyroidism. The geographical variation in the prevalence of hypothyroidism during pregnancy is very wide and ranges from 2.5% to 11%. **Aim and Objectives:** to measure the levels of TSH, FT3 and FT4 in pregnancy and to find out the prevalence of thyroid disorders in pregnancy. Materials and **Methods:** We included a total of 300 patients visiting the antenatal clinic for routine check-up based on inclusion and exclusion criteria. Basic hematological and biochemical investigations were carried out along with thyroid function tests (TSH, FT3 and FT4). All the patients were subjected to first trimester ultrasound scan to confirm gestational age less than 12 weeks. The reference interval for thyroid panel were as per ATA guidelines. **Discussion and Conclusion:** In the present study, we included 300 antenatal women based on inclusion and exclusion criteria. We measured thyroid function tests to calculate and study the prevalence of thyroid disorders in pregnant women. We found the prevalence of 7% thyroid disorders in our study. We found 92.66% euthyroid, 1.33% overt hypothyroidism, 2% subclinical hyperthyroidism and 4% subclinical hypothyroidism.

KEYWORDS : pregnancy, thyroid disorders, euthyroid, subclinical hypothyroidism and subclinical hyperthyroidism

INTRODUCTION:

Pregnancy has a significant effect on the thyroid gland and its functioning [1]. Hypothyroidism in pregnancy is defined as an increased TSH level in serum. Furthermore, based on free T4 levels, it is categorized into overt (lower free T4 levels) and subclinical hypothyroidism (normal free T4 levels) [2]. The most frequent thyroid disorder in pregnancy is maternal hypothyroidism. The geographical variation in the prevalence of hypothyroidism during pregnancy is very wide and ranges from 2.5% to 11% [3].

Worldwide, several studies have reported 1.5%–4% prevalence of hypothyroidism in pregnant women. Among them, 0.3% to 0.5% had overt hypothyroidism (OH), and the rest had subclinical hypothyroidism (SCH) [4-6]. In India, reports on the prevalence of maternal hypothyroidism ranged between 1.2% and 67.0% in various studies [7,8].

The occurrence of hyperthyroidism is less during pregnancy with the prevalence being 0.1%-0.4%. Overt hyperthyroidism is seen in nearly 2% of pregnancy characterized by a reduced TSH and an increased FT3/FT4 while subclinical hyperthyroidism is seen in 1.7% of pregnancy and is characterized by a suppressed serum TSH and normal FT4 [9].

Globally, the leading cause of hypothyroidism in pregnancy is iodine deficiency, and in iodine sufficient areas, most common cause is autoimmune thyroiditis. Other common causes are radio-iodine therapy, thyroidectomy, congenital hypothyroidism, drug use (i.e., rifampicin and phenytoin) and any hypothalamic-pituitary disease. Women with lower thyroid reserves preconceptually are often unable to cope with increased metabolic demands during pregnancy period and can enter the hypothyroid state [5-8].

The present study was conducted to find out the prevalence of thyroid disorders in pregnancy at our tertiary care hospital.

AIM AND OBJECTIVES:

1) To measure the levels of TSH, FT3 and FT4 in pregnancy.
2) To find out the prevalence of thyroid disorders in pregnancy.

MATERIALS AND METHODS: The study was a prospective hospital based type undertaken among the 300 pregnant women attending the ante natal clinic (OPD) of OBG department of Prasad Institute of Medical Sciences, Lucknow for the duration of one year April 2021 to March 2022.

Study design: Prospective hospital based study.

Sample size: 300 cases of antenatal mothers were included.

Inclusion Criteria: All the patients coming to OPD in first trimester for regular antenatal visits were selected. After obtaining the gestational age and informed consent 300 patients were randomly selected for our study. Patients were included if they had <12 weeks of gestation, singleton pregnancy.

Exclusion Criteria: We excluded multiple gestation, women with chronic disorders, bad obstetric history with known cause.

Data collection: Detailed history was taken regarding the symptoms of thyroid disorders, menstrual history, obstetric history, past medical history, family history, personal and social history. General examination was done. Body temperature, pulse rate, blood pressure, respiratory rate was noted. Systemic examination of the cardiovascular system (CVS), central nervous system (CNS), respiratory system and thyroid gland was done. Per abdominal and per vaginal examination was done and findings were recorded.

Blood Sample Collection and Biochemical Investigations: Basic hematological and biochemical investigations were carried out along with thyroid function tests (TSH, FT3 and Ft4). All the patients were subjected to first trimester ultrasound scan to confirm gestational age less than 12 weeks. The reference interval for thyroid panel were as per ATA guidelines. Patients were categorized into subclinical hypothyroidism if they had elevated TSH with normal FT3 and FT4, Overt hypothyroidism if they had high serum TSH with low FT3 and FT4. Similarly, they were categorized as subclinical hyperthyroidism if they had low TSH with normal FT3 and FT4, Overt hyperthyroidism if they had high low TSH with high FT3 and FT4. Sub clinical/ overt hypothyroid cases were treated with Thyroxine. Sub clinical / overt hyperthyroid cases were treated with Propylthoiuracyl.

RESULTS:

In the present study, we included a total of 300 patients coming to OPD in first trimester for regular antenatal visits were selected. After obtaining the gestational age and informed consent 300 patients were randomly selected for our study. Patients were included if they had <12 weeks of gestation, singleton pregnancy.

Table 1: Shows baseline characteristics of the study patients

Parameters	Mean ± SD
Age	24.17 ± 3.78
Gestational age	8.21 ± 1.98

TSH	1.69 ± 0.64
FT3	2.4 ± 0.68
Ft4	1.38 ± 0.57

Table 2: Shows the number and percentage of various thyroid disorders in the study population

Parameters	Number	Percent
Euthyroid	278	92.66
Overt hypothyroidism	4	1.33
Subclinical hyperthyroidism	6	2
Subclinical hypothyroidism	12	4
Total	300	100

Figure 1: Shows the prevalence of thyroid disorders

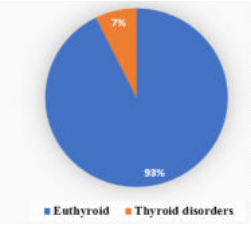
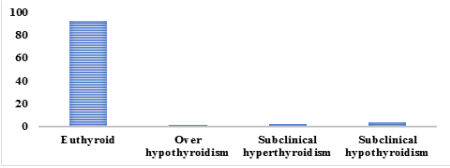


Figure 2: Shows the number and percentage of various thyroid disorders in the study population



DISCUSSION:

In the present study, we included 300 antenatal women based on inclusion and exclusion criteria. We measured thyroid function tests to calculate and study the prevalence of thyroid disorders in pregnant women. We found the prevalence of 7% thyroid disorders in our study. The studies conducted in the past have shown prevalence ranging up to 12.15%.

Studies	Prevalence
Mulik J et al. [10]	12.15%
Sahu MT et al. [11]	12.7%
Azenabor A et al. [12]	11.1%
Chunchaiah S et al. [13]	11.25%
Singh A and Reddy MJ [14]	8.25%
Present study	7%

Primary maternal hypothyroidism is characterized by an increase in the serum TSH levels during pregnancy. It is further classified as subclinical hypothyroidism (SCH) which has normal free T4 levels and overt hypothyroidism (OH) which has decreased free T4 levels. This differentiation is crucial as it has clinical and management implications. Maternal complications reported to be associated with overt hypothyroidism include pre-eclampsia, placental abruption, polyhydramnios, oligohydramnios, hyperemesis, gestational diabetes, premature rupture of membranes, and chronic hypertension. For the fetus too, there is a high risk of fetal death, prematurity, low birth weight, congenital malformations, fetal distress, perinatal hypoxic encephalopathy, and deficit in the mental developmental coefficient. Some epidemiological studies have also pointed towards the association of maternal hypothyroidism and adverse neurological outcomes in the progeny ranging from neurological cretinism, congenital hypothyroidism, to decreased intelligence quotient [15, 16].

Pregnancy is a state of increased thyroid hormone requirement. The majority (50–85%) of previously hypothyroid women (on treatment) need to increase their dose of thyroid supplements post conception. Pregnancy serves as a stress test for the thyroid gland, which leads to hypothyroidism in iodine deficient women or in those having limited thyroid reserve. Furthermore, risk factors such as geographical disparity (in terms of iodine-deficient regions especially across India), obesity, prior history of thyroid dysfunction, the genetic history of thyroid dysfunction, and history of autoimmune disorders also make pregnant women more susceptible to hypothyroidism [17].

TSH levels during pregnancy are lower as compared to the non-pregnant state. As per American Thyroid Association recommendations 2011 as well as endocrinology society guidelines for pregnant women, TSH levels should be within the limits of 0.1 to 2.5 mIU/L during the first, 0.2–3.0 mIU/L in second, and 0.3 to 3.0 mIU/L in the third trimester. However, these guidelines were revised in 2017, and it was recommended that the first-trimester upper normal limit cutoff should be obtained by deducting "0.5 mIU/L" from pre pregnancy TSH value. If this value is unknown, then 4.0 mIU/L should be taken as the upper limit of normal cut-offs [1, 2] Optimal TSH cutoffs have been a topic of controversy since long and may have a bearing on prevalence estimates. European Thyroid Association in 2014 recommended that, due to geographic variation in normal TSH and thyroid hormone levels, reference range should be defined for each antenatal hospital after assessment of local population data. ATA 2017 guidelines also supported these recommendations. These guidelines might be the reason for non-standardized cut-off values are being used by many studies [2,18,19].

However, in Indian setting, the National Guidelines for Screening of Hypothyroidism during Pregnancy 2014 have considered ATA 2011 guidelines for defining cutoffs. A recent article suggested that 4.0 mIU/L as a cutoff as per the revised ATA recommendations may be too high for Indian settings, and intermediate cut-off of 3.00 should be considered [19].

CONCLUSION:

In the present study, we included 300 ante natal women based on inclusion and exclusion criteria. We measured thyroid function tests to calculate and study the prevalence of thyroid disorders in pregnant women. We found the prevalence of 7% thyroid disorders in our study. We found 92.66% euthyroid, 1.33% overt hypothyroidism, 2% subclinical hyperthyroidism and 4% subclinical hypothyroidism.

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