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Original Research Article

Prevalence of thyroid disorders in pregnancy

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ABSTRACT

Background: Thyroid disorders are among the common endocrine problems in pregnant women. Often overlooked in pregnancy due to nonspecific symptoms and hyper-metabolic state of pregnancy. Western literature shows prevalence of hypothyroidism in pregnancy as 2.5% and hyperthyroidism as 0.1-0.4%. There is paucity of data on prevalence of thyroid disorders in Indian pregnant population. This study was carried out to know prevalence of thyroid disorders in pregnant women in Indian population.

Methods: One hundred pregnant women attending antenatal clinic in first trimester were registered. Detailed history and examination was done. Apart from routine basic and obstetrical investigations, TSH, FT3 and FT4 level estimation was done.

Results: Prevalence of thyroid dysfunction was high in this study in first trimester pregnant women, with subclinical hypothyroidism in 6%, overt hypothyroidism in 2%, subclinical hyperthyroidism 2 % and overt hyperthyroidism 0%.

Conclusions: Prevalence of thyroid disorders, especially subclinical hypothyroidism (6%), overt hypothyroidism (2%) and subclinical hyperthyroidism (2%) was high. To prevent adverse effects on maternal and fetal outcome, we are emphasizing the importance of routine antenatal thyroid screening.

Keywords: Chest circumference, Gestational age, Thyroid disorders

INTRODUCTION

Thyroid disorders constitute one of the most common endocrine disorders seen in pregnancy. Maternal thyroid function changes during pregnancy and inadequate adaptation to these changes results in thyroid dysfunction.

These changes are a result of various factors like an increase in thyroglobulin due to elevated estrogen and human chorionic gonadotrophin, increased renal losses of iodine due to increase in glomerular filtration rate, modifications in peripheral metabolism of maternal thyroid hormone and modifications in iodine transfer to placenta. The production of thyroid hormone and iodine requirement increases by 50% during pregnancy.¹ During pregnancy, the thyroid gland increases in size by 10% in

iodine sufficient countries and to greater extent in iodine deficient countries¹. Pregnancy is a stress test for thyroid gland, resulting in hypothyroidism in women with limited thyroidal reserve or iodine deficiency.

Thyroid disorders during early pregnancy has been associated with adverse obstetric and fetal outcome. The main obstetric complications are abortion, pre-eclampsia, abruptio placenta, preterm labour and the fetal complications are prematurity, low birth weight, still birth and perinatal death. Children born to untreated mothers have profound effect on future intellectual development.² Prenatal and postnatal adverse effects including attention deficit and hyperactivity syndrome have been reported in children born to hypothyroid mothers.^{2,3} There is an increase in the incidence of NICU

admissions and respiratory distress syndrome. Maternal hypothyroidism in the 1st trimester may be harmful for fetal brain development and leads to mental retardation and cretinism which includes impairment of mental and physical growth and development and has a negative impact on most organ systems. Data from recently published studies have underscored the association between miscarriage and preterm delivery in women with normal thyroid function who test positive for thyroid peroxidase (TPO) antibodies.^{4,5} During the first trimester, approximately 1 in 10 pregnant women develop antibodies to TPO or thyroglobulin and hypothyroidism develops in roughly 16% of these women.⁵

Thyroid disorders may be overlooked in pregnancy because of nonspecific symptoms and hyper metabolic state of pregnancy. Physiological changes of pregnancy can stimulate thyroid disease. Prevalence of thyroid disorders during pregnancy has a wide geographic variation. Western literature shows a prevalence of hypothyroidism in pregnancy of 2.5% and hyperthyroidism in pregnancy has prevalence of 0.1 to 0.4%.⁶ There is paucity of data on prevalence of thyroid disorders in Indian pregnant women. Few reports show a prevalence of 4.8% to 11% amongst Indian pregnant population.^{7,8} In view of adverse maternal and fetal outcome in pregnant women with thyroid disorders and obvious benefits of early diagnosis and treatment, some expert panels all around the world have suggested routine thyroid function screening of all pregnant women. Therefore, this study was carried out in pregnant women during 1st trimester who attended antenatal clinic of Department of Obstetrics and Gynecology, Sri Guru Ram Das Medical College, Vallah (Amritsar) to know the prevalence of thyroid disorders in pregnant women.

METHODS

This prospective study was done at Department of Obstetrics and Gynecology, Sri Guru Ram Das Medical College, Vallah, (Amritsar) from 15th February 2017 to 15th August 2017. The study was conducted after ethical clearance from the institutional ethical committee. All the patients coming to OPD in 1st trimester for regular antenatal visits were selected. After obtaining the gestational age and informed consent, 100 patients in 1st trimester was randomly selected for the study. Patients were included if they had 1) <13 weeks gestation, 2) Singleton pregnancy, 3) Primigravida /multigravida. Women were excluded if they had multifetal gestation, known chronic disorders (diabetes and hypertension) and had previous bad obstetric history with known cause.

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.

Investigations

Basic investigations including complete blood picture, clotting time, bleeding time, blood grouping and Rh typing, RBS, blood urea, serum creatinine, HIV, Hbs Ag and HCV and complete urine examination were done. Pregnancy <12 weeks was confirmed by clinical assessment, pregnancy test and ultrasonography.

Serum samples were sent for testing TSH, FT3, FT4 levels. The reference ranges of the test values used in this study were as per the Guidelines of American Thyroid Association for the Diagnosis and Management of Thyroid Disease during Pregnancy and Postpartum. 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 3.0 m IU/L and 3rd trimester - 0.3 to 3.0 m IU/L. Normal free T4 level is 0.7 to 1.8 ng/ml and free T3 level is 1.7 to 4.2 pg/ml.

Classification

Depending on the hormonal values, patients were classified into subclinical hypothyroidism: High serum TSH level with normal fT4, fT3 level, overt hypothyroidism: High serum TSH level with fT4 and fT3 less than normal range, subclinical hyperthyroidism: Low serum TSH level with normal fT3, fT4 level and overt hyperthyroidism: Low serum TSH level with fT3 and fT4 more than normal range. Sub clinical/ overt hypothyroid cases were treated with Thyroxine. Sub clinical / overt hyperthyroid cases were treated with Propylthiouracyl.

RESULTS

One hundred pregnant women attending antenatal clinic in first trimester were studied. Maternal demographic characteristics of our study population are shown in Table 1.

Table 1: Baseline characteristics and thyroid profile of study population (n = 100).

	Age (years)	POG (wks)	TSH	T3	T4
Mean	23.27	7.51	1.598	2.590	1.308
SD	4.315	2.713	0.738	0.566	0.407
Minimum	17	2	0.020	0.700	0.170
Maximum	30	12	5.700	5.200	3.330

The mean age of our study population was 23.27 years with mean period of gestation of 7.51 weeks. The mean TSH, T3 and T4 values were 1.598, 2.590 and 1.308 respectively.

Table 2: Prevalence of thyroid disorders among different age groups.

Age (years)	N	No. of TD	Prevalence (%)
≤20	35	1	2.90
21-25	31	7	22.60
26-30	34	2	5.90
>30	-	-	-
Total	100	10	10.00

Table 2 shows prevalence of thyroid disorders in various age groups of pregnant patients. Highest prevalence (22.6%) was seen in pregnant women who were 21-25 years of age. Women who were less than 21 years of age had least prevalence (2.90) of thyroid disorders. The prevalence of thyroid disorders among 26-30 years old was 5.90. None of our patients were over 30 years of age.

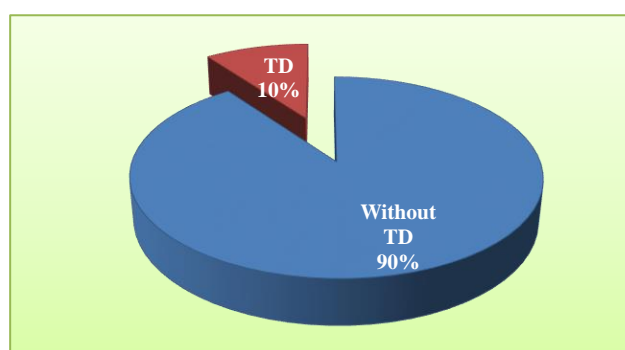


Figure 1: Prevalence of thyroid disorders.

Out of 100 women attending antenatal clinic 10 (Figure 1) had deranged thyroid function making prevalence of thyroid dysfunction as 10%.

Table 3 shows prevalence of various thyroid disorders in study population. Prevalence of overt hypothyroidism was 2%. Prevalence of subclinical hypothyroidism was 6% and was highest. Prevalence of subclinical hyperthyroidism was 2%, whereas prevalence of overt hyperthyroidism was 0%.

Table 4 illustrates mean TSH, T3 and T4 values among various groups. Euthyroid women had mean TSH value of 1.47, mean T3 value of 2.62 and mean T4 value of 1.34. Women who had subclinical hyperthyroidism had mean TSH value of 3.02, mean T3 value of 2.75 and mean T4 value of 1.10. Women who had overt hypothyroidism had mean TSH value of 4.55, mean T3 value of 0.75 and mean T4 value of 0.28.

Table 3: Percentage of various thyroid disorders in study population.

Type	Number	Percent
Euthyroid	90	90.0
Overt Hypothyroidism	2	2.0
Subclinical hyperthyroidism	2	2.0
Subclinical hypothyroidism	6	6.0
Total	100	100.0

Table 4: Mean TSH, T3 and T4 values in study population.

Type	N	TSH		T3		T4	
		Mean	SD	Mean	SD	Mean	SD
Euthyroid	90	1.473	0.411	2.621	0.519	1.347	0.386
Overt Hypothyroidism	2	4.550	1.626	0.750	0.071	0.286	0.150
Subclinical Hyperthyroidism	2	0.020	0.000	2.535	0.530	1.161	0.239
Subclinical Hypothyroidism	6	3.027	0.212	2.758	0.312	1.102	0.313
P value		<0.001**		<0.001**		0.001*	

*p<0.05; Significant; **p<0.001; Highly significant

DISCUSSION

The present study was done at Department of Obstetrics and Gynecology, Sri Guru Ram Das Medical College, Vallah (Amritsar). A total of 100 patients were screened for thyroid disorders in this study. It was prospective study. The main aim of the study was to know the prevalence of thyroid disorders in pregnancy.

The prevalence of thyroid disorders in our study was 10%. Present findings are consistent with Sahu MT et al, who studied 633 women in second trimester.⁸ In their

study the prevalence of thyroid disorders was also 12.7%, which is comparable to study. The prevalence of subclinical hypothyroidism in our study is 6%. In the study of Sahu MT et al the prevalence was 6.47%, which is comparable to our study.⁸ In a study done by Casey BM et al, the prevalence was 2.3% which is very high and not consistent with present study.⁹ The prevalence of overt hypothyroidism in present study is 2%, which is partly consistent with the study done by Sahu MT et al, in which the prevalence was 4.58%.⁸ The prevalence of subclinical and overt hyperthyroidism in our study is 2% and Nil respectively. In the study done by Sahu MT et al

the prevalence was 0.9% and 0.7% for subclinical and overt hyperthyroidism.⁸ The prevalence of subclinical and overt hyperthyroidism was 0.5 and 0.4% respectively in the study done by Stagnaro Green A.¹⁰ The prevalence of subclinical hyperthyroidism is comparable with other studies.¹¹

At present there are no available recommendations for detection or screening of thyroid dysfunction among Indian pregnant women. Recent consensus guidelines do not advocate universal thyroid function screening during pregnancy but recommend testing for high risk women with personal history of thyroid or other autoimmune disorders or with a family history of thyroid disorders. Our study shows high prevalence of thyroid dysfunction, especially subclinical and overt hypothyroidism among Indian pregnant women.

Based on the results of the present study we therefore suggest for a decrease threshold for screening and detection of thyroid dysfunction among Indian pregnant women attending routine antenatal clinic and to be potentially aware of associated maternal and fetal complications.

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