

Original Research Article

Study to estimate the prevalence of thyroid disorders in pregnant women of North Gujarat region of India

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ABSTRACT

Background: The thyroid function is changed during early stage of pregnancy. Various thyroid disorders throughout pregnancy are related with grave maternal and fetal outcomes. The geographical variation in the prevalence of hypothyroidism during pregnancy is very wide and generally assessed for thyroid disorders are recommended in the pregnancy. Therefore, present study aimed to estimate the prevalence of thyroid disorders in pregnant women of North Gujarat, India.

Methods: The present cross-sectional study was done on 200 pregnant women in the department of general medicine at Banas medical college and our trust-based hospital in North Gujarat, India, over a period of one year from July 2020 to June 2021. The patients' demographic profile was recorded; detailed history and meticulous examination were performed in the entire cases. Serum thyroid-stimulating hormone (TSH), T3 (triiodothyronine) and T4 (thyroxine) were analyzed.

Results: The overall prevalence of various thyroid disorders 13%. The most frequent thyroid disorder reported was subclinical hypothyroidism encompassing of 8%, followed by overt hypothyroidism 3% in women and the prevalence of subclinical hyperthyroidism was 2% which was least in our study.

Conclusions: In our study, we conclude that subclinical hypothyroidism is more common than hyperthyroidism in pregnant women. Therefore, we suggested that thyroid function tests should be include along with other routine investigations during pregnancy to identify thyroid dysfunction and minimize the feto-maternal complications during pregnancy and after birth.

Keywords: Thyroid disorders, Hyperthyroidism, Hypothyroidism, Pregnancy, Prevalence

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.¹ Thyroid disorders during early pregnancy have 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.² 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%.³ 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.^{4,5} Development of maternal thyroid disorders during pregnancy can influence the pregnancy outcome and fetal development.⁶ Thyroid dysfunction can lead to adverse effects on maternal and fetal outcome. It can also have gestational diabetes, unbalanced lipid disorders which further may

have cardiovascular complications in the pregnant mother; there are only few studies in India regarding the prevalence of thyroid disorders in India.⁷ Maternal hypothyroidism in the first trimester may be harmful for the fetal brain development and lead to mental retardation. In view of potential adverse outcomes associated with maternal thyroid disorders and obvious benefits of treatment, some expert panels have suggested routine thyroid function screening in all pregnant women.^{8,9} Thus, the present study was undertaken to know the prevalence of thyroid disorders in pregnant population of North Gujarat.

METHODS

The present descriptive cross-sectional study was carried out in the department of obstetrics and gynecology in collaboration with the department of general medicine, general hospitals associated with Banas medical college and research institute Palanpur and our private trust-based hospital in Banaskantha, Gujarat, India, over period of one year from July 2020 to June 2021.

This was a cross-section study including total 200 pregnant women different age groups attending clinics in the study period. All antenatal women in their first-trimester pregnancy were included after taking consent except patients with known thyroid disorders, multiple gestations, hypertension, diabetes mellitus and other medical disorders. The written informed consent was obtained from each patient prior starts of study and demographic information like age, dietary habits, weight, height, body mass index and occupation of every patients was recorded in proforma.

The biochemical parameters like fasting blood glucose (FBG), total cholesterol, triglycerides (TG) and high density lipoprotein cholesterol (HDL-C) levels were determined by enzymatic method using commercial available diagnostic kit on fully automated biochemical analyzer. Low density lipoproteins cholesterol (LDL-C) was determined by using Friedwald formula. T3, T4 and TSH were estimated by the electrochem-illuminescence immune assay (ECLIA) technique using commercially available kits from Roche diagnostics (Mannheim, Germany) with Elecsys 1010 analyzer. The hematological parameters will be estimated by five part hematological analyzer.

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 were not available in the laboratory, the following normal reference ranges were 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 was 0.7 to 1.8 ng/ml and free T3 level was 1.7 to 4.2 pg/ml.

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 thyroxin. The study protocol was approved by institutional ethics committee human (IEC-H).

All patients fulfilled all the inclusion criteria were included in present study like a detailed history had taken regarding the symptoms and signs of thyroid disorders. A thorough general physical examination with reference to pulse, BP, temperature, respiratory rate were noted followed by CVS, CNS, RS, local thyroid examination. All women who had diabetes, collagen vascular disease, heart disease with pregnancy were excluded from the study. Women with unreliable LMP details and pregnancy not confirmed by ultrasound and previously diagnosed as having thyroid disorders or on treatment for thyroid dysfunctions were also excluded from present study.

Statistical analysis

Data was analyzed using statistical package for social sciences, version 20 (SPSS Inc., Chicago, IL). Results for continuous variables are presented as mean±standard deviation and unpaired student's test was used to compare mean data between various thyroid disorders groups. Chi square test and Fischer's exact Chi square test were used for the comparison of categorical variables and presented as percentage.

RESULTS

A total 200 pregnant women attending antenatal clinic in first trimester were enrolled in this study. The mean age of our study population was 25.27±5.56 years with range of age in pregnant women was 20-43 years. The highest numbers of women were in the age group of 21-25 years. The prevalence of various thyroid disorders in different age groups of pregnant women were illustrated in Table 1. Maximum prevalence (21.17%) was observed in pregnant women who were 21-25 years of age. Women who were 20 years or less than 20 years of age had least prevalence (4.0%) of thyroid disorders. The prevalence of thyroid disorders among 26-30 years was 8.0% and 6.66% was among >30 years of age group (Table 1).

In the present study, 26 pregnant women out of 200 had various thyroid disorders secretarial for the overall prevalence of thyroid disorders 26 (13%). The most frequent thyroid disorder reported was subclinical

hypothyroidism encompassing of 16 (8%) women followed by overt hypothyroidism 6 (3%) women and

subclinical hyperthyroidism had 4 (2%) cases which was least in our study (Table 2).

Table 1: Distribution of thyroid disorders among different age group of pregnant women.

Age group (years)	Total no. of cases (n=200)	Thyroid disorders	Parentages (%)	Level of significance
<20	25	1	4.0	p<0.001 as per Chi square test
21-25	85	18	21.17	
26-30	75	6	8.0	
>30	15	1	6.66	
Total	200	26	13.0	

Table 2: Prevalence of different thyroid disorders in pregnant women.

Types of thyroid disorders	Total numbers (n=200)	Prevalence (%)	Level of significance
Euthyroid	174	87	p<0.05 as per Chi square test
Overt hypothyroidism	6	3.0	
Subclinical hypothyroidism	16	8.0	
Subclinical hyperthyroidism	4	2.	
Total	200	100	

Table 3: Mean value of thyroid profile in various thyroid disorders in pregnant women.

Thyroid profile	Thyroid disorders			
	Euthyroid (n=174) (Mean±SD)	Overt hypothyroidism (n=6) (Mean±SD)	Subclinical hypothyroidism (n=16) (Mean±SD)	Subclinical hyperthyroidism (n=4) (Mean±SD)
TSH	1.23±0.24	5.23±1.54**	3.89±0.64**	0.014±0.00**
T3	2.94± 0.46	0.51±0.06*	2.64±0.54	2.13±.56
T4	1.2±0.23	0.43±0.12*	1.34±0.21	1.31±0.32

Level of significance; TSH, OH v/s SCHypo; p=0.001; OH v/s SC hyper; p<0.001, **highly significant, *significant.

Table 3 demonstrates mean value of thyroid profile in various thyroid disorders in pregnant women. The mean value of TSH level (p<0.001) was significantly higher in women with overt hypothyroidism as compared to mean level of TSH in subclinical hypo and hyperthyroidism. Whereas mean value of T3 (p<0.001) and T4 (p<0.001) were significantly lower in women with overt hypothyroidism as compared to mean level of T3 and T4 in subclinical hypo and hyperthyroidism.

DISCUSSION

The present study was performed in department of obstetrics and gynecology with collaboration with department of medicine at Banas medical college and our trust-based hospital in North Gujarat, India. The overall prevalence of thyroid disorders in our study was 13%. Our outcomes were reliable with Sahu et al who studied 633 women in 2nd trimester.⁵ In their protocol the prevalence of thyroid disorders was also 12.7%, which was similar to study. The prevalence of subclinical hypothyroidism in present study was 8%. A study done by Sahu et al the prevalence was 6.47%, which was analogous to our findings.⁵ In a study done by Casey et al the prevalence was 2.3% which was very high and not

comparable with present study.¹⁰ The prevalence of overt hypothyroidism in present study was 3%, which was partially reliable with the study done by Sahu et al in which the prevalence was 4.58%.⁸ The prevalence of subclinical hypo and subclinical hyperthyroidism in our study was 8% and 2% respectively. In the study done by Sahu et al the prevalence was 0.9% and 0.7% for subclinical hypothyroidism and overt hyperthyroidism.⁵ The prevalence of subclinical and overt hyperthyroidism was 0.5 and 0.4% respectively in the study done by Green.¹¹ The prevalence of subclinical hyperthyroidism was similar with other studies.¹²

Limitations

In present study, we used an only one thyroid function test to assess pregnant women concerning the limitations of present study. We did not take follow up with the pregnant women. Second limitation was that we did not determine antithyroid antibodies, which might have given more precise outcomes. Third limitation was that present study was a hospital-based cross-sectional study with a limited sample size. This study cannot be comprehensive to Indian women until the prospective longitudinal study was carried out community based with large sample size.

CONCLUSION

In our study, the overall prevalence of thyroid dysfunction in pregnant women was observed 13% and the prevalence of subclinical hypothyroidism and overt hypothyroidism was reported 8% and 3% respectively, whereas subclinical hyperthyroidism was 4%. In our study, we conclude that subclinical hypothyroidism is more common than hyperthyroidism in pregnant women. Therefore, we suggested that thyroid function tests should be included along with other routine investigations during pregnancy to identify thyroid dysfunction and minimize the fetomaternal complications during pregnancy and after birth.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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