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Original Research Article

Magnitude of thyroid dysfunction among antenatal women attending tertiary care centre

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ABSTRACT

Background: Thyroid disorders constitute one of the most common endocrine disorders in pregnancy. However, there is no universal guidelines to screen every Pregnant Woman for Thyroid dysfunction in India. This study was conducted to evaluate the magnitude of thyroid dysfunction among ante natal mothers in a tertiary care centre.

Methods: This was a cross sectional observational study conducted on ante natal mothers for a period of 6 months. All consecutive ante natal mothers in their first trimester were included in this study. Exclusion criteria was pre-gestational thyroid dysfunction, hypertension and diabetes mellitus. After obstetric examination and investigation, thyroid function test (Free T4 and TSH) was done in all patients.

Results: Mean age of the patients enrolled was 26.2 ± 3.54 years. Mean gestational age at which they underwent screening was 9 ± 2 weeks. The mean BMI of the study patients was 21.7 ± 4 . The prevalence of hypothyroidism in antenatal mothers was 14.5%. 5 patients (5.5%) had hyperthyroidism. The calculated mean TSH value was 4.26 mIU/L.

Conclusions: Universal screening for thyroid dysfunction during pregnancy should be made mandatory in India due to high prevalence, in order to prevent maternal and foetal complications.

Keywords: Foetal outcome, Hypothyroid, Pregnancy, Thyroid dysfunction, Thyroid screening

INTRODUCTION

Thyroid physiology plays a major role in pregnancy, and thyroid disorders constitute one of the most common endocrine disorders in pregnancy.¹ Pregnancy is associated with significant and reversible changes in thyroid function. In essence, pregnancy is a stress for the thyroid, resulting in hypothyroidism in women with limited thyroidal reserve or iodine deficiency. The developing fetus synthesizes thyroid hormones only by the end of the first trimester and, hence, depends on the maternal thyroid hormone for organogenesis, general growth, and development of the central nervous system.^{2,3} Moreover, thyroid hormones are essential for the

maintenance and successful completion of normal pregnancy.⁴ Pregnant women with thyroid dysfunctions are at an increased risk of pregnancy-related complications such as spontaneous abortion, anaemia, preeclampsia, placental abruption, intrauterine growth restriction (IUGR), and postpartum haemorrhage.⁵ Early diagnosis and intervention of pregnant women with thyroid dysfunction will eliminate the pregnancy related complications and improve the maternal and neonatal outcome. However, there is no National guidelines to screen every pregnant woman for thyroid dysfunction in India. This study was conducted to evaluate the magnitude of thyroid dysfunction among ante natal mothers in a tertiary care centre.

METHODS

This was a Cross sectional observational study conducted on ante natal mothers at Department of obstetrics and gynaecology, at a tertiary care centre, Pondicherry, India from October 2018 to March 2019. The study protocol was approved by the Institutional Ethics Committee before the start of the study. All consecutive ante natal mothers in their first trimester were included in this study after getting informed consent. Patients with pre-gestational Thyroid dysfunction, hypertension and diabetes mellitus were excluded from the study. A Detailed history taking and obstetric examination was performed along with routine blood investigation. Thyroid function test (Free T4 and TSH) was done in all patients. The reference range used in the study is based on the guidelines of the American Thyroid Association, 2017, for the diagnosis and management of thyroid disease during pregnancy and postpartum period.⁶ According to the guidelines, the following reference ranges are recommended:

- First trimester, TSH = 0.1-2.5 µIU/mL
- Second Trimester, TSH = 0.2-3.0 µIU/mL
- Third Trimester, TSH = 0.3-3.0 µIU/mL
- Free T4 = 0.8-2.8 ng/dL

Patients screened positive for thyroid dysfunction were evaluated and treated accordingly. The results were documented and analysed.

Statistical analysis

Statistical testing was conducted with the Statistical Package for the Social Science System (SPSS). Continuous variables are presented as mean±SD, and categorical Variables are presented as absolute numbers and percentage.

RESULTS

In total, 90 patients were enrolled for the study. The demographic profile of the study patients is illustrated in Table 1. Mean age of the patients enrolled was 26.2±3.54

years. Mean gestational age at which they underwent screening was 9±2 weeks. The mean body mass index (BMI) of the study patients was 21.7±4. According to modified BG Prasad’s classification, the socio-economic status of the study patients belonging to Class 1, class 2, class 3, and class 4 was 15.50%, 35.50%, 34.50% and 14.50% respectively.

The study population were almost equally distributed based on their residence, 53% belonging to rural and 47% belonging to urban. 22% of the patients had previous history of menstrual irregularities. 46% were primi gravida and 54% were multi gravida among the patients who were enrolled.

Table 1: Demographic profile of the study population.

Variables	Value% (n=90)
Mean age	26.2±3.54
Mean gestational age	9±2 weeks
Mean BMI	21.7±4
Socio economic status (Class 1: Class 2: Class 3: Class 4)	15.50%: 35.50%: 34.50%: 14.50%
Rural /Urban	53%: 47%
Consanguinity	28%
H/O Menstrual abnormality	20 patients (22%)

Table 2: Thyroid dysfunction in study subjects (n=90).

Thyroid dysfunction	Number of patients / % (n=90)
Euthyroid	68 (75.5%)
Hyperthyroid	9 (10%)
Hypothyroid:	13 (14.5%)
Overt hypothyroid	3
Subclinical hypothyroid	10
Mean TSH value	4.26 Miu/litres

Table 2 demonstrates the prevalence of thyroid dysfunction among study patients. In our study, 13 (14.5%) out of 90 pregnant women had hypothyroid, whereas 9 patients had hyperthyroidism. The calculated mean TSH value was 4.26 mIU/L.

Table 3: Correlation of thyroid dysfunction with age and BMI.

Parameters	Euthyroid	Hyperthyroid	Hypothyroid	P value
Age	20-25	27	3	0.02937
	25-30	25	5	
	30-35	16	1	
BMI	<18.5	3	1	0.000071
	18.5-24.9	45	2	
	25-29.9	17	4	
	≥30	3	2	

DISCUSSION

Thyroid dysfunction during pregnancy has been an important area of research due to its imminent impact on maternal and foetal outcome. Maternal and foetal hypothyroidism can also result in irreversible brain damage with mental retardation and neurologic abnormalities which justifies screening for thyroid dysfunction during early pregnancy with interventional levothyroxine therapy for thyroid hypo function. Therefore, this study may help us frame a protocol for

universal screening for thyroid disorder for a better obstetric outcome.

Prevalence of hypothyroidism during pregnancy has a wide geographical variation. Data from western countries indicates that overt hypothyroidism complicates up to 0.3-0.5% pregnancies and the prevalence of subclinical hypothyroidism is estimated to be 2.5%.⁵ In India, the prevalence of hypothyroidism in pregnancy is much higher compared to western countries.

Table 4: Review of literature on magnitude of thyroid dysfunction in antenatal mothers.

Study	Sample size	Mean age years	Prevalence of hypothyroid
Nancy et al ¹⁷	979	26.66±4	9.2%
Singh A et al ¹⁰	400	23.15±3.52	7.45%
Bajaj et al ¹⁶	162	22.8±4	18.9%
Dhanwal et al ¹⁵	2599	25.5±5.6	13.13%
Devi S et al ¹⁴	1000	26.4±5.5	11.6%
Sahu et al ¹¹			11.1%
Gayathri et al ¹²			9.27%
Sahasrabuddhe et al ¹³			10.96%
Present study	90	26.2±3.54	14.5%

Presence of goitrogens in diet, micronutrient deficiency such as selenium and iron deficiency may cause hypothyroidism and goiter.^{7,8} Poverty, insufficient iodine supplementation and fluorinated water may be the major cause for thyroid disorder among pregnant women. High risk women who should be definitely screened are those with history of hypo/hyperthyroidism or thyroid lobectomy or postpartum thyroiditis, family history of thyroiditis, goitre, thyroid autoantibodies, symptoms, signs or biochemical markers suggestive of thyroid disease, type-1 diabetes, other autoimmune disorders, infertility, previous head or neck irradiation, history of miscarriage or preterm delivery.⁹ American thyroid association recommends that trimester-specific reference ranges for serum TSH, as defined in population with optimal iodine intake, should be applied which was used in our study.⁶

Table 4 illustrates the review of literature of prevalence of thyroid dysfunction in antenatal mothers similar to our study. The demographic profile of our study patients is comparable to similar to other studies.¹⁰ The prevalence of hypothyroidism in our study was as high as 14.5%, comparable to other studies. In a study conducted by Singh et al on 400 antenatal mothers, the prevalence of hypothyroidism was 7.5% and hyperthyroidism 0.75%.¹⁰

A study done by Sahu et al, reported the incidence of subclinical and overt hypothyroidism in India as 6.5% and 4.6%, respectively.¹¹ However, the prevalence of subclinical hypothyroidism in northern and southern parts

of India was separately reported as 6.47% and 2.8%, respectively, in another study.¹²

In a study done by Sahasrabuddhe et al, a TSH value of more than or equal to 4 mIU/ml was seen in 8 out of 73 patients (10.96%).¹³ Devi S and her co-workers observed that prevalence of thyroid disorder during pregnancy was 11.6% with 95% CI was 9.64-13.54 and Prevalence of subclinical hypothyroidism in her study was 6.4%.¹⁴

In a study done by Dhanwal et al, 13.13% of pregnant women had hypothyroidism (n=388), using a cut-off TSH level of 4.5 µIU/ml. He also observed that Anti-TPO antibodies were positive in 20.74% of all pregnant women (n=613), whereas 40% (n=155) of hypothyroid pregnant women were positive for anti-TPO antibodies.¹⁵

In a study conducted by Bajaj S et al, prevalence of thyroid dysfunction among pregnant mothers was found to be 24.07% and subclinical hypothyroidism (18.9%) was the commonest thyroid disorder. There was a clear relationship between thyroid dysfunction and history of abortion, pre-term delivery and stillbirths. Prevalence of low birth weight is significantly higher in mothers with thyroid dysfunction.¹⁶

In a study by Nancy et al, prevalence of thyroid dysfunction in pregnancy was 10.8% with hypothyroidism being 9.2%, out of which 8.5% were cases of subclinical hypothyroidism and 0.7% were cases of overt hypothyroidism.¹⁷

The impact of maternal age and BMI was studied in all our patients. Even though there was difference in the prevalence of thyroid dysfunction with age, it was not statistically significant ($p=0.02$). Regarding the correlation of BMI with hypothyroidism, there was statistically significant increase in incidence in overweight and obese mothers ($p<0.05$). In a study assessing the risk factors for developing thyroid dysfunction in pregnancy, increase in incidence was seen with maternal age and increasing BMI, both of which were statistically significant.¹⁷ A study by Ajmani et al has also shown an increased occurrence of thyroid dysfunction with advanced maternal age.¹⁸ Potlukova et al, in his cross sectional study found no significant association between age and serum TSH suppression or elevation.¹⁹

Studies have reported adverse perinatal outcomes, maternal complications, and caesarean section as an indication for fetal distress is significantly high among women with subclinical hypothyroidism which reinforces the importance of detecting subclinical thyroid disorders in pregnancy.^{12,18,20,21} A study by Singh et al on implication of thyroid dysfunction on obstetric outcome, reported that when compared with patients with euthyroidism, preeclampsia and intrauterine growth restriction were the most significant complications observed in patients with hypothyroidism, with the incidence of 33.3% versus 7.3% and 16.6% versus 5.7%, respectively.¹⁰

CONCLUSION

Universal screening for thyroid dysfunction during pregnancy should be made mandatory in India due to high prevalence, in order to prevent maternal and foetal complications.

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