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Original Research Article

A cross sectional study on the frequency of thyroid disorders in pregnancy and the associated obstetric complications

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ABSTRACT

Background: Thyroid disorders have a yet unclear impact on obstetric complications. The studies have been varied and mostly contradictory. The aim of the study was to examine the pattern of thyroid disorders and its obstetric complications.

Methods: This cross-sectional study enrolled 334 pregnant women of less than 12 weeks of gestation. After routine clinical and ultrasound evaluation of all cases, all baseline investigations and TSH was done. In all cases with low TSH free T3 and free T4 was done. All patients were followed up till delivery and the obstetric events were recorded. The data collected were analysed using chi-square test.

Results: Of the 334 enrolled the data on pregnancy related events were available for 276 patients. Subclinical hypothyroidism was detected in 10.1% of the population while 3.6% were having overt (clinical) hypothyroidism. Anaemia was more in subclinical hypothyroidism (39.3%) and overt hypothyroidism (40%). Pre-eclampsia was seen 17.85% with subclinical hypothyroidism and 30% with overt hypothyroidism. Eclampsia was seen in 3.7% of subclinical hypothyroidism and 10% of clinical hypothyroidism. Gestational diabetes mellitus (GDM) was more in patients with subclinical hypothyroidism (25%) and overt hypothyroidism (20%). Oligohydramnios and IUGR were higher in the subclinical hypothyroidism (21.42%, 10.7%) and overt hypothyroidism (20%, 10%). There was no difference between the euthyroid, subclinical hypothyroidism and overt hypothyroidism groups with respect to any of the other variables.

Conclusions: There was a high frequency of thyroid disorders among pregnant women in our study and this had adverse obstetric consequences.

Keywords: Hypothyroidism, Sub-clinical hypothyroidism, Overt hypothyroidism, Obstetric complication

INTRODUCTION

Thyroid disorder is an important factor that may have obstetric complications. Diagnosing hypothyroidism remains a challenge during pregnancy due to the overlap of signs and symptoms among the two entities.¹ Hypothyroidism in pregnancy is considered to be associated with an increased risk of abortion, premature delivery, intrauterine growth retardation, postpartum bleeding, anaemia, and cardiac dysfunction, all of which leads to an increased maternal morbidity.²⁻⁴

Hyperthyroidism during pregnancy increases the risk for preeclampsia, rise in blood pressure in late pregnancy, miscarriage, premature birth and low birth weight. However there are very few good quality studies that show the frequency of thyroid disorders and their complications and most studied are devoted to examining hypothyroidism or hyperthyroidism in isolation than look at the complete picture.^{1,3,6} And studies from South Kerala are not found in literature. Therefore this study plan to examine the pattern of thyroid disorders during pregnancy and the associated obstetric complications.

METHODS

This cross sectional study conducted in the Department of Obstetrics and Gynaecology at a tertiary care teaching centre from January - December 2019, included consecutive pregnant women seeking antenatal care. The prevalence of thyroid disorders in pregnancy is 2-13.2%, across studies.^{7,8} Based on this higher prevalence was taken (13.2%) and the sample needed was calculated as 177. However due to the possibility of loss to follow up due to various factors it was decided to include double the number at 355. The sampling included antenatal women with pregnancy less than 14 weeks who consented to the study. Women with multiple pregnancy, diagnosed thyroid disorders, other endocrine disorders including diabetes, hypertension and those who took infertility treatment were excluded. The sociodemographic, clinical, and routine laboratory investigation details were recorded using a semi structured questionnaire. Serum TSH was assessed for all enrolled women. For women with low value of serum TSH for gestation, free T3 and free T4 evaluated. The reference range used in the study was based on guidelines of the American thyroid association 2011 for the diagnosis and management of thyroid disease during pregnancy and postpartum. The data collected were analysed using Chi-square test. Statistical package SPSS 22.0 version was used to analyse the data.

RESULTS

Of the 334 enrolled the data on pregnancy related events were available for 276 patients as the rest were lost in follow up. The follow up percentage was therefore 82.63%. Data collection was stopped at 334 as by then the number of pregnancies observed till termination had exceeded the estimated sample size of 177. The average maternal age was 26.41 years and 75.4% (208 of 276) belonged to the age group of 20-30 years. Of the rest 13.7% (38/276) belonged to the age group of above 30 years and 10.8% (30/276) were teen pregnancies. Of the sample, 65.9% (182/276) were multigravida and 34.1% (94/276) were primigravida. Of the sample 72.1% (199/276) were Hindus, 14.5% (40/276) were Muslims and 13.4% were Christians. 77.2% (213/276) were from rural area while 22.8% (63/276) were from urban areas. Of the mothers 50.3% (139/276) had high school education,

30.4% (84/276) had primary education, 17.3% (48/276) were graduates and 1.8% (5/276) were postgraduates. Of the sample 72.1% (199/276) were Hindus, 13.4% (37/276) were Muslims and 10.8% were Christians. 59.4% (164/276) were housewives and 40.6% (112/276) were employed.

Of the sample, 85.2% were euthyroid. Subclinical hypothyroidism was detected in 10.1% of the population while 3.6% were having overt (clinical) hypothyroidism. 1.02% of the sample had hyperthyroidism.

Anaemia was seen in 21.7% cases. Of the subclinical hypothyroidism cases, 39.3% had anaemia, while 40% of patients with overt hypothyroidism had anaemia and the differences were statistically significant. Our study found that subclinical hypothyroidism and overt hypothyroidism cases had significantly greater prevalence of anaemia. Pre-eclampsia was seen in 7.2% of the sample and 17.85% with subclinical hypothyroidism and 30% of patients with overt hypothyroidism had pre-eclampsia, which also was statistically significant. Eclampsia was seen in 1.4% and it was seen in 3.7% of subclinical hypothyroidism cases and 10% of clinical hypothyroidism cases and the difference was statistically significant. Gestational diabetes mellitus (GDM) was seen in 11.6% and it was significantly more in patients with subclinical hypothyroidism (25%) and overt hypothyroidism (20%) (Table 1).

Oligohydramnios was seen in 9.4% of the cases and this was significantly higher in the subclinical hypothyroidism (21.42%) and overt hypothyroidism (20%) cases. 3.6% of the cases had intrauterine growth retardation (IUGR) and it was just about significantly more in subclinical (10.7%) and clinical hypothyroidism (10%) cases. Intrauterine death (IUD) was reported in 1.4% of the sample. It was lower at 1% in the overt hypothyroidism cases, but significantly higher in the subclinical hypothyroidism cases (3.57%). Placenta praevia was reported in 1.1% cases, non-progression of labour in 6.9% cases and fetal distress in 10.1% cases. The most common causes of caesarean section which was done in 26.01% cases were fetal distress and non-progression of labour. There was no difference between the euthyroid, subclinical hypothyroidism and overt hypothyroidism groups with respect to any of these variables (Table 1).

Table 1: Distribution of obstetric variables and outcomes with thyroid status.

Variables	Thyroid status			χ^2 P value
	Euthyroid	Subclinical hypothyroidism	Clinical hypothyroidism	
Anaemia	45/235	11/28	4/10	8.149 0.02
Pre-eclampsia	12/235	5/28	3/10	14.11 0.001
Eclampsia	2/235	1/28	1/10	6.66 0.028
GDM	23/235	7/28	2/10	6.46 0.04

Continued.

Variables	Thyroid status			χ^2
	Euthyroid	Subclinical hypothyroidism	Clinical hypothyroidism	P value
Oligohydramnios	18/235	6/28	2/10	7.006 0.03
IUGR	6/235	3/28	1/10	6.024 0.049
IUD	4/235	1/28	1/10	6.620 0.037
Placenta praevia	2/235	1/28	0/10	1.852 0.396
Non progression	16/235	2/28	1/10	0.164 0.921
Fetal distress	25/235	2/28	2/10	1.295 0.523

DISCUSSION

The prevalence of subclinical hypothyroidism was 10.1% and overt hypothyroidism was 3.6%, this finding is in concordance with a recent meta-analysis which reported the prevalence of subclinical and overt hypothyroidism as 9.51% and 2.74% respectively.⁹ Anaemia was more in subclinical hypothyroidism and overt hypothyroidism than euthyroid cases. Meta-analysis of the five studies shows that overt hypothyroidism is associated with gestational anemia.¹⁰ However the same meta-analysis failed to find an association between subclinical hypothyroidism and anaemia in pregnant women.¹⁰ The study also shows hypothyroidism and overt hypothyroidism cases had significantly greater prevalence of pre-eclampsia than euthyroid. Studies have shown that preeclampsia is associated with the pathogenesis of hypothyroidism. And an earlier study shows that in pre-eclamptic women, 44.2% had thyroid dysfunction with 38.9% patients having subclinical hypothyroidism and 4.2% overt hypothyroidism.¹¹ And a recent met analysis concludes that pre-eclamptic women were more at risk of changes in thyroid function tests.¹² Eclampsia was also significantly more in subclinical hypothyroidism and clinical hypothyroidism in our study. This echoes previous studies that show untreated or uncontrolled hypothyroidism during pregnancy may increase the incidence of eclampsia.¹³

Gestational diabetes mellitus was seen more in patients with subclinical hypothyroidism and overt hypothyroidism. This is in concordance with a recent observation that states that pregnant women with TSH levels >4.0 mIU/l have an increased odds of GDM regardless of antibody status and that the use of TSH levels to identify pregnancies at risk of GDM is a novel approach and warrants exploration.¹⁴ Further a recent study shows that pregnant women with subclinical hypothyroidism have an increased risk of developing GDM.¹⁵ Oligohydramnios and IUGR were also higher

in subclinical hypothyroidism and overt hypothyroidism. This is evidenced by earlier studies that showed that subclinical hypothyroidism had a significant association with oligohydramnios and intrauterine growth restriction (IUGR).^{16,17} Intrauterine death (IUD) was significantly higher in subclinical hypothyroidism and not overt hypothyroidism, this agrees and contradicts an earlier study that found that women with IUD more often had overt hypothyroidism and subclinical hypothyroidism.¹⁸ There was no difference between the subclinical hypothyroidism, overt hypothyroidism and euthyroid groups in terms of placenta praevia, non-progression of labour and fetal distress. These findings are concordant with earlier studies.^{3,13}

CONCLUSION

Our study found a high prevalence of sub-clinical and clinical hypothyroidism among pregnant women and that this was associated with obstetric complications. The study however was conducted in a tertiary setting and the results cannot be generalized to the community. However the study throws light on the need for stricter diagnostic criteria and monitoring of thyroid disorders in pregnancy.

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

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