

Original Research Article

CROSS SECTIONAL OBSERVATIONAL STUDY OF THYROID DYSFUNCTION AND ITS ASSOCIATION WITH THE MATERNAL AND NEONATAL OUTCOMES

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ABSTRACT

Background: Maternal thyroid function changes significantly in pregnancy and when the body is unable to adapt to these changes thyroid dysfunction manifests. Various factors affect the production of thyroid during pregnancy an increase in estrogen and human chorionic gonadotropin causes an increase in the production of thyroglobulin. **Objective:** To observe the effects of thyroid dysfunction on pregnant women and the neonates.

Materials and Methods: In this study of 150 women of all trimesters willing to be a part of this study who were all subjected to thyroid function test. The study population was divided into 5 groups based on these TFTs and then the maternal and neonatal outcomes were assessed over the duration of the study.

Results: The incidence of thyroid dysfunction was 26.7%. Subclinical hypothyroidism was the most common abnormality (32/150, 21.3%), followed by overt hypothyroidism (2/150, 1.3%), subclinical hyperthyroidism (5/150, 3.3%), and overt hyperthyroidism (1/150, 0.7%). Maternal complications were observed across groups; comparisons were primarily made between euthyroid and subclinical hypothyroid women due to small numbers in other groups. The euthyroid group had better live birth rate compared to the subclinical hypothyroid group.

Conclusion: Most common entity was subclinical hypothyroidism. It is associated with adverse maternal and fetal outcomes. Hence early diagnosis and proper treatment can help to have better outcomes.

Keywords: thyroid, pregnancy, outcome, management.

INTRODUCTION

Pregnancy can be viewed as a state in which a combination of events occur to modify the thyroidal function. There is change in the level of thyroxine binding globulin, total thyroid hormone level and change in the level of thyroid stimulating hormone (TSH) during normal pregnancy.^[1]

Pregnancy is thus a condition of excessive thyroid stimulation thus increasing the risk of development of maternal thyroid disorders. Various adverse fetal outcomes related to the hypothyroidism are low birth weight, increased death rate in neonates, prematurity etc.^[2,3] The various maternal adverse

outcomes related to the hypothyroidism are preeclampsia, postpartum hemorrhage, threatened abortion etc.^[3,4]

Pregnancy can be viewed as a state in which a combination of events occur to modify the thyroidal function. There is change in the level of thyroxine binding globulin, total thyroid hormone level and change in the level of thyroid stimulating hormone (TSH) during normal pregnancy.^[1] Pregnancy is thus a condition of excessive thyroid stimulation thus increasing the risk of development of maternal thyroid disorders. The development of maternal thyroid disorders during early pregnancy can influence the pregnancy outcome and foetal development by leading to premature birth, PIH,

increased foetal mortality, and low infant birth weight etc.^[2] Most common is subclinical hypothyroidism. In subclinical hypothyroidism, there are normal levels of thyroxine and triiodothyronine. Only thing is that there is slight increase in the levels of serum thyrotropin.^[4] Before the thyroid gland of the foetus develops and is functional (which begins by 12 weeks of gestation) foetus is dependent on the maternal thyroid hormones for normal development. Thus, maternal hypothyroidism in early pregnancy increases the risk of abortion and still birth, impaired neurological development of foetus and congenital malformation and increase the perinatal mortality.^[5,6]

The etiology for thyrotoxicosis in pregnancy is pretty much the same as that in a non-pregnant woman.^[6] Furthermore, other thyroid illnesses such as nodular disease and thyroid cancer are occasionally detected during pregnancy and may require treatment. Together, the burden of thyroid disease affecting women, either before, during, or directly after pregnancy, is substantial.^[7] It has been observed that the subclinical form of hypothyroidism has shown poor clinical outcomes.^[8] It is due to all these reasons that thyroid function tests are commonly assessed during the gestation period.

Maternal thyroid function changes significantly in pregnancy and when the body is unable to adapt to these changes thyroid dysfunction manifests. Various factors affect the production of thyroid during pregnancy an increase in estrogen and human chorionic gonadotropin causes an increase in the production of thyroglobulin.^[9]

All these physiological changes when seen in pathological changes or can uncover the subclinical dysfunction, Therefore, thyroid disorders during pregnancy predispose women to increased fetomaternal and neonatal morbidity and mortality. This study aims to assess the prevalence of thyroid dysfunction in early pregnancy and evaluate its impact on maternal, foetal, and neonatal outcomes.

MATERIALS AND METHODS

Estimation of FT3, FT4, TSH and anti-thyroid peroxidase (anti-TPO) antibodies was performed using the electrochemiluminescence immunoassay technique, a validated and widely accepted method for thyroid function assessment in pregnancy.^[7,12] TSH range was as per the trimester: 0.1–2.5 mIU/L in the first trimester, 0.2–3.0 mIU/L in the second trimester, and 0.3–3.0 mIU/L in the third trimester.^[7,12]

Women with elevated TSH and low FT4 were classified as overt hypothyroidism, while those with elevated TSH and normal FT4 were classified as subclinical hypothyroidism, in accordance with standard international definitions.^[7,14] Women with

suppressed TSH and elevated FT4 were classified as overt hyperthyroidism.^[7]

Trial Design: This cross-sectional observational study was conducted at DVVPF Medical College and Hospital, Ahilyanagar, India over a period of 6 months. A total of 150 pregnant women of all trimesters were included

1. Study Design and Setting
2. Cross-sectional study. Tertiary care hospital. From April 2025 to September 2025.
3. Study Population: 150

Inclusion Criteria: The following criteria were necessary for inclusion:

- Women with singleton pregnancies
- Patients willing to take part in the study.

Exclusion Criteria

- History of chronic systemic illness (e.g., diabetes, hypertension)
- Multiple gestation
- Known chromosomal or foetal anomalies
- Medications affecting thyroid function (e.g., steroids, lithium)

The patients coming to the OPD who fulfil the inclusion criteria were selected for the study. History was taken in detail. Thorough clinical examination was carried out. FT3, FT4, TSH and anti-thyroid peroxidase antibodies (TPO) were investigated as per standard guidelines and protocol. For this, 3 ml sample of blood was obtained as per standard guidelines and protocols. Classification of participants into different categories of hypothyroidism was done as per standard guidelines and protocols.

Based on the results of these tests patients were divided into 5 groups and studied till the neonatal period or till the duration of the study. The maternal, neonatal and foetal outcomes were evaluated.

RESULTS

The study involving 150 pregnant women, thyroid dysfunction was found in 26.7% of the participants. The subjects were then divided into 5 groups based on the results of thyroid function test:

Group A: Euthyroid, defined as normal TSH (as per trimester)

Group B: Subclinical hypothyroid, defined as high TSH (>3.0 mIU/L) in the presence of normal levels of Free T4 (0.8–2.0 ng/dl)

Group C: Overt hypothyroid, defined as high TSH (>3 mIU/L) with low Free T4 (<0.8 ng/dl).

Group D: Subclinical Hyperthyroidism

Group E: Overt Hyperthyroid, defined as with high Free T4 (>2.0 ng/dl) with decreased TSH (<0.2 mIU/L).

The number of euthyroid pregnant women was the maximum among all groups 110 but the number of women affected by subclinical hypothyroidism (32) as compared to the number of women affected by the overt disease was significantly larger, which was 32 and 2 respectively.

Table 1: Thyroid dysfunction in Pregnant Women

Statistic	Frequency	%
Group A (Euthyroid)	110	73.3%
Group B (Subclinical Hypothyroid)	32	21.3%
Group C (Overt Hypothyroid)	2	1.3%
Group D (Subclinical Hyperthyroid)	5	3.3%
Group E (Overt Hyperthyroid)	1	0.7%
TOTAL	150	100%
TOTAL:	150	100%

Maternal complications were assessed across all thyroid status groups. Because of small numbers in Groups C–E, statistical comparison was primarily performed between the euthyroid (Group A) and subclinical hypothyroid (Group B) groups using Fisher's exact test where appropriate. The

occurrence of maternal complications was similar in two groups of A & B. ($p>0.05$). Comparison was done between euthyroid and subclinical hypothyroid groups due to small sample size in other groups. A p value <0.05 was considered statistically significant.^[15]

Table 2: Maternal Outcomes

Maternal complications	Group A (n=110)	%	Group B (n=32)	%	Group C (n=2)	%	Group D (n=5)	%	Group E (n=1)	%	p value†
Anaemia	11	10.0	2	6.2	0	0	0	0	0	0	0.733
Preeclampsia	10	9.1	3	9.4	1	50	0	0	0	0	1.000
Abruptio placentae	1	0.9	0	0.0	1	50	0	0	0	0	1.000
GDM	1	0.9	0	0.0	0	0	0	0	1	100	1.000
PPH	8	7.3	1	3.1	0	0	0	0	0	0	0.684

Neonatal outcomes were assessed across thyroid status groups. Due to small numbers in Groups C–E, statistical comparison was primarily performed between euthyroid (Group A) and subclinical hypothyroid (Group B) groups. Higher proportions of hyperbilirubinemia and respiratory distress syndrome were observed among neonates born to

mothers with thyroid dysfunction; however, the differences between Groups A and B were not statistically significant in this dataset ($p>0.05$). Comparison was done between euthyroid and subclinical hypothyroid groups due to small sample size in other groups.

Table 3: Neonatal Outcomes

Neonatal Outcomes	Group A (n=110)	%	Group B (n=32)	%	Group C (n=2)	%	Group D (n=5)	%	Group E (n=1)	%	p value†
Hyperbilirubinemia	7	6.4	4	12.5	1	50	2	40	0	0	0.268
Respiratory Distress Syndrome	4	3.6	4	12.5	1	50	0	0	0	0	0.077
Sepsis	3	2.7	1	3.1	0	0	0	0	0	0	1
Hypoglycemia	1	0.9	1	3.1	0	0	0	0	0	0	0.401
Hypothermia	1	0.9	1	3.1	0	0	0	0	0	0	0.401
Intracranial bleed	1	0.9	0	0	0	0	0	0	0	0	–
NEC	0	0	0	0	0	0	0	0	0	0	–
Early Neonatal Death	1	0.9	1	3.1	0	0	0	0	0	0	0.401

Comparison was done between euthyroid and subclinical hypothyroid groups due to small sample size in other groups. Fetal outcomes were compared primarily between euthyroid (Group A) and subclinical hypothyroid (Group B) groups due to small numbers in other groups. It was seen that the occurrence of live birth rate was more in the

euthyroid group compared to the subclinical hypothyroid group. ($p=0.001$). Differences in preterm birth, IUGR, low birth weight, and abortion between Groups A and B were not statistically significant ($p>0.05$). No stillbirths were reported in any group.

Table 4: Fetal Outcome

Fetal Outcomes	Group A (n=110)	%	Group B (n=32)	%	Group C (n=2)	%	Group D (n=5)	%	Group E (n=1)	%	p value†
Live births	103	93.6	22	68.8	2	100	5	100	1	100	0.001*
Preterm birth	4	3.6	2	6.2	0	0	0	0	0	0	0.617
IUGR	1	0.9	2	6.2	0	0	0	0	0	0	0.127
LBW	4	3.6	3	9.4	0	0	0	0	0	0	0.19

Abortions	0	0	1	3.1	0	0	0	0	0	0	0.225
Still births	0	0	0	0	0	0	0	0	0	0	—

DISCUSSION

In this study, thyroid dysfunction in pregnancy was common, with subclinical hypothyroidism being the most prevalent disorder. This finding is consistent with Indian studies such as Pahwa and Mangat and Rajput et al. [9,6] Thyroid autoimmunity also plays an important role in adverse pregnancy outcomes. Kumar et al. demonstrated that anti-TPO antibody positivity is associated with increased pregnancy loss even in euthyroid women. [11]

Several studies have reported increased rates of miscarriage, preeclampsia, preterm birth and IUGR in women with thyroid dysfunction. [3,14] Current international guidelines recommend targeted screening in high-risk women. [7,12] However, given the high prevalence of thyroid dysfunction in India, broader screening may be justified. [4]

In this study we found that thyroid dysfunction in pregnancy is a common clinical entity with a lot of women being affected by the sub clinical and overt forms of the disorder. This finding is consistent with several Indian Studies, including Pahwa and Mangat, [9] (2018), who reported a 10% prevalence in first trimester pregnant women, and Rajput et al, [6] (2015) who observed an even higher rate of 21.5% for sub clinical hypothyroidism. These variations reflect the regional, geographic, nutritional and environmental factors which play a role in iodine distribution hence affect the diseased state.

Thyroid autoimmunity also plays a role in pregnancy loss even among euthyroid patients as per the findings of Kumar et al. [10] Their findings suggest that anti tpo antibodies can negatively affect the implantation and early fetal development, reinforcing the need to consider antibody screening in select populations. Adverse obstetric outcomes, including miscarriage, preeclampsia, preterm labor, and intrauterine growth restriction (IUGR), were found with thyroid dysfunction. Ajmani et al, [3] (2013) and Kumar et al, [10] (2023) both documented strong association between maternal complications such as abortion and preeclampsia. Kumar et al also reported association between increased NICU admissions and low APGAR scores in neonates born to hypothyroid mothers.

Current international guidelines recommended targeted screening in high-risk mothers, but the increased prevalence as seen in the study by Unnikrishnan et al, [4] (2013), there is a lot of evidence which points towards the need for more inclusive screening protocols in regions with high prevalence.

The fact that even the subclinical hypothyroid cases influence maternal and neonatal outcomes and the silent nature of this condition makes universal screening imperative.

CONCLUSION

When compared to the euthyroid group both subclinical and overt thyroid dysfunction have significant effect on the maternal and neonatal outcomes. Our study adds to the plethora of studies showing the association between the thyroid disorders and the maternal and neonatal outcomes. Subclinical hypothyroid has adverse effects on both the maternal and neonatal outcomes the absence of symptoms makes it difficult to diagnose hence emphasising the need for early diagnosis and treatment of the disease.

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