International Journal of Medical and Pharmaceutical Research

Online ISSN-2958-3683 | Print ISSN-2958-3675
Frequency: Bi-Monthly
Available online on: https://ijmpr.in/

Original Article

Study of Thyroid Dysfunction in Pregnancy and Fetomaternal Outcome

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Received: 12-04-2026
Accepted: 24-05-2026
Available online: 10-06-2026

ABSTRACT

Background: Thyroid dysfunction is one of the most common endocrine disorders encountered during pregnancy and is associated with adverse maternal and fetal outcomes. Early diagnosis and appropriate management can significantly improve pregnancy outcomes. The study aims to determine the prevalence of thyroid dysfunction in pregnancy and evaluate its impact on fetomaternal outcomes.
Materials and Methods: A prospective observational study was conducted among 112 pregnant women attending the antenatal clinic of a tertiary care hospital. Thyroid function tests including serum Thyroid Stimulating Hormone (TSH), Free T3, and Free T4 were performed. Participants were classified into euthyroid, subclinical hypothyroid, overt hypothyroid, subclinical hyperthyroid, and overt hyperthyroid groups according to trimester-specific reference ranges. Maternal and fetal outcomes were recorded and analyzed.
Results: Among 112 pregnant women, 84 (75.0%) were euthyroid while 28 (25.0%) had thyroid dysfunction. Subclinical hypothyroidism was the most common abnormality (16.1%), followed by overt hypothyroidism (5.4%), subclinical hyperthyroidism (2.7%), and overt hyperthyroidism (0.9%). Pregnancy-induced hypertension (25.0% vs. 8.3%), preterm delivery (21.4% vs. 9.5%), anemia (39.3% vs. 20.2%), and cesarean section (42.9% vs. 28.6%) were significantly higher among women with thyroid dysfunction. Neonatal complications including low birth weight (28.6% vs. 10.7%), NICU admission (21.4% vs. 8.3%), and fetal distress (17.9% vs. 7.1%) were more frequent in the thyroid dysfunction group.
Conclusion: Thyroid dysfunction, particularly subclinical hypothyroidism, is common during pregnancy and is associated with adverse maternal and neonatal outcomes. Routine antenatal screening and timely treatment may reduce fetomaternal morbidity.

Keywords: *Thyroid dysfunction, pregnancy, hypothyroidism, fetomaternal outcome, antenatal screening.*

INTRODUCTION

Physiological and hormonal changes in pregnancy result in increased production of thyroxin (T4) and triiodothyronine (T3) by up to 50%, leading to an increase in a woman's daily iodide requirement, while thyroid-stimulating hormone (TSH) levels decrease, especially in the first trimester.[1] Pregnancy induces profound physiological changes in thyroid gland function owing to increased concentrations of human chorionic gonadotropin (hCG), estrogen-mediated rise in thyroxine-binding globulin, and increased renal iodine clearance. These changes increase the demand for thyroid hormones and may unmask underlying thyroid disorders.[2]

Thyroid hormones play a critical role in fetal neurodevelopment, placental function, and maintenance of normal pregnancy.[3] Both overt and subclinical thyroid dysfunction have been associated with miscarriage, gestational hypertension, preeclampsia, placental abruption, preterm birth, low birth weight, fetal growth restriction, and increased perinatal morbidity.[4,5]

Hypothyroidism remains the most prevalent thyroid disorder during pregnancy, with subclinical hypothyroidism accounting for the majority of cases. The global prevalence of thyroid disorders in pregnancy varies depending on iodine sufficiency and population characteristics.[6] Studies suggest that subclinical hypothyroidism affects approximately 2–5% of pregnancies, while overt hypothyroidism and hyperthyroidism are less common but clinically significant due to their strong association with adverse outcomes.[7,8] Despite the recognized impact of thyroid dysfunction on pregnancy outcomes, screening practices remain variable, especially in developing countries.

The present study was undertaken to assess the prevalence of thyroid dysfunction among pregnant women and evaluate its relationship with maternal and fetal outcomes.

MATERIALS AND METHODS

The present prospective observational study was conducted in the Department of Obstetrics and Gynecology of a tertiary care teaching hospital over a period of 18 months. A total of 112 pregnant women with singleton pregnancies and gestational age less than 20 weeks at the time of enrollment were included in the study after obtaining informed written consent. Women with multiple gestations, known thyroid disease prior to pregnancy, chronic systemic illnesses, and autoimmune disorders were excluded from the study. Detailed demographic characteristics, obstetric history, and clinical information were recorded using a predesigned proforma. Blood samples were collected from all participants for assessment of thyroid function, including serum Thyroid Stimulating Hormone (TSH), Free Triiodothyronine (FT3), and Free Thyroxine (FT4) levels. Based on thyroid function test results, participants were categorized into euthyroid and thyroid dysfunction groups.

The enrolled women were followed throughout pregnancy and delivery, and various maternal and fetal outcomes were assessed. Maternal outcomes included pregnancy-induced hypertension (PIH), gestational diabetes mellitus (GDM), anemia, preterm labor, mode of delivery, and postpartum hemorrhage (PPH). Fetal and neonatal outcomes evaluated included birth weight, fetal distress, neonatal intensive care unit (NICU) admission, APGAR score at birth, and perinatal mortality. All collected data were entered into Microsoft Excel and subsequently analyzed using Statistical Package for Social Sciences (SPSS) version 25. Continuous variables were expressed as mean ± standard deviation, whereas categorical variables were presented as frequencies and percentages. Statistical comparisons between groups were performed using the Chi-square test or Fisher's exact test as appropriate. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Table 1. Demographic Profile of Study Participants (n = 112)

Variables		Number (n)	Percentage (%)
Age Group (Years)	<20	8	7.1
	20–24	28	25.0
	25–29	46	41.1
	30–34	22	19.6
	≥35	8	7.1
Gravidity	Primigravida	48	42.9
	Multigravida	64	57.1
Socioeconomic Status	Lower	18	16.1
	Lower Middle	42	37.5
	Middle	34	30.4
	Upper Middle	14	12.5
	Upper	4	3.6
Educational Status	Illiterate	10	8.9
	Primary School	22	19.6
	Secondary School	38	33.9
	Higher Secondary	28	25.0
	Graduate and Above	14	12.5
Gestational Age at Enrollment	<12 weeks	26	23.2
	12–16 weeks	54	48.2
	>16 weeks	32	28.6

Among the 112 pregnant women enrolled in the study, the majority belonged to the 25–29 years age group (41.1%). The mean maternal age was 26.8 ± 4.3 years. Multigravida women constituted 57.1% of the study population, while 42.9% were primigravida. Most participants belonged to the lower middle socioeconomic class (37.5%) and had completed secondary education (33.9%). Nearly half of the participants (48.2%) were enrolled between 12 and 16 weeks of gestation.

Table 2. Distribution According to Thyroid Status

Thyroid Status	Number	Percentage (%)
Euthyroid	84	75.0

Subclinical Hypothyroidism	18	16.1
Overt Hypothyroidism	6	5.4
Subclinical Hyperthyroidism	3	2.7
Overt Hyperthyroidism	1	0.9
Total	112	100

The table no. 2 shows, the prevalence of thyroid dysfunction was 25.0%, with subclinical hypothyroidism being the most common abnormality.

Table 3. Maternal Outcomes:

Outcome	Thyroid Dysfunction (n=28)	Euthyroid (n=84)	P value
Anemia	11 (39.3%)	17 (20.2%)	0.04
PIH	7 (25.0%)	7 (8.3%)	0.02
GDM	4 (14.3%)	7 (8.3%)	0.35
Preterm Delivery	6 (21.4%)	8 (9.5%)	0.04
Cesarean Section	12 (42.9%)	24 (28.6%)	0.03
PPH	2 (7.1%)	3 (3.6%)	0.41

The above table no. 3 showed that, women with thyroid dysfunction experienced a higher frequency of adverse maternal outcomes compared to euthyroid women. Anemia (39.3% vs. 20.2%; p = 0.04), pregnancy-induced hypertension (25.0% vs. 8.3%; p = 0.02), preterm delivery (21.4% vs. 9.5%; p = 0.04), and cesarean section (42.9% vs. 28.6%; p = 0.03) were significantly more common among women with thyroid dysfunction. Although gestational diabetes mellitus (14.3% vs. 8.3%; p = 0.35) and postpartum hemorrhage (7.1% vs. 3.6%; p = 0.41) were observed more frequently in the thyroid dysfunction group, these differences were not statistically significant. Overall, thyroid dysfunction was associated with an increased risk of adverse maternal outcomes during pregnancy.

Table 4. Neonatal Outcomes:

Outcome	Thyroid Dysfunction (n=28)	Euthyroid (n=84)	P value
Low Birth Weight	8 (28.6%)	9 (10.7%)	0.02
Fetal Distress	5 (17.9%)	6 (7.1%)	0.04
NICU Admission	6 (21.4%)	7 (8.3%)	0.03
APGAR <7 at 5 min	4 (14.3%)	5 (6.0%)	0.09
Perinatal Mortality	1 (3.6%)	1 (1.2%)	0.44

The above table no. 4 showed that, low birth weight was significantly more common in the thyroid dysfunction group (28.6% vs. 10.7%; p = 0.02). Similarly, fetal distress (17.9% vs. 7.1%; p = 0.04) and NICU admission (21.4% vs. 8.3%; p = 0.03) were significantly higher among neonates born to mothers with thyroid dysfunction. Although a low APGAR score at 5 minutes (<7) was observed more frequently in the thyroid dysfunction group (14.3% vs. 6.0%), the difference was not statistically significant (p = 0.09).

DISCUSSION

Thyroid dysfunction is one of the most common endocrine disorders encountered during pregnancy and has been increasingly recognized as a significant contributor to adverse maternal and neonatal outcomes. In the present study, the prevalence of thyroid dysfunction was 25.0%, with subclinical hypothyroidism being the predominant abnormality, accounting for 64.3% of all thyroid disorders. The relatively high prevalence observed in our study highlights the substantial burden of thyroid dysfunction among pregnant women and emphasizes the importance of routine antenatal screening.

The prevalence reported in the present study is comparable to findings from other Indian studies. Dhanwal et al.[9] reported a prevalence of thyroid dysfunction of 14.3% among pregnant women in Delhi, with subclinical hypothyroidism being the most common disorder. Similarly, Rajput et al. [10] observed thyroid dysfunction in 21.5% of antenatal women in Haryana, while Nambiar et al. [11] reported a prevalence of 19.6% in a South Indian population. The slightly higher prevalence observed in the present study may be attributed to regional variations in iodine intake, differences in diagnostic criteria, and variations in the gestational age at screening. Nevertheless, all these studies consistently identify subclinical hypothyroidism as the most prevalent thyroid abnormality during pregnancy.

In the present study, women with thyroid dysfunction experienced significantly higher rates of adverse maternal outcomes. Anemia was observed in 39.3% of women with thyroid dysfunction compared with 20.2% of euthyroid women (p = 0.04). Similar observations were reported by Sahu et al. [12] who demonstrated a higher prevalence of maternal anemia among women with hypothyroidism. Thyroid hormones influence erythropoiesis and iron metabolism, and inadequate hormone levels may contribute to reduced hemoglobin synthesis and increased susceptibility to anemia during pregnancy.

Pregnancy-induced hypertension was significantly more common among women with thyroid dysfunction (25.0%) than among euthyroid women (8.3%) ($p = 0.02$). Comparable findings have been reported by Rajput et al. [10] and Dhanwal et al. [9] both of whom documented increased rates of hypertensive disorders among women with hypothyroidism. The association may be explained by endothelial dysfunction, increased peripheral vascular resistance, and impaired placental vascular development resulting from inadequate thyroid hormone activity.

Preterm delivery occurred in 21.4% of women with thyroid dysfunction compared to 9.5% of euthyroid women ($p = 0.04$). Similar findings have been reported by Sahu et al. [12] who demonstrated a significantly higher incidence of preterm birth among hypothyroid mothers. Thyroid hormones play a crucial role in placental development and fetal maturation, and their deficiency may predispose to premature labor and delivery. Furthermore, the cesarean section rate was significantly higher among women with thyroid dysfunction (42.9% vs. 28.6%; $p = 0.03$). This observation is consistent with findings reported by Nambiar et al. [11] who noted increased operative delivery rates among women with thyroid abnormalities, largely due to fetal distress and obstetric complications.

The present study also demonstrated a significant association between maternal thyroid dysfunction and adverse neonatal outcomes. Low birth weight was observed in 28.6% of neonates born to mothers with thyroid dysfunction compared with 10.7% among euthyroid mothers ($p = 0.02$). Similar results were reported by Rajput et al. [10] who documented significantly lower birth weights among infants born to hypothyroid mothers. Thyroid hormones are essential for fetal growth and placental function, and inadequate maternal hormone availability may impair intrauterine growth.

Fetal distress was significantly more common among neonates born to mothers with thyroid dysfunction (17.9% vs. 7.1%; $p = 0.04$). Additionally, NICU admission rates were significantly higher in the thyroid dysfunction group (21.4% vs. 8.3%; $p = 0.03$). These findings are in agreement with observations made by Dhanwal et al. [9] and Nambiar et al. [11] who reported increased neonatal morbidity among offspring of mothers with thyroid disorders. The higher incidence of fetal compromise may be related to placental insufficiency, preterm birth, and intrauterine growth restriction associated with maternal hypothyroidism.

Although low APGAR scores at five minutes were more frequent among neonates born to mothers with thyroid dysfunction (14.3% vs. 6.0%), the difference did not reach statistical significance ($p = 0.09$). Similarly, perinatal mortality was low in both groups and showed no statistically significant difference (3.6% vs. 1.2%; $p = 0.44$). The lack of significance may be attributed to the relatively small sample size and the availability of timely obstetric and neonatal interventions in the tertiary care setting.

The findings of the present study are consistent with those reported in several Indian studies and reinforce the evidence that thyroid dysfunction, particularly subclinical hypothyroidism, is associated with increased maternal and neonatal morbidity. Given the high prevalence of thyroid dysfunction and its significant impact on pregnancy outcomes, routine thyroid screening during early pregnancy may facilitate timely diagnosis and treatment, thereby reducing fetomaternal complications and improving overall pregnancy outcomes.

CONCLUSION

Thyroid dysfunction affects one-fourth of pregnant women, with subclinical hypothyroidism being the most prevalent abnormality. Maternal thyroid dysfunction is associated with increased risks of pregnancy-induced hypertension, anemia, preterm delivery, low birth weight, and NICU admission. Universal antenatal thyroid screening and early intervention should be considered to improve fetomaternal outcomes.

ACKNOWLEDGEMENTS

The authors acknowledge the support of the Department of Obstetrics and Gynecology and all participants involved in the study.

Conflict of Interest: None declared.

Funding: No external funding was received for this study.

Ethical Approval

The study was approved by the Institutional Ethics Committee, and informed written consent was obtained from all participants.

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