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A Study of Maternal and Fetal Outcomes in Pregnancy with Thyroid Disorders

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Abstract

Background: Thyroid disorders are common endocrine conditions during pregnancy and are linked to adverse maternal and fetal outcomes. Hypothyroidism predominates in Indian populations. This study evaluated the prevalence, types, and impact of thyroid dysfunction on maternal and fetal outcomes in a tertiary care setting in Lucknow, Uttar Pradesh.

Methods: A prospective observational study was conducted from July 2024 to December 2025 at T.S. Misra Medical College and Hospital, Lucknow. One hundred pregnant women aged 20–40 years with thyroid disorders (singleton pregnancies) were enrolled after informed consent. Thyroid function tests (TSH, free T3, free T4) were performed using ATA 2017 trimester-specific reference ranges. Maternal complications, mode of delivery, and fetal outcomes were recorded. Data were analyzed using descriptive statistics, t-test, Chi-square, and Friedman test ($p<0.05$ significant).

Results: Thyroid function parameters showed significant changes over the study period. Mean TSH levels demonstrated a progressive decline from baseline (T1) to subsequent follow-up points (T2 and T3). In contrast, mean T3 and T4 levels showed a gradual and consistent increase over time. Friedman test analysis revealed that these changes in TSH, T3, and T4 levels across the three time points were highly statistically significant ($p < 0.001$ for all). The overall trend indicated improvement and stabilization of thyroid function during follow-up.

Conclusion: Thyroid disorders, especially hypothyroidism, are strongly associated with increased maternal complications (anemia, preterm delivery, pre-eclampsia) and adverse fetal outcomes (low birth weight, respiratory distress). Routine screening and timely levothyroxine treatment are recommended to reduce perinatal morbidity.

Keywords: Thyroid disorders, pregnancy, hypothyroidism, hyperthyroidism, maternal outcome, fetal outcome, preterm delivery, low birth weight, caesarean section, neonatal TSH.

Introduction

The hypothyroidism and hyperthyroidism are two major disorders of thyroid gland which have been reported worldwide approximately in 110 countries and about 1.6 billion people at risk and they need some form of iodine supplementation. Most cases of thyroid disorders are found in Asia, Africa and Latin America.[1]

Thyroid disorders are predominantly because of autoimmune etiology in pregnant women.[2] Hypothyroidism, both overt and subclinical, is common in women of reproductive age and during pregnancy, with frequencies ranging from 0.3% to 2.5%[3] and Hypothyroidism in pregnant women is commonly associated with Hashimoto's thyroiditis.[2] The occurrence of hyperthyroidism in pregnancy ranges from 0.1% to 0.4%, with Graves' disease accounting for majority of the cases.[2]

There is a well-known association of hypothyroidism and decreased fertility. Also there is increased risk for early and late obstetrical complications, such as increased prevalence of abortion, anaemia, gestational hypertension, placental abruption, and postpartum haemorrhages.[4] Whereas, maternal hyperthyroidism during pregnancy is associated with an increased risk of low birth weight of fetus, predisposing to neonatal morbidity and mortality. In addition, maternal high-normal free T4 levels in early pregnancy are associated with lower birth weight and high risk of small for gestational age (SGA) newborns.[3]

Given the high prevalence and potential complications, early diagnosis and management of thyroid dysfunction during pregnancy are essential. This study was conducted to evaluate the association between thyroid disorders and maternal and fetal outcomes in a tertiary care hospital in North India.

Materials and Methods

This prospective observational study was conducted from July 2024 to December 2025 at T.S. Misra Medical College and Hospital, Lucknow.

A total of 100 antenatal women attending the outpatient department were enrolled after obtaining written informed consent.

Inclusion Criteria

- Pregnant women aged 20–40 years
- Singleton pregnancies
- Primigravida or multigravida
- Women with diagnosed thyroid disorders
- Willingness to participate with informed consent

Exclusion Criteria

- Multiple pregnancies
- Medical disorders such as hypertension and diabetes mellitus
- Patients unwilling to participate

Data were analyzed using SPSS version 28. Continuous variables were expressed as mean ± standard deviation, while categorical variables were expressed as frequencies and percentages. Chi-square test, ANOVA, and Friedman test were used to determine statistical significance.

The study was approved by the Institutional Ethics Committee.

Results

A total of 100 antenatal women were included in the study. The baseline characteristics are presented in Table 1. The majority of participants were aged 26–30 years (40.0%), primigravida (52.0%), had normal to overweight BMI (85.0%), were Hindu (92.0%), belonged to rural areas (65.0%), had low educational status, and predominantly belonged to the middle and lower-middle socio-economic classes (78.0%).

In the studied patient population of 100 individuals, hypothyroidism was overwhelmingly prevalent, occurring in 95 cases (95.0%), whereas hyperthyroidism was diagnosed in only 5 cases (5.0%) (Table 2).

The distribution of maternal complications in hypothyroidism & hyperthyroidism patients was analyzed (Table 3). Maternal complications were observed in 58.8% of hypothyroid pregnancies and 80.0% of hyperthyroid pregnancies, with maternal anemia being the most common complication in both groups, while preterm delivery, IUGR, stillbirth, and abruption placenta were seen only in hypothyroidism.

The distribution of the studied patients with hypothyroidism & hyperthyroidism based on the type of delivery was analyzed (Table 4).

The distribution of hypothyroidism & hyperthyroidism in terms of fetal complications was analyzed (Table 5). Fetal complications were more common in hypothyroid pregnancies (63.5%) than in hyperthyroid pregnancies (25.0%), with low birth weight and respiratory distress being the most frequent complications, while hyperbilirubinemia and neonatal death were observed only in the hypothyroid group.

Discussion

The findings of this study highlight the significant impact of thyroid dysfunction on pregnancy outcomes. Similar findings have been reported in previous studies, where hypothyroidism was associated with increased risk of preeclampsia, intrauterine growth restriction, and preterm birth.

Our study noted that the maternal anemia was the most common complication in thyroid dysfunction, affecting 16 (16.8%). This was followed by preterm delivery 12 (12.6%), IUGR 10 (10.5%), abortion 8 (8.4%), and pre-eclampsia 6 (6.3%). Still birth and abruption placenta were observed in 2 patients in each group(2.1%). Overall, 56 patients (58.8%) have maternal complications. In a study Sreelatha S et al[5] reported that the anaemia in subclinical hypothyroid patients is 4.2%, oligohydramnios in sub- clinical hypothyroid patients is 16.7%, pre-term labour in subclinical hypothyroid patients is 3.1%, PPH in subclinical hypothyroid patients is 6.3% and Primary LSCS in subclinical hypothyroid patients is 22.9%.

The study analyzed fetal outcomes in 89 patients and found that 28 % had low birth weight. A significant proportion 20 (22.5%) had a low APGAR score (<7) at 1 minute, which improved by 5 minutes, with 87 (97.7%) having a normal APGAR score (≥7). Sreelatha S et al[5] reported that the LBW in subclinical hypothyroid patients is 21.9%.

Physiological changes during pregnancy place additional demands on the maternal thyroid gland, making women with pre-existing thyroid disorders particularly susceptible to complications. Early diagnosis and appropriate management are therefore critical to improving maternal and neonatal outcomes.

Conclusion

Thyroid disorders during pregnancy are associated with significant maternal and fetal complications. Routine screening for thyroid dysfunction during antenatal care, early diagnosis, and timely treatment can significantly reduce adverse pregnancy outcomes.

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Table 1: Socio-Demographic and Clinical Characteristics of Studied Patients

Variable	Category	Frequency (n=100)	Percentage
Age (Years)	≤25	16	16.0%
	26–30	40	40.0%
	31–35	34	34.0%
	36–40	10	10.0%
Parity	Primigravida	52	52.0%
	Multigravida	48	48.0%
BMI (kg/m²)	18.5–24.9	43	43.0%
	25–29.9	42	42.0%
	>30	15	15.0%
Religion	Hindu	92	92.0%
	Muslim	8	8.0%
Residence Location	Rural	65	65.0%
	Urban	35	35.0%
Educational Status	Illiterate	40	40.0%
	Primary & Middle	28	28.0%
	Secondary & Graduate	32	32.0%
Socio-economic Status	Lower	7	7.0%
	Lower middle	36	36.0%
	Middle	42	42.0%
	Upper middle	12	12.0%
	Upper	3	3.0%

Table 2: Thyroid disorders distribution in studied patients

Thyroid disorders	Frequency (n=100)	Percentage
Hypothyroidism	95	95.0%
Hyperthyroidism	5	5.0%

Table 3: Distribution of Maternal Complications in Patients with Thyroid Disorders

Maternal Complication	Hypothyroidism (n=95) Number of Patients	Percentage	Hyperthyroidism (n=5) Number of Patients	Percentage
Abortion	8	8.4%	1	20.0%
Maternal Anemia	16	16.8%	2	40.0%
Pre-eclampsia	6	6.3%	1	20.0%
Preterm Delivery	12	12.6%	0	0.0%
Still Birth	2	2.1%	0	0.0%
IUGR	10	10.5%	0	0.0%
Abruption Placenta	2	2.1%	0	0.0%
Total	**56**	**58.8%**	**4**	**80.0%**

Table 4 : Distribution of the Studied Patients Based on the Mode of Delivery According to Thyroid Status

Mode of Delivery	Hypothyroidism (n=87) Number of Patients	Percentage	Hyperthyroidism (n=4) Number of Patients	Percentage
Vaginal	31	35.7%	1	25.0%
LSCS	56	64.3%	3	75.0%
Total	**87**	**100.0%**	**4**	**100.0%**

Table 5: Distribution of Fetal Complications According to Thyroid Status

Fetal Complication	Hypothyroidism (n=85) Number of Patients	Percentage	Hyperthyroidism (n=4) Number of Patients	Percentage
Low Birth Weight	24	28.2%	1	25.0%
Hyperbilirubinemia	10	11.8%	0	0.0%
Respiratory Distress	19	22.4%	0	0.0%
Neonatal Death	1	1.1%	0	0.0%
Total	**54**	**63.5%**	**1**	**25.0%**