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Original Research Article

# To Compare the Maternal and Perinatal Outcome in Pregnant Women with and without Thyroid Disorder

**Samudyata[1], Girish B. L[2], Indira H.[3]**

[1]Junior Resident, Department of Obstetrics and Gynecology, Sri Siddhartha Medical College, Tumkur, Karnataka
[2]Professor and Unit Head, Department of OBG, Sri Siddhartha Medical College Tumkur.
[3]Professor, Unit Head & HOD, Department of OBG, Sri Siddhartha Medical College Tumkur.

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**Corresponding author: Dr. Samudyata**
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**Abstract**

**Background:** After diabetes mellitus, thyroid disorders are among the most prevalent endocrine conditions in pregnant women. Several changes in the mother's thyroid function are seen during pregnancy & thyroid dysfunction occurs from failing to adjust to these physiological changes. It is generally known that subclinical thyroid dysfunction, in addition to overt thyroid dysfunction, also negatively affects the mother and the foetus and can cause preterm birth, abortion, preeclampsia, eclampsia, placental abruption, low birth weight, and neonatal hypothyroidism. Thyroid hormone availability issues may also affect a fetus's capacity to grow cognitively and neurologically.

**Aim of the Study:** To compare the maternal and perinatal outcome in pregnant women with and without thyroid disorder.

**Materials and Methods:** This is a prospective study conducted in the Department of Obstetrics and Gynecology at Sri Siddhartha Medical College and Hospital, Tumakuru from February 2021 to July 2022 in 160 patients.

**Results:** In this study, among the 80 cases of thyroid disorder, 75% ( 60/80) cases were Hypothyroid and 25% ( 20/80) cases were Hyperthyroid. Anemia (mild-moderate) was most common complication with p value-0.114, which is not significant. 2nd most common complication being preterm labor with p value – 0.710, which is not significant.

**Conclusion:** In this study of thyroid disorder in pregnancy, showed no significant association between the maternal and perinatal complication in patients with thyroid disorder. As our hospital is a referral center and receive many complicated cases, results cannot be generalized to the whole population and it needs further studies.

**Keywords:** Hypothyroidism, fetal Outcome, Maternal Outcome.



## Introduction

Thyroid disorders are is linked to difficulties for both the mother and the foetus and is the 2nd most prevalent endocrinological disorder during pregnancy.

Hyperthyroidism occurs in 0.1 to 0.4% of pregnant women. [1] Excess thyroxine may cause miscarriage or preterm birth. In untreated women or in those who remain hyperthyroid despite therapy, incidences of preeclampsia, heart failure, and adverse perinatal outcomes are higher like and prolonged jaundice, poor feeding, transient hypothermia, failure to gain weight, constipation 12-fold greater risk of delivering an infant with hearing loss.[2,3]

About 2-3% of pregnant women are hypothyroid of whom 0.3-0.5% have overt hypothyroidism and about 2-2.5% of them present with subclinical hypothyroidism according to the western literature, while in India prevalence rates ranges from 4.8% to 11%.[2] Thyroid auto immunity appears to be associated with an increased risk of miscarriage and preterm delivery. Adverse maternal & perinatal outcomes are preeclampsia, placental abruption, low birth weight baby, preterm still birth. Most experts agree that adequate hormone replacement during pregnancy minimizes the risk of adverse outcomes and most complications. [3]

HCG produced by placenta is homologous to TSH and has some TSH like activity. Maternal thyroid axis changes during pregnancy resulting in increase in $fT_4$ levels and they remain high until birth. Maternal thyrotoxicosis causes congenital hypothyroidism. [4]

**Aim of the Study**

To compare the maternal and perinatal outcome in pregnant women with and without thyroid disorder.

**Its Objectives:**

To assess maternal and perinatal outcome in pregnant women with thyroid disorder

To assess maternal and perinatal outcome in euthyroid pregnancies

To compare the maternal and perinatal outcome in pregnant women with thyroid disorder with euthyroid pregnancy group.

**Materials And Methods**

This is a prospective study conducted in the Department of Obstetrics and Gynecology at Sri Siddhartha Medical College and Hospital, Tumakuru from February 2021 to July 2022 after getting the approval from the Ethical Committee among the women admitted in department of OBG as per the inclusion and exclusion criteria after proper counselling and after getting their consent, participants divided into 2 groups, Group A :78 participants were euthyroid pregnant women and Group B : 78 participants were pregnant women with thyroid disorder and followed up till the end of their pregnancy

**Inclusion Criteria:**

1. All pregnant women

**Exclusion criteria:**

1. women having multiple gestation,
2. Major obstetrical complications like antepartum haemorrhage, malnutrition, hydramnios.
3. systemic disease like cardiac, renal, liver disease
4. Intake of drugs like steroids, amiodarone, methadone, dopamine.

Maternal and perinatal outcomes were noted and compared in both the groups.

To measure the serum TSH level, patient samples were provided. fT3 and fT4 levels were assessed if serum TSH values were abnormal. reference ranges of American Thyroid Association's Guidelines for the Diagnosis and Management of Thyroid Disease During Pregnancy and Postpartum, were used in this study.

The following reference values for normal serum TSH were suggested by ATA Regulation 14.2:

1st trimester – 0.1 to 2.5 m IU/L,

2nd trimester – 0.2 to 3.0 m IU/L and

3 rd trimester – 0.3 to 3.0 m IU/L.

Normal free T4 and free T3 levels range from 0.7 to 1.8 ng/ml and 1.7 to 4.2 pg/ml, respectively. Patients were divided into categories based on their hormonal values: high serum TSH level accompanied by normal fT4, fT3 is considered as subclinical hypothyroidism. Overt hypothyroidism is defined as a high serum TSH level with fT4 and fT3 levels that are below normal. Low serum TSH level with normal fT3, fT4 is considered subclinical hyperthyroidism. Overt hyperthyroidism: Low serum TSH level with higher-than-normal levels of fT3 and fT4.

Sub clinical/ overt hypothyroid cases were treated with Thyroxine. Sub clinical / overt hyperthyroid cases were treated with Propylthoiuracyl. Every 4 weeks, TSH level was estimated and the dose of the drug was adjusted. Outcomes of the pregnancy were followed up and documented. The following outcome variables of the pregnancy in relation to the thyroid disorders were studied: Preeclampsia, Abruptio placenta, Preterm delivery, IUGR, Low birth weight, Stillbirth, Abortion.

**Results And Observation**

Results were analysed based on the following

**Basic variable:**

1. Age of the patient
2. Parity of the patient (obstetric score)
3. BMI of the patient
4. Past obstetric history

**Outcome variable:**

1. Mode of delivery
2. Maternal complications
3. Neonatal outcomes

**Analysis of Results**

In the present study among cases 75% (60/80) cases were Hypothyroid and 25% (20/80) cases were Hyperthyroid. Among Controls 80% (80/80) patients were Euthyroid.

**Table 1: Age distribution**

| Age distribution | Cases | Controls |
|---|---|---|
| <20 years | 05 ( 6.25 % ) | 06( 7.5% ) |
| 20-25 years | 30(37.5% ) | 29( 36.25 % ) |
| 26-30 years | 35( 43.75% ) | 34(42.5 % ) |
| >30 years | 10( 12.5 % ) | 11(13.75 % ) |
| Total | 80(100% ) | 80( 100 % ) |

In both study groups majority of study subjects were in the age group of 26 – 30 years and 2nd largest age group is between 20 – 25 years in both study groups.

**Table 2: Parity distribution**

| Parity distribution | Cases | Controls |
|---|---|---|
| Primigravida | 49( 61.2 % ) | 43( 53.75 % ) |
| Gravida 2 | 19( 23.8% ) | 20( 25% ) |
| Multi gravida | 12 (15%) | 17 (21.25%) |
| Total | 80 (100% ) | 80 (100 % ) |

In this study, majority were primigravida in both study groups 49/80 (61.2 % ) in cases and 43/80 (53.75 % ) in control group. Next majority were 2nd gravida in both groups, being 19/80 (23.8%) in cases and 20/80 (25%) in controls.

**Table 3: Distribution of Thyroid Status**

| Thyroid status | CASES |
|---|---|
| Hypothyroid | 60( 75% ) |
| Hyperthyroidism | 20( 25 % ) |
| Total | 80( 100% ) |

In the present study among cases 60/80 (75%) cases were Hypothyroid and 20/80(25%) cases were Hyperthyroid. Among Controls 80/80 (100%) patients were Euthyroid .

**Table 4: Distribution of Hypothyroidism In Cases**

| Hypothyroidism | Cases | Percentage |
|---|---|---|
| Subclinical hypothyroidism | 35 | 58.3 |
| Overt hypothyroidism | 25 | 41.7 |
| Total | 60 | 100% |

In the present study among hypothyroidism cases 35/80 (58.3%) were having Subclinical hypothyroidism and 25/80 (41.7%) were having Overt hypothyroidism.

**Table 5: Distribution of Past History**

| Past history | CASES | CONTROLS |
|---|---|---|
| Previous BOH | 10 (12.5%) | 5 (6.3%) |
| Previous abortion | 12( 15 % ) | 10( 12.5 % ) |
| Previous Neonatal death | 02(2.5%) | 0 |
| No significant past history | 56 (70% ) | 65( 81.2 % ) |
| Total | 80( 100% ) | 80( 100% ) |

In the present study among cases Previous BOH was seen in 10/80 (12.5%) subjects, Previous abortion in 12/80 (15%) patients, Previous Neonatal deaths in 2/80 (2.5%) and No significant past history in 56/80 (70%) subjects.

Among controls Previous BOH was seen in 5/80 (6.3 %) subjects, Previous abortion in 10/80 (12.5%) subjects, No significant past history in 65/80 (81.2%) subjects.

**Table 6: Distribution By BMI**

| Weight | CASES | CONTROLS |
|---|---|---|
| BMI <25 | 58 ( 72.5% ) | 62(77.5 % ) |
| BMI 26-30 | 16( 20% ) | 16( 20% ) |
| BMI >30 | 6( 7.5 % ) | 2( 2.5% ) |
| Total | 80(100% ) | 80(100% ) |

In the this study majority of study subjects are of BMI <25 kg/m2. Being 58/80 (72.5%) in cases and 62/80 (77.5%) in controls.2$^{nd}$ largest BMI group comprised of BMI between 26 -30kg/m2 being 16/80 (20%) in cases as well as in control group. Least number of patients were noted with BMI >30 kg/m2 , being 6/80 (7.5%) in cases and 2/80 (2.5%) in controls.

**Table 7: Mode of Pregnancy Termination**

| Mode of Termination of Pregnancy | Cases | Controls |
|---|---|---|
| OTHERS | 50( 62.5 % ) | 52( 65 % ) |
| LSCS | 30( 37.5% ) | 28(35 % ) |
| Total | 80(100 % ) | 80( 100% ) |

(OTHERS INCLUDE 40 vaginal delivery, 8 abortion and 2 instrumental delivery in cases, in controls 46 vaginal delivery , 5 abortions and 1 instrumental delivery).

In the present study majority of the subjects delivered by spontaneous vaginal delivery , being 40/80 (50%) in cases and 46/80 (57.5%) in control group. Next majority delivered by LSCS being 30/80 (37.5%) cases and 28/80 (35%) were from control group. And the least number of subjects delivered by assisted vaginal/ instrumental delivery, being 2/80 (2.5%) in cases and 1/80 (1.3%) in control group.

**Table 8: Distribution of Maternal Complications**

| Maternal complications | CASES | CONTROLS |
|---|---|---|
| PIH | 17 ( 21.2% ) | 22( 27.5% ) |
| Anemia (mild-moderate) | 50( 62.5% ) | 40( 50% ) |
| Abortion | 8( 10% ) | 5( 6.25% ) |
| Preterm labour | 20(25 % ) | 18( 22.5% ) |
| LBW | 8( 10% ) | 4( 5% ) |
| IUGR | 10( 12.5% ) | 8( 10% ) |
| IUD | 1(1.25 % ) | 1( 1.25% ) |
| PROM | 10( 12.5% ) | 11( 13.7% ) |
| GDM | 8( 10% ) | 10( 12.5% ) |

(**single study subject has more than one complication)

In the present study among cases Anemia (mild-moderate) was most common complication seen in 62.5% (50/80) patients followed by preterm labor in 25% (20/80) patients.

Among controls Anemia (mild-moderate) was most common complication seen in 50% (40/80) patients followed by preterm labor in 22.5% (18/80) patients.

**Table 9: Distribution of Perinatal Outcome**

| Perinatal outcome | CASES | CONTROLS |
|---|---|---|
| IUD | 1( 1.25% ) | 1( 1.25% ) |
| LBW | 8( 10% ) | 4( 5% ) |
| Open posterior fontanel | 10(12.5 % ) | 5( 6.25 % ) |
| Neonatal jaundice (>7days) | 0 | 0 |
| No complication | 32 (40%) | 60 (77.5%) |
| Total | 80( 100% ) | 80(100 % ) |

In the present study, among cases IUD noted in 1.25% (1/80), LBW noted in 10% (8/80), open posterior fontanel noted in 12.5% (10/80).

Among controls, IUD noted in 1.25% (1/80) LBW noted in 5% (4/80) open posterior fontanel noted in 6.25% (5/80)

**Table 10: Distribution of NICU Admission**

| NICU Admission | Cases | Controls |
|---|---|---|
| YES | 18 ( 22.5% ) | 17( 21.2% ) |
| NO | 62(77.5 % ) | 63( 78.8% ) |
| Total | 80(100 % ) | 80(100% ) |

In the present study among cases only 22.5% patients (18/80) required NICU admissions and among controls 21.2% patients (17/80) required NICU admissions.

## Statistical Analysis

### Case/Control Cross Tabulation

P value significant if its <0.05

| Maternal Complications | Cases (Yes) | (No) | Controls (Yes) | (No) | Chi Square Value | P-VALUE |
|---|---|---|---|---|---|---|
| PIH | 17 | 63 | 21 | 59 | 0.5522 | 0.457 |
| Anaemia | 50 | 30 | 40 | 40 | 2.54 | 0.114 |
| Abortion | 8 | 72 | 5 | 75 | 0.7535 | 0.385 |
| Lscs | 30 | 50 | 28 | 52 | 0.109 | 0.742 |
| Pre-Term Labour | 20 | 60 | 18 | 62 | 0.138 | 0.710 |
| Lbw | 8 | 72 | 4 | 76 | 1.44 | 0.230 |
| Iugr | 10 | 70 | 8 | 72 | 0.2504 | 0.617 |
| Iud | 1 | 79 | 1 | 79 | 0 | 1.000 |
| Prom | 10 | 70 | 11 | 69 | 0.0548 | 0.815 |
| Gdm | 8 | 72 | 10 | 70 | 0.2504 | 0.617 |
| Open Post. Fontanel | 10 | 70 | 5 | 75 | 1.84 | 0.18 |
| NICU admissions | 18 | 62 | 17 | 63 | 0.036 | 0.848 |

**Statistical Analysis of Thyroid Levels**

| | Cases (mean +/- SD) | Controls (mean +/- SD) |
|---|---|---|
| TSH-LEVELS | 7.222+/-3.237 | 2.620 +/-1.040 |
| Free-T3 | 326.9 +/-228.7 | 200+/-67.50 |
| Free-T4 | 28.60 +/- 17.549 | 20.34 +/- 5.051 |

## Discussion

| Maternal Outcome variables | Other Studies | Present study |
|---|---|---|
| Mode of termination of pregnancy – lscs | 24% -Vandana *et al* [5] | 37.5% |
| PIH | 14.7% - Sree latha *et al* study[6]<br>1.9% -Daniel *et al* study | 21.2% |
| Anemia | 4.2% -Sree latha *et al* study | 62.5% |
| Abortion | 2.1% -Sree latha *et al* study<br>26.7%- Subhash *et al* | 10% |
| Preterm labour | 3.1% -Sree latha *et al* study<br>14.03% -Tuija *et al*[7] | 25 % |
| GDM | 4.25%- Sree latha *et al* study | 10% |
| IUGR | O.5% - Daniel *et al* study | 12.5% |
| IUD | 1.1% - pu yu su *et al*[8] | 1.25 % |
| PROM | 2.9% - Tuija *et al* | 12.5% |
| Fetal Outcome variables | | |

| | | |
|---|---|---|
| LBW | 16.32% - Hareesh MV *et al* [9]<br>25% - Ajmani Sangeeta *et al* [10] | 10% |
| Open posterior fontanel | 3.3%- Subhash *et al* | 12.5 % |
| Neonatal jaundice | 0- Singh B *et al* | 0 |
| NICU ADMISSION | 14.28% -Dharasingh Meena *et al*[11] | 22.5% |

## Conclusion

This study showed no association between thyroid disorder and adverse maternal & perinatal outcomes. As this is not a randomized control trial, more well controlled studies are needed to conclude the same. Until then we recommend to follow ACOG &ATA guidelines and screen all ANC cases for thyroid disorders in first trimester by doing serum TSH as first line investigation, irrespective of previous disease status. All pregnant women should receive prompt treatment for thyroid disorder at the earliest for optimal maternal and fetal outcome.

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