

# The Study of Hypothyroidism in Pregnant Women and It's Effect on Maternal and Fetal Outcome

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**Abstract:** ***Objective:** To study the impact of maternal hypothyroidism on maternal and foetal outcome. **Study Design:** The study was conducted for the duration of 6 months from 17/8/20 to 10/3/21. Pregnant women with hypothyroidism who came for ANC check up to OBG Department, MMC&RI, Mysuru irrespective of gestational age, form the source of data. **Results:** In our study, subclinical hypothyroidism was associated with complications like PE (24%), Abruptio Placenta (1%), anaemia (12.5%), Abortion (4.8%), PPH (1.9%), preterm (8.65%), IUGR (13.46%), respiratory distress (27.88%), IUD (1.92%). overt hypothyroidism was associated with complications like PE (39.3%), Abruptio Placenta (7%), anaemia (17.9%), abortion (17.9%), PPH (3.6%), PTD (10.71%), IUGR (10.71%), RD (39.28%) and IUD (7.14%). Hypothyroid pregnant women in euthyroid state had complications like PE (14%), anemia (8%), PPH (2%), IUGR (14%), respiratory distress (10%) and IUD (2%). **Conclusion:** In our study, subclinical hypothyroidism was associated with complications like PE (24%), abruptio placenta (1%), anaemia (12.5%), abortion (4.8%), PPH (1.9%), PTD (8.65%), IUGR (13.46%), respiratory distress (27.88%) and IUD (1.92%). Overt hypothyroidism was associated with complications like PE (39.3%), abruptio placenta (7.1%), anaemia (17.9%), abortion (17.9%), PPH (3.69%), PTD (10.71%), IUGR (10.71%), respiratory distress (39.28%) and IUD (7.14%). Hypothyroid pregnant women in euthyroid state had complications like PE (14%), anaemia (8%), PPH (2%), IUGR (14%), respiratory distress (10%) and IUD (2%), emphasizing the importance of routine antenatal thyroid screening in first trimester. This study re-emphasizes that the requirement of close surveillance of thyroid status to maintain euthyroidism and intensive foetal monitoring during pregnancy to achieve good maternal and perinatal outcome.*

**Keywords:** subclinical hypothyroidism, overt hypothyroidism, IUGR, preterm delivery

## 1.Introduction

Thyroid disorders constitute one of the most common endocrine disorders in pregnancy. The thyroid undergoes physiological changes during pregnancy, such as moderate enlargement of the gland and increased vascularization. Pregnancy is associated with profound modifications in the regulation of thyroid function. These changes are the result of various factors like an increase of Thyroxine Binding Globulin (TBG) due to elevated oestrogen and human Chorionic Gonadotropin (hCG), increased renal losses of iodine due to increased glomerular filtration rate, modifications in the peripheral metabolism of maternal thyroid hormones and modification in iodine transfer to the placenta. About 2-3% of pregnant women are hypothyroid, of whom 0.3-0.5% have overt hypothyroidism and 2-2.5% present subclinical hypothyroidism<sup>1</sup> Uncontrolled hypothyroidism are associated with adverse pregnancy outcomes. There is also a concern about the effect of overt maternal hypothyroidism and even subclinical maternal hypothyroidism on foetal development. In deed subclinical hyperthyroidism is not associated with adverse outcomes. In addition, medications that affect the maternal thyroid gland can cross the placenta and affect the foetal thyroid. Women with hypothyroidism both overt and subclinical are at increased risk of pregnancy-related complications such as threatened abortion, preeclampsia,<sup>2</sup> preterm labour, placental abruption and postpartum haemorrhage. Foetal complications include low birth weight, IUGR, foetal or neonatal hyperbilirubinemia, still birth and perinatal mortality. The present study has been

undertaken to know the obstetric and perinatal outcome of pregnant women suffering from hypothyroidism.

## 2.Methodology

Prospective study done for a period of 6 months from august 2020 to march 2021 in Pregnant women with hypothyroidism who came for ANC check up OBG Department, MMC & RI, Mysuru irrespective of gestational age. Total numbers of pregnant women with hypothyroidism involved in study are 182, Using online sample size calculator provided by [www.surveysystem.com](http://www.surveysystem.com) for proposed population with 95% of confidence interval and confidence level of 5%.

### Inclusion Criteria

All Pregnant women with thyroid disorder who came for ANC check up with singleton pregnancy

**Exclusion Criteria:** Multifetal gestation • Medical disorders like diabetes, hypertension

### Method of Study Subjects:

Pregnant women with hypothyroidism who are coming to OBG department, MMC&RI, Mysuru after signing the written informed consent for participation underwent examination as follows.

1. Gestational age was estimated on the basis of last menstrual period and early obstetric scan.

- Detailed history was taken regarding the symptoms, and signs of thyroid disorders, menstrual history, obstetric history, past history, medical history, family history, personal history.
- Detailed examination with reference to pulse rate, BP, temperature, respiratory rate was noted. Local thyroid examination was done. CVS, CNS, RS, per abdomen and PV examination was done.
- Recent TSH, fT3 and fT4 values were noted and whether the patient was on treatment or not was noted.
- The patients who were not on treatment were treated with Thyroxine and
- Every 8 weeks TSH value was estimated and the dose of the drug titrated. At the end, obstetric outcome and the perinatal outcome of the pregnancy was noted.

The following **outcome variables** in relation to hypothyroidism were studied:

Maternal outcome variables include:

- Miscarriage
- Anaemia in pregnancy
- Pre-eclampsia
- Abruptio placenta
- Postpartum haemorrhage
- Foetal outcome variables includes:
- Premature birth
- Low birth weight
- Increased neonatal respiratory distress.

Preeclampsia was defined as persistently elevated blood pressure (systolic  $\geq 140$  mm Hg and diastolic pressure  $\geq 90$  mm Hg on more than 2 occasions) with proteinuria. Preterm delivery was defined as delivery before 37 completed weeks of gestation after the period of viability. IUGR was defined as birth weight less than 10th percentile for gestational age. Still birth was defined as the birth of a new born after 59 28 completed weeks (1000g or more) when the baby does not breathe or show any sign of life after delivery. Abortion was defined as spontaneous termination of pregnancy before the period of viability. Abruptio placenta was defined as a form of antepartum haemorrhage where the bleeding occurs due to premature separation of normally situated placenta. Postpartum haemorrhage is defined as the blood loss of 500 ml or more from the genital tract following vaginal delivery or 1000 ml or more following caesarean section. Low birth weight was defined as weight  $< 2500$ g. Anaemia in pregnancy was defined as Haemoglobin concentration in the peripheral blood  $\leq 11$ g/100 ml. Neonatal respiratory distress was defined as presence of any 2 of the following features:

- Respiratory rate  $> 60$ /min.
- Subcostal/intercostal recessions
- Expiratory grunt/groaning

### Statistical Methods

Descriptive Statistics displays univariate summary statistics for several variables in a single table and calculates standardized values (z scores). Following

descriptive statistics were employed in the present study-mean, Standard deviation, frequency and percentages. Inferential statistics, The Chi-Square Test procedure tabulates a variable into categories and computes a chi-square statistic. Crosstabs (Cramer's V) procedure forms two-way and multiway tables and provides a variety of tests and measures of association for two-way tables. The structure of the table and whether categories are ordered determine what test or measure to use. The One-Way ANOVA procedure produces a one-way analysis of variance for a quantitative dependent variable by a single factor (independent) variable. Analysis of variance is used to test the hypothesis that several means are equal. This technique is an extension of the two-sample t test. All the statistical methods were carried out through the SPSS for Windows (version 20.0).

### 3.Results

**Table 1:** Mean age among pregnant women with thyroid disorders

Group	Number	Mean age (years)	Std. deviation	p value
S.hypo	104	24.19	4.00	0.536
O.hypo	28	23.21	3.81	
Eu.hypo	50	24.06	4.52	
Total	182	24.00	4.12	

The mean age $\pm$ SD among 182 pregnant women with hypothyroidism was 24 $\pm$ 4.12 years.

**Table 2:** Mean TSH among pregnant women with thyroid disorders

Group	Number	Mean TSH (mIU/l)	Std deviation	p value
S.hypo	104	5.75	1.76	0.000
O.hypo	28	24.90	35.71	
Eu.hypo	50	2.29	0.67	
Total	182	7.75	15.75	

The mean TSH $\pm$ SD among 182 pregnant women with hypothyroidism was 7.75 $\pm$ 15.75 mIU/l.

**Table 3:** Maternal complications in the study population

Maternal complications	S.hypo	O.hypo	Eu.hypo	P value
PE	25	11	7	0.012
Abruption	1	2	0	0.201
Anemia	13	5	4	0.511
Abortion	5	5	0	0.002
PPH	2	1	1	0.982

Out of 104 subclinical hypothyroid pregnant women, 25 (24%) of them had PE, 1 (1%) had abruptio, 13 (12.5%) had anaemia, 5 (4.8%) of them had abortion and 2 (1.9%) had PPH. Out of 28 overt hypothyroid pregnant women, 11 (39.3%) had PE, 2 (7.1%) of them had abruptio, 5 (17.9%) had anaemia, 5 (17.9%) had abortion and 1 (3.6%) of them had PPH. Out of 50 hypothyroid pregnant women in euthyroid state, 7 (14%) had PE, 4 (8%) had anaemia, 1 (2%) of them had PPH, none of them had abruptio and abortion.

**Table 4:** Mode of delivery in the study population

Mode of delivery	S.hypo	O.hypo	Eu.hypo
VD	65	14	37
LSCS	34	9	13

Out of 104 subclinical hypothyroid pregnant women, 65 had vaginal delivery, 34 had LSCS and 5 of them had abortion. Out of 28 overt hypothyroid pregnant women, 14 had vaginal delivery, 9 had LSCS and 5 of them had abortion. Out of 50 hypothyroid pregnant women in euthyroid state, 37 had vaginal delivery and 13 had LSCS.

**Table 5:** Indication for LSCS in the study population

Indications	S.hypo	O.hypo	Eu.hypo
CPD	5	0	0
Breech	2	0	0
Prev.LSCS	6	2	6
Fetal distress	8	1	2
Failed induction	9	1	0
Failure to progress	2	2	2
DTA	0	1	1
Abruption	1	1	0
Severe PE	2	0	1
Precious preg	0	1	1
Total	35	9	13

Among subclinical hypothyroid pregnant women indication for LSCS were CPD-5, breech-2, prev. LSCS-6, Foetal distress-8, failed induction-9, failure to progress-2, abruptio-1 and severe PE-2. Among overt hypothyroid pregnant women indication for LSCS were prev. LSCS-2, Foetal distress-1, failed induction-1, failure to progress-2, DTA-1, abruptio-1, precious pregnancy-1. Among hypothyroid pregnant women in euthyroid state indication for LSCS were prev. LSCS-6, foetal distress-2, failure to progress-2, DTA-1, severe PE-1, precious pregnancy-1.

**Table 6:** Foetal outcome in the study population

Fetal outcomes	S.hypo	O.hypo	Eu.hypo
Live births	97	21	49
Preterm	09	03	00
IUGR	14	03	07
Respiratory distress	29	11	05
IUD	02	02	01

Among subclinical hypothyroid pregnant women, 97 had live births, 9 were preterm babies, 14 were IUGR babies, 29 babies had respiratory distress and 2 were IUD. Among overt hypothyroid pregnant women, 21 had livebirths, 3 were preterm babies, 3 were IUGR babies, 11 babies had respiratory distress and 2 were IUD. Among hypothyroid pregnant women in euthyroid state, 49 had livebirths, none of them had preterm delivery, 7 were IUGR babies, 5 babies had respiratory distress and 1 was IUD.

**Table 7:** APGAR (5 min) score of the babies

APGAR 5min	S.hypo	O.hypo	Eu.hypo	p value
7-10	84	15	47	<b>0.081</b>
4-6	13	05	02	
<4	00	01	00	

Out of 97 livebirths among subclinical hypothyroid pregnant women, 84 (86.60%) had excellent score, 13 (13.40%) had moderate birth asphyxia and none of them had severe birth asphyxia. Out of 21 livebirths among overt hypothyroid pregnant women, 15 (71.43%) had excellent score, 5 (23.81%) had moderate birth asphyxia and 1 (4.76%) had severe birth asphyxia. Out of 49 livebirths among hypothyroid pregnant women in euthyroid state, 47 (95.92%) had excellent scores, 2 (4.08%) had moderate birth asphyxia and none of them had severe birth asphyxia.

**Table 8:** NICU admission status of the babies

NICU admission	S.hypo	O.hypo	Eu.hypo	p value
Yes	45	14	11	<b>0.002</b>
No	52	07	38	

Out of 97 livebirths among subclinical hypothyroid pregnant women, 45 (46.39%) of them were admitted in NICU. Out of 21 livebirths among overt hypothyroid pregnant women, 14 (66.66%) of them were admitted in NICU. Out of 49 livebirths among hypothyroid pregnant women in euthyroid state, 11 (22.44%) of them were admitted in NICU.

**Table 9:** Weight distribution of the babies

Birth weight	S.hypo	O.hypo	Eu.hypo	P value
Normal wt (>2.5 kg)	74	16	42	<b>0.446</b>
LBW (1.5-2.5 kg)	22	07	07	
VLBW (>1-1.5 kg)	03	00	00	
Ex.LBW (<1 kg)	00	00	01	

Out of 99 babies among subclinical hypothyroid pregnant women, 74 (74.75%) had normal birth weight, 22 (22.22%) had LBW and 3 (3.03%) had VLBW. Out of 23 babies among overt hypothyroid pregnant women, 16 (69.56%) had normal birth weight and 7 (30.44%) had LBW. Out of 50 babies among hypothyroid pregnant women in euthyroid state, 42 (84%) had normal birth weight, 7 (14%) had LBW and 1 (2%) had extremely LBW.

## 4. Discussion

The present study was done in OBG department, MMC&RI, Mysuru. A total of 182 pregnant women with hypothyroidism were included in the study. It was a prospective study. The main aim of the study was to know the impact of maternal hypothyroidism on maternal and foetal outcome. Thyroid disorders are common among pregnant women. Diagnosis of hypothyroidism is complicated by non-specific symptoms, the hypermetabolic state of pregnancy and normal physiological changes associated with thyroid gland and its function in pregnancy. If untreated, hypothyroidism may adversely affect the mother and foetus. In our study, subclinical hypothyroidism was associated with complications like PE (24%), Abruptio Placenta (1%), anaemia (12.5%), Abortion (4.8%), PPH (1.9%), preterm (8.65%), IUGR (13.46%), respiratory distress (27.88%), IUD (1.92%). In a study done by Ajmani et al.<sup>4</sup> the incidence of complications in cases of subclinical hypothyroidism were PE (22.3%), anaemia (14.1%), abortion (5.5%), PPH (5.5%), PTD (5.8%), IUGR (4.9%), respiratory distress (11.8%) and IUD (1.7%). Incidence of complications associated with subclinical hypothyroidism in our study were comparable to the study conducted by Ajmani et al. In a study conducted by Leung et al.<sup>8</sup> the incidence of complications in cases of subclinical hypothyroidism were PE (7.6%), PTD (9%), LBW (9%). In a study done by Sahu MT et al.<sup>5</sup> the complications like PE (9.8%), PTD (10.3%), IUGR (2.4%) and IUD (2.5%) were seen in cases subclinical hypothyroidism. In these 3 studies there was no incidence of abruptio placenta. In a study done by Sreelatha et al.<sup>4</sup> The complications like PE (14.7%), anaemia (4.2%), abortion (2.1%), PPH (6.3%) and PTD (3.1%). In our study, the incidence of respiratory distress was more compared to other studies. In our study, overt hypothyroidism was associated with complications like PE (39.3%), Abruptio placenta (7%), anaemia (17.9%), abortion (17.9%), PPH (3.6%), PTD (10.71%), IUGR (10.71%), RD (39.28%) and IUD (7.14%). In a study done by Ajmani et al, the complications like PE (16.6%), Abruptio Placenta (16.6%), anaemia (8.3%), abortion (16.6%), PPH (8.3%), PTD (33.3%), IUGR (25%), RD (25%) and IUD (16.6%) were seen in cases of overt hypothyroidism. In a study done by Leung et al. the incidence of complications in overt hypothyroidism were like PE (22%) and IUD (4%). In a study done by Sahu MT et al. the complications like PE (20.7%), PTD (4.7%), IUGR (13.8%) and IUD (2.9%) were seen in overt hypothyroidism. In a study done by Thanuja et al.<sup>9</sup> the incidence of complications like AP (33.4%) and abortion (66.7%) seen in overt hypothyroidism. In a study done by Abalovich et al.<sup>2</sup> the complications like Abruptio Placenta (19%) and IUD (3%) were seen in cases of overt hypothyroidism. Incidence of complications varied in different studies but some studies are comparable. In our study incidence of PE and respiratory distress were high compared to other studies.

## 5. Conclusion

- In our study, subclinical hypothyroidism was associated with complications like PE (24%), abruptio placenta

(1%), anaemia (12.5%), abortion (4.8%), PPH (1.9%), PTD (8.65%), IUGR (13.46%), respiratory distress (27.88%) and IUD (1.92%).

- Overt hypothyroidism was associated with complications like PE (39.3%), abruptio placenta (7.1%), anaemia (17.9%), abortion (17.9%), PPH (3.69%), PTD (10.71%), IUGR (10.71%), respiratory distress (39.28%) and IUD (7.14%).
- Hypothyroid pregnant women in euthyroid state had complications like PE (14%), anaemia (8%), PPH (2%), IUGR (14%), respiratory distress (10%) and IUD (2%).

Emphasizing the importance of routine antenatal thyroid screening in first trimester. This study re-emphasizes that the requirement of close surveillance of thyroid status to maintain Euthyroidism and intensive foetal monitoring during pregnancy to achieve good maternal and perinatal outcome.

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