

**HYPOTHYROIDISM IN PREGNANCY AND ITS IMPACT ON MATERNAL AND FETAL OUTCOME**Ruchi Kishore<sup>1</sup>, Nalini Mishra<sup>2</sup>, Jyoti Yadav<sup>3</sup>**HOW TO CITE THIS ARTICLE:**

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**ABSTRACT:** Thyroid disorders are most common endocrine disorders affecting women of reproductive age group Hypothyroidism is common in pregnancy with an estimated prevalence of 2-3% Maternal hypothyroidism leads to many maternal and perinatal complications like miscarriage, gestational diabetes mellitus, pre-eclampsia, pre-term labor, placental abruption and fetal death. **AIMS AND OBJECTIVE:** To find out the effect of hypothyroidism on the course of pregnancy, to study the neonatal outcome, to know the prevalence of subclinical and overt hypothyroidism in pregnant women. **MATERIALS AND METHODS:** This prospective study was conducted in department of Obstetrics and Gynecology, Pt. J.N.M. Medical College and associated Dr. B.R.A.M. Hospital Raipur from May 2011 to September 2012. All pregnant women attending the obstetric unit during this period were included in the study after informed consent 10 ml of blood sample of pregnant women was drawn at first visit in the first trimester; then it was centrifuged and stored in aliquots at -70 degree Celsius until assays, which were done after delivery, TFT were assessed by quantitative analysis of serum TSH and FT4 (ELISA). The pregnancy outcome variables like miscarriages, preterm deliveries, IUGR, preeclampsia, anemia, low birth weight, intra uterine fetal demise, antepartum hemorrhage, still birth, postpartum haemorrhage, birth asphyxia were studied. The neonatal outcome was also studied. The statistical analysis was done using odds ratio. P value <0.05 was considered significant. **RESULTS:** Out of the 263 pregnant women 25 had hypothyroidism (9.5%). Prevalence of subclinical hypothyroidism was more as compared to overt one (Table 2). Abortions were seen in 12.5% of subclinical and 11.1% of overt hypothyroid women. PIH and abruptions were significantly higher in subclinical cases (P<0.05) while in overt group both complications were higher as compared to the normal women but p value was not significant for abruption. More of the hypothyroid women had preterm delivery (37.5% in subclinical and 44.4% in overt group), Regarding neonatal complications IUD and Early neonatal deaths were significantly higher in overt hypothyroidism (P<0.01) Hypothyroid women had more of low birth weight babies (31.25% in subclinical and 35.5% in overt) and IUGR babies (18.70% in subclinical and 22.21% in overt), **CONCLUSION:** The present study shows that, though the occurrence of hypothyroidism in pregnancy is less yet it causes many maternal and neonatal complications therefore universal screening of thyroid disorder should be done in pregnancy.

**KEYWORDS:** Hypothyroidism, Pregnancy, Fetomaternal outcome.

**INTRODUCTION:** Thyroid disorders are most common endocrine disorders affecting women of reproductive age group.<sup>1</sup> Hypothyroidism is common in pregnancy with an estimated prevalence of 2-3% and 0.3-0.5% for subclinical and overt hypothyroidism respectively in west.<sup>2</sup> There are a few reports on prevalence of hypothyroidism during pregnancy from India which states the prevalence between 4.8%-11%.<sup>3,4</sup> Hypothyroidism can be overt or subclinical.

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Overt hypothyroidism is characterized by an elevated serum levels of TSH (TSH > 10mIU/L) and subnormal thyroxin (FT4) levels, whereas subclinical hypothyroidism is characterized by an elevated levels of TSH usually beyond the upper reference limit but normal FT4 levels.<sup>5,6,7</sup>

Fetus has to exclusively depend on maternal system for thyroid hormone before 12-14 weeks of gestation, thus maternal hypothyroidism at this stage may lead to neurological deficit, low intelligence quotient, serious cognitive defect and psychomotor development impairment.<sup>5-7</sup> Triiodothyronin activates enzymes required for neurological development hence maternal hypothyroidism cannot be left untreated even beyond 1<sup>st</sup> trimester.<sup>8</sup>

Besides maternal hypothyroidism also leads to many maternal and perinatal complications like miscarriage, gestational diabetes mellitus, pre-eclampsia, pre-term labor, placental abruption and fetal death.<sup>9,10,11</sup>

### AIMS AND OBJECTIVE:

1. To find out the effect of hypothyroidism on the course of pregnancy.
2. To study the neonatal outcome.
3. To know the prevalence of subclinical and overt hypothyroidism in pregnant women.

**MATERIALS AND METHODS:** This prospective study was conducted in department of Obstetrics and Gynecology, Pt. J.N.M. Medical College and associated Dr. B.R.A.M. Hospital Raipur from May 2011 to September 2012. All pregnant women attending the obstetric unit during this period were included in the study after informed consent.

### INCLUSION CRITERIA:

1. Antenatal women with <12 weeks of gestation.
2. Singleton pregnancy.

### EXCLUSION CRITERIA:

1. Antenatal women with multifetal gestation.
2. Pregnant women with chronic disorder like diabetes mellitus and hypertension.
3. Pregnant women of previous bad obstetric history with known cause.
4. Those who underwent surgery for thyroid.

**METHOD:** Details regarding personal characteristics, demographic data, menstrual cycle, obstetric, family and past history were noted. Emphasis was given on risk factors. A thorough general and physical examination with reference to pulse, BP, temperature and respiratory rate followed by examination of the CVS, CNS, respiratory system and local thyroid examination was done. Per abdomen and per vaginal examinations were done and pregnancy was confirmed.

For thyroid function test (TFT) 10 ml of blood sample of pregnant women was drawn at first visit in the first trimester; then it was centrifuged and stored in aliquots at -70 degree Celsius until assays, which were done after delivery, TFT were assessed by quantitative analysis of serum TSH and FT4 (ELISA).

Depending upon the fasting TSH and FT4 values they were grouped as normal/subclinical/overt hypothyroidism.

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- Overt hypothyroidism was defined as an elevated TSH (>2.5 IU/L) in conjunction with a decreased FT4 concentration or women with TSH levels of 10.0mIU/L or above.
- Subclinical hypothyroidism was defined as serum TSH levels between 2.5 and 10mIU/L with a normal FT4 concentration.
- Euthyroid patients were defined as normal serum TSH and FT4 levels.

The pregnancy outcome variables like miscarriages, preterm deliveries, IUGR, preeclampsia, anemia, low birth weight, intra uterine fetal demise, antepartum hemorrhage, still birth, postpartum haemorrhage, birth asphyxia were studied. The neonatal outcome was also studied. The statistical analysis was done using odds ratio. P value <0.05 was considered significant.

Demographic Profile		<2.5 (n=238)	>2.5 (n=25)	P value
1. AGE	<20	24 (10.08%)	2 (8%)	0.7
	20-29	196 (82.35%)	17 (68%)	0.9
	30-39	18 (7.56%)	4 (16%)	0.15
	>40	0 (0%)	2 (8%)	0.01
2. SES		8 (3.361%)	3 (12%)	0.05
		26 (10.92%)	5 (20%)	0.18
		120 (50.42%)	9 (36%)	0.3
		77 (32.35%)	6 (24%)	0.3
3. Residual Area		7 (2.94%)	2 (8%)	0.2
	Rural	85 (35.71%)	9 (36%)	0.9
	Urban	153 (64.28%)	16 (64%)	0.9
4. Booking status	Booked	159 (66.80%)	16 (64%)	0.7
	Unbooked	79 (33.19%)	9 (36%)	0.6
5. Education Status	No formal	16 (6.722%)	2 (8%)	0.8
	Primary	148 (62.18%)	15 (60%)	0.8
	Higher	74 (31.09%)	8 (32%)	

Table 1: Socio Demographic Profile

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Sl. No.	TSH level	No. of. Cases %	
1	Normal	238	3.42
2	Subclinical	16	6.08
3	Overt	9	90.49
	<b>TOTAL</b>	<b>263</b>	<b>100</b>

**Table 2: Distribution of pregnant women according to TSH value**

Maternal complications	Normal N=238		Subclinical N=16		Odds ratio	Confidence interval (CI)	P value
	No.	%	No.	%			
Abortion	6	2.52	2	12.5	5.5	1.02- 29.90	0.04 (s)
PIH	7	2.94	3	18.75	7.61	1.76-32.90	0.006 (s)
Abruptio placentae	3	1.26	2	12.5	11.19	1.72- 72.51	0.01(s)
Vaginal bleeding	10	4.2	2	12.5	3.2	0.65-16.31	0.15 (ns)
PROM	10	4.2	2	12.5	3.2	0.65-16.31	0.15 (ns)
Oligohydramnios	4	1.68	1	6.25	3.9	0.4-37.10	0.23 (ns)
Anemia	15	6.3	3	18.75	3.4	0.88-13.36	0.07 (ns)
Breech	7	2.94	2	12.5	4.7	0.89-24.83	0.06 (ns)
Preterm	23	9.66	6	37.5	5.6	1.86-16.84	0.002 (s)
Operative delivery	25	10.5	6	37.5	5.11	1.71-15.26	0.003 (s)
PPH	2	0.84	1	6.25	7.86	0.67-91.7	0.09 (ns)

**Table 3: Distribution of cases according to maternal complications in subclinical hypothyroidism**

Maternal complications	Normal N=238		OVERT N=9		Odds ratio	Confidence interval (CI95%)	P value
	No.	%	No.	%			
Abortion	6	2.52	1	11.1	4.82	0.51-45.00	0.16 (ns)
PIH	7	2.94	2	22.2	9.42	1.65-53.33	0.01(s)
Abruptio placentae	3	1.26	1	11.1	9.79	0.91-104.78	0.05(ns)
Vaginal bleeding	10	4.2	1	11.1	2.85	0.32-25.04	0.3(ns)
PROM	10	4.2	2	22.2	6.5	1.19-35.45	0.03(s)
oligohydramnios	4	1.68	1	11.1	7.31	0.73-77.07	0.09(ns)
Anemia	15	6.3	2	22.2	4.24	0.81-22.25	0.08(ns)
Breech	7	2.94	1	11.1	4.12	0.45-37.62	0.2(ns)
Preterm	23	9.66	4	44.4	7.42	1.87-29.82	0.004(s)
Operative delivery	25	10.5	3	33.3	4.26	1.00-18.09	0.04(s)
PPH	2	0.84	0	0	4.97	0.22-111.06	0.3(ns)

**Table 4: Distribution of cases according to maternal complications in overt hypothyroidism**

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Neonatal Complications	Normal N=238		Subclinical N=16		Odds ratio	Confidence interval (CI)	P value
	No.	%	No.	%			
Abortion	6	2.5	2	12.5	5.52	1.02-29.9	0.04(s)
Intra Uterine Death	6	2.5	1	6.25	5.22	0.51-53.27	0.04(s)
Live Birth	226	94.95	13	81.25	4.55	1.2-16.4	0.03(s)
I. HEALTHY	208	92	10	76.9	0.28	0.06-1.20	0.009(s)
II. NURSERY	18	7.9	2	22.2	3.5	0.8-15.3	0.48(ns)
III. Early Neonatal Death	6	2.65	2	12.5	11.19	1.72-72.51	0.04(s)
IV. IUGR	6	2.65	1	18.75	5.22	0.51-53.27	0.04(s)
V. APGAR<3 AT 5 MINUTES	6	2.65	2	12.5	11.19	1.72-72.5	0.04(s)
VI. Low Birth Weight	32	14.15	5	31.25	3.87	1.24-12.05	0.06(ns)

Table 5: Distribution of cases according to neonatal outcomes in subclinical hypothyroidism

Neonatal Complications	Normal N=238		OVERT N=9		Odds ratio	Confidence interval (CI)	P value
	No.	%	No.	%			
Abortion	6	2.5	1	11.1	4.83	0.51-45.0	0.1(ns)
Intra Uterine Death	6	2.5	2	22.2	22.38	3.21-155.85	0.007(s)
Live Birth	226	94.95	6	66.6	2.10	0.61-8.60	0.003(s)
I. Healthy	208	92	4	66.6	0.16	0.02-0.04	0.002(s)
II. Nursery	18	7.9	2	33.3	5.9	0.95-37.00	0.1(ns)
III. Early Neonatal Death	6	2.65	2	22.2	22.38	3.21-155.85	0.007(s)
IV. IUGR	6	2.65	2	22.2	22.38	3.21-155.85	0.007(s)
V. APGAR<3 AT 5 MINUTES	6	2.65	2	22.2	22.38	3.21-155.85	0.007(s)
VI. Low Birth Weight	32	14.15	5	55.5	10.65	2.68-42.27	0.003(s)

Table 6: Distribution of cases according to neonatal outcomes in overt hypothyroidism

**RESULTS:** Out of the 263 pregnant women 25 had hypothyroidism (9.5%). Prevalence of subclinical hypothyroidism was more as compared to overt one (Table 2).

The women from the study and control group were similar regarding their socio demographic profile. The pregnant women more than 40 yrs. had higher prevalence of hypothyroidism ( $P<0.01$ ) (Table 1) Abortions were seen in 12.5% of subclinical and 11.1% of overt hypothyroid women. PIH and abruptions were significantly higher in subclinical cases ( $P<0.05$ ) while in overt group both complications were higher as compared to the normal women but p value was not significant for abruption. More of the hypothyroid women had preterm delivery (37.5% in subclinical and 44.4% in overt group) (Table 3-4).

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Regarding neonatal complications IUD and Early neonatal deaths were significantly higher in overt hypothyroidism ( $P < 0.01$ ) Hypothyroid women had more of low birth weight babies (31.25% in subclinical and 35.5% in overt) and IUGR babies (18.70% in subclinical and 22.21% in overt).

**DISCUSSION:** The incidence of hypothyroidism in our study was 9.5% while it was 5% in the study by P. M Thanuja et al and 12.7% in the study by Sahu et al.<sup>12,5</sup> Subclinical hypothyroidism was seen in 6% of women which was comparable to the study of Sahu MT et al while Casey BM et al reported 23% prevalence which was very high and was not consistent with our study.<sup>5,13</sup> The occurrence of overt hypothyroidism was similar to the study by Sahu M P et al.<sup>5</sup>

Maternal complications like abortion was seen in 12.5% of women in subclinical and 11.1% in overt hypothyroidism while it was 50% in subclinical and 66.7% in overt in the study by P M Thanuja et al probably because the prevalence of hypothyroidism in their study was less.<sup>12</sup> Study by Leung et al showed that hypothyroidism is associated with preterm labour which is also seen in our studies probably because of placental insufficiency in these cases. Leung et al found that maternal complications are more common in hypothyroid women preeclampsia (15%), preterm labour (9%).

The present study also showed a higher incidence of PIH (22.2%) and preterm labour (44.4%). The present study also noticed the higher incidence abruption (11.1%), anemia (22.2%) and operative delivery (33.3%) in the women of hypothyroidism.<sup>13</sup>

In our study the neonatal complication like intrauterine deaths, nursery admissions early neonatal deaths, low birth baby were higher in hypothyroid women. We noticed 6.25% and 22.2% of IUD in subclinical and overt group respectively. In study by Sahu MT et al 2.5% of still births, 13.8% of IUGR were observed in hypothyroid female, which was lower as compared to the present study.<sup>5</sup>

**CONCLUSION:** The present study shows that, though the occurrence of hypothyroidism in pregnancy is less yet it causes many maternal and neonatal complications therefore universal screening of thyroid disorder should be done in pregnancy.

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