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A Study of Hypothyroidism in Pregnancy and It's Feto-Maternal Outcomes

Dr. Jasesh Trivedi[1*], Dr. Jayanarayan Bishnumohan Senapati[2], Dr. Misbah Mulla[3], Dr. Kavita Velankar[4]

[1*]Junior Resident, Department of Obstetrics and Gynaecology, Rajiv Gandhi Medical College and Chhatrapati Shivaji Maharaj Hospital, Kalwa, Thane, Maharashtra, India
***Corresponding Author**
[2]Professor and Head of Department of Obstetrics and Gynaecology, Rajiv Gandhi Medical College and Chhatrapati Shivaji Maharaj Hospital, Kalwa, Thane, Maharashtra, India
[3]Associate Professor in Department of Obstetrics and Gynaecology, Rajiv Gandhi Medical College and Chhatrapati Shivaji Maharaj Hospital, Kalwa, Thane, Maharashtra, India
[4]Assistant Professor in Department of Obstetrics and Gynaecology, Rajiv Gandhi Medical College and Chhatrapati Shivaji Maharaj Hospital, Kalwa, Thane, Maharashtra, India

Abstract: ***Thyroid disorders are the second most common endocrine disorders in pregnancy. Overt hypothyroidism occurs in 0.3-0.5% of pregnancies, subclinical hypothyroidism in 2-3%, and hyperthyroidism in 0.1-0.4%. Both overt and subclinical thyroid dysfunction during pregnancy are linked to higher risks of various complications for both mother and baby, including abortions, anemia, preeclampsia, growth issues, preterm birth, and even serious conditions like heart failure in mothers. Offspring may face reduced intellectual function and congenital anomalies, especially with iodine deficiency-related hypothyroidism.***

Keywords: Hypothyroidism, Hyperthyroidism, Pregnancy, Subclinical, Overt, Euthyroid

1.Introduction

Thyroid disorders are the second most common endocrine disorders in pregnancy. Overt hypothyroidism occurs in 0.3-0.5% of pregnancies, subclinical hypothyroidism in 2-3%, and hyperthyroidism in 0.1-0.4%. Autoimmune causes are common, with Graves' disease responsible for over 85% of hyperthyroidism and Hashimoto's thyroiditis being the leading cause of hypothyroidism. Hypothyroidism in pregnancy negatively affects both mother and child, impacting the child's future intellectual development. Pregnancy increases thyroid size (10% in iodine-sufficient areas, more in deficiency regions) and raises thyroid hormone production and iodine needs by 50%. It also stresses the thyroid, potentially causing hypothyroidism in women with low thyroid reserve or iodine deficiency.[1] Thyroid disorder prevalence and complications in pregnancy vary geographically. In India, overt hypothyroidism affects 3–4.58% of pregnancies, while subclinical hypothyroidism occurs in 6.47–9%.[2] Pregnancy's physiological changes can mimic thyroid disease, with overlapping symptoms like heat intolerance, fatigue, constipation, tachycardia, edema, and wide pulse pressure.[3] Overt hyperthyroidism affects 0.4–1.7% of pregnancies, while hypothyroidism occurs in 2– 3% of pregnant women.[4-5] Subclinical hypothyroidism (high TSH, normal T4/T3) is linked to pregnancy complications and potential neurodevelopmental issues in children.

The exact cause of the decline in free thyroid hormones is unclear but involves interactions between TSH, estrogen, and thyroid- binding proteins. In a very recent institution-based observational descriptive study reported on follow- up till the termination of their pregnancies, mothers suffering from SCH had statistically significantly higher incidence of maternal complications such as hypertensive disorders in pregnancy, abortion, postpartum hemorrhage and also fetal adverse outcomes, such as intrauterine growth restriction, fetal premature birth, and low birth weight when compared with euthyroid mothers. Both overt and subclinical thyroid dysfunction during pregnancy are linked to higher risks of various complications for both mother and baby, including abortions, anemia, preeclampsia, growth issues, preterm birth, and even serious conditions like heart failure in mothers. Offspring may face reduced intellectual function and congenital anomalies, especially with iodine deficiency-related hypothyroidism.

Hence the present prospective study aims to assess the prevalence of hypothyroidism (both overt and subclinical) in pregnant women, assess its impact on feto- maternal outcomes and the association between maternal hypothyroidism and adverse maternal outcomes.

2.Aims and Objectives

Aims: To determine the prevalence of hypothyroidism (both overt and subclinical) in pregnant women and assess its impact on feto-maternal outcomes. **Objectives**: To determine the prevalence of' hypothyroidism (both overt and subclinical) among pregnant women in the study population. To evaluate the association between maternal hypothyroidism and adverse maternal outcomes. To assess the impact of maternal hypothyroidism on foetus.

Materials and Methods

A prospective observational study was done with 80 patients to determine the prevalence of hypothyroidism in pregnant women, to assess its impact on mother and foetus and the association between maternal hypothyroidism and adverse maternal outcomes.

Study population:

All Singleton Pregnant women aged 18-45 years attending antenatal clinics after I3 weeks of gestation

Sample size: 80 patients

The study by Korde VR et al[6] reported a prevalence of 12.76% for hypothyroidism in pregnant women. Using the study as reference point, the sample size was calculated using the following formula: n = (Z2 × p x (1 – p))/e2

Where: n = required sample size

Z= Z-statistic for the desired confidence level (e.g., 1.96 for 95% confidence level) p = estimated prevalence of hypothyroidism in pregnant women (0.127)
e = desired precision (margin of error) = (set at 8%)
n = (1.96*^2 * 0.1276 * (1-0.1276)) / 0.08 ^ 2 = 66.79

Therefore, a minimum sample size of 67 pregnant women was required to achieve a 95% confidence level with an 8% margin of error. Assuming a conservative non- response rate of 15% (0.15), the final sample size was adjusted to: Adjusted Sample Size = Initial Sample Size / (1- Non-response Rate) = 67 / (1-0.15) = 78.2 ≈ 80

Hence a sample size of 80 pregnant women was considered adequate for the study.

Inclusion criteria: Pregnant women aged 18-45 years. Singleton pregnancy. Attending antenatal clinics at tertiary teaching health care center during the study period. Willing to provide informed consent for participation in the study. Pregnant women attending antenatal clinics for the first time after I3 weeks of gestation.

Exclusion criteria: Multiple pregnancies (e.g., twins, triplets). Known pre-existing thyroid disorder (hypothyroidism or hyperthyroidism) diagnosed before pregnancy. Previously taking treatment for thyroid disorder with any medication (e.g, levothyroxine). Pre-existing medical conditions known to affect thyroid function (e.g., autoimmune diseases, pituitary disorders). Refusal to participate in the study or inability to provide informed consent.

3.Methodology

Particulars of the women were noted such as name, age, symptoms, menstrual history for menarche, last menstrual period and past menstrual cycles, history of present pregnancy. Past obstetric history was asked for duration of marriage, infertility, gravidity and parity status, recurrent abortions, pre-eclampsia, growth restriction, low birth weight, preterm delivery, prematurity, late pregnancy losses, neonatal deaths, and mental retardation in previous pregnancy. Past medical history was asked for any associated medical disorders like diabetes, thyroid disorders, exposure to radiation or autoimmune disorders.

Significant surgical history, family history was noted. A thorough clinical examination including height, weight, pulse, blood pressure, pedal oedema, thyroid enlargement, etc. was done followed by systemic examination. In obstetrical examination gestational age, presentation and amount of liquor was noted and fetal heart sounds were auscultated with stethoscope. The subjects in the groups were age, body mass index and gravidity matched. The serum was used for thyroid hormone analysis (FT3, FT4 and TSH) in laboratory. TSH, FT3 and FT4 levels in pre eclamptic and normal pregnant women were recorded. The normal values used were Serum FT3 = 1.8-4.2 pg/ml, Serum FT4 = 0.89-1.76 ng/ml, Serum TSH = 0.4-4.0 µIU/ml

All preliminary and baseline investigations like complete blood count, blood grouping and typing, urine routine and microscopy, blood sugar and thyroid function test were done. Ultrasonography was done for fetal growth, liquor and placenta. All investigations pertaining to complications of hypothyroidism were also done. Assessment of thyroid status of patients was done with serum Free T3, T4 and TSH for which 10ml venous blood sample was taken from the cubital vein irrespective of NBM status. All samples were sent to the laboratory where Sera were separated and stored at - 200ºc until assayed. Free T3, free T4 and TSH were measured using fully automated chemiluminescence system (CLIA kits). Patients were followed up till delivery.

Statistical Analysis

Quantitative data is presented with the help of Mean and Standard deviation. Comparison among the study groups is done with the help of unpaired t test as per results of normality test. Qualitative data is presented with the help of frequency and percentage table. Association among the study groups is assessed with the help of Fisher test, student 't' test and Chi-Square test. 'p' value less than 0.05 is taken as significant.

4.Results

A prospective observational cohort study was done with 80 patients to determine the prevalence of hypothyroidism in pregnant women to assess its impact on mother and foetus and the association between maternal hypothyroidism and adverse maternal outcomes.

The present study observed prevalence of hypothyroidism among patients found 12 out of 80 pregnant women had thyroid disorders – 8 pregnant women had subclinical hypothyroid while 4 pregnant women had overt hypothyroid. The prevalence of hypothyroidism was 15%.

Table 1: Prevalence of hypothyroidism among patients

Thyroid Status	N	%
Subclinical Hypothyroid	8	10%
Overt Hypothyroid	4	5%
Euthyroid	68	85%
Total	80	100%

The mean age of subclinical hypothyroid and overt hypothyroid patients was 24.6±2.87 years and 27.7±3.14 years respectively while the mean age of euthyroid patients was 24.5±2.38 years. The maternal age was significantly high in the overt hypothyroid compared to subclinical hypothyroid and euthyroid patients.

Table 2: Distribution of patients according to Age [a] (p <0.05 is significant)

Age (years)	Subclinical Hypothyroid		Overt Hypothyroid		Euthyroid	
	N	%	N	%	N	%
</=20	1	12.5	0	-	3	4.4
21-25	5	62.5	1	25	44	64.7
26-30	2	25	2	50	20	29.4
>30	0	-	1	25	1	1.5
Total	8	100	4	100	68	100
Mean+/- SD	24.6 +/- 2.87		**27.7 +/- 3.14** [a]		24.5 +/- 2.38	

Most of the patients in all the groups were primigravidas with no statistically significant difference between the groups.

Table 3: Distribution of patients according to Parity

Parity	Subclinical Hypothyroid		Overt Hypothyroid		Euthyroid	
	N	%	N	%	N	%
Primi-gravida	5	62.5	3	75	47	69.1
Multi-gravida	3	37.5	1	25	21	30.9
Total	8	100	4	100	68	100

Majority of the subclinical hypothyroid and euthyroid patients had normal BMI. Patients in overt hypothyroid group had significantly higher BMI and majority of the patients in all the groups were from middle class group.

Table 4: Distribution of patients according to BMI [a] (p <0.05 is significant)

BMI (Kg/ m^2)	Subclinical Hypothyroid		Overt Hypothyroid		Euthyroid	
	N	%	N	%	N	%
Normal (18.5-24.9)	5	62.5	0	-	40	80.2
Overweight (25-29.9)	2	25	1	25	21	16.2
Obese (>/=30)	1	12.5	3	75	7	10.3
Total	8	100	4	100	68	100
Mean+/- SD	24.4+/-4.43		**28.2+/-4.69**[a]		23.5+/-3.05	

Table 5: Distribution of patients according to Mode of Delivery
[a] (p <0.05 is significant)

Mode of Delivery	Subclinical Hypothyroid		Overt Hypothyroid		Euthyroid	
	N	%	N	%	N	%
Vaginal Delivery	3	37.5	1	25	41	60.3
LSCS	5	**62.5**[a]	3	**75**[a]	27	39.7
Total	8	100	4	100	68	100

3(37.5%) patients of subclinical hypothyroid, 1 (25%) patient of hypothyroid and 41 (60.3%) patients of euthyroid patients had vaginal delivery. The rate of caesarean section was higher in patients with subclinical hypothyroidism (62.5%) and overt hypothyroidism (75%) as compared to the euthyroid group (39.7%).

Maternal Complications in patients:

Table 6: Maternal Complications in patient
[a] (p <0.05 is significant)

Maternal Complications	Subclinical Hypo-thyroid		Overt Hypo-thyroid		Euthyroid	
	N	%	N	%	N	%
Anemia	0	-	0	-	0	-
Pre-Eclampsia	2	**25**[a]	1	25	5	7.3
Placental Abruption	0	-	2	**50**[a]	1	1.5
GDM	0	-	0	-	1	1.5
PPH	1	12.5	1	25	6	8.8
Pre-term Delivery	2	25	1	25	13	19.1
Oligohydramnios	1	12.5	1	25	7	10.3

Subclinical hypothyroidism was significantly associated with preeclampsia as compared to the euthyroid patients (25% vs. 7.3%). No significant increase in placental abruption (0% vs. 1.5%), gestational diabetes mellitus (0% vs. 1.5%), postpartum haemorrhage (12.5% vs. 8.8%), preterm delivery (25% vs. 19.1%) and oligohydramnios (12.5% vs. 10.3%) was seen in the subclinical hypothyroid patients. Adverse maternal effects in overt hypothyroidism included placental abruption (50% vs. 1.5%). No significant increase in postpartum haemorrhage (25% vs. 8.8%), preterm delivery (25% vs. 19.1%) and oligohydramnios (25% vs. 10.3%) was seen in the overt hypothyroid group.

Adverse Fetal outcomes in overt hypothyroidism included premature birth (50% vs. 5.9%), intrauterine growth retardation (25% vs. 4.5%), low birth weight (50% vs. 11.8%), fetal distress (50% vs. 2.9%), IUD (25% vs. 1.5%) and NICU admission (50% vs. 4.5%) as compared to the euthyroid patients. All outcomes were found to be highly significant. Adverse fetal outcomes in subclinical hypothyroidism included premature birth (12.5% vs. 5.9%), low birth weight (25% vs. 11.8%), fetal distress (12.5% vs. 2.9%) and NICU admission (12.5% vs. 4.5%) as compared to the euthyroid patients.

Table 7: Fetal Outcomes among patients
[a] (p <0.05 is significant)

Fetal Outcomes	Subclinical Hypothyroid		Overt Hypothyroid		Euthyroid	
	N	%	N	%	N	%
Premature Birth	1	12.5	2	**50**[a]	4	5.9
IUGR	0	-	1	**25**[a]	3	4.5
LBW	2	25	2	**50**[a]	8	11.8
Fetal Distress	1	12.5	2	**50**[a]	2	2.9
IUFD	0	-	1	**25**[a]	1	1.5
NICU Admission	1	12.5	2	**50**[a]	3	4.5

Birth Weight of Neonates:

Table 8: Comparison of Birth Weight of Neonates
[a] (p <0.05 is significant)

	Subclinical Hypothyroid		Overt Hypothyroid		Euthyroid	
	Mean	SD	Mean	SD	Mean	SD
Birth weight	2.53	0.49	2.21	**0.33[a]**	2.64	0.50

The mean birth weight in Subclinical Hypothyroid group was 2.53±0.49 kgs, in Overt Hypothyroid group was 2.21±0.33kgs and in Euthyroid group was 2.64±0.50kgs. The mean birth weight in Overt Hypothyroid group was significantly lower than that in Euthyroid group.

Table 9: Comparison of APGAR Scores of neonates
[a] (p <0.05 is significant)

APGAR Score	Subclinical Hypothyroid		Overt Hypothyroid		Euthyroid	
	N	%	N	%	N	%
<7 at 1 Min	1	12.5	2	**50[a]**	4	5.9
<7 at 5 Min	1	12.5	0	-	2	2.9

Apgar score<7 at 1 min was 50% of overt hypothyroid neonates as compared to 5.9% of euthyroid neonates and was statistically significant. The difference in Apgar score<7 at 5 mins in all groups were statistically not significant.

Table 10: Neonatal Outcomes among patients
[a] (p <0.05 is significant)

Neonatal Outcomes	Subclinical Hypothyroid		Overt Hypothyroid		Euthyroid	
	N	%	N	%	N	%
Hyperbilirubinemia	1	12.5	1	25	4	5.9
Respiratory Distress Syndrome	1	12.5	2	**50[a]**	2	2.9
Sepsis	0	-	2	**50[a]**	2	2.9
Hypoglycemia	0	-	0	-	2	2.9
Hypothermia	0	-	0	-	1	1.5
Intracranial Bleed	0	-	0	-	1	1.5
Necrotizing Enterocolitis	0	-	0	-	1	1.5
Early Neonatal Death	0	-	1	25	1	1.5

Neonatal Outcomes observed was respiratory distress syndrome and sepsis which was significantly present in neonates of overt hypothyroid group. No other significant neonatal complications were seen in terms of hyperbilirubinemia, respiratory distress syndrome, sepsis, hypoglycemia, hypothermia, intracranial bleed, necrotizing enterocolitis and early neonatal death in subclinical hypothyroid, overt hypothyroid and euthyroid groups.

5.Discussion

A prospective observational cohort study was done with 80 patients to determine the prevalence of hypothyroidism in pregnant women, assess its impact on mother and foetus and the association between maternal hypothyroidism and adverse maternal outcomes.

12 out of 80 pregnant women had thyroid disorders followed by 8 pregnant women with subclinical hypothyroid while 4 pregnant women had overt hypothyroid with a prevalence of hypothyroidism in present study was 15%. Similar studies by Gupta M et al[7], Khawale R et al[8], Das T et al[9], Prabha T et al[10], Kumar R et al[11] and Kunwar R et al[12] also reported similar prevalence. Gupta M et al[7] prospective and observational study determining fetal and maternal complications associated with hypothyroidism found out of the 2122 patients 132 were detected with hypothyroidism. Out of 132, patients 52 were detected with clinical hypothyroidism and subclinical were 80. Prevalence of hypothyroidism was 6.22%, subclinical and clinical hypothyroidism being 03.77% and 02.45% respectively. Das T et al[9] study observed about 7.5% of the mothers were suffering from overt hypothyroidism, while the prevalence of hyperthyroidism was observed to be 2.5%. Prabha T et al[10] prospective study assessing the prevalence of both subclinical and overt thyroid disorders and maternal and fetal outcomes of antenatal women with hypothyroid disorders showed high prevalence (12.6%) of thyroid disorders in pregnancy, with hypothyroidism at 10.1%. Subclinical hypothyroidism in 6.9% of cases, while overt hypothyroidism was observed in 3.2% of cases.

Khawale R et al[8] prospective observational study found 350 patients (100%), 311 (88.86%) with euthyroidism and 39 (11.14%) with hypothyroidism followed by Twenty- eight patients (8%) with subclinical hypothyroidism whereas 11 (3.14%) had overt hypothyroidism.

Kumar R et al[11] study found prevalence of thyroid disorders in pregnancy was 33.9%, with hypothyroidism (31.6%) being more common than hyperthyroidism (2.3%). Of the total hypothyroid women, 6.3% (n = 19) had overt hypothyroidism, while 25.3% (n = 76) had sub-clinical hypothyroidism. All the hyperthyroid cases were overt, and no woman had subclinical hyperthyroidism.

Kunwar R et al[12] retrospective observational study found incidence of hypothyroidism in pregnancy was 2.11% with 1.7% of subclinical hypothyroidism and 0.31% of overt hypothyroidism.

In the present study, the mean age of subclinical hypothyroid and overt hypothyroid patients was 24.6±2.87 years and 27.7±3.14 years respectively while the mean age of euthyroid patients was 24.5±2.38 years. The maternal age was significantly high in the overt hypothyroid compared to subclinical hypothyroid and euthyroid patients as per ANOVA test (**p<0.05**) which is comparable to the studies of Gupta M et al[7], Khawale R et al[8], Vamja R et al[13], Das T et al[9] and Kumar R et al[11].

The present study observed, majority of the patients in all the groups were primigravidas with no statistically significant difference between the groups with respect to parity. Gupta M et al[7], Khawale R et al[8], Vamja R et al[13], Das T et al[9] and Kumar R et al[11] noted similar findings on parity. Gupta M et al[7] study showed majority of the women were primigravida

(group I 43.75% versus group II 40.38%). Khawale R et al[8] study found 53.85% were multigravida and 18 (46.15%) primigravida patients with hypothyroidism with a higher incidence of hypothyroidism in multigravida patients and majority of patients with euthyroidism (63.03%) were primigravida. Vamja R et al[13] found over half were nulliparous (55–56%). Das T et al[9] showed most of the women were nulliparous (60%), followed by prime mothers (31%). The present study showed body mean mass the mothers was 23.7±0.4 kg/m2. Kumar R et al[11] study showed a significantly higher prevalence of hypothyroidism in the primigravida (53.7%), while hyperthyroidism was seen exclusively in the multi-para women (100%). The present study observed that majority of the subclinical hypothyroid and euthyroid patients had normal BMI. Patients in overt hypothyroid group had significantly higher BMI.

Khawale R et al[8] study observed majority of patients with hypothyroidism i.e. 35 patients (89.75%) weighed more than 50 kgs and maximum weight of the patients with overt hypothyroidism was 98 kgs. Das T et al[9] study found mean body mass was to be 23.7±0.4 kg/m^2.

It was observed in the present study that majority of the patients in all the groups were from middle class group. Gupta M et al[7] study showed majority patients were from poor socioeconomic status. Number of booked patients was 58.75% in subclinical group and 67.30% in clinical group. In the present study, 3 (37.5%) patients of subclinical hypothyroid, 1 (25%) patient of hypothyroid and 41 (60.3%) patients of euthyroid patients had vaginal delivery. The rate of caesarean section was higher in patients with subclinical hypothyroidism (62.5%) and overt hypothyroidism (75%) as compared to the euthyroid group (39.7%). This is concordant to the studies of Gupta M et al[7], Khawale R et al[8] and Kumar R et a[11]. Gupta M et al[7] study showed in group I, 63.75% patients delivered vaginally as compared to 48.08% in group II. Of which preterm vaginal deliveries were 11.25% in group I and 21.16% in group II. Rate of caesarean deliveries was more in group II (51.92%) as compared to group I (36.25%); of which preterm were more in group II (13.46%) as compared to group I (02.50%). Khawale R et al[8] study observed twenty-seven (69.23%) out of the 39 patients with hypothyroidism underwent lower segment caesarean section (LSCS), while five (12.82%) had a normal vaginal delivery and among the women with euthyroidism, majority of them i.e. 200 (64.33%) had normal vaginal deliveries, with 87 (27.97%) undergoing LSCS. Kumar R et al[11] observed significantly higher incidence of emergency lower segment cesarean section (LSCS) in hypothyroid women (48.4%; n = 46) as compared to euthyroid women (32.3%) and most hyperthyroid women (71.4%) had abortion and underwent suction and evacuation.

In the present study, subclinical hypothyroidism was significantly associated with preeclampsia as compared to the euthyroid patients (25% vs. 7.3%). No significant increase in placental abruption (0% vs. 1.5%), gestational diabetes mellitus (0% vs. 1.5%), postpartum haemorrhage (12.5% vs. 8.8%), preterm delivery (25% vs. 19.1%) and oligohydramnios (12.5% vs. 10.3%) seen in the subclinical hypothyroid patients. Adverse maternal effects in overt hypothyroidism included placental abruption (50% vs. 1.5%). No significant increase in postpartum hemorrhage (25% vs. 8.8%), preterm delivery (25% vs. 19.1%) and oligohydramnios (25% vs. 10.3%) was seen in the overt hypothyroid group. Similar findings were observed by Gupta M et al[7], Khawale R et al[8], Vamja R et al[13], Das T et al[9], Kumar R et al[11] and Kunwar R et al[12]. Gupta M et al[7] study found women with clinical hypothyroidism had higher incidence of preeclampsia (i.e;19.23% in comparison to 13.75%) but difference was not statically significant. Incidence of preterm labour was 13.75% in group I as compared to 36.54% in group II which was significant. History of first trimester abortions was more in group I patients compared to group II patients. Incidences of oligohydramnios and polyhydramnios were more in group II as compared to group I. Incidences of APH, PPH, and sepsis were not significant. Women with clinical hypothyroidism had lower incidence of anaemia 23.07% in comparison to 38.75% of women with subclinical hypothyroidism though was not statistically significant. Khawale R et al[8] study found hypothyroidism in patients with preeclampsia, preterm labor, GDM, gestational hypertension, and fetal distress indicating a higher rate of LSCS in women with hypothyroidism compared to those with euthyroidism and higher incidence of spontaneous abortions in 18.75% in patients with overt hypothyroidism.

Vamja R et al[13] observed hypothyroid mothers had higher rates of all negative outcomes than euthyroid mothers, including 11% vs. 6% for preterm birth, 6% vs. 3% for low birth weight, 12% vs. 4% for NICU admission, and 10% vs. 4% for low APGAR scores. The risk of moderate preterm birth (< 32 weeks) rose from 3% in euthyroid to 28% in moderate hypothyroidism (TSH 8.1–15 μIU/mL) based on TSH levels and Low birth weight risk also climbed from 2 to 19%.

Das T et al[9] study found women with SCH, anemia in pregnancy was the maternal complication with the highest incidence (31.2%), followed by hypertensive disorders in pregnancy (28.1%) and adverse maternal outcomes, postpartum hemorrhage had the highest incidence (21.9%). Compared with euthyroid mothers, mothers suffering from SCH had a statistically significantly higher incidence of maternal complications i.e. hypertensive disorders in pregnancy, abortion, antepartum hemorrhage, postpartum hemorrhage and preterm labor.

Kumar R et al[11] study reported about 52% of euthyroid women delivered uneventfully, compared to just 35.8% of hypothyroid and 14.3% of hyperthyroid women. Women with hypo (36.8%) and hyperthyroidism (28.5%) had a higher incidence of preterm labor compared to euthyroid women (33.8%). Hypothyroid women had a higher incidence of preeclampsia (14.7%; n = 14 vs. 5.6%; n = 11), anemia (7.4%; n = 7 vs. 6.1%; n = 12), abortion (7.4%; n = 7 vs. 0.5%; n = 1), meconium stained liquor (5.3%; n = 5 vs. 2.5%; n = 5), and On the other hand, abortions (71.4%; n = 5 vs. 0.5%; n = 1) and intrauterine death (14.3%; n = 1 vs. 5.6%; n = 11) were the most common complications in women with hyperthyroid disorders.

Kunwar R et al[12] study showed Pre-Eclampsia, gestational diabetes abruptio placenta, and postpartum hemorrhage were

the adverse maternal outcome with a higher percentage of these in overt hypothyroidism which was statistically significant.

It was observed in the present study that adverse fetal outcomes in overt hypothyroidism included premature birth (50% vs. 5.9%), intrauterine growth retardation (25% vs. 4.5%), low birth weight (50% vs. 11.8%), fetal distress (50% vs. 2.9%), IUD (25% vs. 1.5%) and NICU admission (50% vs. 4.5%) as compared to the euthyroid patients. All outcomes were found to be highly significant. Adverse fetal outcomes in subclinical hypothyroidism included premature birth (12.5% vs. 5.9%), low birth weight (25% vs. 11.8%), fetal distress (12.5% vs. 2.9%) and NICU admission (12.5% vs. 4.5%) as compared to the euthyroid patients. Any alteration in the maternal thyroid hormone levels consequently affects the feto-maternal outcomes. These findings were reported in studies of Gupta M et al[7], Khawale R et al[8], Vamja R et al[13], Das T et al[9], Kumar R et al[11] and Kunwar R et al[12].

Gupta M et al[7] study observed fetal complications like low birth weight, prematurity, congenital malformations, intrauterine growth retardation and intrauterine death. Khawale R et al[8] study observed fetal outcomes such as LBW, IUGR, and fetal distress was more common.

Vamja R et al[13] study showed Hyperthyroid mothers had higher rates of preterm birth (7%), NICU admission (7%), respiratory distress (7%), and low APGAR scores (7%) compared to euthyroid women.

Das T et al[9] study observed adverse fetal outcomes seen among mothers with SCH, intrauterine growth restriction (IUGR) had the highest incidence (21.9%), followed by prematurity (18.8%). patients suffering from SCH, fetal distress in labor, premature birth, and low birth weight.

Kumar R et al[11] study reported low birth weight and very low birth weight neonates in women in hypothyroid group were (33%, n = 29), and (12.5%; n = 11) respectively, which was higher than the euthyroid group (27.9%; n = 55, 6.1%; n = 12). Whereas in the hyperthyroid group 5,0% (n = 1) were meager birth weight. Kunwar R et al[12] study showed on fetal outcome APGAR score <6 in 5 min, Intrauterine growth restriction (IUGR), NICU admission, neonatal Respiratory Distress Syndrome (RDS), Intrauterine fetal death (IUFD), and congenital anomaly were found with a higher percentage in overt hypothyroidism.

It was observed in the present study that the mean birth weight in Subclinical Hypothyroid group was 2.53±0.49 kgs, in Overt Hypothyroid group was 2.21±0.33kgs and in Euthyroid group was 2.64±0.50kgs. The mean birth weight in Overt Hypothyroid group was significantly lower than that in Euthyroid group. Gupta M et al[7] study found ≤2 kgs weight in 7.69% patients in group II and 3.75% in group I. In group II 11.54% neonates were with weight between 2-2.5 kgs and in group I, 07.50% neonates had weight in this range. Prematurity was seen in 36.52% in clinical group and 13.75% in subclinical group which was significant. Incidence of IUGR was more in group II (16.25% versus 19.23%). In the present study, Apgar score<7 at 1 min was seen in 50% of overt hypothyroid neonates as compared to 5.9% of euthyroid neonates and was found to be statistically significant. The difference in Apgar score<7 at 5 mins in all groups were statistically not significant. It was observed that respiratory distress syndrome and sepsis was significantly present in neonates of overt hypothyroid group. No other significant neonatal complications were seen in terms of hyperbilirubinemia, respiratory distress syndrome, sepsis, hypoglycemia, hypothermia, intracranial bleed, necrotizing enterocolitis and early neonatal death in subclinical hypothyroid, overt hypothyroid and euthyroid groups. Similar observations were noted in the studies of Kumar R et al[11] and Mahadik K et al[14]. Kumar R et al[11] study observed infants with low APGAR scores of <7 at 5 min were significantly more in hypo (11.4%; n= 10) and hyperthyroid mothers (50%; n = 1) as compared to euthyroid women (7.6%; n = 15). Mahadik K et al[14] study showed on fetal outcome, LBW 31.6%, NICU admission 42.1% and low APGAR Score (21.1%) were statistically associated with hypothyroidism.

6.Conclusions

Thyroid dysfunction during pregnancy is associated with higher incidence of adverse fetomaternal outcome. Timely diagnosis and increased awareness minimize the risk of maternal and fetal complications, and initiation of treatment of hypothyroid disorders is essential to ensure a healthy mother giving birth to a healthy baby in every single pregnancy.

Universal screening for thyroid dysfunction in preconception pregnant women is mandatory, especially in a country like India, where there is a high prevalence of undiagnosed thyroid disorders due to the asymptomatic nature of the condition in its early stages.

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