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Original Research Article

Thyroid disorders in pregnancy: prevalence and its fetomaternal outcome in a tertiary hospital of Delhi, India

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ABSTRACT

Background: This study was conducted to determine the fetomaternal outcome in pregnant women with thyroid disorders. The prevalence of thyroid disorders in present study was 15.75%.

Methods: This was a prospective observational study carried out in all pregnant women irrespective of their parity, who attended ANC clinic in department of obstetrics and gynaecology in a tertiary care hospital over a period of 2 years. After registering, the patients were followed up with routine antenatal visits up to delivery and records were reviewed for development of abortion, PIH, preterm delivery, GDM, anemia, placental abruption, still birth, anomalies, fetal distress, meconium stained liquor, low birth weight and neonatal outcome by neonate Apgar score and TSH value.

Results: Mean age group in our study was 27.61 ± 3.14 . Family history was present in 8% of study group versus 0% in control group which was statistically significant ($p=0.028$). Eighteen percent of preeclampsia was diagnosed in study group as compared to 4% in control group which was statistically significant ($p\text{-value}= 0.005$). Fourteen percent patients had preterm labour in study group as compared to 6.7% in control group which was statistically significant ($p\text{ value}= 0.047$). Increased neonatal TSH was found in study group (61.3%) as compared to control group (32%), this difference was statistically significant ($p\text{-value} < 0.001$). There was increased importance of measuring TSH in first trimester as it was statistically significant in study group ($p\text{-value} < 0.001$).

Conclusions: All pregnant women should be screened for hypothyroidism as early as possible or before conception to prevent any fetomaternal complications.

Keywords: Delivery, Fetomaternal outcome, Hypothyroidism, Pregnancy, Prevalence, Thyroid stimulating hormone

INTRODUCTION

Pregnancy is associated with major changes in the physiology of the pituitary thyroid axis and iodine metabolism. Thyroid gland increases by 10% in size during pregnancy in iodine replete areas and 20-40% in areas of iodine deficiency.¹

They are the second most common cause of endocrine dysfunction in women of child bearing age after diabetes. Hypothyroidism is more common during pregnancy than hyperthyroidism.² The incidence of hypothyroidism is approximately 2-3% in iodine deficient population. This is contributed by overt hypothyroidism in 0.3-0.6% and subclinical hypothyroidism in 2-2.5%.³

Thyroid stimulating hormone level continues to be a sensitive marker for thyroid function.

Thyroid function testing in first trimester of pregnancy requires a single blood measurement which can be done at the same time as all other lab tests.

There are not many studies on prevalence of thyroid disorders during pregnancy in Asian Indian population, hence this study was conducted in a tertiary care hospital to establish prevalence and fetal maternal outcome.

METHODS

This study was a prospective observational study which was carried out in all pregnant women irrespective of their parity, who attended ANC clinic in department of obstetrics and gynaecology in a tertiary care hospital over a period of 2 years.

Those pregnant women who got booked in the first trimester and were detected as hypothyroid or hyperthyroid were taken as study group.

The patients with documented history of hypothyroidism, goitre, thyrotoxicosis and molar pregnancy were excluded.

An informed written consent was obtained from the patients and procedure was explained to them.

Pre structured proforma was used to record details of patient.

Blood sample data was collected and patients were divided in two groups according to TSH value.

This is the normal cut off range of thyroid stimulating hormone in a pregnant woman according to her gestational age which was used to categorise patients in study and control group (Table 1).

After registering, the patients were followed up with routine antenatal visits up to delivery and records were reviewed for development of abortion, PIH, preterm delivery, GDM, anaemia, placental abruption, still birth, anomalies, fetal distress, meconium stained liquor, low birth weight and neonatal outcome by neonate Apgar score and TSH value.

Table 1: In hypothyroid thyroid stimulating hormone values.

Weeks of gestation	TSH cut off criteria
< 14 weeks	> 2.5 mIU/L
14-28 weeks	> 3.0 mIU/L
> 28 weeks	> 3.0 mIU/L

Descriptive and inferential statistical analysis had been carried out in the present study. Student t-test (two tailed, independent) had been used to find the significance of study parameters on continuous scale between two groups (inter group analysis) on metric parameters. Chi-square/Fisher exact test had been used to find the significance of study parameters on categorical scale between two or more groups, non-parametric setting for qualitative data analysis.

RESULTS

Eight hundred patients were recruited for this study.

Out of them 126 patients were found to have thyroid disorder, thus the prevalence of thyroid in pregnancy was 15.75%.

Out of those 126, the pregnant patients who fulfilled our inclusion criteria were 76. Seventy-five patients out of them were diagnosed as hypothyroid and only 1 patient was found to be hyperthyroid. These 75 hypothyroid patients and equal number of euthyroid pregnant women were followed till delivery.

Table 2: Distribution of cases according to obstetrics outcome.

Obstetrical complication	Study group		Control group		p-value
	No.	%	No.	%	
Family history	6	8	0	0	0.028
Abortion	6	8	2	2.7	0.276
Preterm labour	11	14.7	5	6.7	0.087
Preeclampsia	14	18.7	3	4	0.005
Anaemia	5	6.7	5	6.7	1.000
GDM	16	21	10	13.3	0.196
IUGR	6	8	6	8	0.919
MSL	5	6.7	7	9.3	0.616
Fetal distress	10	13.3	5	6.7	0.139

Age of study population ranged from 19-42 years. Maximum number of patients in the study group were in age group of 20-30 years (80%). Mean age group in our study was 27.61 ± 3.14 .

Sixty five percent of patients were primigravidas in study group and 60% in the control group. There was no direct correlation between parity and subclinical hypothyroidism.

Table 2 depicts family history was present in 8% of study group as compared to 0% in control group. When results were statistically analyzed, it was found to be significant (p-value = 0.028)*.

Eighteen percent of preeclampsia were diagnosed in study group as compared to 4% in control group. When results were statistically analyzed, it was found to be significant (p-value = 0.005)*.

Fourteen percent patients had preterm labour in study group as compared to 6.7% in control group. When results were statistically analyzed, it was found to be significant (p-value = 0.047).

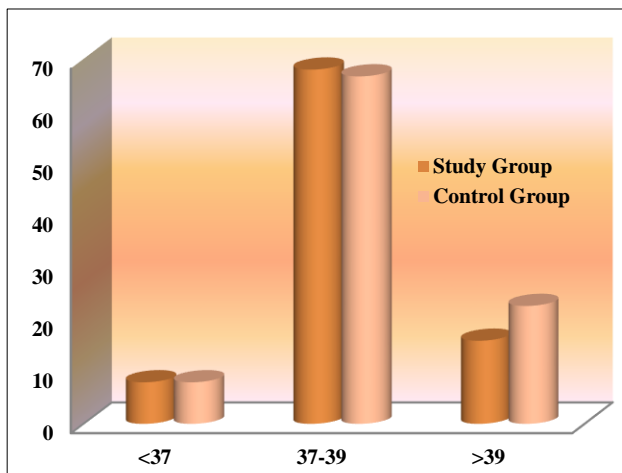


Figure 1: Distribution of cases according to association with gestational age of delivery.

Figure 1 shows that 8% delivered in both study and control group before 37 weeks. While 68% delivered in between 37-39 weeks and 66.7% delivered in control group. When results were statistically analyzed, it was found to be not significant (p-value = 0.684, not significant, Chi-Square test).

Figure 2 shows the percentage of vaginal delivery and caesarean section in the two groups. 58.7% delivered vaginally in study group, while 70.7% had the same in the control group.

Among all patients in study group, 33.3% of patient were delivered by caesarean section as compared to 26.7% in control group.

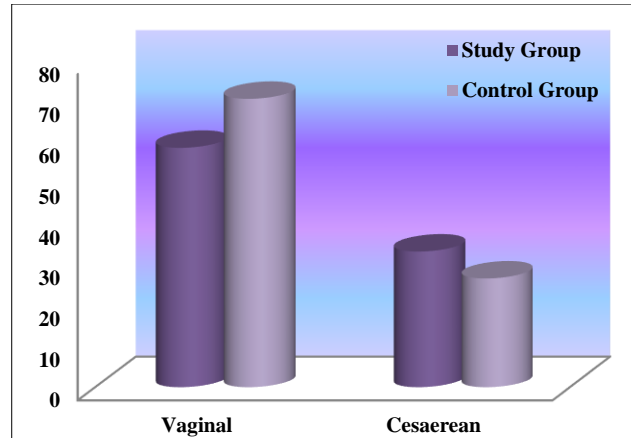


Figure 2: Distribution of cases according to association with mode of delivery.

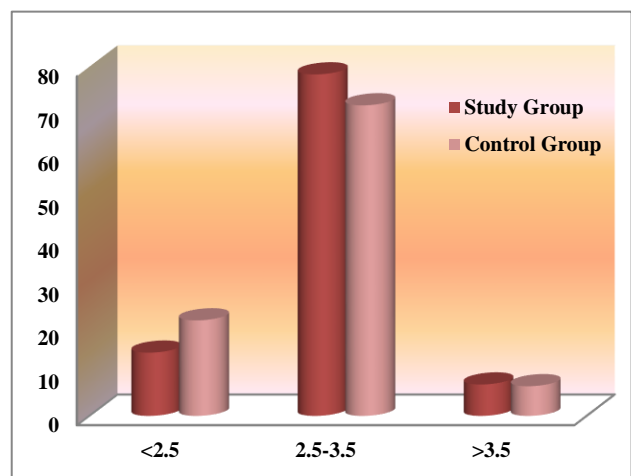


Figure 3: Distribution of cases according to neonatal birth weight.

When results were statistically analyzed, it was found to be not significant (p-value = 0.258, not significant, Chi-Square test).

Figure 3, shows incidence of birth weight of babies born to study and control groups. 10 patients in study group with birth weight < 2.5 kgs while 16 patients in control group which was not statistically significant.

Table 3: Neonatal outcome in relation to neonatal TSH level.

TSH	Study group	Control group	Total
< 2	2 (2.7%)	16 (21.3%)	18 (12%)
2-4	21 (28%)	33 (44%)	54 (36%)
> 4	46 (61.3%)	24 (32%)	70 (46.7%)
Total	75 (100%)	75 (100%)	150 (100%)

P < 0.001**, significant, Chi-Square test.

Seventy eight percent of study groups and 71.2% of control groups had their baby birth weight 2.5-3.5 kgs.

When results were statistically analyzed, it was found to be not significant (p-value = 0.519).

This Table 3 shows neonatal outcome in relation to neonatal TSH level.

Increased neonatal TSH was found in study group (61.3%), with mean TSH value 5.51 ± 2.8 as compared to control group (32%) with mean TSH value as 3.25 ± 1.33 . When results were statistically analyzed, it was found to be significant (p-value = < 0.001).

Table 4: Distribution of TSH values in study and control group.

TSH at first trimester	Study group	Control group	Total
< 2	0 (0%)	58 (77.3%)	58 (38.7%)
2-4	31 (41.3%)	17 (22.7%)	48 (32%)
> 4	44 (58.7%)	0 (0%)	44 (29.3%)
Total	75 (100%)	75 (100%)	150 (100%)

P < 0.001**, significant, Chi-Square test.

Table 4 shows that there was increased importance of measuring TSH in first trimester as it was statistically significant in study group.

DISCUSSION

Thyroid dysfunction in pregnancy is the commonest disorder encountered among the antenatal women. Because of the very non-specific symptoms and the physiological hyper metabolic state of normal pregnancy, thyroid dysfunction in pregnancy may be overlooked and undiagnosed. Thyroid is a very important part of the normal functioning of the body and thyroid dysfunction, if present in pregnancy, has myriad adverse impacts on both the mother and her foetus.

The study was conducted on 800 pregnant patients who visited our OPD irrespective of their gestational age over a period of 2 years. Out of them 126 patients were found to have thyroid disorder, thus the prevalence of thyroid in pregnancy was 15.75%.

Table 5: Prevalence of thyroid disorder in pregnancy.

Name of study	Prevalence %
Present study	15.75
Wang W et al ⁴	10.2
Taghavi M et al ⁵	14.6
Ajmani SN et al ⁶	13.25

Out of those 126, the pregnant patients who fulfilled our inclusion criteria were 76. Seventy-five patients out of them were diagnosed as hypothyroid and only 1 patient was found to be hyperthyroid. These 75 hypothyroid patients and equal number of euthyroid pregnant women were followed till delivery.

Prevalence of thyroid disorder in pregnancy in the present study was 15.75% which is comparable to the study conducted by Wang W, et al, (10.2%), Taghavi M, et al, (14.6%) and Ajmani SN, et al, (13.25%) as shown in Table 5.⁴⁻⁶

Table 6: Mean age in study population as reported by various workers are as under.

Study	Mean age
Present study	27.61 ± 3.14 .
Wang W et al ⁴	27.61 ± 3.55
Ajmani SN et al ⁶	24.51 ± 4.71
Nambiar V et al ⁷	25.19 ± 4.17
Dhanwal DK et al ⁸	25.5 ± 5.6

In the present study, the ages of study population ranged from 19-42 years. Maximum number of patients in the study group were in age group of 20-30 years (80%). Mean age group in our study was 27.61 ± 3.14 as shown in Table 6.

Eighteen percent of patients in control group were > 31 years of age as compared to 18.7% in the study group, who were diagnosed as hypothyroid. This may be due to late age of marriage and delayed conception prevalent now a days in our country.

Study done by Nambiar V, Jagtap VS, et al on 483 patients found the mean age of the subjects was 25.19 ± 4.17 years.⁷

Sixty-five percent of patients in the study group were primigravidas. The gestational age at screening was similar between two groups.

Distribution of cases according to family history

Family history was statistically significant in study group as compared to control population (8%).

This study was supported by study done by Saeed AK et al which also shows statistically significant difference in study group as compared to control group (p = 0.003).⁹

Distribution of cases according to obstetric outcomes

There was increased incidence of abortion in hypothyroid patients (8%) as compared to control group (2.7%).

Table 7: Incidence of abortion as reported by various study.

Study	Incidence of abortion in %
Present study	8%
Singh A et al ¹¹	6.66%
Ajmani SN et al ⁶	5.5%
Saraladevi R et al ¹⁰	4.68%

Similar results were shown by study conducted by Saraladevi R et al, (4.68%), Ajmani SN et al (5.5%), Singh A et al, (6.66%) (Table 7).^{6,10,11}

Table 8: Incidence of preterm labour in various studies are.

Study	Incidence of preterm labour in %
Present study	14.7
Sahu MT et al ¹²	10.3
Saraladevi R et al ¹⁰	7.81

In this present study, the probable reason for higher abortion in study population was that they might have had undetected hypothyroidism at conception, and the treatment might have been insufficient to restore euthyroidism.

There were increased chances of preterm labour in study group as compared to control group (14.7 % versus 6.7%) $p = 0.087$.

Similar results were shown by Ajmani SN et al (33.3%), Saraladevi R et al (7.81%), Sahu MT et al (10.3%) (Table 8).^{6,10,12}

Table 9: Incidence of preeclampsia as reported by various studies.

Study	Incidence of preeclampsia in %
Present study	18.7%
Ajmani SN et al ⁶	22.3%
Singh A et al ¹¹	33.33%
Saraladevi R et al ¹⁰	9.37%
Sahu MT et al ¹²	9.8%

Incidence of preeclampsia in present study was 18.7% in study group as compared to 4% in control group proving it to be clinically significant ($p = 0.005$). This was shown by other studies done by Sahu MT et al, (9.8%), Ajmani SN et al (22.3%), Saraladevi R et al, (9.37%) (Table 9).^{6,10,12}

The present study had 6.7% incidence of anemia in hypothyroid patients and same incidence of 6.7% in control group.

A prospective study conducted by Singh A et al, on 400 pregnant women over a period of 1 year did not show any significant increase in incidence of anemia in hypothyroid (9.2%) and control (10%) patients.¹¹

The present study had 13.3% incidence of GDM in general population as compared to 21.3% incidence in patients diagnosed as hypothyroid patients.

Similar results were shown by Wang YF, Yang HX et al, who conducted a retrospective analysis on perinatal care,

treatment and pregnant outcomes of 31 pregnant women with hypothyroidism.⁴ The incidence of abnormal glucose metabolism was up to 16.1% which was supported by present study.

The present study had 8% incidence of intrauterine growth restriction in study group as well as in control group which did not prove any significance. A study done by Ajmani SN, et al showed 8.4% incidence of IUGR in control patients and 4.9% in study cases. Sahu MT et al, had 2.4% incidence of IUGR in their study.^{6,12}

In this present study none of the hypothyroid patient had still birth and this same result was shown by Ajmani SN et al, where no case of still birth was found.⁶

There was no case of placental abruption in study group. Thanuja PM et al had 0.3% incidence of abruption in their study and Saraladevi R et al, had 1.56% incidence.^{10,13} This may be due to smaller number of patients in this subset and adequate treatment given to patients to maintain euthyroid state.

Distribution of cases according to gestational age and mode of delivery

Sixty-eight percent of study group patients delivered at term. Mean gestational age of delivery was 37.90 ± 1.23 while 66.7% of control group patients delivered at term calculating its mean age of delivery as 38.10 ± 1.11 . Of the 75 patients in the hypothyroid group, 44 (58.7%) patients had a vaginal delivery as compared to 53 (70.7%) in control group. Normal vaginal deliveries were found to be low in the hypothyroid group. Among all patients in study group, 33.3% of patient were delivered by caesarean section as compared to 26.7% in control group.

Table 10: Incidence of vaginally delivered and caesarean section in various studies.

Study	Vaginal delivered	Caesarean section
Present study	58.7%	33.3%
Singh A et al ¹¹	57.14%	39.28%
Ajmani SN et al ⁶	78%	16.6%

This same result was shown by Singh A et al, in which normal vaginal deliveries were found to be significantly low in study group. Twenty three percent of control group patients had caesarean section as compared to 39.28% of study group. But study by Ajmani SN et al, had shown 16.6% of study group patients delivered by caesarean section and 17.1% control group (Table 10).⁶

In this study, among the various indications of caesarean section, the most common was fetal distress showing 13.3% in study group while 6.7% in control group. The increased rate of caesarean section for fetal distress was also found by Ajmani SN et al, in their study and control

group (33.3% versus 13.5%) and in Singh A et al (36.6% versus 14.4%).^{6,11}

Distribution of cases according to neonatal outcomes

The birth weight was less than 2.5 kgs in 10 patients of study group as compared to 16 patients in control group which was not statistically significant and this was supported by study done by Saraladevi R et al as 4.6%.¹⁰

The neonatal Apgar score at 1 min and at 5 min less than 7 was not statistically significant (1.4 versus 0%) and same results were shown by Ajmani SN et al where no significant difference was found.⁶

This present study had statistically significant value of high neonatal TSH in study group as compared to control group (61.3% versus 32%) p-value = < 0.001 with mean TSH value as 5.51±2.8 and 3.25±1.33.

There was increased importance of measuring TSH in first trimester as it was statistically significant in study group. Similar results were shown by Idris I et al, who performed a retrospective study of data from 167 pregnancies.¹⁴

The trimester specific cut off values for TSH in this study were taken according to American thyroid Association (ATA). This helps in early detection and aggressive case finding in all patients rather than targeted case finding.

Considering the above fetal maternal complications, the most practical approach is to screen all pregnant women for hypothyroidism as early as possible or before conception. It will result in early diagnosis and treatment.

The most important question is whether identification and thyroid supplementation of women with hypothyroidism would prevent or modify any of the above adverse effects. Therapy if given after 10 weeks of gestation would not eliminate any already established fetal neurodevelopment impairment.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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