ASSOCIATION IN BETWEEN THYROID HORMONE DYSFUNCTION AND HYPERTENSIVE DISORDERS OF PREGNANCY IN PATIENTS PRESENTING TO A TERTIARY CARE HOSPITAL IN EASTERN INDIA: A PROSPECTIVE OBSERVATIONAL STUDY

Dr. Shreeja Singh [1], Dr. Archana Barik [2]
Senior resident, Consultant
Dept of Obstetrics and Gynaecology,
IG ESI jhilmil, Delhi, India

ABSTRACT: Thyroid dysfunction may play a role in the development of gestational hypertension. However, this relationship remains unclear. This study was performed to evaluate the association between thyroid hormone parameters during early pregnancy and hypertensive disorders of pregnancy. Methods: Women with singleton pregnancies were recruited into this prospective cohort study at 9 to 13 gestational weeks, and their serum thyroid-stimulating hormone and free thyroxine concentrations were measured using ELISA. In total, 140 participants were included in the final analysis. Results: Of the 140 participants, 72 subsequently developed HDP. Compared with women with euthyroidism, both pregnant women with hypothyroidism and those with subclinical hypothyroidism had an increased risk of HDP (adjusted odds ratio [OR], 3.61; 95% confidence interval [CI], 1.52–8.57 and OR, 2.24; 95% CI, 1.06–4.72, respectively). Neonatal outcome in women with thyroid disorder developing HDP had more incidence of SGA and caesarean delivery. Conclusion: Our results suggest that hypothyroidism, subclinical hypothyroidism, and a highthyroid-stimulating hormone concentration during early pregnancy are risk factors for HDP.

KEYWORDS: hypertensive disorders, pregnancy, Free thyroxine, euthyroid, hypothyroid

1. INTRODUCTION:

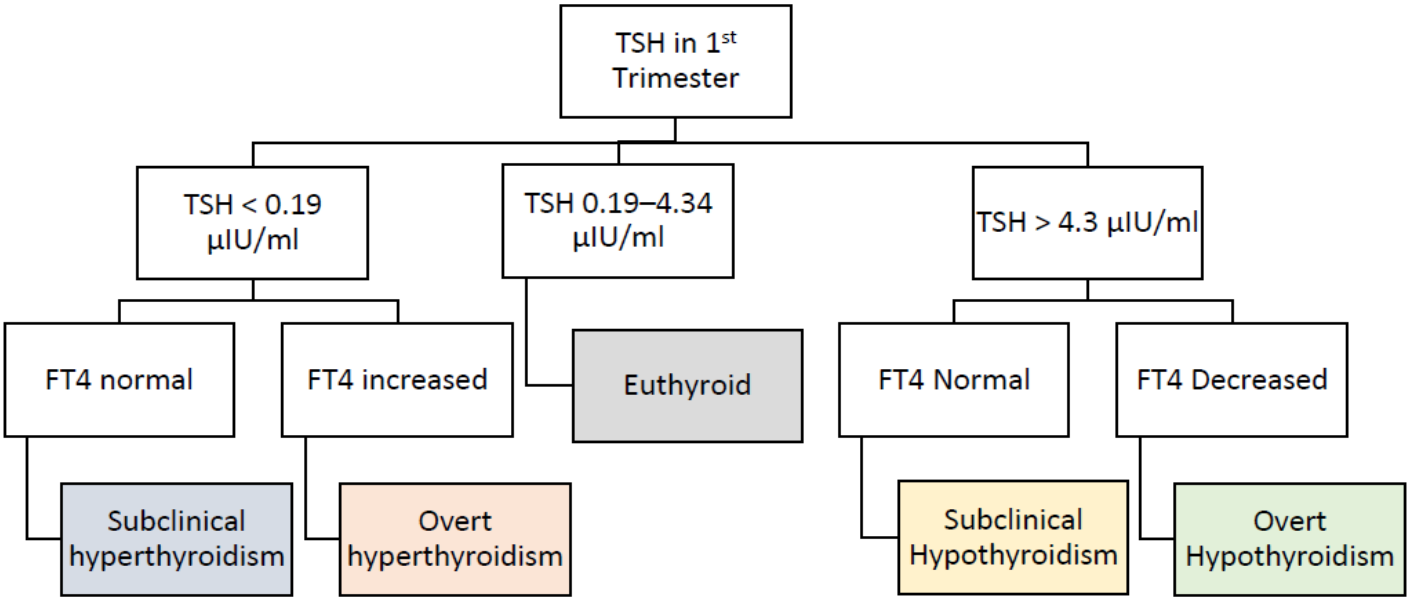
The incidence of overt hypothyroidism is 0.3 to 0.5% and subclinical hypothyroidism 2-Thyroid dysfunction is common among pregnant women. According to previous reports, the prevalence of clinical overt hyperthyroidism or subclinical hyperthyroidism is about 0.1–0.4% during pregnancy. The prevalence of hypothyroidism is about 2.5%, with clinical hypothyroidism accounting for 0.2–0.3%, and subclinical hypothyroidism for 2–3% , while hypothyroxinemia for 1–2%. [1] [2] Thyroid hormone is crucial for normal development of placenta, neuronal migration. Thyroid hormone is essential for the normal development of the placenta. There is evidence that preeclampsia, placental abruption, and preterm labour are all causatively linked to faulty early placentation. However, if overlooked, it can have a detrimental effect on the mother as well as the fetus. The association between overt as well as subclinical thyroid disorders and dysfunction with adverse reproductive outcome is now well understood. Hypothyroidism is known to be one of the causes of hypertension. Both untreated subclinical hypothyroidism and overt hypothyroidism are associated with multiple adverse outcomes in the mother and fetus. Women with treated hypothyroid diseases are not at higher risk than healthy pregnant women for adverse neonatal

outcomes but may also be at increased risk for preeclampsia. [3] The aim of this study was to find if any association exists between thyroid dysfunction in early pregnancy and development of HTD of pregnancy.

2. Method:

Ethics statement:The protocol and design of this prospective obervational study were approved by the hospital ethics and scientific committees of the Tata Main Hospital, a tertiary care hospital in eastern India. All participants provided written informed consent. Study design and participants From June 2022 to May 2023, participants were recruited at their prenatal visit at the 9th to 13th weeks of gestation, singleton pregnancy, and planning to give birth in the study hospital. Pregnant women with chronic hypertension, a history of thyroid disease, and no thyroid measurements were excluded. Data on individual participants were collected using questionnaires during the 9th to 13th weeks of gestation. The pre-pregnancy weight and height were self-reported. In total, 140 pregnant women were included in the final analysis. (fig 1)

overview: (fig 1)



Reference range for TSH [4]	Reference range for FT4 (ng/dl) [5]
first trimester 0.19–4.34 µIU/ml second trimester 0.46–4.57 µIU/ml third trimester 0.61–4.62 µIU/m	first trimester 0.88–1.32, second trimester 0.89–1.60 third trimester 0.87–1.54,

3. Results:

Mean age of women with HDP was 28.68 and mean age of women without HDP was 24 years and there was statisical significance between both the groups (p>0.05). It was observed that Incidence of HDP was higher in nulliparous women. Incidence of obesity was higher in HDP group with thyroid dysfunction (p>0.05). Altered S.TSH was higher in women with HDP group. The mean s.FT4 levels were more in women with HDP with significant statistical difference. SGA (small for gestational age) outcome was higher in HDP group with thyroid dysfunction. incidence of LSCS was higher in women with HDP group (p>0.05). Compared with women with euthyroidism, the logistic regression analysis showed that both pregnant women with hypothyroidism and those with subclinical hypothyroidism had a higher risk of HDP(adjusted OR, 3.61; 95% CI, 1.52–8.57 and adjusted OR, 2.24; 95% CI, 1.06–4.72, respectively). No associations were found between hyperthyroidism or subclinical hyperthyroidism and HDP. (fig 3,4,5)

OVERVIEW OF RESULTS: (fig 3)

CHARACTERISTICS	**WOMEN WITH HDP (n=72)**	**WOMEN WITHOUT HDP (n=68)**	**P value**
Maternal age at birth, yrs	28.68	24	0.00005
Parity 0 >/1	 51 19	 43 25	<.001
BMI NORMAL (18.5-24.9) OVERWEIGHT (>25)	23 50	18 47	0.412
TSH	3.46	2.95	0.022
FT4	2.10	1.68	0.002

(fig 4)

CHARACTERISTICS	**WOMEN WITH HDP (n=72)**	**WOMEN WITHOUT HDP (n=68)**	**P value**
DELIVERY MODES VD **CAESAREAN**	 25 45	 53 15	<0.0001
NEONATAL OUTCOME AGA **SGA**	 21 49	 46 22	<0.00001
APGAR AT 5 MINS <7 **>7**	 8 62	 10 58	0.088

GEST AGE OF DELIVERY <37 W **37-40 W** >40 W	 16 54 0	 3 59 6	0.011

(Fig 5): Risk of HDP by quintile categories of TSH and FT4:

TSH in first trimester	n	N (%) with PIH	OR (CI 95%)	P value
Q1	**27**	**15 (10.9%)**	**1.124 (0.134-9.459)**	**0.332**
Q2	**26**	**12 (8.7%)**	**0.538 (0.071-4.107)**	**0.005**
Q3	**30**	**7 (5.1%)**	**Reference category**	
Q4	**28**	**18 (13%)**	**0.413 (0.057-2.993)**	**0.011**
Q5	**27**	**18 (13%)**	**1.128 (0.327-3.884)**	**0.008**

4. Discussion

In this prospective cohort study, we evaluated the associations of maternal thyroid hormone parameters during early pregnancy with GH. We found that hypothyroidism, subclinical hypothyroidism, and high TSH levels were associated with an increased risk of HDP, findings that agree with those of previous studies. At present, universal thyroid screening during pregnancy remains controversial. Our study adds an important piece of evidence showing that early diagnosis and treatment may result in improved pregnancy outcomes. In this population-based study, our results strengthen the notion that When the TSH and FT4 levels were analyzed using the entire range, we found a significant positive association between the highest TSH quintile (but not the highest FT4 quintile) and the risk of GH. Thyroid hormones act directly to increase peripheral resistance and endothelial dysfunction, causing HDP. Our study does not agree with the findings of the Generation R Study [6], a prospective cohort study showing that high FT4 but not TSH levels during early pregnancy were associated with a significantly increased risk of hypertensive disorders. These differing results might be partially attributable to the study population consisting of pregnant women. A major limitation of our study is that the TSH and FT4 levels were only tested in early pregnancy.

FT4	n	N (%) with PIH	OR (CI 95%)	P value
Q1	27	17 (12.3%)	5.097 (0.773-33.624)	0.091
Q2	29	19 (13.8%)	8.434 (1.626-43.752)	0.011
Q3	27	16 (11.6%)	Reference category	
Q4	27	13 (9.4%)	8.753 (2.196-34.886)	0.002
Q5	28	5 (3.6%)	4.053 (1.105-14.865)	0.035

5. Conclusions

Our results support those of previous studies showing that hypothyroidism, subclinical hypothyroidism, and a high TSH level during early pregnancy are risk factors for HDP. Future research will clarify whether women at risk of GH benefit from thyroid medication during early pregnancy.

6. REFERENCES:

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