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Original Research Article

Prevalence of Hypothyroidism in Pregnancy & It's Impact on Pregnancy Outcome in A Tertiary Care Center in Western Rajasthan: A Prospective Study

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Abstract:

Background: One of the most common endocrinological disorders encountered during pregnancy is hypothyroidism. Major causes of hypothyroidism are endemic iodine deficiency and autoimmune disease. Thyroid dysfunctions are associated with adverse pregnancy outcomes. This prospective study assesses the prevalence of hypothyroidism, and adverse fetal and maternal outcome in hypothyroid women.

Material and Method: this study included 200 pregnant women reporting in the ANC OPD in 1st trimester. The study period is 6 months from January 2023 to June 2023. The adverse outcomes assessed were abortion, preeclampsia, preterm labor and placental abruption, while fetal outcomes noted were IUGR, LBW and still birth.

Results: Prevalence of hypothyroidism in the study population was 12%. 8% and 4% women had subclinical and overt hypothyroidism respectively. Most frequent maternal adverse outcome noted was PIH (16.6%) followed by preterm labor, abortion and abruption.

Conclusion: High prevalence of thyroid disorders, especially hypothyroidism, is present during pregnancy. The adverse outcome can be reduced by routine antenatal thyroid screening.

Keywords: Hypothyroidism. Subclinical Hypothyroidism, Overt Hypothyroidism, Pregnancy Outcome.

Introduction

Thyroid disorders are one of the most common endocrinal disorders seen in pregnancy [1]. Major causes of hypothyroidism being endemic iodine deficiency and Hashimoto's disease [2]. Inadequate adaptations in the maternal thyroid function changes leads to thyroid dysfunction. Women with limited thyroid reserve or iodine deficiency became hypothyroid during pregnancy. There is a 50% rise in the production of thyroid hormone and iodine requirement during pregnancy [3]. Causes of increased iodine requirement during pregnancy being increased renal losses due to increased blood flow, increased GFR and reduced tubular absorption of iodine.

Before 12 weeks of pregnancy, maternal thyroxine contributes to the fetal stores and after that the fetal thyroid starts synthesizing thyroid hormone [4]. Fetal brain development, which occurs mainly in the first trimester, requires maternal thyroxine [3]. Hence, maternal hypothyroidism can affect the fetal brain development leading to mental retardation and cretinism. Obstetrical complications associated with hypothyroidism, both overt and subclinical, are increased miscarriage rate, preterm delivery, preeclampsia, abruption, IUGR, low birth weight and stillbirths [5,6].

There is difficulty in diagnosing hypothyroidism during pregnancy as the signs and symptoms of hypothyroidism simulate that of normal pregnancy. Similar symptoms like heat intolerance, fatigue, and clinical findings of tachycardia, hair changes and weight gain are present in both [7].

There is a wide geographical variation in the prevalence of thyroid disorders in pregnancy. Prevalence of hypothyroidism as per western literature is 2.5% [8] while in Asian continent the prevalence rate varies from 4.8% - 13.13% [9]. India being a moderately iodine deficient region, the prevalence rate varies from 4.8% - 11%. Reported prevalence of overt hypothyroidism and subclinical hypothyroidism during pregnancy being 3% and 9%, respectively[4].Very few studies on the prevalence and impact of hypothyroidism have been conducted in

Western Rajasthan. So, this study aims to throw light on this topic and stress the need for routine screening for thyroid disorders in ANC period.

Material and Methods:

Source of data: This study was conducted in the Department of Obstetrics and Gynecology of American International Institute of Medical Sciences, Udaipur. Study was from January 2023 to June 2023 (6 months).

Type of study: Prospective study conducted on 200 pregnant women who registered in the Obstetric & Gynaecology OPD in the first trimester and were followed till delivery.

Inclusion Criteria:

1. </= 12 weeks gestation.
2. Singleton Pregnancy.
3. Primigravida/Multigravida.

Exclusion Criteria:

1. Patient who did not give consent.
2. Diagnosed cases of thyroid disorders and on thyroid medications.
3. Multiple gestations.
4. Diabetic.
5. Hypertensive.
6. History of recurrent pregnancy loss or bad obstetric history with known causes.

Procedure: 200 pregnant women attending the ANC OPD of AIIMS in first trimester and fulfilling the inclusion criteria were enrolled in the study. Approval was taken from the Institute Ethical Committee. In all selected patients, detailed history regarding the thyroid symptoms, menstrual history, obstetrical history, past medical history, family history and personal history was taken. Thorough general and systemic examination was done, and the findings were recorded. Per abdominal and per vaginal examination was done and findings were recorded.

Routine antenatal investigations like CBC, blood group, RBS, blood urea, serum creatinine, viral disease markers like HIV, HBsAg, HCV, VDRL and urine examination were done. Pregnancy test, clinical examination and ultrasonography was performed in < 12 weeks gestational age patients. Routine TSH was done in all the patients and in patients with deranged TSH, free T4 test was done. The reference range used in this study was as per the guidelines of American Thyroid Association for the diagnosis and management of thyroid disease during pregnancy and postpartum[3]. As per Regulation 14.2 of ATA guidelines, if trimester specific ranges for TSH are not available, the reference ranges recommended in different trimester are as follows:

First trimester - 0.1 – 2.5 μ IU/L

2nd trimester - 0.2 - 3.0 μ IU/L

3rd trimester - 0.3 - 3.0 μ IU/L

Normal free T4 level is 0.7 - 1.8ng/ml.

All hypothyroid patients were further subclassified as:

Subclinical hypothyroidism: High serum TSH with normal free T4.

Overt hypothyroidism: High serum TSH with less free T4 than the normal range.

Hypothyroid patients were treated with thyroxine and subject to serum TSH estimation every four weekly.

Maternal outcome variables considered were preeclampsia, preterm delivery, abortion, and abruption while fetal complications recorded were IUGR, LBW, and stillbirths.

Result

Out of the 200 study subjects, 24 pregnant women (12%) came out to be hypothyroid. So as per our study, the prevalence of hyperthyroidism was 12%.

Table 1: Age distribution

Age (years)	Number of women	Percentage (%)
20-25	88	44
26-30	70	35
30-35	42	21

Majority of the women were in the age group of 20-25 years.

All the study subjects were grouped into three categories based on the serum TSH and free T4 value[3].

Group	Serum TSH(μIU/L)	Free T4 value (mcg/dl)
Euthyroid	0.2 –3.0	normal
Subclinical hypothyroid	> 3.0	Normal.
Overt hypothyroid	>3.0	<7.5

Table 2: Prevalence of thyroid disorders

Group	Number of women	Percentage (%)
Euthyroid	176	88
Subclinical hypothyroid	16	8
Overt hypothyroid	8	4

Out of the 24 women with hypothyroidism, 8% had subclinical hypothyroidism, while 4% had overt hypothyroidism.

Table 3: Maternal complications in hypothyroid patients

Complication	Number of patients	Percentage (%)
Preeclampsia	4	16.6
Preterm delivery	3	12.5
Abortion	2	8.33
Abruption	1	4.16

Preeclampsia was the most frequent maternal complication (16.6%) followed by preterm delivery and abortion being 12.5% and 8.33% respectively.

Table 4: Fetal Complications

Complication	Number of women	Percentage (%)
IUGR	3	12.5
LBW	2	8.33
Still birth	1	4.16

The most common fetal complication in our study was IUGR.

The major observation in our study is:

1. Prevalence of hypothyroidism is 12%.
2. Prevalence of subclinical hypothyroidism is 8%.
3. Prevalence of overt hypothyroidism is 4%.
4. Major maternal and fetal complications being preeclampsia (16.6%) and IUGR (12.5%) respectively.

Discussion

Maternal and fetal outcomes are affected by thyroid dysfunction during pregnancy [10,11]. Low IQ and poor intellectual functions have been reported in children born to hypothyroid mothers [12]. Prevalence of hypothyroidism exhibits wide geographical variation. In Western countries, incidence of overt hypothyroidism being 0.3-0.5% while that of subclinical hypothyroidism being 2.5% [13]. In India, prevalence is higher and that to with wide variation in the different regions of the country. The major causes for high prevalence in India being presence of goitrogen in diet [14], micronutrient deficiency like selenium and iron deficiency which causes hypothyroidism and goiter [15]. Prevalence is even higher in the submountain area [16]. As per our study, the prevalence of hypothyroidism was 12%. Comparable prevalence rates have been reported in studies conducted by Weiwang et al (10.2%) [17], Taqhain et al (14.6%)18 and Ajmani et al (13.25%) [4]. High prevalence rate of thyroid disorders was reported by Rajput et al (26.5%)[19]while prevalence rate as low as 5% was reported by DrThauriya et al[20].

Separate studies have been conducted by different researchers regarding the overall prevalence rates of subclinical and overt hypothyroidism. As per our study, the prevalence rate of subclinical hypothyroidism was 8%. Similar results were stated in the studies conducted by Sahu et al (6.47%) [21] and Sapna C. Shah et al (5.3%) [22]. High prevalence rate was reported in studies conducted by Dinesh K, Dhaval et al (13.5%) [23] and NVR Murthy et al (16.11%) [24].

Overt hypothyroidism accounted for 4% in our study. Similar results were obtained in studies conducted by Sarala Devi et al (2.8%) [25] and Sahu NT et al (4.58%) [21].

The best test to diagnose and screen hypothyroidism during pregnancy is serum TSH and free T4, and all women diagnosed with subclinical hypothyroidism should be tested for antithyroid antibodies [26]. Current updated ATA guidelines suggest that thyroxine should be started if TSH is 2.5 - 4mIU/L and anti-thyroid antibodies are present. If levels are > 4mIU/L, thyroxin should be started irrespective of the level of antithyroid antibodies.

As regards the maternal and fetal outcome, our study was comparable to studies carried out by Leung et al [27] where the incidence of preeclampsia (15%), preterm delivery (9%) and low birth weight (9%), respectively. In our studies, the abortion rate was 8.33% and is similar to only one study conducted by Ajmani et al (16.6%) [4].

Enough evidence regarding the impact of treatment on outcome in subclinical hypothyroidism is not available, but studies have shown that treatment of

overt hypothyroidism prevents maternal and fetal complications.

Conclusion

Our study showed a high prevalence of hypothyroidism, 12%, out of which 8% was subclinical hypothyroidism and 4% was overt hypothyroidism.To reduce maternal and fetal complications prompt identification and treatment is essential. In high prevalence countries like India, adoption of universal screening for thyroid disorders needs to be considered. Our study has certain limitations, for example we did not consider the hyperthyroid state. Secondly, the maternal and neonatal impact on hypothyroidism was taken in toto.The impact of subclinical hypothyroidism and overt hypothyroidism should have been discussed separately.

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