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Original Research Article

A Clinical Study of Maternal and Foetal Outcomes of Cases with Hypothyroidism

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Abstract

Background: Thyroid disorders are common during pregnancy. The availability of thyroid hormones is essential for a healthy pregnancy and optimal fetal growth and development. Overt hypothyroidism is associated with various obstetric and child development complications. Emerging research suggests that even mild thyroid dysfunction can negatively affect pregnancy outcomes. Early diagnosis, appropriate treatment, and maintenance of normal thyroid hormone levels can significantly reduce risks for both mother and fetus, ensuring a safer pregnancy and reducing complications.

Methods: This case-control study was conducted on 50 pregnant patients from the obstetric outpatient department of the Prathima Institute of Medical Sciences, Naganoor, Karimnagar. Thyroid-stimulating hormone (TSH) tests were performed during the first antenatal visit along with routine obstetrical examinations. Patients were monitored until delivery, with those diagnosed with hypothyroidism receiving levothyroxine treatment.

Results: Hypothyroidism is prevalent in pregnant women, with a significant proportion of cases (50%) detected during pregnancy. The highest prevalence was observed in women aged 26-30, followed by 31-35. Early screening and diagnosis of hypothyroidism in pregnancy are crucial, with a majority of cases (48%) detected in the first trimester. Maternal hypothyroidism can increase the risk of adverse fetal outcomes, including recurrent miscarriage, preeclampsia, preterm birth, postpartum hemorrhage, and neonatal intensive care unit (NICU) stay.

Conclusions: Pregnant women should undergo thyroid function screening at their first outpatient visit to detect hypothyroidism and receive appropriate treatment to prevent maternal and fetal complications.

Keywords: Hypothyroidism, Thyroid-stimulating hormone (TSH), Fetal Outcomes.

Introduction

Thyroid disorders are the second most common cause of endocrine dysfunction in women of childbearing age, following diabetes mellitus. [1, 2] Maternal thyroid disorders, especially when they develop in early pregnancy, can significantly impact both pregnancy outcomes and fetal development. It is now well recognized that not only overt thyroid dysfunction but also subclinical forms can lead to adverse effects on pregnancy and fetal development. These complications include miscarriage, pregnancy-induced hypertension, and more severe forms like pre-eclampsia, along with placental abruption, anemia, postpartum hemorrhage, and increased fetal morbidity and mortality. These obstetric issues contribute to higher rates of adverse neonatal outcomes, such as preterm birth, low birth weight, increased neonatal intensive care admissions, and elevated perinatal morbidity and mortality. [2-6] of medip] Iodine deficiency further elevates the risk of stillbirth and miscarriage in pregnant women, reducing iodine availability to the fetus. This deficiency hinders fetal neurological development and impairs cognitive growth, potentially leading to learning disabilities and reduced motivation in later childhood. [8, 9] While hyperthyroidism in pregnancy is less common than hypothyroidism, untreated cases are linked to maternal and fetal morbidity. Neonatal Graves' disease, resulting from the transfer of thyroid receptor antibodies (TRAb) from mother to fetus, occurs in approximately 1-5% of affected newborns. [10] Given the potential adverse outcomes associated with maternal thyroid disorders and the clear benefits of treatment, some expert panels recommend routine thyroid function screening for all pregnant women. This study aims to evaluate the maternal and fetal outcomes in pregnant women

with thyroid disorders and to determine the effects of thyroid dysfunction on both mother and child.

Material and Methods

This prospective observational study was conducted in the Department of Obstetrics and Gynecology, Prathima Institute of Medical Sciences, Naganoor, Karimnagar. Institutional Ethical approval was obtained for the study. Written consent was obtained from all the study participants after explaining the nature of the survey in vernacular language.

Inclusion Criteria

1. Pregnant females with increased TSH levels.
2. Aged 20 – 35 years
3. Registered in the ANC of our Hospital
4. Available for delivery and follow-up.

Exclusion Criteria

1. Females with comorbidities
2. With PIH
3. Females with poor obstetric outcomes were excluded

In addition to routine obstetrical investigations, TSH screening was performed using the chemiluminescence method. Free T3 (FT3) and Free T4 (FT4) levels were measured if TSH was abnormal. The cut-off values for TSH were based on the American Thyroid Association guidelines: 1st trimester: 0.1-2.5 µIU/L, 2nd trimester: 0.2-3.0 µIU/L, and 3rd trimester: 0.3-3.0 µIU/L.[7] Abnormal results were categorized as subclinical hypothyroidism (normal FT4 with elevated TSH) or overt hypothyroidism (low FT4 with elevated TSH). Patients received treatment, and thyroid function tests were repeated every 6-8 weeks during pregnancy, with medication doses adjusted as needed. Patients were monitored throughout pregnancy, and maternal and fetal outcomes were evaluated. Maternal outcomes assessed included mode of delivery, abortion, anemia, preeclampsia, preterm delivery, and postpartum hemorrhage. Fetal outcomes were assessed by birth weight, APGAR score, NICU admission, and neonatal hypo- or hyperthyroidism.

Statistical analysis: All the data was uploaded to an MS Excel spreadsheet and analyzed by SPSS version 22 in Windows format. The continuous variables were represented as mean, standard deviation, and percentages. The categorical variables were analyzed by chi-square test and the values of $p(<0.05)$ were considered as significant.

Results

The table shows the age distribution of pregnant women diagnosed with hypothyroidism. The largest age group was 26-30, followed by 31-35. The age range of this cohort was 21 – 35 and the mean age was 29.5 ± 5.5 years. This indicates that hypothyroidism is most prevalent in women of reproductive age. The youngest age group (21-25) had a lower number of cases, suggesting a potential decrease in prevalence in younger women. This suggests that women in their late 20s and early 30s are at a higher risk of developing hypothyroidism during pregnancy. This could be due to hormonal changes, autoimmune factors, or other physiological changes associated with this age group.

Table 1: Age Distribution of Pregnant Women with Hypothyroidism

Age group (years)	Frequency	Percentage
21 - 25	6	12
26 - 30	23	46
31 - 35	21	42
Total	50	100

The majority of women 28/50 (56%) were multipara, indicating that they had previous pregnancies. A significant proportion 22/50 (44%) were primipara, suggesting that hypothyroidism can also occur in first-time pregnancies. The higher prevalence of hypothyroidism in multipara women might be attributed to factors such as the impact of previous pregnancies on the immune system or hormonal balance.

Table 2: Parity of the cases included in the study

Parity	Frequency	Percentage
Multipara	28	56
Primi	22	54
Total	50	100

Figure 1 shows that the majority of women (34%) belonged to the lower middle class, followed by the upper lower class (22%). A smaller proportion of women were from the upper class (2%) and upper middle class (18%). The data suggests that hypothyroidism may be more prevalent in women of lower socioeconomic status. This could be attributed to factors such as limited access to

healthcare, nutritional deficiencies, or higher exposure to environmental pollutants.

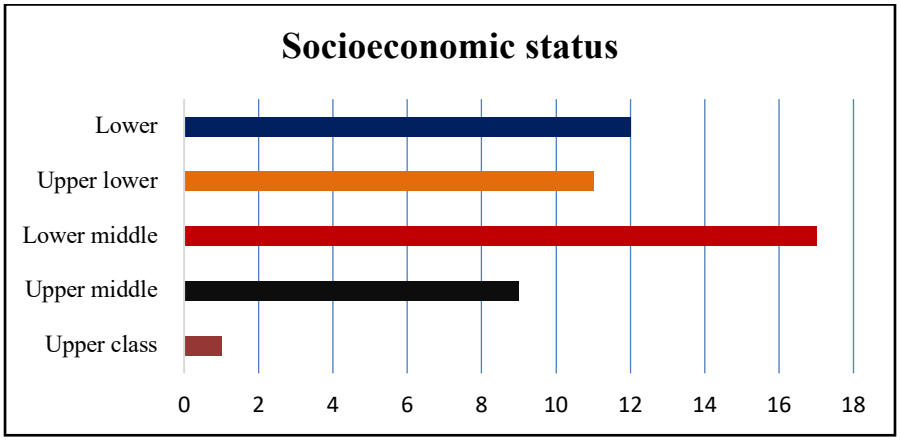

Figure 1: Socioeconomic Status of Pregnant Women with Hypothyroidism

Table 3 presents the distribution of hypothyroidism diagnoses among pregnant women in the study, categorized by trimester of detection. The majority of cases (48%) were detected in the first trimester, indicating that early screening and diagnosis are crucial. The prevalence of hypothyroidism decreased in later trimesters, with only 14% of cases detected in the third trimester. The high detection rate in the first trimester highlights the importance of early screening for hypothyroidism in pregnancy. Early diagnosis and treatment can help prevent adverse maternal and fetal outcomes. The lower detection rate in later trimesters might suggest that the risk of developing hypothyroidism decreases as pregnancy progresses. However, it's important to note that some cases might be missed due to the challenges of screening in the later stages of pregnancy.

Table 3: Hypothyroidism detection amongst the study population

Hypothyroidism detection	Frequency	Percentage
1st trimester	24	48
2nd trimester	19	38
3rd trimester	7	14
Total	50	100

Table 4 presents the frequency of complications observed in newborn babies of mothers with hypothyroidism. Preeclampsia and preterm birth were the most common complications, affecting 12% of newborns each. Recurrent miscarriage and PPH were less frequent, occurring in 4% of cases each. A significant number of newborns (16%) required NICU stay, suggesting potential neonatal complications associated with maternal hypothyroidism. The data suggests that maternal hypothyroidism can increase the risk of adverse fetal outcomes, including preeclampsia, preterm birth, and the need for NICU care.

Table 4: Complications of newborn babies in cases of hypothyroidism

Complications	Frequency	Percentage
Recurrent miscarriage	2	4
PIH	3	12
Preterm birth	3	12
PPH	1	4
NICU stay	4	16

Discussion

Thyroid disorders are significant issues in the female of childbearing age, especially at the time of pregnancy and puerperium. These conditions if left untreated are likely to have adverse effects on both the mother and the developing fetus. Such consequences as spontaneous abortion, preeclampsia, threatened preterm labor, placental abruption, delivery of a small for gestational age neonate, neonatal hypothyroidism, and stillbirth may arise from untreated thyroid disorders in pregnancy [11, 12]. Congenital hypothyroidism is still the main cause of avoidable mental development disorders in children [13].

An alarmingly high frequency of sub-clinical hypothyroidism has been identified among

pregnant women in India which is a matter of public health concern. A potential solution is routine thyroid screening in pregnant women identified to have thyroid issues and then initiating levothyroxine early. Although many developed countries administer national newborn screening for hypothyroidism, controversy still surrounds universal screening of all pregnant women for thyroid disorders, as evidenced by the most recent updates in the American Thyroid Association (ATA) guidelines [14]. Towards the realization of this goal, a cross-sectional descriptive survey was conducted at our hospital on fifty pregnant women with hypothyroidism until the postnatal period to enhance the evaluation of results. It was noted that women with hypothyroidism who received proper treatment had substantially lower intra- and postpartum complications than untreated patients. Moreover, neonates born to treated mothers had less ICU admission rates as well as, low birth weight rates. The results are consistent with a study done by Negro et al. [12] which showed that patients who were screened universally had lesser complications during pregnancy. Another study done by Vaidya et al. [15] revealed that 30% of the screened hypothyroid patients had a subclinical form of the disease. Our study also confirmed this and found that 32% of cases were of subclinical hypothyroidism. These results strongly show that early diagnosis and management of hypothyroidism in pregnancy can not only have a better prognosis for maternal health and fetus but also significantly decrease the future healthcare cost for unnecessary and avoidable complications. This is especially important because India is a developing economy which is still a long way from affording the costs that come with most developed economies' healthcare systems. Screening most pregnant women and proper management means a better deal can be provided by the healthcare system to manage thyroid problems during pregnancy; maternal and fetal health would also improve as a result. Given these compelling findings, it is clear that early detection and proper treatment of hypothyroidism during pregnancy not only improve maternal and fetal outcomes but also reduce the healthcare burden from preventable complications. This is particularly important in resource-limited countries like India. Implementing widespread screening and effective management protocols can help the healthcare system better manage thyroid disorders during pregnancy, ultimately safeguarding the health of both mothers and their unborn children.

Conclusion

Pregnant women should undergo thyroid function screening at their first outpatient visit to detect hypothyroidism and receive appropriate treatment to prevent maternal and fetal complications. Those with thyroid disorders should be closely monitored throughout pregnancy to minimize the risk of obstetric complications, while their newborns should be carefully observed in the first months of postnatal life for any signs of thyroid dysfunction. Proper treatment and regular follow-up will significantly improve both maternal and fetal outcomes.

References

1. Singh S, Sandhu S. Thyroid Disease and Pregnancy. [Updated 2023 Jul 17]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK538485/
2. Biondi B, Kahaly GJ, Robertson RP. Thyroid Dysfunction and Diabetes Mellitus: Two Closely Associated Disorders. Endocr Rev. 2019 Jun 1;40(3):789-824.
3. Braunthal S, Brateanu A. Hypertension in pregnancy: Pathophysiology and treatment. SAGE Open Med. 2019 Apr 10;7:2050312119843700.
4. Chang KJ, Seow KM, Chen KH. Preeclampsia: Recent Advances in Predicting, Preventing, and Managing the Maternal and Fetal Life-Threatening Condition. Int J Environ Res Public Health. 2023 Feb 8;20(4):2994.
5. Wilson GR, Curry RW. Subclinical Thyroid Disease. Am Fam physician. 2005; 72(8): 1517-24.
6. Reid SM, Middleton P, Cossich MV, Crowther CA. Interventions for clinical and subclinical hypothyroidism in pregnancy Cochrane Database Syst Rev. 2010; 7:CD007752.
7. Sahu MT, Das V, Mittal S, Agarwal A, Sahu M. Overt and subclinical thyroid dysfunction among Indian pregnant women and its effect on maternal and fetal outcome. Arch Gynecol Obstet. 2010;281(2):215-20.
8. Tiwari BD, Godbole MM, Chattopadhyay N, Manda A, Mithal A. Learning disabilities and poor motivation to achieve due to prolonged iodine deficiency. Am J Clin Nutr.1996; 63 (5):782-86.
9. Kapil U, Patak P, Tandom M, Singh C, Pradhan R, Dwivedi SN. Micronutrient deficiency disorders among pregnant women in three urban slum communities of Delhi. Indian Pediatr. 1999;36(10):991-98.
10. Marx H, Amin P, Lazarus JH. Hyperthyroidism and pregnancy. BMJ. 2008 Mar 22;336(7645):663-7. AE. Erratum in: BMJ.2008 Apr 12;336(7648).
11. Sahu MT, Das V, Mittal S, Agarwal A, Sahu M. Overt and subclinical thyroid dysfunction among Indian pregnant women and its effect on maternal and fetal outcome. Arch Gynecol Obstet. 2010;281(2):215-20.

12. Negro R, Schwartz A, Gismondi R, Tinelli A, Mangieri T, Stagnaro- Green A. Universal screening vs. case-finding for detection and treatment of thyroid hormonal dysfunction during pregnancy. J Clin Endocrinol Metab. 2010; 95:1699-707.
13. Lazarus JH. Screening for thyroid dysfunction in pregnancy: is it worthwhile? J Thyroid Res. 2011;3:97-112.
14. Ferreira JL, Gomes M, Príncipe RM. Controversial Screening for Thyroid Dysfunction in Preconception and Pregnancy: An Evidence-Based Review. J Family Reprod Health. 2020 Dec;14(4):209-220.
15. Vaidya B, Anthony S, Bilous M, Shields B, Drury J, Hutchison S, et al. Detection of thyroid dysfunction in early pregnancy: Universal screening or targeted high-risk case finding? J Clin Endocrinol Metab. 2007;92:203-07.