

# Prevalence of hypothyroidism in pregnancy

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## Abstract

**Introduction:** Pregnancy is a period that places great physiological stress on both the mother and the fetus. Thyroid disorders are among the common endocrine disorders in pregnant women after diabetes mellitus. Several changes are observed in maternal thyroid function during pregnancy and failure to adapt to these physiological changes results in thyroid dysfunction. When pregnancy is compounded by endocrine disorders such as hypothyroidism, the potential for maternal and fetal adverse outcomes can be immense. **Methods:** The present study was conducted at KIMS hospital, Narketpally. It is a prospective type of study which includes 48 patients diagnosed to have thyroid disorder during their antenatal checkup in the first trimester. It also includes known cases of thyroid disorder. TSH level was estimated. If it is deranged, then FT3 and FT4 levels were estimated. Prevalence of hypothyroidism was noted. Patients were managed accordingly and followed till delivery. Their obstetric and perinatal outcomes were noted. **Results:** In the present study, 48 out of 700 pregnant women screened had thyroid disorders. The prevalence of Hypothyroidism in this study is 6.8%. In the present study, it is affecting more in the age group of 21 to 30 yrs in multigravida, the prevalence of subclinical hypothyroidism is 6.1% and overt hypothyroidism is 0.7%. 86% of pregnancies with SCH had cesarean section, fetal distress (48.38%) being the most common indication. The perinatal mortality rate in hypothyroid women was found out to be 5.5%. **Conclusion:** Routine screening, early confirmation of diagnosis and prompt treatment is required to ensure favorable maternal and fetal outcomes. Subclinical hypothyroidism also needs to be detected and treated to prevent adverse outcomes. It is difficult to diagnose hypothyroidism clinically in pregnancy due to non specific presenting features which may be masked by existing obstetric symptoms. While targeted case finding is generally practiced, recent evidence seems to indicate that universal screening might be a better option.

Key words: Hypothyroidism, Pregnancy, Prevalence

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## Introduction

Hypothyroidism is widely prevalent in pregnant women and the rate of detection, especially in a developing country like India, has not kept pace with the magnitude of the problem. Maternal thyroid function changes during pregnancy. These changes are a result of various factors like an increase in thyroglobulin due to elevated estrogen and human chorionic gonadotrophin, increase renal losses of iodine due to increase in glomerular filtration rate, modifications in peripheral metabolism of maternal thyroid hormone and modifications in iodine transfer to placenta. The production of thyroid hormone and iodine requirement increases by 50% during pregnancy [1]. Pregnancy is a stress test for thyroid, resulting in hypothyroidism in women with limited thyroidal reserve or iodine deficiency.

The incidence of overt hypothyroidism during pregnancy ranges from 0.2 to 2.5% and subclinical hypothyroidism from 2-7% [2-4]. Maternal hypothyroidism especially in first trimester results in neurodevelopmental retardation and impairs cognitive development [5,6]. It is difficult to diagnose hypothyroidism clinically during pregnancy, due to nonspecific presenting features which may be masked by existing obstetric symptoms. Because of this, subclinical hypothyroidism needs to be diagnosed by thyroid function test. Since hypothyroidism is easily treated, timely detection and treatment of the disorder could reduce the burden of adverse fetal and maternal outcomes, which are very commonly encountered.

Ideally screening should be carried out during pre-pregnancy evaluation or as soon as pregnancy is confirmed. There are limited data on prevalence of

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thyroid dysfunction during pregnancy in India and there are no national guidelines for the management of the same. Therefore, the study has been designed to evaluate the prevalence and effects of thyroid dysfunction specially hypothyroidism in pregnancy.

**Materials and Methods**

**Place of study-** This study was conducted in the department of Obstetrics and Gynecology, Kamineni Institute of Medical Sciences, Narketpally, Nalgonda.

**Duration of study-**It was done for a period of 4 months (1<sup>st</sup> February 2018 to 31<sup>st</sup> may 2018) over 700 antenatal patients. All consecutive pregnant women who gave written consent were included in the study

**Type of study-** This is a prospective study wherein pregnant women were included from booked antenatal cases attending outpatient department and also from unbooked cases getting direct admission to the ward or labor room with the some antenatal complications.

**Inclusion criteria**

- Primi and multigravida belonging to any age group
- Singleton pregnancy

**Exclusion criteria**

- Patients with pre-gestational hypothyroidism (delete this from exclusion criteria)
- Multiple pregnancy
- Gestational trophoblastic disease

Detailed history was taken, regarding symptoms of thyroid disorders, menstrual history, obstetric history, past medical history, family history, personal history and social history. General examination was done with reference to general condition of the patient, body temperature, pulse rate, blood pressure, respiratory rate, and findings were reported. Systemic examination of cardiovascular system (CVS), central nervous system (CNS), respiratory system and thyroid gland was done and findings were recorded. Per abdominal & per vaginal examination was done and findings were recorded.

**Basic Investigations:** Complete blood picture, clotting time, bleeding time, blood grouping and Rh typing, GCT, HIV, HbsAg and complete urine examination were done.

**Results**

Pregnancy <12 weeks was confirmed by clinical assessment, pregnancy test and ultrasonography.

**Specific Investigations:** Patients were decided to be screened by serum ultra TSH during their first antenatal visit. The test was explained and counselling was done. Estimation of thyroid stimulating hormone (TSH), free T4, and anti-TPO antibodies was carried out using Roch modular kit using ECLIA technology

If serum TSH values were deranged FT3 and FT4 levels were checked and were counseled regarding further investigation and management. In this regard consultation with endocrinologist was sought whenever necessary.

**Laboratory diagnosis**

- 1) Patients were sent for Thyroid Hormone Profile testing
- 2) If TSH increased and FT4 decreased then it is subclinical / overt hypothyroidism.
- 3) TSH, FT4 and FT3 measured by High-sensitive Radioimmunoassay.

The reference ranges of the test values used in this study were as per the guidelines of American thyroid association for the diagnosis and management of thyroid disease during pregnancy and postpartum. As per regulation 14.2 of ATA guidelines, if trimester specific ranges for TSH are not available in the laboratory, the following normal reference ranges were recommended.

1<sup>st</sup> Trimester -0.1 to 2.5 m IU/L,  
2<sup>nd</sup> trimester -0.2 to 3m IU/L,  
3<sup>rd</sup> trimester -0.3 to 3m IU/L.

Normal free t4 level is 0.7 to 1.8ng/ml  
Free t3 level is 1.7 to 4.2 pg/ml.

Depending upon the normal values, patients were classified into Subclinical hypothyroidism: High serum TSH level with normal FT4, FT3 level. Overt hypothyroidism: High serum TSH level with FT4 and FT3 less than normal range. Subclinical/ overt hypothyroid cases were treated with thyroxin.

Every 4 weeks, TSH level was estimated and the dose of the drug was adjusted.

**Statistical analysis-** Prevalence of hypothyroidism in pregnancy will be assessed using descriptive method.

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In the present study, 48 out of 700 pregnant women screened had thyroid disorders. The prevalence of Hypothyroidism in this study was 6.8%. In the present study, the prevalence of subclinical hypothyroidism was 6.1% overt hypothyroidism was 0.7%.

Out of 700 pregnant women, 43 had subclinical hypothyroidism, 5 cases had overt hypothyroidism thus making Hypothyroidism with highest prevalence among pregnant women.

**Table-1: Distribution of age amongst women in this study related hypothyroid status.**

Age (Years)	Hypothyroid no of cases	Percentage
20-24 yrs	21	43.7%
25-29 yrs	22	45.8%
30-34 yrs	4	8.3%
> 34 Yrs	1	2%
<b>Total</b>	<b>48</b>	<b>100%</b>

45.8% of the hypothyroid women aged 25 -29yrs. 43.7% of hypothyroid women aged between 20 -24yrs. 8.3% of the hypothyroid women were between 30 -34 yrs as shown in Table 1.

**Table-2: Distribution of parity among women in this study related to hypothyroid status.**

	Hypothyroid No of cases	Percentage
Gravida 2 - 4	29	60.4%
> 4 Gravida	5	10.4%
Primigravida	14	29.16%
<b>Total</b>	<b>48</b>	<b>100%</b>

Table 2 reveals majority of the hypothyroid women are multigravide (2 – 4)

**Table-3: fetal outcome in these women.**

Fetal Outcome	Hypothyroid No of Cases	Percentage
Intrauterine Death	0	0
Perinatal Mortality	2	5.5%
Normal	34	94.4%
Aborted	0	0
<b>Total</b>	<b>36</b>	<b>100</b>

Fetal outcome in these women was statistically insignificant. (Fetuses >24 weeks gestation or > 500gms were included). Out of 48, 36 deliveries were conducted in our institute.

**Table-4: Distribution of cases according to fetal weight in hypothyroid women.**

Fetal Weight (Grams ) Birth Weight (Grams )	Hypothyroid No of Cases	Percentage
< 1500	1	2.7%
1500 - 2000	2	5.5%
2000 - 2500	8	22.2%
2500 – 3000	22	61.1%
3000 – 3500	2	5.5%
> 3500	1	2.7%
<b>Total</b>	<b>36</b>	<b>100%</b>

It can be noticed from Table 4 that 30.4% of babies in Hypothyroid group are <2500gms whereas 61.1% of babies in hypothyroid are between 2500 -3000gms and 5.5% of babies in hypothyroid group are between 3000 -3500gms. Distribution of cases according to fetal weight in hypothyroid was statistically insignificant. Thyroid dysfunction in pregnant women can

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influence the outcome for mother and fetus at all stages of pregnancy as well as interfere with ovulation and fertility. Maternal hypothyroidism during early pregnancy is associated with impaired neuropsychological development of children and other adverse outcomes, including premature birth, preeclampsia, breech delivery, and increased fetal mortality. These complications are seen in overt hypothyroidism, as well as in subclinical hypothyroidism.

**Discussion**

Thyroid disorders are one of the most common endocrine disorders in women during pregnancy and are associated with adverse maternal and foetal outcome. Universal screening at the first antenatal visit helps in detecting thyroid dysfunction in pregnancy. Preferably pre-conception screening for thyroid dysfunction is ideal as any hypothyroid state can be corrected before attempting pregnancy.

The main aim of this clinical study was to know the prevalence of thyroid disorders in pregnancy. Prevalence of hypothyroidism during pregnancy has a wide geographical variation. Data from western countries indicates that overt hypothyroidism complicates up to 0.3-0.5% pregnancies and the prevalence of subclinical hypothyroidism is estimated to be 2.5% [7]. In India, the prevalence of hypothyroidism in pregnancy is much higher compared to western countries. Prevalence varies widely among various states in India, as we still face iodine deficiency in many parts of the country. Most common cause of hypothyroidism in pregnancy in developing countries like India is iodine deficiency.

The study found the prevalence of hypothyroidism was 6.8% (overt hypothyroidism 0.7%, subclinical hypothyroidism 6.1%). In a previous study conducted on 633 patients in the Indian population, in 2010, the prevalence of subclinical hypothyroidism was found to be 6.47% [8]. Our statistics are comparable to recent study prevalence. From the data observed, a very high incidence of hypothyroidism has been recorded in case of pregnant women, making the situation call for an immediate attention. The reason for this high incidence may be the malnutrition along with iodine deficiency, poor socioeconomic conditions of the people living nearby, multiple pregnancies, adolescent pregnancies, low nutritional value of food available in here and high physiological demand during the growing age. Environmental factors other than iodine deficiency may also have a possible role for the incidence of hypothyroidism in the region.

Prevalence of hypothyroidism was found to be more in Asian countries compared with west. In a large Chinese study, which included 2899 pregnant women, the prevalence of hypothyroidism was significantly higher in the high-risk group than in the non high-risk group (10.9 vs. 7.0%,  $P=0.008$ ) [9]. Possible reasons for higher prevalence of hypothyroidism, both overt and sub-clinical, in Asian Countries include: increased iodine intake in diet

as suggested by a Chinese study, presence of goitrogens in diet as reported from India and micronutrient deficiency such as selenium or iron deficiency that may cause hypothyroidism and goiter [10,11,12]. Thus, it is expected that the prevalence of hypothyroidism during pregnancy is higher in India and Asia. Moreover, prevalence of hypothyroidism in India is variable. Bandela *et al* [13] from Andhra Pradesh reported 10% prevalence of SCH. Gayathri *et al* [14] reported 2.8% prevalence of SCH. Possible reason for such variability could be the different upper limit cut-offs used for TSH.

This study reveals that majority of hypothyroid women belong to 25-30 years of age with 45% and 20-24 years of age with 43%. This is attributed to early marriage and early conception which is prevalent in India. A study conducted by Joshi k bhat *et al* [15] showed similar results. Among the hypothyroid women majority are multigravida (2-4) (60.4%). Aziz *et al.*, (2006) found majority of hypothyroid women (57.8%) are gravida 2-4 compared to primigravida (34.1%) & gravida >4 (8.07%) [16]. A recent study by Vaidya *et al* reported that screening only women considered "high risk" would miss 30% of women with overt or subclinical hypothyroidism, suggesting that universal screening is better than screening only high risk women [17].

So screening of all, and not only of high risk antenatal women, preferably at confirmation of 1st pregnancy is desirable, especially in our country, as the prevalence of thyroid dysfunction is high.

**Conclusion**

This study concludes that there is a high prevalence of subclinical hypothyroidism in pregnant women. Hence there is a need for universal thyroid screening in pregnancy, especially in the first trimester when the fetal thyroid tissue is not functional.

The role of routine screening becomes all the more relevant in these patients as they are asymptomatic and symptoms if any are ascribed to pregnancy itself. In a country like India where the pregnancy rate is very high because of sheer magnitude of the population and where majority of women seek antenatal care at government institutions, such simple screening procedures could have profound implications on the health of the nation.

**Potential benefits-** Till now, no survey before has been conducted in this region for hypothyroidism. We therefore, practically have no idea of the actual status of hypothyroidism in this region. To the best of our knowledge, this might be the first such study to be conducted in this region. Therefore, further investigation

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becomes necessary to arrive at definite cause of high prevalence of hypothyroidism in this population.

## Author Contributions

**Conception and design:** Amrita Singh, Provision of study, **Material or Patients:** Amrita Singh, **Collection and assembly of data:** Amrita Singh, Sushma Pedduri, **Data analysis and interpretation:** Amrita Singh, Sushma Pedduri, **Manuscript writing:** All authors, **Final approval of manuscript:** All authors, **Accountable for all aspects of the work:** All authors.

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