

# Prevalence of Thyroid Dysfunction in Pregnancy

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## ABSTRACT

There are a few reports of prevalence of hypothyroidism during pregnancy from India with prevalence rates ranging from 4.8% to 11%. Subclinical thyroid dysfunction has adverse outcome on the mother and fetus such as miscarriage, preterm delivery, pre-eclampsia, eclampsia and placental abruption and can also impair the neurocognitive development of the fetus. We conducted a cross-sectional study to find out the prevalence of thyroid disorder in pregnancy in North India. The study was conducted in the antenatal OPD of the Dept. of Obstetrics and Gynecology and Dept. of Medicine, SN Medical College, Agra and antenatal clinic of District Hospital, Agra from July to December 2017. Overall, 1,020 women with uncomplicated intrauterine singleton pregnancy were included. Thyroid-stimulating hormone (TSH), free T4 (fT4) and free T3 (fT3) were measured by high sensitive radioimmunoassay. Out of 1,020 pregnant women, 109 were found as having thyroid disorders. The prevalence of thyroid disorder among women in the age groups 20-25 years, 26-30 years and 31-35 years was 8.7%, 1.8% and 0.19%, respectively. The prevalence of subclinical hypothyroidism, overt hypothyroidism, subclinical hyperthyroidism and overt hyperthyroidism was 6.67%, 1.27%, 1.86% and 0.88%, respectively. The mean TSH level among women with subclinical hypothyroidism, overt hypothyroidism, subclinical hyperthyroidism and overt hyperthyroidism was 3.50, 7.92, 0.05 and 0.014 mIU/L, respectively. The prevalence of thyroid disorder in the first, second and third trimester was 68.80%, 23.85% and 7.33%, respectively. This study has shown high prevalence of thyroid dysfunction, especially subclinical and overt hypothyroidism, in India.

**Keywords:** Thyroid disorder, pregnancy, subclinical hypothyroidism, overt hypothyroidism, subclinical hyperthyroidism, overt hyperthyroidism.

Pregnancy is a state in which the combination of events modifies the function of thyroid. There is a change in the level of thyroxine-binding globulin (TBG), total T3 and T4 and thyroid-stimulating hormone (TSH) during normal pregnancy.<sup>1</sup>

The prevalence of hypothyroidism in pregnancy is around 2.5% according to the Western literature and prevalence of hyperthyroidism in pregnancy is 0.1-0.4%.<sup>2,3</sup> There are a few reports of prevalence of hypothyroidism during pregnancy from India with prevalence rates ranging from 4.8% to 11%.<sup>4,5</sup> During pregnancy, the thyroid gland may increase in size by 10% in iodine-sufficient countries and to a greater extent in iodine-deficient countries. Production of

thyroid hormones and iodine requirement are increased by approximately 50% during pregnancy. In addition, pregnancy is a stressful condition for the thyroid gland, resulting in hypothyroidism in women with limited thyroid reserve or iodine deficiency.

Data from published studies have underscored the association between miscarriage and preterm delivery in women with normal thyroid function who test positive for thyroid peroxidase (TPO) antibodies.<sup>6</sup> The prevalence of Grave's disease is around 0.1-0.4% and that of thyroid autoimmunity (TAI) is around 5-10%.

Studies have shown that the subclinical thyroid dysfunction has adverse outcome on the mother and fetus such as miscarriage, preterm delivery, pre-eclampsia, eclampsia and placental abruption. It may also impair the neurocognitive development of the fetus.<sup>7</sup>

That's why we conducted this study to find the prevalence of thyroid disorder in pregnancy in North India.

## MATERIAL AND METHODS

It is a cross-sectional study conducted in the antenatal OPD of the Dept. of Obstetrics and Gynecology and Dept. of Medicine, SN Medical College, Agra and

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antenatal clinic of District Hospital, Agra from July 2017 to December 2017.

We included 1,020 women with uncomplicated intrauterine singleton pregnancy. We excluded women who had history of thyroid disease or intake of thyroid drugs, multifetal gestation, known chronic disorders (diabetes and hypertension) or patients with bad obstetrics history due to some other cause. After enrolling the patients, a written informed consent was taken, and detailed history and examination was done.

Blood samples were collected after obtaining the consent and were sent for thyroid hormone profile testing.

TSH, free T4 (fT4), free T3 (fT3) were measured by high sensitive radioimmunoassay.

Subclinical hypothyroidism means increase in TSH with normal fT3 and fT4. Overt hypothyroidism means increase in TSH with decrease in fT3 and fT4.

Subclinical hyperthyroidism was defined as serum TSH concentration below the lower limit of reference range with fT3 and fT4 concentration within normal range.

Overt hyperthyroidism was defined as serum TSH concentration below the lower limit of reference range with increase in fT3 and fT4 concentration. Reference ranges of antithyroid antibodies were:

- Thyroid peroxidase antibody (TPOAb) <35 IU/mL
- Thyroglobulin antibody (TgAb) <20 IU/mL.

American Thyroid Association (2007) recommends cut-off values for TSH as:

- First trimester <2.5 mIU/L
- Second and third trimester <3 mIU/L
- Lower limit of normal TSH 0.04 mIU/L.

**RESULTS**

In the present study, a total of 1,020 pregnant women were screened and 109 females were found as having thyroid disorders.

Table 1 shows that the prevalence of thyroid disorder among women in the age groups 20-25 years,

**Table 1. Distribution of Patients According to Age Groups**

Age Group	No. of patients with thyroid dysfunction	Percentage (%)
20-25	89	8.7
26-30	19	1.8
31-35	02	0.19

26-30 years and 31-35 years was 8.7%, 1.8% and 0.19%, respectively. Table 2 shows that the prevalence of subclinical hypothyroidism, overt hypothyroidism, subclinical hyperthyroidism and overt hyperthyroidism was 6.67%, 1.27%, 1.86% and 0.88%, respectively.

Table 3 shows that out of 1,020 women; 109 were found as having thyroid disorder and the prevalence of thyroid disorder in the study was 10.68%.

Table 4 shows that the mean TSH level among women with subclinical hypothyroidism, overt hypothyroidism, subclinical hyperthyroidism and overt hyperthyroidism was 3.50, 7.92, 0.05 and 0.014 mIU/L, respectively. Table 5 shows that the prevalence of thyroid disorder in the first, second and third trimester was 68.80%, 23.85% and 7.33%, respectively.

**Table 2. Distribution of Patients According to Different Types of Thyroid Disorders**

Type of disorder	No. of cases	Percentage (%)
Subclinical hypothyroidism	68	6.67
Overt hypothyroidism	13	1.27
Subclinical hyperthyroidism	19	1.86
Overt hyperthyroidism	09	0.88
<b>Total</b>	<b>109</b>	<b>10.68</b>

**Table 3. Prevalence of Thyroid Disorders**

Sample	No. of cases with thyroid disorder	Percentage (%)
1,020	109	10.68%

**Table 4. Mean TSH levels in Different Types of Thyroid Disorders**

Types	No. of cases	Mean TSH level
Subclinical hypothyroidism	68	3.50
Overt hypothyroidism	13	7.92
Subclinical hyperthyroidism	19	0.05
Overt hyperthyroidism	09	0.014

**Table 5. Distribution of Patients with Thyroid Disorders According to Trimesters**

Trimesters	No. of patients (%)
First trimester	75 (68.80)
Second trimester	26 (23.85)
Third trimester	08 (7.33)

## DISCUSSION

The main aim of the study was to know the prevalence of thyroid disorders in pregnancy. The prevalence of thyroid disorders in our study was 10.68% and it was consistent with the study by Sahu et al<sup>5</sup> in which the prevalence of thyroid disorders was 12.7%. It was also comparable to the study conducted by Wang et al<sup>8</sup> (10.2%), Taghavi et al<sup>9</sup> (14.6%) and Ajmani et al<sup>10</sup> in which the prevalence of thyroid disorder was 13.25%.

In the study conducted by Thanuja et al,<sup>11</sup> the prevalence of thyroid disorder was less (about 5%) and in the study conducted by Rajput et al,<sup>12</sup> the prevalence of the thyroid disorder was high (26.5%).

The prevalence of subclinical hypothyroidism in our study was 6.67% and it was consistent with the study by Sahu et al in which it was 6.47%. Prevalence of subclinical hypothyroidism in pregnancy according to the study conducted by Thanuja et al in Mangalore was less (0.7%), while it was 2.3% according to the study conducted by Casey et al.<sup>13</sup> It was high in the study conducted by Dhanwal et al (13.5%),<sup>14</sup> Murty et al (16.11%),<sup>15</sup> and Singh et al (18%).<sup>16</sup>

The prevalence of overt hypothyroidism in the study was 1.27% and it was comparable to the studies conducted by Taghavi et al, Bandela et al<sup>17</sup> and by Ajmani et al in which the prevalence was 2.4%, 2.87% and 3%, respectively.

Prevalence of overt hypothyroidism in pregnancy in the studies conducted by Wang et al (0.3%) and Dhanwal et al (0.7%) was less compared to the present study. In this study, the prevalence of thyroid disorder in first, second and third trimester was 68.80%, 23.85% and 7.33%, respectively and this is in accordance with the study by Rao and Patibandla.<sup>18</sup>

In India, the most common cause of hypothyroidism in pregnancy is iodine deficiency. Hashimoto thyroiditis is the most common cause of hypothyroidism in iodine-sufficient areas. Presence of goitrogens<sup>19</sup> in diet, micronutrient deficiency such as selenium and iron deficiency may cause hypothyroidism and goiter.<sup>20</sup> Poverty, insufficient iodine supplementation and fluorinated water may be the cause of thyroid disorder among pregnant women. Serum TSH and fT4 are the best screen and diagnose hypothyroidism during pregnancy. The prevalence of overt or subclinical hypothyroidism depends on the upper TSH cut-off level used. There is strong evidence that the reference range for serum TSH is lower throughout the pregnancy compared with the non-pregnant state. The lowest serum TSH levels are

observed during the first trimester of pregnancy and are apparently related to human chorionic gonadotropin (hCG) stimulation of the thyroid gland as serum hCG levels are highest early in gestation.

## CONCLUSION

Thyroid disease is prevalent in women of childbearing age group and for this reason it is common in pregnancy and puerperium. Women with thyroid disorder, both overt and subclinical, are at increased risks of pregnancy-related complications, such as spontaneous abortion, pre-eclampsia, preterm labor and abruption placenta and fetal complications such as low birth weight babies, preterm delivery, intrauterine growth retardation and stillbirth.

At present, there are no recommendations available for detection or screening of thyroid dysfunction among Indian pregnant women. Recent consensus guidelines recommend testing only in cases of high-risk women having personal history of thyroid or other autoimmune disorders or with a family history of thyroid disorders.

This study has shown the high prevalence of thyroid dysfunction, especially subclinical and overt hypothyroidism, in India and thus emphasizes the need to include thyroid function test in the routine screening in the antenatal clinic and the patients to be potentially aware of associated maternal and fetal complications.

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### LS Passes Indian Medical Council (Amendment) Bill

The government will soon come with a National Medical Commission (NMC) Bill to usher in comprehensive reforms in the medical education sector, Health Minister Harsh Vardhan said in the Lok Sabha.

He said this while replying to a debate on Indian Medical Council (Amendment) Bill, 2019, which was later passed by the House by voice vote.

This Bill provides for supersession of the Medical Council of India (MCI) for a period of 2 years with effect from September 26, 2018. It will replace an Ordinance promulgated on February 21.

The Minister said the government is working on the NMC Bill and "will soon take it to Union Cabinet and then in Parliament". He said the NMC Bill, which was introduced in December, 2017, lapsed with the dissolution of the 16th Lok Sabha.

On the Medical Council (Amendment) Bill, the Minister said that the Board of Governors (BoG) which had replaced the MCI has worked well and taken a series of steps to improve medical education in the country.

The BoG has granted accreditation to more number of medical colleges, increased number of seats and reduced procedural hurdles, he said, adding it is manned by doctors of great repute. "This is just a beginning of our work and you will see radical reforms in the medical education of the country," he said.

The Indian Medical Council or the MCI was set up under the Medical Council Act, 1956, for setting standards for medical professionals, new medical colleges and revision of curriculum, among others.