

# Prevalence of hypothyroidism in the first trimester pregnancy in primigravida in North India

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## Abstract

**Introduction and Objectives:** Hypothyroidism is a common and important occurrence during pregnancy. Untreated or undertreated hypothyroidism is seen to be associated with number of deleterious effects ranging from miscarriage, stillbirth to implication on intellectual development of the child. Different studies have shown variation in prevalence of hypothyroidism in pregnant population in their reports.

**Materials and Methods:** This study was conducted with the objective of finding out the prevalence of hypothyroidism in pregnant women presenting to hospital for routine ANC (Anti-natal care) visit. Two hundred and fifty pregnant women presenting in first trimester of pregnancy were included in this study. Primigravida with singleton pregnancy were selected to form the study group. TSH, FT<sub>3</sub>, and FT<sub>4</sub> were estimated by manual ELISA. Level of 4.5 mIU/L was used as cut off to diagnose hypothyroidism. Values more than 4.5mIU/L were considered as hypothyroid.

**Results:** Fifteen out of total two hundred and fifty study subjects showed hypothyroidism as their TSH level was found to be > 4.5 mIU/L (6% prevalence). FT<sub>4</sub> level assessment was done in these cases to differentiate subclinical hypothyroidism from overt hypothyroidism. FT<sub>4</sub> level below 8.5 pmol/L was considered as overt hypothyroidism and levels above 8.5pmol/L was considered as subclinical hypothyroidism.

**Conclusion:** Duration/trimester of pregnancy, gravida status, socioeconomic status, all have possible role in deciding the prevalence of hypothyroidism in pregnant population.

**Keywords:** Subclinical hypothyroidism, Overt hypothyroidism.

## Introduction

Pregnancy is a state of physiological stress for both mother and fetus. Hypothyroidism is a common and important occurrence during pregnancy. Untreated or undertreated hypothyroidism is seen to be associated with number of deleterious effects ranging from miscarriage, stillbirth to implication on intellectual development of the child. Behavioral problems ranging from attention deficit to hyperactivity syndrome is found in babies born to hypothyroid mother.<sup>1,2</sup>

Number of factors like age of mother, parity, geographical distribution, term of pregnancy etc. may have their impact in deciding the prevalence of hypothyroidism in pregnant population.<sup>3</sup> Various reports from India and other countries have shown diverse prevalence of hypothyroidism ranging from 5.6% to 20%.<sup>3-8</sup> Due to conflicting data on prevalence of hypothyroidism during pregnancy from different studies, present study was planned and conducted to find out the prevalence of hypothyroidism in primigravida presenting in a tertiary care hospital setting which is catering patients mainly from low socioeconomic strata in North India. Pregnant women were screened for hypothyroidism during their routine checkups at antenatal clinic.

## Aims and Objectives

This study was planned to find out the prevalence of hypothyroidism in first trimester pregnancy in primigravida in a tertiary care government hospital of North India.

## Materials and Methods

Dr. BSA Medical college & hospital is a newly opened medical college and tertiary care hospital which caters patients mainly of low socio-economic status. Period of this study was April 2015 to September 2015. Total 250 pregnant women with singleton pregnancy presenting in first trimester were included in the study after getting their informed written consent.

Following inclusion and exclusion criteria were adopted to choose the study subjects

### Inclusion Criteria

1. Primigravida
2. Singleton pregnancy
3. Pregnant woman presenting in first trimester (within 12 weeks)
4. Age group 20-45 years

### Exclusion Criteria:

1. Multigravida
2. Multifocal gestation
3. Young mothers (<20 years) & elderly mothers (>45 years)
4. Pregnancy associated with any complication like Diabetes, hypertension

Nature of study was explained to all the study participants in the language they understood. Well informed written consent was obtained from all the subjects included in the study. Under proper aseptic precaution 2ml of blood sample was taken in plain vacutainer and was centrifuged at 3500 rpm for 4 minutes to separate the serum which was used

to estimate TSH, FT<sub>3</sub>, and FT<sub>4</sub> by manual ELISA the kit supplied by 'New life one step analysis'. Statistical analysis was done using SPSS version 12 for Windows.

## Results

15 out of total 250 study subjects showed hypothyroidism, as their TSH level was found to be > 4.5 mIU/L (6% prevalence).

FT<sub>4</sub> level assessment was done in these cases to differentiate subclinical hypothyroidism from overt hypothyroidism. FT<sub>4</sub> level < 8.5 pmol/L was considered as overt hypothyroidism and levels > 8.5 pmol/L was considered as subclinical hypothyroidism. Using these criteria 13/15 (5.2%) patients had subclinical hypothyroidism and 2/15 (0.8%) patients had overt hypothyroidism.

## Discussion

Using cut off for TSH for diagnosing hypothyroidism as 4.5 mIU/L, we found that out of 250 pregnant women screened for hypothyroidism, 15 had TSH values >4.5 mIU/L. Prevalence of hypothyroidism in primigravida in their first trimester was thus found to be 6%. Thirteen out of total fifteen patients [5.2%] had subclinical hypothyroidism which was diagnosed when TSH was high with FT<sub>4</sub> value within normal range. Overt hypothyroidism was diagnosed when TSH was high with low level of FT<sub>4</sub> and it was found in 0.8% of study population [two out of fifteen]. Our finding was in close association with the finding of Divya R Prasad et al<sup>3</sup> where they found 5.6% prevalence of hypothyroidism in first trimester pregnant woman in their study population. Majority of subjects in their study were having subclinical hypothyroidism and lesser number had overt hypothyroidism (4% vs 1.6%).

Prevalence of hypothyroidism has shown wide variation ranging from 5.6% to 20% in pregnant population in different studies done in different regions of the country at different time frame.<sup>6-8</sup> Dinesh K. et al<sup>7</sup> in year 2013 have shown 14.3% prevalence of hypothyroidism in pregnant population in their first trimester with 13.5% in subclinical category and 0.8% in overt category. In a similar study R. Saraladevi et al<sup>5</sup> found 9.2% prevalence in their study subject with 6.4% subclinical hypothyroidism and 2.8% overt hypothyroidism in year 2016. In one rare type of study where only second trimester pregnancy were included, 11% prevalence of hypothyroidism with 6.5% being subclinical hypothyroidism and 4.5% as overt hypothyroidism was reported.<sup>9</sup>

At first glance it looks like a major variation in the prevalence data in different study reports, but in depth analysis shows that the study population selected in these various study were not same with respect to duration of the pregnancy and gravida status of pregnant population. Majority of these studies have reported the prevalence of hypothyroidism in primigravida (irrespective of gravida status)<sup>3,5,7</sup> with one of the study done by Sahu et al. have included second trimester pregnancy.<sup>9</sup>

Studies which have compared the hypothyroidism in different term of pregnancy are rather rare. In one such rare

study Srinivas Rao et al<sup>8</sup> have shown very high prevalence (20.1%) of hypothyroidism in pregnant population. Majority of these hypothyroid subjects [45%] were in first trimester. 21% of these patients were in second trimester, 14% being in third trimester. Remaining 19% of hypothyroid pregnant woman had hypothyroidism since before conception. This study showed that majority of hypothyroidism was found in first trimester pregnancy.

Aziz et al (2006)<sup>10</sup> have shown the effect of parity on occurrence of hypothyroidism. They have reported maximum hypothyroidism in gravida 2-4 compared to primigravida. Similarly G. Shobha et al have reported maximum hypothyroidism in multigravida compare to primigravida.<sup>11</sup> Our study has shown comparatively lower prevalence of hypothyroidism which may be due to the fact that our study population had exclusively primigravida women.

Cut off value of TSH to demarcate hypothyroid from euthyroid state is also an important criteria for determining the prevalence of hypothyroidism. Data from these various studies have shown that they have used different cut off points of TSH for defining hypothyroidism which may be important for variation in the prevalence data. Majority of these studies which have shown higher prevalence of hypothyroidism in pregnancy have used cut off point of 2.5 mIU/L in first trimester and 3.0 mIU/L in higher trimesters as recommended by ATA.<sup>8</sup>

Selecting the lower cut off for TSH for diagnosing hypothyroidism will invariably increase the prevalence of hypothyroidism compare to the study when higher value for TSH is used as cut off point. Our research group has selected 4.5 mIU/L as cut off point for TSH to diagnose hypothyroidism, which may be a reason for our finding of lower prevalence compare to other studies where they have used lower cut offs thus have got higher prevalence.

Contradicting our own statement, study finding of Prasad et al<sup>3</sup> have shown lower prevalence of hypothyroidism (5.6%) in spite of selecting lower cut off used for diagnosing hypothyroidism (2.5 mIU/L and 3.5 mIU/L respectively as per ATA guideline). This finding is in contrast with other studies where much higher prevalence is observed when such lower cut offs for TSH is applied.<sup>8</sup> In one such study where lower prevalence of hypothyroidism was observed in spite of selecting lower cut off for TSH, had patients of mainly middle and high middle class compare to other studies where patients mainly belonged to low socioeconomic strata.<sup>3,7,8</sup> This raises another question that whether the socioeconomic status of pregnant woman play any role in determining the prevalence of hypothyroidism or not.

It may be assumed that patients of lower socioeconomic strata are more prone to develop hypothyroidism due to poor dietary habit and deficiency of essential trace elements in their diet which increases the chance of developing hypothyroidism in such population. This observation highlights the possible role of diet and nutrition in determining the occurrence of hypothyroidism which need to be further strengthen with studies done where diet and nutrition of patient is also taken into consideration.

## Conclusion

Duration/trimester of pregnancy, gravida status, socioeconomic status, all have possible role in determining the prevalence of hypothyroidism in pregnant population. In addition, determination of uniform cut off value for TSH is certainly important to find out the true prevalence of this disorder during pregnancy. This will help in proper and more realistic planning to improve healthcare strategies for pregnant women.

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