

## Prevalence of Hypothyroidism in Pregnancy in a Tertiary Care Hospital

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### ABSTRACT

**Background:** Thyroid hormones are critical for the development of fetal neurological condition and maternal health. Hypothyroidism during pregnancy poses a significant health challenge because it is associated with several adverse health outcome of child and mother.

**Objective:** This study was done to assess the prevalence of hypothyroidism in pregnant women in a tertiary care center.

**Materials and Methods:** The study was done in a tertiary care center situated in outer periphery of Lucknow. The study was conducted over a period of one and a half year. The study included 1695 pregnant women.

**Results:** According to the present study the prevalence of hypothyroidism were 15.91% in first trimester, 11.90% in second trimester and 13.82% in third trimester of pregnancy using a cutoff TSH level of 4.20mIU/l.

**Conclusion:** This study concludes that there is high incidence of hypothyroidism during pregnancy. Majority of pregnant women show features of subclinical hypothyroidism during first

trimester of pregnancy thus screening of hypothyroidism specially in first trimester is necessary in our country.

**Keywords:** Prevalence, Pregnancy, Hypothyroidism.

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### INTRODUCTION

Pregnancy is a period that places great physiological stress on both the mother and the fetus. If pregnancy at any stage is complicated by some endocrine disorder such as hypothyroidism, the new born may have profound effect on future intellectual development.<sup>1</sup> The growing fetus remains dependent on maternal thyroid hormone in early phase of gestation because the fetal thyroid gland starts functioning after 12 to 14 weeks of gestation.<sup>2</sup> There is significant increase in the size of thyroid gland during pregnancy which is approximately 10% in iodine sufficient countries and to a greater extent in countries where there is deficiency of iodine.<sup>3</sup> Pregnancy has an intense influence on thyroid gland and it causes metabolic effect that alters the function of thyroid gland. Because of the physiological changes during pregnancy production of thyroid hormone and iodine requirement both increases approximately 50%.<sup>4</sup> There are some previous studies available showing untreated maternal hypothyroidism and subclinical hypothyroidism with increased adverse maternal and foetal outcomes.<sup>5</sup>

In addition to that pregnancy is stressful condition for the thyroid gland resulting in hypothyroidism. In western countries the prevalence of hypothyroidism is approximately 2.5%.<sup>6</sup> There are few reports also available from India showing prevalence of hypothyroidism during pregnancy ranges from 4.8 to 11%.<sup>7,8</sup>

Therefore this study was conducted on a larger population of pregnant women in a tertiary care center to assess the prevalence of hypothyroidism. Majority of women were from a lower socioeconomic status.

### MATERIALS AND METHODS

#### Study Population

This study was conducted in a tertiary care Hospital and it included 1695 pregnant women.

#### Study Duration

The study was done over a period of one and a half year from November 2017 to March 2019. The study includes 1695 pregnant women.

**Sample Collection**

Prior written consent has also been taken from all the pregnant women. All women were subjected to detailed history and clinical examination using a pre designed performa. Approval from ethical committee has also been taken. Blood samples were collected in outpatient department settings. Roch Moduar Kit using ECLIA (ElectroChemiLuminescence) technology was used for estimation of thyroid stimulating hormone (TSH), free T4 and anti-TPO antibodies. Other than this routine lab investigations like Complete blood count (hemogram), total cholesterol, triglycerides and serum creatinine were also evaluated in all of the pregnant women.

**Data Analysis**

Data was analyzed using Microsoft excel.

**RESULTS**

The mean age of study population was  $26 \pm 5.6$  yrs with mean gestational age of  $24 \pm 12.3$ . (Table 1)

Thyroid function test are the main stay to diagnose a case of hypothyroidism in pregnancy.

Trimester specific ranges of TSH with an upper limit are 3.4mIU/L in first trimester, 3.6mIU/L in second trimester and 4.04mIU/L in third trimester.<sup>9-11</sup>

**Table 1: Demographic characteristics of study population (N=1695)**

Age (In Years)	26.3±5.6
GA (In weeks)	24.1±12.3
BMI (Kg/m <sup>2</sup> )	22.1±6.3
Hemoglobin (g/dl)	9.3±1.4
ESR (1 <sup>st</sup> Trimester)	7.1±2.9
ESR (2 <sup>nd</sup> Trimester)	9.4±1.3
ESR (3 <sup>rd</sup> Trimester)	19±4.1
Serum Creatinine (1 <sup>st</sup> Trimester) (mg/dl)	0.51±0.14
Serum Creatinine (2 <sup>nd</sup> Trimester) (mg/dl)	0.69±0.17
Serum Creatinine (3 <sup>rd</sup> Trimester) (mg/dl)	6.7±0.20
Cholesterol (1 <sup>st</sup> Trimester) (mg/dl)	145.1±12.0
Cholesterol (2 <sup>nd</sup> Trimester) (mg/dl)	149.1±9.9
Cholesterol (3 <sup>rd</sup> Trimester) (mg/dl)	153.2±13.8
Triglyceride(1 <sup>st</sup> Trimester) (mg/dl)	131.2±23.1
Triglyceride (2 <sup>nd</sup> Trimester) (mg/dl)	147.7±17.1
Triglyceride (3 <sup>rd</sup> Trimester) (mg/dl)	166.9±37.2

GA: Gestational Age, BMI: Body Mass Index, ESR: Erythrocyte Sedimentation Rate

**Table 2: Thyroid profile of pregnant women**

Parameters	First trimester (N=371)	Second trimester (N=709)	Third trimester (N=615)
TSH (>4.20 mIU/L)	59(15.91)	84(11.90)	85(13.82)
TPO Ab+	89(18.59)	143(20.01)	139(22.60)
TSH (Mean)	3.49±5.90	3.13±6.92	3.01±2.63
FT4 (mean)	1.12±0.21	1.13±0.20	1.10±21
TPO Ab+ (mean)	41.10±114.21	47.02±127.80	48.19±149.02

The prevalence of hypothyroidism was 15.9% in first trimester, 11.90% in second trimester and 13.82% in third trimester of pregnancy. Anti -TPO antibody were positive in 18.59%, 20.02% and 13.82% in first, second and third trimester respectively.

According to our study following Trimester specific TSH cutoffs the prevalence of hypothyroidism was highest in first trimester of pregnancy followed by third and second trimester of pregnancy.

**DISCUSSION**

Our study was done to evaluate thyroid function during different trimesters of pregnancy in a tertiary care hospital. The major findings of our study were that approximately 13.88% pregnant females were suffering from hypothyroidism and the frequency of hypothyroidism in first trimester was found highest. Majority of pregnant females presented with features of subclinical

hypothyroidism. According to a previous study done in different states of India the prevalence of hypothyroidism in pregnancy was found 13.3%.<sup>12</sup> The prevalence of hypothyroidism has been reported from different countries very recently.<sup>13-15</sup> The findings of our study were consistent with the previous data published in other studies done in India and other countries. In the present study most of the pregnant females with hypothyroidism were reported in first trimester of pregnancy this finding correlated with another study conducted in Delhi which reported 14.3% of pregnant females with hypothyroidism reported in first trimester of pregnancy.<sup>16</sup>

Autoimmune thyroiditis is the commonest cause of hypothyroidism during pregnancy.<sup>17</sup> The prevalence of subclinical hypothyroidism is estimated to be 2-3%. Subclinical hypothyroidism is defined when TSH level is increased with normal concentration of FT4 and

FT3. Women with subclinical hypothyroidism are more likely to show TPO antibody positivity. Some previous studies have shown that hypothyroidism is associated recurrent pregnancy loss in first trimester of pregnancy. Maternal hypothyroidism is a disorder with great potential to adversely affect maternal and fetal outcome. Therefore, routine antenatal thyroid screening is mandatory for the normal fetal neurological development.

The impact of thyroid dysfunction on pregnancy outcomes appears to manifest with a TSH threshold of >2.5 mIU/L in the first trimester of pregnancy. According to study done by Marwaha et al. it has been reported that normal range of thyroid hormones in the Indian pregnant women are higher as compared to international cutoffs.<sup>18</sup> Children born to hypothyroid mother may have poor intellectual function in future.<sup>19</sup> Thyroid function test are the mainstay for screening of cases of hypothyroidism. Increase level of serum TSH indicates primary hypothyroidism and serum free T4 level indicates cases of subclinical hypothyroidism. Seeing the adverse effect of thyroid hormone on pregnancy most of the developed countries have started the National Neonatal Screening Program and routinely screen the pregnant females for hypothyroidism. Maternal hypothyroidism has a great potential to adversely affect the fetal as well as maternal health and it is also associated with multiple other fetal neurological disorders. If hypothyroidism is detected in early stage it can easily treated, so early detection, prompt initiation of treatment and adequate follow up in necessary to manage maternal and fetal hypothyroidism.

## CONCLUSION

The present studies show that prevalence of hypothyroidism in pregnancy is 13.88%. Frequency was highest in first trimester of pregnancy and most of the females were showing features of subclinical hypothyroidism. Some more studies are required to assess the prevalence of hypothyroidism in pregnancy and its adverse effects on pregnancy. These studies will help to decide whether universal screening program for maternal hypothyroidism are required in Indian population.

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