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Screening of Primigravida's for Hypothyroidism and its Co- Relation with Maternal and Foetal Outcomes.

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Introduction

Thyroid hormones are essential for the physiological course of pregnancy and for the optimal differentiation of the embryogenic tissues and foetal brain development. Numerous hormonal and metabolic changes occur in pregnancy that involve maternal endocrine system. There are insufficient data to warrant routine screening of asymptomatic pregnant women for hypothyroidism.

Thyroid disorder, second to diabetes mellitus is the most common endocrine disease in child bearing women. In addition to change in thyroid function tests occurring in pregnancy, hypermetabolic symptoms of normal pregnancy mimic clinical picture of some thyroid disorders. An understanding of the pathophysiological changes in pregnancy and maternal foetal relationship is necessary for the proper recognition and management of thyroid disorders and a successful pregnancy. (1)

Hypothyroidism during pregnancy has a significant effect on both maternal and foetal outcome. spontaneous miscarriages, preeclampsia, placental abruption intrauterine growth retardation, FD and IUFD and to avoid physically and mentally changed progeny. Screening of pregnant women for hypothyroidism has been shown to be cost effective. (2)

Screening of thyroid hormone in all pregnant women is mandatory to avoid hazards.

The present study was aimed to evaluate the incidence of hypothyroidism in pregnant women and its effect on mother during antenatal, intra natal and postnatal period and effect on foetus and neonate. We screened one hundred primigravida's attending the antenatal clinic of Rajkiya Mahila Chikitsalya-

J.L.N. hospital, Ajmer in the state of Rajasthan, India.

Aims and Objectives

1. To screen the primigravida's to determine the incidence of hypothyroidism and follow the consequences in patients attending the antenatal clinic of Rajkiya Mahila Chikitsalya, J.L.N. medical college, Ajmer, India.

2. To study the effect of hypothyroidism on mother during pregnancy, intrapartum and after delivery.
3. To study the effect of hypothyroidism on foetus.

Material and Methods

In the antenatal clinic of the department of obstetrics and gynaecology, Rajkiya mahila chikitsalya, Ajmer a total of 100 consecutive pregnant women (only primigravida's) were included for the prospective study. Exclusion criteria were set in the form of any known medical disorder and any already existing thyroid disorder.

Serum free T3, T4 and TSH measurements were used to determine the thyroid status of pregnant women. Test was conducted at 1st visit then at 28 and 36'th week of pregnancy. The subjects were informed about the procedure. Ten ml of venous blood sample was collected from antecubital vein of each patient for thyroid function test. Radioimmunoassay technique was used for serum free T3, T4 and TSH measurements.

The patients were followed up for the development of obstetric complications and to note onset of labour, mode of delivery. Similarly foetal and neonatal effects were noted i.e., weight of baby, Apgar score and follow up of baby for 3 days.

The statistical analysis of data was done with mean, range and P value by chi- square test.

Interpretations and Result

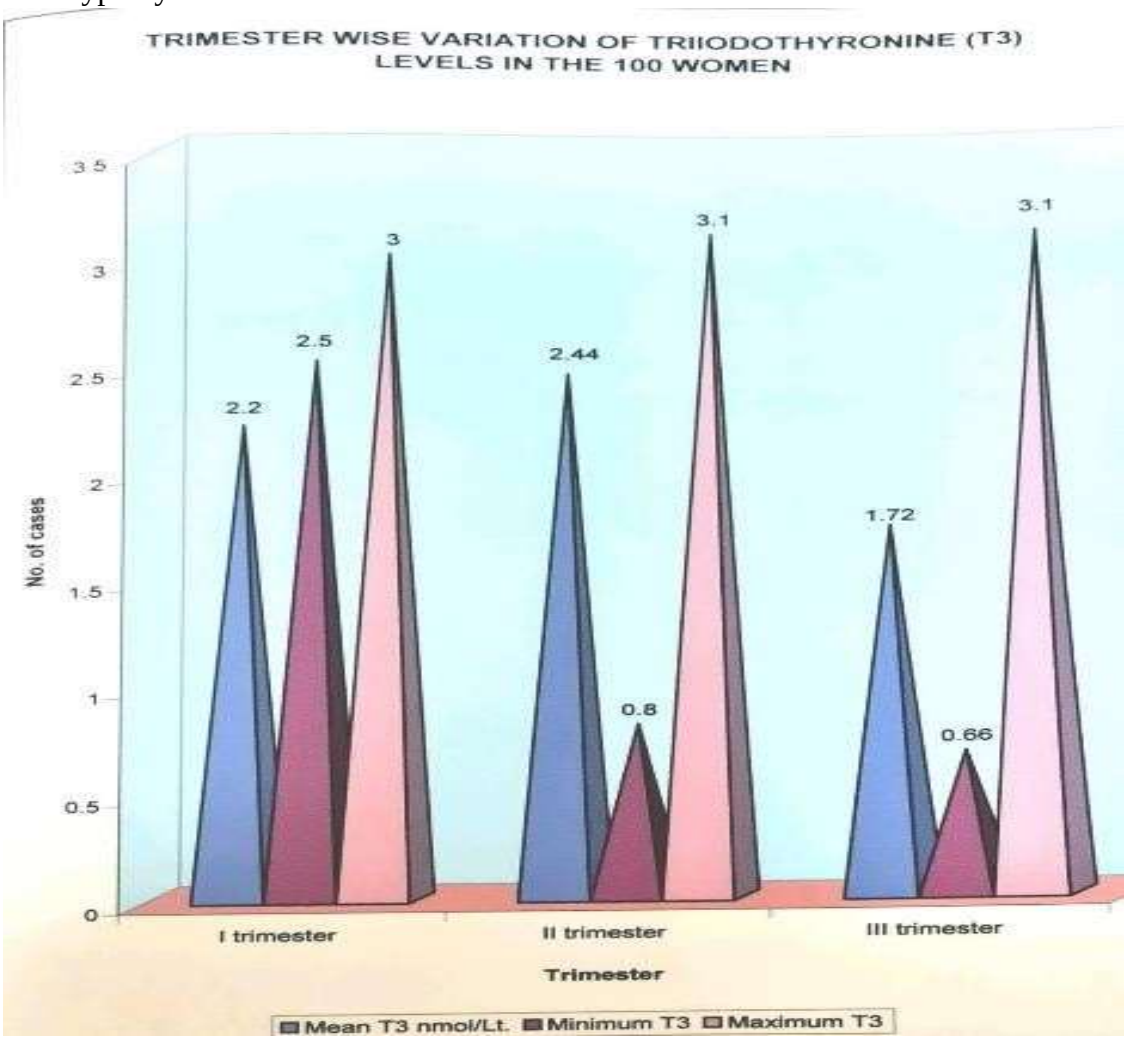
In our prospective study over a year, we estimated serum T3, T4 and TSH levels by Radioimmunoassay (RIA) during their 1st antenatal visit, then at 28th and 36th week of gestation. The normal laboratory reference values of the kit used in nonpregnant state were 1.2- 3.1 nmol/lit for T3, 78.5-151.9 nmol/lit for T4, .5-5mili Iu /ml for TSH.

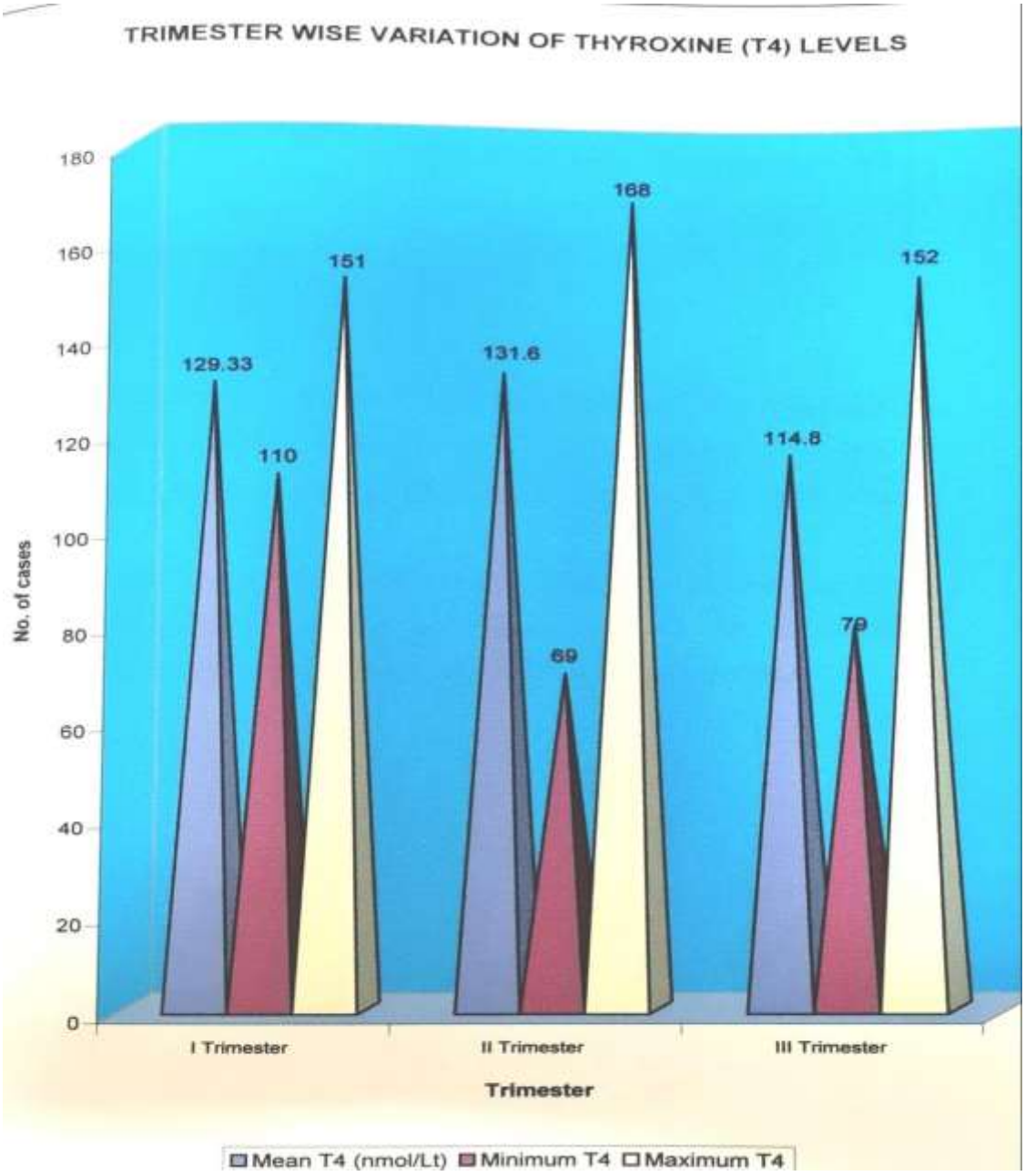
All patients were comparable in their demographic data. The mean age of the women under study was 21.58 years ranging from 18 to 29 years. Mean body weight in our study was 46.58 kilograms.

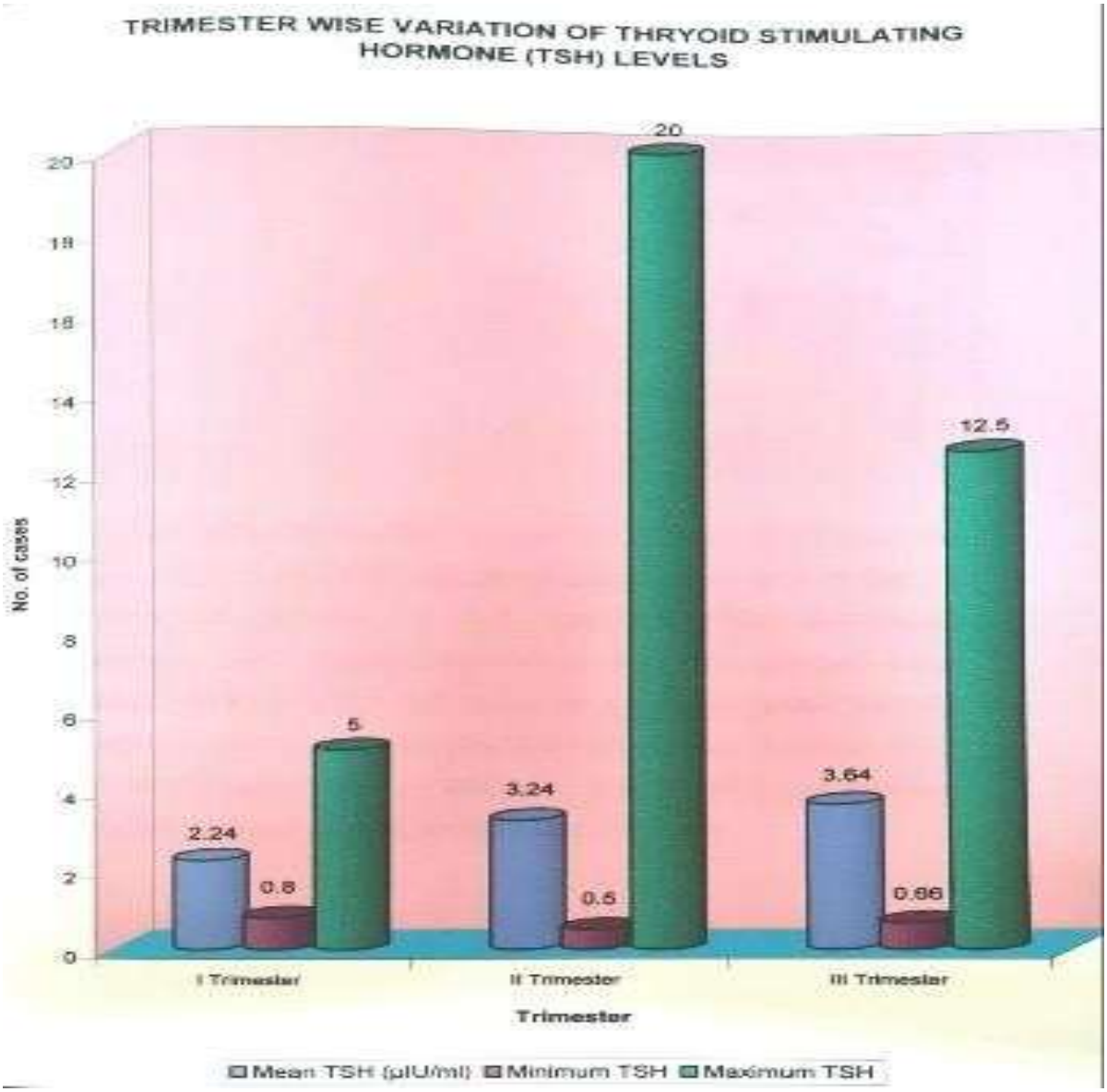
The serum T3 levels were seen to rise through the 1st and 2nd trimester of pregnancy from 2.2 nmol/Lt to mean 2.4 nmol/Lt (though well within normal range of nonpregnant levels (1.2 – 3.1 nmol/Lt). The levels then declined in the third trimester of pregnancy to an average of 1.72 nmol/Lt, towards the lower limit of the nonpregnant levels (1.2 – 3.1 nmol/ Lt). The serum T4 level were also increased in pregnancy through the first and second trimester from an average of 129.3 nmol/ Lt to an average

131.6 nmol/Lt. The rise in second trimester was seen to be with in normal range of the nonpregnant T4 levels. TSH levels in the study were seen to rise through out the pregnancy. In the first trimester, it was an average 2.2 microIU /ml. In the second trimester, it rose to 3.24 micro-IU/ml. The levels further increased to 3.64 micro-IU /ml.

We detected 6 cases with serum TSH levels higher than 5 micro Iu /ml (normal reference range for nonpregnant subjects is .5-5 micro IU/ ml). Out of those 6 patients had low T3 .66 nmol/lit and low serum T4 52 nmol/ Lt and serum TSH was 12.5 micro-IU/ml. This woman was classified as overt hypothyroid and 100 micrograms thyroxine tablet was started. In the follow up it was found that she developed pregnancy induced hypertension (PIH), oligohydramnios and mild IUGR during her antenatal period. She delivered a female child vaginally at 40.2 weeks of gestation. Baby developed jaundice in neonatal period, though the thyroid profile of the neonate was normal. Another woman with raise TSH levels to 20 micro-IU/ml and serum T4 to 168 nmol/lit and serum T3 levels were .8 nmol/lt. however she had no complaints and developed no significant problem. Rest four women with elevated serum TSH levels had normal T3 and T4 values. These cases therefore were classified as subclinical hypothyroidism




TRIMESTER WISE VARIATION OF THYROXINE (T4) LEVELS
180
160
140
120
100
80
60
40
20
0
No. of cases
129.33
110
151
131.6
69
168
114.8
79
152
I Trimester
II Trimester
III Trimester
Trimester
Mean T4 (nmol/Lt)
Minimum T4
Maximum T4



Discussion

To determine an abnormal value, an understanding of normal variation of the population is essential. Different studies in different areas of the world have shown varying results, which might be due to the difference in the iodine intake besides ethnic origin. In a large study conducted by Glinoer et al. (3), in Brussels an area of moderately low iodine supply, they found that the thyroidal activity adjusted to the marked increase in serum thyroid binding globulin (TBG). serum T4 levels increased sharply between 6-9 weeks and thereafter, only slowly eventually reaching with an average plateau at 18 weeks. The T3 levels were more pronounced up to 18 weeks and thereafter plateaued. The co relation between T3 and gestational age was higher than that between T4 and TSH. In the study by Kumar et al (4), mean T3 values were 1.35+-.3 nmol/lit in the first trimester. These were seen to rise through

second trimester to a mean level of 1.55 +-.52 nmol/lit. The levels then declined in the third trimester to a mean level of 1.3+-.68 nmol/Lt. similarly, mean T4 levels were found to be 126.5 +-4.84 nmol/lit in the first trimester. It was seen to rise in second trimester to a mean of 127.8+-3.12 nmol/Lt. the levels than decreased in the third trimester to 126+-2.2 nmol/Lt. In pregnancy, the alterations in total thyroid hormone levels are the direct consequence of the marked increase in serum thyroxine binding globulin (TBG). It is estimated that serum concentrations increase by 1-3 % per day over the trimester to compensate for the increase in TBG.

In a study done by Saho M.T. et al. (5), six hundred thirty-three pregnant women in second trimester were registered, apart from routine obstetrical investigations, TSH level estimation was done. In their study hypothyroid women were more prone to have PIH, IUGR and intrauterine demise as compared to controls. Caesarean rate for foetal distress was significantly higher among pregnant subclinical hypothyroid women. Neonatal complications and gestational diabetes were significantly more in overt hypothyroid women. Lao et al, found mild biochemical hypothyroidism related to severity of preeclampsia in pregnancy.

Our study has shown the that young healthy primigravida with no known metabolic disorder or known thyroid disorder had essentially normal thyroid levels in 99 % women. Showing normal variation in serum T3, T4 and TSH with good obstetric outcomes. Incidence of obstetric complications were insignificant with the P value of <.01. Therefore, once the primigravida falls in low-risk category the complete thyroid profile may not be recommended as a routine primary screening for hypothyroidism in pregnant women.

Summary and Conclusion

The present study was conducted to evaluate the thyroid function profile in pregnancy. The results showed that serum T3 levels increased through the first and second trimesters of pregnancy from a mean of 2.2 nmol/Lt. It then declined in the third trimester to 1.72 nmol/lt. the T4 levels also showed a similar behaviour. A rise in the levels was observed through the first and second trimesters from

129.33 nmol/Lt to 131.6 nmol/Lt and a decline in third trimester. The serum TSH levels showed a phase of elevation from 2.24 micro IU/ml to 3.24 microIU/ml in 1st and 2nd trimester followed by elevation again in third trimester.

In conclusion the result of the present study indicates that:

1. variations in T3, T4, TSH levels were observed during pregnancy. T3 values increased through first and second trimesters. This has also been suggested in other studies. It may be explained by the increase in thyroid binding globulin in pregnancy. T3 is then seen to decrease in the third trimester. T4 was also observed to rise through the first and second trimester and thereafter, decline in the third trimester. The same explanation is suggested for this variation. Serum TSH levels were found to elevate from 1st and 2nd trimester and further increase in 3rd trimester. This might be due to increase demands of T3 and T4 hormone during pregnancy and may be due to stress put on maternal thyroid gland.
2. The result of the study also suggests that values of T3, T4 and TSH which might be abnormal according to the nonpregnant reference range might be a normal variation of pregnancy. Therefore, a separate nomogram is suggested for these values during pregnancy. However further studies are required for this purpose.
3. One patient was detected of the 100 women as having symptomatic hypothyroidism. The patient had raised TSH, reduced T3 and reduced T4. this women developed PIH, oligohydramnios and mild IUGR during antenatal period, she delivered a Fch vaginally at 40.2 weeks of gestation. Her baby developed hyperbilirubinemia during neonatal period. Thyroid profile was normal in baby.
4. A significant co-relation was found in our study between hypothyroid patient and development of PIH and oligo with IUGR.
5. No significant corelation was found in our study between thyroid levels in patient with PIH and those without hypertension.
6. Serum TSH was found >5 micro iu / ml in 5 more women. but serum T3 and T4 were found normal. One patient with isolated TSH elevation delivered by applying outlet forceps due to developing foetal distress. Rest 4 women delivered vaginally and babies of all 5 women were healthy. Antenatal and obstetric outcomes were uneventful.
7. The present study suggest that young healthy primigravida's with no known metabolic disorders and having no history of thyroid disorder in her and family had essentially normal thyroid levels showing normal variations in T3, T4 and TSH with good obstetric outcomes. And when compared with the incidence is insignificant ($p < .01$).

Therefore, over the metabolic disorders are ruled out test like thyroid function tests may not be recommended as a routine primary screening for hypothyroidism in pregnant patients.

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