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A study on maternal and perinatal outcome among pregnant women with hypothyroidism in a rural area of Tamil Nadu

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Abstract
Introduction: The purpose of the study was to prospectively evaluate and compare maternal and perinatal outcome of pregnant women who were diagnosed hypothyroid during pregnancy. Pregnancy has a huge impact on the thyroid function in both healthy women as well as those with thyroid dysfunction.
Aims and Objectives: To find out the measurement of serum T3, T4 and TSH at first antenatal visit and to find out the correlation of hypothyroidism with maternal and perinatal outcome.
Materials and Methods: This study was done among pregnant women who came for first antenatal checkup, attending the OPD of Department of Obstetrics and Gynaecology at Sree Mookambika Institute of Medical Sciences, kulasekharam. Measurement of serum free T3, T4 and TSH were determined at first antenatal checkup. Outcome was measured in terms of preeclampsia, mode of delivery, low birth weight and NICU admissions.
Results: Majority of the hypothyroid subjects were delivered by LSCS and it was found to be significant (p=0.03). In our study 6.1% of the babies got admitted in NICU which is considered significant. In this study it was found that, majority of the hypothyroid mothers had preeclampsia and there was no significant association between preeclampsia and thyroid levels (p>0.05).
Conclusion: Maternal hypothyroidism is a disorder with great potential to adversely affect maternal and fetal outcomes. Maternal effects are preeclampsia, operative deliveries, gestational hypertension, anaemia, preterm delivery and placental abruption. Fetal adverse effects are low birth weight, NICU admission and prematurity. Since hypothyroidism is easily treated, timely detection and treatment could decrease maternal and perinatal outcome. So we recommend routine screening for thyroid dysfunctions in pregnancy.

Keywords: Thyroid profile, pregnancy, preeclampsia

Introduction
Thyroid disease is the second most common cause of endocrine dysfunction in women of reproductive age group. Prevalence of hypothyroidism is found to be more in asian countries compared to west, 11% in India [1].
Thyroid gland undergoes significant changes in size and function during pregnancy [2]. Human chorionic gonodotropin (HCG) influences thyroid function, since it is similar to thyroid stimulating hormone. It stimulates TSH receptors resulting in increased thyroxine production. There is suppression of TSH during the first trimester [3] and slight increase in TSH levels by second trimester. These changes necessitate the use of trimester specific cut offs while interpreting TSH values.
First trimester 0.1-2.5 mIU/ml, second trimester 0.2-3mIU/ml and third trimester 0.3-3mIU/ml. Total T3 and T4 are elevated. Free hormone levels are usually normal, Overt hypothyroidism is when TSH is elevated>10 mIU/ml with decreased free T4.Overt hypothyroidism can cause maternal and fetal adverse effects. Maternal effects are preeclampsia, gestational hypertension, anaemia, preterm delivery, placental abruption and increased operative deliveries. Fetal adverse effects are low birth weight, prematurity, respiratory distress syndrome, perinatal mortality, neuropsychological and cognitive impairment [4-10].
Since hypothyroidism is easily treated, timely detection and treatment could decrease maternal and perinatal outcome. The purpose of the study was to prospectively evaluate and compare maternal and perinatal outcome of pregnant women who were diagnosed during pregnancy.

Aims & Objectives

1. To find out the measurement of serum T3, T4 and TSH at first antenatal visit.
2. To find out the correlation of hypothyroidism and maternal outcome.
3. To find out the correlation of hypothyroidism and perinatal outcome.

Materials and Methods

Study design: prospective observational study The present study was conducted among 116pregnant women who came for first antenatal checkup, all the women attending the OPD of Department of Obstetrics and Gynaecology Sree Mookambika Institute of Medical Sciences who met the inclusion and exclusion criteria during the period from Oct 2017 to Oct 2018 was enrolled into the study. All pregnant women who come for first antenatal checkup are included and those having pregestational hypothyroid, multiple pregnancies and gestational trophoblastic disease were excluded. The study was started after obtaining the clearance from institutional research and institutional ethical committee and enrolled 116 pregnant women, The purpose of the study was explained before getting informed consent, privacy was ensured during the study, a detailed history and clinical examination along with antenatal check up was done. Hypothyroid patients were followed up with serum free T3, T4 and TSH and followed till delivery for both maternal and perinatal outcome. Sociodemographic characteristic details include age, education, occupation, income and socioeconomic status. Study parameters also include serum free FT3 FT4 and TSH. Maternal outcome is based on preeclampsia, mode of delivery and period of gestation and fetal outcome is based on birth weight and NICU admission.

Methods used to measure the quantitative parameters

Thyroid profile [11] and pregnancy induced preeclampsia [12] were measured according to standard guidelines Socioeconomic status was assessed using BG Prasad socioeconomic status scale [13].

Data entry and analysis

Data was entered in Microsoft excel spread sheet 2013and was analysed by sps version 20.0 Descriptive statistics including Mean, Standard deviation and 95% confidence interval were calculated Chi square test was used to find out the association between the factors. $p<0.05$ was considered as significant.

Observations and Results

A prospective observational study was conducted among 116 antenatal mothers attending the OPD of Obstetrics and gynaecology department, According to modified kuppuswamy socioeconomic status classification majority of the antenatal mothers belongs to upper lower socioeconomic status (70%). Mean age of the study participants was 26.75 years with a standard deviation of 4.101.

Thyroid Levels among Study Population

- Total TSH level varied from 0.34 to 5.20mIU/ml. The mean TSH level of the study population was 2.55 mIU with a standard deviation of 2.65.T3 level ranged from 2.5 to 3.9pg/ml. The mean T3 level among the study population was 2.99 pg with a standard deviation of 0.546.T4 level in the study population was varied from 0.6 to1.1ng/dl. Mean T4 level was 0.09071 ng with a standard deviation of 0.869.Mean weight of the study participants was 59.2731kg with a standard deviation of 10.664

Hypothyroid Status In Pregnancy

- Majority of the study population 55 (47.4%) were hypothyroid. Out of the 55 hypothyroid antenatal mothers 4(6.1%) of the study participants had overt hypothyroidism and 6(9.2%) of the study participants had subclinical hypothyroidism. Among the 116 babies delivered only 8(6.19%) had low birth weight. 7(6.1) of the babies admitted to NICU. 22 (19.5%) of the study participants had preeclampsia. Majority of the antenatal mother delivered by normal vaginal delivery. Only 26(22.41%) of the mothers delivered by Lower segment caesarean section.

Our study found that low birth weight babies were more among hypothyroid mothers and there was a statistically significant association between low birth weight and thyroid status among antenatal mothers (p=0.04). Majority of the hypothyroid subjects were delivered by LSCS and it was found to be significant (p=0.03). In this study it was found that, majority of the hypothyroid mothers had preeclampsia and there was no significant association between preeclampsia and thyroid levels ($p>0.05$).

Table 1: Estimation of thyroid profile among study participants

Thyroid Status	Frequency	Percent
Hypothyroid	55	47.4%
Overt Hypothyroid	4	3.4%
Subclinical Hypothyroid	6	5.2%
Normal	51	44%

Discussion

A descriptive study was conducted among 116 antenatal mothers regarding thyroid status and its maternal and perinatal outcome. In the present study among 116 antenatal mothers, 55 (47.4%) were hypothyroid and out of the 55 hypothyroid antenatal mothers 4(6.1%) of the study participants had overt hypothyroidism and 6(9.2%) of the study participants had subclinical hypothyroidism. Similarly Nancy S Pillai [14] *et al*. from kerala reported a prevalence of hypothyroidism in 9.2%, [14] with sub clinical hypothyroidism constituting 8.5% and overt hypothyroidism accounting for 0.7% which is also comparable with the study done by Sahu [15] *et al*. who reported a prevalence of hypothyroidism in 12.7% with overt and subclinial hypothyroidism to be 4.58% and 6.47%.

Our study found that out of the 116 babies delivered 7(6.1%) of the babies admitted to NICU which was statistically significant which is comparable to the study done by sharma [16] *et al*. who reported 42% of the babies admitted to NICU and showed the association between NICU admission and thyroid status.

In our study majority of the antenatal mother delivered by normal vaginal delivery out of which 26 (22.41%) of the mothers delivered by Lower segment caesarean section and it was found to be significant (p=0.03) which is similar to the study done by Dhara [17] *et al*. who reported association between hypothyroid and lower segment caesarean section.

Our study show that 22(19.5%) of the study participants developed preeclampsia and there was no significant association between preeclampsia and thyroid levels ($p>0.05$) but study by sharma D *et al*. [16] showed an association between preeclampsia and thyroid levels about 33.3%.

Conclusion

Maternal hypothyroidism is a disorder with great potential to

adversely affect maternal and fetal outcomes and is also associated with preeclampsia, gestational hypertension, anaemia, preterm delivery, placental abruption and increased operative deliveries, low birth weight, prematurity, respiratory distress along with neuropsychological and cognitive impairment. If the condition is detected early, it is easy to treat with very little effects to the mother and fetus. Hence, we recommend routine screening for thyroid dysfunctions in pregnancy.

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