



A Comparative Study of Thyroid Hormone Levels in Severe and Mild Pre-Eclmaptic Women and Normal Pregnant Women

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Abstract

Pregnancy is usually associated with many complications; one among them is pre-eclampsia which is major cause for the maternal and perinatal morbidity and mortality. The present study deals with the comparison of the thyroid hormone levels in the pre-eclamptic patients (severe& mild) and normal pregnant women. The main objective of this study is to prevent the intra uterine deaths of foetus, preterm labour and to have a matured full-term delivery. This is a case-control, prospective interventional study designed to compare the thyroid hormone levels with pre-eclamptic patient and normal pregnant women. Levels of T3, T4 in pre eclamptic women (cases) were significantly lower and TSH is significantly higher when compared to the normal pregnant women (controls). Primary hypo-functioning of the thyroid can accompany mild preeclampsia and possibly contribute to the pathogenesis. Identification of thyroid abnormalities and appropriate measures might affect the occurrence and severity of morbidity and mortality associating with pre-eclampsia.

Keywords

pre-eclampsia, thyroid, parity, proteinuria, normotensive.

INTRODUCTION

PREGNANCY INDUCED HYPERTENSION: [1-6].

A systolic blood pressure ≥ 140 mm of Hg and /or a diastolic blood pressure of ≥ 90 mm of Hg respectively in pregnant women is termed as pregnancy induced hypertension.

CLASSIFICATION

Four categories:

- Preeclampsia
- Gestational hypertension
- Chronic hypertension
- Preeclampsia superimposed on chronic hypertension.

PRE-ECLAMPSIA:

Pre-eclampsia is defined as the presence of a systolic blood pressure (SBP) greater than or equal to 140mmHg or a diastolic blood pressure (DBP) greater than or equal to 90mmHg or higher, on two occasions at least 4 hours apart in a previously normo tensive patient.

GESTATIONAL HYPERTENSION: -

Gestational hypertension is characterized most often by new onset elevations of BP after 20 weeks of gestation, often near term, in the absence of accompanying proteinuria. The failure of BP to normalize postpartum requires changing the diagnosis to chronic hypertension.

CHRONIC HYPERTENSION: -

Hypertension diagnosed prior to gestational week 20 is considered chronic and de novo hypertension in late gestation that fails to resolve post partum will be reclassified as chronic hypertension.

PRE-ECLAMPSIA SUPERIMPOSED ON CHRONIC HYPERTENSION:

This is defined as the appearance of de novo proteinuria starting with gestational week 20. A sudden increase in the magnitude of the hypertension, the appearance of thrombocytopenia, and/or abnormal levels of transaminases, and in women who have proteinuria early in gestation, a sudden increase in proteinuria, are labeled as highly likely of superimposed pre-eclampsia.

SIGNS AND SYMPTOMS: -

- Increased Blood pressure
- Proteinuria
- Edema
- Sudden weight gain
- Blurred vision
- Lower back pain
- Persistent headache
- Shortness of breath
- Nausea and vomiting
- Abdominal and shoulder pain

• HELLP syndrome

H – Hemolysis; in which oxygen carrying red blood cells break down.

EL–Elevated Liver enzymes; showing damage to the liver

LP – Low Platelet count; that the cells responsible for stopping bleeding are low

DIAGNOSIS: -

Basic investigations to be done are: -

- Blood pressure assessment
- Urine analysis
- Blood tests
- Assessment for fetal well being.

BLOOD PRESSURE: -

- **De novo hypertension** after gestational age of 20 weeks, and new onset of one or more of the following.

URINE ANALYSIS: -

Urine analysis should be a guide for further testing as it has a high rate of both false positives and negatives; if the dip stick test is the only test available. 2+ (30mg/dL) is often, but not always, associated with $\geq 300\text{mg/day}$ proteinuria

- **Proteinuria** ($\geq 300\text{mg/day}$ or a spot urine / creatinine ratio $\geq 30\text{mg/mmol}$)
- Abnormal proteinuria is most certain when measured in a timed collection, $\geq$

300mg/day considered abnormal for pregnancy.

- Spot urine protein/ creatinine ratio $\geq 30\text{mg}$ proteins/mmol creatinine is another alternative, superior to qualitative (dip stick) evaluation alone and equivalent to 24 hr urine collection.
- **Renal insufficiency** (Creatinine $\geq 0.09\text{mmol/L}$ or oliguria)
- **Liver disease** (raised transaminases and / or severe right upper quadrant or epigastric pain)
- **Neurological problems:** convulsions (eclampsia), hyper reflexia with clonus, severe headaches with hyper reflexia, persistent visual disturbances (scotoma),
- **Hematological disturbances:** thrombocytopenia, disseminated intravascular coagulation, hemolysis.
- Fetal growth restriction

Normalization of blood pressure within 3 months post partum was another requirement.

In making this recommendation the ASSHP recognized the multi system nature of the clinical presentation of pre-eclampsia. However, this group also suggested a research definition for investigators, restricted to new onset hypertension after 20 weeks with properly documented proteinuria, stating it will be less sensitive but more specific, ensuring recruitment of true pre eclamptic into scientific research studies.

ROLE OF THYROID HORMONE LEVELS IN PREGNANCY: -

Thyroid hormones are crucial for normal development of your baby's brain and nervous system. During the first trimester the first 3 months of pregnancy—your baby depends on your supply of thyroid hormone, which comes through the placenta. At around 12 weeks, your baby's thyroid starts to work on its own, but it doesn't make enough thyroid hormone until 18 to 20 weeks of pregnancy.

Two pregnancy-related hormones—human chorionic gonadotropin (hCG) and estrogen—cause higher measured thyroid hormone levels in your blood. The thyroid enlarges slightly in healthy women during pregnancy, but usually not enough for a health care professional to feel during a physical exam.

Thyroid problems can be hard to diagnose in pregnancy due to higher levels of thyroid hormones and other symptoms that occur in both pregnancy and thyroid disorders. Some symptoms of hyperthyroidism or hypothyroidism are easier to

spot and may prompt your doctor to test you for these thyroid diseases.

Another type of thyroid disease, postpartum thyroiditis, can occur after your baby is born.

EPIDEMIOLOGY

Pre-eclampsia is a condition in pregnancy characterized by high blood pressure, sometimes with fluid retention and proteinuria. As it is a clinical syndrome that manifests during the second half of pregnancy afflicting 3-7% of pregnant women. Pre-eclampsia is one of the leading causes of maternal mortality and morbidity, especially in developing countries.

In India the incidence of pre-eclampsia is reported to be 8-10% among the pregnant women according to study the prevalence of hypertensive disorders of pregnancy was 7.8% with pre-eclampsia is 4% of the study population in India.

The present Study carried out after procuring clearance from the institutional ethics committee at Gandhi hospital. Women with preeclampsia are increased risk for damage to kidneys, liver, brain, and other organ and blood systems. Preeclampsia may also effect the placenta which can lead to separation of the placenta from the uterus, preterm birth and pregnancy loss or still birth.

AIMS AND OBJECTIVES: -

AIM: -

- To study comparison of the thyroid hormone levels in severe pre-eclampsia, mild pre-eclampsia and normal pregnant women.
- To reduce the pregnancy complications associated with thyroid hormones.
- To reduce the complications like preterm labour and risk of miscarriage.

OBJECTIVES: -

Primary objective:

- To educate the patients in preventing the risk of developing a hypertension in the pregnant women.
- To prevent the intra uterine deaths of foetus with the cause of hypertension associated with oxidative stress.
- And also, to prevent the preterm labour.

Secondary objectives:

- To create awareness about preeclampsia and how we can prevent it from occurring
- To have a healthy and matured deliveries.

METHODOLOGY

STUDY SITE: -

This study is conducted in GANDHI HOSPITAL, HYDERABAD.

STUDY PERIOD:

This study is done for about 6 months.

STUDY DESIGN:

This study is a case –control, prospective interventional study will be carried out for studying the Comparison of thyroid hormones in severe and mild pre-eclampsia and normal pregnant women.

CRITERIA:

Inclusion criteria: -

- Pregnant women with blood pressure greater than 140/90 mm of Hg associated with proteinuria and edema
- Pregnant women with no other co-morbid conditions.
- Willing and able to provide informed, written consent.

Exclusion criteria:

- Pregnant Patients with illness, Anemia, Diabetes mellitus, Essential hypertension, renal insufficiency, cardiovascular disease, Hypothyroidism, and other genetical disorders are excluded.
- Outpatients of GANDHI HOSPITAL

MATERIALS AND METHODS:

All pregnant women attending antenatal clinic Department of obstetrics and gynecology Gandhi hospital Secunderabad in their 2nd and 3rd trimesters are screened for period of 6 months from June 2018 to december 2018.

Clinical observations carried out for gestational age of foetus pulse rate, blood pressure and other relevant history are recorded in the prescribed Proforma after obtaining patient consent.

LABORATORY INVESTIGATIONS:

Thyroid hormones T3, T4, and TSH are done by collecting 2.5ml of blood in plain vacuum container after duly obtaining consent of the patient in the prescribed form. Thyroid hormones (T3, T4, and TSH) are assessed by ECLA by Simons advanced immunoassay machine at CDL labs of Gandhi hospital Secunderabad, TS.

SOURCE OF DATA AND MATERIALS:

- ✓ Data collection form.
- ✓ Patient consent form and information sheet.
- ✓ Case study profile.

STUDY PROCEDURE:

A prospective Observational study is carried out for studying Comparison of thyroid hormones in severe and mild pre-eclampsia and normal pregnant women. All patients dealt with the condition of pre-

eclampsia in Inpatient wards are identified and data including patient's demographic data, laboratory reports such as CBP, LFT's, urine analysis & medication chart are collected in patient data collection form. Follow-up is assessed by telephone interview and review of the medical record for every patient included in the study. If a patient had follow-up outside our institution, medical records will be obtained for review. Data is organized, analyzed and

the outcome results are compared using appropriate statistical methods with reliable significance.

RESULTS

In the case group (severe and mild) pre eclamptic group patient age ranged from 19-30 years and the range for control group (normal pregnant) was 20-36 years. The mean standard deviation ($\pm$ SD) age of study group was 25.78 ± 3.66 and control group was 25.1 ± 3.86 .

Table-I

AGE	AVERAGE	STANDARD DEVIATION	P value
Controls	25.1	3.866	<0.0001
Cases	25.78	3.666	< 0.0001

The mean of systolic blood pressure (140 to 220 mmHg) is 148.5 ± 8.8 and diastolic blood pressure (80 to 130 mmHg) is 94 ± 6.03 in the severe and mild pre-eclamptic group.

The mean of systolic blood pressure is 112.6 ± 4.9 and diastolic blood pressure is 75 ± 6.5 in control group.

Table-II

MEAN BP	AVERAGE	STANDARD DEVIATION
Controls	112.6/75	4.9/6.5
Cases	148.5/94	8.8/6.03

AGE OF PATIENTS

TABLE-III: Table showing the age distribution of patients

AGE OF THE PATIENTS	SEVERE PRECLAMPTIC	MILD PRE ECLAMPTIC	NORMAL PREGNANT
19-21	7	6	12
22-24	13	14	6
25-27	15	14	19
28-30	9	12	9
31-33	6	3	3
34-36	0	1	1

Fig-1 Bar diagram showing the patient age distribution.

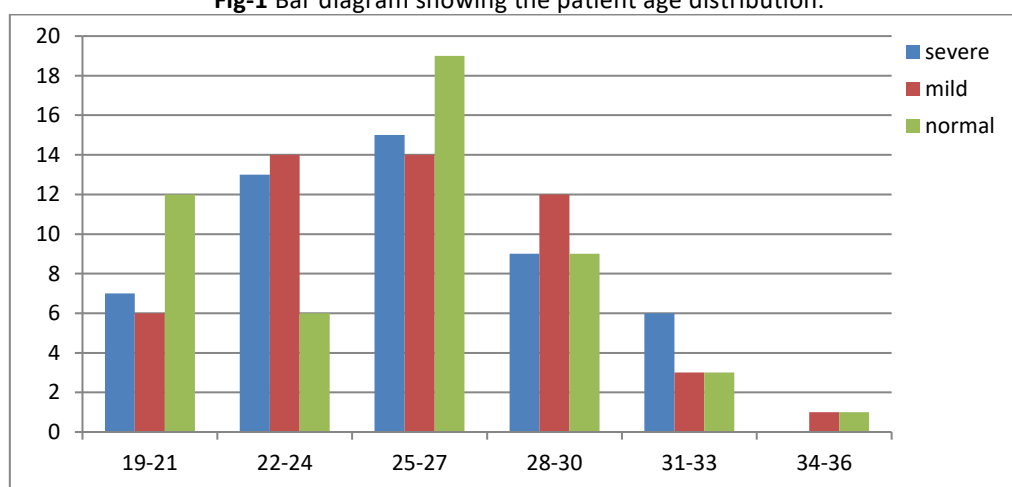
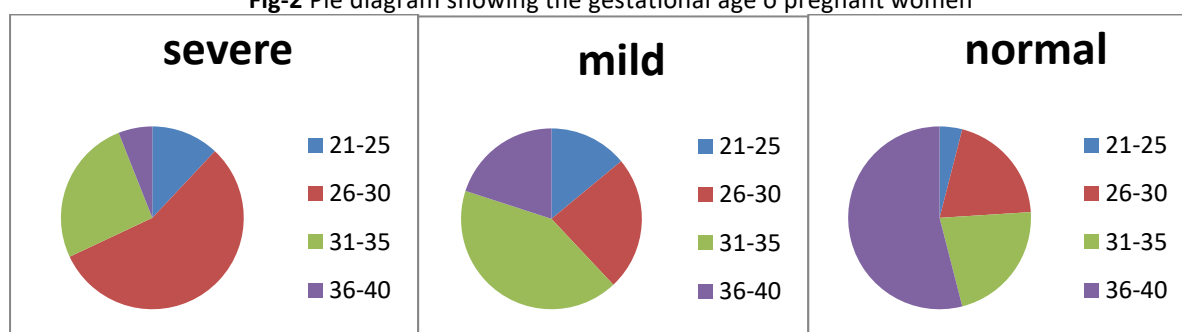
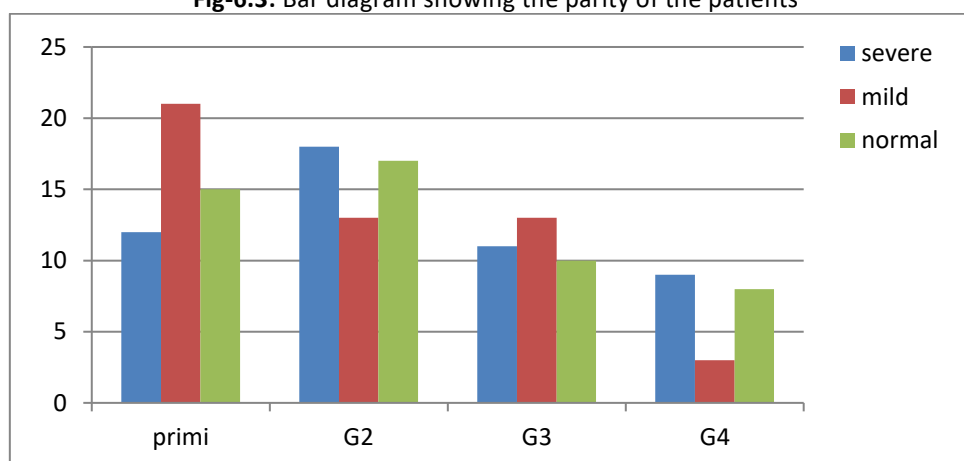


TABLE-IV table showing gestational age distribution of pregnant women

GESTATIONAL AGE OF THE PATIENTS	SEVERE PRECLAMPTIC(n=50)	MILD PRE ECLAMPTIC(n=50)	NORMAL PREGNANT (n=50)
21-25	6	7	2
26-30	28	12	10
31-35	13	21	11
36-40	3	10	27

Fig-2 Pie diagram showing the gestational age o pregnant women

Table –V Table showing parity of patients

PARITY	SEVERE	MILD	NORMAL
Primi	12	21	15
G2	18	13	17
G3	11	13	10
G4	9	3	8

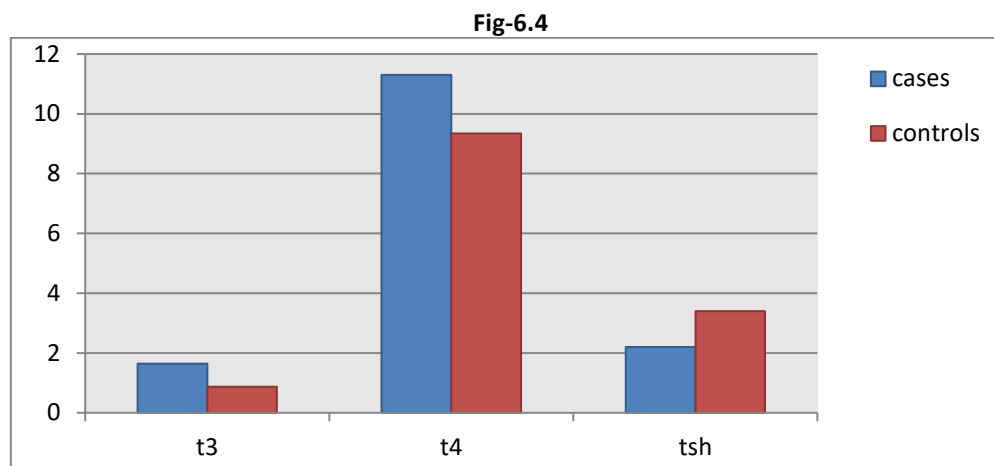
Fig-6.3: Bar diagram showing the parity of the patients


Levels of total T_3 and T_4 in pre-eclamptic women (severe and mild) are 0.869 ± 0.26 and 9.347 ± 2.50 were significantly lower than that of controls 1.645 ± 0.51 and 11.305 ± 2.11 , $p < 0.0001$ was observed in pre-eclamptic group (severe and mild) compared with normo tensive women. The mean

level of TSH significantly higher in pre-eclamptic group 3.403 ± 3.33 than controls 2.197 ± 1.03 . Comparison of total T_3 , T_4 and TSH levels in normal pregnant and pre-eclamptic (mild and severe) women.

TABLE- VI Table showing standard deviation of T₃, T₄ and TSH Levels

PARAMETERS	T ₃ (ng/dl)	T ₄ (µgm/dl)	TSH (µIU/ml)
CONTROLS	1.645 ± 0.51	11.305 ± 2.11	2.197 ± 1.03
CASES	0.869 ± 0.26	9.347 ± 2.50	3.403 ± 3.33



DISCUSSION

In the present study we observed T₃ and T₄ levels were significantly lower and TSH was significantly higher in pre - eclamptic patients.

Other studies are also in agreement with our observation showing lower total T₃ and T₄ and higher TSH values in pre-eclamptic women in the third trimester. Modest decrease in thyroid hormones with concomitant increase in TSH level in maternal serum correlated with severity of pre-eclampsia. More number of pre-eclamptic women had abnormally high TSH levels at the time of diagnosis when compared to normotensive women. A statistically significant higher number of cases with severe preeclampsia were also observed in pregnant women with abnormally high TSH. [18].

It was suggested that for reduced serum concentrations of thyroid hormone can be explained by the loss of protein and hence the protein bound hormone. Since T₃ is mostly peripheral conversion of T₄, decrease in T₃ associated C is a normal consequence besides involvement of liver and kidney. Reduced serum concentrations of T₃ and T₄ may also be explained by the faulty estrogen production due to placental dysfunction in pre-eclamptic women. [17, 19].

CONCLUSION:

Present findings suggest that primary hypo-functioning of the thyroid can accompany mild preeclampsia and possibly contribute to the pathogenesis. Identification of thyroid abnormalities and appropriate measures might affect the

occurrence and severity of morbidity and mortality associating with pre-eclampsia, and it is concluded that the amount of thyroid hormone levels observed in the patients does not depend upon the severity of the complication. Therefore in addition to recommended thyroid function screening in first trimester of pregnancy, its follow up within the third trimester of pregnancy is recommended. [17, 18, 19] In order to prevent or delay the risk of developing pre eclampsia low dose aspirin has been used during pregnancy and also to prevent other complications include prevention of stillbirth, fetal growth restriction, preterm birth, and early pregnancy loss. [20] Recent systematic reviews of low-dose aspirin use during pregnancy have improved our understanding of the role of low-dose aspirin in each of these clinical situations.

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