

## ASSOCIATION OF PRE-ECLAMPSIA WITH SUBCLINICAL HYPOTHYROIDISM IN PREGNANT WOMEN

*Gulab Kanwar<sup>1</sup> & Mahesh Chandra Mehara<sup>2</sup>*

*<sup>1</sup>Senior Professor and Head of Department, Department of Biochemistry, Government Medical College  
Kota, Rajasthan, India*

*<sup>2</sup>Third Year Resident, Department of Biochemistry, Government Medical College Kota, Rajasthan, India*

---

**Received: 10 Mar 2018**

**Accepted: 14 Mar 2018**

**Published: 16 Mar 2018**

---

### **ABSTRACT**

*In pre-eclampsia, the serum concentration of thyroid stimulating hormone is elevated. This might triggers subclinical hypothyroidism. Pregnancy itself is a risk factor for developing hypothyroidism. Ultimately, an insufficient amount of thyroid hormones may lead to severe pregnancy complications.<sup>1</sup>*

### **Method and Materials**

*100 subjects of subclinical hypothyroidism as cases and 100 euthyroid subjects as controls were taken and their serum analyzed for T<sub>3</sub>, T<sub>4</sub> and TSH. Pregnancy outcome in terms of pre-eclampsia were compared in terms of student t-test.*

### **Result**

*Incidence of pre-eclampsia was found clearly in excess in cases as compared to controls, showing an association between pre-eclampsia and subclinical hypothyroidism.*

### **Conclusion**

*There is an association between thyroid abnormalities and pregnancy caused hypertension. It suggests that thyroid function test should be done in each pregnant woman to detect subclinical hypothyroidism, so that timely intervention can be done to prevent pregnancy related complications.*

**KEYWORDS:** T<sub>3</sub>, T<sub>4</sub>, TSH, SCH, Pre-Eclampsia

### **INTRODUCTION**

Pre-eclampsia, characterized by new -onset hypertension to the extent of 140/90mm Hg or more on two occasions, measures 4 hours apart and proteinuria, with or without pedal edema after the 20<sup>th</sup> week of gestation in previously normotensive and non proteinuric patients,<sup>2,3</sup> causes substantial morbidity and mortality in mothers and infants. In pre-eclampsia, the serum concentration of thyroid stimulating hormone is elevated. This might trigger subclinical hypothyroidism. Researchers have shown that TSH levels occasionally improve 2.42 occasions above baseline in women with pre-eclampsia.

Whenever a patient has elevated TSH (reference range: 0.45 to 4.50  $\mu$ U per ml) in conjunction having a thyroid

hormone level inside the regular range, this really is frequently known as “subclinical hypothyroidism.” It’s usually regarded as to become an early stage of hypothyroidism of the different types of thyroid disorders, hypothyroidism is the most common in women. Subclinical hypothyroidism (SCH) is defined as a high TSH concentration with a normal range of serum T4. There is a new consideration towards the possibility that vascular harm, following pre-eclampsia, might impact on the thyroid gland causing subclinical hypothyroidism.

The present study is being undertaken to evaluate the risk of subclinical hypothyroidism in pregnant women having associated pre-eclampsia.

### **Material & Methods**

A comparative cross-sectional study was conducted at Department Of Biochemistry, Medical College, Kota and central lab, Department Of Biochemistry M.B.S Hospital, Kota From Nov.16 to Oct.17, 2017.

**Group 1:** 100 pregnant females with subclinical hypothyroidism

**Group 2:** 100 healthy euthyroid pregnant females as controls

Both groups were compared for pregnancy outcome in term of development of pre-eclampsia.

### **Inclusion Criteria**

- Singlet on pregnancy
- Both primigravida and multigravida between 18-38 years.
- Pregnant female with diagnosed subclinical hypothyroidism selected as cases.
- Cases after 20<sup>th</sup> weeks of gestation.

### **Exclusion Criteria**

- Previously diagnosed hypothyroidism.
- Multiple pregnancies.
- Diabetes mellitus.
- Cardiac disease.
- History of any metabolic disorder before or during the pregnancy.
- History of intake of any medication that might affect thyroid function.
- History of renal disease.
- History of hypertension before 20 weeks of gestation.

### **Statistics**

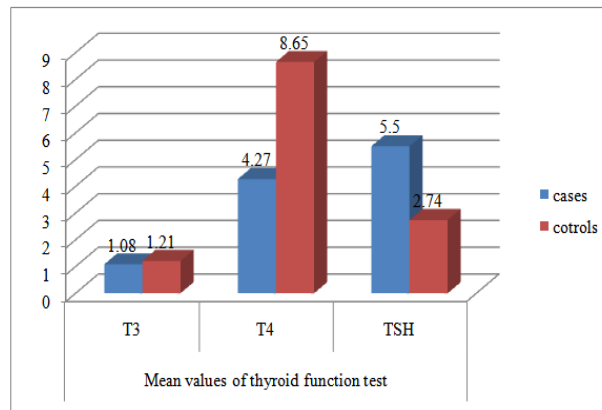
The data was tabulated and analyzed by using suitable statistical software. All the quantitative parameters were expressed as mean with standard deviation in both groups. To test for the differences in the mean values between the two groups for various quantitative parameters. Student’s t-test was applied when the data followed the normal approximation.

Differences in the proportions between different categorical variables were tested through appropriate statistical test.

**RESULTS**

**Table 1: Mean Values of Thyroid Function Tests among Cases & Controls**

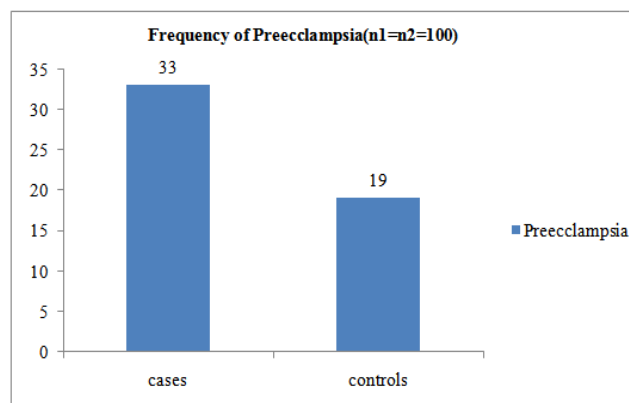
Parameter	Mean Values of Thyroid Function Tests		
	Cases (n1=100)	Controls (n2=100)	p value
T3	1.08	1.21	0.0035
T4	4.27	8.65	<0.00001
TSH	5.5	2.74	<0.00001



**Figure 1: Mean Values of Thyroid Function Tests among Cases & Controls**

**Table 2: Frequency Distribution of Pre-Eclampsia among Cases & Controls**

Parameter	Cases (n1=100)	Controls (n2=100)	p value
	Pre-eclampsia	33	19



**Figure 2: Frequency of Pre-Eclampsia among Cases & Controls**

**DISCUSSIONS**

The one salient finding of this study that pregnant women of the study group was that those identified to have subclinical hypothyroidism had an increased risk for development of pre-eclampsia when compared with euthyroid women of control group (Allan W et al,2000), also revealed the same finding in their epidemiological work of pregnancy- related complications<sup>4</sup>.

Wilson et al, 2012 found positive associations between thyroid disorders and the risk of PIH, mild to severe pre-eclampsia. However, in discordance with above stated study our study suggested that even after an adjustment for confounding factors (eg, maternal age, smoking, rural/urban background, ethnicity, and parity), there was no statistically significant association between pregnant women with hypothyroidism and development of pre-eclampsia<sup>5</sup>.

Different factors may play an important role in the development of pre-eclampsia. Etiology of pre-eclampsia is clearly unknown and it may happen in the second or third trimester of pregnancy (Mehdi *et al.*, 2009; Hasanzadeh *et al.*, 2008)<sup>6, 7</sup>. In present study, our findings showed that levels of TSH were higher and T4 was lower in study population women and no significant difference in T3 levels compared to healthy pregnant women ( $p > 0.05$ ) which was not in agreement with the finding of another study (Kumar *et al.*, 2005; Lao *et al.*, 1990; Skjoldebrand *et al.*, 1986; Basbug *et al.*, 1999)<sup>8,9</sup>.

In accordance with our study (Khaliq *et al.*, 1999), showed that there is significantly increased in TSH levels with development of pre-eclampsia, while few other studies show an association with the risk for developing and severity of pre-eclampsia and increased level of TSH was not significant in pre-eclampsia women<sup>10</sup>.

## SUMMARY AND CONCLUSIONS

The results of the present study suggest that there were significant differences in the development of pre-eclampsia, between pregnant women having subclinical hypothyroidism and healthy pregnant women. Pregnancy-induced hypertension was one of the common complications developed in patients with subclinical hypothyroidism.

There is an association between thyroid abnormalities and pregnancy caused hypertension. The difference of our finding with other studies could be related to different geographical areas, races, and diets. Variation of thyroid functioning later in life may develop in pre-eclampsia women. Thus, it suggests that thyroid function test should be done in each pregnant woman to detect subclinical hypothyroidism so that timely intervention can be done to prevent pregnancy-related complications.

## REFERENCES

1. Hirsch, D., Levy, S., Nadler, V., Kopel, V., Shainberg, B., & Toledano, Y. (2013). Pregnancy outcomes in women with severe hypothyroidism. *European Journal Of Endocrinology*, 169(3), 313-320. <http://dx.doi.org/10.1530/eje-13-0228>
2. American Association of Clinical Endocrinologists and American College of Endocrinology. AACE clinical practice guidelines for the evaluation and treatment of hyperthyroidism and hypothyroidism. *Endocr Pract.* 1995; 1:54-62.
3. Brosens JJ, Pijnenborg R, Brosens IA. The myometrial junctional zone spiral arteries in normal and abnormal pregnancies: a review of the literature. *Is J Obstet Gynecol.* 2002; 187:1416-1423?
4. Allan, W., Haddow, J., Palomaki, G., Williams, J., Mitchell, M., & Hermos, R. *et al.* (2000). Maternal thyroid deficiency and pregnancy complications: implications for population screening. *Journal of Medical Screening*, 7(3), 127-130.

5. Wilson, K.L., B.M. Casey, D.D. McIntire, L.M. Halvorson and F.G. Cunningham, 2012. Subclinical thyroid disease and the incidence of hypertension in pregnancy. *Obstet. Gynecol.*, 119: 315-320
6. Mehdi, F., A. Hossein, H.Z. Maliheh and T.M. Naser, 2009. Serum level of vascular cell adhesion molecule-1 (sVCAM-1) in sera. *Acta Medica Iranica*, 47: 65-70.
7. Hasanzadeh, M., H. Ayatollahi, M. Farzadnia, S. Ayati and M.K. Khoob, 2008. Elevated plasma total homocysteine in pre-eclampsia. *Saudi Med. J.*, 29: 875-878.
8. Kumar, A., B.K. Ghosh and N.S. Murthy, 2005. Maternal Thyroid hormonal status in pre-eclampsia maternal. *Ind. J. Med. Sci.*, 59: 57-63.
9. Auhood Kadhim Zaid, Study of Cases of Thyroid Disorder Hyperthyroidism and Hypothyroidism, *IMPACT: International Journal of Research in Applied, Natural and Social Sciences (IMPACT: IJRANSS)*, Volume 3, Issue 1, January 2015, pp. 9-14
10. Basbug, M., E. Aygen, M. Tayyar, A. Tutus, E. Kaya and O.R. Oktem, 1999. Correlation between maternal thyroid function tests and endothelin in pre-eclampsia-eclampsia. *Obstet. Gynecol.*, 94: 551-555.
11. Khaliq, F., U. Singhal, Z. Arshad and M.M. Hossain, 1999. Thyroid functions in pre-eclampsia and its correlation with maternal age, parity, severity of blood pressure and serum albumin. *Indian J. Physiol. Pharmacol.*, 43: 193-198.

