

Original Research Article

Correlation of thyroid status with severity of hypertension in pregnancy**Rani Kumari^{1*}, Kumari Archana², Roopam Singh³, Rita Tirkey⁴**¹*DNB resident, Department of Obstetrics and Gynaecology, Bokaro General Hospital, Bokaro Steel City, Jharkhand, India*²*Specialist, Department of Obstetrics and Gynaecology, Bokaro General Hospital, Bokaro Steel City, Jharkhand, India*³*Head of the Department, Department of Obstetrics and Gynaecology, Bokaro General Hospital, Bokaro Steel City, Jharkhand, India*⁴*Senior Consultant, Department of Obstetrics and Gynaecology, Bokaro General Hospital, Bokaro Steel City, Jharkhand, India***Received: 20-02-2021 / Revised: 27-03-2021 / Accepted: 05-05-2021****Abstract**

Introduction:Thyroid dysfunction constitutes major endocrine disorders during Pregnancy. It has long been recognized that maternal thyroid hormone excess or deficiency can influence maternal outcomes like miscarriages, anaemia in pregnancy, preeclampsia,abruptio placenta and postpartum haemorrhage and foetal outcome at all stages of pregnancy like prematurity, low birth weight, increased neonatal respiratory distress and foetal thyroid abnormalities which may justify screening for thyroid functions in pregnancy.This study was conducted to see the possible relationship between preeclampsia andthyroid dysfunction.**Method:** The study was a prospective, randomized, observational, case – control study on 216 patients conducted in the department of Obstetrics and Gynaecology, Bokaro General Hospital,Bokaro, Jharkhand,from July – 17 to December – 18.**Observation and results:**No of clinical hypothyroid cases were 12% in severe preeclampsia and while there was no case of clinical hypothyroidism in gestational hypertension.In sub clinical hypothyroid cases was 48% & 20% of severe preeclampsia and gestational hypertension respectively.**Conclusion:**A positive association was found between thyroid hypofunction and pregnancy induced hypertension in the present study.

Keywords:Thyroid dysfunction,severe preeclampsia, gestational hypertension.

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Introduction

Thyroid dysfunction constitutes one of the commonest endocrine disorders duringpregnancy after diabetes mellitus[1].It has long been recognized that maternal thyroid hormone excess or deficiency can influence maternal outcomes like miscarriages, anaemia in pregnancy, preeclampsia,abruptio placenta and postpartum haemorrhage and foetal outcome at all stages of pregnancy like prematurity, low birth weight, increased neonatal respiratory distress and foetal thyroid abnormalities which may justify screening for thyroid functions in pregnancy.Preeclampsia (PE) and gestational hypertension (GH) are new onset hypertensive disorders in pregnancy, occurring after mid-gestation with proteinuria (more than 300 mg/l in 24 hours specimen) after 20 weeks of gestation up to 6 weeks postpartum in previously normotensive non proteinuric pregnant women and without proteinuria respectively[2].The incidence of pre-eclampsia in hospital practice varies widely from 5 to 15%[3].Young and nulliparous women are particularly vulnerable to developing preeclampsia, whereas older women are at greater risk for chronic hypertension with superimposed preeclampsia[4]. This disorder is unique to human pregnancy in which numerous genetic, immunological and environmental factors interact. It is a leading cause of maternal and foetal morbidity and mortality throughout the

world and still is one of the most complex problems in obstetrics. Preeclampsia is associated with eclampsia, HELLP syndrome, placental abruption and end organ damage. The pathophysiology of PE and GH is still largely unknown, but circulating anti-angiogenic factors, like soluble fms-like tyrosine kinase 1 (sFlt1), are thought to play a role⁵.Our aim is to study the association between hypertension in pregnant women and thyroid dysfunction.

Material and method

The study was a prospective, randomized, observational and case – control study conducted in the department of Obstetrics and Gynaecology, Bokaro General Hospital,Bokaro, Jharkhand, carried out from July – 2017 to December – 2018. The study included 108 pregnant women with gestational hypertension and preeclampsia was measured and compared with the levels in 108 healthy controls. Study population Total study population was 2160 out of that for current study prevalence of hypertension in pregnant women in our hospital is 10%.

Inclusion criteria

1. Pregnant women with age 18-35 years.
2. Women with pregnancy induced hypertension.

Exclusion criteria

1. All pregnant women with history of thyroid disease (hypo, or hyperthyroidism,goitre, graves', autoimmune and toxic nodular thyroiditis etc.)
2. Systemic disorders(diabetes, renal diseases, epilepsy or other convulsive disorders,chronic hypertension, autoimmune and collagen vascular diseases)

Correspondence*Dr. Rani Kumari**

DNB Resident, Department of obstetrics and Gynaecology, Bokaro General Hospital, Bokaro Steel city, Jharkhand, India.

E-mail: rani.dr2008@gmail.com

Method of study

Particulars of the women were noted, history of present pregnancy, Past obstetric history were asked, thereafter clinical examination, and All preliminary and baseline investigations and thyroid function were performed.

Statistical method : The collected data was organized, tabulated and statistically analysed using “MedCalc”. The data was analyzed by appropriate statistical tools. Numerical data was expressed as mean \pm standard deviation, mode, percentile and categorical data were expressed as relative frequency and percentage. The following statistical significance tests were applied

1. T-test was used to compare two independent groups of continuous data.

2. The “Chi-square test /Mann- Whitney U test ” was used to compare categorical data.

3. Test of Significance for Difference of Proportions “|Z|-TEST”.

4. For finding correlation coefficient we used “Karl Pearson Correlation Coefficient”.

Finally the calculated values were compared with the tabulated value at particular degree of freedom and finds the level of significance.

A “p-value” was considered to be non-significant if > 0.05 and significant if < 0.05 .

Their inference were as follows-

$P > 0.05$ statistically insignificant

$P < 0.05$ statistically significant

$P < 0.01$ statistically highly significant

$P < 0.001$ statistically very highly significant

Observations & Results**Table 1 : Study Group vs Control Group**

GROUP	STUDY GROUP	CONTROL GROUP
NUMBER OF CASES	108	108
Percentage	50%	50%

Total cases were divided into two groups

- Study Group – Includes women with pregnancy induced hypertension.
- Control group- Includes women who are normotensive

Table 2 : Distribution of cases according to severity of hypertension

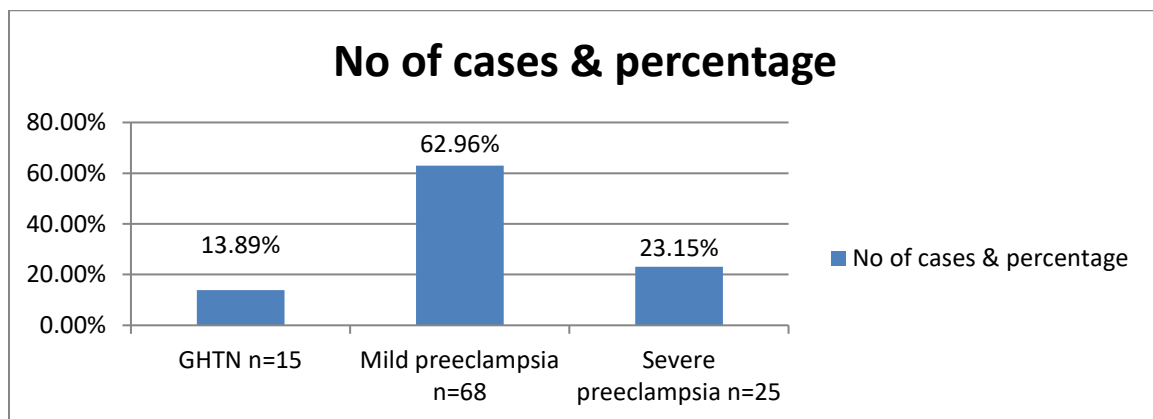
PIH (n=108)	Gestational hypertension(GHTN)	Mild preeclampsia	Severe preeclampsia
No. of cases	15	68	25
Percentage	13.89%	62.96%	23.15%

For Test of Significance, Here we use “Chi – square test { χ^2 – Test}”

$\chi^2_{cal} = 44.056$ {at 95% confidence limit, with degree of freedom = 2, $\chi^2_{tab} = 5.991$ }

$\chi^2_{cal} > \chi^2_{tab}$ { $44.056 > 5.991$ } at 5% level of significance

Hence, there were statistically significant difference among the cases according to severity of hypertension, with p – value { $p < 0.0001$ }

**Fig 1: Shows Distribution of cases according to severity of hypertension**

Majority of women with pregnancy induced hypertension were having mild preeclampsia 62.9% (68 out of 108) followed by severe preeclampsia 23.1% (25 out of 108) and GHTN 13.9% (15 out of 108).

Table 3 : Correlation of thyroid status with severity of hypertension

Thyroid status	Study group			Total
	GHTN	Mild PE	Severe PE	
EU	12(80%)	54(79.41%)	10(40%)	76(70.37%)
SCH	3(20%)	13(19.12%)	12(48%)	28(25.93%)
CH	0(0%)	1(1.47%)	3(12%)	4(3.7%)
TOTAL	15(100%)	68(100%)	25(100%)	108(100%)

For Test of Significance, Here we use “Chi – square test { χ^2 – Test}”

$\chi^2_{cal} = 16.499$ {at 95% confidence limit, with degree of freedom = 4, $\chi^2_{tab} = 9.488$ }

$\chi^2_{cal} > \chi^2_{tab}$ { $16.499 > 9.488$ } at 5% level of significance

Hence, there were statistically significant differences between two groups according to their severity of hypertension, with p – value = 0.0024 { $p < 0.05$ }

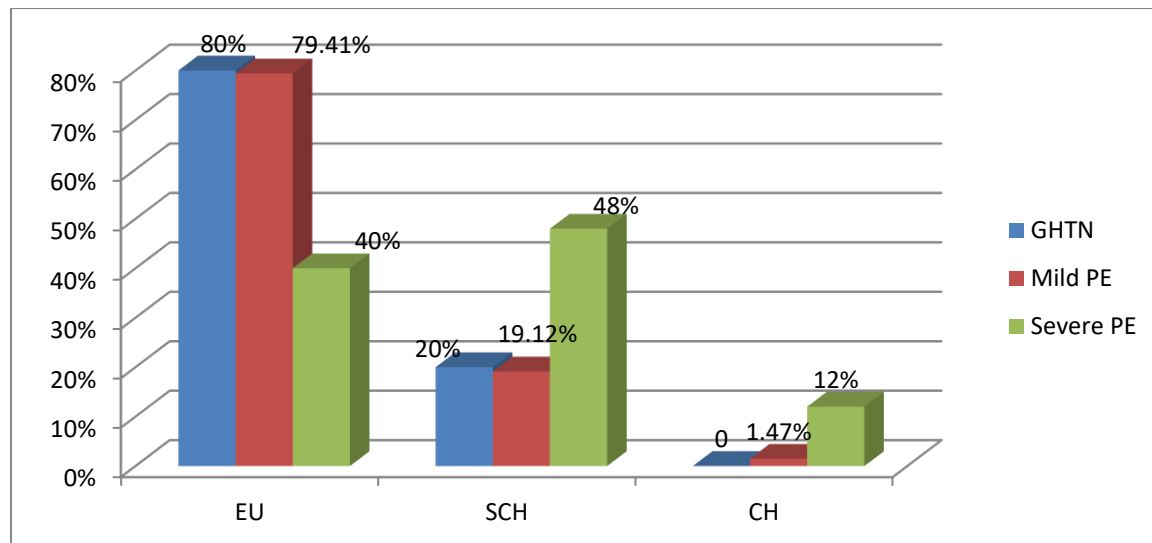


Fig 2 : Shows correlation of thyroid status with severity of hypertension

□□ In the above table, severity of hypothyroidism increased with severity of hypertension.

□□ Significant difference was seen in number of clinical hypothyroid cases and subclinical hypothyroid cases in gestational hypertension and severe preeclampsia respectively.

□□ Number of clinical hypothyroid cases were 12% in severe preeclampsia and while there was no case of clinical hypothyroidism in gestational hypertension.

□□ Number of sub clinical hypothyroid cases was 48% & 20% in severe preeclampsia and gestational hypertension respectively.

Discussion

A total of 216 randomized antenatal and intranatal women were studied. Out of them 108 women were having pregnancy induced hypertension (study group) and 108 women were normotensive (control group) (Table 1)

Distribution of cases according to severity of hypertension (Table 2)

It includes only the study group. Maximum number of cases with pregnancy induced hypertension were having mild Preeclampsia (62.9%) followed by severe preeclampsia 23.1% and gestational hypertension (13.9%). Nearly similar incidence was found in study done by Manjusha et al with 19.2% and 78.8% of gestational hypertension and preeclampsia respectively [6].

Correlation of thyroid status with severity of hypertension (Table 3)

In our study, severity of hypothyroidism increased with severity of hypertension. Euthyroid cases were more in number in gestational hypertension (80%) in comparison to severe preeclampsia (40%). Significant difference was seen in number of clinical hypothyroid cases in gestational hypertension and severe preeclampsia. Cases with clinical hypothyroidism were 12% in women with severe Preeclampsia while no case of CH was found in women with gestational hypertension. Similarly, significant difference was seen in number of subclinical hypothyroid cases in gestational hypertension (20%) and severe preeclampsia (48%). Khaliq F et al [7] found that severe Preeclamptic women show significant difference from mild preeclamptic women with significant increase in serum TSH levels in severe one. Osathanondh R et al [8] found significant decrease in thyroid hormones level in severe Preeclampsia in comparison to mild Preeclampsia. Minire A et al [9] reported 3.3%, 6.9%, 4.2%, 12.3%, 2.79% cases complicated with eclampsia, abruption placenta, HELLP

syndrome, renal failure & DIC respectively in women with preeclampsia. Nearly similar results were seen in our study. Dr. Khanaam M et al [10] found that hypothyroidism was significantly increased in Preeclampsia. Dr. Swapan Das et al [11] found statistically higher number of preeclamptic women had high TSH levels & thyroid disorders. Khanam M et al [10], Khadem et al [12] Asmehan et al [13], Sardana et al [14], Levine et al [15], Mostaghel et al [16], Kumar et al [17] study found that mean TSH of pre-eclamptic women ranged between 3 – 4.5 μ IU/ml and 2 – 3 μ IU/ml in normotensive women. Dr. Khanaam M et al found that hypothyroidism was significantly increased in Preeclampsia. Similarly in our study severity of hypothyroidism increased with severity of hypertension.

Conclusion

A positive association was found between thyroid hypofunction and pregnancy induced hypertension in the present study. However, the association between thyroid function and preeclampsia needs further investigation because of the small number of subjects, geographical variation, different races and different diets of the study. A multicentric study with large population is needed to support the hypothesis that thyroid hormone abnormalities are associated with preeclampsia. To conclude on the basis of our study, we suggest screening for thyroid function in every pregnant women and strongly recommend it in women with pregnancy induced hypertension.

Limitations of the study

1. The study included a small group of population, so the effects of the therapy cannot be studied in a wider range of population.
2. Since majority of the patients included in the study belonged to the middle and lower socio-economic classes, they faced a cost impact.
3. Patients put on oral thyroid medication having impaired absorption due to food and calcium supplementation.

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Conflict of Interest: Nil

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