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RESEARCH ARTICLE

EVALUATION OF THYROID HORMONE STATUS IN PREGNANCY INDUCED HYPERTENSION

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ABSTRACT

Background and Objective: The objective of the study is to find the association between the thyroid hormone status with pregnancy induced hypertension.
Method: Thyroid hormones namely free tri-iodothyronine (FT3), free thyroxine (FT4), and Thyroid stimulating hormone (TSH) were evaluated at the time of diagnosis of PIH in 100 pregnant women.
Statistical Analysis: In the subjects, serum concentration of FT3, FT4 and TSH are estimated using immunoenzymometric assay. The demographic data and hormone levels were analysed using Pearson Chi-square test.
Results: Out of 100 participants 60% were primigravida and 40% were Multigravida. Mean age of the participants was 25.72±3.86 years. Statistics shows that 57% of participants contribute to euthyroid, 36% to subclinical hypothyroid, 5% to overt hypothyroid and 2% to overt hyperthyroid. There was a statistically significant association between PIH and thyroid hypofunction with P-value being 0.003.
Conclusion: In the present study a positive association was found between thyroid hypofunction and PIH which is statistically significant. With regards to the results of present study the measurement of serum levels of FT3, FT4, TSH can be suggested as a criterion for the prediction of PIH.

INTRODUCTION

Among the endocrinal disorder that occur during pregnancy, thyroid disorder is most common after diabetes mellitus [1]. Pregnancy is associated with profound modifications in the regulation of thyroid function. These changes are the result of the various factors like increase of thyroid - binding globulin (TBG) due to elevated estrogen and human chorionic gonadotropin, increased renal loss of iodine due to increased glomerular filtration rate, modification in iodine transfer to placenta occur during pregnancy, modification in the peripheral metabolism of maternal thyroid hormones[2]. Maternal thyroid dysfunction are at increased risk of Pre eclampsia, placental abruption, threatened abortion, preterm labour, post partum hemorrhage[3]. Hypertensive disorder complicating pregnancy are common and form one of the deadly triad including hemorrhage and infection[4]. Hypertensive disorder contribute greatly to perinatal and maternal morbidity and mortality in developing countries. The progression of PIH during its course and its adverse effect on maternal and fetal outcome is unpredictable. PIH have been observed in a significant proportion of antenatal mother suffering from subclinical or overt hypothyroidism. In India incidence of PIH as recorded from hospital statistics vary widely from 5-15 %.[5]. Although, pregnancy is usually associated with very mild hyperthyroxinemia which is the presence of free thyroxin (FT4) value above the 2.5th percentile with thyrotropin (TSH) level within the reference range[6]. The mechanism of hypothyroidism in PIH is not well identified but changes in thyroid function are due to high circulation of estrogen. Excess placental soluble fms-like tyrosine kinase 1 (sFlt1) may contribute to endothelial dysfunction, hypertension, and proteinuria in preeclampsia[7]. There is limited studies on thyroid dysfunction in PIH. The aim of this study is to evaluate the association between thyroid status and PIH in antenatal mother.

MATERIAL AND METHODS

Study design

Prospective study.

Study site

OPD and IP ward of Obstetrics and Gynaecology, Department of Rajah Muthiah Medical College and Hospital, Annamalai University, Chidambaram. Tamilnadu.

Study population

100 antenatal mothers diagnosed as PIH are included in the study as participants with their consent.

Study period

March 2016 – August 2017

Inclusion criteria

Diagnosed cases of PIH

Exclusion criteria

Antenatal mother < 20 weeks of gestation, known case of diabetes, renal disease, cardiac disease, thyroid disorder and multiple gestation.

Study procedure

After getting IHEC approval for the study, Antenatal mothers (> 20 wks) attending OG OPD with BP >149/90mm Hg for first time during pregnancy on two occasions 6hrs apart are diagnosed as PIH and are selected as subject for this study. Informed consent was obtained from each mother and blood sample of about 5ml is collected from the participants for evaluation of thyroid status and results are noted.

Data collection

Participant's name, age, parity, menstrual history, history about present pregnancy, past obstetric, medical, surgical, and family, clinical examination including general examination, vitals, anthropometric measurement, thyroid examination, systemic and obstetric examination were done and findings were noted in a structured case format. All baseline investigations like CBC, blood grouping and typing, urine routine and microscopy, blood sugar, and ultrasonography are recorded. All investigations pertaining to complications of preeclampsia like LFT, RFT, serum uric acid, and serum proteins are done. Assessment of thyroid status with serum FT3, FT4, TSH was done.

Data analysis

According to guidelines and trimester specific TSH values antenatal mothers with PIH were classified as euthyroid, subclinical or overt hypothyroid, subclinical or overt hyperthyroid. The results were analysed with Pearson's chi-square test.

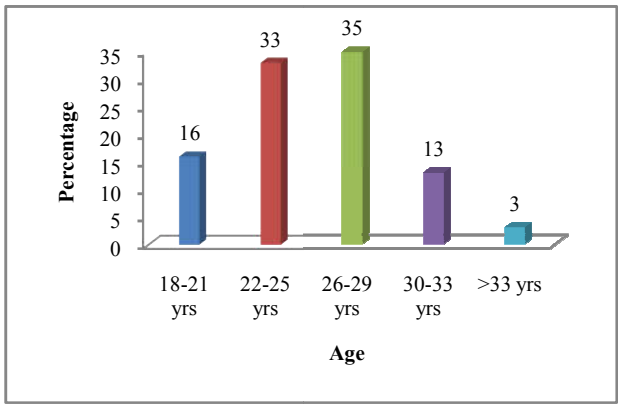
RESULTS

A total of 100 antenatal mother screened positive for pregnancy induced hypertension were enrolled after getting the consent for study.

The Mean age of the participants were 25.72± 3.86. Table 1 shows the age distribution of the participants. Out of 100 cases 60% were Primigravida and 40% were multigravida shown in table 2.

Table 1 Age Distribution of the Participants

Age	No. of cases	Percentage (%)
18-21 yrs	16	16.0
22-25 yrs	33	33.0
26-29 yrs	35	35.0
30-33 yrs	13	13.0
>33 yrs	3	3.0
Total	100	100.0



Graph 1 Age Distribution of the Participants

Table 2 Parity

Parity	No. of cases	Percentage (%)
Primi	60	60.0
Multi	40	40.0
Total	100	100.0

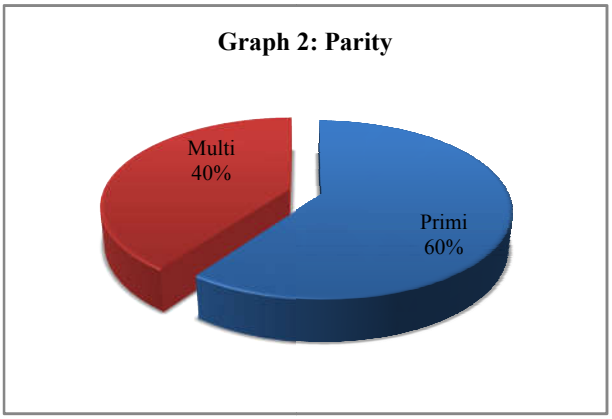


Table 3 Gestational Age of the participants

Gestational Age	No. of cases	Percentage (%)
<37	42	42.0
>37	58	58.0
Total	100	100.0

Data analysis shows 57% of the participant contribute to euthyroid, 36% contribute to subclinical hypothyroid, 5% contribute to overt hypothyroid, 2% contribute to overt hyperthyroid, shown in table 4.

Table 4 Distribution of the cases according to thyroid status

TSH level	No. of cases	Percentage (%)
Overt hyperthyroid (<0.1)	2	2.0
Euthyroid (0.31-3.0)	57	57.0
Subclinical hypo (3.01-10)	36	36.0
Overt hypothyroid (>10)	5	5.0
Total	100	100.0

The mean TSH values of various groups of patient is given in the table- 5.

There was a significant association between pregnancy induced hypertension and thyroid dysfunction with the P-value being significant 0.003 (Pearson's chi-square test) shown in table 5.

Table 5 TSH level in PIH mother

TSH level	PIH		Total
	Mild	Severe	
Overt hyperthyroid (<0.1)	0 (.0%)	2 (12.5%)	2 (2.0%)
Euthyroid (0.31-3.0)	51 (60.7%)	6 (37.5%)	57 (57.0%)
Subclinical hypo (3.01-10)	30 (35.7%)	6 (37.5%)	36 (36.0%)
Overt hypothyroid (>10)	3 (3.6%)	2 (12.5%)	5 (5.0%)
Total	84 (100.0%)	16 (100.0%)	100 (100.0%)

Chi-Square Tests

	Value	df	P value
Pearson Chi-Square	13.925	3	0.003

Table 6 Mean TSH values of participants

	N	Mean	Std. Deviation
Overt hyperthyroid (<0.1)	2	0.0080	0.00424
Euthyroid (0.31-3.0)	57	2.0363	0.70441
Subclinical hypo (3.01-10)	36	4.4806	1.23868
Overt hypothyroid (>10)	5	38.7640	61.79635
Total	100	4.7120	14.77392

DISCUSSION

Gestational hypertension is a serious complication of pregnancy of unknown etiology that may occur in any stage of 2nd and 3rd trimester[8]. Different studies are controversial regarding thyroid hormone levels in pregnancy induced hypertension. This study was done to contribute clarity to the ongoing controversy. In this study, the thyroid hormone status in pregnancy induced hypertension was evaluated. The mean age of the study group is 25.72±3.86 compared to 28.40±5.20 in Lao TT *et al* study and 26.64±5.44 in Dinesh kumar *et al* study [9]. We found that there is a significant association between thyroid dysfunction and pregnancy induced hypertension. Similar study by Kumar *et al* concluded that mean TSH was significantly increased in pre eclampsia compared to control group.

Dhananjaya B.S. *et al* reported that TSH levels were elevated in pre eclamptic patient compared to normal pregnant women, which could be the possible etiology for pre eclampsia. Elevated TSH level could be used as predictor for pre eclampsia[10]

Deshpande S *et al* concluded that there is a positive association found between thyroid hypofunction and pre eclampsia and it was found to be statistically significant.[11]

Manjunatha S *et al* reported that TSH level were higher in pre eclampsia subject compared to normal pregnant women which could indicate possible etiology for pre eclampsia.[12]

Qublan *et al* performed study in 27 severe pre eclamptic cases, reported there is no significant difference in the levels of FT3,FT4,TSH between normal and pre eclamptic women[13].

Nahid Mostaghel *et al* reported no significant difference in cases and control group in thyroid levels. Maternal thyroid hormonal status was evaluated in 132 pregnant women with pregnancy induced hypertension.[14]

CONCLUSION

To conclude, in the present study a positive association was found between thyroid hypofunction and pregnancy induced hypertension.

The findings of this study support the hypothesis that changes in FT3, FT4, TSH levels could contribute positively to the etiology of pregnancy induced hypertension.

This study recommends a multicentric approach with large population to support the hypothesis. However with regard to the result of present study, the measurement of FT3, FT4, TSH is mandatory in all antenatal mother and can be considered as a positive predictor of pregnancy induced hypertension.

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