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Research Article

A Prospective Study on Thyroid Dysfunction and Hypertensive Disorder in Pregnant Women

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Abstract

Negative pregnancy outcomes have been linked to hypothyroidism that is not appropriately managed. Pregnancy increases the need for thyroid hormone, and many women with pre-existing hypothyroidism require higher thyroid hormone dosages in the 1st trimester. A primary cause of maternal and fetal morbidity, hypertension affects 5 to 10% of all pregnancies and is more severe when it results into preeclampsia. We have aimed for a comprehensive study of hypothyroidism and hypertension. With objectives like highlighting the most developed disorder, complications and risk factors. Finally focus on management approach.

Keywords: Hypertension, hypothyroidism, complications, risk factors, TSH, FT3, FT4.

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INTRODUCTION:

Raised blood pressure during maternity is a condition known as gestational hypertension (GH), which, if not treated effectively, can result in fatal consequences such pre-eclampsia, eclampsia, and mortality [1]. It is estimated that 10% to 17% of all pregnancies are impacted by hypertension, a multisystemic illness. The mechanisms underlying the pathogenesis of GH have not yet been fully elucidated, despite the fact that they play a significant role in maternal and perinatal morbidity and mortality. However, hypothyroidism can seriously disrupt the cardiovascular system by altering left ventricular function, lowering cardiac output, and increasing systemic vascular resistance. However, a number of things have been proposed as contributing mechanisms to the increase in blood pressure during pregnancy. These include up to 40% increase in total plasma volume and a 25% rise in red blood cell mass [2].

Thyroid linked endocrinopathies are the second most prevalent endocrine illness in women overall, after diabetes mellitus. In individuals of reproductive age, these illnesses are 4-5 times more common, and they may also be more common in individuals with co-morbid illnesses such pregnancy hypertension [3]. Studies have indicated that people with subclinical hypothyroidism have reduced endothelium-associated vasodilation, which raises the possibility that this condition increases the risk of hypertensive problems during pregnancy [4].

Levothyroxine administration during gestation is correlated to other comorbidities and a 1.5-times increased risk for preeclampsia [5]. The most frequent instance of thyroid malfunction during gestation is an increase in TSH levels with normal FT3 and FT4 levels [6].

Tests presently in use to determine thyroid activity TSH, triiodothyronine (T3), and thyroxine (T4) are occasionally inadequate to definitively establish the illness because T3 and T4 levels are influenced by so many additional non-specific illnesses [7]. Thus, this present study is aimed to assess the thyroid function and hypertension among pregnant women attending antenatal clinic at Gandhi hospital using TSH, FT3 and FT4, as markers.

MATERIAL AND METHODS:

This is an observational prospective study conducted in the inpatient department of Gynecology at Gandhi hospital, Secunderabad from September 2022 to February 2023, with study duration of 6 months. The protocol has been approved by Institutional Ethics Committee at CMR College of pharmacy. The sample size is 120 and 101 cases have been collected. For documentation purposes, a systematic data collection was created in accordance with the standards, and cases were examined and gathered based on the inclusion and exclusion criteria. The sample size is 101 cases have been collected. The purpose of the study is to review patient information up until discharge, analyze medical data, and note any new problems that develop. The study will also gather data and assess the affected population. The final report will be generated after

the analysis and interpretation of the data. The inclusion criteria are pregnant women with hypertension, hypothyroidism, both hypertension and hypothyroidism, and pregnant women. Dropout criteria include patients who abscond, die, or leave the hospital in between the treatment course. Data were obtained on various parameters and final data was analysed by using SPSS software version 29 to obtain the results.

RESULTS:

A total of 101 cases were collected during the study period of 6 months, out of these 101 cases, no patient has left or absconded. Finally 101 cases were identified and analysed for final outcome.

Out of 101 cases, hypothyroidism has highest cases (47%) followed by hypertension (32%) and women with both hypertension and hypothyroidism are 21% (FIGURE 1).

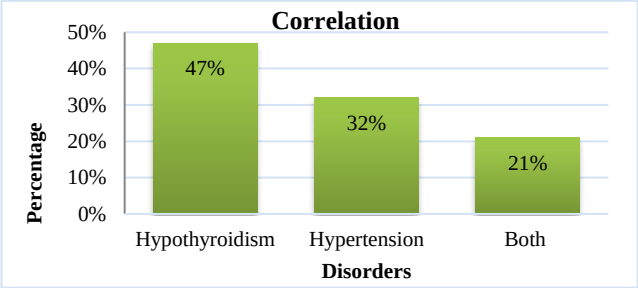

FIGURE 1

One sample t-test, mean and standard deviation for age, gestational age and length of stay:

Statistical analysis was performed using SPSS software version 29, parameters were assessed using one sample t-test and p value was found to be <0.001 which shows that the taken parameters are statistically highly significant (TABLE 1)

TABLE 1: One sample t-test, mean and standard deviation for age, gestational age and length of stay:

Parameters	Test Subjects (Mean ± SD)	p-value
Age	(25.63±4.086)	<0.001
Gestational age (weeks)	(29.69±6.379)	<0.001
Length of stay	(7.78±2.700)	<0.001

CHI-SQUARE ANALYSIS:

Null hypothesis (H0): Hypertension and hypothyroidism are dependent.

Alternative hypothesis (H1): Hypertension and hypothyroidism are independent.

As the chi-square value is greater than the table value null hypothesis is rejected (TABLE 2).

TABLE 2: Correlation between hypothyroidism and hypertension in pregnant women:

		Women with hypothyroidism		Total	Percentage	Chi square
		No	Yes			
Women with hypertension	**No**	0	48	48	47%	42.422
	Yes	32	21	53	53%	
Total		32	69	101	100%	

Test of significance by Pearson Chi-square test {χ^2-test}:

χ^2_{cal}=42.422 {at 95% confidence limit, with degree of freedom=1, χ^2_{tab}=3.841}

$\chi^2_{cal} > \chi^2_{tab}$ {42.422>3.841} at 5% level of significance.

Hence, there was statistically significant difference between the hypertension and hypothyroidism in pregnant women.

Categorization of drugs: Category of drugs prescribed to the patient for the better outcome (TABLE 3)

TABLE 3: Categorization of drugs:

Sl. No.	Category of drugs	No. of cases	Percentage
1	**Multivitamins**	93	92%
2	**Antihypertensive**	83	82%
3	**Thyroid agents**	59	58%
4	**Antacid**	51	50%
5	**Antibiotic**	28	28%
6	**NSAIDS**	8	8%
7	**Female hormone**	2	2%
8	**Anti-fibrinolytic agents**	2	2%
9	**Anticonvulsant**	1	1%
10	**Anticoagulant**	1	1%
11	**Probiotic**	1	1%
12	**Antispasmodic**	1	1%
13	**Serotonin 5 HT3 receptor antagonist**	1	1%

DISCUSSION:

A prospective observational study was conducted to assess the thyroid levels and hypertension in pregnant women. The focus of this study was to review the hypothyroidism and hypertension. The ultimate aim of the study was that it can be beneficial to society. A total of 101 cases were identified, included and analysed for the study from inpatient units of department of Gynaecology, Gandhi hospital, Secunderabad. This study highlights the age group of 21-25 years was mostly presented with hypothyroidism and hypertension followed by the age of 26-30. The present study corresponded with the as study done by **Potlukova E et al 2012**[8], **Singh V et al 2015**[9].

This study highlights that the gestational hypertension is associated with decrease activity of thyroid hormone. The present study corresponded with the as study done by **Ignatius C M et al 2017**[2]. In the present study out of 101 cases 49, 29, 17, 6 cases had gestational age of 31-40 weeks, 21-30 weeks, 11-20 weeks, 1-10 weeks respectively. The present study corresponded with the study done by **Saraladevi R et al 2016**[10]**.**

In the present study out of 101 cases 69 patients were found to be suffering from hypothyroidism in our study, in this TSH levels were found to be increased in most of the patients, maximum 56(81%)cases had TSH levels above 5 ml U/L and remaining 13(19%) cases had TSH levels 0-5 ml U/L, and T3 and T4 levels were mostly found to be normal in our study, maximum 49(71%) cases had T3 levels ranging from 0.92-2.75 nmol/L and minimum 20(29%) cases had T3 levels above 2.76 nmol/L and maximum 64(93%) cases had T4 levels ranging from 4.5-11.2 mcg/dl and minimum 5(7%) cases had T4 level above 11.2 mcg/dl. The present study corresponded with the study done by **Singh A et al 2020**[6]**.**

Among the hypothyroidism cases maximum of 31(45%) cases had subclinical hypothyroidism, followed by 25(36%) cases with overt hypothyroidism and 13(19%) cases had euthyroid. The present study corresponded with the as study done by **Ignatius C M et al 2017**[2]. In the present study out of 101 cases 53 patients were suffering from hypertension. In which maximum 32(60%) cases had mild preeclampsia, 12(23%) cases had severe preeclampsia and 9(17%) had gestational hypertension. The present study corresponded with the study done by **Kumari R et al 2020**[11]**.**

In the present, study out of 101 cases the incidence of maternal complication was placenta previa (5%), seizures (1%), diabetes mellitus (6%), vaginal bleeding (8%), splenomegaly (1%), anemia (1%), metabolic encephalopathy (1%). The present study corresponded with the study done by **Abalovich M et al 2002**[12]. In the present study out of 101 cases the risk factors associated with pregnancy were found to be Rh –ve pregnancy 5%, past history of abortion 5%. The present study corresponded with the study done by **Costumbrado J et al 2021**[13].

We have identified in the study that multivitamins (92%) were drug of choice for most of the patients followed by antihypertensive (82%), thyroid agents(58%), antacids(50%), antibiotics(28%), NSAIDS(8%), progesterone (2%), antifibrinolytic(2%), others(1%). We also found that, around 80% of cases got discharged after treatment with in a period of 1 to 2 weeks. This outcome clearly indicated that a strong and suitable management strategy has been practised by the physicians to treat the patients. This finding match with the length of stay to find that better management strategy leads to lesser length of stay as reported by **Kashi Z et al 2015** [14], **Richard K et al 2022**[15].

In our present study all the statistical analysis were performed using SPSS software version 29, and the parameters like age, gestational age, length of stay were assessed using one sample t-test and p value was found to be <0.001 which defined as the taken parameters are statistically highly significant. The present study corresponded with the as study done by **Ignatius C M et al 2017**[2].

For Test of significance of hypertension and hypothyroidism in pregnant women we used Pearson Chi-square test {χ^2-test}

χ^2_{cal}=42.422 {at 95% confidence limit, with degree of freedom=1, χ^2_{tab}=3.841}

$\chi^2_{cal} > \chi^2_{tab}$ {42.422>3.841} at 5% level of significance.

Hence, there was statistically significant difference between the hypertension and hypothyroidism in pregnant women. The present study corresponded with the study done by **Kumari R et al 2020** [15].

CONCLUSION:

With this study we have found that decreased thyroid gland activity is linked to gestational hypertension. FT3 and FT4 were significantly normal, whereas TSH levels are higher. Our study concluded that with appropriate evaluation and strict adherence towards management strategy for hypothyroidism and hypertension we can provide enhanced patient outcome.

REFERENCES:

1. World Health Organization. Multi-country survey on maternal and newborn health. Geneva, World Health Organization 2014:1-34.
2. Ignatius C M, CE D, Okereke O E, Isi o. Assessment of thyroid function among hypertensive pregnant women: A cross sectional study from south eastern Nigeria. Archives of clinical and biomedical research. 2017;01(01):59-68. https://doi.org/10.26502/acbr.5017006
3. Glinoer D. The regulation of thyroid function in pregnancy: pathways of endocrine adaptation from physiology to pathology. Endocrine reviews. 1997;18(3):404-33. https://doi.org/10.1210/edrv.18.3.0300 PMid:9183570
4. Han y, wang j, wang x, Ouyang l, li y. Relationship between subclinical hypothyroidism in pregnancy and hypertensive disorder of pregnancy: A systematic review and meta-analysis. Frontiers in endocrinology. 2022;13. https://doi.org/10.3389/fendo.2022.823710 PMid:35355565 PMCid:PMC8959212
5. Lintula A, Keski-nisula l, Sahlman h. Hypothyroidism and the increased risk of preeclampsia - interpretative factors? Hypertension in pregnancy. 2020;39(4):411-7. https://doi.org/10.1080/10641955.2020.1800030 PMid:32787605
6. Singh A, Singh S. Status Of Thyroid Hormone Parameters In Hypertensive Disorders Of Pregnancy. Nepalese Medical Journal. 2020;3(1):302-5. https://doi.org/10.3126/nmj.v3i1.29376
7. Wilson KL, casey BM, mcintire DD, halvorson LM, cunningham FG. Subclinical thyroid disease and the incidence of hypertension in pregnancy. Obstetrics & gynecology. 2012;119(2, part 1):315-20. https://doi.org/10.1097/AOG.0b013e318240de6a PMid:22270283
8. Potlukova E, Potluka O, Jiskra J, Limanova Z, Telicka Z, Bartakova J, et al. Is age a risk factor for hypothyroidism in pregnancy? An analysis of 5223 pregnant women. The journal of clinical endocrinology & metabolism. 2012;97(6):1945-52. https://doi.org/10.1210/jc.2011-3275 PMid:22438224
9. Singh V, Srivastava M. Associated risk factors with pregnancy-induced hypertension: A hospital-based KAP study. International journal of medicine and public health. 2015;5(1):59. https://doi.org/10.4103/2230-8598.151263
10. Saraladevi R, Nirmalakumari T, Shreen B, Usha rani V. Prevalence of thyroid disorder in pregnancy and pregnancy outcome. IAIM, 2016; 3(3): 1-11.

11. Kumari R, Kumari A, Roopam S, Tirkey R. Correlation of thyroid status with severity of hypertension in pregnancy. International journal of health and clinical research 2020;35:254-98.

12. Abalovich M, Gutierrez S, Alcaraz G, Maccallini G, Garcia A, Levalle O. Overt and subclinical hypothyroidism complicating pregnancy thyroid. 2002;12:63-6 https://doi.org/10.1089/105072502753451986 PMid:11838732

13. Statpearls. Rh incompatibility [internet]. Statpearls. Statpearls publishing; 2022[cited2023feb9]. Available from: https://www.Statpearls.Com/articlelibrary/viewarticle/28507/ .

14. Kashi Z, Bahar A, Akha O, Hassanzade S, Esmaeilisaraji L, Hamzehgardeshi Z. Levothyroxine dosage requirement during pregnancy in well-controlled hypothyroid women: A longitudinal study. Global journal of health science. 2015;8(4):227. https://doi.org/10.5539/gjhs.v8n4p227 PMid:26573046 PMCid:PMC4873573

15. Hypertension in pregnancy - statpearls - NCBI bookshelf [internet]. [Cited2023feb9].Availablefrom: https://www.Ncbi.Nlm.Nih.Gov/books/NBK430839/