ISSN (P) : 2589-9120 / (O) : 2589-9139
PubMed-National Library of Medicine - ID: 101773527

International Journal of Medical Science and Applied Research (IJMSAR)

Available Online at: https://www.ijmsar.com

Volume – 5, Issue – 3, May – 2022, Page No. : 13 – 19

Evaluation of Maternal and Perinatal Outcome of Pregnancy with Thyroid Disorder: A Prospective Observational Study

[1]Dr. Alka Batar, Assistant Professor, Department of Obs. & Gynae, SMS Medical College, Jaipur, India

[2]Dr. Neha Sharma, Assistant Professor, Department of Obs. & Gynae, SMS Medical College, Jaipur, India

[3]Dr. Nupur Lauria, Senior Professor, , Department of Obs. & Gynae, SMS Medical College, Jaipur, India

[4]Dr. Sangeeta Khyalia, Assistant Professor, Department of Biochemistry, SMS Medical College, Jaipur, India

Citation of this Article: Dr. Alka Batar, Dr. Neha Sharma, Dr. Nupur Lauria, Dr. Sangeeta Khyalia, "Evaluation of Maternal and Perinatal Outcome of Pregnancy with Thyroid Disorder: A Prospective Observational Study,'' IJMSAR – May – 2022, Vol. – 5, Issue - 3, Page No. 13-19.

Corresponding Author: Dr. Alka Batar, Assistant Professor, Department of Obs. & Gynae, SMS Medical College, Jaipur, India

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background

Thyroid disease is common in women of childbearing age and can have significant effects on the maternal and perinatal outcomes. The Maternal outcome includes miscarriage, anemia, preeclampsia, gestational hypertension, placental abruption, preterm delivery, increased rate of caesarean section, and postpartum hemorrhage. Fetal outcome includes preterm birth, neonatal respiratory distress syndrome, low birth weight, perinatal morbidity and mortality, increased NICU admission, neuropsychological and cognitive impairment. Diagnosing thyroid diseases during pregnancy can be difficult as the clinical signs and symptoms mimic those of pregnancy. Hypothyroidism is associated with weight gain, fatigue and constipation while hyperthyroidism causes nausea and increased appetite. The relevance of this study is to document the adverse effects of hypothyroidism on mother and fetus.

Methods

This study was carried out as a prospective observational study at SMS Medical College, Jaipur, India. Total 198 pregnant women in their third trimester were included in the study as per their inclusion criteria. Pregnant women with multiple pregnancies, a known case of thyroid disorder, or women with any pre-existing medical disorders were excluded. Routine

blood investigations and estimation of T3, T4 and TSH was conducted. Women with deranged thyroid profile were subsequently assessed for maternal and perinatal outcomes such as anemia, preeclampsia, preterm labour, low birth weight, low APGAR score, and NICU admissions.

Results

Prevalence of thyroid disorder is 11.1 %, with hypothyroidism and hyperthyroidism occurring in 9.5 %, and 1.5% of subjects respectively. In women with hypothyroidism, anemia was present in 26.3% being significantly associated with hypothyroidism ($p = 0.014$) and preeclampsia was present in 15.8% being significantly associated with hypothyroidism ($p = 0.045$). Among the perinatal outcomes LBW 31.6% ($p = 0.001$) and NICU admissions 42.1%, ($p = 0.000$) were statistically associated with hypothyroidism.

Conclusion

Prevalence of hypothyroidism is 9.6 % in 3rd trimester of pregnancy. Anemia, preeclampsia, low birth weight and neonatal morbidities are significantly associated with hypothyroidism.

Keywords

Hypothyroidism, Hyperthyroidism, Anemia, Preeclampsia, Low birth weight, APGAR Score

Introduction

Thyroid hormones have profound variation during the life span and are associated with severe adverse health impacts. Pregnancy, as an important reproductive event, has a profound but reversible effect on the thyroid gland and its functions [1].

The concentrations of thyroid binding globulins increases till mid pregnancy due to high estrogen levels; Serum thyrotropin (TSH) levels decreases in early pregnancy due to direct thyroidal stimulation by human chorionic gonadotropin (hCG); Thyroid size and thyroid hormone production increases throughout pregnancy and iodine requirement increases due to increased renal clearance and losses to the feto-placental unit. Pregnancy act as a stress test of thyroid function where women with limited thyroid reserve may develop hypothyroidism [2].

Pregnancy is actually a state of excessive thyroid stimulation leading to an increase in thyroid size by 10% in iodide sufficient and 20-40% in iodide deficient areas [3]. Following the physiological and hormonal changes caused by pregnancy and hCG the production of thyroxin (T4) and triiodothyronine (T3) increase up to 50% leading to increase in a woman's daily iodide need, while Thyroid-stimulating hormone (TSH) levels are decreased, especially in first trimester [4].

Effect of Thyroid Disease on Pregnancy

Maternal outcome includes miscarriage, anemia, preeclampsia, gestational hypertension, placental abruption, preterm delivery, increased rate of caesarean section, and postpartum hemorrhage.

Fetal outcome includes preterm birth, neonatal respiratory distress syndrome, low birth weight, perinatal morbidity and mortality, increased NICU admission, neuropsychological and cognitive impairment.

Diagnosing thyroid diseases during pregnancy can be difficult as the clinical signs and symptoms mimic those of pregnancy. Hypothyroidism is associated with weight gain, fatigue and constipation while hyperthyroidism causes nausea and increased appetite [5]. Current recommendations suggest targeted TSH screening for women at high risk for thyroid disease before or during early pregnancy used to confirm the diagnoses and disease severity. However, reference ranges of TSH or free thyroxine (fT4)

obtained from non-pregnant populations do not reflect normal values in pregnant women because of their physiologic changes in thyroid function [6].

Given the high prevalence of thyroid disturbances in pregnancy and associated risk to mother and fetus, this study was aimed to study the effects of thyroid disorders during pregnancy on maternal outcomes (Anaemia, preeclampsia, and preterm delivery) and perinatal outcomes (Low birth weight, APGAR score, and NICU admission).

Material and Methods

The period of data collection was spread over 12 months from Jan 2021 to Dec 2021. First of all, the study protocol was approved by the Scientific and Ethical Committee of the Institution.

This is a prospective observational study which was carried out in the Department of Obstetrics and Gynecology, SMS Medical College, Jaipur. In this study, total 198 pregnant women in third trimester of pregnancy were included. All the participants were also informed about the study procedure and the information required from them for the study. A voluntary informed written consent was taken from the participant, and those who consented, were included in the study. A strict confidentiality was maintained about the personal details of the participants and information related to study. As our objective was to study effect of thyroid disorder on mother and fetus, we required women who were to deliver in coming 3-4 days. As a routine, all women who are admitted in obstetric ward undergo TSH screening workup. We included women who were in labour as well as those who were not in labour. Women with obstetric complications like malpresentation, ante partum haemorrhage, hypertensive disorders of pregnancy, early pregnancy haemorrhage and women with medical disorders like diabetes mellitus, thyroid disease, chronic kidney disease, and heart disease were not included. Endocrine society guidelines 2012 recommends caution in the interpretation of serum free T4 levels during pregnancy and that each laboratory establish trimester - specific reference ranges for pregnant women if using a free T4 assay. Reference range of S. TSH and fT4 taken during third trimester was 0.3 - 3.0 mlU/L and 0.67 - 1.06 (ng/dl) respectively. Free T3, Free T4, TSH levels were done by enhanced chemiluminencence method. All the women were followed in delivery as well as in post natal period till discharge from the hospital. We also included women who were already in various stages of labor. As a part of data collection demographic data, obstetric history, menstrual history, family history, past history, intra partum outcomes, postpartum outcomes, and neonatal outcomes were noted in the Performa.

Data Analysis

Data management and analysis was done using SPSS System. The frequency distribution and graph were prepared for the category variables. The mean and standard deviation were calculated for quantitative variables. The categorical variables were assessed using Pearson chi- square. The test was considered significant

only if the p value comes out to be less than 0.05.

Results

Distribution of the cases according to basic characteristics

Basic characters		Normal thyroid	Abnormal thyroid	Chi-square/P-value
Age (In years) [Mean ± SD]		24.42 ± 2.891	25.23 ± 3.294	p = 0.224
Weight (In kg) [Mean ± SD]		67.4±11.1	68.2±10.8	P=0.750
Residence	Rural	103 (58.5 %)	12 (54.5 %)	Chi-square = 0.127
	Urban	73 (41.5 %)	10 (45.5 %)	P = 0.722

In the present study, mean age of euthyroid women was 24.42 ± 2.89 years and of women with thyroid dysfunction was 25.23 ± 3.29 years.

Mean weight of euthyroid women was 67.4 ± 11.1 kg and women with thyroid dysfunction was 68.2±10.8 kg. Out of euthyroid women 58.5% were from rural residence and 41.5% were of urban area, while 54.5 % women with abnormal thyroid function were resident of rural area and 45.5 % were from urban area.

Distribution of cases according to prevalence of thyroid disorders

Thyroid status	N=198	Percent
Euthyroid	176	88.9
hypothyroidism	19	9.6
Hyperthyroidism	3	1.5

As shown in above table, prevalence of hypothyroidism during pregnancy was found 9.6% and that of hyperthyroidism was 1.5%.

Distribution of cases according to maternal outcomes in thyroid disorders

Outcomes		Euthyroid	Hypothyroid	Hyperthyroid	Chi-square/P-value
Anaemia	Yes	12 (6.8 %)	5 (26.3 %)	0 (0.0 %)	Chi-square = 8.592
	No	164 (93.2%)	14 (73.7 %)	3 (100.0 %)	P = 0.014
Preeclampsia	Yes	7 (4%)	3 (15.8 %)	0 (0.0 %)	Chi-square = 6.205
	No	169 (96 %)	16 (84.2 %)	3 (100.0 %)	P = 0.045
Preterm delivery	Yes	4 (2.3 %)	1 (5.3%)	0 (0.0 %)	Chi-square = 0.702
	No	172(97.7%)	18 (94.7%)	3 (100.0 %)	P = 0.704

As shown in above table, 26.3% of hypothyroid women in comparison to 6.8% of euthyroid women had anemia. No women had anemia in hyperthyroid group.

As shown in above table, 15.8% of hypothyroid and 4% of euthyroid women had pre-eclampsia. No case of pre-eclampsia was observed among women in hyperthyroid group.

In the present study, 5.3% of hypothyroid women delivered preterm compared to 2.3% of euthyroid women. There was no case of preterm delivery among the women in hyperthyroid group.

Distribution of cases according to perinatal outcomes in thyroid disorders

Outcomes		Euthyroid	Hypothyroid	Hyperthyroid	Chi-square/P-value
Low birth weight	Yes	12 (6.8%)	6(31.6%)	0 (0.0 %)	Chi-square = 13.026 P = 0.001
	No	164 (93.2%)	13 (68.4%)	3 (100.0 %)	
Apgar score	< 7	12 (6.8 %)	3 (15.8 %)	0 (0.00 %)	Chi-square = 0.221 P = 0.329
	≥ 7	164 (93.2 %)	16 (84.2 %)	3 (100.0 %)	
NICU admission	Yes	16 (9.1%)	8 (42.1 %)	0 (0.00%)	Chi-square = 17.967 P = 0.000
	No	169 (90.9%)	11 (57.9%)	3 (100.0 %)	

As shown in above table, among hypothyroid group 31.6% babies had LBW. Among euthyroid only 6.8% babies had LBW. There was no case of LBW among the babies in hyperthyroid group.

As shown in above table, among hypothyroid babies 15.8% had APGAR Score < 7 and 84.2% had Score **≥ 7** and among euthyroid babies only 6.8% had APGAR Score < 7 and 93.2% had Score > 7. There was no case of APGAR < 7 among the babies in hyperthyroid group.

As shown in above table, among hypothyroid patients 42.1% babies were admitted in NICU and among euthyroid only 9.1% babies were admitted in NICU. There was no case of NICU admission among the babies in hyperthyroid group.

Discussion

In the present study, prevalence of hypothyroidism and hyperthyroidism during pregnancy was found 9.6 % and 1.5% respectively. This is comparable to the study conducted by **Singh A et al** [7], who performed prospective study on 400 pregnant women in which prevalence of hypothyroidism was 7.5%, while that of hyperthyroidism was 0.75 %.

In the present study, mean age of patients with hypothyroidism and hyperthyroidism was 25.6± 4.3 years and 24.6±3.1 years respectively. Mean age of patients with normal thyroid profile was 24.2 ± 2.66 years. In the study conducted by **Singh A et al.**[7] mean maternal age was 23.04 ± 3.34 years for patients with euthyroidism, 24.83 ± 4.10 years for patients with hypothyroidism, and 20.66 ± 1.52 years for patients with hyperthyroidism.

In present study, 26.3% of hypothyroid and nil of hyperthyroid women in comparison to 6.8% of euthyroid women had anemia. Current study suggest strong association between anemia and hypothyroidism (p=0.014). Similar study conducted by **Fein HG et**

al[8], in which anemia is estimated to affect up to 60% of patients with hypothyroidism.

In the present study, 5.3% of hypothyroid women delivered preterm as compared to 2.3% of euthyroid women, however, the difference was statistically non-significant (p=0.704). This study is compared to **Sreelatha et al.**[10] 3.1% of hypothyroid women delivered preterm.

In present study, among hypothyroid 31.3% babies had LBW in comparison to euthyroid only 28.4% babies had LBW similar to the study conducted by **George et al**[11].Current study shows strong association (p=0.001) between LBW and hypothyroidism. In the present study, 15.8% of babies born to hypothyroid women had APGAR Score <7, however, it was statistically non-significant (p=0.329). This study is compared to the study conducted by **Sharma D et al** [12], who conducted study on 50 pregnant women and concluded that 20% of the babies had low APGAR Score.

In the present study, among hypothyroid women 42.1% babies were admitted in NICU compared to euthyroid in which only 9.1% babies were admitted in NICU, similar to the study conducted by **H Ozdemir et al** [13]. Current study shows strong association (p=0.000) between hypothyroidism and NICU admission.

Conclusion

Thyroid disorder during pregnancy continues to be a major health problem worldwide.

This study concludes that there is a high prevalence of thyroid dysfunction in pregnancy (11.1 %), with the majority of women having hypothyroidism (9.6 %)

Association of maternal anemia, preeclampsia, preterm labour, presence of LBW babies, low Apgar score and increased number of NICU admission; is a major finding of this study.dy 15.8% of hypothyroid and 4% of eut

Although it is well documented that overt hypothyroidism and overt hyperthyroidism have deleterious impacts on pregnancy and childhood outcomes, there is however no consensus on the potential impact of subclinical hypothyroidism and subclinical hyperthyroidism on maternal and fetal health. As a result the universal screening of pregnant women has not been recommended yet, as the benefits of identification of those subclinical for of thyroid disturbances has not been proved. Studies are now focusing on these controversial issues to produce critically needed data on the impact of treating these subclinical forms of thyroid disease on the mother, fetus, and the future intellect of the unborn child.

References

1. Zadeh-Vakili A, RamezaniTehrani F, Hashemi S, Amouzegar A, Azizi F. Relationship between Sex Hormone Binding Globulin, Thyroid Stimulating Hormone, Prolactin and Serum Androgens with Metabolic Syndrome Parameters in Iranian Women of Reproductive Age. Diabetes Metabolism 2012: S:2.
2. Stagnaro-Green A, Abalovich M, Alexander E et al. Guidelines of the American Thyroid Association for the diagnosis and management of thyroid disease during pregnancy and postpartum. Thyroid 21(10), 1081–1125 (2011).
3. The American Thyroid Association Taskforce on Thyroid Disease During Pregnancy and Postpartum. Guidelines of the American Thyroid Association for the Diagnosis and Management of Thyroid Disease during Pregnancy and Postpartum. Thyroid 2011; 21: 1081-1125.

4. Yamamoto T, Amino N, Tanizawa O, Doi K, Ichihara K, Azukizawa M, et al. Longitudinal study of serum thyroid hormones, chorionic gonadotrophin and thyrotrophin during and after normal pregnancy. ClinEndocrinol (Oxf) 1979; 10: 459-468.
5. Bahn RS, Burch HB, Cooper DS et al. Hyperthyroidism and other causes of thyrotoxicosis: management guidelinesof the American thyroid association and American association of clinical endocrinologists. Endocr. Pract. 2011; 17(3), 456–520.
6. De Groot LJ, Abalovich M, Alexander EK et al. Management of thyroid dysfunction during pregnancy and postpartum: an endocrine society clinical practice guideline. J. Clin. Endocrinol. Metab 2012;97(8), 2543–2565.
7. Singh A, Reddy MJ. Prevalence of thyroid dysfunction in pregnancy and its implications. Int J Med Sci Public Health 2015;4:1247-1250.
8. Fein HG, Rivlin RS. Anemia in thyroid disease. The Medical Clinics of North America. W.B. Saunders Co., Philipines. 1975:59.
9. Tudela CM, Casey BM, McIntire DD, Cunningham FG. Relationship of subclinical thyroid disease to the incidence of gestational diabetes. Obstet Gynecol 2012;119(5):983-8.
10. Sreelatha S et al. Int J Reprod Contracept Obstet Gynecol. 2017 Aug;6(8):3507-3513.
11. George M, George SM, Jayashree Thankachi VM. Hypothyroid in pregnancy screen or not. J Evol Med Dent Sci. 2015;4(29):4973-8.
12. Sharma D et al. Int J Reprod Contracept Obstet Gynecol. 2017 Dec;6(12):5548-5553.
13. Ozdemir H, Akman I, Coskun S, Demirel U, Turan S, Bereket A et al. Maternal thyroid dysfunction and Neonatal thyroid problems. Int J Endocrinol. 2013;2013:987843.