DOI: https://doi.org/10.53350/pjmhs22164323

ORIGINAL ARTICLE

A Clinical Study on Thyroid Dysfunction in Pregnancy and its Effect on the Fetomaternal Outcome

SHAKILA YASMIN[1], SABA NADEEM[2], AISHA JAVED[3], NAJM US SEHAR[4], SADIA SHAKEEL[5], AMNA ANUM[6]
[1]*Associate Professor Obstetrics & Gynecology Bahawal Victoria Hospital Bahawalpur*
[2]*Assistant Professor Obstetrics & Gynecology Bahawal Victoria Hospital Bahawalpur*
[3]*Senior Registrar Obstetrics & Gynecology Bahawal Victoria Hospital Bahawalpur*
[4]*Post Graduate resident Obstetrics &Gynecology Bahawal Victoria Hospital Bahawalpur*
[5]*Senior WMO Obstetrics and Gynecology Department Bahawal Victoria Hospital Bahawalpur*
[6]*WMO Obstetrics and Gynecology Department Bahawal Victoria Hospital Bahawalpur*
Corresponding author: Saba Nadeem, Email: nadeemsaba1986@gmail.com, Cell: 03226529552

ABSTRACT

Background: Thyroid gland is the power house of human body. It provides energy for the various biochemical processes of the body and helps to maintain basal metabolic rate.

Objective: To estimate the prevalence of thyroid dysfunction in pregnancy and to evaluate the obstetric and perinatal outcomes in such pregnancies

Setting: Department of Obstetrics & Gynecology, Bahawal Victoria Hospital Bahawalpur from 15 January 2021 to 15 JUNE 2021

Study Design: A Descriptive Case Series.

Materials and Methods: A total of 292 cases of antenatal patients, irrespective of their period of gestation were enrolled in this study by random sampling method. Patients with multiple pregnancies and having bad obstetrical history were excluded. Detailed history and obstetrical examination, routine blood test and serum TSH were performed. These patients were followed during labour, delivery and puerperium and maternal outcome and neonatal outcomes were noted.

Results: In this study we enrolled two hundreds and ninety two (292) antenatal women. Out of total 292 patients only 61 (20.9%) were nulliparous and rest of the patients were multiparous. The prevalence of thyroid dysfunction in pregnancy was 8.2%. Out of this, 2.74 % patients had sub clinical hypothyroidism (SCH). Overt hypothyroidism (OH) was seen in 2.40%, sub clinical Hyperthyroidism in 1.71% & the incidence of overt hyperthyroidism was 1.37%. Maternal complication included: abortion (5.5%), pre-eclampsia (3.4%), abruption-placentae (4.1%), preterm labour (4.5%), PPH (4.2%) and puerperal sepsis (2.8%). Neonatal outcomes included: preterm births (5.4%),LBW (5.1 %), IUGR (6.2%), still birth (4.4%), neonatal death (5.1%), low APGAR score (<7 at 5 minutes) (6.9%).

Conclusion: Thyroid dysfunction in pregnancy, though has a low incidence, but is associated with adverse maternal and fetal complications. Thus thyroid screening should be done in antenatal period to improve fetomaternal outcome.

Keywords: Thyroid dysfunction, Hypothyroidism, Hyperthyroidism, Fetomaternal outcome, Overt Hypothyroidism, Subclinical Hypothyroidism.

INTRODUCTION

Pregnancy is a locus of a multiplex of fluctuations in most of the hormones of the body in all the three trimesters. Due to the raised serum hCG levels in pregnancy, TSH titers lower down as alpha unit of hCG mimic the alpha unit of TSH and eventually T3 and T4 levels are raised.[1] Thyroid hormone plays a pivotal role in fetal maturation and development through the various phases of embryonic life.[2] Pregnancy is a condition of surplus need of thyroid hormone levels because of escalated demand in need for fetal growth and neurological development. This ushers to increased hormone synthesis which then depends on iodine supply.[1] The placenta is impermeable to maternal T3 therefore it has a nible section in fetal neurodevelopment programme when compared to maternal T4.[2] Amongst the endocrine complications in reproductive age group of women, lows and highs in thyroid hormone production and function rank the second.[4] Hyperthyroidism complicates 0.1-0.4% of gestations. However hypothyroidism strikes 2-3% of pregnant women amongst whom 0.3-0.5% has overt hypothyroidism and 2-2.5% are diagnosed with subclinical hypothyroidism.[5] Severe maternal hyperthyroidism if un-treated is associated with thyroid crisis (storm) along with intra uterine death, preterm labour , iatrogenic preterm delivery, gestational hypertensive disorders and cardiac manifestations.[6]

The etiology behind the association of thyroid disorders and early pregnancy losses may be due to thyroid hormone end receptor resistance in mothers because of the transit of high levels of thyroid hormone to the fetus via placenta. Autoimmune causes have the highest percentage of irreversible neurological deficit in addition to the fetal thyroid dysfunction.[7] Another research by J Nath and S Duttathe reported 6% prevalence of thyroid dysfunction in pregnancy. 7 % these patients had sub clinical hypothyroidism (SCH) and Overt hypothyroidism (OH) was seen in 2.5%. Sub clinical Hyperthyroidism and overt hyperthyroidism were 1.3% and 2% respectively.[8]

Hyperthyroidism is rare in comparison to hypothyroidism showcasing an incidence of 0.2%. during pregnancy.[9,10] There should be targeted, risk factor based screening of women like those with a previous history of thyroid disease, known case or family history of type 1 diabetes mellitus or other autoimmune conditions.[11] Appropriate and in time diagnosis and follow up improves both maternal and fetal squeale, especially reduces the effect on fetal intellectual development.[4]

This study is carried out to determine the frequency of thyroid dysfunction in pregnancy and its aftermath in fetal and maternal outcomes. Our objective in this study is to predict the prevailing prevalence of thyroid dysfunction in pregnancy in our country, as there is no reliable local data available. This study in this way will showcase the healthcare burden of thyroid disorders in pregnancy in Pakistan contributing towards prevention and saving lives.

MATERIALS AND METHODS

A descriptive case series study was conducted at Department of Gynae and Obstetrics, Bahawal Victoria Hospital Bahawalpur from 15 January 2020 to 15 JUNE 202. A total of 292 patients were included in the study taking Anticipated proportion for thyroid dysfunction = 6%, Confidence Interval = 95%, Precision required (d) = 2.8%. No- probability consecutive sampling method was used. All pregnant women who visited Gynae outpatient department at any period of gestation for the antenatal care and consented to deliver at this institute were included in this study. While the women with APLS syndrome, twins/triplet gestation, diagnosed molar pregnancy confirmed either by ultrasound or hCG levels, diagnosed cases of parathyroid or pituitary gland disorders , diabetes mellitus and hypertension were excluded. Women with

bad obstetric History like recurrent miscarriages or unexplained intrauterine death or still birth were also excluded.

All pregnant women with singleton pregnancy determined by ultrasound, irrespective of the gestational age were enrolled in the study over a period of 6 months, by random sampling method from those patients who attended the OPD of the department of Obstetrics & Gynaecology Bahawal Victoria hospital (B.V.H) Bahawalpur. Informed written consent was taken from the participating women and also approval of the institutional ethical review committee was sought. A detailed obstetric history was interviewed at the time of enrollment followed by a general physical and obstetric examination. Baseline investigation of ABO-Rh typing, viral markers, Complete Blood Count (CBC), Random Blood Sugar, Urine complete examination, Obstetric ultrasound and blood sample for serum TSH were sent to B.V.H Pathology laboratory. Patients with abnormal TSH tests on initial labs were subjected to complete Thyroid profile tests with free T3 and free T4 levels. These patients were observed throughout their pregnancy through routine regular antenatal visits and followed during labour, delivery and puerperium and maternal and neonatal outcomes were noted. Maternal outcome variables we studied were mainly pre-eclampsia, abruptio placenta, preterm labour and delivery, miscarriages, PPH and puerperal sepsis. Fetal outcome variables under study were preterm birth, low birth weight (LBW),intra uterine fetal death(IUFD), neonatal sepsis, low APGAR score at 1 & 5 minutes and neonatal death.

The data was analyzed by computer software SPSS version 20. Descriptive statistical tests were performed. Mean and standard deviation was calculated for age. The qualitative data like gender and presentations of thyroid dysfunction were labelled on frequency distribution table.

RESULTS

Two hundreds and ninety two (292) women participated in the study. Thirty five percent patients were below 30 years and Sixty five percent patients were above 30 years. Out of total 292 patients only 61 (20.9%) were nulliparous and rest of the patients were multiparous (TABLE I). The prevalence of thyroid dysfunction in pregnancy was 8.2%. Out of this, 2.74 % patients had sub clinical hypothyroidism (SCH). Overt hypothyroidism (OH) was seen in 2.40%, sub clinical Hyperthyroidism in 1.71% & the incidence of overt hyperthyroidism was 1.37%(TABLE II).

Regarding mode of delivery 68.8% patient underwent normal delivery and 23.6% underwent cesarean section and there were 4.7 % abortions. Adverse maternal outcomes were observed in 95 patients (32.5%) and there were no complications in the rest 197 (67.5%) patients. The most frequent complications encountered were miscarriages (5.5%), pre-eclampsia (3.4%), abruptio placentae (4.1%), preterm labour (4.5%), PPH (4.2%) and puerperal sepsis (2.8%). Among the neonatal outcomes, 194 patients (66.4 %) had none and 98 (33.6 %) had adverse fetal outcomes. Most observed complication were, preterm births (5.4%), LBW (5.1 %), IUGR (6.2%), still birth (4.4%), neonatal death (5.1%), low APGAR score (<7 at 5 minutes) (6.9%).

Table 1: Demographic Data

Age	Below 30	102 (35%)
	Above 30	65% (190%)
Parity	0	61(20.89%)
	1	48(16.43%)
	2	62(21.23%)
	3 or >3	121(41.43%)

Table 2: Distribution Of Thyroid Dysfunction In Pregnancy

Thyroid dysfunction	Subclinical Hypothyroidism	Overt Hypothyroidism	Subclinical Hyperthyroidism	Overt Hyperthyroidism	Euthyroid
	8 (2.74&)	7 (2.40%)	5(1.71%)	4(1.37%)	259(88.6%)

Table 3: Neonatal Outcomes

Outcome	Repondents with thyroid dysfunction	Repondents with Euthyroid	Frequency of respondents
Normal	4(16.7%)	191 (71.3%)	195(66.8%)
Pre-term birth	4(16.7%)	12(4.4%)	16(5.4%)
Low birth weight	3(12.5%)	12 (4.4%)	15(5.2%)
Intra uterine fetal death	4(16.7%)	14 (5.2%)	18(6.2%)
Still birth	2(8.3%)	11(4.2%)	13(4.4%)
Low APGAR score (<7)	5(20.8%)	15(5.6%)	20(6.8%)
Neonatal death	2(8.3%)	13(4.9%)	15(5.2%)
Total	24 (100%)	268(100%)	292 (100%)

Table 4: Maternal Complications

Complication	Overt Hypo.	SC. Hypo.	Overt Hyper.	SC. Hyper.	Total with %	Euthyroid Respondent (268)
None						197 (67.5%)
Abortion	2 (12.5%)	1 (6.2%)	1 (6.2%)	1 (6.2%)	5 (20.8%)	16 (5.5%)
Abrubtio placentae	1 (8.3%)	1 (8.3%)	0	0	2 (8.4%)	12 (4.1%)
Pre–eclampsia	1 (10%)	2 (20%)	1 (10%)	1 (10%)	5 (20.8%)	10 (3.4%)
Preterm labour	1 (7.6%)	1 (7.6%)	2 (15.2%)	2 (15.2%)	6 (25.0%)	13 (4.5%)
P.P.H	2 (16.7%)	2 (16.7%)	1 (8.3%)	0	5 (20.8%)	12 (4.2%)
Puerperal sepsis	1 (12.5%)	0	0	0	1 (4.2%)	8 (2.8%)

DISCUSSION

292 pregnant women who attended Obstetric OPD in Bahawal Victoria Hospital Bahawalpur consented to be a part of the study. The prevalence of thyroid disorders in pregnancy was found to be 8.2% in our data which was comparable with the research reported by Jayati and Dr. S Dutta [8] 6% and Sahu M et al at 12.7 %.[12]

Statistics regarding Subclinical hypothyroidism (SCH) prevalence in our study were 2.74 % in contrast to 6.4 % in Sahu M et al research paper.[12], but was similar to what exhibited by Casey BM et al [13] at 2.3 % and jayati N and Dutta S[8] at 2.0%.

Overt hypothyroidism was 2.40% in our study that was in consistent reported by jayati N and Dutta at 2.5%.[8]

Subclinical hyperthyroidism was 1.71% that was indifferent to that of Jayati N and Dutta S[8] 0.5 %. In a Study conducted by Stangnaro Green, the subclinical & overt hyperthyroidism was 0.5 % & 0.4 % respectively in the study population.[14]

Leung et al stated that in his reference population subclinical hypothyroidism was complicated by pre-eclampsia (15%), Preterm delivery (9%) and Low Birth Weight babies (9%)[15]. Sahu MT et al [12], however debated the connection between PE (9.8%), Preterm Delivery (10.3%), IUGR (2.4%) and Still birth (2.5%) in subclinical hypothyroidism.

In our study, the incidence of overt hypothyroidism was 2.74% with maternal complication of miscarriages the highest. Jayati N reported 2.5% overt hypothyroidism associated with greater percentage of pregnancy losses and hypertensive complications of pregnancy. [8] Various other studies which were conducted around the world also reflected the similar figures with a little difference in the prevalence of the types of thyroid hormone dysfunction.[15] Abolovich et al reconfirmed the parallel path of thyroid level fluctuations and ante partum hemorrhage (19%)and small babies.[16]

In our study we found subclinical hyperthyroidism to be 2.4% out of which miscarriages (6.2%) complicated the pregnancies the highest. Tuija Mannisto et al[17], supported the common pathway of the same complications with subclinical hyperthyroidism.

The incidence of overt hyperthyroidism in our research was 1.71 % in which preterm birth topped all the other morbidities. Which was supported by Jayati N, where overt hyperthyroidism was 1.0 % with pre eclampsia occurring to be the most.[8] Robert Negro et al reported hyperthyroidism in low risk group with outcomes like PIH(16.7%), preterm births (16.7%) and abortions (14.3%).[18] Kriplani A et al on the other hand reported no perinatal mortality in their study on hypothyroidism in pregnancy.[19]

The percentage of various complications diversified in different studies but centered upon the same morbidities mainly. This helps us to concentrate on the fact that pregnancy with thyroid dysfunction if goes un-noticed, the progression to a healthy mother and baby at the end of pregnancy can be difficult. Even little variations can have long lasting and drastic implications. Amongst them the deep rooted and enduring adverse effect on baby's intellectual and cognitive maturation is agonizing.[20]

One of the limitations of our study is a small sample size. A larger sample size and multi center study may help to reflect better and generalize the results. This would initiate awareness in the population also emphasizing upon the importance of pre-natal screening and optimizing the condition.

CONCLUSION

In our study of 292 women, 24 patients had thyroid dysfunction (incidence 8.2%) which though is less but of immense importance as they are linked to a multiplex of adverse bearings on both the mother and her fetus. Since we observed high incidence of fetomaternal adverse outcomes and complications thyroid dysfunction, therefore, it is recommended that a low threshold should be set for screening mothers for thyroid gland abnormalities at the booking visit or ideally pre conceptionally for early detection and treatment. Increased public awareness can help us clear the lapses between diagnosis and a specialized antenatal care.

REFERENCES

1. Dermatol. Mar 1999;135(3):348-9.Bernal J. Thyroid hormone receptors in brain development and function.Nat Clin Pract Endocrinol Metab 2007;3:249–59.
2. Soldin OP, Tractenberg RE, Hollowell JG, Jonklaas J, Janicic N, Soldin SJ. Trimester-specific changes in maternal thyroid hormone during gestation. Clin Obstet Gynecol. 2004;14:1084–90.
3. Vanderpump M. Thyroid and iodine nutritional status: a UK perspective. Clin Med 2014;14(6):7-11
4. Negro R, Mestman JH. Thyroid disease in pregnancy. Best practice & research. Clinical endocrinology & metabolism. 2011;25(6):927-43.
5. Mitchell ML, Klein RZ, Sargent JD et al. Iodine sufficiency and measurements of thyroid function in maternal hypothyroidism. Clinical Endocrinology (Oxford) 2003;58: 612-616.
6. Weetman A. Graves' disease. N Engl J Med 2000;343:1236-1248.
7. Smith C, Thomsett M, Choong C, Rodda C, McIntyre HD, Cotterill AM. Congenital thyrotoxicosis in premature infants. Clin Endocrinol. 2001;54: 371-76.
8. Jayati N, Dutta S. A Clinical Study on Thyroid Dysfunction in Pregnancy and its Effect on the Fetomaternal Outcome. Int J Sci Res 2015;4(9):2068-70.
9. Neale DM, Cootauco AC, Burrow G. Thyroid disease in pregnancy. Clin Perinatol. 2007;34(4):543-57.
10. Reid SM, Middleton P, Cossich MC, Crowther CA. Interventions for clinical and subclinical hypothyroidism in pregnancy. Cochrane Database Syst Rev. 2010;7:7752.
11. Karakosta P, Alegakis D, Georgiou V. Thyroid dysfunction and autoantibodies in early pregnancy are associated with increased risk of gestational diabetes and adverse birth outcomes. J Clin Endocrinol Metab. 2012;97(12):4464–72
12. Sahu MT et al . Overt and Subclinical dysfunction, among indian pregnant women and its effect on maternal & fetal outcome . Archives of gynaecology and obstetrics .201;281(2):215-220.
13. Casey BM, Dashe JS, Wells CE, et al. Subclinical hyperthyroidism and pregnancy outcomes. Obstet Gynecol 2006;107:337.
14. Stagnaro-Green A. Overt hyperthyroidism and hypothyroidism during pregnancy. Clin Obstet Gynecol. 2011;54(3):478-87
15. Leung AS et al .Perinatal outcomes in hypothyroid pregnancies Obstet Gynecol 1993;81(3):349-353
16. Abalovich M, Gutierrez S, Alcaraz G, et al. Overt and subclinical hypothyroidism complicating pregnancy. Thyroid 2002;12:63.
17. Tuija Mannisto , et al .Thyroid dsfunction & maternal morbidity . J. Clin endoerinol .Metab 2010;95(3):1084-1094.
18. Robert Negroet al .Detection and treatment of thyroid disease in pregnancy. J Clinical endoerinol Metab. 2010;95(4):1699–1707
19. Kriplani A et al . Maternal aand Perinatal outcome in thyrotoxicosis complicating pregnancy . Eur J Obstet. Gynecol Reprod Biology; 1994,54(3): 159 – 63.
20. Thanuja PM. Thyroid dysfunction in pregnancy & Maternal outcome.Journal of Dental and Medical sciences 2014;13(1):11–15