

## Research Article

# Pregnancy outcome in overt hypothyroidism

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### ABSTRACT

**Background:** To study the pregnancy outcomes in terms of miscarriage, gestational hypertension, preeclampsia, placenta previa, placental abruption, preterm labour, preterm PROM, rate of caesarean section, postpartum hemorrhage, premature birth, low-birth weight, fetal distress in labour, fetal death and congenital anomalies.

**Methods:** The studied subjects included all pregnant women reported to the hospital for a period of one year (November 2012 to October 2013). They were subjected to detailed history, general physical, systemic, local examinations, routine investigations, thyroid function tests (serum TSH, T<sub>3</sub>, T<sub>4</sub>) and divided into two groups, Group-I: Overt hypothyroidism (TSH >10Mu/L; T<sub>3</sub> and T<sub>4</sub> <normal) and Group-II: Euthyroid pregnant women (control group). Outcomes of study group were compared with control group. The data was analyzed using computer software Microsoft Excel and SPSS version 19.0 for Windows. Chi square test was performed to evaluate statistical significance. A p-value of <0.05 was considered as statistically significant.

**Results:** 17045 women reported to hospital during one year period and after applying exclusion criteria 14810 women qualified. Out of these, 14770 pregnant women were found euthyroid and 40 (0.23%) women were overt hypothyroid. Pregnancy outcome like miscarriage (p<0.001), placental abruption (p<0.03), preterm premature rupture of membrane (p=0.003), low birth weight (p<0.001) and premature birth (p=0.003) was found to be statistically significant.

**Conclusions:** Due to adverse pregnancy outcome, women in early pregnancy should be screened for thyroid disorder and those found hypothyroid should be treated.

**Keywords:** Overt hypothyroidism, Pregnancy outcome

### INTRODUCTION

An estimated two billion individuals worldwide have insufficient iodine intake, with those in south Asia and sub-Saharan African particularly affected.<sup>1</sup> Pregnancy constitutes an increased stress on the thyroid gland, reflecting an increased demand on the maternal thyroid hormone production to meet both fetal and maternal needs.<sup>2</sup> The incidence of overt hypothyroidism during pregnancy is estimated to be 0.3 to 0.5%.<sup>3</sup> There is change in the level of thyroxine-binding globulin (TBG), total thyroid-hormone level and change in the level of

thyroid stimulating hormone (TSH) during pregnancy.<sup>4</sup> This increased TBG concentration leads to an expansion of the extra-thyroidal pool and result in elevated total T<sub>3</sub> and T<sub>4</sub> levels due to an increase in maternal thyroid hormone synthesis. Maternal thyroid synthesis is also increased due to an accelerated renal clearance of iodide resulting from the increased maternal glomerular filtration rate.<sup>5</sup> Women with hypothyroidism have increased risk of abortion, gestational hypertension, anemia, abruptio placentae and postpartum hemorrhage.<sup>6</sup> The risk of these complications is greater in women with overt, rather than subclinical hypothyroidism.<sup>5</sup> Severe maternal hypothyroidism can result in irreversible

neurological deficit in the offspring. Graves' disease can lead to pregnancy loss as well as fetal thyroid dysfunction.<sup>7</sup> Raised maternal TSH in the second trimester is also associated with an increased rate of fetal death after 16 weeks of gestation.<sup>8</sup> In addition to adverse obstetrical outcomes, maternal hypothyroidism is associated with adverse neonatal outcomes. As the fetus does not begin to produce its own thyroid hormones until approximately 12 weeks gestation, it is solely dependent on maternal thyroxine (T<sub>4</sub>) during early gestation.<sup>9</sup>

Treatment of maternal hypothyroidism during pregnancy greatly improves both obstetrical and neonatal outcomes.<sup>10-12</sup> Adequate thyroxine replacement for women with overt hypothyroidism in early pregnancy results in term delivery in 90% but failure to achieve normal TSH during pregnancy has been associated with term delivery in only 20%.<sup>6</sup> Women should be made euthyroid as quickly as possible.

## METHODS

The present study was conducted in the Department of Obstetrics and Gynaecology, Government Medical College, Jammu for a period of one year (November 2012 to October 2013). Women with overt hypothyroidism and euthyroid pregnant women were included while excluded subjects were women with hyperthyroidism, subclinical hypothyroidism, other medical disorders - hypertension, diabetes mellitus, renal disorders, etc. and drug-induced hypothyroidism. All participants were subjected to detailed history, thorough general physical, systemic, local examinations and routine investigations, thyroid function tests (serum TSH, T<sub>3</sub>, T<sub>4</sub>).

Two groups were made, Group-I: Pregnant women with overt hypothyroidism and Group-II: Euthyroid pregnant women (control group). Pregnancy outcomes of subjects in the study group (group-I) were compared with control group (group-II). Serum TSH, T<sub>3</sub> and T<sub>4</sub> were measured by Radioimmunoassay (RIA) method. The reference values taken were as per Medical College Endocrinology Laboratory, which are as follows: TSH (0.5 to 5 mU/L), T<sub>3</sub> (0.8 to 1.6 ng/mL or 80 to 160 ng/dL) and T<sub>4</sub> (60 to 120 ng/mL or 6 to 12 µg/dL).

The data was analyzed using computer software Microsoft Excel and SPSS version 19.0 for Windows. Mean and standard deviation (SD) was calculated and reported for quantitative variables. Chi square test was performed to evaluate statistical significance.

## RESULTS

A total of 17045 pregnant women reported to hospital from November 2012 to October 2013 and 14810 pregnant women qualified after applying exclusion criteria. Out of these, 14770 pregnant women were found euthyroid and overt hypothyroidism was identified in 40

(0.23%) pregnant women. Further observations were made on overt hypothyroid women, who are as follows: Majority of women (55%) were in the age group of 26-30 years, 32.50% in age group of 20-25 years. Mean age was 26.93±3.42 years with range of 21-36 years. Majority of patients (47.50%) were primigravidas, G2 (32.50%), G3 (10%) and G4 and above (10%). Majority of patients (37.50%) presented at a gestational age of <20 weeks, 30% at 37-40 weeks, 27.50% at 20-37 weeks and 5% at >40 weeks. Mean gestational age at time of presentation was 28.16±11.86 weeks with range of 8 - 40.3 weeks.

Statistically, pregnancy outcomes like miscarriage, preterm premature rupture of membrane, placental abruption, low birth weight (<2.5 kg) and premature birth were found to be highly significant (p<0.01), while gestational hypertension, preterm labour, preeclampsia, placental previa, postpartum haemorrhage, lower segment caesarean section, fetal distress, intrauterine deaths and congenital anomalies were found to be non-significant (p>0.05) (Table 1).

**Table 1: Comparison of pregnancy outcome between euthyroid and overt hypothyroidism patients.**

Pregnancy outcome	Patients		Statistical inference (χ <sup>2</sup> test)
	Euthyroid (n=14770) No.	Overt hypothyroidism (n=40) No.	
Gestational hypertension	2441	10	p<0.15*
Miscarriage	1777	15	p<0.001**
Preterm labour	1016	4	p=0.43*
Preterm premature rupture of membrane	490	6	0=0.003**
Placental abruption	192	2	p<0.03**
Preeclampsia	820	0	p=0.22*
Placenta previa	344	0	p=0.63*
Postpartum haemorrhage	388	0	p=0.33*
Lower segment caesarean section	5123	10	p=0.19*
Fetal distress	1550	7	p<0.17*
Low birth weight (<2.5 kg)	1764	13	p<0.001**
Pre mature birth	1610	11	P=0.003**
IUD	546	0	p=0.21*
Congenital anomalies	280	0	0=0.45*

\*Non-significant; \*\*Highly significant.

## DISCUSSION

Thyroid disorders are common entity during pregnancy. Although clinically overt hypothyroidism may be easily recognised in pregnant women on the basis of symptom and signs, milder form may go unnoticed so accurate laboratory assessment of maternal thyroid function should be done.

The important findings are as follows, overt hypothyroidism was identified in 40 (0.23%) women, which is same as seen in all previous reports. Abalovich et al reported 0.3-0.5% incidence of overt hypothyroidism among pregnant women.<sup>3</sup> Cleary-Goldman et al also documented overt hypothyroidism in 0.3% (n=33) pregnant women in the first and 0.2% women in the second trimester.<sup>13</sup>

15 (37.5%) women in study group had statistically significant miscarriage rate ( $p < 0.001$ ). Abalovich et al showed that untreated hypothyroidism, subclinical or overt, at the time of conception is associated with miscarriage rate of 31.4% compared with 4% in euthyroid subjects.<sup>3</sup>

2 (5%) women in study group had placental abruption which was statistically significant ( $p < 0.03$ ). Davis et al also reported abruption in 19% of overtly hypothyroid women.<sup>14</sup>

6 (15%) women in study group had preterm premature rupture of membranes (PPROM) which was statistically significant ( $p = 0.003$ ).

11 (27.5%) women in study group had preterm delivery, which was statistically significant ( $p = 0.003$ ). Abalovich et al reported that if treatment is inadequate 20% of overtly hypothyroid women delivered prematurely and when treatment was adequate, 100% of overtly hypothyroid women carried pregnancies to term.<sup>6</sup>

13 (32.5%) women in study group delivered low birth weight babies and when compared with control group it was found to be statistically significant with  $p < 0.001$ . Leung et al reported that women with overt hypothyroidism were more likely to deliver low birth weight babies than those in general population (22% versus 6.8% respectively;  $p < 0.02$ ).<sup>15</sup> Rest of the findings were not found to be statistically significant when compared with euthyroid pregnant women.

## CONCLUSION

Due to adverse pregnancy outcome women should be screened for thyroid disorder and those found hypothyroid should be adequately treated and followed in pregnancy which will lead to improved maternal and fetal outcome.

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## REFERENCES

- Zimmermann MB, Jooste PL, Pandav CS. Iodine-deficiency disorders. *Lancet.* 2008;372:1251-62.
- Gliener D, De Nayer P, Bourdoux P. Regulation of maternal thyroid during pregnancy. *J Clin Endocrinol Metab.* 1990;71:276-87.
- Abalovich M, Amino N, Barbour LA. Management of thyroid dysfunction during pregnancy and postpartum: An Endocrine Society clinical practice guidelines. *J Clin Endocrinol Metabol.* 2007;92:S1-S47.
- Burrow GN. Thyroid function and hyperfunction during gestation. *Endocrine Review.* 1993;14(2):194-202.
- Sahay RK, Nagesh VS. Hypothyroidism in pregnancy. *Indian J Endocrinol Metab.* 2012;16:364-70.
- Abalovich M, Gutierrez S, Alcaraz G, Maccallini G, Garcia A, Levalle O. Overt and subclinical hypothyroidism complicating pregnancy. *Thyroid.* 2002;12:63-6.
- Nambiar V, Jagtap VS, Sarathi V. Prevalence and impact of thyroid disorders on maternal outcome in Asian-Indian pregnant women. *J Thyroid Res.* 2011.
- Allan WC, Haddow JE, Palomaki GE. Maternal thyroid deficiency and pregnant complications: implications for population screening. *J Med Screen.* 2000;7(3):127-30.
- Morreale de EG, Obregon MJ, Escobar del RF. Role of thyroid hormone during early brain development. *Eur J Endocrinol.* 2004;151:U25-37.
- Haddow JE, Palomaki GE, Allan WC, Williams JR, Knight GJ, Gagnon J. Maternal thyroid deficiency during pregnancy and subsequent neuropsychological development of the child. *N Engl J Med.* 1999;341(8):549-55.
- Pop VJ, Brouwers EP, Vader HL, Vulsma T, van Baar AL, de Vijlder JJ. Maternal hypothyroxinaemia during early pregnancy and subsequent child development: A 3-year follow-up study. *Clin Endocrinol (Oxf).* 2003;59(3):282-8.
- Tan TO, Cheng YW, Caughey AB. Are women who are treated for hypothyroidism at risk for pregnancy complications? *Am J Obstet Gynecol.* 2006;194(5):e1-3.
- Cleary-Goldman J, Malone FD, Lambert-Messerlian G, Sullivan L, Canick J, Porter TF. Maternal thyroid hypofunction and pregnancy outcome. *Obstet Gynecol.* 2008;112(1):85-92.
- Davis LE, Leveno KJ, Cunningham FG. Hypothyroidism complicating pregnancy. *Obstet Gynecol.* 1988;72(1):108-12.

15. Leung AS, Millar LK, Koonings PP, Montoro M, Mestman JM. Perinatal outcome in hypothyroid pregnancy. *Obstet Gynecol.* 1993;81:349-53.

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