VOLUME-6 | ISSUE-1 | JANUARY-2017 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 78.46

Original Research Paper

Thyroid Dysfunction In Antenatal Patients And Its Maternal Outcome

Medical Science

KEYWORDS: Thyroid dysfunction , Prevalence, Maternal outcome, Fetal outcome ndon

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ABSTRACT

Aim : To determine the current prevalence of thyroid dysfunction in normal pregnant women and to study the impact of thyroid dysfunction on maternal and fetal outcome. **Materials and methods:** This study was carried out in pregnant women during 1st trimester who attended antenatal clinic of maternity hospital to know the prevalence of thyroid disorders in pregnant women living in and around and also to know the outcome of pregnancy in women suffering from thyroid disorders. **Results:** In this study, prevalence of thyroid disorder was 11.6% with 95% CI of 9.64 to 13.54 which was high when compared to other regions in India and in other parts of Asia. Subclinical hypothyroidism and Overt hypothyroidism was 6.4% and 2.8% respectively. Subclinical and Overt hyperthyroidism was 1.8% and 0.6% respectively. Subclinical hypothyroidism was more prevalent and hidden, leading to the poor obstetrical outcome and fetal complications. Rate of miscarriage was high in overt hyperthyroid patients. **Conclusion:** Due to the immense impact that the maternal thyroid disorder has on maternal and fetal outcome, prompt identification of thyroid disorders and timely initiation of treatment is essential. Thus, universal screening of pregnant women for thyroid disorder should be considered especially in a country like India where there is a high prevalence of undiagnosed thyroid disorder.

INTRODUCTION

Thyroid disorders constitute one of the most common endocrine disorders in pregnancy [1]. Pregnancy is associated with profound modifications in the regulation of thyroid function. These changes are the result of various factors like an increase of thyroxine-binding globulin (TBG) due to elevated estrogen and human chorionic gonadotropin (hCG), increased renal losses of iodine due to increased glomerular filtration rate, modifications in the peripheral metabolism of maternal thyroid hormones, and modification in iodine transfer to the placenta [2].

The physiological changes of pregnancy can simulate thyroid disease. Symptoms of heat intolerance, sluggishness, fatigue, and constipation and examination findings of tachycardia, edema, and wide pulse pressure are common to pregnancy and thyroid disease much in same way [3].The prevalence of overt hyperthyroidism complicating pregnancy has been reported to range between 0.4 and 1.7 % [4] and an estimated 2–3 % of women are hypothyroid during pregnancy [1, 5]. Overt hyperthyroidism occurs in 0.4–1.7 % of pregnant women [6].

Numerous hormonal changes as well as alterations in metabolic demands occur during pregnancy, resulting in profound and complex effects on thyroid function. Because thyroid disorders are much more prevalent in women of childbearing age than in men of the same age group, it is not surprising that common thyroid disorders, such as chronic autoimmune thyroiditis, hypothyroidism, Graves' disease (GD), etc, are relatively frequently observed in pregnant women. The main change in thyroid function associated with the pregnant state is the requirement for an increased production of thyroid hormone which depends directly upon adequate availability of dietary iodine and a normal and functional thyroid gland. Indeed, the physiological adaptation to the pregnant state can only take place when the iodine intake is appropriate. When iodine intake is deficient, however, pregnancy can reveal an underlying iodine deficiency.(7) Iodine deficiency (ID) during pregnancy and infancy may impair growth and neurodevelopment of the offspring and increase infant mortality. It is noteworthy that assessment of iodine status in pregnancy is difficult. Meanwhile, it remains unclear whether iodine intakes are sufficient in this group, leading to calls for iodine supplementation during pregnancy in several industrialized countries.(8) The economy of the thyroid is modified by several complex physiological changes such as the marked increase in both serum thyroid binding globulin (TBG) concentrations and extrathyroidal thyroxine (T4) distribution space that take place during the first half of gestation. To maintain the homeostasis of T4 concentrations, the thyroid machinery must produce more T4 until a new steady state is reached around mid-gestation. Thus, the main change in thyroid function associated with the pregnant state is the requirement of an increased production of thyroid hormone which, in turn, depends directly upon the adequate availability of dietary iodine and integrity of the thyroid gland. Therefore, any functional perturbation of normal thyroid function may have consequences for pregnancy outcome, and conversely, pregnancy by itself may affect the presentation and course of most thyroid disorders.(9-15)

Material and methods

Source of the data: This study was done at G.C.R.G. Medical College Lucknow in department of biochemistry from 2nd January 2016 to 15th November, 2016.

Type of study: Prospective study done in 500 pregnant women in 1st trimester till delivery.

Inclusion criteria: <12 weeks of gestation, Singleton Pregnancy and Primigravida/ Multigravida.

Exclusion criteria: Multi fetal gestation, Known chronic disorders like Diabetes and hypertension, Previous bad obstetric history with known cause, patient planned follow up and delivery in other hospital.

Procedure: 500 pregnant women attending antenatal clinic in first trimester at G.C.R.G. Medical College &Hospital, Lucknow and fulfilling inclusion criteria were enrolled in the study after institutional ethics approval and consent from the study subjects. Detailed history was taken, regarding the symptoms of thyroid disorders, menstrual history, obstetric history, past medical history, family history, personal and social history. General examination was done with reference to general condition of the patient, body temperature; pulse rate, blood pressure, respiratory rate and the finding were recorded. Systemic examination of the cardiovascular system (CVS), central nervous system (CNS), respiratory system and

VOLUME-6 | ISSUE-1 | JANUARY-2017 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 78.46

thyroid gland was done and findings were recorded. Per abdominal and per vaginal examination was done and findings were recorded.

Investigations

Basic investigations: Complete blood picture, Clotting time, Bleeding time, Blood grouping and Rh typing, RBS, Blood urea, Serum creatinine, HIV, HbsAg, HCV and Complete urine examination were done.

Pregnancy <12 weeks was confirmed by clinical assessment, pregnancy test and ultrasonography.

Specific Investigations: Patients were sent for the testing of serum TSH level. If serum TSH values were deranged, fT3 and fT4 levels were checked. The reference ranges of the test values used in this study were as per the Guidelines of American Thyroid Association for the Diagnosis and Management of Thyroid Disease during Pregnancy and Postpartum. As per Regulation 14.2 of ATA Guidelines, if trimester-specific ranges for TSH are not available in the laboratory, the following normal reference ranges are recommended: 1st trimester – 0.1 to 2.5 m IU/L, 2nd trimester – 0.2 to 3.0 m IU/L and 3rd trimester – 0.3 to 3.0 m IU/L. Normal free T4 level is 0.7 to1.8 ng/ml and free T3 level is 1.7 to 4.2 pg/ml. Depending on the hormonal values, patients were classified into

Subclinical hypothyroidism: High serum TSH level with normal fT4, fT3 level,

Overt hypothyroidism: High serum TSH level with fT4 and fT3 less than normal range,

Subclinical hyperthyroidism: Low serum TSH level with normal fT3, fT4 level,

Overt hyperthyroidism: Low serum TSH level with fT3 and fT4 more than normal range.

Sub clinical/ overt hypothyroid cases were treated with Thyroxine.

Sub clinical / overt hyperthyroid cases were treated with Propylthoiuracyl.

Every 4 weeks, TSH level was estimated and the dose of the drug was adjusted.

Outcome of the pregnancy was followed up and documented. The following outcome variables of the pregnancy in relation to the thyroid disorders were studied: Preeclampsia, Abruptio placenta, Preterm delivery, IUGR, Low birth weight, Still birth, Abortion.

RESULT

Total Sample Size	500
Positive Sample	58
Negative sample	442

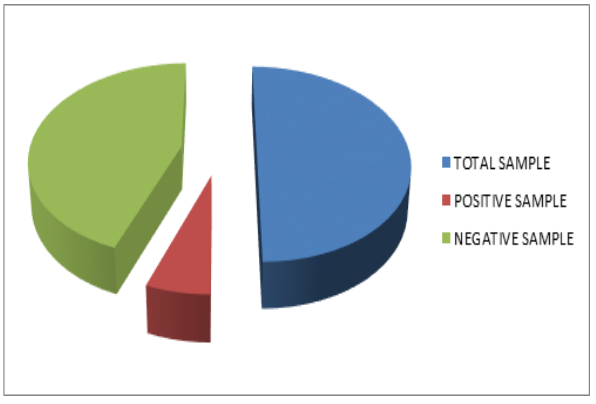

Table - 1: Prevalence of types of thyroid disorders among 500 pregnant woman screened

Type of disorder	No. of cases	%
Subclinical hypothyroidism	32	6.4%
Overt hypothyroidism	14	2.8%
Subclinical hyperthyroidism	9	1.8%
Overt hyperthyroidism	3	0.6%
Total	58	

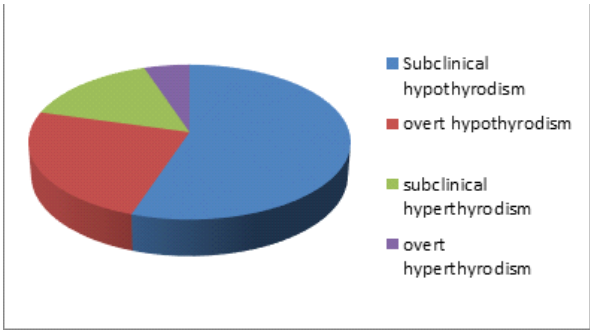

Table - 2: TSH levels in the study cases

Type of disorder	No. of cases	Mean	SD
Sub clinical hypothyroidism	32	4.11	1.26
Over thypothyroidism	14	8.86	3.28
Sub clinical hyperthyroidism	9	0.022	0.017
Overt hyperthyroidism	3	0.014	0.008

Table - 3: Maternal and fetal complications among 32 cases of hypothyroidism.

Complications of subclinical hypothyroidism	No. of cases	%
Pre eclampsia	3	9.37%
Preterm delivery	2	6.25%
Abortions	1	3.12%
Abruptio placenta	1	3.12%
Fetal complications	**of subclinical**	**hypothyroidism**
IUGR	2	6.25%
Low birth weight	1	3.12%
Still birth	1	3.12%
Maternal complications of	**Overt hypothyroidism**	
Pre eclampsia	3	21.4%
Preterm delivery	2	7.14%
Abortions	2	7.14%
Abruptio placenta	1	3.57%
Fetal complications of Overt	**hypothyroidism**	

IUGR	3	21.4%
Low birth weight	2	7.14%
Still birth	1	3.57%

Table - 4: Maternal and fetal complications among 9 cases of hyperthyroidism

Maternal Complications of subclinical Hyperthyroidism	**No. of cases**	**%**
Pre eclampsia	2	22.2%
Preterm delivery	1	11.1%
Abortions	1	11.1%
Fetal complications of	**subclinical hyperthyroidism**	
IUGR	2	22.2%
Still birth	1	11.1%
Maternal complications	**Overt hyperthyroidism**	
Abortion	4	44.4%

DISCUSSION

A total of 58 (11.6%)sample positive from the 500 total patient in which 32(6.4%) patient suffer from the subclinical hypothyroidism, 14 (2.8%)suffer with overt hypothyroidism, 9 (1.8%)suffer with subclinical hyperthyroidism and 3 (0.6%)suffer with overt hyperthyroidism.

Prevalence of thyroid disorders in pregnancy varies in different regions and different studies. Prevalence of thyroid disorder in pregnancy in the present study was 11.6% which is comparable to the another study conducted by Weiwei Wang, et al. in China [16] (10.2%), Taghavi, et al. in Mashhad, Iran [17] (14.6%) and Ajmani, et al.in India [18] (13.25%). In the study conducted by Dr Thanuja, et al. [19] the prevalence of thyroid disorder was less, about 5% and in the study conducted by Rajput, et al. in Haryana [20] the prevalence of thyroid disorder was high (26.5%) and is not comparable with the present study. Present study was comparable to the studies conducted by Sahu, et al. In Indian [21] (6.47%), Weiwei Wang, et al. in China [16] (7.2%), Taghavi, et al. Iran [17] (7.4%) and Sapana C Shah, et al. [22] (5.3%). Prevalence of the subclinical hypothyroidism in pregnancy according to the study conducted byDr Thanuja P M, et al. [19] in Manglore was less (0.7%) and it was high according to the studies conducted by Dinesh K [23], Dhawal, et al.in INDIA [23] (13.5%), NVR Murty, et al. in INDIA [24] (16.11%), KP Singh, et al. IN Manipur [25] (18%) and Rajput, et al. in Haryana [20] (21.5%) which was not simmilar with the present study.

Prevalence of overt hypothyroidism in pregnancy according to the present study was 2.8% which was comparable to the studies conducted by Taghavi, et al. in Mashhad,

[30] (2.4%), P V Bandela, et al. in Rayalaseema [26] (2.87%) and Ajmani, et al. in India [18] (3%)Prevalence of overt hypothyroidism in pregnancy according to the studies conducted by Weiwei Wang, et al. [16] (0.3%) and Dinesh K Dhanwal in India. [23], (0.7%) was less when compared to the present study. Studies conducted by Sahu, et al. In Indian [21] and K P Singh, et al. in Manipur. [25] shows a prevalence of about 4.5% which was slightly higher when compared to the present study.

Prevalence of hypothyroidism during pregnancy has a wide geographical variation. Data from western countries indicates that overt hypothyroidism complicates up to 0.3-0.5% pregnancies and the prevalence of subclinical hypothyroidism is estimated to be 2.5%. In India, the prevalence of hypothyroidism in pregnancy is much higher compared to western countries. Prevalence varies widely among various states in India, as we still face iodine deficiency in many parts of the country. Most common cause of hypothyroidism in pregnancy in developing countries like India is iodine deficiency. Hashimoto thyroiditis is the most common cause of hypothyroidism in iodine sufficient areas.

Presence of goitrogens in diet in India [27], micronutrient deficiency such as selenium and iron deficiency may cause hypothyroidism and goiter in India [28]. Poverty, insufficient iodine supplementation and fluorinated water may be the major cause for thyroid disorder among pregnant women.

In the sub mountain areas (Kashmir to North East India), geo-chemical nature in deficiency of iodine and micronutrients, due to glaciations, high rain fall and floods leading to decrease iodine content in soil and water is considered to be the cause of increase prevalence of hypothyroidism in these regions [29,30].

Serum TSH and free T4 are the best tests to screen and diagnose hypothyroidism during pregnancy. The prevalence of overt or subclinical hypothyroidism depends on the upper TSH cut-off levels used. There is strong evidence that the reference range for serum TSH is lower throughout the pregnancy compared with the non pregnant state. The lowest serum TSH levels are observed during the first trimester of pregnancyand are apparently related to hCG stimulation of the thyroid gland as serum hCG levels are highest early in the gestation.

According to several guidelines, serum TSH reference intervals should be established from the 95% confidence limits of the log-transformed values of at least 120 apparently healthy individuals without any personal or family history of thyroid disease, goitre, thyroid autoantibodies or medications.

Conclusion: Due to the immense impact that the maternal thyroid disorder has on maternal and fetal outcome, prompt identification of thyroid disorders and timely initiation of treatment is essential. Thus, universal screening of pregnant women for thyroid disorder should be considered especially in a country like India where there is a high prevalence of undiagnosed thyroid disorder.

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