Study on prevalence of hypothyroidism in pregnancy in rural population of Pilkhuwa, Hapur, U.P.

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Abstract

Introduction: Thyroid dysfunction is a common endocrine disorder in pregnancy. Thyroid hormones are necessary for development of fetal brain during pregnancy. Thyroid dysfunction during pregnancy has significant adverse effects such as preterm delivery, preeclampsia, miscarriage and low birth weight. In India one of the common health issues is hypothyroidism in pregnant patient. There is lack of data regarding prevalence of hypothyroidism in pregnancy while the problem is increasing day by day.

Aim & Objective: 1. To study the prevalence of Hypothyroidism in rural population of Pilkhuwa, Hapur; 2. To study the age and trimester of pregnancy in relation to Hypothyroidism; 3. To Early diagnosis of disease so as to reduce morbidity & mortality; 4. To suggest corrective measures based upon the information gathered in the study.

Materials and Methods: A study was conducted at Yashoda clinic Pilkhuwa Hapur. Patients attending antenatal clinic and checkup were included and TSH reports were collected.

Observation: A total of 101cases were included in the study that came for antenatal check-up. Out of 101 cases, 59 are euthyroid. 16 cases had TSH between 2.5 -3.0. 26 cases had TSH from 3.0 -7.5. None of the patient had TSH equal to or above 10 units.

Result: In first trimester 7 cases out of 81 which required treatment with eltroxin and needed follow up. 32 out of 81 cases required only follow up.

In second trimester 3 cases out of 15 which required treatment with eltroxin and follow up. 7 cases out of 15 required follow up.

In third trimester none of the cases in third trimester required treatment or follow up.

Conclusion: Hypothyroidism is an important health issue among pregnant women which can cause several complications in ongoing and future pregnancies like recurrent abortions, infertility, PIH, preterm labour APH, PPH. All pregnant women and ladies who are planning pregnancies should be screened for thyroid disease.

Keywords: Hypothyroidism, India, Prevalence, subclinical hypothyroidism, Undetected hypothyroidism.

Introduction

Thyroid gland is an important gland, secretes thyroxin hormone. Thyroxin is needed for cellular oxidation and neurological development.[1] It regulates metabolism and hormone production in our body. In early pregnancy demand of thyroid hormones increases, because thyroid hormones are essential for fetal brain development, at this phase of time fetus depends on maternal thyroid hormones. The fetal thyroid gland starts producing hormone from 10 weeks of gestation,[2] but it is not in sufficient amount so fetus depend up to 20 weeks of gestation on the maternal thyroxin.[3] T4 concentrations reach adult levels at 36 weeks of gestation, while T3 always remains below adult concentrations.[4] During pregnancy as demand of thyroid hormone increases, serum TSH level also increases, and it is called primary maternal hypothyroidism. Secondary maternal Hypothyroidism is- increased Serum TSH level due to – TSH Secreting pituitary tumour, thyroid hormone resistance etc.

Primary maternal hypothyroidism is of two types-

1. Overt Hypothyroidism
2. Sub clinical Hypothyroidism

Overt hypothyroidism is characterised by increase serum TSH level with low serum T4 level. But if serum TSH level is equal or more than 10 m IU/L than it is overt hypothyroidism irrespective of serum T4 level. Sub clinical Hypothyroidism is characterised by increase serum TSH level (below 10 m IU/L) with normal serum T4 level.

Hypothyroidism is 2nd commonest endocrine disorder during pregnancy[5]. Iodine is an important part of thyroid hormone, so its requirement also increases during pregnancy. Deficiency of Iodine increases chances of Hypothyroidism.[6] In iodine deficient areas prevalence of hypothyroidism is 1-2 %.

Hypothyroidism in pregnancy leads to impaired fetal development, and can lead to-Miscarriage, pregnancy induced hypertension, pre-eclampsia, placental abruption, anaemia, postpartum haemorrhage and stillbirth during pregnancy,[7,8] increase neonatal mortality; and impaired neurological development, faltering growth and cretinism in child hood.[9]

Thyroid autoimmunity is common in young women. Studies have shown a 3–20% prevalence of circulating thyroid antibodies in women during or

shortly after pregnancy. These women are at risk of becoming hypothyroid during pregnancy.[10-11]

Impaired intelligence and psychomotor development has led to the suggestion that women should be screened for hypothyroidism, either by serum TSH or free T_4. Mild TSH elevation did not put the fetus at risk. An increased risk of fetal deaths in women with TSH equal to or greater than 10 m IU/L has been reported.[9,12]

Aims and Objectives

Aim of this study is:

1. To study the prevalence of Hypothyroidism in rural population of Pilkhuwa, Hapur.
2. To study the age and trimester of pregnancy in relation to Hypothyroidism.
3. To Early diagnosis of disease so as to reduce morbidity & mortality.
4. To suggest corrective measures based upon the information gathered in the study.

Materials and Methods

Pregnant women those attended OPD for antenatal check-up were taken. A detailed history and clinical examination was done than venous samples were collected.

Samples were collected either empty stomach or after light meals avoiding fatty meals.

Inclusion criteria: Normal pregnant women those attended OPD for antenatal check-up were included in the study.

Exclusion criteria: All others with diabetes, collagen disease, and heart disease in pregnancy were excluded.

One hundred one pregnant women in the age group of 18 to 40 years, who attended the antenatal clinic, were personally followed and, TSH screening was done using fasting serum sample at first check up and as early as the pregnancy was confirmed.

In selected patients whose TSH was increase, FT4 was done to confirm diagnosis and treatment was started. TSH was repeated at 8 weeks interval and post natally.

If there was an excess weight gain, preterm pains and pregnancy-induced hypertension, TSH was repeated. High risk women were given special attention.

Diagnostic criteria in pregnancy: Pregnancy-specific and trimester specific reference levels for TSH are as follows:

Ist trimester - 0.1-2.5mIU/l;
IInd trimester - 0.2-3mIU/l;
IIIrd trimester - 0.3-3mIU/l.

Observation

A total of 101cases were included in the study that came for antenatal check-up.

Table 1: Age wise distribution of patients

Age [years]	No. of cases
18-25	77
26-30	20
31-35	3
36-40	1

Out of 101patients enrolled in the study
76.23% of patients were between 18 – 25yrs,
19.80% were between 26 -30 yrs,
2.97%were between 31 -35 yrs,
0.99% were between 36 -40 yrs.
It shows maximum number of cases are young between 18 -30 yrs.

Table 2: Distribution of patients according to TSH reports

TSH report	No. of cases
0.02-2.5	59
2.5-3.0	16
3.0-7.5	26
10.0 - >	0

Out of 101 cases
59 are euthyroid.
16 cases had TSH between 2.5 -3.0.
26 cases had TSH from 3.0 -7.5.
None of the patient had TSH equal to or above 10 units.

Table 3: Trimister wise study of prevelence of hypothyroidism

S.No.	Trimister	Cases	Subclinical Hypothyroidism	Overt Hypothyroidism
1	First Trimister	81	32	7
2	Second Trimister	15	7	3
3	Third Trimister	5	0	0

In first trimester out of 81 cases
32 had subclinical hypothyroidism and i.e. 39.50%,
7 had overt hypothyroidism, i.e. 8.75%.
In second trimester out of 15 cases
7 had subclinical hypothyroidism i.e. 46.66%,
3 had overt hypothyroidism i.e. 20%.

Results

Among the 101 pregnancies studied, maximum numbers of patients were in age group of 18 -30 years.
We arranged the women according to TSH values into three groups.
Group 1 first trimester – had
7 cases out of 81 which required treatment with eltroxin and needed follow up.
32 out of 81 cases required only follow up.
Group 2 – second trimester had
3 cases out of 15 which required treatment with eltroxin and follow up.
7 cases out of 15 required follow up.
Group 3 – third trimester
None of the cases in third trimester required treatment or follow up.

Discussion

In Pregnancy there is extra load on thyroid gland due to increase thyroxin binding globulin, increased demand for iodine, and thyroid stimulation by HCG.[13] These are some factors due to which borderline hypothyroid women after conception, can develop sub clinical or overt hypothyroidism.

Fetus depends in the first 12 weeks on the mother for thyroxine.[14] A substantial amount of thyroxin is transferred across the placenta. Placental de-iodinases can convert T4 to T3. Fetus needs thyroxin for brain development, growth, and lung maturation.[14]

Untreated hypothyroidism in pregnancy is associated with adverse maternal effects. During pregnancy, it is known to result in miscarriages (in early pregnancy), recurrent pregnancy losses, anaemia, pre-eclampsia, gestational diabetes, abruption placentae, postpartum haemorrhage, increased caesarean sections due to fetal distress, and rarely myopathy and even congestive heart failure (CHF) in severe cases[7]. Hypothyroidism results in preterm births, intrauterine growth restriction, intrauterine fetal demise, respiratory distress and increased perinatal mortality (PNM). In newborns, it leads to cognitive, neurological and developmental impairment[1]. Thyroid hormone is critical for fetal brain development.

Hypothyroidism has also been associated with adverse effects on intelligence quotient (IQ) and neuropsychological development.[15] Following the diagnosis of overt hypothyroidism, levo thyroxin replacement should be commenced, aiming to achieve a TSH level within the trimester-specific pregnancy reference range.[16] The majority of pregnant women with pre-existing hypothyroidism will need increments of their levothyroxine dose by 25–50%, often within four to eight weeks of gestation and the dose increment tends to plateau by 16 weeks of gestation[17]. Such a dose increment should take place immediately on confirmation of a missed cycle or a positive pregnancy test.

Internationally the prevalence of hypothyroidism in pregnancy is 2-3%. Of these, 0.3-0.5% is OH and 2-2.5% is SCH.[18] Studies have demonstrated 60% risk of fetal loss and 22% risk of gestational hypertension with untreated OH. A firm association between OH and adverse risk to the maternal-fetal unit has been demonstrated. The miscarriage rate in SCH is 6% vs 3.6% in euthyroid women.[16] A two-to three fold increased risk of pregnancy related complications was demonstrated in untreated women with SCH.

Nationally prevalence of hypothyroidism in pregnancy in the Indian population is 4.8-12%. Reported prevalence by Sahu et al 2010 was 6.47% with 4.58% as OH. Another Indian study has reported the prevalence of hypothyroidism to be 12%, of which 3% was OH and 9% was SCH. TPO antibodies are positive in around 50% pregnant women in SCH, as compared to 7% in euthyroid pregnant women.

Incidence of hypothyroidism in women with recurrent pregnancy loss up to 12 weeks is 4.1-16.6%. The miscarriage rate in SCH is 12 -21%, while in OH, it is 21%. The rate of stillbirth is 0-16.6% for SCH and 4.2% for OH. The incidence of pre-eclampsia has been reported as 16% for OH and 22% for SCH. The incidence of abruptio placentae is 16% for OH and 5% for SCH. Intrauterine Growth Restriction (IUGR) prevalence is 25% in OH and 8% in SCH, while the incidence of pre-term delivery is 33% with OH and 11% with SCH.

Our study also shows that prevalence of overt hypothyroidism is 8.75%, and 20% in first and second trimester respectively. We found that prevalence of subclinical hypothyroidism in our study group as 39.50%, 46.66% in first and second trimester respectively. This study shows that this may be the tip of iceberg, there may be larger section of pregnant women who do not has asses to the facility of TSH screening.

Even government Hospitals in U.P. do not include TSH levels in antenatal check-up despite large section of poor and rural patients go to government hospitals for registration of delivery.

Thus if maternal levels of thyroxin are not well maintained in pregnancy, fetus is at risk. This demands an early or even prenatal FT4, TSH screening and more frequent fetal monitoring of thyroxin levels in pregnancy.

Conclusion

According to our study hypothyroidism is increasing day by day .It is an important health issue among pregnant women which can cause several complication in ongoing and future pregnancies like recurrent abortions, infertility, PIH , preterm labour APH, PPH .

All pregnant women and ladies who are planning pregnancies should be screened for thyroid disease.

Thyroid Screening is a must at first booking, ideally prenatally to prevent miscarriages. T3, T4, FT4, TSH screening is able to pick up even borderline cases 0.25- 2mIU/ml recognized as normal ref. range for TSH.

Repeat TSH screening to be done at 8 weeks interval or each trimester, as and when the situation dictates. Adequate replacement therapy should be given when TSH is high

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