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Hospital Based Prevalence of Hypothyroidism Among Pregnant Women During Pregnancy, A Cross-Sectional Study

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Abstract

Background: Thyroid diseases are the one of the commonest endocrine disorders affecting women of reproductive age group & hence constitutes the commonest endocrine disorder in pregnancy. It has long been seen that maternal thyroid hormone deficiency or excess can influence further the outcome for mother & foetus at all stages of pregnancy as well as interfere with fertility & ovulation.[1,2] Maternal hypothyroidism is the most common disorder of thyroid function in pregnancy & has been associated with foetal loss, miscarriage, preterm delivery, preeclampsia, low birth weight, placental abruption, foetal distress & reduced intellectual function of the offspring. Pregnancy is very delicate & it is too much necessary to be aware of the various many factors that can further prevent a healthy pregnancy. Awareness of such kind of problems can lead to the prevention of many complications. Thyroid awareness in pregnancy can further prove to be a lifesaver for both mother & child[2]. **Aims & objective:** Primary objective: To assess Hospital Based Prevalence of Hypothyroidism among Pregnant Women During Pregnancy who attend antenatal check-up in obstetric clinic or admitted in obstetrics & gynaecology department due to some other obstetrics reasons. Secondary objective: To assess the awareness about Hypothyroidism among the pregnant women coming for antenatal check-up. To give appropriate recommendation on the basis of study findings. Early diagnosis of Hypothyroidism will require for early Treatment to minimize the Hypothyroidism related adverse events to pregnant mother & new-born. **Methods:** Cross sectional study was done taking 200 pregnant irrespective of Age, parity, or socioeconomic status. Study subjects who are willing to participate in the study & given written consent. **Results:** Prevalence of thyroid disorders, especially subclinical hypothyroidism (9.69%), overt hypothyroidism (2.55%) & total hypothyroidism (12.3%) was high. **Interpretation and conclusion:** The present study has paved the way for the acceptance of universal thyroid screening in pregnant women, especially in the Indian context.

Keywords
Hypothyroidism, Thyroid stimulating hormone, T_3, T_4, Thyroid screening.

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INTRODUCTION:

January is 'Thyroid Awareness Month,' which calls for great attention to the many health problems connected to the thyroid[1] disorders. While a lot of importance is given to other medical disorders in pregnancy, thyroid disorders are usually misdiagnosed & even not adequately treated[1]. Pregnancy is very delicate & it is too much necessary

to be aware of the various many factors that can further prevent a healthy pregnancy. Awareness of such kind of problems can lead to the prevention of many complications. Thyroid awareness in pregnancy can further prove to be a lifesaver for both mother & child[2].

Thyroid diseases are the one of the commonest endocrine disorders affecting women of reproductive age group & hence constitutes the commonest endocrine disorder in pregnancy. It has long been seen that maternal thyroid hormone deficiency or excess can influence further the outcome for mother & foetus at all stages of pregnancy as well as interfere with fertility & ovulation.[1,2] Maternal hypothyroidism is the most common disorder of thyroid function in pregnancy & has been associated with foetal loss, miscarriage, preterm delivery, preeclampsia, low birth weight, placental abruption, foetal distress & reduced intellectual function of the offspring. These adverse outcomes have been associated with both overt hypothyroidism (elevated TSH & reduced free T4) found in about 0.2% of pregnancies as well as subclinical hypothyroidism (elevated serum TSH & normal free T4 concentration) found in about 2.3% of pregnancies.[3,4,5,6] Thyroid dysfunction is often overlooked in pregnant women because of the nonspecific symptoms & the hyper metabolic state of pregnancy.[7] Hence thyroid function test becomes essential to know the thyroid status in pregnancy & also to detect the subclinical disease. In view of the potential for serious adverse events associated with maternal thyroid disease & the apparent benefits of treatment, many have recommended routine thyroid function screening in pregnancy. As hypothyroidism would be a cause of pregnancy complications in previous pregnancy, females are tested for thyroid dysfunction in their next earlier approach, to the health care providers i.e., in next pregnancy in a developing country like ours. Hence our study is undertaken to find the significance of the prevalence hypothyroidism in pregnancy. In pregnancy thyroid disorder constitute one of the most common endocrine disorders [1] women with thyroid dysfunction both overt & subclinical are at increased risk of pregnancy related complications & foetal complications. [2, 3] Pregnancy is associated with profound modifications in the regulation of thyroid function. These changes are the result of various factors like increase of thyroxine binding globulin (TBG) due to elevated oestrogens & Human chorionic gonadotropin (HCG), increased renal losses of iodine due to increased glomerular filtration rate, modifications in the peripheral metabolism of maternal thyroid hormones & modification in iodine transfer to placenta.[1] Maternal hypothyroidism in the most common thyroid disorder in pregnancy, has been associated with infertility, 1st trimester spontaneous abortions, threatened abortions, pre-eclampsia, preterm labour, placental abruption, & postpartum haemorrhage. Foetal complications include low birth weight babies, preterm delivery, intrauterine growth retardation, high rates of stillbirth & neonatal deaths, neonatal hyperbilirubinemia, higher incidence of neonatal hypothyroidism, & increased perinatal mortality. [1, 2] Maternal hypothyroidisms during early pregnancy leads to retardation of the neurological development in foetal stage & also impairs the cognitive development thereby leading to disability in learning and lowered achievement motivation in later stages of childhood.[4] The hypothyroidism prevalence as per various studies varies. There are significant adverse effects on maternal & foetal outcome were seen emphasizing the importance of routine antenatal thyroid screening.[1, 2, 4, 5, 6] The present study is undertaken to know the need of universal screening for hypothyroidism in antenatal women in assessing the prevalence & early detection of hypothyroidism.

METHODOLOGY:

Source of data

Blood sample will be collected from the Pregnant women who attend antenatal clinics or admitted in Department of Obstetrics & Gynaecology, Bundelkhand medical college Hospital, Sagar. We conducted this study in Department of Biochemistry & collected 3ml Venous blood sample for analysis. Equipment used for analysis is Siemens Advia Centure XP based on principal of Chemiluminescence immunoassay (CLIA). Study subjects have been explained about the nature & reason for the study & they can withdraw from the study anytime. We excluded study subjects who are not willing to participate, history of multi foetal gestation, renal disease or patients with bad obstetrics history.

RESULTS:

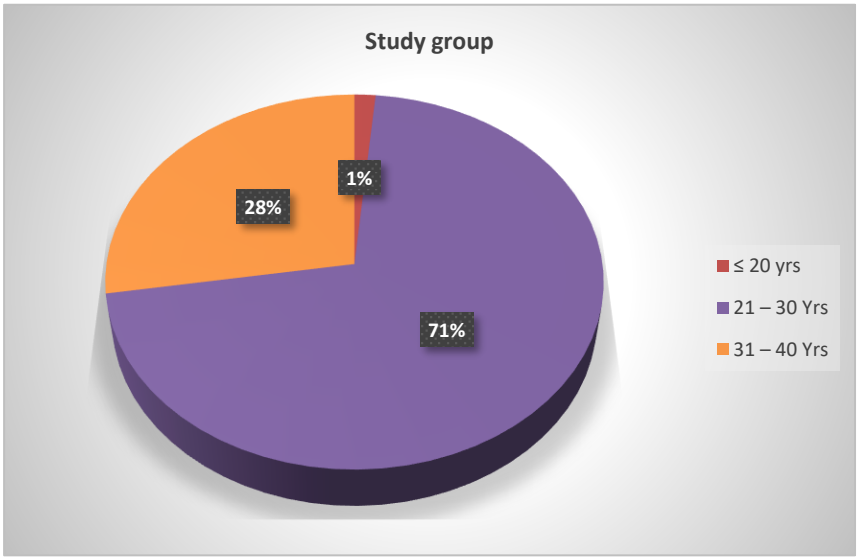
The results obtained in this present study were from a total number of 200 subjects. These 200 subjects include pregnant females. The concentrations of serum T3, T4, & TSH in blood sample, were analyzed and their results are shown in the following tables and graphs.

Table 1: Baseline Characteristics of pregnant women

S.No	Parameters	Mean ± SD
1	Age (Years)	24.46 ± 3.97
2	Number of females in 1st Trimester	22
3	Number of females in 2nd Trimester	23
4	Number of females in 3rd Trimester	155
5	Systolic BP (mmHg)	114.42 ± 12.7
6	Diastolic BP (mmHg)	74.56 ± 9.6

Table:2 Age distribution

Age	Study
≤ 20 yrs	3
21 – 30 Yrs	142
31 – 40 Yrs	55
Total	200



In my study most of the patients were in the age group of 21-30 years (71%). There was no significant difference in distribution of cases between the groups based on age. Mean age of our participant's is 24.46 years & belongs to 21 -30-year group. Maximum participants are in third trimester. The incidence of hypothyroidism was more common in the 21-30 years age group, but it might have been influenced by the fact that most of the study population was in the age group.

Table 3: Table showing mean & SD of parameters assessed in study subjects.

S. No	Parameters (n=200)	Mean ± SD
1	TSH	2.7 ± 1.83
2	T4	8.87 ± 2.4
3	T3	1.63 ± 0.93

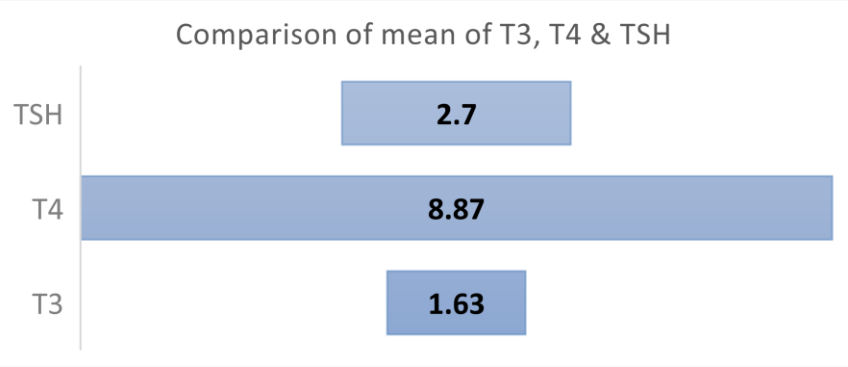
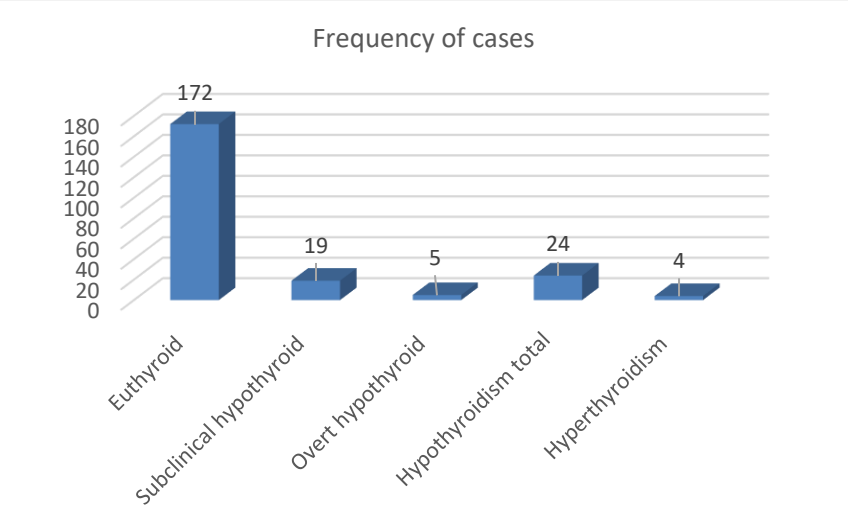
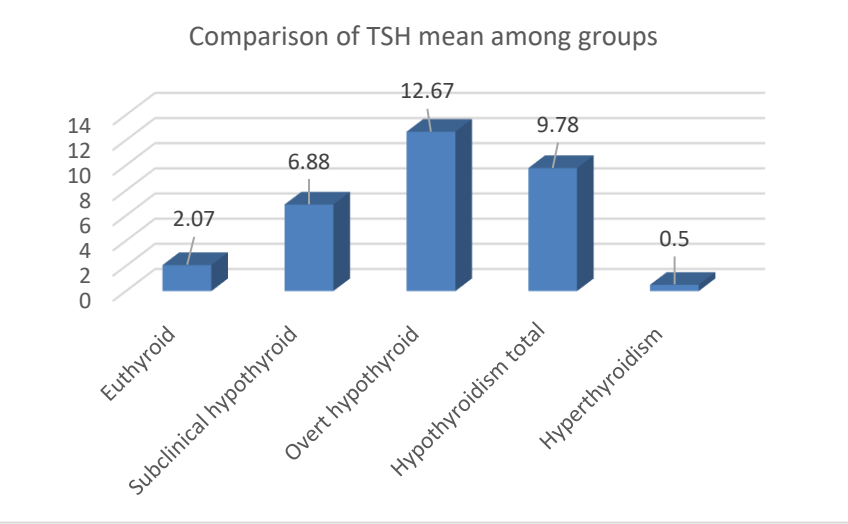


TABLE 4: PREVALENCE

S. No	Patient thyroid status	Frequency	TSH (Mean ± SD)
1	Euthyroid	172	2.07 ± 0.57
2	Subclinical hypothyroid	19 (9.69%)	6.88 ± 1.46
3	Overt hypothyroid	5 (2.55%)	12.67 ± 1.69
4	Total	196	2.7 ± 1.83
5	Hypothyroidism total	24 (12.3%)	9.78 ± 1.45
6	Hyperthyroidism	04 (2%)	0.5 ± 0.98





The present study revealed that out of 200 participant's 9.69 % belong to sub clinical thyroid & 2.55 % overt hypothyroid.

DISCUSSION:

The present study was done in Government Bundelkhand Medical College Sagar, Madhya Pradesh. A total of 200 patients were screened for thyroid disorders in this study. It was cross-sectional study. The aim of our study was to analyse the prevalence of thyroid disorders in pregnancy. The prevalence of thyroid disorders in our study was 12.3%. Our findings are consistent with the reports from the study of Sahu MT et al[8], who studied 633 women in second trimester. In their study the prevalence of thyroid disorders was also 12.7%, which is comparable to our study. In the study of Sahu MT et al[8] the prevalence was 6.47%, which is more in our study (9.69%). In a study done by Casey BM et al[3], the prevalence was 23% which is very high & not consistent with our study. Our study of total prevalence of hypothyroidism results are similar to study done by Sanjay kalra et al.[9] they studied total of 5376 adult male or non-pregnant female participants >18 years of age were enrolled, of which 5360 (mean age: 46 ±14.68 years; 53.70% females) were evaluated., they found total prevalence of hypothyroidism 10.95% & showed significantly higher (P < 0.05) proportion of females vs. males (15.86% vs 5.02%) & older vs. younger (13.11% vs 7.53%), adults were diagnosed with hypothyroidism. Additionally, 8.02% (n= 430) patients were diagnosed to have subclinical hypothyroidism (normal serum free T4 & TSH = 5.50 µIU/ml). Anti – TPO antibodies suggesting autoimmunity were detected in 21.85% (n =1171) patients. The prevalence of subclinical hypothyroidism in our study was 9.69% & concluded that female gender & older age was found to have significant association with hypothyroidism. In the study done by vikas Yadav et al they searched PubMed, Web of Science, Scopus, Google Scholar, & Shodhganga (Indian thesis repository) for observational studies, providing prevalence of hypothyroidism among pregnant women in India. Systematically selection of study & extraction of data procedures were followed. Assessment of quality of each study was done using JBI critical appraisal checklist. The random effects model used for pooling the sizes effect. Assessment of Publication bias was done using the funnel plot & rank correlation test. $I2$ statistics was done to measure heterogeneity across studies. Heterogeneity in the pooled estimates was further explored with subgroup analyses & meta-regression analysis. *Results*. Sixty-one studies were found eligible & included in this review. The pooled estimate of the hypothyroidism prevalence of pregnant women was 11.07% (95% CI: 8.79–13.84, $I2$ = 99%). Pooled prevalence estimates of subclinical & overt hypothyroidism are 9.51% (95% CI: 7.48–12.04, $I2$ = 98%) & 2.74% (95% CI: 2.08–3.58, $I2$ = 94%) & concluded that 11.07% pooled prevalence of hypothyroidism in pregnant women in India.

Table: Prevalence of subclinical hypothyroidism

Study	Prevalence
Our study	9.69%
Sanjay kalra et al	8.02%
Sahu MT	6.47%
Casey BM	23%

The prevalence of overt hypothyroidism in our study was 2.55%, which is partly consistent with a study done by Sahu MT et al[8], in which the prevalence is 4.58%.

Table - 12: Prevalence of overt hypothyroidism

Study	Prevalence
Our study	2.55%
Sanjay kalra et al	Not calculated
Sahu MT	6.47%
Casey BM	23%

The prevalence of subclinical & overt hyperthyroidism in our study was 0% & 2.0% respectively. In a study done by Sahu MT et al[8], the prevalence was 0.9% & 0.7% for subclinical & overt hyperthyroidism. In a study done by Tuija mannisto et al [10], the prevalence was 3.5% & 1.3% for subclinical & overt hyperthyroidism. The prevalence of subclinical hyperthyroidism is comparable with other studies. The prevalence of Subclinical & Overt Hyperthyroidism was 0.5 & 0.4% respectively in a study done by Stagnaro Green A study.[11]

CONCLUSION:

Prevalence of thyroid disorders, especially subclinical hypothyroidism (9.69%), overt hypothyroidism (2.55%) & total hypothyroidism (12.3%) was high. Significant adverse effects on maternal & foetal outcome were seen emphasizing the importance of routine thyroid profile. The present study has paved the way for the acceptance of universal thyroid screening in pregnant women, especially in the Indian context. The hypothyroidism prevalence in pregnant women varies across states in India, but insufficient data is issue. Moreover, there are no agreed upon guidelines for management of subclinical hypothyroidism in pregnant women. Therefore, further research is needed to fill these gaps regarding the diagnosis & management of hypothyroidism in pregnant women in a heterogeneous country like India.

SUMMARY:

The present study was conducted in government Bundelkhand medical college, Sagar. It is a cross sectional study and we included screening of 200 pregnant women coming to routine antenatal check-up after that TSH level was estimated. If it is deranged, then T3 & T4 levels estimated. The prevalence of total hypothyroidism in our study was 12.3% with a CI of 10.3 - 13.9%. The prevalence of subclinical hypothyroidism in our study was 9.69%. The prevalence of overt hypothyroidism in our study was 2.55%. The prevalence of hyperthyroidism in our study was 2% respectively.

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