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Original Research Article

A community based prospective study on thyroid dysfunction among pregnant females and its effect on maternal and neonatal outcome

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ABSTRACT

Background: Thyroid disorders are often overlooked in pregnancy because of their non-specific symptoms and the hypermetabolic state of pregnancy. The laboratory measurements of thyroid function play an important role in the assessment of maternal thyroid health. Thyroid disorders can have grievous effect on mother and new-borne which can be prevented. The study was aimed to find the prevalence of thyroid dysfunction among pregnant females and its effect on maternal and neonatal outcome.
Methods: A prospective study was conducted from August 2019 to October 2020 among 360 pregnant females in the rural fields practice area of a medical college. Thyroid function test was done in all pregnant females and the maternal and neonatal outcome was noted.
Results: 20.31% of the pregnant females were found to be suffering from thyroid dysfunction which is approximately 1/5th of the total sample. Out the total females with thyroid dysfunction maximum females suffered from subclinical hypothyroidism that is 10.94% while 1.56% had overt hypothyroidism. 1.88% and 5.94% had subclinical and overt hyperthyroidism respectively. Postpartum haemorrhage, pre term delivery, abortion and neonatal deaths were more common in females with thyroid dysfunction as compared to euthyroid females although not statistically significant.
Conclusions: Though pregnancy outcome was not found to be significantly adverse among females with thyroid dysfunction, very high prevalence of thyroid dysfunction among pregnant warrants its detection during antenatal care to be uniformly included in peripheral health care centres.

Keywords: Thyroid, Dysfunction, Pregnancy, Maternal outcome, Neonatal outcome

INTRODUCTION

Thyroid disorders are amongst the commonest endocrinological disorders encountered in pregnancy. Thyroid disorders are often overlooked in pregnancy because of their non-specific symptoms and the hyper-metabolic state of pregnancy. Hence, the laboratory measurements of thyroid function play an important role in the assessment of maternal thyroid health.[1] The prevalence of thyroid dysfunction in pregnancy varies in different studies from 10-26%. (Sahu et al 12.77%, Rajput et al 26.5%, Kaundaniya et al 12.8%, Sarla et al 10.8%). The estimated worldwide prevalence of hypothyroidism in pregnancy is 2-3%. Of these, 0.3-0.5% is overt hypothyroidism (OH) and 2-2.5% is subclinical hypothyroidism. Studies have demonstrated 60% risk of foetal loss and 22% risk of gestational hypertension with untreated OH. Prevalence of hypothyroidism in pregnancy in the Indian population is 4.8-12%.[2] 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, abruptio placentae, postpartum haemorrhage, increased caesarean sections due to foetal distress, and rarely myopathy and even congestive heart failure (CHF) in severe cases. Hypothyroidism results in preterm births, intrauterine growth restriction, intrauterine foetal demise, respiratory distress and increased perinatal mortality (PNM). In new-borns, it leads to cognitive, neurological and developmental impairment. The incidence of thyrotoxicosis or hyperthyroidism in pregnancy is varied and complicates between 2 and 17 per 1000 births when gestational-age appropriate TSH threshold values are used.[3] Hyperthyroidism causes pre-eclampsia, heart failure in mother and pre term, still birth, intra uterine growth retardation, thyrotoxicosis and hypothyroidism in foetus. Universal screening has not been recommended till now in any country due to paucity of data and most of the available guidelines recommend screening of high-risk pregnant women.[2] In India, screening for thyroid disorders among pregnant is not conducted routinely under any national programme or by any public health centre. Thyroid disorders can have grievous effects on new-born and as the condition is detectable and adverse pregnancy outcomes can be prevented. This study was planned to determine the prevalence of thyroid dysfunction in pregnant females in the rural field practice area of Jhalawar medical college and its impact on maternal and neonatal outcome.

METHODS

A community based prospective study was conducted in rural field practice area of Jhalawar medical college, Jhalawar. All the pregnant females in the rural fields practice area were included in the study irrespective of the trimester. The study was conducted from June 2019 to December 2020. A sample size of 360 women was taken with 25% prevalence and 20% allowable error and adding 20% loss to follow up. The total pregnant females were stratified according to the trimester of pregnancy and equal numbers of females were randomly selected in each trimester. 40 females were lost to follow up.

Inclusion and exclusion criteria

First, second, third trimester females and female ready to give informed written consent were included in the study. Females with known history of chronic disorders (diabetes and hypertension, cardio vascular disease), not ready to give written informed consent and females already on treatment for thyroid dysfunction before conception were excluded from the study.

Procedure

Predesigned and pretested questionnaire was filled by the researcher by interviewing the participants and the clinical examination and the routine investigation like Haemoglobin, HIV, Urine albumin sugar were done at the RHTC laboratory. The samples for thyroid function test (T_3, T_4, TSH) were tested at the department of biochemistry of parent medical college. The participants with deranged thyroid function were referred to the obstetrician for management to avoid unethical practice. All the study participants were followed up to collect information regarding pregnancy outcome. The data was entered in Microsoft Excel 10.0 and analysed using Epi Info software version 7.2.2.6. The study was conducted after getting permission from institutional ethical committee. Chi square test, ANOVA, t-test and other suitable test were applied and p value<0.05 was considered significant.

RESULTS

The prevalence of thyroid dysfunction in pregnant females was 20.31% which is approximately one fifth of the total. The distribution of thyroid dysfunction in pregnant females where subclinical hypothyroidism (10.94%) was most common followed by overt hyperthyroidism (5.94%), subclinical hyperthyroidism (1.88%) and overt hypothyroidism (1.56%) (Figure 1).

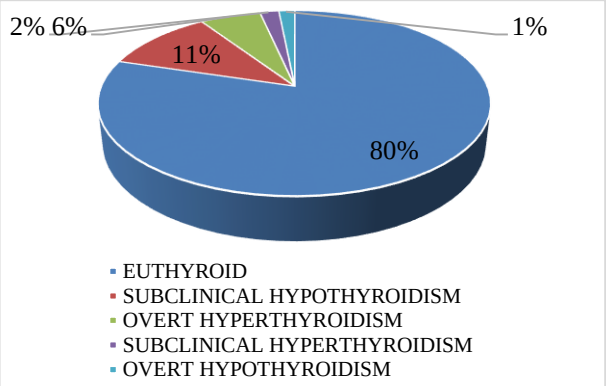

Figure 1: Thyroid function among pregnant females.

Distribution of thyroid dysfunction according to the trimester is depicted in (Table 1).

Table 1: Thyroid dysfunction according to trimester.

Trimester	Hypothyroid N (%)	Euthyroid N (%)	Hyperthyroid N (%)
First	12 (30)	89 (34.90)	1 (4)
Second	14 (35)	90 (35.30)	11 (44)
Third	14 (35)	76 (29.80)	13 (52)
Total	40 (100)	255 (100)	25 (100)

Out of all hyperthyroid females, 4% were diagnosed in first trimester, 44% in second trimester and 52% in third trimester respectively. The mean BMI of hypothyroid group is 22.89 kg/m^2 which is more in comparison to euthyroid (21.05 kg/m^2) and hyperthyroid group (21.17 kg/m^2) but not statistically significant (p value= 0.141). For further analysis, pregnant females suffering from hypothyroidism or hyperthyroidism were considered as

'females with thyroid dysfunction' collectively. Females with thyroid dysfunction complained of dysmenorrhoea more as compared to euthyroid females but the difference is not statistically significant (Table 2).

Table 2: Menstrual problems among study participants.

Menstrual problems	Observation	Euthyroid (n=255) Frequency (%)	Thyroid dysfunction (n=65) Frequency (%)	Total (%)
Dysmenorrhea	Yes	40 (15.68)	11(16.92)	
	No	215 (84.32)	54 (83.07)	0.807
Amount of menstrual flow	Scanty	23 (9.01)	8 (12.33)	
	Normal	221(86.66)	56(86.153)	0.439
	Overflow	11 (4.31)	1(2.50)	

Table 3: Comparison of pregnancy outcome in females with thyroid dysfunction and euthyroid.

Pregnancy outcome	Euthyroid (n=255) Frequency (%)	Thyroid dysfunction (n=65) Frequency (%)	P value
Abortion	6 (2.35)	2 (3.08)	0.738
Neonatal deaths	2 (0.80)	2 (3.1)	0.135
PPH	6 (2.40)	1 (1.59)	0.69
Preterm	18 (7.23)	3 (4.76)	0.4852
LSCS	31 (12.45)	8 (12.70)	0.9563
Low birth weight	96 (38.56)	24 (38.10)	0.949

Scanty menstrual flow is more common in females with thyroid dysfunction (12.33%) as compared to euthyroid females. Total 3.08% females with thyroid dysfunction had abortion which is more as compared to 2.35% in euthyroid group but not statistically significant (Table 3). The percentage of neonatal death among thyroid dysfunction was 3.17% which is very high as compared to 0.8% on euthyroid group but the difference is not significant. No case of eclampsia was reported among study sample. Out of total, 7.23% euthyroid females delivered preterm as compared to 4.76% females with thyroid dysfunction. Females with thyroid dysfunction have slightly more chances c-section as compared to euthyroid females.

DISCUSSION

The prevalence of subclinical hypothyroidism in our study was 10.94% which is similar to a study conducted by Ajmani et al, in Hindu Rao hospital, Delhi which was around 12%.[4] A multicentric study conducted in 11 cities of India showed the 36.06% pregnant females suffered from hypothyroidism which is much more in comparison to our study.[5] Similarly the prevalence of subclinical hypothyroidism conducted by Rajput et al was high (21.5%).[6] The prevalence of subclinical hypothyroidism was comparatively less in the studies conducted by Sahu et al (6.47%), Vaidya et al (6.3%), Kaundinya et al (7%), Nambiar et al (4.8%), Saraladevi et al (6.4%), Pahwa et al(6%), Tiwar et al (6.4%).[1,7-12] Overt hypothyroidism in current study was present in 1.56% of the pregnant females which is similar to the study conducted by Rajput et al (1.3%), Pahwa et al (2%). While the prevalence of overt hyperthyroidism was slightly more in Sahu et al (4.58%), Krishnamma et al (3.9%), Kaundinya et al (3.4%), Saraladevi et al (2.8%), Tiwari et al (3.8%). The prevalence of subclinical hyperthyroidism in current study was 1.88% which was consistent to the findings in the study conducted by Vaidya et al (1.2%), Pahwa et al in Amritsar (2%), Saraladevi et al in Warangal (1.8%), Kaundinya et al Goa (1.6%). While the study conducted by Rajput et al showed the prevalence to be 3.3%. The prevalence of subclnincal hyperthyroidism in the study conducted by Sahu et al was only 0.94%. Overt hyperthyroidism in current study area was 5.94% which is more than studies conducted by Sahu et al (0.78%), Vaidya et al (0.7%), Rajput et al (0.4%), Kaundinya et al (0.8%), Saraladevi et al (0.6%), Krishnamma et al (1.3%). Pregnant females were followed up till term to see the outcome of pregnancy. In our study no abortion occurred in females with subclinical hypothyroidism which is inconsistent with the finding in other studies conducted by Ajmani et al (2.39%), Kaudinya et al (5.71%) but similar results were seen in study conducted by Sahu et al where there were no abortions. No abortion wasseen in overt hypothyroid group similar to study conducted by Sahu et al but was inconsistent with the study conducted by Ajmani et al (16.6%), Nambiar et al (21.4%), Kaudinya et al (5.2%) where the abortion rate was high. In our study the prevalence of abortion in subclinical and overt hyperthyroid group was 3.07% which is less in comparison to the study conducted by Nambiar et al (4.5%) and Kauduniya et al (16.66%).[7-13] This difference can be because all the females with thyroid dysfunction were referred to the gynaecologist for management because it would have been unethical to deprive them of treatment when we knew about their abnormal thyroid status. Majority of them were diagnosed in first and

second trimester so with treatment there could have been improvement in thyroid function. This reason might have also contributed to non-significant association between neonatal death and thyroid dysfunction. Current study could not find association between preterm delivery and thyroid dysfunction. The prevalence of PPH among females with thyroid dysfunction in our study is 1.59% in comparison to 2.40% in euthyroid. This can be because of the fact that anaemia and other factors play a major role as risk factors for preterm delivery and PPH. The prevalence of low birth was similar in both euthyroid (38.56%) and thyroid dysfunction group (38.10%). Low birth weight is also affected by anaemia, maternal nutrition and other factors which could have been the reason for this insignificant difference. Future studies with multi-centric approach on larger sample can throw more light on this crucial issue.

Limitations

Because of time and financial constraints thyroid function after treatment for thyroid dysfunction in pregnant females was not done. This could have given a clear idea of the effect of treatment on thyroid dysfunction and its effect of maternal and neonatal outcome. Thyroid test of the neonates were also not done for the same reason.

CONCLUSION

In the current study, one fifth of the pregnant females were found to be suffering from thyroid dysfunction which is very high. Although there was no significant difference in the outcome of pregnancy in thyroid dysfunction and euthyroid group, the high prevalence of thyroid dysfunction in pregnancy is a sufficient reason to include thyroid function test as a part of routine investigation during antenatal check-up in all public sector.

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