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Original research article

Contrasting prenatal thyroid screening with targeted case detection

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Abstract

Background: Thyroid abnormalities during pregnancy and their effects on the developing baby have gained a lot of attention in recent years. Pregnancy-related thyroid abnormalities occur more frequently than any other endocrinological condition.

Material and Methods: This study used a prospective design. From November 2021 to November 2022, 200 pregnant patients with a singleton pregnancy were enrolled in the study at the prenatal clinic of the Department of Obstetrics and Gynecology, Sri Sathya Sai Medical College and Hospital, Tamil Nadu, India.

Results: A total of 200 participants participated in the screening process for this study. Women, on average, were 25 years old at the time. At the time of the screening, the typical gestational age was between 7-8 weeks. 143 were nullipara, 57 were multipara. 35 of the patients in the primi group and 25 of the patients in the multi group showed an abnormal thyroid profile.

Conclusion: Based on the findings of this research, we can draw the conclusion that universal thyroid screening is superior to targeted case discovery, which excludes approximately one third of individuals who have an aberrant thyroid profile. When compared with patients whose thyroid profiles were normal, those patients who had an abnormal thyroid profile had a higher incidence of complications.

Keywords: Pregnancy, general thyroid screening, and focused case.

Introduction

In recent years, thyroid abnormalities that occur during pregnancy and the implications that these abnormalities have on the growing baby have garnered a lot of interest. Thyroid conditions that are brought on by pregnancy have a higher incidence rate than any other type of endocrinological disorder. There is a significant geographical disparity in the prevalence of hypothyroidism among pregnant women [1, 2]. The West has the smallest differences, at 2.5%, while India has the largest, at 11%. As a direct consequence of this, the incidence rate in Asian countries is far higher than in Western nations. Because there are obvious benefits to treating maternal thyroid problems, a number of expert committees have advocated for screening to be performed on a routine basis. Nevertheless, the clinical practice guideline published by the Endocrine Society recommends a case finding strategy in which only high-risk women are tested [3, 4]. Those who have a personal or familial history of thyroid difficulties, type 1 diabetes mellitus, or who have additional risk factors are at a higher risk. Those who are at a higher risk also include those who are older [5, 6]. Infertility, a history of premature delivery or an autoimmune disease; goiter; thyroid antibodies; a history of head or neck irradiation; or a history of repeated abortions are all risk factors for developing thyroid antibodies. In their most recent analysis, Dhanwal and colleagues showed that the prevalence of hypothyroidism was shockingly high. In light of these findings, I decided to investigate whether or not the United States would benefit from implementing a policy of universal screening. My goal was to find out whether or not this would be the case. There is a correlation between subclinical hypothyroidism and fetal cognitive and motor deficits, as well as preterm birth, preeclampsia, and spontaneous abortion [5-7].

Not only does the size of the population that is tested have an influence on the yield and cost-effectiveness of screening, but also the variables that are used and the threshold at which they are applied do. Therefore, the threshold needs to be modified in accordance with values that change depending on the trimester. Maternal hypothyroidism during the first trimester has been linked to impaired brain development in the developing fetus [8, 9]. It is possible to avoid these issues with widespread screening and timely treatment during the first trimester of pregnancy; but, it is too late to prevent the neurodevelopmental delay that has already taken place. In the same way as in the first trimester, the fetus's neurodevelopment is entirely dependent on the thyroid hormones produced by the mother [10].

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Hypothyroidism can be caused by a number of factors, including a lack of iodine in the diet, autoimmune thyroiditis, treatment with radioactive iodine, and surgical removal of the thyroid gland. Hyperthyroidism affects significantly less than one percent of women who are pregnant. Subclinical hyperthyroidism does not have any effect on the outcomes of pregnancies either. Screening for hypothyroidism is therefore the primary focus of attention. The major purpose of the research was to gather evidence in support of prenatal thyroid screening being performed routinely. Analyzing the results of individuals suffering from thyroid problems, both those with sufficient treatment and those without, and calculating the percentage of undiagnosed instances that would be missed by a case-finding technique [9-11].

Materials and Methods

This study used a prospective design. From November 2021 to November 2022, 200 pregnant patients with a singleton pregnancy were enrolled in the study at the prenatal clinic of the Department of Obstetrics and Gynecology, Sri Sathya Sai Medical College and Hospital, Tamil Nadu, India. All study participants provided written informed permission. Patients who were already diagnosed with hypothyroidism or hyperthyroidism were also excluded.

Inclusion Criteria

- All pregnant women who are willing to return for follow-up care and who have scheduled a first trimester visit at GTMCH.
- Patients with known autoimmune problems, thyroid abnormalities in one's own or one's family, obesity, recurrent abortions, IUD use in the past, and prolonged infertility are considered high risk.

Exclusion Criteria

- People with thyroid conditions known to exist Patients who refuse to attend follow-up appointments those affected by molar pregnancy

At the time of enrollment, participants provided written informed consent, had their medical histories thoroughly explored, underwent a focused general physical examination, and had their results recorded on a standard Proforma. During the initial consultation, we checked their TSH and free T4. A blood draw was performed in the morning after a fasting period. The patients are then evaluated for the presence of risk factors for thyroid dysfunction, and those who have them are classified as high risk, while those who don't are classified as low risk. Screening only those at high risk, as opposed to everyone, for thyroid dysfunction was analyzed to see if it is sufficient.

Statistical Analysis

The frequencies and percentages of demographic variables were provided in categories. Mean and standard deviation for age were provided. Chi-square tests are used to compare thyroid profiles and clinical factors. McNemar's test was used to examine the relationship between TSH and T3, T4, and FSH. Thyroid dysfunction prevalence was determined using a confidence range of 95%. Different kinds of bar graphs and pie charts and doughnut charts and subdivided bar graphs were used to illustrate the information.

Results

A total of 200 patients participated in the study's screening process. The typical female age was 25. In most cases, screening was performed between 7 and 8 weeks into the pregnancy. Nulliparous 143, multiparous 57. In the Primi group, 35 people and in the Multi group, 25 people had an abnormal thyroid profile. There were 100 serious instances, and 140 average cases. 60 patients, or 5%, of the group examined, showed an abnormal thyroid profile. There were 6 cases of subclinical hyperthyroidism, 4 cases of overt hyperthyroidism, and 34 cases of preclinical hypothyroidism. Sixty patients were examined, with 38 having risk factors and 22 having none. These 22 patients, or about a third of the total, would be missed if a high risk screening strategy was used. There was a statistically significant difference between the two groups, with a chi square of 247.334 and a p value of less than 0.001.

Table 1: Thyroid Status

Sr. No.	Thyroid status	No. of women
1.	Normal	140
2.	Abnormal	60
	Total	200

Table 2: Thyroid dysfunction types

Sr. No.	Types	No. of women
1.	Subclinical hypothyroidism	30
2.	Subclinical hyperthyroidism	10

ISSN:0975 -3583,0976-2833 VOL13, ISSUE 08, 2022

3.	Overt hypothyroidism	12
4.	Overt hyperthyroidism	8
	Total	60

Table 3: Status of Thyroid Risk

Sr. No.	Risk status	No. of women
1.	With Risk factors	32
2.	Without Risk factors	28
	Total	60

Table 4: Level of TSH

Sr. No.	Types	No. of women
1.	<0.10 ng/ml	10
2.	0.1 - 3.0 ng/ml	140
3.	3 - 5 ng/ml	16
4.	> 5 ng/ml	34
	Total	200

Table 5: Complications

Sr. No.	Complication	No. of women
1.	Yes	70
2.	No	130
	Total	200

Table 6: Among Complications, treatment

Sr. No.	Treatment	No. of women
1.	Adequate	6
2.	Not adequate	18
	Total	24

A statistically significant finding. Which suggests that patients who were not given adequate care were more likely to experience complications.

Ten patients had TSH values below 0.1, 340 had TSH values between 1-3, 16 patients had TSH values between 3-5, and 24 patients had TSH values between 5-10. Sixty individuals out of four hundred suffered problems, and twenty-four of those had an abnormal thyroid profile. Out of these 24, 4 had PIH, 4 had IUGR, 6 had oligohydramnios, 4 were preterm, 2 had abruption, and 2 had intrauterine devices. Complications such as Oligo, preterm 11, and IUD2 were seen in the remaining patients with a normal thyroid status. 4 cases of gestational diabetes, 6 cases of preeclampsia, 2 cases of polyhydramnios. Patients with an abnormal thyroid profile had a higher rate of complications.

Six women were found to have preexisting symptoms of thyroid illness. Out of the 5, 5 were overweight. Six people reported a family history of thyroid problems. Five of them were accustomed to living in hilly terrain. Seven had a family history of recurrent miscarriage, premature delivery, or infertility; five had a family history of autoimmune illnesses; and four were elderly. But among those 22 patients, there were no major risk factors. Therefore, all of these cases would be missed if only the high-risk population were screened. Twenty-four out of the sixty individuals had a negative perinatal outcome. This provides statistical evidence linking elevated TSH levels to a higher risk of a negative pregnancy outcome. More problems occurred in people who were not treated properly. There were 30 preterm births in the screened population, and 6 of those patients had abnormal thyroid profiles. In the hypothyroid group, one infant was born prematurely and later died. The results of this study provide strong evidence linking abnormal TSH levels to poor fetal outcomes.

Discussion

People who were screened, 10 had planned cesarean sections, 90 had emergency cesarean sections, 80 had natural vaginal deliveries, 12 had forceps, and 8 had vacuums. There were 15 elective LSCS, 13 emergency LSCS, 13 normal vaginal deliveries, 23 deliveries aided by forceps, and 3 deliveries aided by vacuum among the group with an abnormal thyroid profile. Fetal distress, CPD, and unsuccessful induction were the most common reasons for LSCS. Only 5 of the 24 patients with complications were given appropriate care. One PIH, one IUGR, two oligohydramnios, and one premature birth occurred despite adequate treatment. There were 3 PIH, 3 IUGR, 4 oligohydramnios, 3 preterm, 2 abruptions, 2 IUDs, and 2 missed abortions in the inadequate therapy group.

Therefore, approximately one-third of pregnant women with these thyroid disorders would go undiagnosed if the high-risk case finding approach were used. My findings corroborated those of Vaidya *et al*. In 2012, the endocrine society decreased the acceptable range for TSH from 0.5 to 0.1 mIu/L.

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Similar to the study by Dave *et al*., the mean gestational age in this one was also 9. Compared to the 153 patients in the study by nazourpur *et al*. and the 305 patients in the study by Dave *et al*., this study tested 400 pregnant individuals. There were 1560 participants in the Vaidya *et al*. trial [10-12].

The topic of prenatal screening for thyroid disease remains contentious. While there is limited proof that identifying and treating pregnant women with subclinical hypothyroidism improves maternal and fetal outcomes, the widespread availability of screening tests and the relatively low cost of treatment have contributed to the growing popularity of this universal screening approach. Findings from this study indicate that case discovery using potential risk variables for thyroid disease misses 25% of individuals with hyperthyroidism, 43.8% of individuals with overt hypothyroidism, and 32.3% of individuals with subclinical hypothyroidism. The findings were consistent with those of the Vaidya *et al*. [11-14].

It was significantly more prevalent to have hypothyroidism than hyperthyroidism. Overt hyperthyroisdism is uncommon; the prevalence in my sample was 1%, which was close to but greater than the rate in the prince *et al*. study among Asian women (0.02%). Thyroid diseases were strongly linked to multiple independent risk variables. Unfavorable outcomes were seen more frequently among patients with aberrant thyroid profiles than among those with normal thyroid profiles. Similar results were found in the studies conducted by Dave *et al*. in Madhya Pradesh, Negro *et al*., and Vaidya *et al*. [15-17].

There is disagreement over which potential dangers must be considered in any case-finding method. There is not enough information on the association between age of patient and abnormal thyroid function (13), despite the fact that the American Thyroid Association and European organizations guidelines regard age 30 years as one of the risk factors and suggest screening all women who are over the age of 30. Evidence suggested that when women over the age of 30 were included in case finding efforts, the percentage of pregnant women located rose from 55.3% to 85.6%. Given the widely varying incidence of these risk factors among communities, it is imperative that thyroid screening there policies be evidence-based for each county and society [17, 18].

The current study demonstrated that nearly one-third of pregnant women with thyroid dysfunction were being missed due to the lack of a uniform screening approach, even though the frequency of risk factors was relatively low among South Indian pregnant women. However, people with subclinical thyroid disorders were largely ignored. There is a lack of reliable information currently available about the results of treating these ladies. Although some research has linked subclinical hypothyroidism to negative pregnancy outcomes and found that treatment with L-thyroxine reduced or eliminated these outcomes, other research has not found this to be the case [19-21].

My study's key strength was its methodology, which was based on its primary population: Indian women in their first trimester of pregnancy. In contrast to some other studies, all individuals in this one had a thorough assessment of their thyroid function, including a history, a physical examination, and thyroid function testing. However, our study's findings cannot be extrapolated to regions with varying levels of iodine sufficiency or other risk factors [22-24].

Thus, it can be concluded that approximately one-third of pregnant women who had of thyroid dysfunction were missed by the targeted high-risk case finding approach. While it would seem reasonable to recommend universal screening for thyroid diseases in pregnancy given the low cost of treatment and widespread availability of screening tests, this is not yet possible due to a lack of conclusive data on the impact of treating subclinical hypothyroidism. The targeted high-risk case discovery method may be shown to be ineffective, especially in populations with a low frequency of supposed risk factors, if evidence from ongoing prospective trials demonstrates the efficacy of treating subclinical hypothyroidism in pregnancy. However, free testing and treatment for Thyroid disorder is provided by the government in countries like India, so this is something that can be recommended and done in our government institutions [25, 26].

Conclusion

This research shows that a third of individuals with an aberrant Thyroid profile are missed by targeted case detection, hence it stands to reason that universal thyroid screening is preferable. When comparing patients with abnormal thyroid profiles to those with normal thyroid profiles, we found that the former had a higher complication rate. Improved neonatal and maternal outcomes can be achieved with early detection and treatment of thyroid disease. Furthermore, treatment costs are manageable. Hence Universal screening should be encouraged in countries where the incidence of thyroid disease is high.

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Conflict of Interest

None

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ISSN:0975 -3583,0976-2833 VOL13, ISSUE 08, 2022

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