

Prevalence of Subclinical Hypothyroidism in Pregnant Women in Tehran-Iran

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Abstract

Background: Maternal subclinical hypothyroidism during pregnancy is associated with various adverse outcomes. Recent consensus guidelines advocate universal thyroid function screening during pregnancy. There are no data from Iran about the prevalence of thyroid hypofunction in pregnancy. This study aims to find the prevalence of thyroid dysfunction.

Materials and Methods: In this descriptive cross sectional study, thyrotropin (TSH) was measured in 3158 pregnant women irrespective of gestational age from October 2008-March 2012. If TSH was more than 2.5 mIU/L in the first trimester or more than 3 mIU/L in the second or third trimester, free T4 was measured to diagnose subclinical / overt hypothyroidism. If serum free T4 was in the normal range (0.7-1.8 ng/dl) the diagnosis was subclinical hypothyroidism and if below the normal range, overt hypothyroidism was diagnosed.

Results: A total of 3158 pregnant women were evaluated. One hundred forty seven of them were diagnosed as hypothyroidism. Subclinical hypothyroidism and overt hypothyroidism were present in 131 (89.1%) and 16 (10.9%) women respectively. Prevalence of subclinical hypothyroidism was 4.15%. Most of the subclinical and overt hypothyroidism cases were diagnosed in the first trimester.

Conclusion: It appears logical to check TSH during pregnancy due to the observed prevalence of subclinical hypothyroidism.

Keywords: Hypothyroidism, Pregnancy, Prevalence, Thyrotropin

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Introduction

Thyroid disorders are among the common endocrine problems in pregnant women. It is now well known that not only overt, but also subclinical hypothyroidism (SCH) has adverse effects on maternal and fetal outcome (1). There are studies which show low intellectual and motor development of children is associated with abnormalities of maternal thyroid function (1, 2). According to the study by Sahu et al. in India on 633 pregnant women, the prevalence of subclinical and overt hypothy-

roidism was 6.5% and 4.6% respectively (3). Fetal thyroid gland is not functional up to 12 weeks of gestation. Thyroid releasing hormone crosses the placenta to stimulate fetal thyroid. So maternal thyroid function is very important during the first trimester (4). During the first trimester, human chorionic gonadotropin (hCG) level is high that act like thyrotropin (TSH) (α subunit of hCG and TSH is similar). So the range of TSH, under the influence of placental hCG, is decreased during pregnancy with the lower normal TSH level in the

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first trimester being poorly defined and an upper limit of 2.5 mIU/L. At 10-12 weeks of gestation, plasma level of hCG begin to decline to act like TSH, so TSH is increased a little to an upper normal limit of 3mIU/L in the second and third trimester (4). According to the study by Soldin et al. trimester-specific measurements of T3, FT4 and TSH is warranted (5). However, a study in Iran by Zarghami et al. stated that TSH level did not show significant differences in different trimesters of pregnancy(6). There is no data from Iran about the prevalence of SCH in pregnancy and there is debate about universal screening of thyroid function in pregnancy.

We therefore studied the thyroid function of pregnant women to know the prevalence of subclinical hypothyroidism.

Materials and Methods

This descriptive cross-sectional study was done on 3158 pregnant women in Taleghani Hospital in Tehran, Shahid Beheshti University of Medical Sciences from October 2008-March 2012. For all pregnant women in the first prenatal care and during routine laboratory workup, screening of thyroid function was done by TSH level in endocrine laboratory in Taleghani Hospital by the chemiluminescent immunoassay (Elecsys 2010, Hitachi, Diamond, Japan). If TSH level was >2.5 mIU/L in the first trimester or TSH >3 mIU/L in the second or third trimester, free T4 measurement was done by chemiluminescent immunoassay to know whether it is subclinical or overt hypothyroidism. If serum FT4 was in the normal range (0.8-1.7 ng/dl) SCH was diagnosed and if below the normal range, OH was the diagnosis.

Their demographic (maternal age, gestational age, parity) and clinical details were collected as part of routine antenatal care and were recorded. We asked the women about personal and family history of thyroid disease. Duration of gestation was calculated from last menstrual period and verified by ultrasonography. The Ethical Committee of Shahid Beheshti University of Medical Sciences approved this study and informed consent was taken from all participants. SPSS software version 20 were used for data analysis including t test.

Results

The age of patients ranged from 17-38 years old with mean \pm SD (27 ± 5) (Table 1). Among 3158 women, 147 were diagnosed as hypothyroidism (Table 2). Eighty-four (57.1%) were nulliparous and 63 (42.9%) were multiparous.

Table 1: Distribution of patient age of overt and subclinical hypothyroidism in pregnant women in Tehran-Iran between 2008 and 2012

Age (Y)	Frequency	Percent	Cumulative frequency
<20	18	12.2	12.2
20-25	36	24.5	36.7
25-30	61	41.5	78.2
>30	32	21.8	100
Total	147		

Table 2: Prevalence of overt and subclinical hypothyroidism in pregnant women in Tehran-Iran (2008-2012)

Type of hypothyroidism	No.of patients	Prevalence
Subclinical	131 (89.1%)	4.15%
Overt	16 (10.9%)	0.5%
Total	147 (100%)	4.65%

Most of the women with subclinical hypothyroidism were diagnosed in the first trimester and many women were undetected till the second and third trimesters (Table 3).

According to table 3 there was a significant difference in mean age (about 3.5 years) of patients in overt and subclinical groups ($p=0.02$). This means that universal screening is necessary because most of the pregnancies occur in young women.

Table 3: Relationship between mean age and gestational age and type of hypothyroidism in pregnant women in Tehran-Iran (2008-2012)

Diagnosis	Age (Y)		Number of patients in each trimester			
	Mean	SD	First	Second	Third	Total
Subclinical	26.85	4.989	76	31	24	131
Overt	30.38	4.856	9	4	3	16
Total	27.24	5.079	85	35	27	147

Discussion

We found the prevalence of subclinical hypothyroidism to be 4.15%. According to the study by Casey et al. the prevalence of subclinical hypothyroidism during early pregnancy is common, affecting about 2.5% pregnant women (7, 8). A similar result was reported by Allan et al. (9), Vaidya et al. (10) and Mannisto et al. (11). These studies are in contrast with the report by Gillett who stated that routine screening of pregnant women is not necessary for thyroid function, unless they were at increased risk of thyroid disease (12).

This suggests that subclinical hypothyroidism is more common in Iranian pregnant women. Subclinical hypothyroidism during early pregnancy has been shown to be associated with impaired neuropsychological development of children and several other adverse outcomes, including preterm delivery, preeclampsia and increased fetal mortality (1-4, 8, 10, 11, 13-16). But the study by Cleary Goldman et al. showed that subclinical hypothyroidism is detectable in 2.2% in the first and second trimesters with no adverse outcome in pregnant women with thyroid hypofunction (15). Pregnancy has much influence on the thyroid gland and thyroid function. Physiological changes of pregnancy cause the thyroid gland to increase production of thyroid hormones to meet maternal and fetal needs. TSH and human chorionic gonadotropin (hCG) have identical α subunits whereas the β subunits differ in their amino acid sequence (4). There is also an uncertainty regarding the most appropriate initial screening test for thyroid dysfunction in pregnancy. The consensus guidelines recommend using TSH level as the initial test (10, 14-16). The American College of Obstetricians and Gynecologists (2007) concluded that although observational data were consistent

with the possibility that subclinical hypothyroidism was associated with adverse neuropsychological development, there have been no interventional trials to demonstrate improvement in decision to do routine thyroid screening of pregnant women. There are reports that testing the high risk group only for thyroid function would miss about one third of pregnant women with overt/subclinical hypothyroidism (7, 9, 17-22). Most of our patients with overt hypothyroidism were diagnosed in the first trimester. This is in agreement with a previous study by Sahu et al. in India in which the rate of overt hypothyroidism was reported as 4.6% (3). We know that patients with overt hypothyroidism usually are infertile and if they become pregnant, complications of pregnancy such as abortion may occur. So universal screening for thyroid function appears logical. Also, diagnosis of subclinical hypothyroidism during the third trimester is necessary to treat them and prevent postpartum depression.

Conclusion

There is a high percentage of pregnant women that reach second and third trimester of pregnancy with undiagnosed thyroid disease. It is therefore necessary to screen women with a serum TSH, if they are pregnant or deciding to become pregnant.

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