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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first trimester being poorly defined and an up-
ner limit of 2.5 mIU/L. At 10-12 weeks of ges-
tation, 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 dif-
f erent 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 sub-
clinical 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 prena-
tal care and during routine laboratory workup,
screening of thyroid function was done by TSH
level in endocrine laboratory in Taleghani Hos-
pital by the chemiluminescent immunoassay
(Elecys 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 trimes-
ter, free T4 measurement was done by chemi-
luminescent immunoassay to know whether it
is subclinical or overt hypothyroidism. If se-
rum 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 re-
corded. 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 Univer-
sity of Medical Sciences approved this study
and informed consent was taken from all par-
ticipants. 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 ± SD (27 ± 5) (Table 1). Among
3158 women, 147 were diagnosed as hypothy-
roidism (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

<table>
<thead>
<tr>
<th>Age (Y)</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>18</td>
<td>12.2</td>
<td>12.2</td>
</tr>
<tr>
<td>20-25</td>
<td>36</td>
<td>24.5</td>
<td>36.7</td>
</tr>
<tr>
<td>25-30</td>
<td>61</td>
<td>41.5</td>
<td>78.2</td>
</tr>
<tr>
<td>&gt;30</td>
<td>32</td>
<td>21.8</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>147</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Type of hypothyroidism</th>
<th>No.of patients</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subclinical</td>
<td>131 (89.1%)</td>
<td>4.15%</td>
</tr>
<tr>
<td>Overt</td>
<td>16 (10.9%)</td>
<td>0.5%</td>
</tr>
<tr>
<td>Total</td>
<td>147 (100%)</td>
<td>4.65%</td>
</tr>
</tbody>
</table>

Most of the women with subclinical hypothy-
roidism 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 pa-
tients in overt and subclinical groups (p=0.02)
.This means that universal screening is neces-
sary because most of the pregnancies occur in
young women.
Prevalence of Subclinical Hypothyroidism

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

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Age (Y)</th>
<th>Number of patients in each trimester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Subclinical</td>
<td>26.85</td>
<td>4.989</td>
</tr>
<tr>
<td>Overt</td>
<td>30.38</td>
<td>4.856</td>
</tr>
<tr>
<td>Total</td>
<td>27.24</td>
<td>5.079</td>
</tr>
</tbody>
</table>

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.

Acknowledgements

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References


