Subclinical Hypothyroidism Prevalence in Pregnant Ladies in AL-Hilla city in Iraq

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Submission date:- 30/4/2018 Acceptance date:- 13/6/2018 Publication date:- 1/10/2018

Keywords: Hypothyroidism, Pregnancy, Prevalence, Thyrotropin(TSH).

Abstract

Recent guidelines adapted unique pregnancy thyroid function screening tests because pregnancy subclinical hypothyroidism is associated with different adverse outcomes. There are no data from Iraq about the prevalence of thyroid hypo function in 1st trimester of pregnancy. This study aims to find the prevalence of thyroid dysfunction in 1st trimester.

Patients and Methods: In this descriptive cross sectional study, thyroid stimulating hormone (TSH) was measured in 100 pregnant women from May 2017-December 2017 in Babylon teaching hospital for maternity and pediatric and in private clinic. If TSH was more than 2.5 mIU/L in the first trimester, free T4 was measured to diagnose then differentiate between subclinical & overt hypothyroidism. If free T4 was in the normal value (0.7-1.8 ng/dl) the diagnosis was subclinical hypothyroidism and if below the normal value, overt hypothyroidism was diagnosed.

Results

A total of 100 pregnant women were evaluated. Twenty-eight of them were diagnosed as hypothyroidism. Subclinical hypothyroidism and overt hypothyroidism were present in 24 (24%) and 4 (4%) women respectively. Most of the subclinical and overt hypothyroidism cases were diagnosed in the first trimester.

1- Introduction

There are different studies which show decreased intellectual and motor development of babies is associated with abnormalities of their mothers thyroid function [1, 2]. Thyroid gland disorders are one of the common endocrine problems in pregnant ladies. It is now well known that not only overt, but also subclinical hypothyroidism (SCH) has adverse side effects on maternal and fetal outcome [1]. Fetal thyroid gland is not working up to 12 weeks of gestation. Thyroid releasing hormone crosses the placenta to stimulate fetal thyroid gland. So maternal thyroid function is very important during the first trimester [4]. During the first trimester, human chorionic gonadotropin (hCG) level is elevated that act similar to thyroid stimulating hormone (TSH) (α subunit of hCG and TSH is similar). So the effect of TSH, under the influence of placental hCG, is low during pregnancy with the decreased TSH level in the first trimester beings poorly defined and an upper level of 2.5 mIU/L. At 10-12 weeks of gestation, plasma level of hCG begins to decline to act like TSH, so TSH is increased a little to an upper normal level of 3mIU/L in the second and third trimester[4]. However, a study in Iraq stated that TSH level did not show significant differences in different trimesters of pregnancy. There is no data from Iraq about the prevalence of SCH in pregnancy and there is debate about unique screening of thyroid function tests in pregnancy. We, therefore, studied the thyroid function of pregnant ladies to know the prevalence of subclinical cases of hypothyroidism.

2- Patients and Methods:

This descriptive cross-sectional study was done on 100 pregnant ladies in Babylon teaching hospital for maternity and pediatrics in Alilla city and in private clinic , Babylon university of Medical Sciences . For all pregnant ladies from May 2017-December 2017 during routine laboratory workup, screening of thyroid function tests was done by TSH level in the endocrine laboratory 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, overt hypothyroidism was the diagnosis. Their demographic (maternal age, gestational age, parity ,BMI, residence) 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. Informed consent was taken from all participants. SPSS software version 20 was used for data analysis.

3- Results

Table1shows that the mean age of pregnant women who participated in the study is 26.32±6.04years.Regarding body mass index and weeks of gestation, the mean is 29.12±3.46kg/m2 and 8.0±2.06weeks respectively. Over half of pregnant women (60.0%) reside in urban areas while (40.0%) reside in rural areas .Up to 64.0% 0f pregnant women are multigravida.

Table 1:Distribution of the pregnant mothers according to age, BMI, GA, parity and residence.

Variables		
Age (years)	26.32±6.04	(16-40)
BMI (kg/m^2)	29.12±3.46	(24-38)
Weeks of gestation (week)	8.0±2.06	(4-12)
Residence		
Urban	60	60.0%
Rural	40	40.0%
Total	100	100.0%
Parity		
Primigravida	36	36.0%
Multigravida	64	64.0%
Total	100	100.0%

Table 2 shows that the mean of thyroid stimulating hormone (TSH) and free T4 is 2.49±0.82 and 1.07±0.3 respectively.

Table 2: Distribution of the pregnant mothers according to TSH and FT4.

Variable	Mean±SD	Range
TSH*(U/ml)	2.49±0.82	(1.6-4.8)
FT4** (ng/dl)	1.07±0.3	(0.5-1.8)

*TSH: .Thyroid stimulating hormone . **FT4:Free T4.

Figure 1 shows that subclinical hypothyroidism represents 24.0% of the total pregnant mothers in the first trimester who participated in the study while 4.0% have overt hypothyroidism.

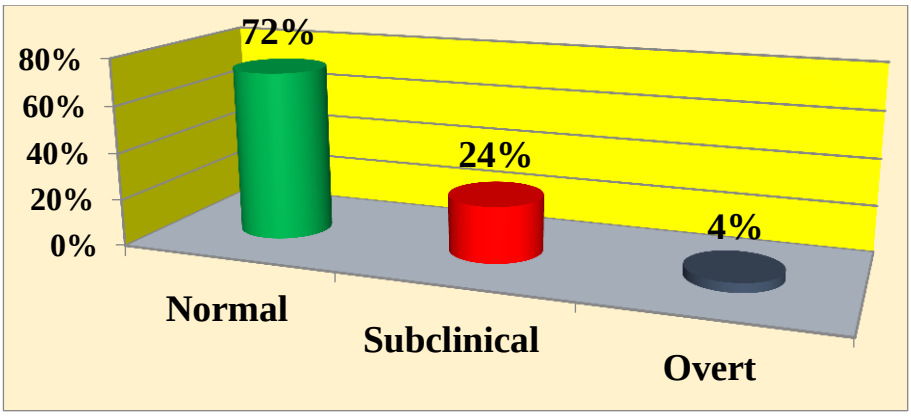

Figure 1: Distribution of pregnant mothers according to the diagnosis of hypothyroidism.

Table 3 shows that fisher exact test was conducted to show the association between parity, residence with the diagnosis of hypothyroidism. There is a significant association between residence and diagnosis (p-value <0.001)

Table 3: Association between parity, residence and diagnosis of hypothyroidism.

Variables	Diagnosis			Total	P- value
	Normal	Subclinical	Overt		
Parity					
Primigravida	24(33.3%)	12(50.0%)	0(0.0%)	36(36.0%)	0.1[f]
Multigravida	48(66.7%)	12(50.0%)	4(100.0%)	64(64.0%)	
Total	72(100.0%)	24(100.0%)	4(100.0%)	100(100.0%)	
Residence					
Urban	52(72.2%)	8(33.3%)	0(0.0%)	60(60.0%)	<0.001*[f]
Rural	20(27.8%)	16(66.7%)	4(100.0%)	40(40.0%)	
Total	72(100.0%)	24(100.0%)	4(100.0%)	100(100.0%)	

*P- value≤ 0.05 was significant. f:fisher-exact test.

In this table, F-test (ANOVA) was conducted to show if there were mean differences of age ,BMI and weeks of gestation according to diagnosis of hypothyroidism(normal ,subclinical or overt).In all circumstances there were significant mean differences (p-value <0.001*)

Table 4: Mean difference of age , BMI and GA according to diagnosis of hypothyroidism in pregnant women.

Variable	Study groups	N	Mean±SD	F- test	P-value
Age (year)	Normal	72	26.89±5.67	22.66	<0.001*
	Subclinical	24	22.33±2.8		
	Overt	4	40.0±0.0		
BMI (kg/m^2)	Normal	72	28.06±2.77	31.52	<0.001*
	Subclinical	24	30.83±2.72		
	Overt	4	38.0±0.0		
Week of gestation(week)	Normal	72	7.11±1.49	45.63	<0.001*
	Subclinical	24	10.17±1.6		
	Overt	4	11.0±0.0		

*P- value≤ 0.05 was significant.

Figure 2 :-This figure shows that there was a significant negative linear correlation between TSH and FT4(p-value = 0.011*, r = - 0.252)

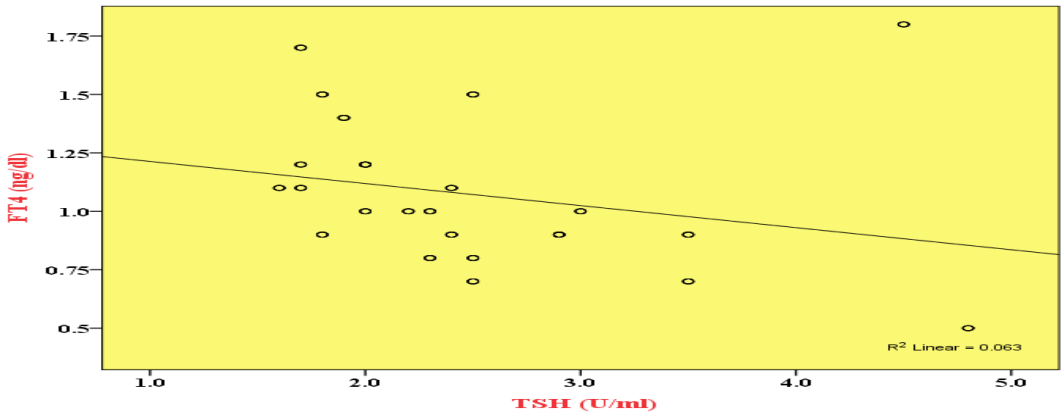

Figure 2: Correlation between TSH and FT4.

Figure 3 depicts that there was a significant mean difference of TSH according to age,(p-value =0.006).Regarding FT4 also there was a significant mean difference according to age ,(p value =0.03)

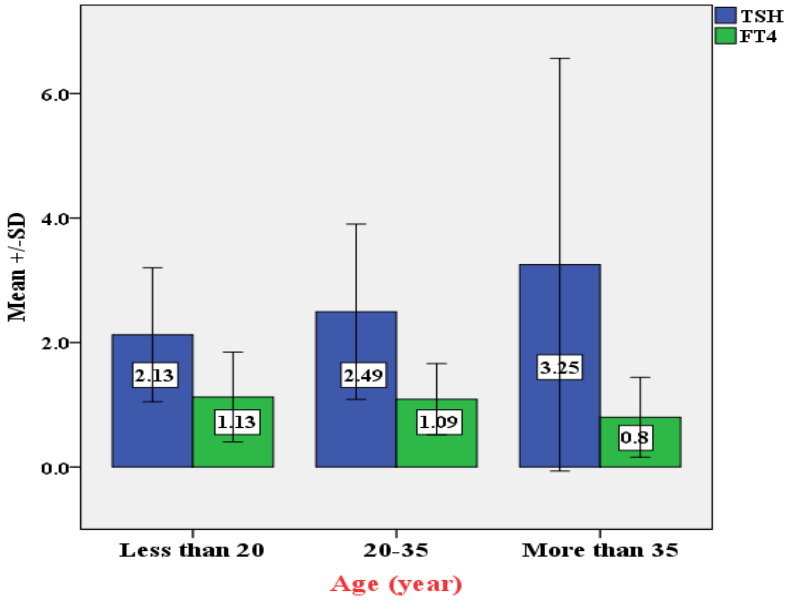

Figure 3: Distribution of TSH and FT4 according to the age of the pregnant mothers.

Figure 4 depicts the higher percentage of subclinical cases of hypothyroidism was present in women aged 20- 35 years (83.3%),while those aged younger than 20 years ,the percentage was 16.7%

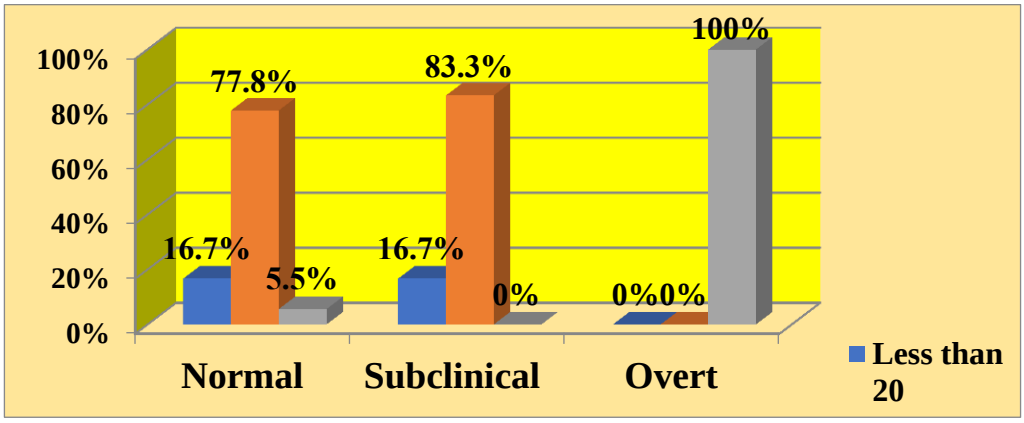

Figure 4: Association between age of the pregnant women and diagnosis.

4-Discussion

We found the prevalence of subclinical hypothyroidism to be 6.15%. According to the study by Casey et al. the prevalence of subclinical hypothyroidism during early pregnancy is common, affecting about 5.5% 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 pregnant women especially in Iraqi pregnant ladies. Subclinical hypothyroidism during early pregnancy has been shown to be associated with the 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.

5- 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 to overcome the complications that may occur due to maternal hypothyroidism.

CONFLICT OF INTERESTS

There are no conflicts of interest.

6- References

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الخلاصة

جميع التوجيهات والتوصيات الحديثة تتبنى عمل مسح شامل لوظائف الغدة الدرقية خلال فترة الحمل وذلك بسبب اكتشافهم ان الامهات المصابات بهبوط هرمون الغدة الدرقية غير المشخص (تحت السريري) خلال فترة الحمل ترافقها اعراض جانبية ونتائج سلبية غير مرغوب بها , ولا توجد في العراق احصائيات حول نسبة انتشار هبوط او خمول هورمونات الغدة الدرقية في فترة الحمل وهذه الدراسة تهدف الى ايجاد نسبة خلل الغدة الدرقية خلال فترة الثلاثة اشهر الاولى من الحمل.

المرضى وطريقة العمل:- في هذه الدراسة المقطعية الوصفية ,الهرمون المحفز للغدة الدرقية قد قيس لمئة امرأة حامل منذ شهر ايار ٢٠١٧ الى شهر كانون الاول ٢٠١٧ في مستشفى بابل للولادة والاطفال والعيادة الخاصة. اذا كان الهرمون المحفز للغدة الدرقية اكثر من ٢,٥ ملي انترناشيونال يونت / لتر في الثلاثة اشهر الاولى او اكثر من ٣ ملي انترنشونال يونت/ لتر في ستة اشهر الاخيرة يجب قياس هرمون الغدة الدرقية T4 الحر لتشخيص هبوط هورمونات الغدة الدرقية السريرية وتحت السريرية. اذا كان قياس هرمون T4 الحر في مصل الدم ضمن الحدود الطبيعية (٠,٧- ١,٨ نانو غرام / دسي لتر) التشخيص يكون هبوط او خمول الغدة الدرقية تحت السريري, اما اذا كان قياس T4الحر في مصل الدم اقل من الحد الطبيعي فهذا يعني هبوط الغدة الدرقية السريري هو التشخيص.

النتائج:- تم فحص مئة امرأة حامل, ٢٨ امرأة منهم شخصوا لأول مرة بمرض هبوط هرمون الغدة الدرقية, فكانت النتائج كاللاتي ٢٤ امرأة حامل شخصت بهبوط هرمون الغدة الدرقية تحت السريري والاربعة الباقين شخصوا بمرض هبوط هرمون الغدة الدرقية السريري ولأول مرة واكثرهم شخصوا خلال الثلاثة اشهر الاولى من الحمل.

الكلمات الدالة: قصور الغدة الدرقية، الحمل، الانتشار، ثيروتروبين (TSH).