

# A comparative study between recurrent miscarriages resulting from thyroid dysfunction and autoimmune diseases in the first trimester of pregnancy

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## Abstract

**Background:** The most frequent adverse pregnancy result is miscarriage. Pregnancy-related major changes and their effects on the mother and fetus are linked to thyroid antibodies and thyroid diseases.

**Objectives:** The aim of the presented study is to compare the miscarriages caused by thyroid diseases and autoimmune diseases in the first trimester of pregnancy., by the following objectives: 1- measurement FT3, FT4 and TSH 2- Antibody determination of TPO and anti-tg 3- antiphospholipid antibodies

**Methodology:** The study was conducted during the period from 1st of February 2022 to the 1st of April 2022, the number of participant become 120(100 patient and 30 control ) female .Their age were ranged from 19 - 46 years, sample were attended from Hospital women and children in the province of AL-Anbar. pregnant women with miscarriage were divided into thyroid disorders(51) and autoimmune diseases(49) to compare between thyroid hormones and antithyroid hormones between the two groups and to know the percentage of thyroid disorders in relation to autoimmune diseases. The Statistical Analysis System-SAS (2012) program was used to detect the effect of different factors in study parameters.

**Results:** The prevalence of thyroid disorder and autoimmun disease during pregnancy was 100 out of which 49 had thyrorid disorde and 51 had autoimmun disease. there is a significant difference (  $P \leq 0.001$ ) of abortion in miscarriage pregnant women with thyroid disorder comper to in autoimmune disease. The mean and standard deviation of anti-tpo are higher in Rm with Autoimmune thyroid disease compared to other groups. anti-tg and APL are higher in pregnancy with Autoimmune thyroid disease compared to Thyroid disorder. no significant difference between TSH and FT3 in patient with autoimmune and thyroid disorder despite the mean  $\pm$  sd in TD is lower than AID and high significant ( $p \leq 0.05$ )in level of FT4.

**CONCLUSION:** Women with a positive autoimmune disease may be more likely to have a pregnancy loss than if they have a thyroid disorder.

**Keywords:** pregnancy, thyroid dysfunction, autoimmune diseases.

## INTRODUCTION

One of the most prevalent endocrine diseases in women of reproductive age is thyroid disease(1). Thyroid autoimmunity (TAI)is the most typical cause of thyroid dysfunction(2). The most common complication of pregnancy is miscarriage, which is the loss of a pregnancy before 24 weeks of gestation. It can affect up to one in every five women who conceive(3). Thyroid autoimmune disease may be a significant risk factor for miscarriage and premature delivery, according to the available research(4). Compared to women with normal thyroid function, autoimmune thyroid illness, or combined subclinical hypothyroidism and autoimmune thyroid disease, carries the highest risk. In addition, compared to women with normal thyroid function, those with subclinical hypothyroidism and autoimmune thyroid disease frequently miscarried sooner in the course of their pregnancies(5).

Studies have shown a link between thyroid autoantibodies, particularly thyroid peroxidase antibodies, and unfavorable pregnancy outcomes, such as miscarriage, preterm birth, and unfavorable neurodevelopmental aftereffects in children, even in

women with biochemically normal thyroid function(6). TAI, which is characterized by the presence of anti-thyroid peroxidase (anti-TPO) and/or anti-thyroglobulin (anti-TG) antibodies, may cause a chronic lymphocytic thyroiditis, which ultimately leads in thyroid tissue destruction and thyroid function loss(7). Measurement of TPO and TG antibodies in circulation can quickly identify autoimmune thyroid illness.

## MATERIALS AND METHODS

The study was conducted during the period from 1st of February 2022 to the 1st of April 2022 . obtained the study was approved by ethical committees of department of Biology .College of Science University of Al-Anbar.After exclude patient with DM, hypertension , euthyroid and liver disease, the number of participant become 120(100 patient and 30 control ) female .Their age were ranged from 19 - 46 years. All sample were attended from Hospital women and children in the province of AL-Anbar. patient subclinical information was opained direct from patient questionnaire. Seven milliliters of venous blood were collected from a suitable vein from pregnant at three trimester .this blood was transferred in to gel tube ,and water bath ,allowed to clot for ten minutes at 37 C ,at that moment were centrifuged at (3000 rpm) for five minutes. The clear serum stored frozen in refrigerator at (-10 C) .

Hormonal test (for TSH, FT4,FT3,ANTI-TPO and ANT-TG)was performed by using (VIDAS) BioMerieux Company, France, through an enzyme linked fluorescent assay" (ELFA). Normal reference range of TSH in first trimester were( 0.38 – 4.31  $\mu$ IU/mL) . the normal reference rang of FT3and FT4 were (2.17 – 3.34 pg/ml )( 0.82 – 1.63 ng/dl ) respectively.

Anti -phospholipid autoantibodies (APL) screen IgM were estimated by ELISA kits according to the manual procedure of Aeskulisa Company (Germany) in human serum. the normal reference rang of APL were Positive ranges : > 12 U/ml .

The Statistical Analysis System-SAS (2012) program was used to detect the effect of different factors in study parameters.. Student t-test was used to determine the significance difference between distributed variables . The least significant difference –LSD test (Analysis of Variation-ANOVA) was used to significant compare between means at  $P \leq 0.01$ . The correlation coefficient was estimated between all variables in this study at  $P \leq 0.01$ .

## Results:

Table 1 shows that there is a significant difference ( $P \leq 0.001$ ) of abortion the mean  $\pm$  SD (1.627 $\pm$ 0.662) in miscarriage pregnant women with thyroid disorder comperere to mean  $\pm$  SD (2.184 $\pm$ 0.905) in autoimmune disease.

Table (1): the mean  $\pm$  SD of miscarriage in pregnant women

Group	No	Mean of abortion
control	20	0.0000
Thyroid disorder	49	1.627+0.662
Autoimmune thyroid disease	50	2.184+0.905
p-value		0.001**

Table 2 shows the prevalence of thyroid autoimmunity in pregnant women with recurrent abortion. The mean and standard deviation of anti-tpo (32.283+118.307)are higher in Rm with Autoimmune thyroid disease compared to other groups. The mean and SD of anti-tg and APL are higher in pregnancy with Autoimmune thyroid disease compared to Thyroid disorder.

Table (2): Comparison of ANTI-thyroglobulin and APL first trimester of pregnancy among women with thyroid disorder and autoimmune thyroid disease

parameter	No	Mean $\pm$ sd (ANTI-TPO)	Mean $\pm$ sd (ANTI-TG)	Mean $\pm$ sd (APL)
Control	20	4.595+2.379	16.588+9.915	4.762+3.437

<b>Autoimmune thyroid disease</b>	51	32.283+118.307	24.642+25.785	9.682+11.114
<b>Thyroid disorder</b>	49	3.424+2.560	10.350+1.449	4.593+3.008
<b>P-value</b>		0.013*	0.024*	0.002**

The table above show no significant difference between TSH and FT3 in patient with autoimmune and thyroid disorder despite the mean  $\pm$  sd in TD is lower than AID and high significant ( $p \leq 0.05$ ) in level of FT4 .

Table (3): Comparison of thyroid hormone levels in the first trimester of pregnancy among women with thyroid disorder and autoimmune thyroid disease

Pregnancy in 1st	No	Mean $\pm$ SD		
		TSH	FT3	FT4
<b>Control</b>	20	1.889+1.222	3.035+0.502	1.192+0.296
<b>Autoimmune thyroid disease</b>	51	2.308+1.982	3.547+3.108	2.241+3.065
<b>Thyroid disorder</b>	49	2.219+2.895	2.781+0.586	1.263+0.591
<b>p-value</b>		0.790	0.171	0.030*

## DISCUSSION

The study showed that when comparing the studied factors between the two groups of pregnant women who had miscarriages, the mean of thyroid autoantibodies increased in women with autoimmune disease compared to those with thyroid disorders.

Thyroid autoantibodies are prevalent to a lesser extent in sera from other non autoimmune thyroid illnesses, and their presence significantly contributes to the pathophysiology of a variety of thyroid disorders. Thyroid autoantibodies have been shown to be present in 1 to 40% of patients with autoimmune thyroid illnesses, but their incidence in non-autoimmune diseases is unknown(8). this explains our results

The results obtained from this work were involved highly significant increase in level of abortion in pregnancy with autoimmune disease compared with thyroid disorder.

The most frequent cause of thyroid dysfunction is autoimmune thyroid disease, which can result in both hypothyroidism (Hashimoto's thyroiditis) and hyperthyroidism (Graves' disease).

Thyroid autoantibodies, particularly anti-TPO and anti-Tg, are what thyroid autoimmunity is defined by. Autoantibodies have demonstrated valuable outcomes as early illness diagnostic markers in recent years(9)

The previous study indicated(10) that the most prevalent type of thyroid dysfunction is autoimmune thyroid disease, which can result in both hypothyroidism (Hashimoto's thyroiditis) and hyperthyroidism (Graves' disease). Thyroid autoantibodies, particularly anti-TPO and anti-Tg, are what thyroid autoimmunity is defined by. Autoantibodies have recently demonstrated useful results as early diagnostic indicators in a variety of disorders, including cancer, rheumatoid arthritis, and celiac disease.

Thyroid antibodies have been linked to a number of issues, including miscarriage and early labor, among pregnant women with thyroids that are working normally (i.e., euthyroid). Thyroid antibodies have also been linked to various maternal and newborn problems(11).

Thyroid hormone production and metabolism are aided by the thyroid peroxidase enzyme, which is the target of thyroid peroxidase antibodies. Thyroid peroxidase antibodies are not always a symptom of illness, despite the fact that they are frequently present in autoimmune thyroid diseases(12).

Pre-existing subclinical thyroid dysfunction may worsen when the need for thyroid hormones increases during pregnancy. Because of increased estrogen levels and the moderate thyroid-stimulating effects of HCG, which works similarly to TSH, the concentration of thyroid hormones in the blood increases during pregnancy. T4 (thyroxin) levels increase from 6 to 12 weeks of gestation and reach their peak by midgestation, although TSH behaves in the opposite way. (13).

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