

## THE PHARMA INNOVATION - JOURNAL

### Assessment of Antithyropoxidase Antibodies and Thyroid Hormones Among Sudanese Pregnant Women

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**Objectives:** This study aimed to assess the thyroid functions during pregnancy by measuring of Thyroid hormones and anti-thyroid peroxidase antibodies.

**Materials and Methods:** A Comparative cross sectional study included Two hundred (200) pregnant women and One hundred (100) healthy non pregnant women with a mean age (27.1±7.2) and (29.3±9.7), respectively. Blood samples were collected from different hospitals in Khartoum, to measure Anti thyroperoxidase Antibody (TPO), TSH, FT3, and FT4 by ELISA method.

**Results:** There were significant increase in the means of thyroperoxidase antibodies titer in pregnant women compared with control group (27.91±6.37 vs 26.30±4.76 IU/ml), P Value = (0.01). One pregnant women (0.5%) showed a positive antibodies titer to thyroperoxidase and four (2.0%) had equivocal titers. There were insignificant changes in the means of TSH, FT3 and FT4 between pregnant women and control group (P Value = 0.73, 0.18 and 0.44, respectively).

**Conclusion:** There were significant increases of TPO antibodies in pregnant women compared to controls; however there were insignificant change in thyroid hormones during pregnancy among Sudanese pregnant women. In respect to family history of thyroid diseases and abortion there were significant increase in the mean of TSH and significant decrease in the means of both FT3 and FT4.

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**Keyword:** Anti-Thyroperoxidase Antibody, Thyroid Stimulating Hormones, Free Triiodothyronine, Free Thyroxin.

#### 1. Introduction

Thyroid hormones (TH) play a vital role in the development and function of both the fetus and the placenta, reflecting an important maternal physiological changes during pregnancy <sup>[1]</sup>.

Defects in the thyroid gland leads to disturbances in the thyroid hormones and can affect both the pregnant woman and the fetus. One of these defects is hypothyroidism which is the most serious disorder during pregnancy, and it might

go unnoticed as some other 'non-specific' problems. The implications are staggering when one considers that there is a significant increase in intrauterine deaths, spontaneous abortions, premature births and pre-eclampsia [2].

Other disease like chronic autoimmune thyroiditis, often manifested only by thyroid peroxidase antibodies (TPO-Abs) and/or thyroglobulin antibodies (Tg-Abs), is associated with two- to four-fold increases in miscarriage rate and premature deliveries [3]. Moreover, a pregnant woman with positive TPO-Abs has a 30–52% chance of developing post-partum thyroiditis (PPTD) [4]. In iodine-sufficient regions, chronic autoimmune thyroiditis is also the most common cause of hypothyroidism, often at subclinical levels, that may be further aggravated by the increased need for thyroid hormones in pregnancy [1]. The lack of thyroid hormones, even sub-clinically, is associated not only with an increased risk of obstetrical complications but also with an impaired neuropsychological development of the child [5].

Detection of thyroid functions by detecting the changes of the thyroid hormones in the serum is the basic search procedures in the diagnosis of the thyroid gland functions. Its regulation is based on feedback, however, during pregnancy there are also other mechanisms affecting the thyroid hormones, (mainly by suppression of TSH) presumably due to the thyroid-stimulating

activity of hCG early in the pregnancy when hCG levels are in its highest level [6]. The objectives of this research were to evaluate the effects of pregnancy on thyroid functions and to correlate the presence of Anti-Thyropoxidase Antibody with abortion cases.

## 2. Materials and methods

A Comparative cross sectional study included two hundred (200) pregnant women and one hundred (100) healthy non pregnant women with a mean age (27.1±7.2) and (29.3±9.7), respectively. Blood samples were collected from different Khartoum teaching hospital, Bahry teaching hospital and Omdurman teaching hospital. Serum anti thyroperoxidase antibody (TPO), thyroid stimulating hormone (TSH), free thyroxin 3 (FT3), and free thyroxin 4 (FT4) were measured by ELISA method (Bio Tek -ELx800. USA). Statistical analysis was performed using Statistical Package for Social Science (SPSS version 16) computer software.

## 3. Results

This study included 200 pregnant women and 100 healthy control with a mean age of (27.1±7.2) years. From the 200 pregnant women 30% (n=60) were in the 1st trimester, 27% (n=54) were in the 2<sup>nd</sup> trimester and 43% (n=86) in the 3<sup>rd</sup> trimester.

**Table 1:** Comparison between the means of TPO, TSH, FT3 & FT4 in pregnant women and the control groups.

Variable		Mean±Std. Dev	P Value
TPO (IU/ml)	Pregnant (n=200)	27.91±6.37	0.015 *
	Control(n=100)	26.30±4.76	
TSH (IU/ml)	Pregnant(n=200)	2.26±1.47	0.725
	Control(n=100)	2.16±0.99	
FT3 (pg/ml)	Pregnant(n=200)	2.80±0.71	0.185
	Control(n=100)	2.69±0.65	
FT4 (ng/dl)	Pregnant(n=200)	1.41±0.34	0.438
	Control(n=100)	1.38±0.30	

Independent sample T. test was used for comparison.

P. value considered significant at level  $\leq 0.05$

There were 15.5% (n=31) of pregnant women had a family history of thyroid diseases, while 28% (n=56) of pregnant had a history of abortion.

Antibodies against thyroperoxidase were raised (i.e.: more than 60 IU/ml) in 0.5% (n=1), and 2% (n=4) were Equivocal (i.e.: in the range between

40–59.9 IU/ml) of the pregnant women. The mean of anti-thyroperoxidase antibodies was significantly increased more than control (P. value=0.015), while there were no significant correlation determined between pregnancy with the means of TSH, FT3 and FT4 (P. value=0.725, 0.185 and 0.438 respectively) (Table 1).

considering abortion the means of anti-thyroperoxidase antibodies and TSH were significantly increased while the means of FT3 and FT4 were significantly decreased (P. value=0.009, 0.003, 0.008 and 0.001 for TPO, TSH, FT3 and FT4 respectively) (Table 2).

**Table 2:** Comparison between the means of TPO, TSH, FT3 & FT4 according to abortion.

Present of abortion		Mean±Std. Dev	P value
TPO (IU/ml)	Yes(n=56)	30.06±8.27	0.009 *
	No(n=144)	27.07±5.25	
TSH (IU/ml)	Yes(n=56)	2.61±2.15	0.003 *
	No(n=144)	2.06±1.03	
FT3 (pg/ml)	Yes(n=56)	2.69±0.84	0.008 *
	No(n=144)	2.85±0.65	
FT4 (ng/dl)	Yes(n=56)	1.35±0.43	0.001 *
	No(n=144)	1.44±0.30	

Independent sample T. test was used for comparison.  
P. value considered significant at level ≤0.05

Same findings were determined between histories of having thyroid diseases and the means of anti-thyroperoxidase antibodies and thyroid function

tests (P. value=0.000, 0.001, 0.040 and 0.030 for TPO, TSH, FT3 and FT4 respectively) (Table 3).

**Table 3:** Comparison between the means of TPO, TSH, FT3 & FT4 according to family history of thyroid diseases.

Family history		Mean±Std. Dev	P value
TPO (IU/ml)	Yes(n=31)	35.28±9.26	0.000*
	No(n=169)	26.56±4.57	
TSH (IU/ml)	Yes(n=31)	3.61±2.56	0.001*
	No(n=196)	1.95±0.95	
FT3 (pg/ml)	Yes(n=31)	2.50±0.89	0.040*
	No(n=196)	2.86±0.66	
FT4 (ng/dl)	Yes(n=31)	1.25±0.47	0.030*
	No(n=169)	1.45±0.31	

Independent sample T. test was used for comparison.  
P. value considered significant at level ≤0.05

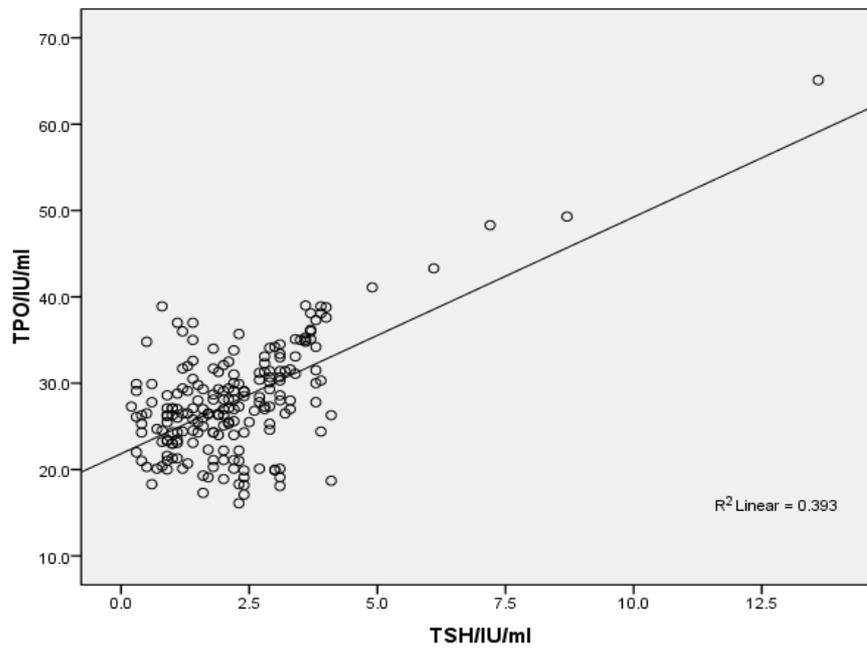
Significant positive correlation were determined between the mean of thyroperoxidase antibodies and the mean of TSH (p. value=0.000) (figure:1) and significant negative correlation were determined with the mean of FT3 and FT4 (p. value=0.004 and 0.002, respectively) (figure: 2 and 3).

pregnant women had a significant titer of TPO antibodies and 2% had equivocal titer, this finding disagrees with the study that found the prevalence of TPO antibodies in pregnant women was 11.2% [7], this disagreement might be due to differences in study group population.

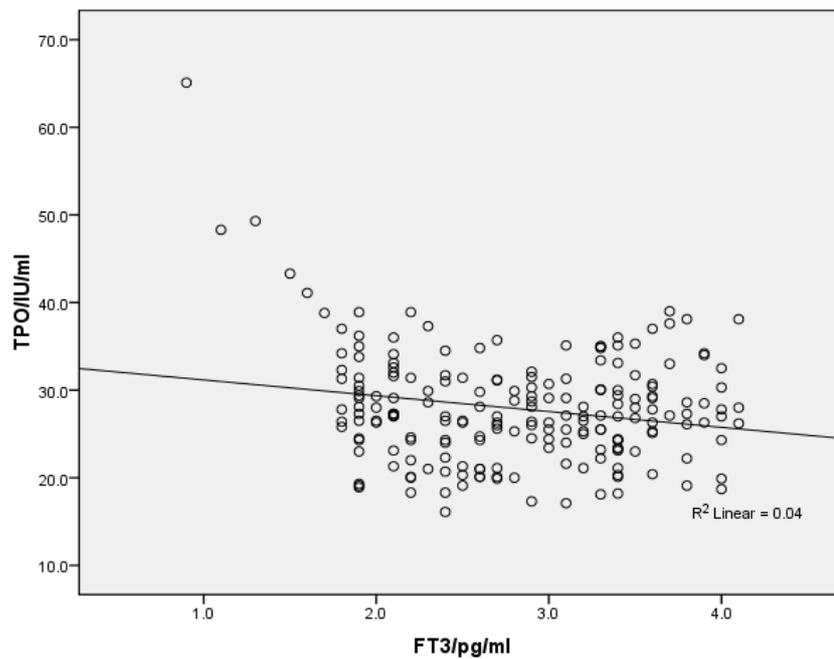
According to the history of abortion there were significant increase in the means of serum TPO antibodies and serum TSH with significant decrease in the means of FT3 and FT4 this agrees

#### 4. Discussion

This study showed there were 0.5% of Sudanese



**Fig 1:** Scatter plot shows the relationship between serum TPO (IU/ml) and serum TSH (IU/ml) in pregnant women. ( $r=0.627$ ,  $P$ .value=0.000)



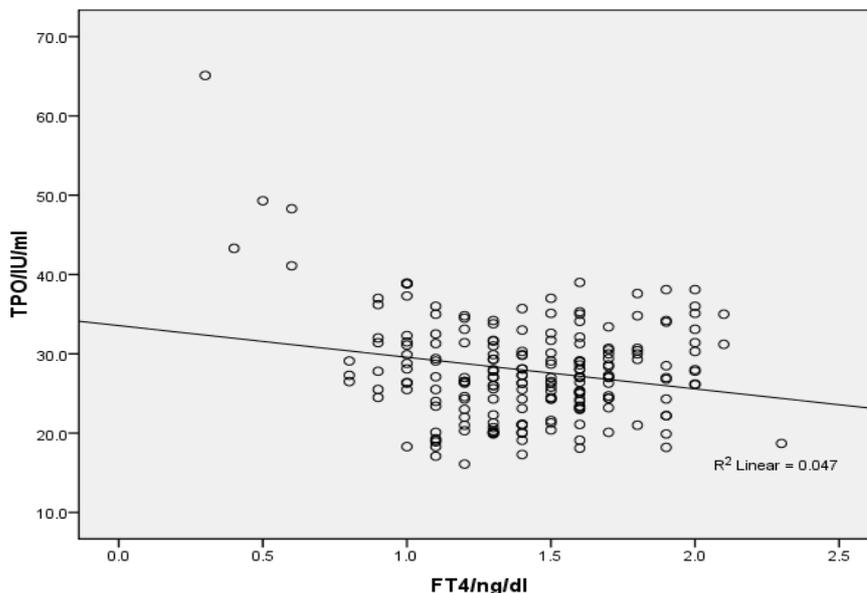
**Fig 2:** Scatter plot shows the relationship between serum TPO (IU/ml) & serum FT3 (pg/ml) in pregnant women. ( $r= -0.201$ ,  $P$ .value=0.004)

with Skjoldebrand study that found women with TPO antibodies more likely to have spontaneous abortion than healthy control [8].

In respect to the family history of thyroid disease there were significant increases of serum TPO in pregnant women this agrees with Glinoyer study [1].

There were a significant positive correlation between TPO and TSH that agrees with Mariotti study who found serum TSH was already shifted

to higher value in women with Autoimmune Thyroid Disease (AITD) compared with control Group [9].



**Fig 3:** Scatter plot shows relationship between serum TPO (IU/ml) & serum FT4 (ng/dl) in pregnant women. ( $r = -0.216$ ,  $P$ . value = 0.002)

It can be concluded that the frequency of positive TPO antibodies were 0.5%, 2% were equivocal and 97.5% were negative among Sudanese pregnant women. There were significant increases in TPO antibodies in pregnant women who had a positive family history of thyroid disease and abortion. There were significant positive correlation between TPO antibodies & TSH.

It recommended that the screening of thyroid functions test (TFT) & serum TPO antibodies to be done routinely for each pregnant woman and especially for those with family history of thyroid diseases and/or history of abortion.

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