

Study of Association between Lipid Profile and Thyroid Hormones in Pregnancy

Suhad Abdulaziz Ibrahim and Salman A. Ahmed

Department of Chemistry, College of Sciences, Al-Nahrain University, Baghdad-Iraq.

Abstract

Thyroid function during pregnancy is important for both the mother and the developing fetus. Especially during the first trimester, when the fetus is completely dependent on the mother for thyroid hormone. Increase liver metabolism is seen, renal plasma flow increases during pregnancy. This Study includes measurement of the thyroid hormones T3, T4, TSH and lipid profile, in serum of fifty pregnant women between 16-50 years during the three trimesters compared with serum of twenty non-pregnant women between 17-45 years. Results of pregnant women at first trimester showed that there was a significant difference at ($P < 0.001$) in hormones T4, in the second trimester it was found that a highly significant difference at ($P < 0.001$) in hormones T3, T4 and TSH at ($P < 0.05$), and In the third trimester there was a highly significant difference at ($P < 0.001$) in hormones T4 and T3 ($P < 0.05$) all compared with the control group. The results of lipid profile showed that at the second trimester there was a significant difference at ($P < 0.05$) in cholesterol and LDL, in the third trimester it was found a highly significant differences at ($P < 0.001$) in cholesterol, triglyceride, LDL and VLDL compared with the control group. A strong positive correlation coefficient was found at the first trimester between T3 with a weak of gestation and HDL. and between TSH with cholesterol, VLDL, triglyceride, LDL, CHO/HDL and LDL/HDL, at the second trimester a significant positive correlation coefficient was found between T3 with triglyceride, VLDL and CHO/HDL. And there was a negative correlation coefficient between TSH with triglyceride, VLDL and T3. At third trimester there was a negative correlation coefficient between T4 with triglyceride and VLDL. Results of non-pregnant group were found with a negative correlation coefficient between T3 with triglyceride, VLDL, LDL, and LDL/HDL and there was a positive correlation coefficient between TSH with HDL, and T3 .

Keywords: lipid profile (cholesterol, Triglyceride, high density lipoprotein(HDL), Low density lipoprotein(LDL), very low density lipoprotein(VLDL), thyroid hormones (T3, T4, TSH), pregnant women.

Introduction

Thyroid hormone causes increased cholesterol synthesis and degradation as well as increased lipolysis. This results in a lowering of serum cholesterol. In the first trimester (3 months) of pregnancy, the fetus is completely dependent upon the mother's thyroid hormones. During the second and final trimesters of pregnancy, most fetuses are able to provide some thyroid hormone but also continue to rely upon their mothers for some hormone. Problems of brain development occur when either the mother is unable to provide for the fetus' needs in the first trimester, or neither the mother nor the fetus can provide for fetal needs during the remainder of pregnancy[1]. Other things is the availability of iodine to the mother since iodine is an important requirement to provide

for proper thyroid production by both the mother and the developing fetus Cholesterol and Triglyceride are a measurement of various lipids that are found in the blood. This kind of blood test is often used to assess risk of heart disease. There are two common concerns people have about lipids in their diet: one is their high caloric value, which may lead to undesired weight gain.

Materials and Methods

This study was conducted at the AL-ELWIA HOSPITAL Department of Clinical Chemistry and at the Central Public Health Laboratories Department of Hormones. All measurements were during the period (1/7/2007 to 8/4/2008), Seventy women were included in this study; the study groups included Fifty pregnant women at three trimesters. And twenty non-pregnant as control

group .lipid profile and thyroid hormones were examined in both the pregnant and non-pregnant groups. Ten milliliters of blood was taken from pregnant at each trimester and non-pregnant women, then centrifuged (at 2500 round/min for 10 min) to get the serum, which is stored at (-20°C) unless used immediately. This part was divided to two part some of serum used to measured thyroid hormone (T3,T4,TSH).and other for measuring the lipid profile (cholesterol, triglyceride).

Statistical analysis

Statistical analysis was performed by the SPSS 12.01 statistical Package for social sciences and also Excel 2003. Data analysis was done Using chi-square test for tables with frequencies. All values were expressed as Mean \pm Standard.

Deviation of the mean (M \pm SD). Statistical

Results and Discussion

Fifty sample of pregnant women and twenty sample of non- pregnant as (control group) were studied. The age of the other is their association with high total cholesterol levels, which are a risk factor for cardiovascular disease. Limiting the intake of fat and oil in the diet, especially saturated fats, may help keep cholesterol levels low and thus lower ones risk of heart disease [2,3].

HDL(high density lipoprotein), LDL (low density lipoprotein, VLDL (very low density lipoprotein)) and ratio CHO/HDL, HDL/LDL. T3,T4, TSH Hormons were determined by miniVidas(Kit-T3,T4.TSH (VIDAS T3, T4,TSH-Biomerieux-FRANCE) mini Vidas device from mini Vidas Company from Italy. Cholesterol was measured by (cholesterol Enzymatic colorimetric method kit-LOT (12200C), LiNEAR Chemicals, SPAIN. Triglyceride was measured by (triglyceride Enzymatic colorimetric method kit-LOT (12327E), LiNEAR Chemicals, SPAIN.HDL was measured by HDL-cholesterol (DIFFERENTIAL PRECIPITATION) Enzymatic colorimetric method kit-LOT (1133010), LiNEAR Chemicals, SPAIN. lipid profile are done by using spectrophotometer model (CECIL-CE1011)[4,5]

analysis were performed using students t-test to estimate the difference between the groups pregnant and control .ANOVA-test to compare the different among groups and it is control groups and correlation regression, taking (P<0.05) as the lowest limit of significance. P value <0.05 was regarded as statistically significant the pregnant women ranges between (16-50) years. with a (mean \pm SD) at three trimester while :

The first trimester there was (29 \pm 7) years, The second trimester was (24 \pm 6) years, The third trimester with mean age (27 \pm 6) years .The age of non- pregnant women ranges between (17- 45) years with a mean \pm SD (35 \pm 10) years. Table (1) shows the mean \pm SD of T3,T4 at the first, second and third trimester All were increase than mean \pm SD of control group while the mean \pm SD of TSH at at the first, second and third trimester All were decrease than mean \pm SD of control group. Also Table (1) shows that cholesterol at the first trimester was less than mean \pm SD of control group but at the second and third trimester the mean \pm SD were increase than mean \pm SD of the control group, For Triglyseride at the first and second trimester were less than mean \pm SD of control group. while at the third trimester the mean \pm SD was increase than mean \pm SD of the control group, the mean \pm SD of HDL at the first, second and third trimester were respectively increase than mean \pm SD of control group, the mean \pm SD of LDL(low density lipoprotein) at the first trimester was decrease than mean \pm SD of the control group, while at the second trimester and third trimester were respectively increase than mean \pm SD of the control group, the mean \pm SD of VLDL(very low density lipoprotein):at the first and second trimester was respectively decrease than mean \pm SD of the control group, while at the third trimester was increase than mean \pm SD of the control group and the mean \pm SD of CHO/HDL and LDL/HDL at the firsttrimester of the ratio CHO/HDL and ratio LDL/HDL were respectively decrease than mean \pm SD of the control group, while at the second and third trimester were decrease mean \pm SD of control group.

Table (1)
The mean and standard deviation of thyroid hormone and Lipid profile parameter for both pregnant and non- pregnant women.

Parameter	Cholesterol mg/dl	Triglyceride mg/dl	HDL mg/dl	VLDL mg/dl	LDL mg/dl	CHOL/ HDL mg/dl	LDL/ HDL mg/dl	T3 nmol/l	T4 nmol/l	TSH μIU/l
FIRST TRIMISTER	107.56	90.09	50.55	18.38	37.02	2.34	0.89	2.22	96.62	1.06
	± 32.96	± 38.74	± 15.36	± 7.71	± 33.42	± 1.09	± 0.89	± 0.33	± 12.88	± 0.75
SECOND TRIMISTER	143.64	129.64	45.73	25.94	71.98	3.46	1.87	3.01	106.54	0.83
	± 32.42	± 64.92	± 14.71	± 12.97	± 30.43	± 1.43	± 1.23	± 0.81	± 20.66	± 0.52
THIRD TRIMISTER	153.19	224.07	46.35	44.83	62.03	3.53	1.57	2.66	115.17	1.52
	± 28.08	± 120.80	± 13.34	± 24.71	± 32.43	± 1.08	± 0.96	± 0.72	± 18.04	± 1.50
CONTROL	118.59	160.84	41.0	32.17	45.42	3.29	1.24	1.95	77.42	1.67
	± 27.36	± 98.28	± 13.00	± 19.65	± 28.75	± 1.74	± 1.24	± 0.29	± 10.55	± 1.13

**=*highly significant at P* ≤ 0.001. *=*significant difference at P* ≤ 0.05.

Thyroid function tests change during pregnancy due to the influence of two main hormones: human chorionic gonadotropin (hCG), the hormone that is measured in the pregnancy test and estrogen, the main female hormone.[6]. HCG can weakly turn Study done by Mocan *et al* 2001 They mentioned that serum TSH levels declines in pregnant women compared with non pregnant women. Uncontrolled maternal hyperthyroidism during pregnancy has been associated with fetal tachycardia on the thyroid and the high circulating hCG levels in the first trimester may result in a slightly low TSH. When this occurs, the TSH will be slightly decreased in the first trimester and then return to normal throughout the duration of pregnancy. Estrogen increases the amount of thyroid hormone binding proteins in the serum which increases the total thyroid hormone levels in the blood since more than 99% of the thyroid hormones in the blood are bound to these proteins. Zarghami N and Khosrowbeygl, 2005 finding that serum total T4 level in pregnant during three trimester were significantly ($p < 0.001$) higher compared to non-pregnant women[7]. Corinne R, et.al 2004 finding that Plasma concentrations of Total T4 and total T3 concentrations increase sharply in early pregnancy and plateau early in the second trimester at concentrations 30-100% greater than non pregnancy values[8]. The etiology of this increase in total circulating thyroid hormones involves, primarily, increased concentrations of plasma thyroxin binding globulin (TBG). Another proposed

mechanism for this increase in total thyroid hormone concentrations is production of type III deiodinase from the placenta. This enzyme, which converts T4 to reverse T3, and T3 to diiodotyrosine (T2), has extremely high activity during fetal life, Glinoe D, 1997 said that Increased demand for T4 and T3 has been suggested to increased production of these hormones with, ultimately, increased concentrations in the circulation during pregnancy, and this increased risk of miscarriage, spontaneous abortion, fetal death may occur as a result of chromosomal abnormalities[9]. Total T3, total T4 at the third trimester significantly higher ($P \leq 0.001$) than control group This study agrees with (fast heart rate), small for gestational age babies, prematurity, stillbirths and possibly congenital malformations[10]. Serum hormones T3, T4, TSH. the significant as Table (2), The elevated levels of thyroid hormone pregnant were found to have significantly higher levels in serum T4 ($P \leq 0.001$) at the first trimesters but non significantly T3, TSH ($P \geq 0.05$) compared with control group, as table (2) The elevated level of thyroid hormones in pregnant were found to have significantly higher levels in serum T3, T4, ($p < 0.001$) and TSH ($P \leq 0.05$) compared with control group and Twenty pregnant women in the third trimesters as Table(2). The elevated levels of thyroid hormone in pregnant were found to have significantly higher levels in serum T3, T4 ($P \leq 0.001$) but non significantly for TSH $P = (0.724)$ between the third trimester and control group.

Serum of lipid profile (cholesterol, Triglyceride and HDL) were compared between the study groups (pregnant at the first trimester) and control groups as Table (3) shows that lipid profile were not significantly at the first trimester for pregnant women compared with control group, as Table (4) in this study shows that at the second trimester the cholesterol, LDL were have significantly lower ($P \leq 0.05$), but non significant positive in serum Triglyceride, HDL, LDL, CHO/HDL,

LDL/HDL ($P \geq 0.05$) during the second trimester for pregnant women compared with control group. Also at the third trimester as Table (5) shows that significantly increase were found in serum cholesterol, triglyceride, LDL ($P \leq 0.001$), and significantly decrease were found in serum VLDL ($P < 0.05$), but non significant in serum HDL, CHO/HDL, LDL/HDL ($P \geq 0.05$), at the third trimester for pregnant women compared with control group.

Table (2)
comparison of hormones levels between the pregnant women in three trimester and its control not pregnant women's.

Hormones	Firsttrimester mean \pm SD	Control mean \pm SD	P-value
T3(nmol/ml)	2.22 \pm 0.33	1.95 \pm 0.29	0.122
T4(nmol/l)	96.62 \pm 12.88	77.42 \pm 10.55	0.003**
TSH(μ IU/ml)	1.06 \pm 0.75	1.67 \pm 1.13	0.138
Hormones	Secondtrimester mean \pm SD	Control mean \pm SD	P-value
T3(nmol/ml)	3.01 \pm 0.81	1.95 \pm 0.29	0.006**
T4(nmol/l)	106.54 \pm 20.66	77.42 \pm 10.55	0.001**
TSH(μ IU/ml)	0.83 \pm 0.52	1.67 \pm 1.13	0.023*
Hormones	Thirdtrimester mean \pm SD	Control mean \pm SD	P-value
T3(nmol/ml)	2.66 \pm 0.72	1.95 \pm 0.29	0.017*
T4(nmol/l)	115.17 \pm 18.04	77.42 \pm 10.55	0.000**
TSH(μ IU/ml)	1.52 \pm 1.59	1.67 \pm 1.13	0.724

**=highly significant at $P \leq 0.001$. *=significant difference at $P \leq 0.05$.

Table (3)
Comparism of Lipid profile parameter (cholesterol, triglyseride, HDL, LDL, VLDL, CHO/HDL, LDL/HDL) between the pregnant At the First trimester and its control.

Parameters	Firsttrimester mean \pm SD	Control mean \pm SD	P-value
Cholesterol (mg/dl)	107.56 \pm 32.96	118.59 \pm 27.36	0.659
Triglyceride (mg/dl)	90.09 \pm 38.74	160.84 \pm 98.28	0.066
HDL(mg/dl)	50.55 \pm 15.36	41.0 \pm 13.00	0.126
LDL(mg/dl)	37.02 \pm 33.42	45.42 \pm 28.75	0.071
VLDL(mg/dl)	18.38 \pm 7.71	32.17 \pm 19.65	0.975
CHO/HDL(mg/dl)	2.34 \pm 1.09	3.29 \pm 1.74	0.267
LDL/HDL(mg/dl)	0.89 \pm 0.89	1.24 \pm 1.24	0.988

**=highly significant at $P < 0.001$. *=significant difference at $P < 0.05$.

Table (4)
Comparism of Lipid profile parameter (cholesterol, triglyseride, HDL, LDL, VLDL, CHO/HDL, LDL /HDL) between the pregnant At the Second trimester and its control.

Parameters	secondtrimester mean \pm SD	Control mean \pm SD	P-value
cholesterol(mg/dl)	143.64 \pm 32.42	118.59 \pm 27.36	0.039*
triglyceride(mg/dl)	129.64 \pm 64.92	160.84 \pm 98.28	0.229
HDL(mg/dl)	45.73 \pm 14.71	41.0 \pm 13.00	0.287
LDL(mg/dl)	71.98 \pm 30.43	45.42 \pm 28.75	0.013*
VLDL(mg/dl)	25.94 \pm 12.97	32.17 \pm 19.65	0.229
CHO/HDL(mg/dl)	3.46 \pm 1.43	3.29 \pm 1.74	0.846
LDL/HDL(mg/dl)	1.87 \pm 1.23	1.24 \pm 1.24	0.404

**=*highly significant at P<0.001.* *=*significant difference at P<0.05.*

Tables (4 and 5) shows that increases in serum lipids are common during the second half of pregnancy. Many pregnant women had serum concentrations of total cholesterol which in non-pregnant women would be associated with an increased risk of coronary heart disease (CHD). We have also shown that the concentrations of LDL and HDL cholesterol are increased in pregnancy. The increases in total and LDL cholesterol and triglyceride are similar to those reported by others, but the increase in HDL cholesterol has not been widely observed. Our results for HDL cholesterol agree with those of Desoye et al 1999, and with those of Piechota and Staslewski 1992. Other workers have reported little change in HDL cholesterol during pregnancy [11]. High plasma concentrations of endogenous oestrogens are well known to lower LDL cholesterol, the mechanism whereby pregnancy induces hyperlipidaemia has not been fully elucidated. The complementary and opposing actions of the individual pregnancy hormones and their changing concentrations during pregnancy would be expected to lead to pronounced alterations in lipoprotein metabolism as gestation progresses. Oestrogens can increase the concentration of plasma triglyceride by stimulating hepatic production of the triglyceride-rich very low density lipoproteins (VLDL) [12]. Oestrogens increase the concentration of HDL cholesterol by directly stimulating. Production of LDL is stimulated by oestrogen. but the net effect is to reduce plasma concentrations as the clearance of LDL

is enhanced owing to increased activity of the hepatic LDL receptors. The role of progesterone in pregnancy associated hyperlipidaemia is questionable. Progestogens have been shown to oppose the actions of oestrogens on lipoprotein metabolism, leading to increased concentrations of LDL cholesterol and decreased concentrations of HDL cholesterol. Some authors have suggested that the oestrogen: progesterone ratio, which is low in early and in very late pregnancy is important in the balance of alterations in lipoprotein metabolism throughout pregnancy. The actions of exogenous progestogens on lipoprotein metabolism seem, however, to depend on the androgenicity of the preparations used. Natural progesterone is not androgenic and has not been shown to affect lipoprotein concentrations, and so many not be involved in the alterations in lipoprotein metabolism during pregnancy. Our study also agree with Kostner G.M, Marth EA. and Pfeiffer KH 1988.^[13] said that The hyperlipidemia of pregnancy is accompanied by an increase in the plasma cholesterol esterification rate for the first half of gestation. During the second half of gestation there is little change in the plasma cholesterol esterification rate, in the presence of a continuing increase in plasma lipid levels. Increased triglyceride, found in pregnancy induced hypertension, There is a general agreement that thyroid hormones influence the mechanism of triglyceride but the results are controversial to study of. Diamant [13]. And Thorklid; O'Brien *et al.*, and Mukhopadhyay

et al. Berti et al; said that Most of the articles related to plasma lipids in pregnancy agree that both increase during pregnancy, as well as lipoprotein. In our own study, the mean value of HDL-C was higher at three trimester of normal pregnancy over the non pregnant women, but statistically the alteration was not significant ($P>0.05$). This study was reported by many worker. Oestrogen is responsible for induction of triglyceride and HDL. In present study, serum VLDL-C level at third trimesters have higher mean and significantly ($P<0.05$) during pregnancy in comparison to non-pregnant women, which is perhaps due to hypertriglyceridemia leading to enhanced

entry of VLDL that carries endogenous triglyceride into circulation. LDL-C level increases and highly significant ($P<0.001$) at second and third trimester and this study also reported by many workers. This finding is in agreement with that of previous reports (Thorkild and Orbie, Sucic *et al.*, de-Castero *et al.*, Iguma *et al.*, and Jung *et al.*)[14]. which demonstrate that LDL-C clearance is reduced in hypothyroidism. The mechanism responsible for that had been attributed to the decrease in the number of LDL-C receptors. On the other hand, thyroid hormones enhance LDL-C receptors expression.

Table (5)

Comparism of Lipid profile parameter (cholesterol, triglyseride, HDL, LDL, VLDL, CHO/HDL, LDL/HDL) between the pregnant At the Third trimester and its control

parameters	Thirdtrimester mean \pm SD	Control mean \pm SD	P-value
cholesterol(mg/dl)	153.19 \pm 28.08	118.59 \pm 27.36	0.001**
triglyceride(mg/dl)	224.07 \pm 120.80	160.84 \pm 98.28	0.008**
HDL(mg/dl)	46.35 \pm 13.34	41.0 \pm 13.00	0.410
LDL(mg/dl)	62.03 \pm 32.43	45.42 \pm 28.75	0.008**
VLDL(mg/dl)	44.83 \pm 24.71	32.17 \pm 19.65	0.033*
CHO/HDL(mg/dl)	3.53 \pm 1.08	3.29 \pm 1.74	0.431
LDL/HDL(mg/dl)	1.57 \pm 0.96	1.24 \pm 1.24	0.518

** = Strong Correlation is significant at $P<0.001$. * =Correlation is significant at $p<0.05$.

Table (6)

Correlation between thyroid hormone and lipid profile parameters at the FIRSTTRIMISTER of pregnant woman.

Parameter	firsttrimi	cholesterol	triglycerid	HDL	LDL	VLDL	CHO/HDL	LDL/HDL	T3	T4
cholesterol	0.253									
triglycerid	-0.159	0.365								
HDL	0.381	0.003	0.106							
LDL	0.197	0.835**	0.02	-0.465						
VLDL	-0.16	0.35	0.988**	0.105	0.007					
CHO/HDL	0.023	0.599*	0.251	0.708*	0.817**	0.233				
LDL/HDL	0.164	0.620*	0.082	0.677*	0.885**	0.063	0.974**			
T3	0.571	-0.06	-0.022	0.444	-0.241	-0.011	-0.108	-0.094		
T4	0.314	0.02	0.003	0.357	-0.159	0.002	-0.189	-0.186	0.295	
TSH	0.159	0.597*	0.522	-0.12	0.512	0.529*	0.383	0.367	-0.235	-0.312

** = Strong Correlation is significant at $P<0.001$. * =Correlation is significant at $p<0.05$.

Table (6) Shows the Correlation between Thyroid Hormone and Lipid profile parameters at The firsttrimester of Pregnant Woman also the Clinical investigation from the pregnant women at the second trimester as Table (7) shows that a highly significant positive correlation at ($P < 0.001$) between cholesterol with LDL ($r = 0.761$), also triglyceride with VLDL ($r = 1.000$), and ratio CHO/HDL with LDL ($r = 0.815$), and between LDL/HDL with LDL ($r = 0.832$), CHO/HDL ($r = 0.984$), ratio LDL/HDL with HDL ($r = 0.824$), also ratio CHO/HDL with HDL ($r = 0.811$), and there is significantly

positive correlation at ($p \leq 0.05$) between cholesterol with triglyceride ($r = 0.672$), T3 ($r = 0.298$), VLDL ($r = 0.671$), also between T3 with VLDL ($r = 0.630$), and between T4 with T3 ($r = 0.646$). There is non significant a negative correlation between TSH with triglyceride ($r = -0.535$), T3 ($r = -0.521$). And weak positive correlation between TSH with T4 ($r = 0.058$). Clinical investigation from pregnant women at the third trimester. Table (8) shows the Correlation between Thyroid Hormone and Lipid profile parameters at The thirdtrimester of pregnant women.

Table (7)
Correlation between Thyroid Hormone and Lipid profile parameters at the Secondtrimester of pregnant women.

	2ndtrimest	cholester	triglyceri	HDL	LDL	VLDL	CHO/HDL	LDL/HDL	T3	T4
cholesterol	0.428									
triglyceride	0.41	0.672*								
HDL	0.189	0.036	0.236							
LDL	0.19	0.761**	0.175	-0.545						
VLDL	0.41	0.671*	1.000**	0.237	0.174					
CHO/HDL	0.1	0.441	0.11	0.811**	0.815**	0.109				
LDL/HDL	0.02	0.391	-0.04	0.824**	0.832**	-0.041	0.984**			
T3	0.351	0.298	0.631*	-0.213	0.151	0.630*	0.37	0.241		
T4	0.429	-0.097	-0.007	-0.206	0.00	-0.008	0.154	0.119	0.646*	
TSH	-0.1	-0.253	-0.535*	0.018	-0.05	-0.535	-0.26	-0.165	-0.521	0.058

** = Strong Correlation is significant at $P < 0.001$. * = Correlation is significant at $p < 0.05$.

Table (8)
Correlation between Thyroid Hormone and Lipid profile parameters at the THIRDTRIMESTER of pregnant women.

	thirdtrimi	cholester	triglyceri	HDL	VLDL	LDL	CHO/HDL	LDL/HDL	T3	T4
cholesterol	-0.233									
triglycerid	-0.306	0.171								
HDL	0.125	0.093	-0.31							
VLDL	-0.305	0.169	1.000**	-0.31						
LDL	-0.025	0.702**	0.470*	-0.1	-0.472*					
CHO/HDL	-0.139	0.467*	0.368	0.775**	0.367	0.450*				
LDL/HDL	0.194	0.404*	0.451*	-0.017	-0.452*	0.693**	0.397*			
T3	0.237	0.038	-0.04	-0.19	-0.04	0.141	0.169	-0.023		
T4	0.112	-0.132	-0.384	-0.116	-0.384	0.221	0.02	0.056	0.147	
TSH	-0.034	-0.094	-0.108	0.063	-0.108	-0.027	-0.088	-0.046	0.176	-0.122

** = Strong Correlation is significant at $P < 0.001$. * = Correlation is significant at $p < 0.05$.

Results for the non-pregnant women as Table (9). The highly significant positive correlation at ($P \geq 0.001$) was found between triglyceride with VLDL ($r=1.000$), and cholesterol with LDL ($r=0.681$), between LDL with ratio CHO/HDL ($r=0.742$), ratio LDL/HDL ($r=0.746$), between ratio LDL/HDL with ratio CHO/HDL ($r=0.891$)

highly significant negative correlation between ratio LDL/HDL with TSH ($r=-0.252$), and between ratio CHO/HDL with TSH ($r=-0.202$). There was non significant positive correlation between cholesterol with triglyceride ($r=0.456$). There was non significant a negative correlation between TSH with T4 ($r=-0.35$).

Table (9)
Correlation between Thyroid Hormone and Lipid profile parameters at the Control group (not pregnant women).

	cholester	triglyceri	HDL	VLDL	LDL	CHO/HDL	LDL/HDL	T3	T4
cholesterol									
triglycerid	0.456*								
HDL	-0.09	-0.099							
VLDL	0.456*	1.000**	-0.099						
LDL	0.681**	-0.205	-0.47*	-0.205					
CHO/HDL	0.571*	0.231	0.790**	0.231	0.742**				
LDL/HDL	0.513*	0.038	0.627**	0.038	0.746**	0.891**			
T3	0.097	-0.442*	-0.235	-0.442*	0.501*	0.225	0.426*		
T4	0.224	0.181	-0.199	0.181	0.179	0.281	0.22	-0.06	
TSH	-0.067	0.048	0.446*	0.048	-0.298	-0.202	-0.252	0.632**	-0.35

** = Strong Correlation is significant at $P < 0.001$. * = Correlation is significant at $p < 0.05$.

Conclusion

In this study it found that During three trimester of pregnancy ,both serum levels of T3&T4 were higher than serum TSH level this may produce hyperthyroidism if not controlled symptoms. also Pregnancy at third trimester have increase levels of Lipid profile and more correlation between lipid and lipoprotein associated with thyroid hormone especially at second trimester during pregnancy than first and third trimester this is due to physiological changes during pregnancy.

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الخلاصة

تتغير وظائف هرمونات الغدة الدرقية أثناء الحمل خاصة خلال الأشهر الثلاث الأولى حيث يعتمد الجنين بصورة كلية على هرمونات الدرقية للام وهي تؤثر على عمليات ايض الدهون. في هذه الدراسة تم دراسة مصل 50 امرأة حامل خلال الثلاث فترات من أشهر الحمل تراوحت أعمارهن بين (16-50) سنة ومصل 20 امرأة متزوجة غير حامل تراوحت أعمارهن بين (17-45) سنة اعتبرت كمجموعه سيطرة. النتائج: في الأشهر الثلاث الأولى كان هناك ارتفاع في مستوى هرموني الدرقية T3,T4 ونقصان

في مستوى هرمون TSH. خلال الثلاث فترات من الحمل ويرجع هذا الى اختلاف في تركيز البروتينات الحاملة (Thyroxin Binding Globulin and Prealbumin -TBG) منخفض عدا مستوى HDL كان عالي.أيضا وجد هناك علاقة موجبه قويه بين هرمون TSH مع cholesterol, VLDL، في الأشهر الثلاث الثانيه كانت هنالك ارتفاع مستوى هرموني الدقيه T3,T4 ونقصان في مستوى هرمون TSH. التراكيبسرايد والبروتين الدهني واطى الكثافه جدا كانت ذا مستوى منخفض في حين الكوليستيرول والبروتين عالي والواطى الكثافه كانت عاليه المستوى. ايضا وجد T3,T4 لهم احتماليه معنويه عاليه جدا ($P<0.001$) في حين TSH له احتماليه معنويه اقل من ($P<0.05$)، ايضا الكوليستيرول والبروتين واطى الكثافه اظهرت احتماليه معنويه اقل من ($P<0.05$) و جد ايضا بين T3 و T4 وعلاقه بين T3 والتراي كليسرايد وكذلك مع البروتين الدهني الواطى الكثافه جدا.في الأشهر الثلاثه الاخيره من الحمل كانت هنالك ارتفاع مستوى هرموني الدقيه T3,T4 ونقصان في مستوى هرمون TSH. ايضا وجد T4 له احتماليه معنويه عاليه جدا ($P<0.001$) في حين T3 له احتماليه معنويه اقل من ($P<0.05$)، في حين الـ TSH لم يظهر احتماليه. ايضا الكوليستيرول والبروتين واطى الكثافه والتراكيبسرايد لهم احتماليه معنويه عاليه جدا ($P<0.001$) في حين البروتين الدهني الواطى الكثافه جدا اظهرت احتماليه معنويه اقل من ($P<0.05$) اظهرت النتائج بالنسبه الى النساء الغير حوامل بان هنالك علاقته موجبه قويه بين هرمون الـ TSH والبروتين عالي الكثافه وكذلك مع هرمون T3. هرمون T3 له علاقته موجبه قويه مع البروتين واطى الكثافه وعلاقه سالبه قويه مع التراكيبسرايد والبروتين واطى الكثافه جداً.