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## Full Length Research Article

### ESTIMATION OF LIPID PROFILE IN PREECLAMPTIC AND NORMAL PREGNANT WOMAN AMONG SUDANESE PATIENTS IN KHARTOUM STATE

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#### ABSTRACT

The objectives of this study are to assess the effect of pregnancy (in the third trimester) and pregnancy complicated by hypertension on lipid profile in Sudanese pregnant women. The study was carried out utilizing 120 women, including 40 non-pregnant women and unmarried (control), 40 pregnant women at the third trimester, and 40 women with preeclampsia. Their ages ranged from 17- 38 years. Serum was analyzed for total cholesterol, LDL cholesterol, HDL cholesterol, and triglyceride. The group of normal pregnant women showed significantly ( $P < 0.05$ ) increased concentrations of, serum total cholesterol, LDL cholesterol, and triglyceride, compared to the non-pregnant women. And significantly ( $P < 0.05$ ) decreased concentration of serum HDL cholesterol. The group of women with preeclampsia had significantly ( $P < 0.05$ ) increased concentrations of, serum total cholesterol, LDL cholesterol, and triglyceride compared to the normal pregnant women. Beside that the women with preeclampsia showed a significant ( $P < 0.05$ ) decrease in serum HDL cholesterol compared to normal pregnant women. When the women with preeclampsia were compared to the control, they showed significantly ( $P < 0.05$ ) increased concentrations of, serum total cholesterol, LDL cholesterol, and triglyceride, and no significant changes in serum HDL cholesterol. We conclude that, dyslipidemia and are the features of preeclampsia in Sudanese pregnant women.

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#### INTRODUCTION

Profound local and systemic changes in maternal physiology were found to be initiated by conception and continued throughout pregnancy. After expulsion of the placenta, many of these changes are rapidly reversed, although certain alterations, particularly those affecting the generative tract, are more gradual in their return to the non gravid state (Willson and Carrington, 1987). When these normal adaptations are coupled with pregnancy-induced complications (like hypertension), the women may demonstrate a reduction of renal function leading to an increased risk of prenatal

morbidity and mortality (Gifford *et al.*, 1990). Hypertension complicates 10-15% of all pregnancies among them, 10-20% also develop proteinuria (Beaufils, 2002). High blood pressure in pregnancy is a major contributor to maternal and prenatal disease and death (Granger *et al.*, 2001). Preeclampsia is a triad of oedema, hypertension, and proteinuria occurring primarily in nulliparas after the 20th gestational week and most frequently near term (Davis *et al.*, 1989). Moreover, preeclampsia, a syndrome of hypertension and proteinuria, develops in 5% of first pregnancies and in 1% of multigravid women (Davey and Mac-Gillivray, 1983), and it is the most common cause of maternal and fetal morbidity and mortality (Perloff, 1998). Serum lipid profile is measured for cardiovascular risk prediction and has now become almost a routine test. The test includes four basic parameters: total cholesterol, HDL cholesterol, LDL cholesterol and

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triglycerides. Dyslipidemia is associated with an increased risk of preeclampsia (Enquobahrie et al., 2004). In early pregnancy, there is increased body fat accumulation associated with increased lipogenesis, while in late pregnancy, there is accelerated breakdown of fat depots which play an important role in fetal development (Herrera., 2002). In pregnancy, lipolysis of TG-rich lipoproteins is reduced because of decreased lipolytic activities of the mother. In Preeclampsia, the vascularization of the fetoplacental unit may be impaired, resulting in yet-undefined compensatory mechanisms that may further increase synthesis of maternal Triglyceride (TG) levels. In addition, the decreased catabolism of TG-rich lipoproteins by reduced placental uptake and the putative concomitant decrease of lipoprotein lipolysis results in the accumulation of TG-rich remnant lipoproteins in the maternal circulation. Remnant lipoproteins may induce platelet activation and endothelial dysfunction, thus leading to the major clinical symptoms of preeclampsia (Enquobahrie et al., 2004).

**MATERIALS AND METHODS**

A total of 120 Sudanese women who came from different parts of the Sudan to Khartoum state hospitals were included in this study. They were divided into three groups, forty non-pregnant women (unmarried) were used as control, forty normal pregnant women were in the third trimester and forty women with preeclampsia. According to their geographic distribution in the Sudan, they were classified into five groups presented as seen in table (1). 47% of the control group members were within the age range of 21 – 29 years, 40% were less than 21 years and 13% were more than 29 years. 56% of the normal pregnant women at the third trimester were within the age range of 21- 29 years, 6% were less than 21 years, and 38% were more than 29 years. Of the women with pregnancy complicated by hypertension, 40% were within the age range of 21 – 29 years, 8 % were less than 21 years, and 52% were more than 29 years, as seen in table (2). 18% of the normal pregnant women were in the third trimester are primigravida, and 65% were multiparous. 65% of women with pregnancy complicated by hypertension were primigravida, and 35% multiparous, as seen in table (3). All the control members were normotensive.

**Table 1. Distribution of the study population according to their geographic location in the Sudan**

Location	Population No	%
North	20	16.6
South	5	4.2
Center	45	37.5
West	35	29.2
East	15	12.5
Total	120	100

**Table 2. Distribution of the study groups according to their ages**

Study groups	Less than 21 years %	21 – 29 years %	More than 29 years %
Control	40	47	13
Normal pregnant women	6	56	38
Women with preeclampsia	8	40	52

**Table 3. Distribution of the study groups according to parity**

Study groups	primigravida%	multiparous%
Normal pregnant Women	18	65
Women with pregnancy complicated by hypertension	65	35

**Blood pressure**

The normal pregnant women have a mean systolic blood pressure of 115 ± 10.51 mm Hg and diastolic blood pressure of 74 ± 6.8 mm Hg. While the women with pregnancy complicated by hypertension have a mean systolic blood pressure of 164.58 ± 20.79 mm Hg and diastolic blood pressure of 104.79 ± 12.63 mm Hg as seen in table (4). 10% of the women with pregnancy complicated by hypertension gave past history of hypertension. Lastly, oedema was present in 61% of women with pregnancy complicated by hypertension.

**Blood Sampling**

Blood samples were collected from the controls and the patients after an overnight fast from the cephalic vein, using sterile syringes and, then the blood was allowed to clot at room temperature, serum was then separated in sterile containers and kept at -20°c until analyzed for total cholesterol, LDL cholesterol, HDL cholesterol, and TG.

**Table 4. The blood pressure of normal pregnant women and women with preeclampsia**

Study groups	Systolic blood pressure mm Hg	Diastolic blood pressure mm Hg
Normotensive pregnant Women	115 ± 10.51	74 ± 6.8
Women with pregnancy complicated by hypertension	164.58 ± 20.79	104.79 ± 12.63

**Statistical Analysis**

All values reported in the text are mean ± standard error mean. The data was collected and analyzed statistically using student t test. A p-value <0.05 was determined to be significant. All statistical analyses were performed with statistical GraphPad Prism software.

**RESULTS**

The results of total cholesterol, LDL cholesterol, HDL cholesterol, and TG in control, normal pregnant women and preeclamptic group were shown in Table (5) and Figure 1. The results revealed that the levels of total cholesterol, LDL cholesterol, and TG in preeclamptic women were found significantly higher (p < 0.05) than the control and normal pregnant women at third trimester. Also, the study revealed significant decrease (p < 0.05) in HDL cholesterol when compared to the normal pregnant women at third trimester.

Table 5. Total cholesterol, LDL cholesterol, HDL cholesterol, and TG in control, normal pregnant women and preeclamptic women

Parameters	Control group (n = 40)	Pregnant women at third trimester (n = 40)	Women with preeclampsia (n = 40)
Serum total cholesterol mg/dl	201.2± 10.14	212.4 ± 17.85	240.1± 31.71
Serum LDL cholesterol mg/dl	110.9± 17.03	129.89 ± 14.19	138.15 ± 19.62
Serum HDL cholesterol mg/dl	45.21 ± 10.28	58.33 ± 9.54	47.05 ± 9.10
Serum TG mg/dl	128.22 ± 14.45	208.97 ± 30.72	265.81 ± 41.63

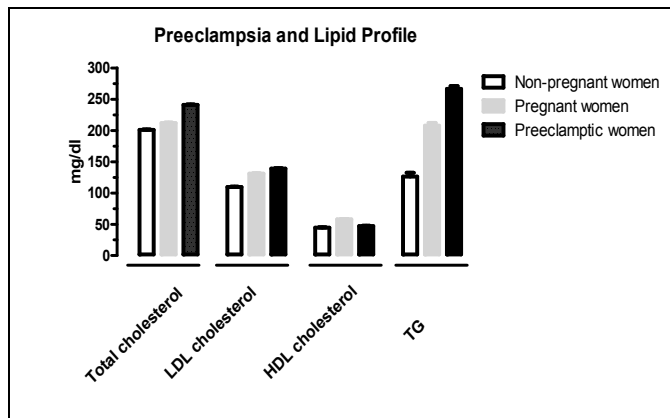


Figure 1. Total cholesterol, LDL cholesterol, HDL cholesterol, and TG in control, normal pregnant women and preeclamptic women

## DISCUSSION

This study shows the effect of pregnancy and pregnancy complicated with hypertension on lipid profile in Sudanese women, as indicated by serum total cholesterol, LDL cholesterol, HDL cholesterol, and triglyceride. It shows that there were an elevated values of serum total cholesterol, LDL cholesterol, and TG in preeclamptic women at ( $p < 0.05$ ) in comparison with the normal pregnant women at third trimester as shown in (Table 5), these findings are agreement with the results of other studies (Enquobahrie *et al.*, 2004; Adiga *et al.*, 2007). During pregnancy, all lipid fractions increase in parallel to the increase in pregnancy age. This increase secondary to the increase in estrogen and progesterone levels during pregnancy which induce biosynthesis of TG (Salameh and Mastrogiannis, 1994; Potter and Nestel, 1979). Moreover, previous studies demonstrated that, serum total cholesterol, triglyceride, and LDL cholesterol concentrations were increased in women with preeclampsia and this is may contribute to endothelial cell dysfunction in preeclampsia.

It also stated that early pregnancy dyslipidemia is associated with increased risk of preeclampsia (Belo *et al.*, 2002; Adiga *et al.*, 2007). Furthermore, in pregnancy, lipolysis of TG-rich lipoproteins is reduced because of decreased lipolytic activities of the mother. In Preeclampsia, the vascularization of the fetoplacental unit may be impaired, resulting in yet-undefined compensatory mechanisms that may further increase synthesis of maternal Triglyceride (TG) levels. In addition, the decreased catabolism of TG-rich lipoproteins by reduced placental uptake and the putative concomitant decrease of

lipoprotein lipolysis results in the accumulation of TG-rich remnant lipoproteins in the maternal circulation. Remnant lipoproteins may induce platelet activation and endothelial dysfunction, thus leading to the major clinical symptoms of preeclampsia (Enquobahrie *et al.*, 2004). We conclude that most lipid profile increase during pregnancy in both normotensive at third trimester and preeclamptic women. The most significant increase is in levels of triglyceride, LDL and total cholesterol. In preeclamptic women, hyperlipidemia is more profound than in the normotensive group.

## REFERENCES

- Adiga, U., D'souza, V., Kamath, A., *et al.* 2007. Antioxidant activity, lipid peroxidation in preeclampsia. *J Chin Med.*;70:10
- Beaufils, M. 2002. Pregnancy-related hypertension. *Rev. Med. Interne.* 23(11): 927-38.
- Belo, L., Caslake, M., Gaffney, D. *et al.* 2002. Changes in LDL size & HDL concentration in normal and preeclamptic pregnancies. *Atherosclerosis.* 162(2):425-32.
- Davey, D. A. and Mac-Gillivray, I. 1983. The classification of hypertensive disorders of pregnancy. *Am. J. Obstet. And Gynecol.* 158: 892-898.
- Davis, G., Brenta, Bishop, L., Michael and Diana, M. 1989. Clinical laboratory science, strategies for practice. By J. B. Lipincott company.
- Enquobahrie, D. A., Williams, M. A., Butler, C. L., Frederick, I. O., Miller, R. S. and Luthy, D. A. 2004. Maternal plasma lipid concentrations in early pregnancy and risk of preeclampsia. *Am J Hypertens* 17(7): 574-581.
- Gifford, R. W., August, P. and Chesley, L. C. 1990. National high blood pressure education program working group on high blood pressure in pregnancy. *Am. J. Obstet and Gynecol.* 163: 1689 - 712.
- Granger, J. P., Alexander, B. T., Bennett, W. A. and Khalil, R. A. 2001. Pathophysiology of pregnancy-induced hypertension. *Am. J. Hypertens.* 14: 178S - 185S.
- Herrera, E. 2002. Lipid metabolism in pregnancy and its consequences in the fetus and newborn. *Endocrine* 1943-55.
- Perloff, D. 1998. Hypertension and pregnancy-related hypertension. *Cardiol. Clin.* 16(1):79 - 101.
- Potter, M. J. and Nestel, J. P. 1979. The hyperlipidemia of pregnancy in normal and complicated pregnancies. *Am J Obstet Gynecol.* 15:165-170.
- Salameh, W. A. and Gnancy. *Clin Obstet Gynecol.* 37:66-77.
- Willson, R. J. and Carrington, R. E. 1987. *Obstetrics and Gynecology*, 8<sup>th</sup> edition. 251:275, by the C.V. Mosby Company.

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