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# Serum Lipid Profile Estimation in Pregnancies Complex by Preeclampsia

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**ABSTRACT**
Pre-eclampsia and eclampsia is associated with substantial risks for the fetus. These include intrauterine growth restriction, death and prematurity with attendant complications whereas the mother is at risk of renal failure, pulmonary edema, stroke and death. The sample size was calculated to compare two groups (cases and controls) with a 5% prevalence of preeclampsia, confidence level of 95% and a power of 80%. In this case, it was expected that the maximum difference in proteinuria in the test group would be 30%, compared with the unexposed group. Thus, the sample size would be a minimum of 33 women in each group. The preeclamptic patients had significantly higher serum levels of triglycerides and VLDL compared with the healthy controls. Increased triglycerides levels and delayed triglycerides clearance and high blood pressure are the reasons for the development of preeclampsia and eclampsia. Triglycerides, high blood pressure are, preeclampsia, eclampsia.

## INTRODUCTION

It develops as a result of elevated blood pressure and pee protein levels. Women who are preeclamptic frequently experience swelling in their hands, feet and legs. Although it can happen earlier, this syndrome typically manifests during the second trimester of pregnancy, most frequently in the later half of the second or third trimester. It occurs in about 5% of pregnancies and affects both the mother and the unborn child. It is a major cause of maternal morbidity and mortality[1-2]. Abnormal lipid profile has a direct impact on endothelial dysfunction and is known to be highly related with atherosclerotic cardiovascular disorders. The primary characteristic of pregnancy-related toxaemia is hypertension which is thought to result from the vasospastic phenomena in the kidney, uterus, placenta and brain[3]. Another major pathophysiological mechanism for pregnancy-induced hypertension is thought to be altered lipid synthesis, which results in a drop in the PGI 2 TXA2 ratio[4]. Therefore, it appears that aberrant lipid metabolism plays a role in the pathophysiology of pregnancy-induced hypertension (PIH).

The benefits of studying the lipid profile from serum include early diagnosis, prognosis prediction and tracking the development of pathology. Blood-based tests are an attractive option for patient screening because to their simplicity, affordability, non-invasiveness and potential for recurrent sample.

Additionally a major contributing component to the pathophysiology of pregnancy-induced hypertension is hormonal imbalance which is mirrored in changes to the serum lipid profile. There are significant hazards to the foetus linked with pre-eclampsia and eclampsia. In contrast the mother is at risk of renal failure, pulmonary edoema, stroke and death. These complications include intrauterine growth restriction, mortality and preterm with related complications. The cause or causes of pre-eclampsia are still unknown despite much investigation and there are no clinically helpful screening tools to detect women who are at risk of developing the condition[5]. Dyslipidemia in early pregnancy is linked to a higher risk of pre-eclampsia. Six When compared to women who had a normal pregnancy, women with a history of pre-eclampsia have significantly different lipid profiles and are more susceptible to lipoprotein oxidation. It is reported that one of the main causes of proteinuria and hypertension in pre-eclampsia is disorders in lipoprotein metabolism[6]. In light of the aforementioned data, it is hypothesised that changes in lipid metabolism may be crucial in the emergence of pre-eclamptic and eclamptic symptoms. The goal of the current study was to examine how the lipid profiles of normal, preeclamptic and eclamptic women differed in terms of total lipids, HDL cholesterol, LDL cholestero and cholesterol.

## MATERIALS AND METHODS

We conduct this study at Department of Obstetrics and Gynaecology at National Institute of Medical Sciences and Research. The patients were divided into two groups. Pregnant women with preeclampsia (cases) and normal pregnant women (controls). The cases and controls were matched according to maternal age, gestational age, race and body mass index (BMI) in accordance with the selection criteria previously established. The study group and controls were selected from among the patients seen at Gujart adani institute of medical science between June 2011 and January 2014. The study was approved by the Ethics Committees of Hospital and written informed consent was obtained from all patients.

The sample size was calculated to compare two groups (cases and controls) with a 5% prevalence of preeclampsia, confidence level of 95% and a power of 80%. In this case, it was expected that the maximum difference in proteinuria in the test group would be 30% compared with the unexposed group. Thus, the sample size would be a minimum of 33 women in each group.

Women with diabetes, chronic hypertension, autoimmune diseases or renal diseases were excluded. Preeclampsia was diagnosed in accordance with the criteria proposed by the National High Blood Pressure Education Program 10 i.e. blood pressure 140-90 mm Hg and proteinuria $\geq$300 mg in 24 hrs urine samples. Blood samples were collected from all participants after a 12 hrs fast using 5 mL tubes containing ethylenediaminetetraacetic acid (EDTA). The samples were immediately centrifuged and processed using a lab test diagnostic kit.

**Statistical analysis:** The mean serum lipid concentrations of the cases and controls were compared using Student's t-test. The mean level of each lipid was correlated with the 24 hrs proteinuria concentration using Pearson's coefficient test. Significance was set at $p<0.05$. We also used the Student t test to compare the means of the groups for arterial pressure, proteinuria, total cholesterol, high-density lipoproteins (HDL) LDL, very low density lipoproteins (VLDL) and triglycerides, taking $p<0.05$. Correlations between proteinuria and cholesterol were made using Pearson's correlation coefficient, considering only the group with preeclampsia. The analyses were performed using the SPSS software, version 16.

## RESULT

Fifty-two preeclamptic and forty-five healthy pregnant women who met the study's inclusion requirements were invited to take part. Table 1 displays the characteristics of the participants. The data indicates that there were no statistically significant variations in the women's ages, body mass

Table 1: Demographic and clinical characteristics of participants.

| Characteristic | Preeclampsia n = 52 | Healthy controls n = 45 | p-value |
|---|---|---|---|
| Race/ethnicity | | | |
| White | 21 (45.3) | 16 (35.5) | |
| Mixed | 24 (48.3) | 21 (54.7) | 0.5 |
| Black | 7 (8.3) | 8 (12.8) | |
| Age | 25.3±5.1 | 24.4±5.1 | 0.9 |
| Body mass index | 29.3±4.1 | 28.4±4.1 | 0.10↑ |
| Gestational age | 36.3±3.1 | 36.3±2.2 | 0.4↑ |

Table 2: Correlation between 24 hrs proteinuria and lipid profile among 82 pregnant women proteinuria (mg dL over 24 hrs)

| | Absent | 0.3-0.9 | 1-2 | >2 | p-value |
|---|---|---|---|---|---|
| Total | | | | | |
| Cholesterol | 230.0(54) | 226.0(43) | 233.0(61) | 274.0(61) | 0.08 |
| LDL | 134.0(47.1) | 122.1(35.3) | 124.0(43.1) | 152.3(51.2) | 0.46 |
| VLDL | 44.1(12.1) | 49.2(19.1) | 60.2(26.2) | 68.1(18.3) | <0.0005 |
| HDL | 54.0(16) | 56.0(16) | 50.0(13) | 58.0(13) | 0.88 |
| Triglycerides | 218(51) | 243(95) | 299(120) | 340(81) | <0.0001 |

index (BMI) level of pregnancy or race. Additionally, there were no appreciable variations in the levels of total serum cholesterol, LDL or HDL between the women in good health and the preeclampsia patients. When compared to the healthy controls, the preeclamptic patient's serum levels of VLDL and triglycerides were considerably greater (Table 2). There was a positive and significant correlation found between the severity of proteinuria and the levels of triglycerides and VLDL (Table 2).

## DISCUSSIONS

In contrast, the mother is at risk of renal failure, pulmonary edoema, stroke and death. These complications include intrauterine growth restriction, mortality and preterm with related complications. The reason or causes of preeclampsia are still unknown despite much investigation and there are no clinically helpful screening tools to identify women who will develop preeclampsia. Dyslipidemia in early pregnancy is linked to a higher risk of pre-eclampsia[7].

When compared to women who had a normal pregnancy, women with a history of pre-eclampsia have significantly different lipid profiles and are more susceptible to lipoprotein oxidation. It is reported that one of the main causes of proteinuria and hypertension in pre-eclampsia is disorders in lipoprotein metabolism.

Triglyceride and VLDL concentrations in our study were substantially greater in the preeclamptic patients than in the healthy women. Women with raised triglycerides were twice as likely to develop preeclampsia, according to a review of 22 research by Ray *et al*[8]. The four studies that controlled for age, BMI and parity showed a four-fold increased risk when compared to women with normal triglycerides. Triglyceride testing between 28 and 32 weeks was also proposed as a potential predictor of preeclampsia. Based on the aforementioned data, it is hypothesised that modifications to lipid metabolism could be crucial in the emergence of preeclamptic symptoms. Therefore, the purpose of the current study was to look at how the lipid profiles of healthy and preeclamptic women differ. In the current investigation, none of the group's third trimester normal pregnancy levels showed a discernible change in total cholesterol. These results resemble those of Sattar *et al*. Twelve Others, however, have discovered a marked rise in serum TC in pregnancy-related toxemia[9].

In our study, pre-eclamptic and eclamptic pregnant women showed a considerable drop in HDL-C. Oestrogen is in charge of suppressing serum LDL and inducing TG and HDL. It also causes oestrogen levels to drop in preeclampsia. However, insulin resistance and hypooestrogenaemia are also contributing factors to the low HDL level in pre-eclampsia. The current study's findings about a considerable decrease in LDL-C levels during the third trimester of a normal pregnancy may be related to hyperestrogenaemia, whereas eclampsia and pre-eclampsia show a significant increase in LDL-C levels.

## CONCLUSIONS

The findings reported in this study suggest that the women who develop pre-eclampsia and eclampsia had disturbed lipid profile due to abnormal lipid metabolism. Increased triglycerides levels and delayed triglycerides clearance and high blood pressure are the reasons for the development of preeclampsia and eclampsia. This association may be significant in understanding the pathological process of pre-eclampsia and may help in developing strategies for prevention and early diagnosis of pre-eclampsia and eclampsia.

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