

In the Pre-eclampsia and Normotensive Patient- Lipid Profile Study

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Abstract

Pre-eclampsia is associated with substantial risks for the fetus and mother. Disorders of lipoprotein metabolism are reported to be a major cause of hypertension and proteinuria in pre-eclampsia. This was a cross-sectional comparative study carried out in the Department of Obstetrics and Gynecology, Sylhet, M.A.G Osmani Medical College Hospital, Sylhet during December 2013 to May 2014. 50 pre-eclampsia and 50 normotensive pregnant women's serum lipid profile were selected according to inclusion and exclusion criteria. Fasting lipid profile was measured after 10-12 hours overnight fasting. The mean age (25.12 # 3.98 years vs 24.94 # 3.90 years; $p=0.820$), gestational age (36.80 # 0.70 weeks vs 36.9 # 1.1 weeks ; $p=0.144$), and BMI (21.43 # 2.09kg/M² vs 22.02 # 1.73kg/M², $p=0.131$) were statistically similar in both pre-eclamptic women and the control pregnant women. SBP (163.70 #11.24mm of Hg vs 115.10 # 9.39mm of Hg; $p<0.001$) and DBP (103.6 #9.4mm of Hg vs 71.50 #5.37mm of Hg $p<0.001$) were significantly higher in pre-eclamptic women than that of normotensive pregnant women. Serum total cholesterol (227.56 # 55.79mg/dl vs 194.56 # 43.33mg/dl, $p=0.001$). serum LDL-cholesterol (147.72 #51.03mg/dl vs 119.43 # 37.17mg/dl; $p=0.002$) and serum triglyceride (232.06 # 65.54mg/dl vs 157.44 # 64.24mg/dl $p<0.001$) were significantly higher in pre- eclampsia than that of normal pregnancy; while serum HDL- cholesterol (38.96 # 2.93 mg/dl vs 45.82 # 6.11 mg/dl; $p <0.001$) was significantly lower in pre-eclampsia than that of control pregnancy. An abnormal lipid profile has a direct effect on endothelial dysfunction. Early detection of these parameters may help patient by preventing complications in pre-eclampsia.

Keywords: Lipid profile, normotensive, pre-eclampsia.

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Introduction

Pre-eclampsia, defined by presence of both hypertension to the extent of 140/90 mm Hg and proteinuria (≥ 300 mg/day) induced by pregnancy after 20th week with multiple target organs involvement¹⁻³. Worldwide the incidence of pre-eclampsia ranges between 2 and 10% of pregnancies. There are approximately 3.6 million births per year in Bangladesh. Over 100,000 develop eclampsia per year. Eclampsia causes 16% of maternal mortality on a national basis which is equivalent to about 4500 death in one year⁴. The association of alteration of serum lipid profile in essential hypertension is well documented. An abnormal lipid profile has a direct effect on endothelial dysfunction. The most important feature to toxemia of pregnancy is hypertension which is supposed to be due to vasospastic phenomenon in kidney, uterus, placenta and brain⁵.

Pre-eclampsia is associated with substantial risks for the fetus. These include intrauterine growth restriction, death and prematurity. Early pregnancy dyslipidemia is associated with an increased risk of pre-eclampsia⁷. Women with a history of pre-eclampsia have significant differences in lipid parameters and an increased susceptibility to lipoprotein oxidation when compared with women who had normal pregnancy. Disorders of lipoprotein metabolism are reported to be a major cause of hypertension and proteinuria in pre-eclampsia⁸.

The present study was designed to investigate the alteration in lipid profile (Cholesterol, triglycerides, HDL cholesterol, LDL-cholesterol) in pre-eclamptic women and normotensive pregnant women.

Materials and Methods

This study was a hospital based descriptive type of case-control study, carried out in IPD (inpatient department) of Obstetrics and Gynecology of Sylhet M.A.G Osmani Medical College and Hospital, Sylhet in between December 2013 to May 2014. Total 100 cases (50 cases of pre-eclampsia and 50 normotensive pregnant women were grouped as case and control respectively.) were enrolled in this study. Data was collected by using a preformed questionnaire and check list. Cases were selected according to inclusion and exclusion criteria. Inclusion criteria were patients with pre-eclampsia of aged 15 to 30 years and gestational age of 28-42 weeks, body mass index (BMI) and gestational age matched

normotensive pregnant women. Exclusion criteria were pre-existing dyslipidemia, hypertension, chronic renal failure and diabetes mellitus. Informations (according to questionnaire) were taken from patients. Laboratory measurements: Fasting lipid profile was measured. After data collection all data was entered in master sheet and Statistical analyses were carried out by using the Statistical package for Social Sciences version 16.0.

Results

The most commonly affected age group of pre-eclampsia was 21 to 25 years (58.0%) while in normotensive pregnant women it was 58.0%, There was no significant different of age group between pre-eclampsia and normotensive pregnant women ($\chi^2=1.179$; $p=0.820$) (table-I).

Table-I: Comparison of the age of the patients between pre-eclampsia and normotensive pregnant women.

Age	Study group		p-value
	Group-A (n=50)	Group-B (n=50)	
18-20 years	6 (12.0)	4 (8.0)	p=0.758
21-25 years	25 (56.0)	29 (58.0)	
26-30years	9 (18.0)	12 (24.0)	
31-35 years	7 (14.0)	5 (10.0)	
Mean #SD	25.12±3.98	24.94±3.90	p=0.820

The mean gestational age of the patients in pre-eclamptic group was 36.80±0.70 weeks and in normotensive pregnant women was 36.9±1.1 weeks. There was no significant different of mean gestational age between the groups ($f=-1.486$; $P=0.144$) (table-II).

Table-II: Comparison of the gestational age between pre-eclampsia and normotensive pregnant women.

Gestational age	Study group		p-value
	Group-A (n=50)	Group-B (n=50)	
	28 (56.0)	33 (66.0)	p=0.758
	22 (44.0)	17 (34.0)	
Mean weeks #SD	36.80±0.70	37.04±0.90	p=0.144

The height of the pre-eclamptic women was 153.22±6.11 cm and was 152.04±6.13 cm in the normotensive pregnant women.

The weight of the pre-eclamptic women was 50.24±5.04 kg and was 50.84±4.37 kg in the normotensive pregnant women. Body mass index (BMI) of the pre-eclamptic women was 21.43±2.09 kg/m² and 22.02±1.73 kg/m² in the normotensive pregnant women. There was no significant different in BMI among the three groups ($t=-1.521$; $p=0.131$) (table-III).

Table-III: Comparison of the anthropometric data of the patients between pre-eclampsia and normotensive pregnant women.

Parameter	Study group		p-value
	Group-A (n=50)	Group-B (n=50)	
Height (cm)	153.22±6.11	152.04±6.13	p=0.338
Weight (Kg)	50.24±5.04	50.84±4.37	p=0.526
BMI (Kg/M ²)	21.43±2.09	22.02±1.73	p=0.131

The systolic blood pressure (SBP) of the pre-eclamptic women was 163.70 ± 11.24 mm of Hg and was 115.10 ± 9.39 mm of Hg in the normotensive pregnant women. There was significant difference in systolic blood pressure between group-A and Group-B ($t=23.459$; $p<0.001$).

The diastolic blood pressure (DBP) of the pre-eclamptic women was 103.06 ± 9.4 mm of Hg and was 71.50 ± 5.37 mm of Hg in the normotensive pregnant women. There was significant difference in diastolic blood pressure between group-A and Group-B ($t=27.007$; $p<0.001$)(table-IV).

Table-IV: Comparison of the status of blood pressure of the patients between pre-eclampsia and normotensive pregnant women.

Blood pressure	Study group		p-value
	Group-A (n=50)	Group-B (n=50)	
SBP(mm of Hg)	163.70 ± 11.24	115.10 ± 9.39	p<0.001
DBP (mm of Hg)	100.60 ± 5.41	71.50 ± 5.37	p<0.001

Serum total cholesterol level in the pre-eclamptic women was significantly higher as compared to that of normotensive pregnant women (227.56 ± 55.79 mg/dl vs. 194.56 ± 43. mg/dl ; $t=3.303$; $p=0.001$), Serum HDL-cholesterol level in the pre-eclamptic women was significantly lower than on normotensive pregnant women (38.96 ± 2.93 mg/dl vs. 45.82 ± 6.11 mg/dl; $t=-7.160$; $p<0.001$) Serum LDL- cholesterol level in the pre-eclamptic women was significantly higher as compared to that on normotensive pregnant women(147.72 ± 51.03 mg/dl vs. 119.43 ± 37.17 mg/dl; $t=3.168$; $p<0.002$). Serum triglyceride level in the pre-eclamptic women was significantly higher as compared to that of normotensive pregnant women(232.06 ± 65.54 mg/dl vs. 158.44 ± 64.26 mg/dl; $t=5.671$; $p<0.001$) (table-V).

Table-V: Comparison of the serum lipid level of the patients between pre-eclampsia and normotensive pregnant women.

Blood pressure	Study group		p-value
	Group-A (n=50)	Group-B (n=50)	
Total cholesterol	227.56 ± 55.79	194.56 ± 43.33	p<0.001
HDL- cholesterol	38.96 ± 2.93	45.82 ± 6.11	p<0.001
LDL- cholesterol	147.72 ± 51.03	119.43 ± 37.17	p<0.002
Triglyceride	232.06 ± 65.54	158.44 ± 64.26	p<0.001

Discussion

In this study the mean age of the patients in pre-eclampsia group was 25.12 ± 3.98 years and in normotensive pregnant women was 24.94 ± 3.90 years. There was no significant different of mean age between the groups ($p=0.820$). This result was supported by Abubakar.¹³ In another study de Lima et al.⁹ found the mean age of the pre-eclampsia mother was 23.05±4.7 years ; while Khanam K et al.¹⁴ reported the mean age of the mild

pre-eclampsia mother was 29.7 ± 1.5 years and severe pre-eclamptic mother was 29.2 ± 1.2 years.

In the present study the mean gestational age of the patients in pre-eclamptic group was 36.80 ± 0.70 weeks and in normotensive pregnant women was 36.9 ± 1.1 week. There was no significant difference of mean gestational age between the group ($p=0.144$). This result was in agreement with the result of de Lima et al.⁹ Akhter.¹⁹ also found that the mean age of gestation was 36.0 ± 2.7 in pre-eclamptic or eclamptic patients. Bhowmik et al.¹⁶ found that the mean age of gestation was 34.7 weeks in pre-eclamptic patients.

In this study systolic blood pressure (SBP) of the pre-eclamptic women was 163.70 ± 11.24 mm of Hg and was 115.10 ± 9.39 mm of Hg in the normotensive pregnant women. There was significant difference in systolic blood pressure between pre-eclamptic women and normotensive pregnant women ($p<0.001$). This result was in agreement with the study of Abubakar¹³.

In this study diastolic blood pressure (DBP) of the pre-eclamptic women was 103.6 ± 9.4 mm of Hg in the normotensive pregnant women. There was significant difference in diastolic blood pressure between pre-eclamptic women and normotensive pregnant women ($p<0.001$). This result was in agreement with the study of Abubakar¹³. Similarly Kashinakunti et al.¹⁷ found that diastolic blood pressure was significantly higher in pre-eclamptic mother than the control normal pregnant women.

In this study serum total cholesterol level in the pre-eclamptic women was 227.56 ± 55.79 mg/dl and was 194.56 ± 43.33 mg/dl in the normotensive pregnant women. There was significantly higher serum total cholesterol level in pre-eclamptic than that of control normal pregnancy ($p=0.001$). This result was similar to other studies that serum total cholesterol level was significantly higher in pre-eclamptic than that of control normal pregnancy^{1,6,11,13}.

In the present study serum HDL-cholesterol level in the pre-eclamptic women was 38.96 ± 2.93 mg/dl and was 45.82 ± 6.11 mg/dl in the normotensive pregnant women. Serum HDL-cholesterol level was significantly lower in pre-eclamptic than that of control normal pregnancy ($p<0.001$). This result was similar to other studies that serum HDL-cholesterol level was significantly lower in pre-eclamptic than that of control normal pregnancy^{1,6,10,11,12,18}.

In the current study serum LDL-cholesterol level in the pre-eclamptic women was 147.72 ± 51.03 mg/dl and was 119.43 ± 37.17 mg/dl in the normotensive pregnant women. Serum LDL-cholesterol level significantly higher in pre-eclamptic than that of normal pregnancy. ($p=0.002$).

This result was similar to other studies that serum LDL-Level was significantly higher in pre-eclampsia control normal pregnancy^{1,6,11,14,18,19}.

In our serum triglyceride level in the pre-eclampsia women was 232.06 ± 65.54 mg/dl and was 157.44 ± 64.26 mg/dl in the normotensive pregnant women. Serum triglyceride level was significantly higher in pre-eclampsia than that of normal pregnancy ($p<0.001$). This result was similar to other studies that serum triglyceride level was significantly higher in pre-eclampsia than that of normal pregnancy^{1,6,9,10,11,13,15,17}.

Conclusion

Patient who develops pre-eclampsia have abnormal lipid profile. This abnormal lipid profile is responsible for endothelial dysfunction. This endothelial dysfunction may play a key role in the pathophysiology of pre-eclampsia. Early detection of these parameters may help patient by preventing complications and is going to aid in better management of pre-eclampsia.

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