

Frequency of Pre-Eclampsia and Comparison of Lipid Profile in Pre-Eclamptic and Normotensive Pregnant Females

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ABSTRACT

Background: Preeclampsia is clinically characterized by multiple symptoms like proteinuria and hypertension which are noted after 20-weeks of gestation. This disease is potentially harmful disease occurring in pregnancy threatening vitality of unborn child and mother both. The changes in lipids present in serum are often reported in cases of preeclampsia.

Aim: To determine the frequency of Pre-eclamptic pregnant females and to compare the mean lipid profile in pre-eclamptic and normotensive pregnant females

Methods: This cross sectional study was done after taking informed consent. Blood samples were then taken (about 5 ml of venous blood after at least 8 hours of fasting overnight) and sent to hospital laboratory. Blood sample was analysed for serum lipids i.e. Triglycerides (TG), total cholesterol (TC), Low Density Lipoprotein (LDL) and high Density Lipoprotein (HDL) for subjects. All data was collected by researcher herself.

Results: In this study the mean age was 27.61 ± 4.83 years while the frequency of pre-eclampsia in pregnant women was seen in 20.91%. According to lipid profile the mean serum triglycerides was 177.86 ± 29.02 , the mean total cholesterol was 129.0 ± 21.51 , the mean HDL and LDL was 36.7 ± 6.95 and 129.7 ± 20.78 for LDL. , comparison of lipid profile of normotensive pregnant women and pre-eclamptic patients was done it shows that serum triglycerides was 162.20 ± 10.61 in normotensive and 230.04 ± 11.53 in pre-eclamptic cases, p value was 0.0001, total cholesterol was 117.69 ± 8.10 in normotensive and 166.65 ± 12.68 in pre-eclamptic cases, p value was 0.0001, HDL was 38.58 ± 5.67 in normotensive and 165.78 ± 27.91 in pre-eclamptic cases, p value was 0.0001 while LDL 118.79 ± 7.81 in normotensive and 13.46 ± 3.44 in pre-eclamptic cases, p value was calculated as 0.0001.

Conclusion: We concluded that the mean lipid profile in pre-eclamptic cases is significantly different than normotensive pregnant females.

Keywords: Pregnant females, pre-eclampsia, lipid profile

INTRODUCTION

Hypertensive abnormalities in pregnancy lead to major pregnancy disorders which range from pregnancy-induced-hypertension or PIH to completely blown pre-eclampsia¹. Globally prevalence rates for this disease vary. For developing countries prevalence rates of preeclampsia vary between 1.8% to 16.7%². One study done at tertiary-care hospital in the country, Soomro S, et al. observed 18% maternal mortalities which occur because of pre eclampsia^{3,4}. Perinatal and maternal mortality and morbidity are related with pre-elampsia. Maternal deaths include eclampsia, pulmonary edema, renal failure & stroke. Fetal deaths include preterm birth, IUGR and LBW.⁵ Preterm delivery resulting in newborn child being small according to gestational age or SGA are related with elevated risk leading to CV diseases & hypertension in older life⁶.

Although exact etiology of preeclampsia is unclear, many risk factors are described including nulliparity, multiple gestation, maternal age (advanced or young), obesity, assisted reproductive methods, ethnicity, preeclampsia history, familial history and that prior to pregnancy⁷. Several factors may contribute towards full-blown pre-eclamptic-syndrome accompanied by multi-system dysfunction of vasculare contributing as central cause⁸. After many investigations, major pathophysiological circumstances of the disease are unknown, hence therapeutic and preventive strategies are delayed⁹.

The current study was planned to determine the frequency of Pre-eclamptic pregnant females presenting in a tertiary care hospital and to compare the mean lipid profile in pre-eclamptic and normotensive pregnant females. There is unclear evidence regarding variation in mean lipid profile in pre-eclamptic and normotensive pregnant females. The

international literature gives controversial mean difference regarding total cholesterol, HDL and LDL but they are consistent for higher triglycerides in pre-eclamptic and normotensive pregnant women¹⁰⁻¹². Due to local research and clear picture of lipid profiles in preeclamptic and normotensive females. If we find significant changes in levels of lipid profiles in pre-eclamptic females then in future we can opt early screening to prevent the morbidities due to lipid profile abnormalities.

MATERIAL AND METHODS

This cross sectional study was conducted in the Department of Obstetrics and Gynaecology, Unit I, Sir Ganga Ram Hospital, Lahore during a period of six months. It is estimated as 110 cases using 95% confidence interval, 7% margin of error, taking an expected percentage of preeclampsia as 16.7%². Non probability consecutive sampling technique was used.

Inclusion Criteria: Subjects having age 20-35 were taken in second and third trimester (calculated from last menstrual period by researcher) having any parity presenting for routine antenatal visits.

Exclusion criteria:

- Pregnant women with BMI > 25 (assessed on standard criteria based on weight to height ratio)
- Pregnant women with multifetal gestation (assessed on their USG)
- Pregnant women with known chronic hypertension (assessed on their medical record)
- Pregnant women with known diagnosed renal disease (assessed on their medical record)

Data collection procedure: After approval from ethical review of our hospital, data was collected from patients meeting inclusion criteria presenting to OPD of SGRH. Informed consent was obtained. According to operational definition

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pregnant females were recorded having preeclampsia or normotensive. Blood samples were then taken (about 5 ml of venous blood after at least 8 hours of fasting overnight) and sent to hospital laboratory. Blood sample was analysed for serum lipids i.e. Triglycerides (TG), total cholesterol (TC), Low Density Lipoprotein (LDL) and high Density Lipoprotein (HDL) for subjects. All data was collected by researcher herself. Preeclampsia was defined hypertension of at least 140/90mmHg recorded on two separate occasions and 4 hours apart and in the presence of at least 300mg protein in a 24 hour collection of urine, arising after 20 weeks of pregnancy.

Lipid profile: all profiles were noted after 8 hours overweight fast and at the time of inclusion in the study. SPSS 20 was used to enter and analyzed data. Age of subjects, gestation age and values of Serum triglyceride, Total cholesterol, HDL and LDL mg/dl were shown as mean±S.D. Qualitative data like preeclampsia was presented as frequency and percentage. Independent sample t-test was used to compare the mean serum triglyceride, total Cholesterol, HDL and LDL mg/dl in pre-eclamptic and normotensive pregnant females. $P < 0.05$ was considered statistically significant. Data was stratified for age, parity and gestational age (weeks). Post stratification t-test was applied for quantitative outcome variable and chi-square test was applied for qualitative outcome variable to control potential effect modifier, with P -value < 0.05 as significant.

RESULTS

A total of 110 cases fulfilling the inclusion/exclusion criteria were enrolled to determine the frequency of Pre-eclamptic pregnant females presenting in a tertiary care hospital and to compare the mean lipid profile in pre-eclamptic and normotensive pregnant females. The mean age of females was 27.61 ± 4.82 years, the mean gestational age was 30.05 ± 4.52 weeks and mean parity was 3.25 ± 1.33 . Frequency of pre-eclampsia in pregnant women was recorded in 23(20.91%) while 87(79.09%) had no findings of the morbidity. Lipid profile of the cases was recorded showing that 177.86 ± 29.02 for serum triglycerides, 129.0 ± 21.51 for total cholesterol, 36.7 ± 6.95 for HDL and 129.7 ± 20.78 for LDL. Comparison of lipid profile of normotensive pregnant women and pre-eclamptic patients was done it shows that serum triglycerides was 162.20 ± 10.61 in normotensive and 230.04 ± 11.53 in pre-eclamptic cases, p value was 0.0001, total cholesterol was 117.69 ± 8.10 in normotensive and 166.65 ± 12.68 in pre-eclamptic cases, p value was 0.0001, HDL was 38.58 ± 5.67 in normotensive and 165.78 ± 27.91 in pre-eclamptic cases, p value was 0.0001 while LDL was 118.79 ± 7.81 in normotensive and 13.46 ± 3.44 in pre-eclamptic cases, p value was calculated as 0.0001.

Table 1: Mean Comparison of Lipid profile in both study group

Lipid profile	Normotensive		Pre-eclamptic		P value
	Mean	SD	Mean	SD	
Triglyceride	162.20	10.61	230.04	11.53	0.0001
Total cholesterol	117.69	8.10	166.65	12.68	0.0001
HDL	38.58	5.67	165.78	27.91	0.0001
LDL	118.79	7.81	13.46	3.44	0.0001

DISCUSSION

Hypertension is considered among the category of common medical disorders in pregnancy¹³⁻¹⁶. PIH constitutes many hypertensive disorders which are initiated after gravid state of 20-weeks in pregnancy¹⁷. Gestational hypertension including eclampsia & preeclampsia comprises 70% of total cases; on other hand chronic hypertension constitutes 30% of total hypertension abnormalities in pregnancy¹⁸. As for developed countries, incidence of eclampsia is reported to be 1 in every 2000 deliveries when a comparison is done to developing nation where incidence is 1 in every 100 subjects to 1 in every 1700 subjects. Eclampsia and preeclampsia constitute almost > 50,000 maternal mortalities globally per year¹⁷. Our study was done with goal of proving unclear proof related to variation for mean lipid-profile in normotensive & pre-eclamptic pregnant women. Literature worldwide provides controversial average difference for total cholesterol, LDL and HDL but these are constant for triglycerides with higher molecular weight in normotensive and pre-eclamptic pregnant women^{10,11,12}. In our research study, 69(62.73%) had age range of 20 to 30 yrs and 41(37.27%) were from 31 to 35 yrs in age, mean±sd was estimated as 27.61 ± 4.83 yrs, pre-eclampsia frequency in women who are pregnant was noted in 23(20.91%), lipid profile in cases was noted as 177.86 ± 29.02 for triglycerides in serum, 129.0 ± 21.51 for cholesterol in total, 36.7 ± 6.95 for that of HDL & 129.7 ± 20.78 for that of LDL, comparing in pre-eclamptic patients & normotensive pregnant females was done showing that triglycerides in serum were 162.20 ± 10.61 for normotensive & 230.04 ± 11.53 for pre-eclamptic subjects, p -value noted as 0.0001, 117.69 ± 8.10 total cholesterol levels in normotensive & 166.65 ± 12.68 total

cholesterol in pre-eclamptic cases, p -value noted as 0.0001, HDL as 38.58 ± 5.67 for normotensive & 165.78 ± 27.91 in cases of pre-eclamptic, p -value was noted as 0.0001 and LDL was noted as 118.79 ± 7.81 for normotensive & 13.46 ± 3.44 in pre-eclamptic subjects, p -value was noted as 0.0001. In past mean Triglyceride noted in unit of mg/dl in preeclampsia and normotensive pregnant women is reported as 165.6 ± 17.22 & 225.6 ± 28.93 (p value < 0.05) respectively. The total cholesterol levels (mg/dl) for normotensive & preeclamptic pregnant females was same statistically for example 169 ± 17.03 & 86.3 ± 34.43 (p value < 0.05) respectively. The average HDL levels for normotensive & preeclampsia women were statistically different that is 55.7 ± 7.11 & 42.4 ± 9.29 (p value < 0.05) respectively.

The average Triglyceride levels measured in mg/dl in normotensive & preeclampsia pregnant females is reported to be 165.6 ± 17.22 & 225.6 ± 28.93 (p values ≤ 0.05) respectively. The average total cholesterol levels measured in mg/dl for normotensive & preeclampsia pregnant females was same statistically i.e., 169 ± 17.03 & 186.3 ± 34.43 (p value > 0.05) respectively. The average HDL cholesterol levels in mg/dl for preeclampsia & normotensive pregnant females were different statistically i.e. 55.7 ± 7.11 & 42.4 ± 9.29 (p values ≤ 0.05) respectively. The average LDL cholesterol levels in mg/dl for pre-eclamptic & normotensive pregnant females was same statistically for both group i.e., 115.2 ± 10.72 & 134.4 ± 24.26 (p value > 0.05) respectively¹⁰.

The average LDL levels measured in mg/dl for preeclamptic & normotensive pregnant females was same statistically in both categories i.e. 115.2 ± 10.72 & 134.4 ± 24.26 (p value < 0.05) respectively¹⁰. All above research work corresponding to results show pre-eclamptic subjects had

abnormal lipid-profile significantly when comparison was done with normotensive pregnant patients. Recently a meta-analysis reviewing preeclampsia and hypertriglyceridemia reported maternal levels of triglycerides in pregnancy were increased in females with subsequently stable preeclampsia;¹⁹ although, methodological approach of researchers is more inclusive & comprehensive. Normal metabolism for lipids in pregnancy is already examined in various studies²⁰⁻²³. In 1st trimester, levels of lipids are same as those of levels before pregnancy. Although, in 2nd & 3rd trimesters in pregnancy, significant deviation of the non-pregnant subjects for lipid levels was noted. In normal cases of pregnancies (without any morbidities for example preeclampsia or gestational diabetes), total levels of cholesterol elevates by 50%, & levels of triglyceride elevate to significant levels by almost 2 to 4 times. Additionally, HDL-Cholesterol levels elevate by almost 30%, & LDL-Cholesterol levels elevate by 50%²². These alterations in metabolism of lipids in pregnancy cause maternal fat accumulation in 1st two thirds period of gestation for serving as calories source for fetus and mother in late periods of pregnancy & in lactation^{20,24}. Synthesis of placental steroid is also mediated by cholesterol, & triglycerides are utilized for oxidation in placenta & formation of membrane²⁵. Hours after the baby is delivered reversal for hyperlipidemia begins & is completed essentially by 6 to 10 weeks post-partum²⁵. To summarize, the findings in our research support previous literature & significant alteration in lipid levels in females who were pre-eclamptic were present however, researchers can go for early-screening for prevention of morbidities because of abnormalities in lipid profile.

CONCLUSION

It is concluded that the mean lipid profile in pre-eclamptic cases is significantly different than normotensive pregnant females.

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