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REVIEW ARTICLE

A STUDY OF LIPID PROFILE IN SECOND AND THIRD TRIMESTER OBESE PREGNANT PATIENTS IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Objective: To study the levels of lipid profile during second and third trimester pregnancy. **Introduction:** Currently, maternal prepregnancy body mass index (BMI) has increased and reflecting the overall increase in the prevalence of obesity [(1)]. Higher BMI during pregnancy have negative implications on pregnancy outcomes, results affect the burden on health of both mother and the infant at risk. **Material and methods:** This case control study was conducted at the department of gynecology & obstetrics, Lalla Ded Hospital a tertiary care hospital, by enrolling antenatal cases for the the study. The study was conducted on 25 obese women (BMI>30Kg/ m^2). **Results:** In obese second and third trimester, the mean cholesterol levels were 215.35±15.8 229.82±16.2 mg/dl respectively. The mean HDL levels were 43.5±5.8 and 40.6±5.2 mg/dl. The mean TGL levels were 179.23±36.5 and 190.58±39.4 mg/dl. Whereas, non-obese second and third trimester had decreased total cholesterol levels. **Conclusion:** Overweight/obese women have more atherogenic lipid profile than normal weight women during second and third trimester pregnancy, which may help to predict the pregnancy outcomes.

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INTRODUCTION

Currently, maternal prepregnancy body mass index (BMI) has increased and reflecting the overall increase in the prevalence of obesity [(1)]. Higher BMI during pregnancy have negative implications on pregnancy outcomes, results affect the burden on health of both mother and the infant at risk [(2)]. Pregnants who are obese are at high risk of developing preeclampsia and gestational diabetes mellitus. It will influence the neonatal outcomes like perinatal mortality, macrosomia, and congenital anomalies [(3)]. Maternal obesity also leads to higher chances of cesarean sections. The long-term impact of maternal obesity includes maternal weight retention and exacerbation of obesity and postpartum [(4)]. Pregnancy is characterized by progressive increases in serum lipids, and this adaptation is essential to promote normal fetal growth and developmen. In the nonpregnant state, obesity is associated with an atherogenic phenotype including high serum concentrations of total cholesterol, low-density lipoprotein (LDL), and triglycerides as well as a reduction in serum high-density lipoprotein (HDL) cholesterol [(5)].

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However, less is known regarding the influence of maternal obesity or excess weight gain on serum lipid profiles during pregnancy. There are a limited data comparing lipid profiles between normal weight and overweight/obese women during pregnancy in rural settings of Andhra Pradesh state. Hence we conducted this study to understand the changes of maternal serum lipids profiles in overweight and obese women compared with normal weight women between second and third trimester of pregnancy.

MATERIALS AND METHOD

This case control study conducted at gynecology & obstetrics department of GMC Srinagar, India. 25 cases with BMI>30 Kg/ m^2 of aged 20 to35 years enrolled in the study. Second and third trimester pregnant womens were enrolled in the study. Age matched pregnant womens with BMI 20–25 Kg/ m^2enrolled as control. Fasting blood samples were collected to analyse the levels of the lipid profile: Total Cholesterol, TGs, HDL, and LDL. Values for both obese pregnant and non-obese pregnant women were expressed as mean± SD. The paired sample t test was used to test the level of significance and $P<0.05$ was considered significant.

RESULTS

Table 1 shows that the mean levels of serum triglycerides and total cholesterol were significantly higher & mean level of serum HDL were significantly lower in 2nd and 3rd trimesters of pregnancy when compared with non-obese pregnant controls.

Table 1. Maternal serum lipid values in the second and third trimester

	Second trimester		Third trimester	
	Obese	Non-obese	Obese	Non-obese
Total cholesterol (mg/dl)	215.35±15.8	191.4±12.5	229.82±16.2	212.4±10.5
Triglycerides (mg/dl)	179.23±36.5	160.82±32.2	190.58±39.4	177.87±36.79
LDL cholesterol (mg/dl)	105.6±14.9	103.5±16.2	119.59±25.26	114.71±26.23
HDL cholesterol (mg/dl)	43.5±5.8	44.4±6.4	40.6±5.2	41.2 ± 8.6

Table 2. Maternal characteristics and pregnancy outcomes by lean versus overweight/obese status

Demographics	Obese	Non-obese	P-value
Age(years)	24.0(±4.9)	23.0(±3.7)	0.11
BMI(mean)	33.4 (±7.1)	21.6(±2.3)	<0.01
SBP	115.8(±7.5)	108.1(±10.7)	<0.01
DBP	70.7(±6.0)	65.2(±8.1)	<0.01
Hypertensive disorders during pregnancy	10(7.4%)	8(8.9%)	0.67

The mean level of serum LDL was significantly higher in 3rd trimester of pregnancy when compared with control. The mean level of serum HDL was lower in the third trimester than compared with second trimester. There was significant change observed in systolic and diastolic blood pressure when compare both obese and non-obese pregnants.

DISCUSSION

Pregnancy causes drastic changes in maternal physiology and metabolism. These changes are mainly due to alteration in various hormonal levels (6). Elevated levels of progesterone, estrogen, hPL, hPGH, inflammatory mediators etc leads to alteration in insulin signaling pathway causing state of insulin resistance. Increased IR is associated with development of dyslipidemia (7). In our study, there was increased serum triglyceride, serum total cholesterol & serum LDL levels while decreased serum HDL levels in pregnant obese women than non-obese pregnant women. Overweight and obese pregnant women demonstrate a more atherogenic lipid profile in second trimester pregnancy when compared to normal weight women. Maternal serum total cholesterol, LDL cholesterol, HDL cholesterol, and triglycerides increase in all women in second and trimester. This finding is in accordance with studies done by Parchwani D et al (8) & Pusukuru R et al (9). HDL causes reverse cholesterol transport in our body. Decline in HDL is associated with elevated total cholesterol and LDL levels. Need for cholesterol also increases in pregnancy due to elevated steroid hormone synthesis. Therefore in pregnancy serum total cholesterol and LDL cholesterol are elevated.

Dyslipidemia in early pregnancy is significant because more atherogenic lipid profiles are associated with a variety of pregnancy complications, including spontaneous preterm birth (10, 11), gestational diabetes, and pre-eclampsia (12, 13). However, most of the available data are cross-sectional, and it is unknown which gestational age or duration of dyslipidemia is necessary to contribute to adverse pregnancy outcomes. The mechanisms linking early pregnancy dyslipidemia to pregnancy complications are incompletely understood.

In our study, we found that as pregnancy advances, dyslipidemia increases. Such changes are more marked in 3rd trimester than in 2nd trimester than in 1st trimester. This finding is in accordance with studies done by Parchwani D et al. & Kumar S et al (8, 14). Presence of dyslipidemia is associated with increased maternal and fetal morbidity and mortality.

It may also have long term effect on maternal health and lead to increased risk of development of obesity, atherosclerosis, type 2 diabetes mellitus, etc (15). Hence, it is advisable to screen pregnant women for serum lipid profile. If dyslipidemia is diagnosed, she should be given proper antenatal care, to avoid high risk pregnancy (16)

Conclusion

Dyslipidemia can complicate the pregnancy and increase maternal and fetal morbidity and mortality. Therefore, pregnant women should be screened for lipid profile and dyslipidemia should be identified. Dyslipidemic mothers should be advised for necessary dietary and lifestyle modifications which can reduce maternal and fetal complications.

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