



COMPARATIVE STUDY OF TOTAL CHOLESTEROL AND TRIGLYCERIDE OF NORMAL PREGNANT WOMEN IN DIFFERENT TRIMESTERS OF PREGNANCY

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ABSTRACT **Background:** Pregnancy is associated with many metabolic changes in mother in each trimester. The present study was conducted to elucidate any significant variation in the total cholesterol (TC) and triglyceride (TG) level during normal pregnancy in the different trimesters and its clinical significance in pregnancy. **Methods:** The study was conducted on pregnant women from rural areas attending antenatal clinic of NIMS Hospital. TC, TG and blood glucose were measured in serum in all three trimester of pregnancy. **Results:** The serum TG & TC level increased significantly ($P < 0.001$) in all the trimesters of pregnancy and serum TG level showed elevation with highest 2 to 3 fold in the third trimester. **Conclusions:** Increase in the plasma concentration of TGs or TC is a risk factor for the development of atherosclerosis.

KEYWORDS : Pregnancy, Blood sugar, Total cholesterol, Triglyceride

INTRODUCTION

Pregnancy is one of the most wonderful events in a couple's life. Pregnancy has been described as a state of increased insulin resistance and insulin secretion and of reduced hepatic insulin extraction.⁽¹⁾

In early pregnancy, there is increased body fat accumulation associated with both hyperphagia and increased lipogenesis while in late pregnancy there is an accelerated breakdown of fat depots, which plays an important role in foetal development.⁽²⁾ The neutral fats are increased in first trimester and cholesterol and phospholipids in second trimester.⁽³⁾ During gestation the fetus requires substantial amounts of cholesterol for early fetal development & growth and maternal cholesterol contributes substantially to fetal cholesterol by passage through the placenta.⁽⁴⁾

Extreme increases in maternal cholesterol during gestation, as with pregnancy induced hypercholesterolemia. In the pre-pregnancy hypercholesterolemic group, 78% of fetal arteries had plaque buildup and 76% of fetal arteries in the pregnancy induced hypercholesterolemic group had plaque buildup whereas only 63% of fetal arteries in the normocholesterolemic group had plaque buildup.⁽⁵⁾ During pregnancy, TC levels begin to rise late in the first trimester and early in the second trimester. On average, TC levels peak during the third trimester. It is not uncommon to have TC levels exceed 240 mg/dL during the final weeks of pregnancy.⁽⁶⁾ A 2016 study of 137 normal weight Brazilian women reported an average rate of change for TC of 43% from first to third trimester.⁽⁷⁾ The higher concentration of estrogen and insulin resistance is thought to be responsible for the hypertriglyceridemia of pregnancy.⁽⁸⁾

The present study was undertaken to elucidate any significant variation in the Total cholesterol, triglycerides during normal pregnancy in the different trimesters and to evaluate the clinical significance of the Total cholesterol, triglycerides level in pregnancy.

METHODS

Study Period: June 2018 to December 2018

Study Population: The study population consisted of 60 normal pregnant women from rural population in different trimesters of pregnancy and compared with 20 age matched healthy non pregnant women selected from general rural population as control.

Sample collection

All subjects were made to fast overnight at least for a minimum of 8 hrs. 5 ml of fasting venous blood was collected from the antecubital vein under aseptic precautions from each subject into plain vials. The blood was centrifugated after coagulation at 4000 rpm for 5 minutes and the serum was removed and stored at 4°C.

Inclusion criteria

Healthy non pregnant and pregnant women.

Exclusion criteria

Pregnant women with gestational diabetes mellitus, anemia, hypertension, obesity, smoking, alcoholism and Women with other chronic diseases that may affect the lipid profile.

Biochemical evaluation:

Blood samples of all the subjects were taken and analyzed for estimation of blood glucose total cholesterol and triglycerides and all three parameters were measured enzymatic colorimetrically using ready to use kit.

Glucose Oxidase Peroxidase method (GOD-POD) for blood glucose⁽⁹⁾, Cholesterol Oxidase Peroxidase method (CHOD-POD) for TC⁽¹⁰⁾ & Glycerin phosphate oxidase Peroxidase method (GPO/PAP) for TG⁽¹¹⁾ were used.

STATISTICAL ANALYSIS

The paired sample t test was used to test the level of significance and $P < 0.05$ was considered significant.

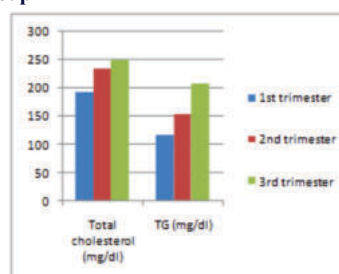
RESULTS

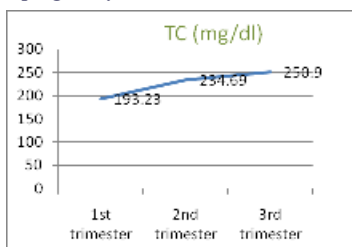
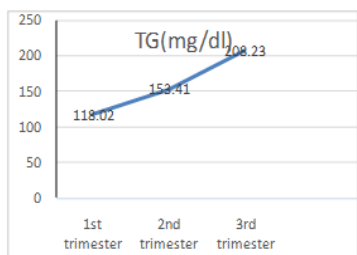
Table 1: Level of TC and TG level in control and 3 trimester of pregnancy

Groups	TC (mg/dl) (Mean±SD)	TG (mg/dl) (Mean±SD)
Control	163.83±21.83	77.77±17.13
1st trimester	193.23±19.90*	118.02±30.29*
2nd trimester	234.69±35.72*	153.41±36.52*
3rd trimester	250.90±48.43*	208.23±62.45*

*significant

Graph 1: Chart showing comparison of TC and TG level of control and study group



Graph 2: This line graph shows increase level of TC in three trimesters of pregnancy**Graph 3: This line graph shows increase level of TG in three trimesters of pregnancy**

DISCUSSION

Some previous studies showed that the most dramatic damage in the lipid profile in normal pregnancy is serum hypertriglyceridemia, which may be as high as two to three folds in the third trimester over the levels in non-pregnant women.⁽¹²⁾

In the present study similar was observed were serum TG concentration showed very significant increase ($P < 0.001$) in third trimesters of pregnancy the mean value being raised almost 2 to 3 folds. (Table-1) (Graph-3). Through TG value increase with the advancing gestation although the mean TG level remained in the normal range first trimester and second trimester of pregnancy. Hypertriglyceridemia of pregnancy is distinguished from other hyperglyceridemia by an increase or maintenance of HDL Cholesterol.

In the present study total cholesterol level increased significantly ($P < 0.001$) in all trimesters of pregnancy when compare with control group (Table-1) (Graph-2). Although the total cholesterol increases to maximum in the third trimester, the maximum rate of increase occurred during second trimester. The same observation was reported in study conducted by okojie FO et al (2011).⁽¹³⁾ The increase in the total cholesterol in the first trimester as compare to the control subject can be attributed to the formation of zygote in the uterine wall.⁽¹⁴⁾

The Total cholesterol in the second trimester was observed to be higher than those of the control subjects. This is response to the maternal switch from carbohydrate to fat metabolism which is an alternative pathway for energy generation due to high energy demand.⁽¹⁵⁾ The rise in total cholesterol in third trimester as compare subject may due to the development of foetal organ in the third trimester.⁽¹⁶⁾

It has been suggest that the increase in plasma TG and cholesterol patterns during pregnancy might be useful to identify women who would develop arthrogenic changes later in life.⁽¹⁷⁾

In our study show no variation was found in random blood glucose (84.29 ± 10.33) which was in normal range in all three trimesters. So according to our study, in pregnancy blood sugar level in different trimester's remains within normal range.

CONCLUSIONS

We can say that Increase in the plasma concentration of TGs or cholesterol leads to dyslipidemia and hyperlipidaemia which predisposes to formation of atherosclerotic plaques, a risk factor for the development of atherosclerosis therefore it is important to monitor the changes in lipid level during pregnancy. There is significant amount of dyslipidemia due to the physiological changes in the body due to pregnancy which may be attributed to the hormonal changes during pregnancy.

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