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MEAURMENT OF LIPID PROFILE IN NORMAL SUDANESE PREGNANT WOMENS IN DIFFERENT TRIMESTERS

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ABSTRACT

Pregnancy has being found to be associated with changes in lipid profile and this differs with each trimester. In this study serum total cholesterol (TC), triglyceride (TG), high density lipoprotein (HDL) and low density lipoprotein (LDL)were estimated in 90 pregnant women during normal gestation (30 in each trimester) and in 30 as control. The subjects were selected in Khartoum city randomly. Pregnant women were the main population under the study to estimate the risk of heart disease in pregnant women compare with non pregnant women. The study show that there was a highly significant difference between the means of plasma total cholesterol levels, among the test group, which was higher, compared to the control group, with a P value of (0.00). In addition, there was a highly significant difference between the means of plasma LDL levels, among the test group, which was higher, compared to the control group, with a P value of (0.00). In addition, there was a highly significant difference between the means of plasma HDL levels, among the test group, which was higher, compared to the control group, with a P value of (0.00). In addition, there was a highly significant difference between the means of plasma triglyceride levels, among the test

group, which was higher, compared to the control group, with a P value of (0.00).This study concluded that, there was an effect of pregnancy on heart function and that result in elevation of LDL (bad cholesterol) due to hormonal change.

KEYWORD: Pregnancy, Lipid profile, Trimester, Cholesterol.

INTRODUCTION

During the pregnancy a woman undergoes dramatic physiological and hormonal change it large amount of estrogen, progesterone and corticosteroid production during pregnancy affect various metabolic physiological and endocrine system. Pregnancy is accompanied by significant variations in maternal lipid metabolism.[1, 2] 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.[3] Blood lipid concentrations, lipoproteins and apolipoproteins in the plasma increase significantly during pregnancy.[4] Fat storage occurs primarily during mid-pregnancy.[5,6] There is some evidence that progesterone which increases markedly in the second half of pregnancy, may act to reset the lipostat in the hypothalamus. Hypercholesterolemia is an important cause of early atherosclerosis.[7] Nevertheless, there is conflicting evidence for an association between parity and the risk of cardiovascular disease in women.[8,9] LDL-C levels peak at mid-third trimester, probably as a consequence of the hepatic effect of estradiol and progesterone.[10] It has been suggested that the increase in plasma triglycerides and LDL-C patterns during pregnancy might be used to identify women who will develop atherogenic changes later in life.[4] The change in hormonal production during the pregnancy seem to concern (estrogen, estradiol and progesterone). The amount of these hormones production during pregnancy greater than administration to human.

MATERIAL AND METHOD

Study population: A total of 1 20 health pregnant women were used for this study from the different trimesters (30 in first trimester, 30 in second trimester and 30 from third trimester) and 30 non pregnant women as control group.

Blood sample collection: 5 ml of venous blood samples were collected from pregnant and non pregnant women in plain tubes after an overnight fast from chosen from Sudan International University, Omdurman city and Khartoum city. After collection, the samples were allowed to clot for half an hour following which the samples were centrifuged and

serum was analyzed to measure the concentration of Serum total cholesterol (TC), triglycerides (TGs), HDL and, LDL-C.

Laboratory method: Serum total cholesterol (TC), triglycerides (TGs) were measured by (urite) its chemical fully automated analyzer while HDL cholesterol were measured by chemically precipitation method by (biosystem) commercially available kits, LDL cholesterol concentration was calculated using Friedewald's Formula.[11]

Statistical analysis statistical analysis was performed by using the statistical package for social science (SPSS). results was presented as mean ± SD. ANOVA test was using to compare mean of different numerical variable, to determine the lipid profile in pregnant women by different trimesters.

4. RESULTS

In this study 120 subjects were chosen for determination of serum lipid profile concentration (total cholesterol, triglyceride, HDL cholesterol, LDL). 90 of them were pregnant women with mean age 27.5± 6.5 years, 30 of them were first trimesters, 30 of them were second trimesters and 30 of them were third trimesters. The other 30were non pregnant subjects represent control group with mean age 22±3years. The subjects were chosen from Sudan International University, Omdurman city and Khartoum city. The results obtained were statistically analyzed, using T test and one sample test. The level of significance was expressed as P= <(0.05) for Significant.

Table(1) descriptive summary of the means and SD of serum total cholesterol, triglyceride, HDL and LDL cholesterol concentrations in case study and control groups.

Table (2) shows comparison of means of serum total cholesterol, triglyceride, HDL and LDL cholesterol concentrations in pregnant women verses different three trimesters.

Figure (1) shows comparison of means of serum total cholesterol concentrations between different trimesters.

Figure (2) shows comparison of means of serum Triglyceride concentrations between different trimesters.

Figure (3) shows comparison of means of serum HDL –C concentrations between different trimesters.

Figure (4) shows comparison of means of serum LDL-C concentrations between different trimesters.

Table (4.2). illustrates the Mean of total cholesterol level in The Cases and the Control.

Variable	Test group n=90	Control group n= 30	P value
T. cholesterol	172±48.5	144±19.1	0.00
Triglyceride	188.3±26.9	155.7±16.1	0.00
HDL	72.1±26.2	54.4±12.2	0.00
HDL	61.9±23.7	58.7±12.2	0.00

The mean difference is significant at the 0.05 level. The table shows the mean ± SD, range in brackets ( ) and probability (P) value

Table (4.3) illustrates the Mean of total cholesterol level between the trimesters.

Variable	First trimester	Second trimester	Third trimester	P value
cholesterol	134.8 ±34.2	152.2±14.2	229±25	0.00
Triglyceride	172.9±24	193.7±18.6	198.4±30.5	0.00
HDL	54.6±14.8	60.8±10.2	101±21.6	0.00
HDL	46.9±18.7	52.7±10.5	86.3±18.5	0.00

The mean difference is significant at the 0.05 level. The table shows the mean ± SD, range in brackets ( ) and probability (P) value.

Figure(4.3) mean of total chlestrol level between different trimesters

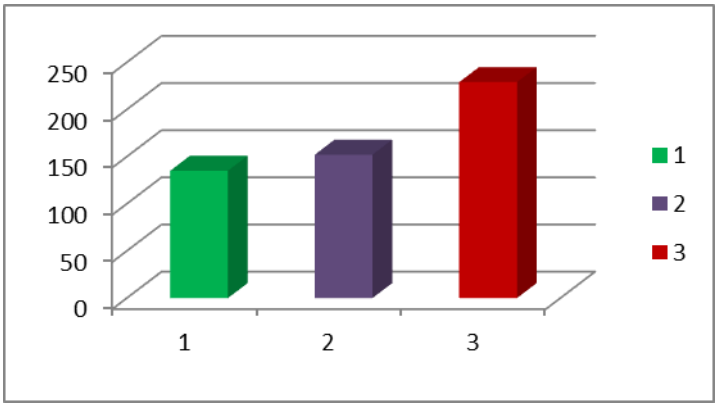


Figure (4.6) show mean of triglyceride level between different trimesters

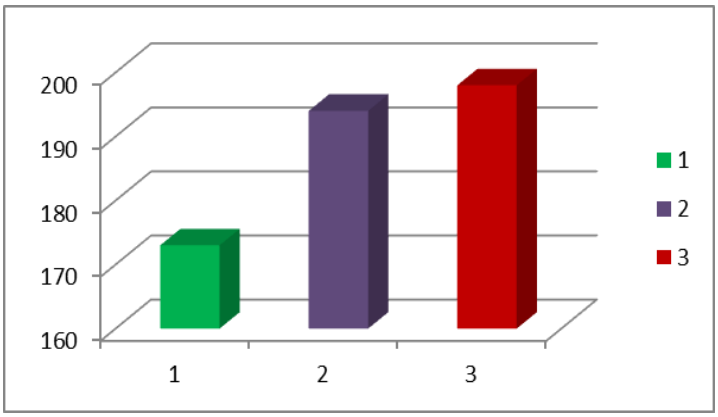


Figure (4.12)show mean of HDL level between different trimesters

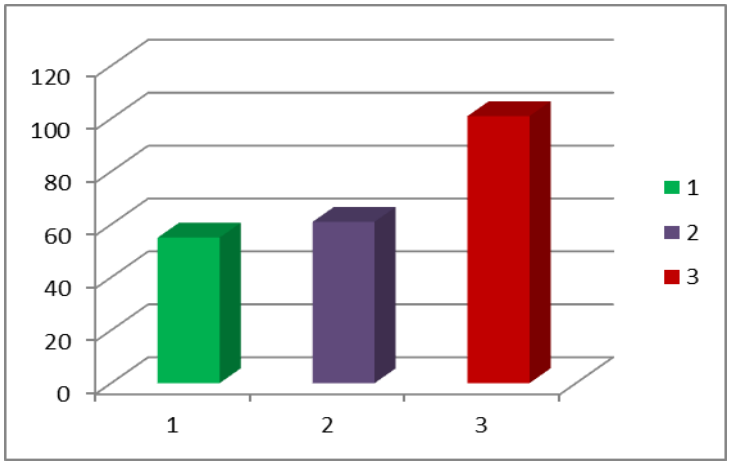
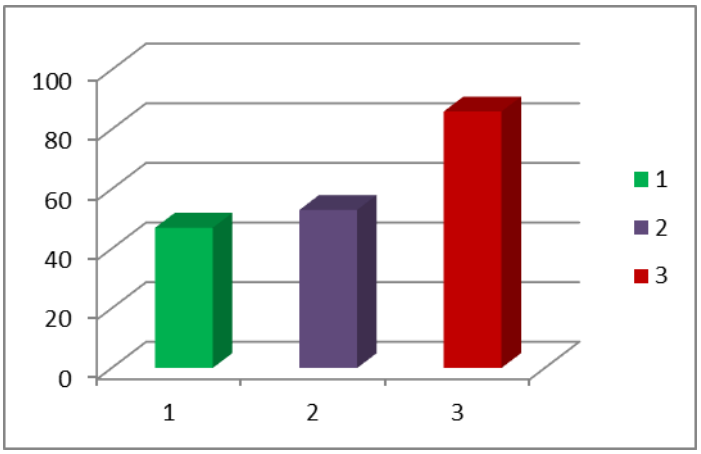


Figure (4.12) show mean of LDL level between different trimesters



(1: first trimester, 2: second trimester, 3: third trimester)

DISSCUTION

In this study, it was observed that the concentration of serum total cholesterol, serum triglyceride, high density lipoprotein cholesterol and low density lipoprotein cholesterol in normal pregnant women increased with increasing gestational age. Similar observations were reported in studies conducted by Fahraeuset et al [12], Jimenez et al. [13] and Potter and Nestel et al.[14] The principal modulator of this hypertriglyceridemia is estrogen as pregnancy is associated with hyperoestrogenaemia. Estrogen induces hepatic biosynthesis of endogenous triglycerides, which is carried by VLDL.[15] This process may be modulated by hyperinsulinism found in pregnancy.[16] Furthermore, this study showed that total cholesterol, high density lipoprotein and triglyceride levels of the test subjects in the first trimester were higher than that of the control subjects. This is in agreement with those of Klovich and Hallman,[17] in which they observed that, in the first trimester of pregnancy there is formation

of zygotein the uterine wall. This accounts for the elevated levels of cholesterol and triglyceride in the first trimester. Total cholesterol, triglyceride, HDL and LDL of the test subjects in the second trimester were observed to be higher than those of the control subjects. This is in line with the findings of Wald and Guckle.[18] Who observed that the increase in the maternal lipid profile is in response to the maternal switch from carbohydrate to fat metabolism which is an alternative pathway for energy generation due to high energy demand. Total cholesterol, triglyceride, HDL and LDL levels of the test subjects in the third trimester were higher than those of the control subjects. This is in line with results of Russeland Copper,[19] in which they reported that there is development of foetal organ in the third trimester.

CONCLUSION

Two consistent manifestations of altered maternal lipid metabolism associated with gestation are the accumulation of lipids in maternal tissues and the development of maternal hyperlipidaemia.[20] This is reflected in the results obtained from this research work. Studies in recent past have incriminated abnormal lipid metabolism during pregnancy in the pathogenesis of atherosclerosis, ischaemic heart disease, intrauterine growth disease intrauterine growth retardation and hypertension.[21] Hence estimation of lipid profile is strongly recommended as part of the laboratory investigations during pregnancy so as institute prompt management strategies to prevent deleterious effect of hyperlipidaemia associated with pregnancy.

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