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Serum triglyceride and cholesterol levels in pregnant malarial patients in Lagos Nigeria.

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ABSTRACT

Fifty pregnant women were recruited for this study out of which twenty-seven were positive to and show symptoms of malaria while twenty-three were negative and do not show symptoms of malaria. The mean concentration of triglycerides was found to be 129 ± 41.77 mg/dl and 107.78 ± *29.75* mg/dl in pregnant malarial patients (PMP) and pregnant non-malarial patients (PNMP) respectively. The mean concentration of cholesterol was found to be *157±51.15* mg/dl and 119.87 ± 32.89 mg/dl in PMP and PNMP respectively. The results show an association between levels of TAG and cholesterol and malaria in pregnancy. There was a significant difference in the mean levels of cholesterol between PMP and PNMP at $P < 0.01$. There was also a significant difference in the mean concentration of TAG and cholesterol between the first and second trimester of pregnancy in PMP while at the third trimester a significant increase in the levels of TAG and cholesterol was observed.

INTRODUCTION

Malaria has been recognized as the most important of parasitic diseases, which remains a serious health problem in many parts of the tropics (Pamiker, 1993). Malaria is a disease caused by protozoan parasites of the genus plasmodium, which infect and destroy red blood cells (Marsh, 1992). It is a serious but preventable disease, the parasite is transmitted by the anopheles mosquito and during its life cycle it passes through a number of distinct stages in his human and mosquito hosts which can be contracted by anyone irrespective of age and sex (Olliaro, *et* al, 1996). During pregnancy, pregnant women are susceptible to many infections and infectious diseases, which may prove serious, and life threatening to the mothers and many has a profound impact on the fetal out-come (Brabin, 1983). Malaria infection in pregnant women may be more severe than in non-pregnant women. Malaria may increase the risk of adverse pregnancy outcomes, including pre-maturity, abortion and stillbirth (Ollairo, *et al*, 1996,WHO, 1998). Pregnancy is associated with increased metabolic rate and as a result of the demand of the fetus for essential metabolites, there seems to be a shift from the use of certain metabolites (Onyeneke and Alumanah, 1988). Several studies have revealed that factors like diabetes mellitus, obesity, diet starvation and other diseased conditions that lead to altered carbohydrate and lipid metabolism can affect the lipid changes in pregnancy (Onyeneke and Alumanah, 1988).

Moderate increase in cholesterol level during pregnancy has been reported (Darmandy and Pastle, 1982). Intra-erythrocytic malaria parasites actively import obligate nutrients from serum and export proteins and lipids to erythrocyte and membrane (Ahmed, *et* al, 2003). Low — level *Plasmodium falciparum* infection though hypothetical has been found to induce significant changes in common lipid parameters (Faucher, *et* a!, 2002). This present investigation is of utmost interest since work on the effect of infectious diseases on serum lipid levels in Nigerian pregnant women has not been fully established. The present study was therefore undertaken to determine the combined effect of malaria and pregnancy on some serum lipids level in some Nigerian women.

Abbreviation: PMP: pregnant malarial patient, PNMP: pregnant non-malarial patient, TAG: triacyglycerol or triglyceride

MATEIALS AND METHODS

Experimental subjects

With due permission from the management of R - Jolard Hospital Gbagada Lagos, Nigeria, Pregnant women attending the ante - natal clinic were recruited for this study. After they have been briefed and their consent sought, questionnaires were distributed to them to know their age, the age of the pregnancy and possible symptoms of malaria and or other infections.

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Sample collection.

5.0 ml of venous blood was collected using syringe and needle from the pregnant women. The blood samples were grouped according to the age of the pregnancy i.e. 4 to 9 wks. (First trimester), 17 to 24 wks. (Second trimester) and 30 to 34 wks. (Third trimester). 1.0 ml of the blood was put in clean sterile bottles for parasite screening and the remaining 4.Oml was put in heparinized bottles. The blood was allowed to stand for 10 to 20 min. separating the blood into serum and blood clot The serum was collected using a Pasteur pipette and kept in the freezer before analysis.

Screening of blood samples for presence of malaria parasite.

The blood thick films were made and stained using Giemsa stain and allowed to dry. After drying immersion oil was dropped on the film and viewed at x100 objective of the light microscope.

Determination of Serum Triglyceride (TAG) and Cholesterol

Serum triglyceride was determined by means of enzymatic procedure of Weiland, 1963 (Weiland, 1963) and total cholesterol was determined by similar procedure as described by Siedel, 1981 (Siedel, 1981).

Statistical Analysis

The statistical analysis of the results was done using the students' t-test.

RESULTS AND DISCUSSION

All the fifty pregnant women recruited for this study falls within the age bracket of 22 - 34 years. Of all the fifty subjects, twenty - seven were positive to *Plasmodium falciparum* malaria and show symptoms of malaria while twenty -three were negative and show no symptoms of malaria, this corroborate the fact that pregnant women living in endemic areas are more susceptible to many infectious diseases especially malaria (Brabin, 1983).

The result shows an increase in the mean concentration of TAG and Cholesterol between the test sample and the control (Table 1). There was an initial increase in the levels of these lipids in the first trimester with a drop in the second trimester and a sharp increase in the third trimester of pregnancy (Fig.2). This result is in agreement with the result of Onyeneke and Alumanah, 1988 (Onyeneke and Alumanah, 1988). The result of their study reveals an increase in cholesterol and triglycerides level during pregnancy.

This study has also shown an upward increase in the serum lipid levels of normal pregnancy and malaria in pregnancy. A functional relationship was observed when serum lipid levels of the two groups were analyzed and compared.

The mean concentration of TAG and cholesterol were found to be 129.15± 41.79mg/dl and 107.78 ± 29.75mg/dl in pregnant malarial patients (PMP) and pregnant non- malarial patients (PNMP) respectively (Table 1). The increase in the level of these lipids in pregnant women could be as a result of altered endocrine function of several different organs (Darmandy and Pastle, 1982) while a further increase of lipid in PMP could be as a result of metabolic changes often experienced during malaria attack. The results show a rise in the levels of TAG and Cholesterol in the first trimester followed by a fall in the second trimester and a subsequent rise again at the third trimester of pregnancy (Fig.2). Cholesterol was found higher in the two groups (Fig. 1). This could also be due to the reason given above and also could be because cholesterol is not metabolically important as a metabolic fuel when compared with TAG, Hyperlipidemia is a well-known syndrome of human pregnancy but the underlying mechanism is imperfectly understood (Aratieutics, *et el,* 1982)

TABLE 1. Mean ±SD concentrations Triglycerides and Cholesterol in pregnant malarial patients (PMP) and pregnant non-malarial patients (PNMP).

	PMP (n=27)	**PNMP (n=23)**
Triglycerides mg/d1	129.15 ± 41.79	17.78 ± 29.75
Cholesterol mg/d1	157.19 ± 51.15	119.87 ± 32.89

TABLE 2. Mean ±SD concentrations Triglycerides and Cholesterol in the first, second and third trimester of pregnancy in pregnant malarial patients (PMP).

	First (n=12)	Second (n=9)	Third (n=6)
Triglycerides mg/d1	136.70 ± 26.96	17.78 ± 29.75	175.17 ± 37.59
Cholesterol mg/d1	153.30 ± 38.14	119.87 ± 32.89	221.60 ± 29.78

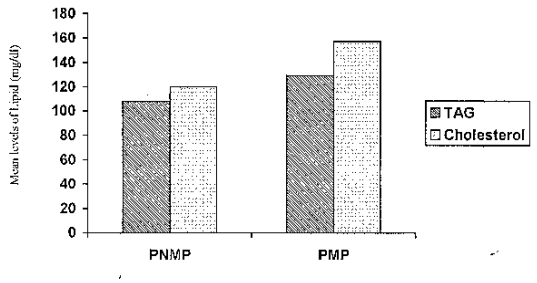

Fig. 1: The Distribution of Triglycerides and Cholesterol in PMP and PNMP

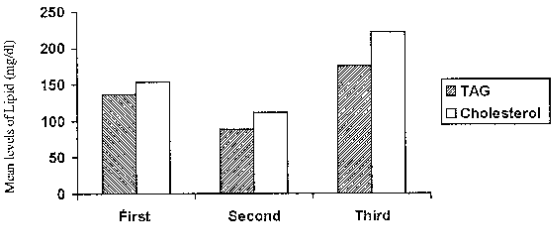

Fig. 2: The distribution of Triglycerides and Cholesterol in the first, second and third trimester of pregnancy in PMP.

Statistical Analysis of the results shows a significant difference in the mean concentrations of TAG and Cholesterol between the two groups at $p<0.01$ There was also a significant difference in the mean concentration of TAG and Cholesterol between the first and second and second and third trimester of pregnancy in the pregnant malarial patients group. The significant increase in the level of these lipids in the PMP could be as a result of the invasion of the liver by malaria parasites causing congestion, formation of pigments and enlargement of the liver hence preventing the liver from carrying out its physiological and metabolic functions effectively (Parniker, 1993).

Malaria should be recognized as a global priority in health care more so in pregnancy. With the true extent of the problem under estimated, large scale epidemics becoming more frequent and drug resistance development to current anti-malarial, malaria continues to be a major health problem for obstetricians across the tropical world (Brabin, 1983).

The result of this finding has shown significant lipid changes related to malaria in pregnancy. To be more responsive to the health care needs of pregnant women in Nigeria further studies are needed to explore the relevance of this finding at the population level in hyper-endemic malarial areas.

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