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The influence of age on lipid profile among women taking hormonal contraceptives

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ABSTRACT

Family planning clinic and women at large, in Port Harcourt, Rivers State, have adopted the administration of hormonal contraceptives to cub incessant occurrence of unplanned pregnancies among women within the reproduction age. This study was carried out to evaluate the effect of hormonal contraceptives (Medroxyprogesterone acetate or Norethisterone oenanthate) on lipid profile of premenopausal women at different age groups. Total cholesterol (TC), Triglycerides (TG), High–Density Lipoprotein Cholesterol (HDL-C) and Low Density Lipoprotein Cholesterol (LDL-C), of both women who were users and non-users of hormonal contraceptives at different age groups (16-25, 26-35, and 36-45 years of age) were estimated using enzymatic method. There were raised levels of TG, TC, HDL-C and reduced level of LDL-C among women taking hormonal contraceptives. The increase levels of TC and HDL-C in women within the age range of 26-35 years was significant ($p \leq 0.05$). The result obtained suggested that the use of hormonal contraceptives do not impose any cardiovascular risk among these women in all age groups, rather, a beneficial effect. Women within the age range of 26-35 years by this study, had effect that is more beneficial because they had significantly high levels of TC and HDL-C, and reduced Castelli risk index I and II (TC/HDL-C and LDL-C/HDL-C respectively).

Keywords: Contraceptives, age, lipids, cardiovascular.

INTRODUCTION

Unplanned pregnancies have driven women to resort to different types of contraception (which include hormonal and non-hormonal methods of contraception). Hormonal contraception has been one of the most effective reversible methods, and however the method of choice among women and family planning clinics (Lech 2003). Waine et al. (1963) noted that until 1960s attention was not drawn to the adverse metabolic effect of the contraceptive hormones. These hormonal contraceptives are estrogen and/or progesterone based compounds whose effects involve not only on the uterus or ovaries, but also on other body

tissues like skin, brain, arteries and veins (Speroff and Darney 1992, Helena et al., 2003). It has been suggested that those women receiving hormonal contraceptives develop a series of metabolic effects, which include raised serum lipid and lipoprotein concentrations (Sheu et al., 1994; Guazzelli et al., 2005). Barr et al. (1951) and Nikkila et al., 1953) demonstrated that relative or absolute decrease in the Cholesterol carried in the HDL-fraction of plasma was seen in atherosclerotic patients, and therefore stated that impaired catabolism of Chylomicron remnant, Intermediate Density Lipoprotein (IDL), and Low Density Lipoprotein-Cholesterol (LDL-C) are associated with atherosclerosis. Disruption in the catabolism of these three atheriogenic lipoproteins gives rise to increase in serum Cholesterol that can result in atherosclerosis.

The alterations in lipid metabolism that occur with the use of hormonal contraceptive have aroused considerable concern that hormonal contraceptives might increase the risk of premature atherosclerosis (Teichman 1995). Stadel (1981) also noted that hormonal contraceptives have been implicated in the increase in incidence of cardiovascular and thromboemoblic disease. According to Brezinka and Padmos (1994), the effect is dose dependent.

The two basic constituents of hormonal contraceptives, estrogen and progestin, have different effects on lipid metabolism. Estrogen tends to have favourable effect by increasing serum Triglyceride and HDL-C concentration, and reducing LDL-C concentration (LaRosa et al., 1989), while progestin, depending on dose and formulation, may have opposite effect (Ottoson 1984), except third generation progestin such as desogestrel (Lobo et al., 1996). Lobo et al. (1996) also observed that long use of combined hormonal contraceptives containing desogestrel and ethinyl estradiol increases LDL-C, and this gives a potential cardio-protective benefit.

The effect of age on lipid profiles among women taking hormonal contraceptives has not been considered, and this prompted this study. This study was set to determine the age groups of women who are more favorable to use hormonal contraceptives. Lipid profiles of this group of women, at different age groups, residing in Port Harcourt, were evaluated in this study.

MATERIALS AND METHODS

This study was carried out in Port Harcourt, the capital city of Rivers State, Nigeria. A random selection of 100 premenopausal women of different ages, grouped into three, thus: 16 to 25 years, 26 to 35 years, 36 to 45 years. These women were apparently healthy, non-pregnant, premenopausal and non-breast-feeding. Fifty of the women who were non users of contraceptives were used as control group, while the rest fifty were users of hormonal contraceptive drugs for at least 3 months before sample collection, and these women were attending Family Planning Units of two Primary Health Centers in Port Harcourt. The hormonal contraceptives used for this study were Medroxyprogesterone acetate (MPA) or Norethisterone oenanthate (NEO) and each were administered to the women appropriately.

A fasting blood sample of 5ml volume was obtained from each patient. The serum of the samples was used to estimate the concentrations of Total Cholesterol (TC), Triglyceride (TG), High Density Lipoprotein-Cholesterol (HDL-C), and Low Density Lipoprotein - Cholesterol (LDL-C), colorimetrically using enzymatic method.

Statistical analysis

The various data collated were analyzed statistically using mean, standard error, students-paired t-test, and probability tests with P-value equal to or less than 0.05 regarded statistically significant ($P \leq 0.05$).

RESULTS AND DISCUSSION

The results obtained were represented in the tables below. Table 1 showed the change in TG, TC, HDL-C and LDL-C levels of women within the age range of 16 – 25

years. It was observed that higher levels of TG, TC, HDL-C and lower level of LDL-C of the women taking hormonal contraceptive were not statistically significant ($p > 0.05$).

The levels of TG, TC, HDL-C were higher in this group of women (26-35 years) taking hormonal contraceptive than their counterpart in control group as seen in Table 1 below. LDL-C level of these women was lower than that of the control women. The changes in TC and HDL-C levels were statistically significant ($p < 0.05$) but the changes in TG and LDL-C level were not statistically significant ($p > 0.05$).

From the same Table 1, it was noticed that hormonal contraceptives did not have any significant effect on the lipid profile ($p > 0.05$) in these women within the age (36 – 45 years) though there were higher levels of TG, TC and HDL-C and lower level of LDL-C than in the control women, the effect was statistically insignificant ($p > 0.05$).

High levels of TC, TG, HDL-C, and lower levels of LDL-C were observed in every age group considered in this study. This agrees with the findings made by Moutos et al. (1994) and Benajione et al. (1997) on women taking ethinyl estradiol and Gestodene contraceptives. Adekunle et al. (2000) observed raised levels of TG, TC, HDL-C and LDL-C among Nigerian women taking normegestrol acetate – Uniplant. In the study made by Evans and Forinash, there were significantly high levels of TC, TG, HDL-C, and lower level of LDL-C in women that used medroxyprogesterone-Estradiol cypionate injections.

The change in levels in these lipid parameters was not statistically significant except in TC and HDL-C in women within the age group of 26-35 years.

The Castelli index I and 2 (TC/HDL-C and LDL-C/HDL-C ratios) in all age groups were reduced in women on hormonal contraceptives and these showed no risk of cardiovascular disease among these women. This also agrees with the findings of Aldrighi et al. (2004) and Cromie et al. (2000). There was no significant change in level of LDL-C-among the users of hormonal contraceptives.

Table 1: Comparative results of TG, TC, HDL-C AND LDL-C Level in Control and Women on Hormone Contraceptive at different age intervals.

Age interval	Number of women	TG mmol/l	TC mmol/l	HDL-C mmol/l	LDL-C mmol/l
16-25 yrs Non-users	16	0.91± 0.05	3.80±0.11	1.79±0.19	1.50±0.17
16-25 yrs Users	10	1.04± 0.06	3.83±0.15	2.32±0.21	1.07±0.16
P value		P>0.05	P>0.05	P>0.05	P>0.05
26-35 yrs Non-users	19	0.97±0.05	3.92±0.10	1.95±0.15	1.60±0.16
26-35 yrs Users	28	1.20±0.12	4.50±1.19	2.70±1.19	1.34±0.17
P value		P>0.05	P<0.05	P<0.05	P>0.05
36-45 yrs Non-users	14	0.91±0.02	4.01±0.11	1.73±0.22	1.89±0.18
36-45 yrs Users	13	1.02±0.12	4.16±0.21	2.42±0.26	1.29±0.23
P value		P>0.05	P>0.05	P>0.05	P>0.05

Total Cholesterol (TC), Triglyceride (TG), High Density Lipoprotein-Cholesterol (HDL-C), Low Density Lipoprotein-Cholesterol (LDL-C)

Table 2: The TC/HDL-C ratio of the non- users and users of hormonal contraceptives.

Age	16-25 years	26-35 years	36-45 years
Non users	2.12	2.0	2.31
Users	1.65	1.67	1.72

Table 3: The LDL-C/HDL-C ratio of the non- users and users of hormonal contraceptives.

Age	16-25 years	26-35 years	36-45 years
Non users	0.84	0.82	1.09
Users	0.46	0.50	1.72

Conclusion

The significant change in levels of Total Cholesterol and High-Density Lipoprotein- Cholesterol among women on hormonal contraceptives within the age range of 26-35 years suggests that the administration of hormonal contraceptives can offer a cardio –protective effect on women within this age range than any other age group.

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