

Influence of Oral Contraceptive Pills on plasma Lipid Profile Levels among Sudanese Females

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Abstract

Oral contraceptive pills (OCP) are used to regulate and control birth in pre-menopausal women, but their side effects on blood pressure and cardiovascular disease become premonition. This Case-control study was carried out in women attending Sudanese family planning Society in Atbara City, Sudan to measure lipid profile as a risk factor for over mentioned diseases. A total of 117 participants with age ranged between (19-45) years old were divided into two groups: 67 participants were using OCP for periods of one year or more and 50 participants whom neither use OCP nor being pregnant were selected as control group. About 5ml of venous blood drawn from each participant by standard procedure to measure lipid profile include measurement of serum cholesterol (TC) mg/dl, triglyceride (TG) mg/dl, high density lipoprotein (HDL-C) mg/dl and low density lipoprotein (LDL-C) mg/dl. The results showed that the mean serum cholesterol level was (156.16±5.52) mg/dl, the mean serum triglyceride level was (126.89±12.84) mg/dl, the mean serum LDL-C was (88.75±2.95) mg/dl and the mean serum HDL-C level was (48.06±4.54) mg/dl. In conclusion, there was no effect of using OCP on the level of lipid profile, except for HDL-C which has a significant decrease in its level compared to control group.

Keywords: Contraceptive pills, Lipid Profile, Sudan.

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1. Introduction

Hormonal Oral Contraceptive Pills (OCP) has been one of the most effective and widely used forms of birth control [1]. They revolutionized birth control in the 20th century by giving women ultimate control over their fertility [2]. Oral contraception has been on the market for 40 years now and has been used by more than 200 million women around the world [3]. They usually contains two hormones, estrogen and progesterone, which act like the hormones found naturally in human body called as combined oral contraceptive (COC) [3]. The side effects most frequently associated with the use of (OCP) include headache, gastrointestinal complains and breast pain [4,5].

OCP appear to influence the concentrations of serum lipids and lipoproteins and may share as risk factor in developing cardiovascular disease [6]. Estrogen affects the cardiovascular system through its impact on cardiovascular

risk factors such as the lipid profile. OCP alter the lipid profile by estrogen receptor which alter the affect of hepatic apolipoprotein upregulation[7].

The present study was conducted to determine the possible changes in the concentrations of serum lipids and lipoproteins during one contraceptive cycle in women using oral contraceptives and also during one menstrual cycle in women not using them.

2. Material and Method

This Case-control study was carried out in women attending Sudanese family planning Society-Atbara, Sudan to determine lipid profile, notably measurement of TC, TG, HDL-C and LDL-C as a risk factor of cardiovascular diseases. Approval from Ministry of Health was obtained. Sixty seven women with age range between (19-45) years old using OCP for periods of one years or more was

enrolled in the study as a study group, and fifty women who neither use OCP nor being pregnant in the same range of target cases was selected as a control group. About 5ml of venous blood drawn from each participant by standard procedure and within one hour of collection, blood samples were centrifuged at room temperature and plasma was obtained, then lipid profile measured by using Spectrophotometer (Biosystem BTS-310).

2.1 Experimental protocols:

TC and TG levels were evaluated by using the semi-automatic colorimetric enzymatic method. HDL-C fractions were separated by precipitating the VLDL-C and LDL-C in the sample precipitate with phosphotungstate and magnesium ions. The supernatant contains HDL-C. The HDL-C is then spectrophotometrically measured by means of the coupled reactions. While LDL-C in the sample precipitate with polyvinyl sulphate; their concentration was calculated from the difference between the serum total cholesterol and the cholesterol in the supernatant after centrifugation.

2.2 Statistical analysis:

Statistical analysis was carried-out using statistical package for social sciences (SPSS version 20, Chicago, IL, USA). All the numerical data were expressed as mean ± Standard Error of Mean. Differences in means of continuous variables between the study groups were compared using Chi-square test to check for statistical significance of association between two categorical variables (cross-tabulation) and t-squire test to measure the strength of the association between two numerical variables. P-values were considered significant at 0.05 or lower (p≤0.05).

3. Results

This study was carried out in Atbara, River Nile State. Data presented in this study were obtained from questionnaire and Laboratory diagnosis of biochemical parameters TC, TG, HDL-C and LDL-C in serum of two groups of participants(users and control).

Table 1 showed the distribution of the age of the users group. It was ranged from 19-45 years old. 12(17.9%) were from 19-29 years, 34 (50.7%) were from 30-38 and 21 (31.3%) were from 30-45 years.

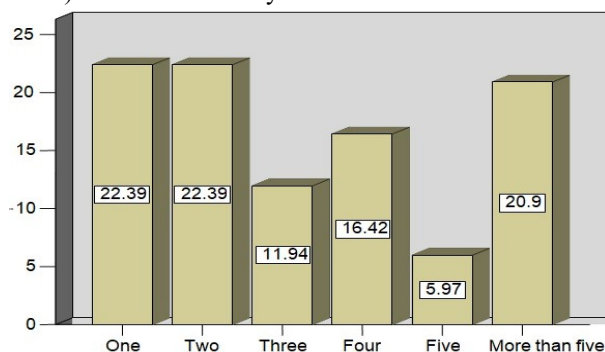


Figure 1: distribution of study group according to the period of using OCP in years

Table 1 showed the mean of lipid profile levels in users and control groups. Mean level of serum TC of OCP users was 156.16mg/dl, compare to control group which have mean TC level 143.62mg/dl. Mean level of TG of OCP in users was126.89mg/dl compared to control group which have TG mean level 124.82mg/dl. Mean level of HDL-C of OCP users was 48.05mg/dl, compare to control group which have HDL-C mean level 55.28mg/dl. Level of serum LDL-C of OCP users was 88.98mg/dl, compared to control group which have LDL-C level 62.75mg/dl.

Table 1: Mean Of Lipid Profile Levels in users and Control Groups

Group	Number	Mean			
		TC	LDL-C	HDL-C	TG
Users group	67	156.16	88.98	48.05	126.89
Control group	50	143.62	62.75	55.28	124.82

TC: Total Cholesterol (mg/dl), LDL-C: Low Density Lipoprotein (mg/dl); HDL-C: high density lipoprotein (mg/dl); TG: Triglyceride (mg/dl)

Table 2 showed that 32 (47.8%) of users group have low level of HDL-C, 11(16.4%) have high level of HDL-C and 24(35.8%) have a normal level of HDL-C. There was 43 (64.2%) of participants have a significant change in HDL-C level (P value<0.05).

Table 2: The t-tests for lipid profile parameters in users group compared to control group

Parameter	Paired Differences					
	Mean	SD	SEM	t	df	Sig. (2-tailed)
TC	12.82	49.76	7.04	1.82	49	0.08
TG	6.66	118.77	16.80	0.40	49	0.69
HDL-C	24.27	45.69	6.46	3.76	49	0.000
LDL-C	7.42	30.50	4.31	1.72	49	0.09

TC: Total Cholesterol (mg/dl); LDL-C: Low Density Lipoprotein (mg/dl); HDL-C: high density lipoprotein (mg/dl); TG: Triglyceride (mg/dl); SD: Standard Deviation; SEM: Mean Standard Error; df: Degree of freedom

4. Discussion

Many studies discuss the risk of OCP regarding the development of cardiovascular diseases although formulation of contraceptive was greatly changed and the dose was reduced from 150µg to 20µg. However, there is still much debate about this subject. It was reported that OCP have a measurable effect on lipid profile in 1981[8]. This study was designed to investigate the effect of using OCP on lipid profile levels.

In this study, the effect of OCP on cholesterol level was not significant, and the mean of cholesterol does not exceed the normal levels, this finding was in disagreement with the study conducted in Iraqi women which found that cholesterol have a positive correlation with the uses of OCP[9]. Other study found that cholesterol level was higher in women who used OCP compared to control group [10]. As in cholesterol, triglycerides level was also not significantly affected by using of OCP, this finding

was in disagreement with a study which have showed that the mean level of fasting triglyceride was higher among OCP users than nonusers [10], and also associated with haemostatic abnormalities such as increased activation of the pro-coagulation factor VII [11, 12], which lead to increased risk for venous thromboembolism in the users of COC [11, 13]. Moreover, this study found a significant decreased in the HDL levels among OCP users compared to control group, which agree with the study of Shacker [9] who found that there was a highly significant reduction in HDL-C in the study group when compared with the control group [9]. Our findings were in contrast with the results of early studies which had reported an increased risk of fatal and nonfatal myocardial infarction among OCP users, particularly those in premenopausal age groups [13]. Fortunately, the risk of developing cardiovascular disease is increase during using of OCP in the present of other factors such as smoking, hypertension and diabetes mellitus [14]. In current study there is non-significant effect of OCP on LDL-C level, this was in agreement with the experts which hypothesize that estrogen exerts cardio-protective effects in several ways other than by it is favorable impact on lipids [15]. Furthermore, some studies clearly showed that atherosclerosis was decreased not increased, while using the pill. On other hand, the experimental animal showed that OCP offered protection against development of atherosclerotic plaque [16-18].

Regarding the age of study group, there was no significant difference on the lipid profile level between different age groups. Our study was in agreement with studies showed that there was distorted perception of OCP safety, especially among women aged 35 years and older. Consequently, the proportion of premenopausal women using OCP today is small as compared with younger age groups, for example, among women aged 20 to 24 years, about 54% use the pills. In contrast, OC use declines at age of 35 years; the percentage of women who use OCs is about 10%. For women aged 40 to 44 years, the percentage using the pills was only 6% [19, 20].

Furthermore, in this study all women use the combined OCP, and there is no effect of type of OCP on lipid profile, this in agreement with the study compared the types of pills, in different doses 20 µg and 35 µg preparation in 463 OC-treated women. Women taking the 20 µg OCs were reported significantly fewer side effects than women using the 35 µg OC [21].

Eventually, this study showed that no significant correlation between period of using OCP and effect in the lipid profile levels. This in agreement with other study which found that the risk is highest during the first year of use is not related to estrogen component of currently available pill formulation [22] and the risk of myocardial infarction, ischemic stroke and hemorrhagic stroke does not become higher with increasing duration of OCP use or

because of past use and may increase due to other causes like obesity [23].

In conclusion, this study there was no effect of using OCP on the level of lipid profile, except for HDL-C which has a significant decrease in its level compared to control group.

From this study its recommended to conduct a longitudinal study involves several parameters, since little data are available on the relationship between Sudanese cohorts and OCP use.

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