

Effect of low-dose oral contraceptives on Lipid profile levels in Sudanese women using oral contraceptive pills

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ABSTRACT

Background: Oral contraceptives provide highly reliable contraceptive protection even though imperfect use is considered, and are widely used worldwide.

Objective: This study aimed to assess the effect of low dose combined oral contraceptive pills use on lipid profile levels in Sudanese women, and to find its correlation with age, BMI and duration of using oral contraceptive.

Material and Methods: A clinically-based descriptive study was conducted during the period from May to October 2013. Sixty six women using low dose combined oral contraceptive were selected as a test group compared to sixty six apparently healthy non users as a control, attending the family planning center of Omdurman Maternity Hospital in Khartoum state, Sudan. Blood specimens were collected from both groups and serum levels of Total Cholesterol, Triglyceride and High Density Lipoprotein (HDL) were estimated and Low Density Lipoprotein (LDL) was calculated using Friedewald equation.

Results : Results showed a significant increase in the mean serum levels of Total Cholesterol, Triglyceride and HDL in the test group compared with the control group ($p < 0.05$) and insignificant increase in the mean serum levels of LDL in the test group ($P = 0.327$). HDL levels decreased with age (P value 0.000) while Cholesterol, Triglyceride and LDL levels were not affected. The study also showed significant increase in Cholesterol, Triglyceride and decrease in HDL with duration of oral contraceptive use ($P < 0.05$). The BMI was significantly higher in users than non-users ($P 0.025$).

Conclusion: Combined oral contraceptive pills adversely affect the lipid profile. This may be due to drug responsiveness, as well as increased BMI. There is a correlation between duration of oral contraceptive use and lipid profile among the studied cases.

Key words: Contraceptive pill, Low Doses, Serum lipids, Sudanese Women.

Contraception is the prevention of conception by contraception device, drug or chemical agents. It is widely used to provide better quality of life by helping families to manage their resources¹. In the developed countries, where the rate of contraceptive use rate is very high, 1700 of the 358,000 maternal deaths is attributed to contraceptive use². The combination of

different concentrations of estrogen and progestin are known as combined oral contraceptives (COCs). In the present study the composition of the oral contraceptive taken by the women was: Ethinyl Estradiol (EE) (0.03mg) and Levonorgestrel (0.15mg). In Women, several risk factors are associated with development of cardiovascular disease, such as family history, obesity, smoking, unfavorable lipid profiles, high levels of homocystein and fibrinogen, physical inactivity, use of oral contraceptives (OC), diabetes mellitus, hypertension and genetic factors³. Many studies have reported a lower incidence of atherosclerosis and cardiovascular diseases in premenopausal women compared to age

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matched mendue to the cardio protective action of estrogen^{4, 5}.In the last five decades studies demonstrated that the levels of HDL cholesterol are inversely related to the clinical events that predispose atherosclerosis and cardiovascular diseases, whereas the levels of LDL cholesterol are directly related to these events^{6, 7}.Estrogenas steroids able to promoting the protective actions, mainly it decreases the hepatic lipase, which degrades HDL so it result in increases HDL and decreases the production of LDL (Although the protective effect which done by the estrogen, progesterone may play an adverse role which influence the metabolism of the lipids⁹Progestogens,increase the activity of hepatic lipases by altering on the effect of estrogen on lipids profile, result in promoting a reversion in the increase of HDL¹⁰. So this study aimed to evaluate the possible effects of Oral contraceptives among users.

MATERIALS and METHODS:

A clinically-based cross-sectional descriptive

Table (1): Comparison of mean Total Cholesterol, Triglycerides, HDL and LDL between study group and control group.

Variables	Study group (mean ± SD)	Control group (mean ± SD)	P value
Cholesterol	143 ± 21	135 ± 19	0.026
Triglyceride	112 ± 17	95 ± 22	0.000
High density lipoprotein	40 ± 4	38 ± 5	0.038
Low density lipoprotein	81 ± 20	77 ± 17	0.327

Table (2): Effect of age on lipid profile in oral contraceptive pills users.

Variables	Group 1 (25-34)y	Group 2 (35-45) y	P value
Cholesterol	144 ± 19	143 ± 25	0.961
Triglyceride	111 ± 14	113 ± 21	0.786
High density lipoprotein	42 ± 4	37 ± 4	0.000
Low density lipoprotein	79 ± 19	83 ± 22	0.464

Table 3: Body mass index (BMI) of the study population.

BMI	Study group (mean ± SD)	Control group(mean ± SD)	Pvalue
Normal	22±1.7 n= 40	21±1.7 n= 54	0.286
Over weight	26±1.3 n= 54	27±1.3 n= 12	0.116
Total	23.9± 2.7 n= 66	22.9±2.7 n= 66	0.025

People with BMI=18.5—24.9 were considered to have normal weight, people with BMI=25.0—29.9 were classified overweight.

study was conducted during the period from May to October 2013.In the present study the composition of the oral contraceptive taken by the women was: Ethinyl Estradiol (EE) (0.03mg) and Levonorgestrel (0.15mg). Sixty six women attending the Family Planning Center of Omdurman Maternity Hospital in Khartoum state, Sudan and using low dose combined oral contraceptive were selected as a test group attending the Family Planning Center of Omdurman Maternity Hospital in Khartoum state, Sudan. The test group was compared with a control group which included 66 apparently healthy women (non-users). Blood specimens were collected from both groups and serum levels of Total Cholesterol, Triglyceride and HDL were estimated and LDL was calculated using Friedewald equation (LDL =cholesterol – (TG ÷5+ HDL).Ages of the test group were matched with the control group. The BMI was calculated as weight (kg) divided by squared height (m²). Serum Cholesterol, Triglyceride and HDL were measured by enzymatic

methods using semi-automated analyze Mindary BA-88 A.

Statistical Package for Social Science (SPSS version 19) computer software was used for data analysis. Means \pm SD were calculated. Independent T-test and Persons' correlation were used (significance level was set at $P > 0.05$).

RESULTS:

In this study the test group was composed of 66 contraceptive user women while the control group was composed of 66 non user women.

There is significant difference between the mean of Cholesterol, Triglyceride and High density lipoprotein in test group compared to

control group. The Low density lipoprotein was also insignificantly higher in users than non- users as shown in Table (1). The oral contraceptive users were sub divided into two groups according to age; group 1 (25-34) years old and group 2(35-45). HDL level was significantly higher in oral contraceptive users group 1 compared with group 2, while mean concentrations of Cholesterol, Triglyceride and LDL were not significantly altered (Table 2).Table (3)shows significant elevation in body mass index in users than non-users. There is statically significant relationship between the duration of contraceptive use and the concentration of Cholesterol, TG and the HDL, but not LDL (figures (1-4)).

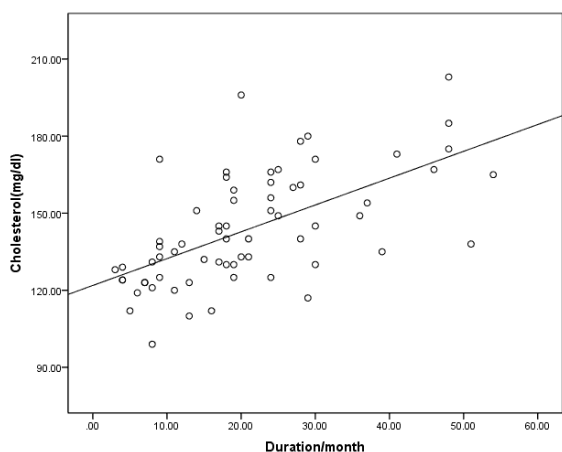


Figure (1): The correlation between duration of oral contraceptive use and the concentration of Total Cholesterol ($r=0.607$, $p<0.000$).

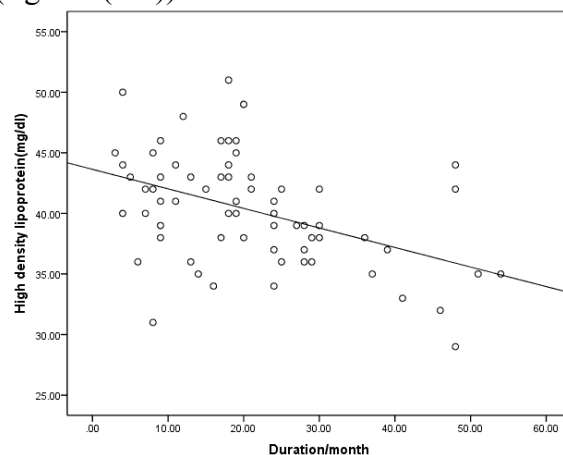


Figure (3): The correlation between duration of oral contraceptive use and the concentration of High Density Lipoprotein ($r= 0.450$, $p<0.000$).

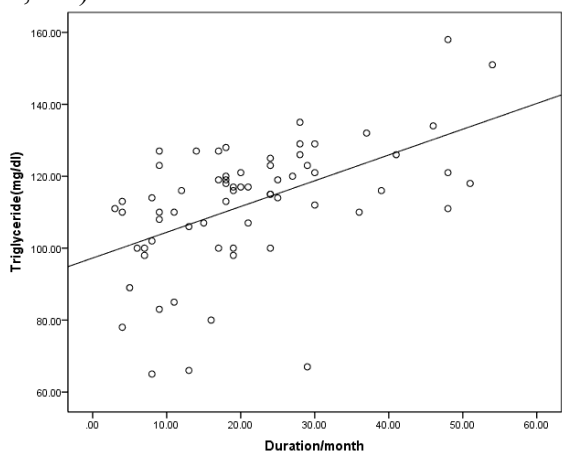


Figure (2): The correlation between duration of oral contraceptive use and the concentration of Triglyceride ($r=0.518$, $p<0.000$).

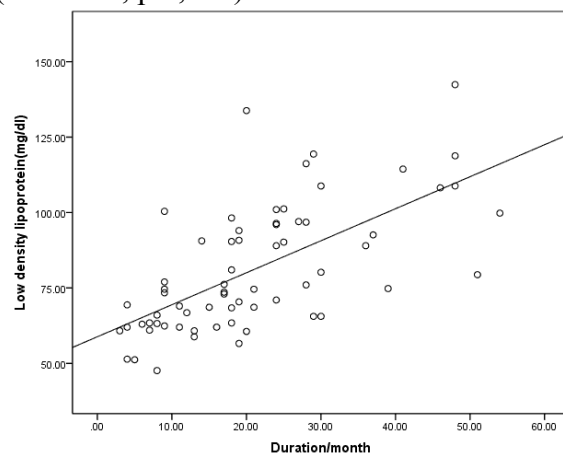


Figure (4): The correlation between duration of oral contraceptive use and the concentration of serum Low density lipoprotein ($r = 0.100$, $p= 0.424$).

DISCUSSION:

The major health risks of oral contraceptives are cardiovascular diseases particularly coronary artery disease, stroke and venous thrombo embolism^{11,12}. The present study aimed to assess the lipid profile levels in Sudanese women using low dose combined oral contraceptive pills.

In this study low dose combined oral contraceptives users show a significant increase in Cholesterol, Triglycerides and HDL in user as compared to control (P 0.05). This is mainly due to the effect of estrogen as it increases liver lipogenesis which results in elevated levels of Triglycerides (TG) and HDL. It has been suggested that the TG changes are due to the induction by estrogens of a hepatic microsomal enzyme that limits the rate of TG synthesis. This study agrees with a study done by F Nazet.al¹³, who revealed that oral estrogens and progestins in hormonal contraceptives have been shown to increase Cholesterol and TG, HDL and LDL. Furthermore, HDL levels decreased with age (p 0.000). This agrees with a study done by Aldrighi JM et al¹⁴.

Also the study found that there was a significant increase in Cholesterol and TG and significantly decreased HDL with duration of contraceptive use. The present study supports the earlier studies¹⁵. Our study showed significant difference among both study groups with respect to BMI. These findings were very consistent with the findings that oral contraceptive intake increases appetite and abnormal high concentrations of serum lipids among women¹⁶. Weight gain might be also related to a reduction in physical activity. Progesterone, however, in the oral contraceptive causes an increase in an appetite and fat deposits¹⁷. Nevertheless, obese women should look for other methods of contraception.

CONCLUSION:

This study concluded that in Sudanese women using low dose oral contraceptive pills, the levels of Cholesterol and Triglycerides were significantly increased in users as compared to non-users with

significant correlation with duration of use but not affected by age. In addition, it showed significant increase in High density lipoprotein in users compared to non-users with negative correlation with duration of oral contraceptive use and decrease in High density lipoprotein levels with age. Low Density Lipoprotein levels did not differ between the two groups and was not affected by age and duration of contraceptive use. Moreover, the results showed that the BMI was significantly higher in users than non-users.

The authors recommended that lipid profile should be estimated before and during the course of combined oral contraceptives. Awareness sessions on health eating pattern for mothers who are going on oral contraceptive should be implemented in schools, audio-vision systems and local organizations. Monitoring of BMI as well as biochemical examinations has to be carried out monthly for oral contraceptive taking women.

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