



ORIGINAL ARTICLE

Relationship between Long Duration Use of Hormonal Contraceptive and Serum Lipid Profiles among the Women of Dhaka City

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Abstract

Background: Long duration use of hormonal contraceptives can cause different metabolic effects. **Objective:** The purpose for the present study was to see the relationship between long duration of use of hormonal contraceptives and serum lipid profiles. **Methodology:** This cross-sectional study was carried out in the Department of Obstetrics & Gynaecology in collaboration with the Biochemistry Department at Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh from July 2004 to December 2005 for eighteen (18) months. Women of reproductive age group who had given the history of taking low-dose oral contraceptive pills (OCP) containing 30 meg ethinyloestradiol (EE) plus 150 meg levonorgestrel (LNG) were included as study population. The women were divided into group A which was consisted of women who were using OCP for up to 5 years and group B who were using OCP for more than 5 years. Blood was collected from each woman in fasting state and serum was sent for estimation of serum lipids profiles like serum triglycerides, total cholesterol, LDL and HDL. **Result:** The women in group A was consisted of 20 women and the rest 20 women were in group B. Comparison of mean age between control and case groups showed no significant difference (31.75 ± 4.85 vs 30.43 ± 5.44 years). In women using OCP ≤ 5 years and >5 years, the mean (\pm SD) cholesterol levels were 252.50 ± 48.86 and 239.55 ± 48.73 mg/dl ($p > 0.10$), triglyceride levels were 204.30 ± 48.10 and 191.45 ± 67.89 mg/dL ($p > 0.10$), HDL levels were 42.82 ± 8.96 and 43.00 ± 6.46 ($p > 0.10$) and LDL levels were 168.83 ± 50.82 and 158.26 ± 50.32 ($p > 0.10$) respectively. **Conclusion:** The level of total cholesterol and triglycerides are not significantly varied with long duration (more than 5 years) of oral contraceptive pills use. [Journal of Current and Advance Medical Research 2019;6(1):10-13]

Keywords: Contraceptives; cholesterol; LDL; HDL; triglycerides; OCP; long time use

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Introduction

Women who use oral contraception have higher level of plasma triglycerides and the majority of which are caused by very low-density lipoprotein¹. The estrogen component of oral contraceptives is believed to be responsible for the effect and appears to raise the triglyceride levels in a dose dependent manner. These increases in triglycerides may be of concern. Since some conditions characterized by elevated triglycerides are associated with atherosclerosis². Estrogen exerts protective effects on lipid metabolism by enhancing removal of low-density lipoprotein cholesterol (LDL-C) and increasing levels of high-density lipoprotein cholesterol (HDL-C)³. Estrogen also increases triglyceride levels⁴.

Nevertheless, the net effect of estrogen is favourable, and it does not appear to be atherogenic⁵. Synthetic progestin has been found to decrease HDL and increase LDL. However, it may be prudent to select an OCP with a progestin that has a neutral or beneficial effect on lipid changes like norgestimate desogestrel for women with known dyslipidemias. The newer and less androgenic progestin norgestimate and desogestrel have either a neutral or beneficial effect on lipid profiles⁶. A large number of Bangladeshi women of various socio-economic statuses using low dose OCP. There are different types of combined low dose OCP used by the Bangladeshi women.

All these OCPs contain 30 micrograms (meg) of ethinyl estradiol (EE), but their progesterone component varies. Shukhi is mostly used by the women of low socio-economic status, because the family planning program of the Government of Bangladesh made it available to them free of cost and contains 30 meg ethinylloestradiol (EE) and 150 meg levonorgestrel (LNG)⁷. The increase in cholesterol, triglycerides and LDL increases the risk of coronary heart disease. It is not clear that the long duration use of hormonal contraceptive can cause more chance of serum lipid abnormalities. Therefore, this study was undertaken to see the relationship between long duration use of hormonal contraceptives and serum lipid profiles.

Methodology

This was a cross-sectional study which was carried out in the Department of Obstetrics & Gynaecology in collaboration with the Biochemistry Department at Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh. The study period was from July 2004 to December 2005 for the duration of eighteen (18) months. Study subjects

were collected from the family planning department of BSMMU and DMCH (Dhaka Medical College Hospital) during the study period. This study included women who were using low dose OCP containing 30 meg EE plus 150 levonorgestrel (LNG) for more than one year. Purposive sampling technique was applied for this study. The researcher herself interviewed the respondents according to their convenience. Women of reproductive age (20-40 years) presented with normotensive, non-diabetic, nonsmoker and nonalcoholic were included as study population. Women with systemic disease like liver disease, kidney disease which secondarily affect lipid metabolism, history of using beta-blockers, thiazide diuretics, glucocorticoids and women using other than above oral or hormonal contraceptives were excluded from this study. Before starting the research work, permission was taken from the hospital authorities. After selection of study subjects, detailed history was taken and a careful physical examination was performed. Subjects were requested to fast overnight (10-12 hours) and to report at around 9 a.m. in the Department of Biochemistry, BSMMU, for laboratory tests. Blood was collected from each subject with disposable syringe by antecubital venipuncture with full aseptic precautions. Then blood was transferred into a plain test tube for estimation of serum lipids. The serum was separated as quickly as possible from the sample by centrifugation for 10 minutes at 3000 rpm. The clear serum obtained after centrifugation was preserved in a screw-capped test tube. To avoid diurnal variation, samples were collected always between 8 to 9 AM. All relevant information was recorded in a predesigned data collection sheet. Collected data were compiled and appropriate statistical analyses either Unpaired Student's t test or Chi-square test were done using computer based software, Statistical Package for Social Science (SPSS 16.0). A p value <0.05 was taken as minimum level of significance.

Results

The present study was carried out in the Department of Obstetrics and Gynaecology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, during the period from July 2004 to December 2005 (18 months), to evaluate the lipidaemic status of Bangladeshi women using low-dose oral contraceptive pills (OCP). The study population was divided into two subgroups designated as group A which was consisted of 20 women who were using OCP for up to 5 years and the rest 20 women designated as group B who were using OCP for more than 5 years. Comparison of

age between control and case groups showed no significant difference (Mean±SD 31.75±4.85 vs 30.43±5.44 years, respectively) (Table 1).

Table 1: Comparison of Age, Weight and Parity of the Study Subject

Parameters	Case	Control	p value
Age (years) Mean±SD (Range)	31.75±4.85 22 to 40	30.43±5.44 20 to 40	>0.10 ^{ns}

Unpaired student's 't' test; ns = Not significant

Comparison of lipid levels, i.e. cholesterol, triglycerides and LDL showed statistically significant differences between groups (raised in case group), but no significant difference in case of HDL. In control and case groups (respectively), mean±SD cholesterol levels were 156.50±2.26 and 246.03±48.10 mg/dL, triglycerides 143.13±45.62 and 197.88±58.44 mg/dL, HDL 39.59±8.23 and 42.91±7.71 mg/dL and LDL 88.29±30.56 and 163.54±50.20 mg/dL (Table 2).

Table 2: Comparison of Lipid Profiles between the Study Groups (mg/dL)

Parameters	Control	Case	p value
Cholesterol	156.50±2.26	246.03±48.10	0.001
Triglycerides	143.13±45.62	197.88±58.44	0.001
HDL	39.59±8.23	42.91±7.71	0.05 ^{ns}
LDL	88.29±30.56	163.54±50.20	0.001

Unpaired Student's 't' test; ns = Not significant

Effect of duration of OCP use (≤5 years and >5 years) did not show any statistically significant difference on lipid levels, such as cholesterol, triglycerides, HDL and LDL. Mean (±SD) cholesterol levels were 252.50±48.86 and 239.55±48.73 mg/dl, triglyceride levels were 204.30±48.10 and 191.45±67.89 mg/dl, HDL levels were 42.82±8.96 and 43.00±6.46, and LDL levels were 168.83±50.82 and 158.26±50.32, respectively in women using OCP ≤5 years and >5 years, respectively (Table 3).

Table 3: Effect of Duration on of OCP use on Lipid Levels in Cases (mg/dL)

Lipid Profiles	Duration of OCP use (years)		p value
	Group A ≤5 (n=20)	Group B >5 (n=20)	
Cholesterol	252.50±48.86	239.55±48.73	0.10 ^{ns}
Triglycerides	204.30±48.10	191.45±67.89	0.10 ^{ns}
HDL	42.82±8.96	43.00±6.46	0.50 ^{ns}
LDL	168.83±50.82	158.26±50.32	0.50 ^{ns}

Unpaired student's 't' test; ns = Not significant

Discussion

Women who use OCP have higher levels of plasma

triglycerides⁸. This increase in triglycerides may be of concern since some of these conditions are associated with atherosclerosis. Since millions of women currently use OCP, it is important to find out the exact changes in lipid profile⁹.

This study was conducted on Bangladeshi women who used OCP for more than 1 year which was ranged from 1 to 14 years. The main aim of this study was to see the relationship between long duration use of hormonal contraceptives and serum lipid profiles. Serum triglyceride level was significantly higher (p<0.001) in cases in comparison to control. In another work conducted by Song et al⁹ it is found that triglycerides are increased by the desogestrel OCPs but not by levonorgestrel OCPs.

There was no statistically significant increase observed in cases compared to control of HDL level. In a study conducted by Song et al⁹ it was found that HDL-c decreased significantly with Microgynen containing 30 meg of EE + 150 meg of LNG.

Effect of duration of OCP use did not show any statistically significant difference on lipid levels such as cholesterol, HDL, LDL and triglyceride levels. This result is similar to the study conducted by Deslypere et al¹ where serum levels are determined after long term use (5-12 years) of hormonal contraceptives. The effects of long term use of hormonal contraception on lipids do not differ from those predicted for short term studies.

The relevant studies conducted in this country and abroad were thoroughly analyzed to draw a conclusion in this study regarding the effect of OCPs on serum lipid profiles. Another similar study was conducted on Bangladeshi women taking low-dose OCPs for 6 months to 5 years evaluating their serum lipid profiles and comparing between low and high BMI groups. The study has found no significant change in serum total cholesterol, HDL cholesterol and LDL cholesterol between the groups⁷.

In a study conducted by Walsh and Sacks² it is found that women who use low-dose OCP which contains 0.035 meg ethinyl estradiol have significantly higher levels of VLDL triglyceride, Apo B and cholesterol. It is observed that OCP use have the greatest effect on large triglyceride-rich VLDL increasing its plasma concentration three fold and production rate five fold.

A striking inverse relationship is observed between high-density lipoprotein and progestogen dose. Pills

with 250 meg levonorgestrel are significantly associated with a high rate of total disease than those with 150 meg levonorgestrel. There is a statistical relationship of cerebrovascular disease with the dose of norethidrone. In a study conducted by Schaefer et al³ it is found that the increase in VLDL production induced by OCP is most likely due to its estrogenic component and has found that a high-dose of ethinyl estradiol 0.100 mg elevates the VLDL- apo B level of three premenopausal women by doubling the rate of VLDL- apo B production from 8.6 to 16.0 mg/kg per dL.

In a large scale prospective study⁸ the effect of different types of progestogens norethidrone acetate of NEA and levonorgestrel are noted. Over the past generation, it has become clear that progestogen affects lipoprotein metabolism and arterial wall biology in many potentially beneficial ways¹⁰. But concomitant progestin therapy may inhibit rate of metabolism by acting as antiestrogen. Both the type and dose of progestin is important⁴.

Conclusions

In conclusion duration of OCP use for less than 5 years and more than 5 years did not show any significant variation on the serum lipids values. However, use of low dose OCP significantly increases serum cholesterol, serum triglyceride and LDL cholesterol levels. OCP users should be monitored their blood sugar level.

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