



## Measurement of lipids levels and lipase enzyme in women who take birth control pills in Samarra city – Iraq



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### Abstract

The current study aimed to explicate the effect of preventative pill effect on the lipids levels and lipase activity. The study design included two groups each consists of thirty women; preventative pill group (women who were taking contraceptive pills) and control group (women who were not taking contraceptive pills), their ages ran between (20-40) year. Blood samples were collected for the period from 1/11/2019 to 3/1/2020. Results of this study showed that there was a significant increase in the levels of total cholesterol (TC), Triglycerides (TG), low-density lipoproteins-cholesterol (LDL-C) and very low-density lipoproteins-cholesterol (VLDL-C) in contraceptive pills group compared to control group, while there was a significant decrease in Lipase activity and high-density lipoprotein-cholesterol (HDL-C) level in contraceptive pills group compared with control group.

**Keywords:** Contraceptive Pill, lipids, cholesterol, TG, HDL-C, lipase

### 1. Introduction

Oral Contraceptive Pill contains hormonal compounds that a woman takes it to prevent contraceptive methods, and these pills are divided into two parts, a single section consisting of the hormone progesterone only, and other division a complex made up of the hormones progesterone and estrogen [1,2].

The first type of pill is Enovid 10 that contains 9.85 mg of the progestogen norethindryl and 150 micrograms of estrogen mestranol. Today's pills contain significantly lower hormonal doses of 0.1 to 3.0 mg of modern progestogen and 20 to 50 micrograms of estrogen [3,4].

The contraceptive pill act with different mechanisms to prevent pregnancy, including: preventing the processes of ovulation, so the ovaries will not release an egg every month, or the pills will thicken cervical mucus, and this mucus is liquid around the cervix and prevents sperm from reaching the uterus, as well as changes in the endometrium

may reduce the chances of an ovum implantation [5,6].

Lipase is the enzyme that catalyzes the hydrolysis of lipids and is the main enzyme that breaks down dietary fats in the human digestive system [7]. The lipase plays essential roles in the digestive process, which is the transport and processing of dietary fats (such as triglycerides, fats, and oils) in most, if not all, organisms [8].

The lipase is one of the digestive enzymes responsible for digesting fats, which facilitates the process of breaking down fats and facilitating their digestion by regulating chemical reactions in the body and reducing energy consumption, it is also responsible for the transmission of cholesterol in the body, which is an enzyme found in plants, animals and bacteria, the lipase is used as a medicine to treat many digestive disorders such as Crohn's disease [9,10].

The aim of the study was to verify the influence of contraceptive pill on the lipids levels and lipase activity in the blood of healthy young women.

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## 2. Materials and Methods

### 2.1. Sample collection

Thirty blood samples were collected from women who were taking the contraceptive pill for a period from one year to above, and their ages ranged between (20-40) year, and 30 blood samples were collected for women who were not taking the contraceptive pill and in the same age group. Blood samples were collected from outpatient clinical centres, from 1/11/2019 to 3/1/2020.

### 2.2. Blood collection

After fasting 16 hours, at room temperature let the samples for coagulation and for a period of 15 min., the serum was expelled at 3000 rpm, and the separated sera were frozen at -20 °C for future biochemical analysis.

### 2.3. Biochemical parameters analyses

Biochemical parameters were assessed by used kits supplied from Biolabo Co. France, and applied the guidance with pamphlet. The examination included (TC, TG and HDL-C and Lipase).

Lipids profile (TC, TG, HDL-C) and lipase level were controlled by the enzymatic colorimetric technique for the quantitative in vitro analytic estimation utilizing a unit [11,12].

VLDL-C was determined from following condition:  
 $VLDL-C = TG/5$ .

LDL-C was determined from following condition:  
 $LDL-C = TC - (HDL-C + VLDL-C)$ .

### 2.4 Statistical analysis

The results were communicated as mean  $\pm$  SD for all value. Information was investigated for critical contrast utilizing t-test ( $P < 0.05$ ) by Minitab program to compare the chemical variables between two groups.

## 3. Results and Discussion

The results showed a significant increase ( $P \leq 0.05$ ) in the concentration of TC, TG, LDL-C and VLDL-C in ladies who have the contraceptive pill compared with control group, while there was a significant decrease the lipase activity and HDL-C in ladies have the contraceptive pill, compared with the control group, as showed in table 1.

**Table 1:** Effect of contraceptive pill on lipids levels and lipase activity.

Groups	Lipase U/L	TC mg/dl	Triglyceride mg/dl	HDL-C mg/dl	LDL-C mg/dl	VLDL-C mg/dl
Contraceptive group	5.48 $\pm$ 1.5*	200.4 $\pm$ 48.8*	90.5 $\pm$ 20.6*	55.5 $\pm$ 18*	126.8 $\pm$ 30.5*	18.1 $\pm$ 4.4*
Control group	8.52 $\pm$ 2.2	153.3 $\pm$ 28.3	22.2 $\pm$ 1.6	68.3 $\pm$ 13.8	80.7 $\pm$ 13.7	4.4 $\pm$ 0.3

\* This sign means different significant at  $P \leq 0.05$ .

The preventative pill (containing estrogen and progesterone) influences the cardiovascular framework all the more habitually through its blackout on cardiovascular danger elements and lipids, oral contraceptives change lipid levels through the genomic pathway, and progestogens have a more prominent capacity to adjust the advantageous impacts of estrogen on lipids [13].

The after effects of the current investigation concur with the consequences of past examinations, which demonstrated that having the prophylactic pill prompts an expansion in the degree of cholesterol fixation [14,15]. The result additionally demonstrated an increase in the cholesterol level of preventative pill group contrasted with the healthy group, and that the guideline of the degree of

cholesterol in the blood might be influenced by the pace of digestion or movement of the LDL receptors or its capacity to change over to bile acids [16,17].

The results showed an expansion in the degree of TG, and this is predictable with the aftereffects of a past report, which demonstrated that taking the preventative pill prompts an increment in the TG level, which is related with age and the length of taking the tablets [18], as there was a huge expansion in the TG level and oral estrogen additionally builds TG level [19]. High fatty oils because of oral utilization of estrogen don't show a danger of atherosclerosis from blend anti-conception medication pills and neutralize the sleek changes brought about by estrogen. The degree of TG with more androgen progesterone raises the degree of fatty substances close to intensifies

containing less measures of androgen progesterone's, which have little impact on lipid digestion in ladies of typical weight [20,21].

Rising fatty oil levels with age and length of preventative use implies that lower portions of the chemical estrogen increment serum fatty substances [22,23], and the huge positive relationship among age and fatty substances can be ascribed to the drawn out utilization of the prophylactic pill. On the estrogen chemical, this is upheld by the solid positive connection between length of utilization and fatty substance levels. Changes with age and term of utilization can be clarified by the impact of estrogen on these lipoproteins. This expands the development of fats in the liver, causing an expansion in fatty substance levels [24].

The results additionally showed that there was a reduction in the degree of HDL-C in ladies taking the prophylactic pill contrasted with the control group [18]. Preventative pills can prompt weight acquire [25,26].

In spite of the presence of weight acquire in this examination among prophylactic clients, the markers of HDL-C were critical in the pill-taking gathering contrasted with the benchmark group. High fatty oils because of oral utilization of estrogen may not show a danger of creating atherosclerosis and oppose the lipid changes brought about by estrogen. Hence, the level of HDL-C diminishes. consequently, progesterone, likewise found in joined oral contraceptives, diminishes the plasma centralization of HDL-cholesterol [17,20].

The consequences of the current investigation showed an increment in the degree of LDL-C for ladies taking the preventative pill contrasted with the benchmark group. The outcomes showed huge contrasts between ladies taking of oral contraceptives contrasted with the solid gathering, as a huge expansion in LDL-C was seen in ladies who utilize the preventative pill contrasted with the individuals who didn't utilize it.

The consolidate preventative safe estrogen-initiated lipid changes [21], which expands levels of low-density lipoproteins of androgenic progestogens. The activity of LDL-C, HDL-C ensures against cardiovascular infection by controlling the progression of cholesterol from the tissues and changing irritation [27]. It adds to the expanded expulsion of VLDL-C particles, as they are quickly changed over into LDL-C. In the wake of changing over to LDL-C, HDL-C will improve the progression of cholesterol from tissues to the liver, where LDL-C is the backwards relationship of LDL-C with both age and span can be credited with the impact of delayed estrogen use [24].

In another examination, it was demonstrated that ladies who took prophylactic pills that contain a low level of estrogen and a high level of progestin have 24% more elevated levels of LDL-C, which adds to weight acquire, which prompts coronary illness than non-clients [28]. The current examination showed an increase LDL-C. There was a somewhat higher frequency of exceptionally low-density lipoprotein (low-density lipoprotein) unsaturated fats for the ladies taking the preventative pill than the control group VLDL-C levels are higher for patients utilizing, ethinylestradiol (30EE) contrasted with the benchmark group. Concerning the ethinylestradiol (20EE) clients, undeniable degrees of VLDL-C were additionally seen regarding the benchmark group. The more significant levels of VLDL-C present in the prophylactic gatherings could likewise be ascribed to the estrogen chemical, which could build the liver's discharge of this lipoprotein, to raise fatty oil levels higher in ladies who use contraceptives when contrasted with the benchmark group, since VLDL-C is a lipoprotein wealthy in fatty substances [16]. The result showed that the degree of VLDL-C in the blood was essentially higher in women taking contraceptive pill contrasted with healthy group, the degree of VLDL-C expanded with age and term contraceptive pill use [13,23]. Changes with age and span of utilization can be clarified by the impact of estrogen on these lipoproteins. This expands lipid development in the liver causing a rise in VLDL-C levels [29]. The positive age-related relationship with VLDL-C proved by delayed utilization of estrogen is supported by the solid positive relationship of term with VLDL-C. VLDL-C levels were higher and increment with age and term of pill use [30].

The current examination showed a decline in the level of the lipase catalyst, as preventative medications lead to an abatement in the lipase chemical, which can cause a huge diminishing because of perpetual harm to the pancreatic cells that produce the lipase. This can be brought about by long haul issues, for example, constant pancreatitis or cystic fibrosis [31]. The instrument by which hypertriglyceridemia prompts pancreatitis is that the hydrolysis of fatty substances by pancreatic lipase prompts collection of free unsaturated fats in high focuses [32,33]. The pancreas contains a high convergence of lipase chemical that separates fatty oils into glycerol and free unsaturated fats, which are ordinarily bound to albumin. Birth control pills that contain estrogen increment the degrees of fatty substances in the blood, as the expansion relies upon the portion of estrogen and is reflected in an increment in low-

density lipoproteins, chiefly because of the expanded creation of fatty substances in the liver [34,35].

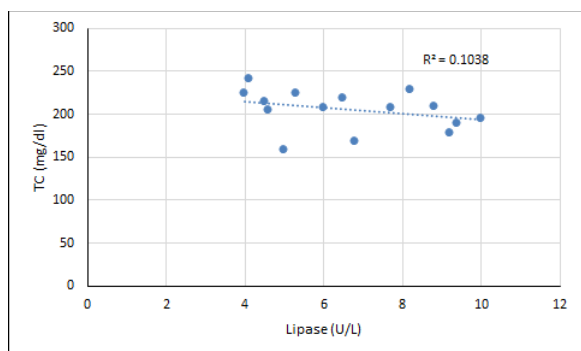
The results in table 2 were showed the correlation coefficients between lipase and TC, TG, HDL-C, LDL-C and VLDL-C.

**Table 2:** The correlation between lipase and measured parameters in contraceptive pill user.

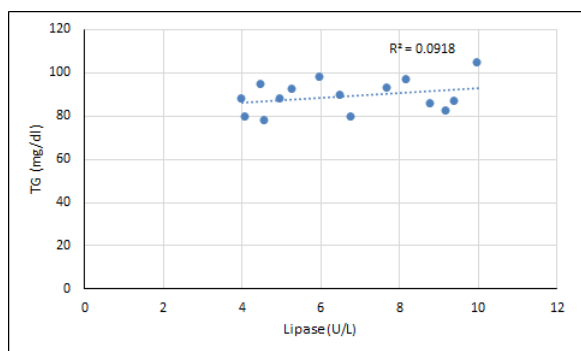
Parameters	r value
TC	-0.322*
TG	0.303*
HDL-C	0.777*
LDL-C	0.511*
VLDL-C	0.210

\* This sign means different significant at  $P \leq 0.05$ .

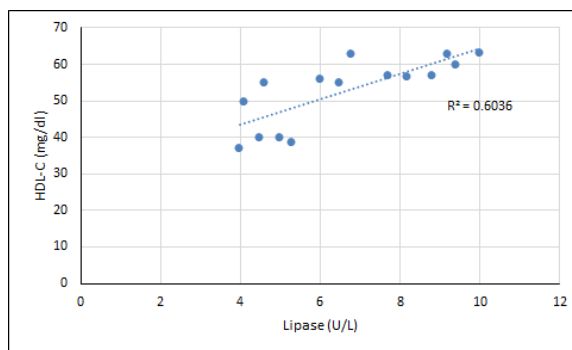
Results showed a positive significant correlation between lipase and TG, HDL-C, LDL-C, negative significant correlation between lipase and TC. In addition to weakly correlation between lipase and VLDL-C. As showed in figures 1, 2, 3, 4 and 5.



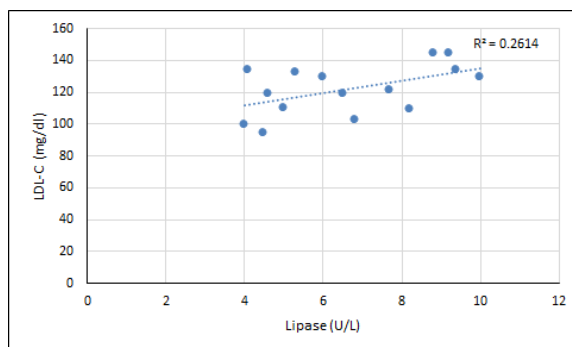
**Figure 1:** Correlation coefficients between lipase and TC.



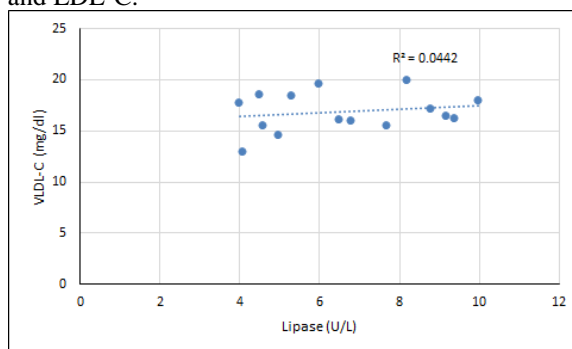
**Figure 2:** Correlation coefficients between lipase and TG.



**Figure 3:** Correlation coefficients between lipase and HDL-C.



**Figure 4:** Correlation coefficients between lipase and LDL-C.



**Figure 5:** Correlation coefficients between lipase and VLDL-C.

#### 4. Conclusion

The result showed the contraceptives pill lead to increase the levels of TC, TG and LDL-C. As well as decrease the HDL-C level and lipase activity.

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