



## Original Article

## Biochemical Effects of Oral Contraceptive Pills on Serum Bilirubin, Creatinine and Antioxidants System Among Females

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## ABSTRACT

Both estrogens and progestogens antifertility agents are used by huge number of females. Excessive use of antifertility agents caused toxic effects on body systems. Liver play its key role in the metabolic process of these toxic antifertility agents. **Objective:** To examine the biochemical effects of oral contraceptive pills on serum bilirubin, creatinine and antioxidants system among females. **Methods:** Participants of the study were categorized in to two groups i.e. control group(CG)(female using no contraceptive pills)and experimental group(EG)(females using contraceptive pills). Five (05) ml of blood was collected from each subject by vein cut and an expendable syringe. All blood samples were marked with separate identification code or mark. Ferric reducing assay protocol (FRAP) was applied for measuring oxidative stress and liver functions test (LFTs) was performed for measuring serum bilirubin and creatinine. **Results:** The collected data were tabulated and were analyzed by using mean, standard deviation, frequency and percentage etc. through the application of statistical package for social sciences (SPSS, version-26.0). **Conclusions:** Based on analysis the researcher draws the conclusion that oral contraceptive pills (OCP) have significant effect on serum bilirubin (p-value was 0.004), serum creatinine (p-value 0.023) and oxidative stress (p-value 0.002).

## INTRODUCTION

Both estrogens and progestogens antifertility agents are used by huge number of females. Excessive use of antifertility agents caused toxic effects on body systems. Liver play its key role in the metabolic process of these toxic antifertility agents. By having direct or indirect relation of liver, it is important to know the physiological and pathological vitality of these agents [1]. Liver produces different enzymes having different functions [2,3].

Contraceptive pills cause disturbance in liver cell and biliary secretion and liver tumor among the female, [4]. Liver tumor caused by oral contraceptive pills of two types i.e. tumors may be of two types either tumor made from blood vessel or round shape tumor. Mostly it was benign tumor but some time contingent upon the body state it become malicious [5]. Liver metabolize many poisonous and toxic compounds from blood thus long use of oral

contraceptive can damage the liver [6]. Use of estrogen and progesterone hormones caused gal stone formation, cholestasis and also venous thrombosis in liver [7]. Literally 80% bilirubin is resultant to breakdown of hemoglobin (means part of hemoglobin, myoglobin, cytochromes, catalase, peroxidase, etc.) [8]. Actually it is toxic in nature but body has natural mechanism for making it clean and usable [9-11]. 20% bilirubin is found in tissues like liver and muscles. 4mg/kg of body weight bilirubin is produced on daily basis by the body [12-14]. Drugs effect liver enzymes particularly bilirubin level. In addition, drugs also damage the liver cell [15]. Drugs like diazepam and oxytocin both effect the level of bilirubin concentration [16]. Evaluated blood pressure in a major cause of cardiovascular problems and also considered a leading cause of many health problems [17]. Serum bilirubin is one among the powerful antioxidants and helps in reducing the chances of cardiovascular problems [18, 19]. Creatinine is a waste product resultant to normal wear and tears of the muscles and thus creatinine is found in blood stream of the body [20]. An evaluation of serum creatinine concentration reduces the level of glomerular filtration and caused rise in blood urea nitrogen [21]. Contraceptive pills significantly cause oxidative stress while oxidative stress causes the failure of kidney. In females using oral contraceptive pills the level of plasma rennin was significantly increase as compared to non-user the increase plasma rennin level leads to fundamental hypertension [22]. Just like other health complications among the users of contraceptive pills the user of oral contraceptive pills may at risk of cardiac problems. A great number of female may lead to death every year due to cardiac problems caused by oral contraceptive pills [23]. As a result of all the above critical discussion, it is obvious to say that medicines caused different enzymatic changes in body. What changes occur in serum bilirubin, creatinine and antioxidant system? To discover the fact, the researchers intend to carry a research study under the title "Biochemical effects of oral contraceptive pills on serum bilirubin, creatinine and antioxidants system among females"

## METHODS

Below procedures were adopted by the researcher for reaching at certain findings and conclusion. The participants of the study were comprised of females (user and non-user of contraceptive pills (OCP). Thus participants of the study were categorized in to two groups i.e. control group (CG) (female using no contraceptive pills) and experimental group (EG) (females using contraceptive pills). Control group (CG) was comprised of 24 subjects and experimental group (EG) was comprised of 60 subjects. Furthermore, the selection criteria for participants were;

Subject using contraceptive pills from minimum duration of one (01) year, subjects aging not less 20 years and more 30 years, subjects who voluntarily participate in the study, subject using no other kind of medication instead of OCP and subjects having no chronic health problems. Five (05) ml of blood was collected from each subject by vein cut and an expendable syringe and quickly move into serum accumulation gel tubes and thus each sample was marked with separate identification mark. Ferric reducing assay protocol (FRAP) introduced by Benzie I.F., Strain J (1996) was applied for measuring oxidative stress and liver functions test (LFTs) was performed for measuring serum bilirubin and creatinine. For the assessment of oxidative stress all the principles of FRAP was applied accordingly as suggested by Benzie I.F., Strain J (1996). Collected data were tabulated and examined by using mean, standard deviation, frequency and percentage etc. through the application of statistical package for social sciences (SPSS, version-26.0).

## RESULTS

Table 1 shows the frequency and percentage of subjects. The total number of respondents aging 20-25 were 45 (53.57%) and the subjects aging 26 to 30 years were 9 (46.42%).

Age	Frequency (%)
20-25 Years	45 (53.57%)
26-30 Years	39 (46.42%)
Total	84 (100)

**Table 1:** Age-wise frequencies and percentages of subjects

Table 2 shows the comparison of both CG and EG in term of serum bilirubin. Data were expressed in term of mean a, standard deviation and p-value. Mean and standard deviation of CG was  $0.967 \pm 0.251$ . Mean and standard deviation of EG  $1.3833 \pm 0.66081$ . T value of both CG and EG was  $-2.994$ , df was 82 and p value was 0.004.

Comparison of control and subject	Number	M+SD	DF	T	P-value
Serum bilirubin mg/dl	CG	24	.967±.251		-2.994
	EG	60	.38±.661	82	

**Table 2:** Comparison of CG and EG in term of Serum bilirubin mg/dl.

Table 3 shows the comparison of both CG and EG in term of serum creatinine. Data were expressed in term of mean a, standard deviation and p-value. Mean  $\pm$  SD of CG was  $0.93 \pm 0.21$ . Mean  $\pm$  SD of EG  $0.95 \pm 0.25$ . T value of both CG and EG was  $-0.448$ , df was 82 and p value was 0.655.

Comparison of control and subject	Number	M+SD	DF	T	P-value
Serum Creatinine mg/dl	CG	24	.93±.21		.655
	EG	60	.95±.25	82	

**Table 3:** Comparison of CG and EG in term of Serum creatinine

Table 4 shows the comparison of both CG and EG in term of FRAP. Data were expressed in term of mean a, standard deviation and p-value. Mean  $\pm$  SD of CG was  $137.95 \pm 20.9$ . Mean  $\pm$  SD of EG  $110.54 \pm 39.2$ . T value of both CG and EG was 3.236, df was 82 and p-value was 0.002.

Normal and subjects comparison		Number	M+SD	DF	T	Sig. (2-Tailed)
Ferric reducing antioxidant power assay	CG	24	137.95 $\pm$ 20.9			.002
	EG	60	110.54 $\pm$ 39.2	82	3.236	

**Table 4:** Comparison of CG and EG in term of FRAP

## DISCUSSION

It is found that oxidative stress was primarily allied with oral contraceptive pills (OCP). Such emerging concept was supported by Pincemail et al., [24]. They further concluded that OCP caused or lead the body towards oxidative stress. He further indicated that OCP was not only source of oxidative stress but it also caused letdown of entire body functions. Present study finds that contraceptive pills have a significant effect on the liver cells. This finding was also supported by of the previous research studies conducted by Shojania by stating that drugs effect the liver functions. Oral contraceptives disturbed the biliary secretion as well as damage to liver cells. The studies conducted by Dourakis et al., supported that present study by indicating that oral contraceptive pills affected the functional capacity of liver [26]. The study conducted by Lim et al., revealed that systolic blood pressure is inversely concerned with serum bilirubin concentration which caused hypertension. The findings of the study showed that cardiovascular risk is totally concerned with serum bilirubin [27-30].

## CONCLUSION

On the basis of data analysis and findings, it is concluded that oral contraceptive pills caused significant effects on serum bilirubin and creatinine. In addition, it also indicated by findings of the study that OCP caused oxidative stress.

## Conflicts of Interest

The authors declare no conflict of interest.

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