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**INDO AMERICAN JOURNAL OF  
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.1745494>Available online at: <http://www.iajps.com>**Research Article****A CROSS-SECTIONAL STUDY TO EXAMINE ANTIOXIDANT  
STATUS OF WOMEN BY APPLYING FOUR DISSIMILAR  
CONTRACEPTION METHODS****<sup>1</sup>Dr. Aqsa Akram, <sup>2</sup>Dr. Muhammad Qasim, <sup>3</sup>Dr. Ayesha Hussain**<sup>1</sup>Nishter Medical College Multan<sup>2</sup>Muhammad Medical College Mirpur khas Sindh<sup>3</sup>Nishter Medical College Multan**Abstract:**

**Objective:** This research is designed to examine the antioxidant status of women through the application of four dissimilar methods of contraception.

**Methodology:** We selected a sample of (60) non-pregnant women whose age ranged between (16 - 45) years and applied four diverse methods as, oral contraceptive pills, Norplant, injectable and intra-uterine devices (IUD) who were attending Nishter Hospital Multan. For the control group, we selected fifty-eight women, ranged from (16 - 45), seemed healthy who were not observing any contraceptive technique. Researchers determined the body mass index (BMI) of all research participants either who subjects or controls group were. By using standard spectrophotometric methods, we determine the serum levels of ascorbic acid, tocopherol, bilirubin, uric acid, creatinine, malondialdehyde, albumin total protein. We took an estimated value of Progesterone with the help of the chemiluminescence method and for the determination of selenium, we applied atomic absorption spectrophotometry (AAS).

**Results:** Researchers acquired a significant value of BMI in women by using oral contraceptive pills (OCP) in comparison with the control group ( $P < 0.05$ ) while we noted it insignificant ( $P > 0.05$ ) among injectable, intra-uterine device (IUD), and Norplant users. The women who were on OCP reported with mean serum ascorbic acid ( $P < 0.01$ ), total protein ( $P < 0.01$ ), albumin ( $P < 0.05$ ), tocopherol ( $P < 0.05$ ), selenium ( $P < 0.01$ ), uric acid ( $P < 0.05$ ), which were significantly lower when we took an insight of comparison if it with the control group. But in terms of users of other contraceptive methods, it was insignificant ( $P > 0.05$ ). Moreover, researchers did not find any apparent one to one association between antioxidants and progesterone among women who were on IUD, OCP, Norplant and injectable.

**Conclusion:** The methods like injectable, IUD and Norplant presented no effect, whereas, oral contraceptive pills displayed a significant declining effect on the status of antioxidants. Conclusively, scholars recommend a routine monitoring of the antioxidant status for the subjects who are undergoing through different methods of contraceptive, especially who are on OCP.

**Keywords:** Norplant and injectable, Chemiluminescence, Contraception, Antioxidants, cardiovascular disease

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**INTRODUCTION:**

Oxidative stress leads to several disease conditions like cancer and cardiovascular disease [1,2]. Oxidative stress has resulted in many diseases that highlighted the importance of method like, oral contraceptives in women [3]. In this regard, some of the research studies took an account of the effect of oral contraceptives use on variation in mineral, carbohydrate, enzymes, lipid and vitamin metabolism as researchers have detected them in the deterrence of pregnancy [4]. Therefore, the findings on the association of oxidative stress with oral contraceptives are still debatable. Somehow, some scholars proposed that estrogens report an antioxidant influence that can add to its defensive effects on the cardiovascular system through the prevention of lipid oxidation [5]. Saha and Chiang *et al.* coded that estrogens substantially limit the oxidative loss to lipids which are vulnerable to free essential generating systems [6,7]. Some other research studies recorded an antioxidant impact of estrogen on women and rats accepting hormone replacement therapy (HRT) [8]. Kose *et al.* and Sisson *et al.* reported a noteworthy rise in lipid peroxides with a related decrease in antioxidant level [9,10]. This research study aimed at the assessment of antioxidant condition and bioindicators of oxidative loss of lipids in the female by using the methods like injectable, oral contraceptive pills, intrauterine device and Norplant.

**MATERIAL AND METHODS:**

The population of the study encompassed non-lactating, prophylactic women and no contraceptive non-lactating females. This study enrolled the sample from two hospitals of Multan.

To examine the effects of contraception and prophylactic on antioxidants condition among the subjects, researchers the design of a cross-sectional randomized study. Researchers selected a sample of (60) non-lactating women observing reproductive age group of (16 - 45) years whose mean age was (33.4 + 0.9) discerning one of the four recommended methods of contraception and fifty-eight women who were significantly healthy as control group (non-lactating, non-contraceptive users) in similar age group Nishter Hospital Multan for clinical examination. For more elaboration of idea and findings, researchers categorized the research sample into ten subjects for an oral contraceptive, ten for injectable, thirty-one on intrauterine device and rest of the nine women for Norplant implant. The mean time duration of research examination was (7.0 + 1.8) years. In this regard, researchers administered a questionnaire to acquire related demographic data

from the women on contraception. As this study involves the public affairs in terms of their disease which necessitate complete secrecy. Therefore, we seek ethical approval from the ethical review committee of Nishter Hospital, and additionally, we obtained the informed consents from all the research participants prior to their participation in the research.

We excluded all those women from the study who were pregnant, nursing the babies, used to smoking. Moreover, we also carefully excluded all those women who were suffering from acute or chronic diseases and additionally, the cases who were taking any medicines that could possibly influence antioxidant status.

We used stadiometer to measure the height of subjects in standing position. We noted the measurements least to the nearest value of (0.01m). We measured the height by standing the subjects upright against the measuring tape, keeping the heels together, fully touching to the surface of the wall, aligning the shoulders and buttocks and positioning the Frankfurt plane horizontal to head.

We observed the same careful method for measuring the weight of the subjects and recorded the measurements closed to the nearest kilogram. We placed a standardized balance on a plain surface and before taking the values we performed the zeroing of balance for accurate recordings. All the women stood in the centre of the surface of the balance without any assistance, facing to the front and by keeping the body relaxed in a light dress. Then we drew the value of BMI by taking the average height and weight in square meters. For a blood sample, we collected a sample of (10 ml) blood into heparinized anticoagulated tubes of lithium and put them in a polythene bags quickly. We used MSE centrifuge at the rate of (3000rpm) to swirl the sample for five minutes and stored the plasma in the frozen state at -200C and we analyze the blood samples within (72) hours.

Aye Kyaw prescribed a simple colourimetric method to determine ascorbic acid concentration [11]. For the measurement of tocopherol, we used the method proposed by Baker and Frank at (520nm). We determined total protein by using the Biuret method at an absorbance of (550nm) [12]. Whereas, for quantifying the albumin level we used Bromocresol Green method and calculated absorbance at (630nm). To determine the uric acid concentration, we applied the Uri-case calorimetry. Calorimetry also helped to calculate bilirubin. Jaffe colourimetric method suited

for the measurement of Creatinine. We expressed the findings of lipid peroxidation as  $\mu\text{mol/L}$ , that we assessed by calculating thiobarbituric acid reactive substances (TBARS). By using atomic absorption spectrophotometric technique (AAS) we acquired the value for Selenium. We used a prescribed version of SPSS for statistical analysis. And expressing the findings of the study as the mean  $\pm$  SEM. For statistical analyses, we used the Pearson's rank correlation test and student-t-test. We report the significant p-value as ( $<0.05$ ).

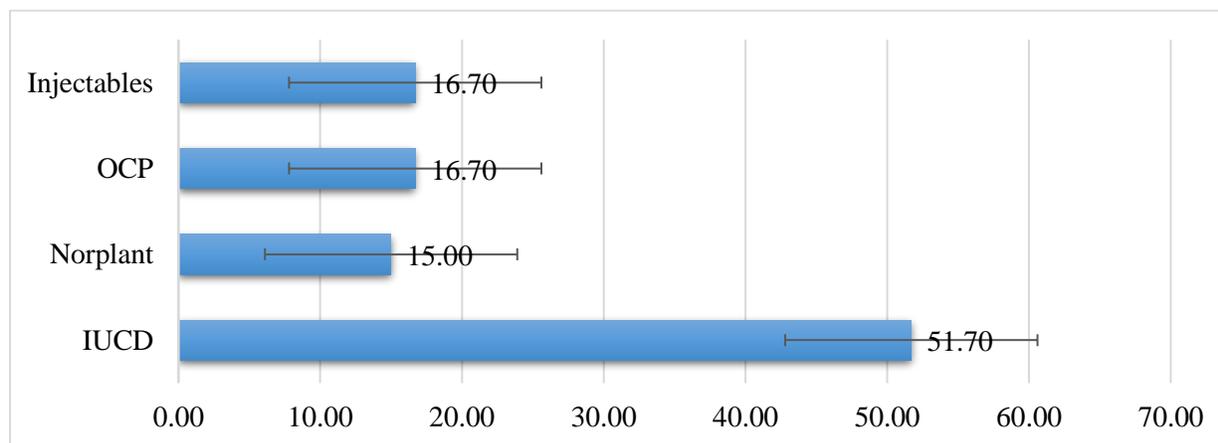
### RESULTS:

A great number of women from the research participants laid between the age group of (28 – 33) years who were on the four distinct methods of contraception. The women between the age group of (40 – 45) years were comparatively less in numbers. Whereas, the women from (46 – 50) years age group were least. The findings of the research also revealed that a great part of the sample in the age group of (26 – 30) was on OCP and injectable. On the other hand, more subjects between the age group of (31 – 35) were on IUD. Whereas, women on Norplant reported between (36 – 40) years. When we compared with the control group, we found no apparent differentiation ( $>0.05$ ) between the blood pressure of women and BMI on IUD, Norplant and injectable. We recorded a notable change in the values of BMI and systolic blood pressure among the women who

were on OCP when we assess it in comparison with the control group. In this study, (16.7%) of the women were undergoing on OCP, (16.7%) on the injectable, (15%) on Norplant, and (51.7%) on IUD. Moreover, we observed serum ascorbic acid level had an affirmative association with albumin ( $r=0.782$ ,  $P<0.01$ ). In addition to it, we also noted a distinctive positive correlation between creatinine and serum tocopherol ( $r=0.627$ ,  $P<0.05$ ). We determined the positive association of serum uric acid with selenium ( $r=0.816$ ,  $P<0.01$ ) and albumin ( $r=0.662$ ,  $P<0.05$ ). But, serum MDA had a negative association with uric acid ( $r=-0.883$ ,  $P<0.05$ ). In terms of women on injectable, we found no noteworthy correlation between serum progesterone and other parameters. Therefore, serum uric acid concentration had positive association with albumin ( $r=0.766$ ,  $P<0.01$ ) and MDA ( $r=0.688$ ,  $P<0.05$ ). The research did not report any findings which could draw any significant association between serum progesterone and other biochemical constraints of women on Norplant. Though, the study recorded a significant veto correlation between selenium and serum ascorbic acid ( $r=0.670$ ,  $P<0.01$ ). Moreover, a close examination of the control group and the women on IUD, injectable and Norplant, the levels of tocopherol, ascorbic acid, uric acid, selenium, creatinine, total protein and albumin did not code any difference significantly.

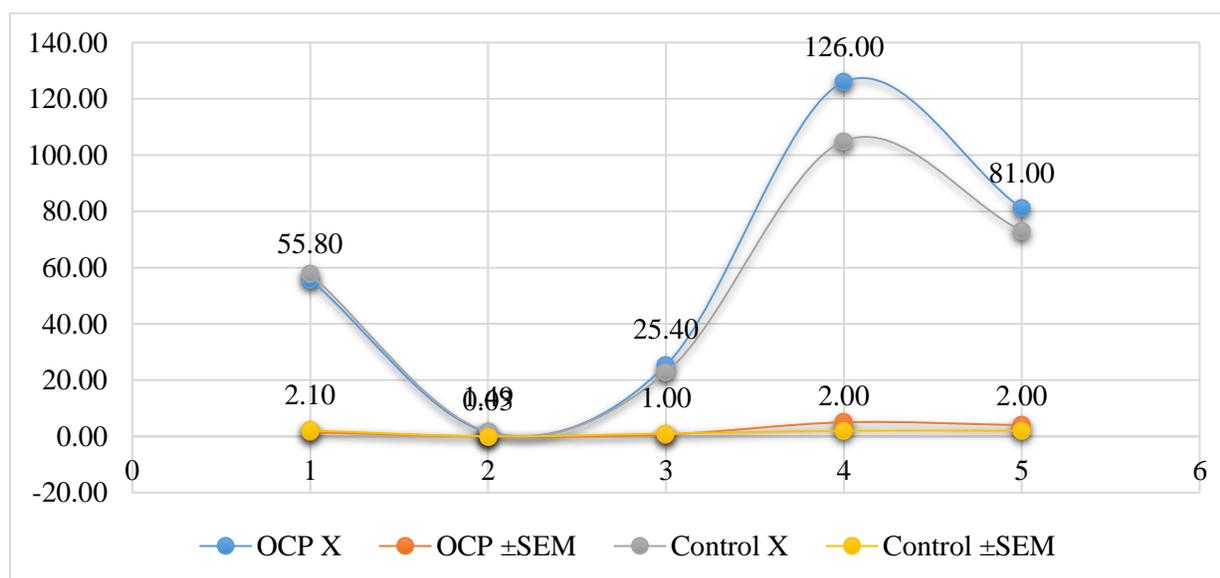
**Table – I:** Method Wise Distribution

Method	Percentage
IUCD	51.70
Norplant	15.00
OCP	16.70
Injectables	16.70

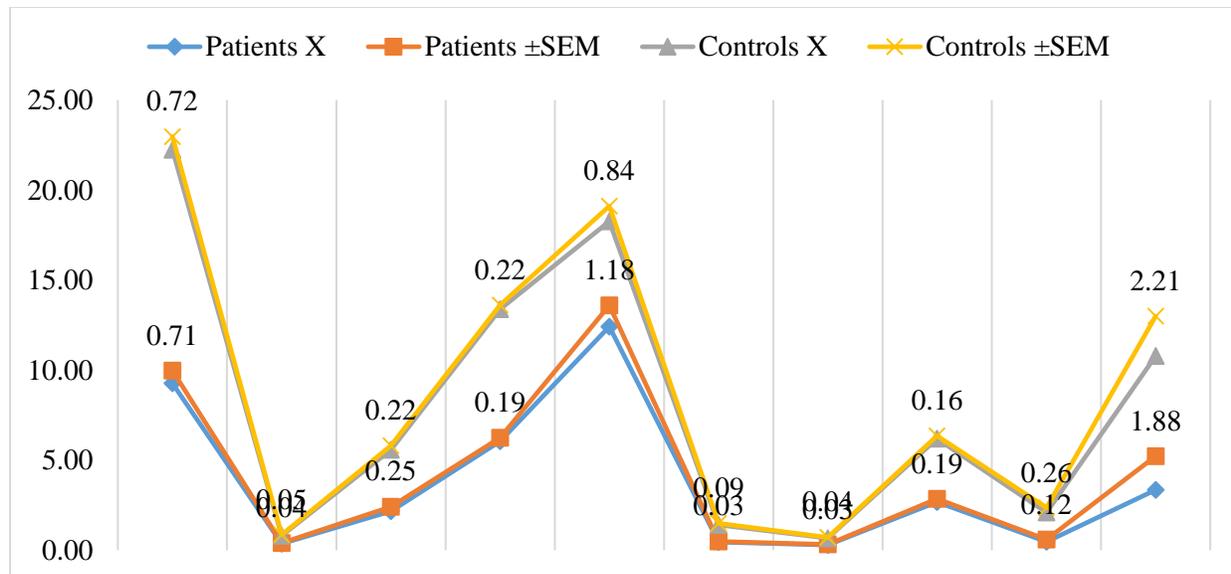


**Table – II:** Group-Wise Blood Pressure and Anthropometric Features

Variables	OCP		Control		T-Value	P-value
	X	±SEM	X	±SEM		
Weight (Kilograms)	55.80	1.50	57.70	2.10	0.74	NS
Height (Meter)	1.49	0.02	1.60	0.03	3.23	< 0.05
BMI (kg/m <sup>2</sup> )	25.40	0.70	22.70	1.00	2.51	< 0.05
Systolic BP (mmHg)	126.00	5.00	105.00	2.00	3.88	< 0.05
Diastolic BP (mmHg)	81.00	4.00	73.00	2.00	1.74	NS

**Table – III:** Group-Wise Non-Enzymatic Antioxidant status and level of Serum Progesterone

Variables	Unit	Patients		Controls		T-Value	P-value
		X	±SEM	X	±SEM		
Tocopherol	mg/dl	9.270	0.710	12.270	0.720	2.97	< 0.05
Creatinine	mg/dl	0.360	0.040	0.410	0.050	0.81	NS
Uric acid	mg/dl	2.170	0.250	3.160	0.220	3.03	< 0.05
Total protein	g/dl	6.050	0.190	7.150	0.220	3.75	< 0.01
Malondialdehyde	μmol/L	12.420	1.180	4.670	0.840	5.33	< 0.01
Ascorbic acid	mg/dl	0.460	0.030	0.920	0.090	4.76	< 0.01
Bilirubin	mg/dl	0.290	0.030	0.350	0.040	1.18	NS
Albumin	g/dl	2.670	0.190	3.330	0.160	2.63	< 0.05
Selenium	μmol/L	0.470	0.120	1.510	0.260	3.62	< 0.05
Progesterone	μmol/L	3.350	1.880	5.560	2.210	0.76	NS



### DISCUSSION:

This research explored that the ladies from the age group (16 – 20) on OCP and Norplant, specifically single, had the tendency to avoid pregnancy because of their involvement in illegitimate sexual relationships. On the other hand, young ladies from the age group of (21 – 25) on IUD, striving for their career or were enrolled in somewhere institutes were also reluctant to be pregnant. We also observed through this research by applying all the methods for an investigation that a greater part of the research sample on IUD fall between the age group of (31 – 35) years. Furthermore, this research also revealed on the basis of findings that all the women who were on OCP did not gain any significant amount of weight as it was expected in the absence of such diseases which usually stimulate loss in weight [13, 16].

The findings of this research study, reported no apparent variation in BMI and other biochemical considerations of women who were on injectable, Norplant and IUD when we compare then with the control group. The women on OCP reported with a positive association between serum ascorbic acid and albumin, serum tocopherol and creatinine, serum uric acid and albumin and selenium. But the correlation between the serum tocopherol and creatinine did not find any solid conclusive statement.

Among many other limitations, this research study faced a major issue of sample size. Due to time limitation and management in addition with logistics support, the researchers encountered with the enrollment of more participants into the research sample that was necessitated. Researches also faced economic issues while enrolling the participants. Moreover, the researcher did not receive any

economic support from any institute that added in the limitation of the research. However, through experience, we perceive that such limitations could not affect the overall achievement of the research objectives.

### CONCLUSION:

The correlation between oxidative stress and contraceptives seek the consideration of many academic debates and disputes among the scholars [17]. Scholars claimed that estrogens are beneficial to limit atherosclerosis. Although, these estrogens have the potential to generate oxidative stress which is one of the other factors to develop atherosclerosis [18]. Therefore, this study endeavoured successfully to present that OCP has a significant correlation with varied oxidative status among the women on OCP. Whereas, IUD, injectable and Norplant did not present any apparent effect. Conclusively, a distinct rise in MDA level and a clear decline in ascorbic acid, selenium and tocopherol intensely supported the anticipation of this research. Moreover, for future research, we recommend to take an account of real effect as a cardiovascular risk element in users on OCP and regular follow-up of the antioxidant status of women by using variant methods of contraception can be advantageous.

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