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Research Article:

Associations of Combined Oral Contraceptive Use with Inflammatory, Oxidative Stress, and Metabolic Alterations

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Abstract

Background: Combined oral contraceptives (COCs) are the most common method of contraception as well as a management tool for various gynecological conditions. The impact of COCs on oxidative stress and inflammatory status is still to be clarified. **Aim:** To evaluate the biochemical indicators of oxidative stress and inflammation in COC users. **Methods:** A total of 93 women (43 COC users and 50 non-users) were enrolled in this comparative observational study. Serum concentrations of malondialdehyde (MDA), superoxide dismutase (SOD), total antioxidant capacity (TAC), high-sensitivity C-reactive protein (hsCRP), interleukin-6 (IL-6), and tumor necrosis factor-alpha (TNF-α) were determined. Metabolic parameters and lipid profile were also examined**. Results:** Levels of hsCRP and TNF-α in COC users were significantly higher as compared to non-users ($p<0.001$), whereas the IL-6 levels were comparable between two groups. There was a significant increase in MDA levels and a decrease in SOD activity in COC users ($p<0.05$). However, TAC was not significantly different. Moreover, COC users had significantly higher glucose level and a worse lipid profile, with higher atherogenic indices ($p<0.01$). The duration of COC use was positively associated with inflammatory and oxidative stress markers and negatively with antioxidant parameters. **Conclusion:** Increased oxidative stress, low-grade inflammation, and unfavorable metabolic alterations may be linked to COC use, and such associations could probably be intensified with longer duration of use; therefore, it is advised to monitor women who are using COC for long period; specially those at higher risk of cardiometabolic disease.

1. Introduction

Combined oral contraceptives (COCs) are among the most currently used methods of reversible contraception. These agents are also used as a means of regulating menstruation, treating acne, endometriosis, and polycystic ovarian syndrome (PCOS) (1). Even-though they have been considered to be generally safe, concerns about the primary pathophysiological mechanisms that link between COCs use and increased risk of myocardial infarction, ischemic stroke, venous and arterial thromboembolism have been raised by some studies (2). Oxidative stress, which is a state where there is an imbalance between the generation of reactive oxygen species (ROS) and the capacity of the antioxidant systems (3), together with low-grade chronic inflammation are two mechanisms that in turn cause endothelial dysfunction, atherosclerosis, and carcinogenesis (4). Women taking COCs have been reported by clinical and experimental studies to result in decreased total antioxidant capacity (TAC) and antioxidants molecules as well as increased biomarkers of oxidative damage such as lipid hydroperoxides, malondialdehyde (MDA), and oxidized LDL (5,6). Nonetheless, COCs have been found to be linked with raised inflammation biomarkers including high-sensitivity C-reactive protein (hsCRP) and other cytokine-related or glycoprotein acetyl inflammatory indices in both healthy and diseased women. Furthermore, available data has revealed that COCs may induce metabolic and inflammatory abnormalities, a state that is reversible after discontinuation of the drug, indicating a direct effect (7,8). At the same time, data of young-healthy women have demonstrated a strong positive correlation between oxidative stress biomarkers and hsCRP, which not only reveals a redox-inflammatory state but also highlights COC-related cardiovascular risk (9). While previous studies have examined individual aspects of inflammation or oxidative stress in COC users, the present study uniquely provides a comprehensive, multi-domain evaluation integrating inflammatory cytokines, oxidative stress markers, antioxidant defenses, and metabolic risk indices within a single cohort, along with region-specific data from the Mosul population. Accordingly, the present study aimed to assess specific biochemical markers of inflammation and oxidative stress in women who use COCs and to compare these indicators with those found in women not using hormonal contraception.

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2. Patients and methods

2.1. Study design, settings and ethical considerations

This is a comparative cross-sectional observational study that included women of reproductive age, who are currently using COCs and matched non-users, during the period from October 2025 to February 2026. The study participants were collected from the right Sector of Nineveh Health Directorate; specifically, from Tamuz health center at Mosul city. To ensure that all procedures are performed in accordance with the ethical principles of the Declaration of Helsinki for research involving human participants, two ethics approvals were obtained from the Pharmaceutical Research Ethics Committee at the College of Pharmacy, University of Mosul (reference code: PRC-25-3-11), and from the Nineveh Health Directorate's Local Ethics Committee (approval code: 2025248). Also, before enrollment in any procedure, all participants were informed about the main aims, objectives and methods of the study, and each participant signed written informed consent accordingly. To obtain clinical and demographic data, including medical history and the existence of any concurrent diseases, a research questionnaire was given to each participant via direct interview. Eligibility of inclusion was considered using these data in accordance with the prearranged inclusion and exclusion criteria. Additionally, each participant was subjected to a clinical evaluation by consultants to ensure eligibility to participate in the study and to rule-out those with conditions that might affect its outcomes.

2.2. Sample size and collection

This study involved a total of 93 women between 18-45 years who were divided into two groups. Group 1 included 43 women on COCs (containing 150µg levonorgestrel and 30µg ethinylestradiol; Bayer, Germany) for at least six months; whereas group 2 included 50 women who have not used any hormonal contraceptives to serve as a control group. To strengthening the internal validity of the observed associations and to minimize the potential confounding effects of lifestyle-related factors on the studied biochemical parameters, all of the included participants in both groups were maintaining regular physical activity and adherence to a balanced diet. Women younger than 18 years old or older than 45 years, women who were using COCs for less than 6 months, those with cardiovascular disease and endocrine disorders or using any chronic medications or having chronic illness were excluded from the study.

2.3. Laboratory settings and biochemical investigations

Blood samples were obtained from all participants after an overnight fasting and placed in a serum separator tube, let to clot for 30 minutes then centrifugation for 10 minutes at around 3000xg to collect serum. Subsequently, serum was stored at -20°C until used for biochemical analysis of the investigated parameters. Evaluation of oxidative stress was performed via assessment of TAC, MDA and superoxide dismutase (SOD), whereas inflammation markers evaluation based on the measurement of serum concentrations of hsCRP, interleukine-6 (IL-6) and tumor necrosis factor-alpha (TNF-a). hsCRP, was measured using specific kit and automated clinical chemistry analyzer supplied by Smart-120; China, based on latex particle coated with specific anti-human CRP enhanced immunoturbidimetric assay. The remaining investigated parameters were investigated according to the manufacturer instructions using ELISA kits supplied by Sanghai ideal company (China) in ALLSHENG Microplate reader AMR-100. Lipid profile, including total cholesterol, triglycerides, and HDL were also investigated in this study by enzymatic colorimetric method intended use for the quantitative determination of these parameters in the serum using automatic chemistry analyzer (SMART-120).

2.4. Statistical analysis

GraphPad Prism version 8.4.2 was used for statistical analysis. Shapiro-Wilk test was used to evaluate the distribution of the data, which was used to express continuous variables as mean ± standard deviation (SD). The independent samples were used to compare women who used COCs with the control group using Student's t-test, whereas for the categorical variables the chi-square or Fisher's exact test were applied. Due to the exploratory nature of this study and limited availability of eligible participants, the post hoc evaluation was used to suggests adequate power for primary outcomes of oxidative stress and inflammation markers. Pearson correlation coefficients was used to evaluate correlations between study variables. To assess independent predictors of oxidative stress and inflammatory markers, multiple linear regression models were constructed for each outcome, including BMI and COC as independent variables, to control for potential confounding. All analyses were two-tailed with $p < 0.05$ considered statistically significant.

3. Results

This study included 93 women in total, 43 of whom used COCs with mean age 32.98 ± 7.1 years and 50 of whom did not (control group), with mean age 32.34 ± 6.6 years. **Table 1** provides an overview of the study population's clinical and demographic features. Age ($p = 0.65$) and breastfeeding status ($p = 0.06$) did not differ significantly between the two groups. On the other hand, COC users had a significantly higher body mass index (BMI) than controls ($p < 0.001$). In terms of reproductive history (**Table 2**), a significantly greater percentage of COC users had more than two births than non-users ($p < 0.001$), but there was no significant difference in the number of abortions between the groups ($p = 0.9$).

Table 1. Demographic and clinical characteristics of the study population

Variable	COC Users (n = 43)	Control (n = 50)	p-value
Age (years)	32.98 ± 7.10	32.34 ± 6.60	0.65
BMI (kg/m²)	28.43 ± 4.70	23.25 ± 2.40	<0.001
Duration of COC use (years)	3.70 ± 2.70	—	—
Breastfeeding, n (%)	28 (65.1%)	23 (46.0%)	0.06

Data are presented as mean ± standard deviation or number (percentage). Statistical comparisons were performed between COCs users and control group using unpaired t.test. For Statistics of the categorical variables was performed using the chi-square or Fisher's exact test. The level of significance was recorded when p value is <0.05. BMI: Body mass index, n: Number, COC: Combined oral contraceptives

Table 2. Reproductive history

Variable	COC Users (n = 43)	Control (n = 50)	p-value
Number of births, n (%)			<0.001
≤2 births	17 (39.5%)	40 (80.0%)	
>2 births	26 (60.5%)	10 (20.0%)	
Number of abortions, n (%)			0.90
≤2 abortions	37 (86.0%)	43 (86.0%)	
>2 abortions	6 (14.0%)	7 (14.0%)	

Data are presented as number (percentage). Statistical comparisons were performed between COCs users and control group using chi-square or Fisher's exact test. The level of significance was recorded when p value is <0.05.

Inflammatory markers are illustrated in **Table 3**. hsCRP (10.68 ± 8.75 mg/L in COC users vs 1.12 ± 0.65 mg/L in control) and TNF-α (12.88 ± 3.18 pg/mL in COC users vs 6.5 ± 2.67 pg/mL in control) were significantly higher in COC users than in controls; both p < 0.001. COC users had higher levels of IL-6 (8.18 ± 3.88 pg/mL in COC users vs 6.72 ± 3.43 pg/mL in control), but this difference was not statistically significant (p = 0.057).

Table 3. Inflammation markers in the studied groups

Variables	COCs users (n=43)	Control (n=50)	P value
hsCRP (mg/L)	10.68 ± 8.75	1.12 ± 0.65	**<0.001**
TNF-α (pg/mL)	12.88 ± 3.18	6.5 ± 2.67	**<0.001**
IL-6 (pg/mL)	8.18 ± 3.88	6.72 ± 3.43	0.057 (NS)

Data are presented as mean ± standard deviation and are significant where indicated when p value is <0.05, using unpaired t.test.. hsCRP: high-sensitivity C-reactive protein; TNF-a: tumor necrosis factor-alpha; IL-6: interleukin-6.

Table 4 shows the oxidant/antioxidant profile. When comparing COC users to the control group, SOD activity was significantly lower (p = 0.01; 142.6 ± 38.61 U/mL in COC users vs 161.3 ± 30.49 U/mL in control). COC users had significantly higher levels MDA, a marker of lipid peroxidation (p = 0.012; 3.96 ± 2.46 nmol/mL in COC users vs 2.95 ± 1.24 nmol/mL in control). COC users had lower TAC, but this difference was not statistically significant (p = 0.12; 14.83 ± 4.64 µmol/L in COC users vs 16.18 ± 3.8 µmol/L in control). Data are presented as mean ± standard deviation and are significant where indicated when p value is <0.05. SOD: superoxide dismutase; TAC: total antioxidant capacity; MDA: malondialdehyde. Multiple linear regression analyses were performed to evaluate the independent effects of BMI and COC use on inflammatory and oxidative stress biomarkers (**Table 5**).

Table 4. Oxidant/antioxidant status in the studied groups

Variables	COCs users (n=43)	Control (n=50)	P value
SOD (U/mL)	142.6 ± 38.61	161.3 ± 30.49	**0.01**
TAC (µmol/L)	14.83 ± 4.64	16.18 ± 3.8	0.12 (NS)
MDA (nmol/mL)	3.96 ± 2.46	2.95 ± 1.24	**0.012**

Data are presented as mean ± standard deviation and are significant where indicated when p value is <0.05. SOD: superoxide dismutase; TAC: total antioxidant capacity; MDA: malondialdehyde.

Table 5. Multivariable linear regression analysis of inflammatory and oxidative stress biomarkers adjusted for BMI and COC

Outcome	Predictor	β (SE)	95% CI	p-value
hsCRP (R^2 = 0.401, p < 0.001)	BMI	0.170 (0.170)	−0.167 to 0.507	0.318
	COC use	8.669 (1.521)	5.647 to 11.69	<0.001
TNF-α (R^2 = 0.555, p < 0.001)	BMI	0.091 (0.083)	−0.073 to 0.256	0.273
	COC use	5.910 (0.743)	4.434 to 7.387	<0.001
MDA (R^2 = 0.067, p = 0.045)	BMI	0.015 (0.054)	−0.093 to 0.123	0.787
	COC use	0.928 (0.488)	0.012 to 1.844	0.043
SOD (R^2 = 0.102, p = 0.008)	BMI	1.745 (0.968)	−0.179 to 3.668	0.075
	COC use	−27.71 (8.68)	−44.96 to −10.46	0.0019

Data are presented as regression coefficient (β) with standard error (SE), 95% confidence interval (CI), and p-value. Multiple linear regression models were constructed for each outcome variable, including body mass index (BMI) and combined oral contraceptive (COC) use as independent variables. R^2 represents the proportion of variance explained by each model. hsCRP: high-sensitivity C-reactive protein; TNF-a: tumor necrosis factor-alpha; MDA: malondialdehyde; SOD: superoxide dismutase; BMI: body mass index; COC: combined oral contraceptives.

For hsCRP, the model was statistically significant (R^2 = 0.401, p < 0.001), with COC emerging as a strong independent predictor (p < 0.001), while BMI was not significantly associated (p = 0.318). In a similar way, a strong model fit was obtained from TNF-α (R^2 = 0.555, p < 0.001). The use of COC continued to be a significant predictor for the obtained results (p < 0.001), whereas BMI again showed no independent effect (p = 0.273).
The linear regression for MDA was significant (R^2 = 0.067, p = 0.045). Major independent predictors of MDA were COC (p = 0.043) while BMI was not an independent predictor (p = 0.787). Again, the model was also statistically significant for SOD (R^2 = 0.102 p = 0.008). The relationship between COC and SOD was shown to be a significant inverse association (p = 0.0019), while the association of BMI with SOD did not show statistical significance (p = 0.075). BMI alone did not predict independent of any of the studied biomarkers, suggesting that these associations are independent from differential adiposity between groups.
The cardiovascular risk markers and metabolic parameters are summarized in **Table 6**. COC users had significantly higher FSG levels (p = 0.003) in comparison to control. COC users also showed a significantly negative lipid profile, with lower HDL levels (p = 0.017) and higher levels of triglycerides, LDL, VLDL, total cholesterol, and non-HDL cholesterol (all p < 0.01). Additionally, COC users had significantly higher levels of the AIP and TyG index (p = 0.0019 and p = 0.003, respectively), indicating a higher risk of cardiometabolic disease.

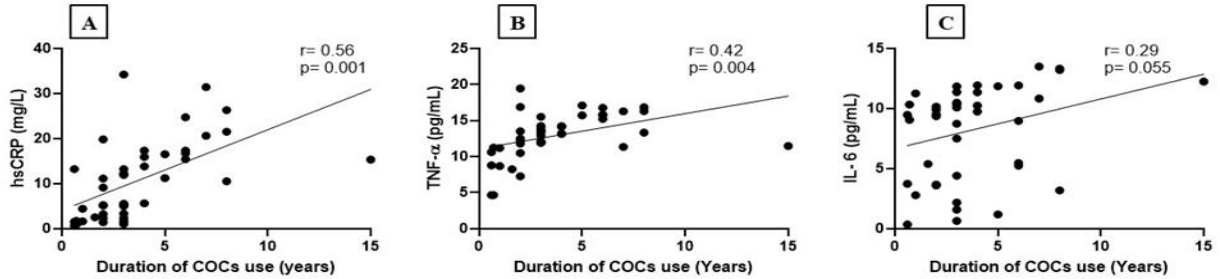
Table 6. Metabolic profile and cardiovascular risk markers in the studied groups

Variables	COCs users (n=43)	Control (n=50)	P value
FSG (mg/dL)	103 ± 13.05	96.94 ± 9.58	**0.003**
Cholesterol (mg/dL)	226.3 ± 44.8	176.6 ± 21.24	**<0.001**
Triglycerides (mg/dL)	149.8 ± 58.06	122.2 ± 37.05	**0.006**
HDL (mg/dL)	57.91 ± 10.25	62.58 ± 8.23	**0.017**
LDL (mg/dL)	138.4 ± 45.34	89.57 ± 18.8	**<0.001**
VLDL (mg/dL)	29.96 ± 11.61	24.43 ± 7.41	**0.006**
TyG index	8.87 ± 0.43	8.63 ± 0.33	**0.003**
non-HDL (mg/dL)	168.4 ± 43.68	114 ± 18.46	**<0.001**
AIP	0.026 ± 0.19	-0.08 ± 0.14	**0.0019**

Data are presented as mean ± standard deviation and are significant where indicated when p value is <0.05. FSG: fasting serum glucose; LDL: low-density lipoprotein; HDL: high-density lipoprotein; VLDL: very low-density lipoprotein; TyG index: triglyceride-glucose index; AIP: atherogenic index of plasma.

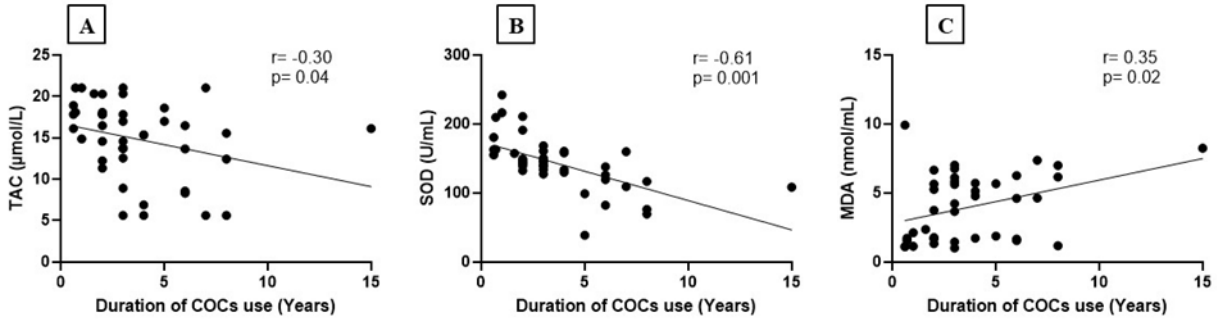
Inflammatory and oxidative stress markers were found to be correlated with the length of COC use. Longer usage tended to correlate negatively with antioxidant parameters and positively with oxidative stress and inflammatory markers, indicating a time-dependent impact of COCs on these biochemical pathways as shown in **Figures 1** and **2**.

Figure 1. Correlation between duration of COCs use and inflammation markers



Correlation between duration of COCs use and inflammatory markers (A: hsCRP, B: TNF-α, C: IL-6). A positive correlation was observed between duration of COCs use and inflammatory markers, suggesting a cumulative inflammatory effect using Pearson's correlation test.

Figure 2. Correlation between duration of COCs use and oxidation markers



Correlation between duration of COCs use and oxidative stress markers (A: TAC, B: SOD, C: MDA). Duration of COCs use was associated with increased oxidative stress and reduced antioxidant defense, indicating a time-dependent redox imbalance using Pearson's correlation test.

4. Discussion

The present study demonstrated that the use of COCs significantly changed metabolic, oxidative stress and inflammatory parameters. Compared to non-users, women using COCs had an adverse metabolic profile characterized by dyslipidemia and increased cardiometabolic risk indices with a pro-inflammatory state reflected by increased hsCRP and TNF-α levels. Changes in oxidative balance were also noted with increased levels of MDA and reduced activity of SOD.

Previous studies have shown links between COC use and individual markers of inflammation or oxidative stress, but this study adds to the literature by providing a comprehensive, multi-domain assessment within a single population group. In particular, we concurrently evaluated inflammatory markers (hsCRP, TNF-α, IL-6), oxidative stress indicators (MDA), antioxidant defense markers (SOD and TAC), and metabolic risk parameters, which allowed a more integrated interpretation of the biochemical profile associated with COC use. This study also provides regional data for the Mosul population, for whom thorough biochemical profiling has been limited currently.

The 2 study groups were similar in terms of age at baseline; therefore, potential confounding by age was minimized. Although COC users had significantly higher BMI values, BMI was not an independent predictor of hsCRP, TNF-α, MDA or SOD in multivariable regression models, suggesting that the observed associations are not fully explained by differences in adiposity. On the other hand, COC use was independently associated with higher levels of inflammatory markers, lower antioxidant defense capacity (reflected by lower SOD activity) and a slight increase in oxidative stress (as indicated by MDA levels). The persistence of these results after adjustment for BMI supports the validity of the observed associations. Therefore, the findings suggest that COC use might contribute to the initiation of inflammatory and oxidative changes through pathways independent of increased body weight, such as endothelial dysfunction, cytokine activation or hormonal modulation.

Adipose tissue is an active endocrine organ, releasing pro-inflammatory cytokines such as TNF-α and IL-6, which contribute to insulin resistance and systemic inflammation. As described earlier, obesity-associated inflammation is a major player in metabolic dysregulation (10). Nevertheless, the amount of inflammatory alterations in this study suggests that COC-related hormonal effects likely play an independent role. The hsCRP elevation in COC users in the present study is in agreement with earlier studies showing that hormonal contraceptives may induce a low-grade inflammatory state (11,12). Large observational data showed that users of COC are much more likely to have elevated hsCRP concentrations compared with non-users, suggesting a higher cardiovascular risk profile (13). The marked increase in TNF-α in the present study further supports the presence of an activated inflammatory environment. TNF-α is a key mediator of the association between inflammation and insulin resistance, by inhibition of the insulin receptor signaling (14).

Recent molecular studies have suggested that hormonal contraceptives may influence cytokine expression in a context-dependent manner, particularly via estrogen-mediated immune signaling pathways (15). Although not statistically significant, the borderline elevation of IL-6 in this study supports the opinion that IL-6 responses are more variable and are influenced by individual metabolic or hormonal factors. On the other hand, increased MDA levels and decreased SOD activity results reflect increased lipid peroxidation and decreased antioxidant defense in COC users. Such observations in the current study are in agreement with earlier report that revealed the use of COCs is probably associated with increased oxidation and antioxidant capacity depletion. For instance, Osman and Al-Mutairi found that oral contraceptive users had significantly lower total antioxidant capacity and higher CRP levels, indicating increased oxidative stress (16). Furthermore, research data has demonstrated that oxidative stress markers are higher in a significant level in those using COC. This high oxidative stress is strongly correlated with hsCRP levels, reflecting a specific connection between oxidative stress and inflammation (9). Additionally, ROS can activate pro-inflammatory signaling pathways, such as NF-kB, resulting in increased cytokine production and maintained chronic low-grade inflammation (17).

Presumably, the metabolism of estrogen produces reactive intermediates that contribute to the generation of ROS. Furthermore, dyslipidemia increases the susceptibility of lipid peroxidation, to impacts mitochondrial function via hormonal modulation (18). The TAC may initially be increased to compensate oxidative status; while other enzymes, like SOD, are reduced according to the lack of a significant change in TAC. In addition to changes in inflammatory oxidative stress parameters, the current research has found that women using COCs are presented

with significant metabolic abnormalities, including elevated FSG, dyslipidemia, and increased TyG index and AIP. These results may reflect an increased atherogenic and thrombotic risks, with possible shifting toward insulin resistance. Such results, are in agreement with the previously published data that demonstrated elevated triglycerides and LDL cholesterol, with their link to COC use. These changes are thought to be caused by changes in hepatic lipid metabolism brought on by estrogen (19).

The increase value of TyG index, an indicator of insulin resistance, could reflect a deleterious effect of COCs on glucose metabolism even in the absence of hyperglycemia. This is consistent with new research that links hormonal contraceptives to mild metabolic dysregulation, which may be caused by changes in adipokine balance and insulin signaling (20).

To further strengthen the association between COCs use and biochemical changes noticed and make it more validated, this study adopted correlation analysis of how long COCs were used and the main inflammatory and oxidative stress markers. Time of exposure is a logical measure of cumulative hormonal effects. In fact, the studies have revealed significant relationships of different oxidative stress markers with the inflammatory parameters of COCs users, pointing to interconnected and probably progressive effects at the biological level (9,21). Hence, to check the association between duration of use and the levels of the biomarkers will definitely give more idea if the changes happen with the time. The results of the present research are in line with the hypothesis of a cumulative effect as they reveal positive associations between the length of COCs use and inflammatory and oxidative markers, while at the same time there are negative correlations with antioxidant parameters. This makes it more likely that COCs do have a role in these pathways as levels of different substances change over time. On the other hand, it is important to mention that correlation does not imply causation, thus, longitudinal or interventional studies are needed to support these findings.

The presence of low-grade inflammation, oxidative stress, and metabolic abnormalities in COCs users may result in serious medical conditions, especially in women with pre-existing risk factors, such as obesity or insulin resistance. The elevation of hsCRP and oxidative stress markers has been linked to increased cardiovascular risk, which suggests that surveillance of women at risk is recommended when they are prescribed long-term use of COCs. The cross-sectional design of the study does limit the ability to make causal inferences. Additionally, the sample sizes are relatively small, which might lead to a reduced power in detecting less pronounced differences (biomarkers: IL-6 and TAC).

5. Conclusion

COC use contributed to the increased level of systemic inflammation and oxidative stress, decreased antioxidant defenses, regardless of BMI. These results may indicate that COC use is associated with an elevated cardiometabolic risk, which should be investigated in longitudinal studies to establish a causal relationship.

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Authorship Contribution Statement: Noor H. Aziz: Conceptualization, Methodology, Investigation, Data curation, Formal analysis, Visualization, Writing-original draft, Project administration. Mohammed N. Abed: Conceptualization, Methodology, Validation, Supervision, Writing-review & editing, Formal analysis.

Consent to Participate: The corresponding author confirms that all authors have participated sufficiently in the work, take public responsibility for the content, and have approved the final version of the manuscript.

Consent for Publication: The authors consent to the publication of this study.

Ethics Approval: This study was approved by the Pharmaceutical Research Ethics Committee, College of Pharmacy, University of Mosul (Reference Code: PRC-25-3-11), and by the Local Ethics Committee of the Nineveh Health Directorate (Approval Code: 2025248). Written informed consent was obtained from all participants prior to enrollment.

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Data Availability: The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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ارتباط استخدام موانع الحمل الفموية المركبة بالتغيرات الالتهابية والإجهاد التأكسدي والاضطرابات الأيضية

الخلاصة

المقدمة: تعد موانع الحمل الفموية المركبة (COCs) أكثر وسائل منع الحمل شيوعا، كما تستخدم كخيار علاجي لعدد من الحالات النسائية. ومع ذلك، لا يزال تأثيرها على الإجهاد التأكسدي والحالة الالتهابية غير واضح تمامًا.**الهدف:** تقييم المؤشرات الكيميائية الحيوية للإجهاد التأكسدي والالتهاب لدى مستخدمات موانع الحمل الفموية المركبة. **طرق العمل**: شملت هذه الدراسة الرصدية المقارنة 93 امرأة (43 من مستخدمات موانع الحمل الفموية المركبة و50 من غير المستخدمات). تم قياس تراكيز المالوندايالديهايد(MDA) ، وإنزيم سوبرأوكسيد ديسميوتاز(SOD) ، والسعة الكلية لمضادات الأكسدة(TAC) ، والبروتين المتفاعل C عالي الحساسية(hsCRP) ، والإنترلوكين-6(IL-6) ، وعامل نخر الورم-ألفا (TNF-α) في المصل. كما تم تقييم المؤشرات الأيضية وملف الدهون.**النتائج:** كانت مستويات hsCRP و TNF-α أعلى بشكل معنوي لدى مستخدمات موانع الحمل مقارنة بغير المستخدمات($p<0.001$) ، في حين لم تُظهر مستويات IL-6 فروقًا معنوية بين المجموعتين. لوحظ ارتفاع معنوي في مستويات MDA وانخفاض في نشاط SOD لدى المستخدمات($p<0.05$) ، بينما لم يكن هناك فرق معنوي في TAC. بالإضافة إلى ذلك، أظهرت مستخدمات موانع الحمل مستويات أعلى من الكلوكوز وتدهورا في ملف الدهون، مع ارتفاع المؤشرات تصلب الشرايين ($p<0.01$) كما ارتبطت مدة استخدام موانع الحمل الفموية المركبة ارتباطًا إيجابيا بمؤشرات الالتهاب والإجهاد التأكسدي، وارتباطا سلبيا بمضادات الأكسدة.**الاستنتاج:** يرتبط استخدام موانع الحمل الفموية المركبة بزيادة الإجهاد التأكسدي وحدوث التهاب منخفض الدرجة، إلى جانب تغيرات أيضية غير ملائمة، وقد تتراكم هذه التأثيرات مع مرور الوقت. ينصح بمتابعة النساء المعرضات لخطر مرتفع للإصابة بالأمراض القلبية الاستقلابية.

الكلمات المفتاحية: موانع الحمل، الإجهاد التأكسدي، الالتهاب، البروتين المتفاعلC ، الدهون.