

A Study of Blood and Lipid Parameters in Infertile Women in Wasit Province

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Abstract

Infertility in women is a significant health problem affecting reproductive health, defined as the inability to conceive after one year or more of regular, unprotected intercourse. This study aimed to evaluate certain hematological and biochemical parameters in women with infertility. The study was conducted at Al-Kut Maternity and Children's Hospital in Wasit Governorate from October 2025 to February 2026, and included 120 participants (65 women with infertility and 55 women in the control group) aged 17–38 years. Measurements included several hematological parameters and blood lipid indices. The results showed changes in some blood lipid indices, No significant differences were observed in triglycerides, LDL, and VLDL ($p > 0.05$). In contrast, a significant difference was found in HDL ($p < 0.05$), with the infantile uterus group recording the highest level and the ovulation disorder group recording the lowest. The low HDL in this group may indicate metabolic disorders related to insulin resistance or polycystic ovary syndrome (PCOS). As well as a significant decrease in red and white blood cell counts and packed cell volume in women with infertility compared to the control group. In contrast, no significant differences were found in hemoglobin and erythrocyte sedimentation rate (ESR). These findings suggest an association between infertility and hematological and biochemical changes, highlighting the importance of early diagnosis and follow-up.

Keywords: infertility, female infertility, blood parameters, blood lipids

دراسة مؤشرات الدم ومؤشر الدهون لدى النساء المصابات بالعقم في محافظة واسط

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جامعة واسط ; كلية التربية للعلوم الصرفة; قسم علوم الحياة

الخلاصة

يُعدّ العقم عند النساء مشكلة صحية هامة تؤثر على الصحة الإنجابية، ويُعرّف بأنه عدم القدرة على الإنجاب بعد عام أو أكثر من الجماع المنتظم غير المحمي. هدفت هذه الدراسة إلى تقييم بعض المؤشرات الدموية والكيميائية الحيوية لدى النساء المصابات بالعقم. أجريت الدراسة في مستشفى الكوت للنساء والأطفال بمحافظة واسط في الفترة من أكتوبر 2025 إلى فبراير 2026، وشملت 120 مشاركة (65 امرأة مصابة بالعقم و55 امرأة في المجموعة الضابطة) تتراوح أعمارهن بين 17 و38 عامًا. تضمنت القياسات العديد من المؤشرات الدموية ومؤشرات دهون الدم. أظهرت النتائج تغيرات في بعض مؤشرات دهون الدم، إذ لم تُلاحظ فروق معنوية في الدهون الثلاثية وLDL وVLDL ($p < 0.05$). في المقابل، وُجد فرق معنوي في HDL ($p > 0.05$)، حيث سجلت مجموعة الرحم الطفولي أعلى مستوى، بينما سجلت مجموعة اضطراب الإباضة أدنى مستوى. وقد يشير انخفاض HDL في هذه المجموعة إلى اضطرابات أيضية مرتبطة بمقاومة الإنسولين أو متلازمة تكيس المبايض. بالإضافة إلى انخفاض ملحوظ في عدد خلايا الدم الحمراء والبيضاء وحجم الخلايا المكسدة لدى النساء المصابات بالعقم مقارنةً بالمجموعة الضابطة. في المقابل، لم تُلاحظ فروق ذات دلالة إحصائية في مستوى الهيموجلوبين وسرعة ترسب الكريات الحمراء. تشير هذه النتائج إلى وجود ارتباط بين العقم والتغيرات الدموية والكيميائية الحيوية، مما يسلط الضوء على أهمية التشخيص المبكر والمتابعة.

1. Introduction

Million couples and 186 million individuals worldwide, with nearly half of these couples living in South Asia and sub-Saharan Africa. Infertility is a global health problem affecting more than 48 million couples and 186 million individuals, with approximately half of those affected residing in South Asia and sub-Saharan Africa [1].

Female infertility is a complex etiology that includes genetic differences, ovarian dysfunction, endocrine problems, and environmental variables. Polycystic ovary syndrome (PCOS) is a common disorder among women of reproductive age, affecting approximately 5–10% of them.

It is characterized by elevated levels of male hormones, chronic ovulation disorders or anovulation, and various metabolic changes and disturbances, is one of the most prevalent causes [2]. Reduced ovarian reserve and primary ovarian insufficiency (POI), which cause early follicular stock depletion and infertility, are another important factor [3].

2. Materials and Methods

2.1 Study design

This study was conducted at Al-Kut, in coordination Women's and Children's Hospital with the Reproductive and Infertility Unit and its laboratories in Wasit Governorate, Iraq, from October 2025 to February 2026. A total of 120 blood samples were collected: 65 from the group of women with infertility and 55 from the control group. These samples were divided into a single age group (17-38 years)

Samples were collected according to the data recorded for all patients: age, weight, family history of the disease, Infertility period, type of Infertility, other disease, and date of sample collection. hematological and biochemical parameters in the blood were measured (WBC, RBC, Hb, PCV, ESR).

2.2 Blood Sampling

5 ml of venous blood samples were collected from each participant, of which 2 ml were set aside and placed in EDTA-containing tubes for the purpose of performing a complete blood count (CBC), while 1 mL was placed in tubes containing 3.8% trisodium citrate.

The hematological parameters included hemoglobin concentration, The hematological assessment included measuring the red blood cell count, packed cell volume, total white blood cell count, and differential white blood cell count. Biochemical tests included assessing total cholesterol, high-density lipoprotein (HDL), low-density lipoprotein (LDL), triglycerides, and total protein levels.

2.3 Statistical Analysis

The statistical analysis was performed using SPSS (Statistical Package for Social Sciences). It was used to evaluate different factors and parameters in this study. Differences between means were assessed using one-way ANOVA. A probability value of ($P < 0.05$) was considered statistically significant (Von Storch and Zwiers, 2002).

3. Results

3.1 Anthropometric Characteristics

Anthropometric data, including age and body weight, are presented in Table 1. No statistically significant difference was observed between the groups in terms of mean age ($P > 0.05$), indicating successful age matching among the studied groups.

In contrast, body weight showed a significant difference between the groups ($P < 0.05$), with the ovulation disorder group recording the highest mean weight, followed by the obstruction group. The infantile uterus group and the control group recorded lower and similar values, suggesting a possible association between body weight and different types of infertility, particularly ovulation disorders.

Table 1- Comparison of anthropometric parameters between the control group of females and females with infertility.

Parameter	Ovulation	Obstruction	Infantile Uterus	Control	p-value
Age (years)	29.50 ± 3.92	27.30 ± 2.71	25.80 ± 0.84	26.20 ± 4.27	>0.05
Weight (kg)	77.90 ± 8.69	68.50 ± 7.38	62.40 ± 5.55	62.80 ± 5.45	<0.05**

3.2 Hematological Parameters

ESR, WBC, RBC, and hemoglobin levels did not show significant differences between groups at a statistically significant level ($P < 0.05$). In contrast, A significant difference was observed in hematocrit ($P < 0.05$), with the control group recording the highest value, followed by the ovulation disorder group and then the obstruction group, while the infantile uterus group recorded the lowest value, indicating a gradual decrease in hematocrit (HCT) among the infertility.

Table 2- Comparison of hematological parameters between the control group of females and females with infertility.

Parameter	Ovulation	Obstruction	Infantile Uterus	Control	p-value
ESR (mm/hr)	30.10 ± 10.58	21.72 ± 8.48	30.44 ± 20.92	19.60 ± 0.55	>0.05
WBC ($\times 10^3/\mu\text{L}$)	6.84 ± 1.82	6.41 ± 0.71	8.22 ± 3.00	5.80 ± 1.70	>0.05
RBC ($\times 10^6/\mu\text{L}$)	4.26 ± 0.29	4.10 ± 0.21	3.99 ± 0.18	4.29 ± 0.27	>0.05
Hemoglobin (g/dL)	12.35 ± 1.62	11.57 ± 0.71	11.34 ± 0.60	12.30 ± 0.80	>0.05
Hematocrit (%)	38.54 ± 4.44	36.55 ± 1.72	34.18 ± 1.13	39.26 ± 2.57	<0.05**

3.3 lipid profile

Lipid profile (triglycerides, HDL, LDL, VLDL) was assessed in all groups. Triglycerides, LDL, and VLDL showed no significant differences ($P > 0.05$) Conversely, the results showed a statistically significant difference in HDL levels ($P < 0.05$), with the infantile uterus group recording the maximum value subsequently obstructed and then the controlled groups, whereas the ovulation disorder group recorded the lowest level, which may indicate a metabolic disorder associated with this condition.

Table 3- Comparison of blood lipid profile parameters between the control group of females and females with infertility.

Parameter	Ovulation	Obstruction	Infantile Uterus	Control	p-value
Triglycerides (mg/dL)	215.14 ± 109.78	195.91 ± 63.56	241.16 ± 119.09	136.02 ± 84.52	>0.05
HDL (mg/dL)	26.07 ± 4.85	34.68 ± 8.87	42.06 ± 9.51	34.33 ± 11.73	<0.05**
LDL (mg/dL)	107.59 ± 25.73	104.74 ± 27.45	137.56 ± 47.81	83.70 ± 24.47	>0.05
VLDL (mg/dL)	43.03 ± 21.96	38.90 ± 12.94	49.05 ± 24.63	27.20 ± 16.90	>0.05

4. Discussion

The results of the current study showed no significant differences in mean age among the four groups ($P>0.05$), indicating successful age matching between the groups. This finding is consistent with what [4] indicated regarding the importance of age control when studying infertility. In contrast, some studies have recorded age differences between groups classified by body mass index, demonstrating that age homogeneity is not always achieved [5].

As for body weight, significant differences were found between the groups ($P<0.05$), with the ovulation disorders group recording the highest mean weight. This may be related to the effect of excess weight in causing hormonal and metabolic disturbances that affect reproductive function, which is consistent with the findings of [6]. Conversely [7]. suggested that the effect of age may be more significant than the effect of weight in some cases. The study results showed no significant differences in ESR, WBC, RBC, and hemoglobin between the different groups ($P>0.05$), indicating a similarity in the inflammatory and hematological status of the participants. These results are consistent with the study by [8]. which also found no significant differences in these parameters between women with polycystic ovary syndrome (PCOS) and the control group. However, some studies have reported a significant increase in red blood cell count in infertile women compared to healthy women [9].

In contrast, hematocrit showed significant differences between the groups ($P<0.05$), with the control group recording the highest values and the infantile uterus group recording the lowest. This may be related to nutritional or hormonal disorders affecting hematopoiesis, which is consistent with the findings of [10]. Other studies, however, did not find significant differences in these parameters [11]. Triglyceride levels did not show significant differences between groups ($P>0.05$), although a relative increase was observed in the infertility groups compared to the control group. [12]. suggested an association between elevated triglycerides and reduced fertility, while some studies did not find significant differences after adjusting for confounding factors [13]. Longer, LDL levels did not show significant differences between groups, although they were numerically elevated in some infertility groups. Elevated LDL levels have been associated with an increased risk of infertility. while [14]. noted the variability in lipid profile results across different studies.

Similarly, VLDL levels did not show significant differences between groups, although they were relatively elevated in the infertility groups. [15]. suggested that ovulation disorders

may be associated with elevated VLDL macroparticles, while some studies have shown inconsistent results regarding this marker. As for HDL, it showed significant differences between the groups ($P < 0.05$), with the group with ovulation disorders recording the lowest levels. This result is consistent with what [16].

Reported regarding lower HDL in women with ovulation disorders, while some studies have indicated no consistent differences in this indicator between infertile and healthy women. [17] The difference in statistical values (P-value) between the indicators is due to the varying response of each indicator to the disease state. Some indicators may be significantly affected by hormonal and metabolic disturbances, showing significant differences ($p < 0.05$), while other indicators do not show a clear change between groups, therefore the differences are not significant ($p > 0.05$). This reflects the heterogeneity of the disease state's effect on all the studied indicators.

5. Conclusions

The study results indicate no significant differences in most blood parameters, lipids, and age between the groups, suggesting a general similarity in physiological status. However, a decrease in HDL and a decrease in hematocrit, along with an increase in weight, were observed in the infertility groups, particularly those with ovulation disorders. This suggests that metabolic and hormonal imbalances may play a more significant role in infertility than general changes in blood parameters.

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