

# Physiological Change of Interleukin-1 Alpha (IL-1 $\alpha$ ) in Iraqi, Thi-Qar Women with Polycystic Ovarian Syndrome

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**Abstract— Background:** IL-1 $\alpha$  is pro-inflammatory cytokine. In healthy cells, the IL-1 $\alpha$  precursor is essentially present in almost all cell types, but it becomes a bioactive mediator upon necrotic cell death. IL-1 $\alpha$  is also expressed by infiltrating myeloid cells within injured tissues. **Aim and Objective:** In this review, we focus on the biology of IL-1, its relationship to polycystic ovarian syndrome, and its developing role in the development and maintenance of the inflammatory processes that underlie the pathophysiology of PCOS women. **Materials and Methods:** Between the ages of (16 and 43), the 75 female patients enduring polycystic ovary syndrome are compared to the (50) healthy females in the oversight group. IL-1 alpha concentrations were noticeably greater in PCOS women compared to the control group, with p-values between (0.05-0.01) indicating a significant difference. These findings examined a non-significant difference in IL- levels between PCOS women and the control group, according to BMI. The research showed that PCOS women had considerably more IL-1 than women without PCOS in all BMI groups. IL-1-, however, in PCOS women and the Control Group The present findings looked at a non-significant variation in IL-1-concentration between PCOS women and the control group, according to Age. According to Age, the current results investigated at a non-significant difference in the concentration of IL-1- in PCOS women and the control group.

**Conclusion:** When comparable age groups for women with (PCOS) and controls were examined, the results showed a significant rise in PCOS cases at p. value < 0.05.

**Keywords:** Interleukin-1Alpha (IL-1 $\alpha$ ), PCOS, Pathophysiological detection, Thi-Qar women

## I. INTRODUCTION

Polycystic ovarian syndrome (PCOS), one of the most common endocrine illnesses, affecting 8-13% of women of reproductive age. Anovulation, hyperandrogenism (HA), and polycystic ovary

shape is defining features (PCOM) [1]. Also, it has been shown that they have low-grade inflammation, which increases insulin resistance. Diet, lifestyle, and exposure to specific environmental contaminants have a deleterious impact on PCOS. PCOS directly affects fertility, but if addressed, has major health consequences [2].

Important cytokines in the control of innate immunity and inflammation are a group of proteins belonging to the interleukin 1 (IL-1) family. IL-1 are the IL-1 family members that have received the most attention for their ability, to regulate apoptosis and proliferation in a variety of cell types [3]. The processes of fertilization and implantation may be impacted by the multifunctional cytokine IL-1, which has highly inflammatory properties in reproductive biology [4]. The crucial cytokine known as interleukin-1 alpha (IL-1), which contributes to inflammatory responses [5]. Numerous cell types, including fibroblasts, hepatocytes, keratinocytes, macrophages, dendritic cells, and T cells, significantly express IL-1 $\alpha$  [6].

According to research, PCOS-related low-level chronic inflammation may contribute to the condition's long-term effects [7]. According to in vitro research [8]. Pro-inflammatory stimuli increase the steroidogenic enzymes needed for the generation, of androgens in theca cells of the ovary (hyperandrogenism).

Interleukins play a number of functions and patterns, including supporting pro- and anti-inflammatory responses as well as immunomodulatory activities. These processes begin with the interleukin-1 $\alpha$  biomolecules' binding to the specific cell receptors, which may result in the development of immune responses. Nevertheless, the matching receptors, ligands, and signaling pathways are what determine these reactions' efficiency and specificity [9]. Since



inflammatory markers stimulate androgen synthesis in the ovaries, resulting in hyperandrogenism, PCOS and inflammation are related [10].

The metabolic syndrome component of obesity was linked to persistent inflammation in obese people [11].

## II. MATERIAL AND METHODS

### A. Study population

Between last December 2021 and June 30, 2022, 75 female patients with polycystic ovary syndrome between the ages of (16 and 43) participated, in comparison to 50 healthy voluntary women who served as the control group. Any drugs that might affect PCOS's ability to operate normally, such as anti-androgen and anti-lipid therapy, diabetes medications, and hormones, were excluded from consideration. A history of autoimmune diseases, such as diabetes, hyperprolactinemia, and recognized hyperandrogenic syndromes, could also be ruled out. Menopausal, pregnant, hyperandrogenemic, or menstruating irregularly women were also unsuitable.

The next two categories were looked into.

### B. Diagnostic Criteria

The diagnostic standards for PCOS are based on the (2017) study "History of discovery of polycystic ovary syndrome," which used ESHRE/ASRM criteria.

1. Oligomenorrhea and Amenorrhea.
2. Biochemical or clinical hyperandrogenemia is one example.

A polycystic ovarian morphology is defined by ultrasound as having 12 or more (2–9 mm) follicles or more per ovary.

Patients who meet at least two of the aforementioned diagnostic criteria after excluding those with congenital adrenal hyperplasia, diabetes, prolactinaemia, autoimmune disorders, androgen-secreting tumors, etc.

### C. Statistical analysis

The statistical software program (SPSS) (Statistical Package for Social Science) was used to evaluate the current data using the following statistical principles.

T test on an independent sample. At p-values of (0.05 and 0.01), one-way ANOVA and least significant difference (LSD) are used.

### D. Blood collecting

In both the patient and control groups, five ml of blood were drawn from each woman during the luteal phase of her menstrual cycle. Venous blood samples were put in a sterile, vacuum-sealed glass gel and clot-stimulator tube, allowed to coagulate for (30) minutes, and then centrifuged. A duplicate of the serum was taken out and placed in an Eppindroff tube before being utilized for chemical and hormonal research.

### E. Body Mass Index

Body mass index (BMI) is calculated by multiplying a woman's squared weight in kilograms by her height in meters [12]. The four groups that made up the control and patient populations in this study were normal weight (BMI 24), overweight (BMI 24), obesity (BMI 24), and obesity1 (BMI 24). Additionally, the BMI value was used to split the control and patient populations into two groups: normal weight (BMI 24) and overweight, obesity, and obesity1 (BMI 24). The BMI was categorized in accordance with [13].

## III. RESULT

IL-1alpha Concentration in (PCOS) Women and the Control Group, as Estimated. Women with PCOS experienced a considerable rise in IL-1 $\alpha$ . As seen in table (1-1), at p.value 0.05 .

Concentration of the IL- involved in PCOS women and control groups (Table 1-1)

Table 1-1: concentration of IL-1 $\alpha$  in PCOS women and control group

Parameter	Mean	SD	T test P. value
	+		
	PCOS No. 75	Control No.50	
IL- $\alpha$	129. $\pm$ 36.0	29.4 $\pm$ 5.24	< 0.001

### A. Estimation IL-1 $\alpha$ in PCOS patients and control group according to BMI.

The current study examined a non-significant difference in IL-1 levels between PCOS women and the control group, according to BMI. The findings also demonstrated a considerably higher concentration of IL-1 in PCOS women than in the control group, as indicated in table (1-2) across all BMI categories.

Table 1-2: IL-1 $\alpha$  concentration in PCOS patients and control group according to BMI

IL-1 $\alpha$ BMI Kg/M <sup>2</sup>	Cases No.	PCOS Mean $\pm$ SD	Cases No.	Control Mean $\pm$ SD	t. test P. value
Normal W	15	127.8 $\pm$ 19.6	16	30.0 $\pm$ 2.69	< 0.001
Overweight	34	136.5 $\pm$ 38.7	21	30.4 $\pm$ 4.91	< 0.001
Obesity	14	114.4 $\pm$ 16.7	8	26.3 $\pm$ 5.91	< 0.001
Obesity I	12	130.3 $\pm$ 37.9	5	29.4 $\pm$ 6.79	< 0.004
P. value	75	0.543	50	0.100	
LSD		No-Sig		No-Sig	

*B. Estimation IL-1-α in PCOS patients and Control Group According to Age*

In the current study, age-related variations in IL-1 levels between PCOS women and the control group were

compared. when PCOS-positive ladies and controls were compared by age groups, the findings, as shown in tables (1-3), indicated a significant increase in PCOS cases at p. value (0.05) .

Table 1-3: IL1-α concentricity in PCOS patients and control group as stated by age groups.

IL-1-α	Cases No.	PCOS Mean± SD	Cases No.	Control Mean± SD	t. test P. value
16-25	27	117.7 ± 15.5	15	29.2 ± 5.11	<0.001
26-35	30	134.1 ± 42.3	23	29.9 ± 4.82	<0.001
Above 35	18	135.6 ± 40.5	12	28.6 ± 6.21	<0.001
P. value	75	0.320	50	0.697	

IV. DISCUSSION

The investigation of IL-1- levels in this study revealed in table (1-1) that sera from PCOS patients had considerably higher IL-1- concentrations than expected. According to studies, PCOS is a chronic, low-level inflammatory syndrome, and this persistent illness may have a role in how the condition manifests itself over time [7].

This finding was consistent with prior research by Aboeldalyl [14]. Inflammation has been associated, with the pathophysiological process underlying PCOS and its effects, and its presence is therapeutically beneficial. According to these results, IL-1 has a detrimental effect on follicle development and ovarian function.

The results of the present study disagree with those of Escobar [15], and more research is needed to clarify whether the pro-inflammatory state is brought on by PCOS itself, or simply by the higher quantities of dysfunctional adipose tissue in those people.

It's possible that such a concept shows the potential that inflammation might cause hyperandrogenism in PCOS. A cytokine known as interleukin-1 alpha has the capacity, to cause inflammation, which may have an effect on the ovulation, implant, and fertilization processes.

According to BMI, there was no statistically significant difference in IL-1 levels between, the PCOS women and the control group in the current investigation. (table1-2). Additionally, PCOS women's IL-1 concentration was noticeably higher than that of the control group. in all BMI measurements. The finding of this investigation was consistent with [16], who discovered that interleukin-1 α (IL-1 α) belongs to the main adipokines involved in the control of inflammatory processes in obese people and also that dysfunctional adipose tissue cells emit a number of cytokines, including IL-1 [17].

The findings of [18] were contested by researchers, who couldn't agree on whether PCOS itself, or the underlying obesity was to blame for the higher inflammation in PCOS. Due to the increased inflammation brought on by obesity and the possibility that the majority of PCOS patients are obese,

it has been discovered that abdominal obesity may influence sera IL-1 levels.

In the current study, the concentration of IL1- According to the table, there were no statistically significant differences between the PCOS women and the control group by age categories. (1-3).Additionally, compared to all age groups, PCOS women showed a statistically significant rise.Controls (p value 0.05). Studies have revealed that PCOS is characterized by continuing low-level inflammation, which may be a factor in the condition's long-term repercussions [7]. It's possible that the largest occurrence of polycystic ovarian syndrome occurs in women between the ages of 18 and 44.

CONFLICT OF INTEREST

Authors declare that they have no conflict of interest.

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