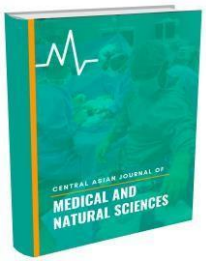

CENTRAL ASIAN JOURNAL OF MEDICAL AND NATURAL SCIENCES
https://cajmns.centralasianstudies.org/index.php/CAJMNS
*Volume: 05 Issue: 04 | October 2024 ISSN: 2660-4159*

*Article*

# Comparison among Vitamin D Levels in Associate with PCOS Variables in Women

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**Abstract:** Vitamin D deficiency is a condition that has been linked to an amplified hazard of acquiring Polycystic Ovary Syndrome in females. The objective of this investigation was to look at vitamin D deficiency in women with PCOS, also to see if there is a physiological function and effect on some of the bio-chemical indicators and the interaction between them. In this case study, there are two groups:80women with PCOS plus20normal women as a healthy controls. Serum hormonesFSH,LH,EstrogenE2,and Testosterone plus serum vit.D were measured in wholly research members using contemporary biochemical procedures. The results reveled that serum vit.D were significantly minor in patients by PCOS P = 0.00005compared with control group. The serum concentration of vit.D was meaningfully inferior in obese women with PCOS compared with non-obese women, meanwhile, concentrations of serum vit.D were shown to be favorably linked with(BMI),(P = 0.03).In conclusions, when compared to healthy women, there was no significant increase in the average stages of FSH,LH,andE2 in any group of PCOS women. In addition, the concentration of vit.D was substantially positively associated with the age of women with PCOS and BMI, not find any correlation between serum vit.D concentration with infertility duration,FSH,LH,E2,and Testosterone hormones in both women with PCOS and the group's control, and the study not find any correlation between serum vit.D concentration with infertility duration, FSH, LH, E2,and Testosterone hormones in both women with PCOS and the control group .Vitamin D deficiency is common in PCOS women in Iraq. Especially in those with a high BMI. its impact on hormonal regulation may be limited.

**Keywords:** polycystic- ovary/ovarian syndrome, vitamin D deficiency, BMI, hormone.

**Citation:** Chyad, A, R. M. Comparison among Vitamin D Levels in Associate with PCOS Variables in Women Central Asian Journal of Medical and Natural Science 2024, 5(4), 830-834.

Received: 10th June 2024
Revised: 11th July 2024
Accepted: 24th August 2024
Published: 27th Sept 2024



## 1. Introduction

PCOS (Polycystic Ovary/ovarian Syndrome) is a widespread syndrome among ladies all aroundthe world It is often related with anovulation, irregular menstruation, and most of the time infertility. Approximately 70% of affected women are not diagnosed and it may persist for a long time before this syndrome is recognized. This syndrome is diverse, defined by a combination of symptoms and consequences of androgen excess and ovarian failure [1]. Recent studies have indicated that PCOS appears at an early age and continues throughout life [2]. Some studies have indicated that being overweight and obese increase the severity of this syndrome and in rare cases, PCOS may lead to advanced disorders such as endometrial hyperplasia or tumors [3]. Although there is no consensus in some of the data as to whether the amount of vitamin D variations between women with PCOS than those without, but majority of researchers have established a link between Vitamin D and metabolic difficulties in PCOS patients. [4]. Recent studies have shown that vitamin D deficiency is common in patients with PCOS and that may be related with metabolic and endocrine disorders in PCOS [5]. Another study found that using vitamin D as a dietary supplement lowers blood pressure, insulin

resistance, and testosterone stages in PCOS patients. [6]. Some studies have also found that when compared to non-obesity 'PCOS' patients, Vitamin D levels decreased in obese women with PCOS when compared to PCOS patients. Non-obese [7]. PCOS may causes an increase in the concentration of less potent estrogen. Androgen is the source of estrogen in ovarian cells. As stated in the theory of the two cells gonadotrophin theory, there are two cells one is granulose cell and the another is the granulose cell, the theca cells are stimulated by Luteinizing Hormone (LH) and secret androgen which upon entering the granulosa cell gets converted into estrogen by the enzyme called aromatase and by a gonadotrophin Follicular Stimulating Hormone (FSH). When this change happens in the ovary, estradiol, a potent estrogen, is produced; however, when this conversion happens in the peripheral fat cells, estrogen is secreted [8]. As can be seen from the preceding, Vitamin D is significant in the formation of PCOS and as a result, various studies on Asian people have focused on this topic. The purpose of this study is to see if there is a substantial drop in vitamin D levels in Iraqi women with PCOS there will also be an emphasis on the association between vitamin D levels and certain biomarkers in women with this illness (Min, 2020).

## 2. Materials and Methods

The research was conducted on Iraqi's women in 2021. This study included dual groups. The initial group included 80 women with PCOS their ages with a mean +SD of 31.8+5.892 years. While the second included 20 healthy women. Their ages with a mean +SD of 31.95+5.725 years. Their age matched those of patients group and control group. Venous blood samples were collected by taking (5 ml) of blood from each patient, all of them healthy human beings from women. The serum was isolated using centrifugation has 3000 rpm aimed at ten minutes. Serum was divided into aliquots in the tubules till hormone and 25 (OH)-D estimation. We analyzed the subsequent variables: FSH, LH, E2 and Testosterone,and Serum 25(OH)-D by using biochemical methods and special kits. Arithmetical analyzes were performed with Microsoft SPSS version 24 which includes the following (mean + SD), P-values less than 0.05 were deemed significant. The lined reversion examination was performed to examine the association of the 25 (OH)-D values through the hormone's variable.

## 3. Results

The participants' clinical and biochemical profiles are depicted in Table 1 Data from 80 women with PCOS were evaluated, and they were compared to 20 healthy women as a control group. The study's findings show a statistically significant rise in the amount of vitamin D in blood serum of the control group as compared with the women with PCOS (P =0.00005). The mean + SD of age, severity of infertility, and follicle-stimulating hormone levels (FSH), luteinizing hormone (LH), and estrogen in the two groups were equal, and statistical analysis revealed no significant difference. Other characteristics, such as BMI and testosterone levels, differed significantly between the two groups. Table 1 shows that (p = 0.03 and p =.00005), respectively.

**Table 1 A** comparison of some characteristics of the women with PCOS with the control group

| Biomarkers | women with PCOS (n = 80) Mean ±SD | Control (n = 20) Mean ±SD | p-value | p < 0.05 |
|---|---|---|---|---|
| Vit D3 (ng/ml) | 19.0625±12.77 | 31.9±9.547 | 0.00005 | significant |
| women age years | 31.8±5.892 | 31.95±5.725 | 0.9 | not significant |
| infertility duration years | 5.25±2.18 | 4.8±2.19 | 0.4 | not significant |

| | | | |
|---|---|---|---|
| **FSH (IU/L)** | **5.68±1.56** | **5.511±1.55** | **0.6** | **not significant** |
| **BMI** | **27.26+8.08** | **23.1+5.94** | **0.03** | **significant** |
| **LH (IU/L)** | **10.57+2.85** | **10.38+2.95** | **0.7** | **not significant** |
| **Esterogen (esterodiol)pg/ml** | **99.88±62.53** | **98.35±48.705** | **0.9** | **not significant** |
| **Testosterone** | **1.36±0.989** | **0.42±0.277** | **0.00005** | **significant** |

According to this study, there is a weak significant connotation between serum 25(OH)D concentration level and women's age and BMI in women with PCOS, with the impact being visible when compared to the control group. Furthermore, we did not find any correlation between serum 25(OH)-D concentration with infertility duration, FSH, LH, E2, and Testosterone hormones in both women with a PCOS and the control group, in addition to the absence of relationship between them as indicated by the R2values such as shown in Table 2

**Table 2** Correlations between 25(OH) D and other biomarkers in the women with PCOS ovarian and control

| | **women with PCOS** | | | | **control** | | | |
|---|---|---|---|---|---|---|---|---|
| **D3** | **women age years (r)** | **$R^2$** | **p-value** | **significant** | **women age years (r)** | **$R^2$** | **p-value** | **significant** |
| | **0.289** | **0.15** | **0.009** | **Yes** | **0.04** | **0.7** | **0.8** | **No** |
| **D3** | **infertility duration years(r)** | **$R^2$** | **p-value** | **significant** | **infertility duration years(r)** | **$R^2$** | **p-value** | **significant** |
| | **0.11** | **0.07** | **0.3** | **No** | **0.3** | **0.5** | **0.1** | **No** |
| **D3** | **FSH (IU/L) (r)** | **$R^2$** | **p-value** | **significant** | **FSH (IU/L) (r)** | **$R^2$** | **p-value** | **significant** |
| | **0.1** | **0.08** | **0.3** | **No** | **0.07** | **0.5** | **0.7** | **No** |
| **D3** | **BMI (r)** | **$R^2$** | **p-value** | **significant** | **BMI (r)** | **$R^2$** | **p-value** | **significant** |
| | **0.2** | **0.12** | **0.03** | **Yes** | **0.02** | **0.6** | **0.9** | **No** |
| **D3** | **LH (IU/L) (r)** | **$R^2$** | **p-value** | **significant** | **LH (IU/L) (r)** | **$R^2$** | **p-value** | **significant** |
| | **0.09** | **0.09** | **0.4** | **No** | **0.02** | **0.6** | **0.9** | **No** |
| **D3** | E2 **pg/ml(r)** | **$R^2$** | **p-value** | **significant** | E2 **pg/ml(r)** | **$R^2$** | **p-value** | **significant** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **0.14** | **0.09** | **0.19** | **No** | **0.008** | **0.2** | **0.9** | **No** |
| **D3** | **T (r)** | **$R^2$** | **p-value** | **significant** | **T (r)** | **$R^2$** | **p-value** | **significant** |
| | **0.16** | **0.2** | **0.14** | **No** | **0.1** | **0.4** | **0.6** | **No** |

## 4. Conclusion

Over a billion persons are vitamin D deficient, which is a major problem worldwide. [9]. While the study's findings found substantial differences suggesting a vitamin D shortage in women with PCOS when compared to the results of healthy women as a control group, this study focused on assessing the levels of vitamin D concentration in PCOS women. This study also focused on some biochemical indicators such as hormones, which were prudently careful to approve or reject impurity, besides, the special effects of vitamin D inadequacy on the efficiency and stages of these hormones will be considered as optional by the study in both groups, PCOS and the control set. We found no relation among vitamin D and these hormones.

Some studies have shown encouraging results when utilizing vitamin D as a treatment for PCOS, since the vitamin can help lower insulin resistance and high androgen levels, as well as enhance fat metabolism, all of which can help minimize the risk of PCOS. [10]. Current study findings concur with another study by Fang F et al. in which they indicated that vitamin D deficiency is closely related with the occurrence of polycystic ovaries in women [11]. Therefore, Numerous researches that have been conducted in recent years have confirmed the analysis of vitamin D in women with PCOS [11]. Several studies have been conducted showing that vitamin D deficiency is associated with increased body mass index (BMI) in women, and this is congruent with the findings of this research, since there was a significant association between vitamin D deficiency and BMI in both women with PCOS and the control group [12].

Vitamin D has been found in research to be negatively linked to obesity and diabetes. Research has indicated that 25 (OH) -D can rise the appearance of insulin receptors [13]. Additionally, another study indicated that vitamin D has a secondary beneficial purpose in the part of insulin by regulating extracellular calcium [14]. Other researchers concurred with the findings, and colleagues the association between vitamin D levels are not statistically significant and BMI in women with the syndrome which does not agree with the results of our study [15]. The difference between the results of the studies can be attributed to the difference in the sample size, environmental and social conditions, as well as differences in diet, lifestyle, and diagnostic times of vitamin D deficiency. Previous studies reported that vitamin D deficiency is associated with a disorder of hyper and organism such as serum testosterone, free androgen index, and free testosterone [16]. The serum levels of FSH, LH, and E2 in the current study were within normal levels in both groups, where no statistically significant difference was observed despite a significant difference in vitamin D concentrations ($p < 0.05$). Our findings show that vitamin D deficiency may be related to increased testosterone levels in cases of PCOS. These results may be consistent with Thomson R.L., et al as the results of their study indicated that women with PCOS had higher testosterone concentrations in comparison to the control group [17]. The findings of this study correspond with those of Arun Kumar et al, who found that body mass index (BMI) and testosterone were higher in the vitamin D group (30 ng / mL) than in the vitamin D control group. [18]. The findings of this study contradict Ahmed and others' claims that there is a positive association between vitamin D levels and levels of FSH, LH, and testosterone [19]. We think that a lack of vitamin D leads to the development of PCOS. As a result of obesity and elevated testosterone levels. Our data indicate that a shortage of vitamin D possibly be a risk factor for the progress of PCOS.

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