

Frequency of Vitamin D Deficiency in Patients with Polycystic Ovarian Syndrome

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ABSTRACT

Aim: To determine the frequency of vitamin D deficiency in women presented with polycystic ovarian syndrome.

Study Design: Cross-sectional/observational

Place and Duration: Study was conducted at Obstetrics and Gynaecology department of Saidu Teaching Hospital, Swat for duration of one year from 15 January 2019 to 15 January 2020.

Materials & Methods: Total 122 patients of polycystic ovarian syndrome with ages 20 to 50 years were enrolled in this study. Patient's detailed demographics including age, body mass index, duration of diseases, parity and residence were recorded after taking consent. Serum 25-hydroxyvitamin D level <20 ng/ml was considered as deficiency of vitamin D. data was analyzed by SPSS 24.0.

Results: 30 (24.6%) patients were having ages <25 years, 48 (39.34%) had ages 25 to 30 years, 25 (20.5%) had ages 31 to 35 years and 19 (15.8%) were having ages above 35 years. 75 (61.5%) patients were having BMI <30 kg/m² while 47 (38.5%) patients had BMI >30kg/m². Deficiency of vitamin D found in 83 (68.03%), 21 (17.21%) patients had vitamin D insufficiency and 18 (14.8%) patients had vitamin D level >30 ng/mL.

Conclusion: It is concluded that frequency of vitamin D deficiency was very high in patients with polycystic ovarian syndrome.

INTRODUCTION

The most common endocrine disorder in women of reproductive age is polycystic ovary syndrome (PCOS). It is characterised by polycystic ovaries, menstrual dysfunction, infertility, biochemical and clinical hyperandrogenism. Vitamin D is largely unknown to be correlated in PCOS with endocrine, metabolism and genetics. After all, vitamin D is not really a vitamin[1]. It is also a precursor hormone and is an essential factor in preserving hormonal equilibrium. It is the building block of a strong steroid hormone called calcitriol in your body.¹

There has been widespread discussion about Vitamin D recently, possibly because up to 75% of the population worldwide is vitamin D deficient. Vitamin D can put one at risk for many health problems such as rickets, tuberculosis, psoriasis, multiple sclerosis, inflammatory bowel disease, diabetes Type 1 diabetes. Many of these diseases can be decreased by 20-0% or more by an increase in vitamin D intake by exposure to sun, foods fortified or supplementary medicines. It is estimated that²

The most common endocrine condition is polycystic ovary syndrome (PCOS), which occurs in up to 18 percent of this population. The symptoms are relatively mild. PCOS is differentiated by polycystic ovaries, menstrual dysfunctions, infertility and biochemical hyperandrogenic (elevated androgen) and clinical hyperhyperandrogenic³. Metabolic disorders, particularly insulin resistance, often affect women who suffer from polycystic ovary syndrome (PCOs). Accumulative evidence indicates that deficiency in vitamin D may lead to insulin resistance growth.

Vitamin D is largely unknown in PCOS to interact with endocrine, metabolism and genetic aspects⁴. Vitamin D is well-known for its role in preserving the homeostasis of calcium and phosphorus and in encouraging bone

mineralization. In addition to sex steroid hormones, vitamin D also modulates reproductive processes in men and women by means of the classic regulators of human reproduction. A deficiency of vitamin D in women with PCOS is normal in women with serum levels of 25 hydroxy vitamin D (25OHD) <20 ng/mL. Vitamin D deficiency is common in women with PCOS⁵. Accumulative proof is available of the significant reproductive role played by vitamin D.

In the ovary, endometrium and placenta, vitamin D and reproductive function were found. Vitamin D deficiency is associated with calcium deregulation, which contributes to the development of follicular arrest in women with PCOS and results in menstrual and fertility dysfunction⁶. Studies have shown that women with PCOS have mostly insufficient vitamin D levels, and vitamin D replacement therapy may have a beneficial effect on insulin resistance (IR) in women with PCOS. People with higher vitamin levels are 40% less prone to diabetes. The pancreas secretes insulin with the vitamin. It also decreases systemic inflammation, which affects resistance to insulin⁷.

Our research aims to determine the frequency with which women with polycystic ovary syndrome experience a vitamin D deficiency. Although the work has been completed, locally it remains minimum for further techniques and modifications to provide an effective basis.

MATERIALS AND METHODS

This cross-sectional/observational study was conducted at Obstetrics and Gynaecology department of Saidu Teaching Hospital, Swat for duration of one year from 15 January 2019 to 15 January 2020.

A total 122 patients of polycystic ovarian syndrome with ages 20 to 50 years were enrolled in this study.

Patient's detailed demographics including age, body mass index, duration of diseases, and waist circumference were recorded after taking written consent. Diabetic patients, patients with acute renal failure, liver failure patients, patients with pelvic inflammatory disease, pregnant women, patients on vitamin D supplementation and patients with hypertension were excluded from this study.

5 ml of blood sample was taken from each patient to examine the level of 25-hydroxy vitamin D. 25OHD level ≥ 30 ng/mL considered sufficient, 20-29 ng/mL considered as insufficient and <20 ng/mL was considered as deficiency of vitamin D. All the data was analyzed by SPSS 24.0. Frequencies and percentages were recorded in tabulation form. Chi-square test was done to examine the association between body mass index and vitamin D deficiency. P-value <0.05 was taken as statistically significant.

RESULTS

Among all the 122 patients, 30 (24.6%) patients were having ages <25 years, 48 (39.34%) had ages 25 to 30 years, 25 (20.5%) had ages 31 to 35 years and 19 (15.8%) were having ages above 35 years. 75 (61.5%) patients were having BMI <30 kg/m² while 47 (38.5%) patients had BMI >30 kg/m². 58 (47.54%) patients had disease duration <2 years and 64 (52.46%) were disease duration above 2 years. Mean systolic BP was 105.13 ± 13.06 mmHg and mean diastolic BP was 73.02 ± 5.62 mmHg. Mean waist circumference was 85.24 ± 10.94 cm. (Table 1)

Table No 1: Demographical details of all the patients

Characteristics	Frequency No.	%age
Age (yrs)		
<25	30	24.6
25 to 30	48	39.34
31 to 35	25	20.25
>35	19	15.8
BMI		
<30 (kg/m)	75	61.5
>30 (kg/m)	48	38.5
Disease Duration		
> 2 yrs	58	47.54
<2 yrs	64	52.46
Mean Systolic BP (mmHg)	105.13 ± 13.06	-
Mean Diastolic BP (mmHg)	73.02 ± 5.62	-
Mean waist Circumference (cm)	85.24 ± 10.94	-

According to the 25-hydroxy vitamin D level, deficiency of vitamin D found in 83 (68.03%), 21 (17.21%) patients had vitamin D insufficiency and 18 (14.8%) patients had vitamin D level >30 ng/mL. (Table 2)

Table No 2: Frequency of vitamin D among all the patients

Variables	Frequency No.	% age
Vitamin D Deficiency	83	68.03
Vitamin D Insufficiency	21	17.21
Vitamin D Sufficient	18	14.8

Patients with BMI ≥ 30 kg/m² had high rate of vitamin D deficiency 45/48 (93.8%) as compared to patients with BMI <30 kg/m² 46/75 (61.33%), a significant association was found between higher BMI and vitamin D deficiency with p-value <0.001 . (Table 3)

Table No 3: Association between vitamin D deficiency with BMI

Variables	Vitamin D Deficiency	No Deficiency	P-value
BMI			<0.001
<30 (kg/m)	46 (61.3%)	29 (38.7%)	
>30 (kg/m)	45 (93.8%)	3 (6.2%)	

DISCUSSION

Hypovitaminosis D is connected to the onset of chronic diseases and that the deficiency may interfere with the normal physiology of the human body⁸. We conducted present study to examine the frequency of vitamin D deficiency in women with polycystic ovarian syndrome. In this regard 122 patients with polycystic ovarian syndrome were analyzed. Majority of patients 48 (39.34%) were ages between 25 to 30 years followed by 30 (24.6%) patients had ages <25 years, 25 (20.5%) had ages 31 to 35 years and 19 (15.8%) had ages above 35 years. These results were comparable to many of previous studies in which majority of patients 40% to 55% were ages between 25 to 30 years⁹⁻¹⁰.

75 (61.5%) patients were having BMI <30 kg/m² while 47 (38.5%) patients had BMI >30 kg/m². A study conducted by Parikh U et al¹⁴ reported in their study that 46% patients had BMI <25 and 54% had BMI >30 kg/m². 58 (47.54%) patients had disease duration <2 years and 64 (52.46%) were disease duration above 2 years. Mean systolic BP was 105.13 ± 13.06 mmHg and mean diastolic BP was 73.02 ± 5.62 mmHg. Mean waist circumference was 85.24 ± 10.94 cm. In another study out of 60 cases 41 (68%) of women with PCOS had vitamin D deficiency (level <20 ng/ml) but without significant difference among the groups according to BMI (p=0.054) i.e. 22 (37%) were non-obese and 19 (31%) were obese¹¹.

In present study we deficiency of vitamin D found in 83 (68.03%), 21 (17.21%) patients had vitamin D insufficiency and 18 (14.8%) patients had vitamin D level >30 ng/mL. Similar frequency of obesity (45.5%), Anjum et al in 2013¹² have recorded a significant vitamin D deficit of 56% in polycystic ovary syndrome patients at Dow University of the Health Sciences, Karachi, in a 2016 study conducted in Rawalpindi Railway Hospital.¹³ We have observed that vitamin D in 57.9% of women with PCOS have been deficient in Korean population in Kim et al¹⁰. Wehr et al in Austria observed a relative lower incidence of 31.2%.¹⁴

We found that patients with BMI ≥ 30 kg/m² had high rate of vitamin D deficiency 45/48 (93.8%) as compared to patients with BMI <30 kg/m² 46/75 (61.33%), a significant association was found between higher BMI and vitamin D deficiency with p-value <0.001 . These findings were similar to some earlier studies where obese patients were more pronounced than patients with standard BMI for a vitamin D deficiency¹⁵⁻¹⁶. However, some research found no meaningful association of obesity with p-value deficit $p > 0.05$ ¹⁷. There were no significant correlations.

The effect of vitamin D substitution on symptoms of disease in these patients is also necessary. Therefore, in future practice, such a study is recommended.

CONCLUSION

Normal levels of vitamin D help a person prevent many common disorders, such as diabetes, infertility, metabolic

syndrome and may minimize death rates from serious diseases. In this study, we concluded that in patients with polycystic ovarian syndrome, the prevalence of vitamin D deficiency was 68.03%. We also discovered that vitamin D deficiency was higher in patients with higher BMI.

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