



THE PREVALENCE OF VITAMIN D DEFICIENCY IN PCOD PATIENTS VERSUS NORMAL POPULATION

Gynaecology

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ABSTRACT

Vitamin D deficiency (VDD) is common in women with and without polycystic ovary disease (PCOD). There is evidence that Vitamin D has role in incidence of PCOD and may be associated with metabolic and endocrine disorders in PCOD. Obesity is associated with low serum vitamin D level. The aim of this study is to know the prevalence of Vitamin D deficiency in PCOD patients versus normal population. **METHOD-** This is comparative analytical study on two unpaired population by using cross sectional study design. The study was conducted in NMCH Patna from October 2015 to January 2017. 50 Patients suffering from PCOD and 50 patients attending Gynaecology OPD from other problem having regular menstrual cycle were studied. Serum vitamin D level and BMI was measured. Results were classified as follows- Serum concentration of 25(OH)D was measured. Vitamin D deficiency were indicated as < 20 ng/ml, insufficiency as $21 - 29$ ng/ml and sufficiency was defined as > 30 ng/ml. **Results-** in PCOD group 24% of patients had normal serum Vitamin D level, 26% had insufficient and 50% had deficient level of serum Vitamin D. In control group 56% women had normal value, 26% insufficient and 20% were deficient of Vitamin D. Mean serum Vitamin D level was 22.6 in PCOD group as compared to control 30.88. In PCOD group Vitamin D level was lower in obese patients. **Conclusion-** This study found significant lower level of Vitamin D in PCOD patients

KEYWORDS:

PCOD, BMI, Vitamin D deficiency.

INTRODUCTION-

Polycystic ovary syndrome (PCOS) is the most common female endocrine disorder with a prevalence of 5–10%. PCOS is characterized by the presence of polycystic ovaries, menstrual dysfunction, infertility, biochemical and clinical evidence of hyperandrogenism in women of reproductive age.

Vitamin D is a steroid hormone, synthesized mainly by the skin on exposure to ultraviolet light, with $<10\%$ – 20% coming from diet. Vitamin D receptor is present on intestines, skeleton, and parathyroid glands, reproductive organs, such as ovary (particularly granulosa cells), uterus, placenta, testis, hypothalamus, and pituitary gland. Vitamin D receptor (VDR) regulates more than 3% of the human genome, including genes that are crucial for glucose metabolism.

Vitamin D deficiency is found both in general population and in patients of PCOD. Accumulating evidence suggests that vitamin D deficiency may be involved in the pathogenesis of PCOS. Number of observational studies have demonstrated associations between lower level of Vitamin D levels and PCOS. Thomson et al (1) reported that prevalence of Vitamin D deficiency in women with PCOS is about 67–85 per cent, with serum concentrations of 25(OH)D <20 ng/ml

AIM OF STUDY- The aim of this study is to assess the prevalence of serum Vitamin D deficiency in women with and without PCOD-

METHOD AND MATERIAL- This is a comparative analytical study on two unpaired population by using a cross sectional study design. The study was conducted in NMCH, Patna from 50 patients suffering from PCOD and 50 healthy women were included in the study.

PCOS was diagnosed using the Rotterdam criteria. Of the following three criteria, two are required to confirm the diagnosis:

- Clinical and/or biochemical signs of hyperandrogenism,
- Oligo- and/or anovulation, and
- Polycystic ovaries (by ultrasound).

INCLUSION CRITERIA

- Women of age 15–35 years
- Patient had not received calcium or vitamin D preparations, and women who are exposed to sunlight

- Not suffering from Hyperprolactinemia, hypothyroidism, Cushing's syndrome, congenital adrenal hyperplasia, and androgen secreting tumors.

- PCOS women and control women did not take any medication known to affect Serum vitamin D level..

Weight was measured in light indoor clothing and barefoot and height was measured in stand up position. BMI was calculated according to formula, $BMI = \text{kg/m}^2$. Based on BMI findings, we divided the participants into four following groups: less than 18.5 kg/m^2 as underweight, $18.5\text{--}22.9 \text{ kg/m}^2$ as normal weight, $23\text{--}24.9 \text{ kg/m}^2$ as overweight and 25 kg/m^2 or more as obese. 50 patients were studied in both group.

Blood sample was taken and serum vitamin D concentration was measured. Serum Vitamin D divided into 3 groups Deficiency <20 ng/ml, Insufficiency as $21 - 29$ ng/ml and Sufficient was defined as >30 ng/ml.

TABLE -1- DISTRIBUTION OF CASES ACCORDING TO BMI

BMI	PCOS		CONTROL	
	NUMBER	PERCENTAGE	NUMBER	PERCENTAGE
UNDERWEIGHT	0	0	5	10%
NORMAL WEIGHT	8	16%	30	60%
OVERWEIGHT	18	36%	10	20%
OBESE	24	48%	5	10%

TABLE -2 DISTRIBUTION OF CASES ACCORDING TO SERUM VITAMIN D LEVEL

SERUM VITAMIN D LEVEL	PCOD	CONTROL	P VALUE (BY CHI SQUARE TEST)
			<0.05
DEFICIENCY	25	10	
INSUFFICIENT	13	12	
SUFFICIENT	12	28	

TABLE -3 – MEAN SERUM VITAMIN D LEVEL IN PCOD AND CONTROL

	SERUM VITAMIN D LEVEL		P VALUE
	MEAN LEVEL	SD	<0.000015
PCOS	22.60		
CONTROL	30.88		

TABLE -4- Distribution of Vitamin D Levels in Women with and without PCOS based on BMI

SERUM VITAMIN D LEVEL						
	PCOD			CONTROL		
BMI	NOR MAL	INSUFFI CIENCY	DEFE CIENCY	NOR MAL	INSUFFI CIENCY	DEFE CIENCY
UNDERWEIGHT	0	0	0	2(5)	1(5)	2(5)
NORMAL	4(8)	2(8)	2(8)	20(30)	6(30)	4(30)
OVERWEIGHT	6(18)	4(18)	8(18)	5(10)	3(10)	2(10)
OBESE	2(24)	7(24)	15(24)	1(5)	2(5)	2(5)
TOTAL	12(24%)	13(26%)	25(50%)	28(56%)	12(24%)	10(20%)

TABLE-5 - MEAN VITAMIN D LEVEL IN WOMEN WITH AND WITHOUT PCOD BASED ON BMI

	PCOD	PCOD	CONTROL	CONTROL	
BMI	Mean vitamin d level ng/ml	SD	Mean vitamin d level nmg/ml	SD	
UNDERWEIGHT	0		24	9.92	
NORMAL WEIGHT	31	10.65	32.86	8.46	
OVERWEIGHT	25.166	10.25	30.6	10.068	
OBESE	17.875	8.42	25.6	11.08	P value is 0.03

RESULTS AND DISCUSSION— In my study according to BMI 48% of the PCOD patients were obese, 36% were overweight and 16 % were of normal weight. In control group 10 % patients were under weight, 60% of the patients were of normal weight, 20% patients overweight and 10% were obese.

Among PCOD patients Vitamin D deficiency was found in 50 % cases, insufficiency in 26% and normal level in 24% of patients. In control group 56% of patients had normal Vitamin D level, 24% of patients were insufficient and 20 % were deficient.

Mean serum Vitamin D level was 22.60 ng/ml in PCOD group and 30.88ng/ml in control group which is clinically significant.

-In PCOD group mean serum Vitamin D level was 31ng/ml in normal BMI group, 25.16ng/ml in overweight group and 17.87ng/ml in obese patients. In control group mean serum Vitamin D level was 24ng/ml in underweight group, 32.6g/ml in normal weight group, 30.6 ng/ml in overweight group and 25.6 ng/ml in obese patients.

Several study have been done to study the association between serum Vitamin D and PCOD. Mahmoudi et al(2) found the women with PCOS had a significantly higher vitamin D level (29.3 ng/ml in PCOS women vs 19.4 ng/ml in control women).

Elida et al reported significantly lower level of Vitamin D level in PCOD group compared to normal population –(25.25 vs 36.30)(3)

Wehr et al (4)also reported lower level of Vitmin D in PCOD patients(n=545) compared to control group(25.7 vs 32 ng/ml) Ashraf Moini et (5) al reported no clinically significant difference in

serum Vitamin D level between PCOD and normal population- Li et al. (6) reported lower Vitamin D levels, although not significant, in women with PCOS compared with women without PCOS (11 ng/ml in PCOS group vs 17 ng/ml in controlgroup).(4)

Fouzia hanif et al (7)reported no significant difference in serum Vitamin D level in patients with PCOD compared to normal population

Wehr et al (7)also reported lower level of Vitmin D in PCOD patients(n=545) compared to control group(25.7 vs 32 ng/ml) It is speculated that low level of serum Vitamin D in PCOD patients may be due to obesity. Vitamin D is fat soluble and in obesity, a higher proportion is sequestered in adipose tissue, lowering bioavailability When assessed independently low serum Vitamin D level was found in overweight and obese PCOD patients. In contol group low serum vitamin d level was noted in obese patients only..When both group was compared matched with BMI statistically lower level of Vitamin D was found in obese PCOD. In PCOD group serum Vitamin D level was lower in obese patients compared to normal weight and overweight patients.

Hahn et al. (8) reported significant negative correlation between 25(OH)D levels and BMI in PCOD patients. Asheim et al. (9) found lower levels of 25(OH)D in morbidly obese women.

Limitation of this study-Weaknesses of this study is that the sample size is small. So this result cannot be extrapolated to entire population. Secondly sample is not homogeneous.

Conclusion of study- PCOD is common endocrine disorder .It is usually associated with increased BMI. Significantly Lower level of serum vitamin D is found in PCOD patients compared to control group. In my study mean serum level of vitamin D was lower in obese patients compared to normal and overweight patients.

In general population 44% of patients were either Vitamin D insufficient or deficient. There are increasing evidence supporting the role of vitamin D deficiency as a risk factor for gestational diabetes, recurrent pregnancy failure, multiplesclerosis, type 1 diabetes, CVD and several malignant tumors. 25(OH)D deficiency is concern for public health and implies an emergent need to interfere

Reference-

- 1) Rebecca L. Thomson, Simon Spedding and Jonathan D. Buckley Vitamin D in the aetiology and management of polycystic ovary Syndrome Clinical Endocrinology (2012) 77, 343–350
- 2) Mahmoudi, T., Gourabi, H., Ashrafi, M. et al. (2010) Calcitropic hormones, insulin resistance, and the polycystic ovary syndrome. Fertility and Sterility, 93, 1208–1214.
- 3) Vitamin D Levels in Women with Polycystic ovary Syndrome Elida Sidabutrari, Binarwan Halim2, Muhammad Fidel Ganis Siregar, Delfi Lutan.-6 th congress ASPIRE pages 125-132
- 4) Wehr, E., Trummer, O., Giuliani, A. et al. (2011) Vitamin D associated polymorphisms are related to insulin resistance and vitamin D deficiency in polycystic ovary syndrome. European Journal of Endocrinology, 164, 741–749
- 5) Ashraf Moini ET AL -Comparison of 25-hydroxyvitamin D and Calcium Levels between Polycystic Ovarian Syndrome and Normal Women int J Fertil Steril 2015 April-june
- 6) Li, H.W.R., Brereton, R.E., Anderson, R.A. et al. (2011) Vitamin D deficiency is common and associated with metabolic risk factors in patients with polycystic ovary syndrome. Metabolism: Clinical and Experimental, 60, 1475–1481
- 7) Hanif fauzia et al. vitamin d level in unmarried female with pcod, JIIMC(2016.)
- 8) Hahn S, Haselhorst U, Tan S, Quadbeck B, Schmidt M Roesler S, et al. Low serum 25-hydroxyvitamin D concentrations are associated with insulin resistance and obesity in women with polycystic ovary syndrome. Exp Clin Endocrinol Diabetes. 2006; 114(10): 577-583
- 9) Asheim ET, Hofso D, Hjelmestaeth J, Birkeland KI, Bohm-er T. Vitamin status in morbidly obese patients: a cross sectional study. Am J Clin Nutr. 2008; 87(2): 362-36