



CODEN [USA]: IAJ PBB

ISSN: 2349-7750

## INDO AMERICAN JOURNAL OF PHARMACEUTICAL SCIENCES

Available online at: <http://www.iajps.com>

Research Article

### ANALYSIS OF EFFECT OF VITAMIN D SUPPLEMENTATION IN POLYCYSTIC OVARY SYNDROME (PCOS) IN PAKISTANI ENVIRONMENT

Dr Ayesha Shafaq<sup>1</sup>, Dr. Momina Masud<sup>2</sup>, Dr Shahjahan Anwar<sup>3</sup>

<sup>1</sup>Mayo Hospital Lahore, <sup>2</sup>Sir Ganga Ram Hospital, Lahore, <sup>3</sup>MO at BHU Lalian.

Article Received: March 2019

Accepted: April 2019

Published: May 2019

**Abstract:**

**Introduction:** Polycystic ovary syndrome (PCOS) is the most common female endocrine disorder, affecting approximately 4%–18% women of reproductive age. It is a heterogeneous androgen excess disorder with different degrees of reproductive and metabolic dysfunctions.

**Aims and objectives:** The main objective of the study is to analyse the effect of Vitamin D Supplementation in Polycystic Ovary Syndrome (PCOS) in Pakistani environment.

**Material and methods:** This cross sectional study was conducted in Mayo Hospital Lahore during March 2018 to December 2018. This study was done with the permission of ethical committee of hospital. The data was collected from 100 female patients who were suffering from PCOS. Venous blood samples were drawn at examination and stored at  $-80^{\circ}\text{C}$  after centrifugation at 3000 rpm for 10 min at  $20^{\circ}\text{C}$ .

**Results:** The data was collected from 100 female patients who were suffering from PCOS. The mean age was  $34 \pm 5.05$  years with a median BMI of 25.2 (22.0–30.4  $\text{kg}/\text{m}^2$ ) and 24.0 (22.0–27.0  $\text{kg}/\text{m}^2$ ). Overall median serum 25(OH)D was 49.0 (27.1–74.1  $\text{nmol}/\text{l}$ ) in PCOS versus 64.5 (39.2–85.7) in the control women. A severe vitamin D deficiency was present in 136 (21%) women out of 639 PCOS women, 190 (30%) women had a serum 25(OH)D between 25.1 and 50.0  $\text{nmol}/\text{l}$ , 165 (26%) women had a serum 25(OH)D between 50.1 and 75.0  $\text{nmol}/\text{l}$ , and 148 (23%) women had a serum 25(OH)D  $> 75 \text{ nmol}/\text{l}$ .

**Conclusion:** It is concluded that there is a significant association between vitamin D status and metabolic disturbances in patients with PCOS. Moreover, PCOS women had a significant lower serum 25(OH)D compared to fertile controls.

**Corresponding author:**

**Dr. Ayesha Shafaq,**  
Mayo Hospital, Lahore.

QR code



Please cite this article in press Ayesha Shafaq et al., Analysis Of Effect Of Vitamin D Supplementation In Polycystic Ovary Syndrome (Pcos) In Pakistani Environment., Indo Am. J. P. Sci, 2019; 06(05).

**INTRODUCTION:**

Polycystic ovary syndrome (PCOS) is the most common female endocrine disorder, affecting approximately 4%–18% women of reproductive age. It is a heterogeneous androgen excess disorder with different degrees of reproductive and metabolic dysfunctions. Metabolic disturbances including insulin resistance, hyperinsulinemia and dyslipidemia, are common features in the majority of women with PCOS [1]. Women with PCOS may also be at elevated risk of vitamin D deficiency (VDD). In contrast to a prevalence of 20%–48% among the general adult population, a relative higher prevalence of VDD is observed among women with PCOS. Additionally, positive associations of VDD with some well-known comorbidities of PCOS including type 2 diabetes, insulin resistance, metabolic syndrome, and cardiovascular diseases, are reported [2]. In this regard, an increasing number of studies have been conducted to investigate the specific relationship between vitamin D status and PCOS [3]. Although several studies have suggested that lower vitamin D levels are associated with increased risk of insulin resistance and metabolic disturbance among women with PCOS, the current findings are inconsistent [4].

Polycystic ovary syndrome (PCOS) is the most common endocrinopathy in women of reproductive age, with a prevalence up to 10% depending on which diagnostic criteria are used. It is characterized by ovulatory dysfunction, hyperandrogenism and/or polycystic ovarian morphology [5]. Metabolic disturbances are present in a majority of the women suffering from PCOS, i.e. 30–40% have impaired glucose tolerance and insulin resistance with compensatory hyperinsulinemia, and as many as 10% will develop type 2 diabetes mellitus during their fourth decade. Adipose tissue dysfunction has been implicated as a contributor to insulin resistance in women with PCOS. However, a substantial number of

lean women affected by PCOS have insulin resistance as well, independent of obesity [6].

**Aims and objectives:**

The main objective of the study is to analyse the effect of Vitamin D Supplementation in Polycystic Ovary Syndrome (PCOS) in Pakistani environment.

**MATERIAL AND METHODS:**

This cross sectional study was conducted in Mayo Hospital Lahore during March 2018 to December 2018. This study was done with the permission of ethical committee of hospital. The data was collected from 100 female patients who were suffering from PCOS. Venous blood samples were drawn at examination and stored at  $-80^{\circ}\text{C}$  after centrifugation at 3000 rpm for 10 min at  $20^{\circ}\text{C}$ . Endocrine evaluation included serum levels of gonadotropic hormones (LH, FSH) and estradiol ( $\text{E}_2$ ), testosterone, dehydroepiandrosterone sulfate (DHEAS), fasting glucose and insulin. Hormone assays have been described in detail elsewhere.

**Statistical analysis:**

Data are presented as means  $\pm$  standard deviation if normally distributed, and as median and interquartile range in case of a skewed distribution.

**RESULTS:**

The data was collected from 100 female patients who were suffering from PCOS. The mean age was  $34 \pm 5.05$  years with a median BMI of 25.2 (22.0–30.4  $\text{kg/m}^2$ ) and 24.0 (22.0–27.0  $\text{kg/m}^2$ ). Overall median serum 25(OH)D was 49.0 (27.1–74.1 nmol/l) in PCOS versus 64.5 (39.2–85.7) in the control women. A severe vitamin D deficiency was present in 136 (21%) women out of 639 PCOS women, 190 (30%) women had a serum 25(OH)D between 25.1 and 50.0 nmol/l, 165 (26%) women had a serum 25(OH)D between 50.1 and 75.0 nmol/l, and 148 (23%) women had a serum 25(OH)D  $> 75$  nmol/l.

**Table 01:** Regression analysis of serum 25(OH)D and lipid profile

	PCOS	Control	p-value
Age (y)	$34 \pm 5$	$32 \pm 5$	$< 0.01$
Body Mass Index ( $\text{kg/m}^2$ )	25.2 (22.0–30.4)	24.0 (22.0–27.0)	$< 0.01$
BP systolic (mmHg)	$118 \pm 13$	$114 \pm 11$	$< 0.01$
BP diastolic (mmHg)	$77 \pm 11$	$73 \pm 9$	$< 0.01$
Serum 25(OH)D (nmol/l)	49.0 (27.1–74.1)	64.5 (39.2–85.7)	$< 0.01$
Storage of samples (years)	6	10	$< 0.01$

**DISCUSSION:**

Vitamin D deficiency has been proposed as the possible missing link between insulin resistance and PCOS. Vitamin D is a fat-soluble vitamin that is synthesized endogenously through sunlight-induced photochemical conversion of cholesterol to 7-dehydrocholesterol in the skin or obtained from the diet [7]. Subsequently vitamin D undergoes a hydroxylation twice, first vitamin D is transported to the liver where it is rapidly hydroxylated by 25-hydroxylase into 25-hydroxyvitamin D (25(OH)D). The second hydroxylation occurs in the kidney and is catalyzed by 1 alpha-hydroxylase to form 1,25-dihydroxyvitamin D (1,25(OH)<sub>2</sub>D), the active metabolite of vitamin D [8].

Epidemiologic studies suggest that low vitamin D levels are related to impaired glucose clearance, insulin secretion, and insulin resistance. It is known that vitamin D affects glucose metabolism and may play a role in the development of subsequent metabolic and endocrine disorders in women with PCOS [9]. Our study identified eight studies that investigated the effects of vitamin D therapy on metabolic and/or endocrine parameters on women with PCOS [10]. The results of this study suggest that supplementation of vitamin D does not significantly improve metabolic (except triglycerides) and endocrine features in PCOS patients. Similarly, no significant differences in metabolic parameters (except fasting insulin) were found between vitamin D supplementation and placebo groups [11].

**CONCLUSION:**

It is concluded that there is a significant association between vitamin D status and metabolic disturbances in patients with PCOS. Moreover, PCOS women had a significant lower serum 25(OH)D compared to fertile controls.

**REFERENCES:**

1. Dunaif A, Segal KR, Futterweit W, Dobrjansky A. Profound peripheral insulin resistance, independent of obesity, in polycystic ovary syndrome. *Diabetes* 1989; 38(9):1165–1174.
2. Nandi A, Sinha N, Ong E, Sonmez H, Poretsky L. Is there a role for vitamin D in human reproduction? *Horm Mol Biol Clin Invest* 2016; 25(1):15–28.
3. Bland R, Markovic D, Hills CE, Hughes SV, Chan SLF, Squires PE et al. Expression of 25-hydroxyvitamin D3-1alpha-hydroxylase in pancreatic islets. *J Steroid Biochem Mol Biol* 2004; 89-90(1–5):121–125.
4. Bouillon R, Carmeliet G, Verlinden L, Etten van E, Vertuyf A, Luderer HF et al. Vitamin D and human health: lessons from vitamin D receptor null mice. *Endocr Rev* 2008; 29(6):726–776.
5. Grimnes G, Emaus N, Joakimsen RM, Figenschau Y, Jenssen T, Njolstad I et al. Baseline serum 25-hydroxyvitamin D concentrations in the Tromso Study 1994–95 and risk of developing type 2 diabetes mellitus during 11 years of follow-up. *Diabetic Medicine* 2010. 27 1107–1115.
6. Mitri J, Muraru MD, Pittas AG. Vitamin D and type 2 diabetes: a systematic review. *European Journal of Clinical Nutrition* 2011. 65 1005–1015.
7. Pittas AG, Lau J, Hu FB, Dawson-Hughes B. The role of vitamin D and calcium in type 2 diabetes. A systematic review and meta-analysis. *Journal of Clinical Endocrinology and Metabolism* 2007. 92 2017–2029.
8. Song Y, Wang L, Pittas AG, Del Gobbo LC, Zhang C, Manson JE et al. Blood 25-hydroxy vitamin D levels and incident type 2 diabetes: a meta-analysis of prospective studies. *Diabetes Care* 2013. 36 1422–1428.
9. Joergensen C, Gall MA, Schmedes A, Tarnow L, Parving HH, Rossing P. Vitamin D levels and mortality in type 2 diabetes. *Diabetes Care* 2010. 33 2238–2243.
10. Ferder M, Inserra F, Manucha W, Ferder L. The world pandemic of vitamin D deficiency could possibly be explained by cellular inflammatory response activity induced by the renin-angiotensin system. *American Journal of Physiology: Cell Physiology* 2013. 304 C1027–C1039.
11. Sugden JA, Davies JI, Witham MD, Morris AD, Struthers AD. Vitamin D improves endothelial function in patients with type 2 diabetes mellitus and low vitamin D levels. *Diabetic Medicine* 2008. 25320–325.