Comparative Study of Vitamin D Deficiency between PCOD and Normal Women: A Prospective Hospital Based Study

Hena Shamim Farooqui

ABSTRACT

**Background:** Polycystic ovary syndrome (PCOS) is the most common endocrine disorder in women of reproductive age, with a prevalence of 6–10% in the general population. PCOS is characterized by the following: ovulatory dysfunction resulting in oligo-amenorrhea and/or anovulation, hyperandrogenism and/or hirsutism, and the presence of polycystic ovarian morphology by ultrasound. Vitamin D also plays a physiologic role in reproduction including ovarian follicular development and luteinization via altering anti-Müllerian hormone (AMH) signaling, follicle-stimulating hormone sensitivity and progesterone production in human granulosa cells. The aim of this study aimed to compare levels of vitamin D in women with PCOS and normal women.

**Methodology:** Total fifty women were included in this study. Among the fifty cases 50% were from PCOD group and 50% were normal. This study was conducted in the Dept. of Obs/Gynae, LBKMCH, Saharsa. Blood sample was taken, and serum vitamin D concentration was measured.

**Result:** Mean serum 25(OH) vitamin-D level in PCOD group and in control group is clinically significant.

**Conclusion:** This study concludes that 25(OH) vitamin-D was clinically significant, but not sufficient to be a diagnostic tool for PCOS.

**Keywords:** Polycystic ovary syndrome, 25(OH) vitamin-D, Endocrine, Vitamin D deficiency

INTRODUCTION

Polycystic ovary syndrome (PCOS) is the most common endocrine disorder in females of reproductive age group. Its prevalence is 6–10% in general population. Ovulatory dysfunction resulting in oligo-amenorrhea, anovulation, hyper-androgenism, hirsutism, and the presence of polycystic ovarian morphology in ultrasonography are the characteristic features of PCOS. Its association with anovulation, hyperinsulinemia and central obesity has been reported to increase chances of type 2 diabetes mellitus, endometrial cancer and cardiovascular diseases. Low Vitamin D levels have been reported to be associated with the development of obesity and insulin resistance in young women with PCOS.

It is a known fact that Vitamin D has important roles in bone metabolism, in regulation of calcium-phosphorus equilibrium and in cell differentiation and proliferation. It has been found to play a physiologic role in reproduction including ovarian follicular development and luteinization via altering anti-Müllerian hormone (AMH) signaling, follicle-stimulating hormone sensitivity and progesterone production in human granulosa cells. The presence of specific vitamin D receptor (VDR) in pancreatic β-cells and skeletal muscle, the expression of 1-α-hydroxylase enzyme which can catalyze the conversion of 25-hydroxyvitamin D [25(OH)D] to 1,25-dihydroxyvitamin D and the presence of a vitamin D
response element in the human insulin gene promoter have been reported to affect the glucose homeostasis.[7] It has also been shown to increases regulation of steroidogenesis as well as insulin synthesis and secretion in the human ovarian tissue.[8]

Vitamin D deficiency has been found to be common in the general population. Several studies have reported low levels of vitamin D (less than 20 ng/ml) in 10-60% of the adults.[9] Vitamin D has been reported to have pleotropic effects and its deficiency has been found to be associated with the pathogenesis of neoplasms, immune system disorders, diabetes mellitus, cardiovascular diseases, etc.[10] Several cross sectional and prospective studies have observed the negative association between vitamin D levels and insulin resistance.

METHODS

Study population: Total fifty women were included in this study. Among the fifty cases 50% were from PCOD group and 50% were normal.

Study Area: This study were conducted in Dept. of Obs/Gynae, LBKMCMB, Saharsa.

Sample collection: Blood sample was taken and serum vitamin D concentration was measured. Women with PCOD were diagnosed by using following criteria:

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

Duration of study: The duration of the study were six month.

Inclusive criteria: Women had not receive calcium or vitamin D & age group between 15-30 years included in this study.

Data analysis: Data were analyzed by using statistics.

RESULTS

In our study, fifty total numbers of women were included. Out of which 25 were belongs to PCOD group and another 25 women were normal. Among the 25 normal cases 60% were normal and 40% were undergoing in underweight (8%), overweight (20%), and obese (12%). On the other hand in PCOD group 16% normal, 36% overweight, 48% were obese. In this study, 48% deficiency, 28% insufficiency, 24% sufficiency were occurred in PCOD group of women. Whereas in normal women 20% deficiency, 24% insufficiency, 56% sufficiency was occurred.

<table>
<thead>
<tr>
<th>Table 1: Distribution of women according to conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patients with</strong></td>
</tr>
<tr>
<td>PCOD</td>
</tr>
<tr>
<td>NORMAL</td>
</tr>
<tr>
<td>TOTAL</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2: Distribution of women according to weight</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weight</strong></td>
</tr>
<tr>
<td>Underweight</td>
</tr>
<tr>
<td>Normal</td>
</tr>
<tr>
<td>Overweight</td>
</tr>
<tr>
<td>Obese</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

DISCUSSION

In the present study, the percentage of obese, overweight and normal weight PCOD patients were 48%, 36% and 16% respectively whereas, in control group the percentage of underweight, normal weight, overweight and obese patients were 6%, 60% and 20% and 12%. The deficiency of Vitamin D was found in 48% cases, insufficiency in 28% and normal level in 24% among the PCOD patients. While in control group, the level of Vitamin D in 56% of patients was found normal, 24% of patients were insufficient and 20% were deficient. Mean serum Vitamin D level in PCOD group and in control group is clinically significant.

Several studies have been done on the association between serum vitamin D and PCOD. Mahmoudi et al found in one of their study that women with PCOS had a significantly higher vitamin D level (29.3 ng/ml) in comparison to control women (19.4 ng/ml). In contrast to this study, Elida et al reported significantly lower level of Vitamin D level in PCOD group compared to normal population.[11-12]

In an another study, Wehr et al also showed lower level of Vitamin D in PCOD patients (n=545) in comparison to control group (25.7 vs 32 ng/ml).13 Ashraf Moini et al revealed no significant difference in serum Vitamin D level between PCOD and without PCOD patients.14 Similar results were found in Li et al. and Fouzia Hanif et al studies.15-16 Wehr et al reported in their study the level of Vitamin D in PCOD patients was lower (n=545) in comparison to control group (25.7 vs 32 ng/ml). It is suggested that in PCOD patients, low level of serum Vitamin D may be due to obesity. It is known that Vitamin D is fat soluble and in obesity, a higher proportion is sequestered in adipose tissue, lowering bioavailability. When assessed independently in overweight and obese PCOD patients, the serum Vitamin D level was found low whereas in control group low serum vitamin D level was found in obese patients only. When both the group was compared and matched with BMI statistically, the low level of Vitamin D was found in obese PCOD. The serum Vitamin D level was found lower in obese patients compared to normal weight and overweight patients in PCOD group.

Hahn et al. revealed in one of their study that there was significant negative correlation between 25(OH)D levels and BMI in PCOD patients. Similar results were found in Asheim et al. studies.[17-18]

CONCLUSION

PCOD is a very common endocrine disorder. It is generally associated with increased BMI. The level of serum vitamin D is found significantly lower in PCOD patients in comparison to control group. In the present study mean serum level of vitamin D was lower in obese patients compared to normal and overweight patients of patients were either Vitamin D insufficient or deficient in general population. There is increasing evidence which supports the role of vitamin D
deficiency as a risk factor for gestational diabetes, recurrent pregnancy failure, multiple sclerosis, type 1 diabetes, CVD and several malignant tumors etc. 25(OH)D deficiency is an emergent need to interfere for public health.

REFERENCES
12. Vitamin D Levels in Women with Polycysticovary Syndrome Elida Siddatuhart1, Binawan Halim2, Muhammad Fidel Ganis Siregar, DelfiLutan, 6 th congress ASPIRE pages 125-132.
16. Hanif fauzia et al. vitamin d level in unmarried female with pooid, JIMC(2016.)