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ORIGINAL ARTICLE

Prevalence of Vitamin D Deficiency in Women with Polycystic Ovarian Syndrome

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ABSTRACT

Aim: To study frequency of vitamin D deficiency in women with polycystic ovary syndrome.
Study Design: Cross-sectional study
Place and Duration: Bacha Khan Medical Complex, Swabi from May 2023 to Oct 2023.
Materials & Methods: 100 women with polycystic ovarian syndrome with ages 20 to 45 years were included. Patients' data including age, body mass index, illness duration, parity and residency were recorded once they gave their permission. Vitamin D insufficiency was defined as a serum 25-hydroxyvitamin D level <20 ng/ml. SPSS 22.0 was used to analyze the data.
Results: Majority of the patients 40 (40%) were aged between 26-30 years, followed by 31-35 years 30 (30%) patients. Mean BMI of the patients was 27.46±6.85 kg/m^2. We found that 70 (70%) patients had vitamin D deficiency.
Conclusion: We concluded that patients with polycystic ovarian syndrome had a higher than expected incidence of vitamin D deficiency.
Keywords: Vitamin D Deficiency, PCOS

INTRODUCTION

About 18% of women of reproductive age have PCOS, making it the most common kind of endocrine disorder in the population[1] It's common for women with PCOS to have polycystic ovaries (PCOS), disrupted menstruation, infertility, and biochemical and clinical hyperandrogenism[2]. PCOS is linked to cardiovascular disease, type 2 diabetes, dyslipidemia, and impaired glucose tolerance. Obesity and insulin resistance are major contributors to PCOS development.[3] As a result, PCOS is the most prevalent cause of infertility among women. Both classical and nonclassical tissues such as the ovary may benefit from the pleiotropic effects of vitamin D on a wide range of intracellular regulatory systems[4] "Vitamin D supplementation may be an attractive, cost-effective, and safe treatment option in PCOS," says one author. Lean mass increases, insulin levels are regulated by vitamin D intake, and the sensitivity to insulin is improved[5]

If you're obese, you're going to have different metabolic effects than if you're thin. Vitamin D and PCOS body composition research in India are few and far between. Recently, researchers have focused on the possible metabolic dysregulation linked to PCOS and vitamin D insufficiency[6-8]

In some investigations, such as cross-sectional and case-control studies[9,10], patients with PCOS had lower vitamin D levels when compared to healthy controls, whereas other studies revealed no such difference[11,12]. It is possible that inconsistencies in results are due to differences in sample size and methodological choice, or to a range of case characteristics such as patients' age, BMI, skin colour, food, or level of physical activity and exercise are to blame. According to[13], obesity is associated with a reduction in 25-hydroxyvitamin D levels. The lesser concentrations of vitamin D-binding protein seen in obese PCOS patients increases the likelihood of such individuals having low vitamin D levels in their blood stream. The risk of vitamin D insufficiency increases in those with PCOS who have a higher body mass index (BMI).

Obesity, especially abdominal obesity, has been shown to have a deleterious impact on insulin sensitivity in patients with PCOS, particularly in women[14] Although it is possible that this link is not based on PCOS at all, but rather on obesity, this remains to be determined. A deficiency in vitamin D may contribute to the development of insulin resistance in women who have PCOS, according to some research. According to a meta-analysis of randomised clinical studies, short-term vitamin D treatment reduced insulin resistance, total cholesterol, and LDL-C levels in the blood[15]

Vitamin D deficiency in women with polycystic ovarian syndrome (PCOS) was the focus of this study.

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MATERIALS AND METHODS

This cross-sectional/observational study was conducted at Bacha Khan Medical Complex, Swabi from May 2023 to Oct 2023

A total of 88 women with polycystic ovarian syndrome between the ages of 20 and 40 were included in this research. After obtaining written permission, variables such as age, BMI, illness duration, and waist circumference were collected for each patient. Individuals with diabetes, acute renal failure, liver failure, pelvic inflammatory disease, pregnancies, vitamin D supplementation, and hypertension were excluded from this research. Diabetic patients were also eliminated.

To measure 25-hydroxy vitamin D, 5 ml of blood was drawn from each subject. 25OHD levels > 30 ng/mL were deemed adequate, while those between 20 and 29 ng/mL were deemed inadequate, and those below 20 ng/mL were deemed vitamin D deficient. SPSS 22.0 was used to analyse the whole dataset. Tables were used to record percentages and frequencies. Vitamin D insufficiency and obesity have been linked using a chi-square test. Statistical significance was defined as a P-value of 0.05 or below.

RESULTS

In our study majority of the patients 40 (40%) were aged between 26-30 years, followed by 31-35 years 30 (30%) patients, 17 (17%) patients were aged between 21-25 years and 13 (13%) were >35 years of age(.fig 1)

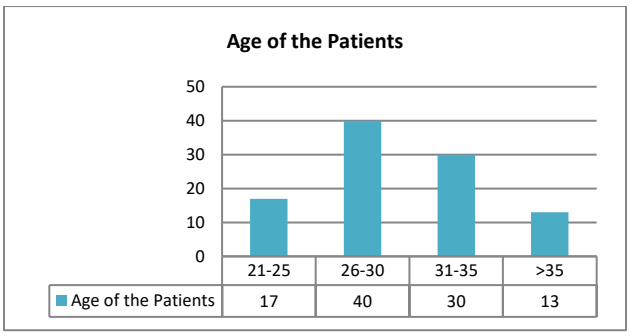

Figure 1: Age of Enrolled Patients

Mean BMI of the patients was 27.46±6.85 kg/m^2. Mean disease duration of the patients was 2.42±3.28 years. Mean waist circumference of the cases was 84.14±11.34 cm Mean systolic BP was 107.13±8.51 mmHg and mean diastolic BP was 74.6±8.51 mmHg. (Table 1)

Table 1: Enrolled patients had detailed demographics

Variables	Mean	STD
Mean BMI (kg/m^2)	27.46	6.85
Mean Disease duration (years)	2.42	3.28
Mean circumference (cm)	84.14	11.34
Mean Diastolic BP (mmHg)	74.6	8.51
Mean Systolic BP (mmHg)	107.13	8.51

We found that 70 (70%) patients had vitamin D deficiency, insufficiency found in 13 (13%) patients and sufficient amount of vitamin D >30 ng/mL found in 17 (17%) cases. (figure 2)

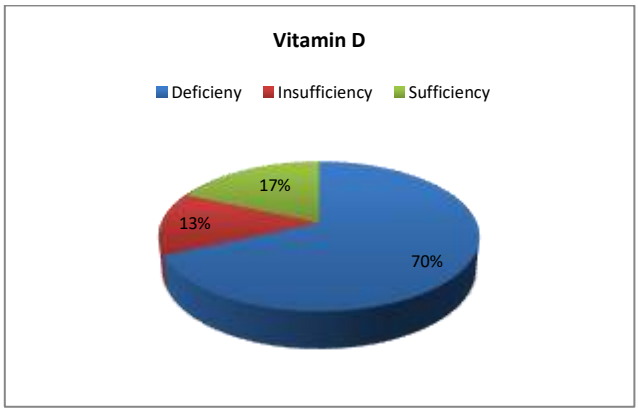

Figure 2: Association of vitamin D deficiency among all the patients

Among 70 patients of vitamin D deficiency 58 (82.86%) patients had BMI >25kg/m^{2}and 12 cases had BMI <25kg/m^2.(table 2)

Table 2: BMI and vitamin D deficiency

Variables	Frequency	Percentage
BMI		
<25kg/m^2	12	17.14
>25kg/m^2	58	82.86

DISCUSSION

Women with PCOs are more likely to be vitamin D deficient[16] Vitamin D insufficiency and the metabolic abnormalities reported in PCO women have been linked in many studies. It's pretty normal for PCOs to get involved. That a lack of vitamin D causes insulin resistance, a rise in blood pressure, and biochemical abnormalities in Total Cholesterol, CRP, TG, and LDL and HDL I blood levels[17]

In our study 100 women were presented in which majority of the patients patients 40 (40%) were aged between 26-30 years, followed by 31-35 years 30 (30%) patients, 17 (17%) patients were aged between 21-25 years and 13 (13%) were >35 years of age. These findings were comparable to the previous studies[18,19] Mean BMI of the patients was 27.46±6.85 kg/m^2. Mean disease duration of the patients was 2.42±3.28 years. Mean waist circumference of the cases was 84.14±11.34 cm Mean systolic BP was 107.13±8.51 mmHg and mean diastolic BP was 74.6±8.51 mmHg. Adiposity (as measured by BMI) and vitamin D levels in PCOS women have been the subject of many studies. In spite of the fact that BMI isn't particularly accurate, it's nevertheless often employed to measure obesity. Vitamin D levels and BMI seem to have an inverse relationship, according to a number of studies[17,20]

Women with PCOS were more likely than other women to have 25(OH)D levels less than 30 ng/mL. (72.8 percent of the time). Approximately 75% of those who took part in the study had 25(OH)D levels below the permissible range of 50 nmol/l[21] According to observational studies, low 25(OH)D levels are connected with obesity and higher cardiovascular disease risk factors, suggesting that vitamin D deficiency may exacerbate the symptoms of PCOS. A multiple regression analysis of our data revealed a relationship between low vitamin D levels and HOMA-IR and SHBG levels in PCOS patients.. Among women with polycystic ovarian syndrome, vitamin D deficiency has been associated to insulin resistance (PCOS)[22] HOMA-IR was shown to be an even higher independent risk factor for vitamin D insufficiency in women with PCOS than SHBG in a study of people with the condition. Although their 25(OH)D levels are low, some PCOS individuals may not have the syndrome. According to their findings, women with PCOS who were also vitamin D deficient did not benefit from vitamin D treatment in terms of insulin sensitivity or insulin resistance[23] In the current study, vitamin D deficiency was observed in 60 (68.2 percent) of the patients, with insufficiency reported in 12 (13.6 percent) and acceptable levels found in 16 (18.2 percent).

Fifty-two (86.7 percent) of the sixty patients with vitamin D insufficiency were overweight, with only eight instances having a BMI less than 25kg/m2. The BMI was shown to be associated with vitamin D levels using dual energy x-ray absorptiontiometry (DEXA); however, the PCOS group had lower vitamin D levels than the control group while having a greater BMI than the control group[24] Other research has shown that PCOS is associated with reduced vitamin D levels, even in the absence of the other risk factors[25] Women with untreated PCOS had lower vitamin D levels than women in the control group, even after controlling for age and BMI[26]

CONCLUSION

People with adequate vitamin D levels are less likely to develop serious conditions such as diabetes, infertility, and metabolic syndrome all of which are linked to high mortality rates. Studies have shown that 70% of individuals with polycystic ovarian syndrome (PCOS) are vitamin D deficient. Additionally, vitamin D deficiency is more common among individuals with higher Body Mass Index (BMI).

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