DOI: https://doi.org/10.53350/pjmhs221661083

ORIGINAL ARTICLE

Determine the Prevalence of Vitamin D Deficiency in Individuals with PCOS Who are Admitted to a Tertiary Care Hospital

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ABSTRACT

Aim: The purpose of this research was to study vitamin D deficiency in women with polycystic ovary syndrome.
Study Design: Observational/cross-sectional study
Place and Duration: The study was conducted at Gynaecology & Obstetrics department of Chandka Medical Hospital, Larkana and Naimat Begum Hamdard University Hospital, Karachi during the period from June 2021 to January 2022.
Materials & Methods: In this research, 88 women with polycystic ovarian syndrome between the age of 20 and 40 years participated. 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-hydroxy vitamin D level <20 ng/ml. SPSS 22.0 was used to analyze the data.
Results: In our study majority of the patients 35 (39.8%) was aged between 26-30 years, followed by 31-35 years 25 (28.4%) patients. Mean BMI of the patients was 29.23±7.55 kg/m^2. We found that 60 (68.2%) patients had vitamin D deficiency.
Conclusion: According to the findings of this research, patients with polycystic ovarian syndrome had a higher than expected incidence of vitamin D deficiency.
Keywords: Vitamin D, Deficiency, PCOS, Polycystic ovarian

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.

MATERIALS AND METHODS

This cross-sectional/observational study was conducted at Gynaecology & Obstetrics department of Chandka Medical Hospital, Larkana and Naimat Begum Hamdard University Hospital, Karachi during the period from June 2021 to January 2022. 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 35 (39.8%) were aged between 26-30 years, followed by 31-35 years 25 (28.4%) patients, 15 (17.04%) patients were aged between 21-25 years and 13 (14.8%) were >35 years of age(.fig 1)

Mean BMI of the patients was 29.23±7.55 kg/m^2. Mean disease duration of the patients was 2.2±4.71 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)

We found that 60 (68.2%) patients had vitamin D deficiency, insufficiency found in 12 (13.6%) patients and sufficient amount of vitamin D >30 ng/mL found in 16 (18.2%) cases. (figure 2)

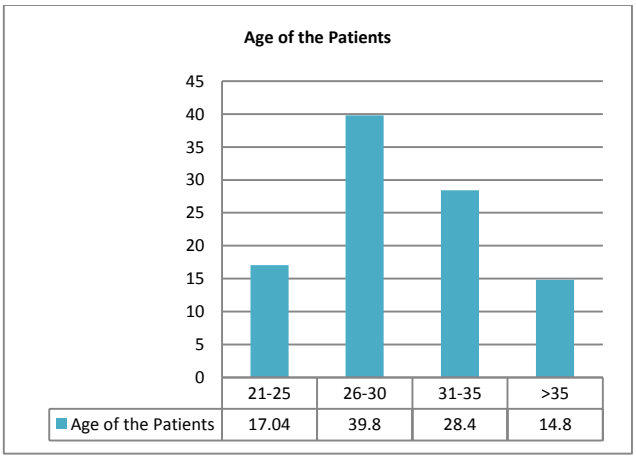

Figure 1: Distribution of age with enrolled women

Table 1: Enrolled patients had detailed demographics

Variables	Mean	Std
Mean BMI (kg/m^2)	29.23	7.55
Mean Disease duration (years)	2.2	4.71
Mean circumference (cm)	84.14	11.34
Mean Diastolic BP (mmHg)	74.6	8.51
Mean Systolic BP (mmHg)	107.13	8.51

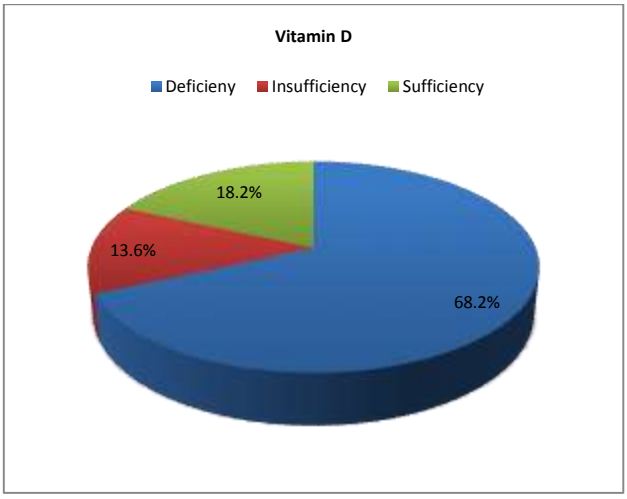

Figure 2: Association of vitamin D deficiency among all the patients

Among 60 patients of vitamin D deficiency 52 (86.7%) patients had BMI >25kg/m^{2}and 8 cases had BMI <25kg/m^2.(table 2)

Table 2: BMI and vitamin D deficiency

Variables	Frequency	Percentage
BMI		
<25kg/m^2	8	13.3
>25kg/m^2	52	86.7

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 99 women were presented in which majority of the patients 35 (39.8%) were aged between 26-30 years, followed by 31-35 years 25 (28.4%) patients, 15 (17.04%) patients were aged between 21-25 years and 13 (14.8%) were >35 years of age. These findings were comparable to the previous studies.[18,19] Mean BMI of the patients was 29.23±7.55 kg/m^2. Mean disease duration of the patients was 2.2±4.71 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

An person with a healthy amount of vitamin D is less likely to develop diabetes, infertility, or metabolic syndrome, all of which have high death rates. The incidence of vitamin D insufficiency in individuals with polycystic ovarian syndrome was found to be 68.2%. A greater incidence of vitamin D insufficiency was also seen in individuals with higher BMI.

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