VITAMIN D DEFICIENCY AND PCOS; ASSOCIATION BETWEEN VITAMIN D DEFICIENCY AND PCOS IN FEMALES PRESENTING IN A TERTIARY CARE HOSPITAL.

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ABSTRACT… Background: Polycystic ovary syndrome (PCOS) is mainstream gynaecological problems in adult women. Vitamin D has been linked to propensity of developing PCO. As this hormone has certain effects on insulin sensitivity and restoration of reproductive capacity in women with PCOs. So, a study was planned to establish correlation of deficiency of vitamin D and PCOs. Objectives: To determine the correlation of deficiency of vitamin D with PCOs in patients reporting to a teaching hospital. Study Design: Case control study. Setting: Institute of Shaikh Zayed Hospital, Lahore, Gynae-Obst Department. Period: Six months from July 2015 to December 2015. Material & Methods: If serum level of vitamin D is < 25nmol/L then deficiency was labeled. Odds ratio was calculated between PCOs and vitamin D deficiency. Results: The mean age of the patients was 26.91±6.09 years. In this study, 70% females were married. The mean BMI of patients was 22.59±2.48kg/m², and 76(76%) patients had normal BMI and 24(24%) patients were overweight. Vitamin D deficiency was observed in 47 cases in which 31 were from case group and 16 were from control group with significant association i.e. OR=3.47. Conclusion: Our study results concluded that there is more risk of vitamin D deficiency in females with PCOS as compared to females without PCOS.

Key words: Vitamin D Deficiency, Polycystic Ovarian Syndrome, PCOS, Females.

INTRODUCTION
Polycystic ovary syndrome (PCOS) is widespread problem in an adult women (found in upto 5 – 10%).1,2 Vitamin D is a fat-soluble vitamin, not commonly found in food. However it can be supplemented. Vitamin D insufficiency is defined as a 25(OH) D level of 21 to 29ng/mL and vitamin D deficiency as a 25(OH) D level below 20ng/mL.3

Women with PCOS often have resistance to insulin. Study say that metabolic syndrome may be caused by deficiency of Vitamin D.4 Women with PCOS have mostly insufficient vitamin D levels, and vitamin D replacement therapy may have a beneficial effect on IR in obese women with PCOS.5 Additionally reproductive biology is highly affected by deficiency of vitamin D, however the pathophysiology is still unknown.6

A previously conducted case control study found that low 25-hydroxyvitamin D (<25nmol/L) were found in 44.0% and 11.2% of subjects in PCOS and control groups, respectively (P = 0.047).7 However another study case control study showed that vitamin D deficiency in PCO cases was 92.1% while in control was 87.0% and difference was insignificant (P=0.560). Authors concluded that no difference was found in the absolute level of serum vitamin D between PCOS patients and matched controls. Prevalence of vitamin D deficiency was equally common among both patients and controls. Additionally, no correlations was found between serum vitamin D level and clinical or metabolic profiles, suggesting that the role of vitamin D in the pathogenesis of PCOS is not yet clear.8

Rationale of our study is to determine the determine the correlation in between deficiency of vitamin D and PCOS in females presenting in a tertiary care hospital. The frequency of PCO is growing in local population particularly in young unmarried
females. In routine, it has been observed that most of females are vitamin D deficient but no evidence is available regarding the association of PCO with vitamin D deficiency. Moreover, previous literature has reported controversial results. So to confirm the association of PCO with vitamin D deficiency, we want to conduct this study. This will help us to improve our practice. Moreover, we would get local magnitudes as there was no local evidence observed in literature.

OBJECTIVE
To establish correlation between deficiency of vitamin D and evidence of PCOs in patients reporting to a teaching hospital.

MATERIALS AND METHODS
A case control study was run at OBGYN Dept, Shaikh Zayed Hospital, Lahore for 6 months. Sample size of 100 cases in each group was calculated with 80% power of test. 5% level of significance and taking expected percentage of vitamin D deficiency i.e. 44.0% in females with PCO and 11.2% in control group females presenting in a tertiary care hospital. All patients were include through non probability consecutive sampling as we include particular cases of PCOs. Females of age 18-40 years with complaint of lower abdominal pain and complaint of irregular bleeding (oligomenorrhea (cycles>35 days) or amenorrhea (fewer than 3 cycles in the past 6 months) and ultrasound scan showing 12 or more follicles measuring 2-9mm and LH/FSH ration>1 IU/L were included. In case group, females with PCO (ultrasonographic detection of PCOs (> 12 follicles measuring 2-9mm) along with LH/FSH ration >1 IU/L with oligomenorrhea (cycles > 35 days) or amenorrhea (fewer than 3 cycles in the past 6 months). In control group, females without PCO (normal females) were included. Controls will be selected as age matched females who come as attendants with the patients. Females with hypertension (BP> 140/90mmHg) abnormal ECG, liver problem (AST>40IU, ALT>40IU), renal insufficiency (creatinine >1.2mg/dl and bleeding disorders (PT>20sec, aPTT>15sec). diabetic females (BSR>186mg/dl). Pregnant females, females taking multivitamins or smokers were excluded. Blood sample was obtained by using 5cc BD syringe. All samples were sent to the laboratory of the hospital for assessment of vitamin D level. If vitamin D level <2.5nmol/L, then vitamin D deficiency was labeled. All the information was collected on specially designed proforma. Data analysis was done by using SPSS version 17.0. Quantitative variables like, age, BMI and vitamin D level was measured in the form of mean + SD. Qualitative variables like marital status and vitamin D deficiency was measured in the form of frequency and percentage. Odds ratio was calculated to determine the association between PCO and vitamin D deficiency. OR>1 was considered as risk for association. P-value<0.05 was taken as significant. Frequency was calculated for parity.

RESULTS
The mean age of cases was 28.20±6.40 years and mean age of controls was 25.62±5.54. The mean height of cases was 1.60±0.06m and control was 1.61±0.06m. The mean weight of cases was 57.92±6.13kg and control was 57.86±4.94kg. The mean BMI of cases was 22.67±2.52kg/m² and control was 22.51±2.47kg/m². Among cases, 39 females had normal BMI and 10 were overweight while among controls, 37 females had normal BMI and 13 were overweight. Among cases, 40 females were married and 10 were unmarried while among controls, 30 females were married and 20 were unmarried. The mean vitamin D level of cases was 22.75±6.52nmol/L while mean vitamin D level of controls was 28.75±9.10nmol/L (Table-I). Overall vitamin D deficiency was detected in 47% patients. Deficiency of Vitamin D was observed in 31 cases and 16 controls. Statistically significant association established between vitamin D deficiency and PCOS. Among females with PCOS the chances of vitamin D deficiency was 3.47 times more as compared to females without PCOS (Table-II).

Effect of vitamin D deficiency was also observed in presence of other factors including age, BMI, and marital status on PCOS. Age did not show significant impact and was not included in the final regression model (P>0.05) and the final model included BMI, marital status and vitamin D
deficiency (Table-III) i.e.

\[
\text{PCOS} = 4.157 - 0.511(\text{BMI}) + 1.711(\text{marital status}) + 4.848(\text{vitamin D deficiency})
\]

**Table-III. Logistic regression to check the association of vitamin D deficiency with PCOS in presence of different factors**

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**Table-I. Characteristics of patients in both groups**

* = significant difference in vitamin D level in both groups (p<0.001)

**DISCUSSION**

Vitamin D deficiency is frequently found in women having PCOs. Various studies ascertained association between deficiency vitamin D and metabolic derangement seen in women with PCOs. It’s fairly common for were with PCOs that concomitant deficiency of vitamin D results in resistance to insulin, development of raised BP and biochemical derangements in Total Cholesterol, CRP, level of TG and LDL and HDL in blood. PCOs is a complex of disorders with anovulation and signs and symptoms of hyperandrogenenism development of a state of hyperinsulinism. It has been reported to have a prevalence of 6-12%. In our study the vitamin D deficiency was found in 47% patients in which 31 (62%) were cases and 16 (32%) were controls. The cases in our study had Statistically 3.47 times increased risk of vitamin D deficiency as compared to control odds ratio i.e. 3.47.

A previous study demonstrated PCOs is associated with development of impaired tolerance to glucose, type-II DM and metabolic syndrome (reference quote).

Another study showed PCOs women had more predilection to cardiovascular disease than non PCOs control (reference quote).

Where as one study showed vitamin D higher in PCOs than in controls.

One meta analysis failed to prove low levels of vitamin D in PCOs than non PCO control group. A study by Mazloomi et al showed PCOs itself was associated with decreased vitamin D levels independent of other risk factors.
In our study cases were 5.08 times more deficient in vitamin D than control group in normal BMI patients i.e. or 5.08.

There was one study that compared normal weight BMI (19-24.99) with PCOs and over weight BMI 25-29.99 with PCOs; levels of vitamin D were found in both groups. Statistically significant P value <0.05 and 0.01. Hence proved PCOs is associated with decreased vitamin D levels.17

CONCLUSION
Our study found significant deficiency of vitamin D in female with PCOs as compared to females without PCOs that females most probably are vitamin D deficiency and vitamin D therapy with help in resolution PCOs as well.


REFERENCES


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WE SEE THE **WORLD**, NOT AS IT IS, BUT AS WE ARE!

"Unknown"

**AUTHORSHIP AND CONTRIBUTION DECLARATION**

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<tr>
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<td>Maryam Bashir</td>
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