# FREQUENCY OF POLYCYSTIC OVARIAN SYNDROME (PCOS) AMONG OBESE DIABETIC AND NON DIABETIC FEMALES WITH CLINICAL FEATURES OF HYPERANDROGENISM

**Asifa Siraj, *Mamoona Mushtaq**

Combined Military Hospital Kharian, *Military Hospital Rawalpindi

## ABSTRACT

***Objective:*** To determine the frequency of Polycystic Ovarian Syndrome in obese diabetic and non-diabetic females with clinical features of hyperandrogenism and to find if type 2 diabetes is a risk factor for developing polycystic ovarian syndrome.

***Study design:*** A cross-sectional comparative study.

***Place and Duration of study:*** The study was done in Gynaecology and obstetric unit of Military Hospital Rawalpindi from June 2004 to April 2005.

***Patients and Methods:*** Eighty four obese females were enrolled and counseled about the procedure Body Mass Index (BMI) age and clinical features of hyperandrogenism, were recorded. Informed consent was taken, their relevant information was documented on the data collection sheets. These females were divided in two groups, 46 patients who had type 2 diabetes mellitus were enrolled in group 1 (n=46), 38 patients with normal fasting plasma glucose were enrolled in group 2 (n=38) as controls. Transvaginal scan was done on females of both groups to record the findings of Polycystic Ovarian Syndrome (PCOS).

***Results:*** Eighty four women were included for the study, all had BMI > 28, out of 46 patients who were enrolled in group-1; 32 (69%) (95% C1:59.2-78.8) had polycystic ovaries on transvaginal scan (table), while in control group, 38 women who were enrolled 23; (61%) (95% CI: 50.7 – 71.3) had polycystic ovaries. The frequency of PCOS was slightly higher in diabetics compared to the non diabetics 70% vs 61% respectively. The statistical analysis by chi-square test revealed a statistically insignificant relationship (p>0.05).

***Conclusion:*** There was no statistically significant difference between the frequency of PCOS among diabetics and non-diabetics and this does not support the view that type 2 diabetes could be a risk factor for PCOS.

**Keywords:** Polycystic Ovarian Syndrome, Diabetes Mellitus

## INTRODUCTION

The Polycystic Ovarian Syndrome (PCOS) is the commonest hormonal disturbance to affect women of reproductive age, commonly detected by ultrasound with estimated prevalence of 20–33% in the general population [1].

In 1935 Stein and Leventhal first described the polycystic ovaries as a frequent cause of irregular ovulation or anovulation in women resulting in hirsuitism, greasy skin, acne, sub fertility and infertility [2]. There is a close association between disturbance of insulin metabolism and PCOS, some believe that PCOS is the ovarian expression of the "Metabolic Syndrome". While insulin resistance is seen in at least 40% of women with PCOS [3]. In recent years, there have been a number of developments in the understanding of the genetics and pathophysiology of PCOS which have provided basis for the development of new strategies for its management. An understanding of the long-term health consequences (type-2 diabetes, cardiovascular disease and endometrial cancer) provides an opportunity to develop strategies for the screening of women at risk [3].

It is understood that ultrasound provides an excellent technique for the detection of

**Correspondence:** Maj Asifa Siraj, Gynaecologist, Combined Military Hospital Kharian
E-mail: asifakashif@yahoo.com
*Received: 06 Dec 2007: Accepted 31 July 2008*

polycystic ovarian morphology, identification of polycystic ovaries by ultrasound does not automatically confer a diagnosis of PCOS, using a combination of clinical and ultrasonographic criteria the diagnosis of PCOS is usually reserved for those women who exhibit an ultrasound picture of Polycystic Ovaries and who display one or more of the clinical symptoms (menstrual cycle disturbance, hirsuitism, obesity) [4].

At the meeting of the American Society of Reproductive Medicine (ASRM) and European Society of Human Reproduction and Embryology (ESHRE) in 2003, a refined definition of PCOS was agreed, that for the first time, included a description of the morphology of polycystic ovary. The new definition requires the presence of two out of the following three criteria: (i) Oligo and / or an ovulation (ii) hyperandrogenism (clinical / biochemical) and (iii) Polycystic Ovaries, with exclusion of other etiologies [5].

Elevated serum insulin levels are more common in both lean and obese women with PCOS than weight-matched controls. Type 2 diabetes mellitus is considered as a long term health consequence of Polycystic Ovarian Syndrome as those who have PCOS are likely to develop type 2 diabetes mellitus. Hence a study was designed to find the frequency of PCOS in obese diabetic and non-diabetic females who are clinically hyperandrogenic, and to find if type 2 diabetes could be a risk factor for PCOS.

## PATIENTS AND METHODS

This cross-sectional comparative study was conducted in the Gynaecology and Obstetrics Unit of Military Hospital Rawalpindi from July 2004 to April 2005. Eighty four obese women were included in the study with BMI [the weight in kg divided by square of height is meters] > 28, with clinical features of hyperandrogenism i.e. (hirsuitism, oligo / hypomenorrhea, sub fertility, acne, oily skin) patients of 35 – 40 years of age were included in the study.

The patients were divided in two groups, group 1 included females who had type 2 diabetes (n=46) and group 2 included healthy females with fasting plasma glucose levels with in the reference range. But both the groups had features of chemical hyperandrogenism. The required information was collected and documented on the study performa's. Patients who had Insulin Dependent Diabetes (IDDM) were excluded from the study. Transvaginal scan was performed to find the ultrasonic features of Polycystic Ovaries i.e. 12 or more follicles measuring 2 – 9 mm in diameter and / or increased ovarian volume.

**Table: Relationship of PCOS among Diabetics and non Diabetics (P>0.05)**

| Category | PCOS Present n (%) | PCOS Absent n (%) |
|---|---|---|
| Diabetics(n=46) | 32 (70%) | 14 (30%) |
| Non – Diabetics (n=38) | 23 (61%) | 15 (39%) |

## RESULTS

Eighty four patients were recruited all were obese (BMI>28) and had clinical features of hyperandrogenism. The patients had age between 35-40 years, 43 (51%) were between 35-37 years and 41 (49%) were between 38-40 years. They were divided in two groups. In group 1; out of 46, 32 (70%) (95% CI. 59.2 – 78.8) females had ultrasonic features of PCOS, while in group 2, out of 38 females, 23 (61%) (95% Cl 50.7 – 71.3) had PCOS on ultrasound. The frequency of PCOS in diabetics was slightly higher than non-diabetics but this difference was statistically insignificant (p >0.05) (Table)

## DISCUSSION

The pathogenesis of polycystic ovaries and the associated syndrome is not clear, but the heterogenecity of presentation of polycystic ovarian syndrome (PCOS) suggests that a single cause is unlikely. Recent genetic studies have identified a link between PCOS

and disordered insulin metabolism, and suggests that the syndrome may be a presentation of a complex genetic trait disorder [6].

Estimates of the prevalence of PCOS are greatly affected by the nature of the group that is being assessed. Women who are selected on the basis of the presence of a symptoms associated with the syndrome (e.g hirsuitism, acne, and menstrual cycle disturbances) would be expected to demonstrate a prevalence greater than that which exists in the general population. In this study 84 women presenting with clinical features of hyperandrogenism and obesity were divided in two groups; group 1 those who had type 2 diabetes, group 2 those who had normal glycemic levels. Transvaginal ultrasound was carried out. The frequency of PCOS among the diabetic and non-diabetic groups was not statistically significantly different, 70% vs 61% ($p>0.05$).

World over different frequencies of PCOS were quoted by various study groups. In a study of 173 women presenting with anovulation or hirsuitism. Adam et al [7] found the frequency of PCOS (using the ultrasound criteria for diagnosis) to be 26% in women with amenorrhea, 87% in women with oligomenorrhea, and 92% in women with hirsuitism and regular cycles. In another study 389 women presenting with menstrual cycle disturbances, Gadir et al [8] had quoted the frequency of polycystic ovaries as 65%. In a similar study of 350 women presenting with hirsuitism and / or androgenic alopecia. O'Driscoll et al [9] identified polycystic ovaries in 60% of 282 women whose ovaries were successfully visualized on ultrasound. Moreover, examining 119 women with acne but no menstrual disturbance, obesity, or hirsuitism, Peserico et al [10] found the frequency to be 45% in this group.

The above mentioned results indicate that PCOS is common in specific groups of women. Various studies have determined the frequency of PCOS to be 20-33% in general population [1]. The highest reported prevalence of PCOS was 52% among South Asian immigrants in Britian11. Rodin et al [11], demonstrated that South Asian women with polycystic ovaries, had a comparable degree of insulin resistance than the control group. However no study was carried out to find the frequency of PCOS in our region, although both PCOS and type 2 diabetes are common in this region [12].

The reported high frequency in our region underscores the need for more studies to find the frequency, risk factors and possible long term health consequences of PCOS to reduce the morbidity and mortality associated with it. The other finding from this study was that PCOS is equally prevalent in the diabetic and non diabetic group suggests that diabetes does not seem to be a risk factor for developing PCOS, although no study has yet been done to find the frequency of PCOS in diabetics locally or internationally.

## CONCLUSION

It is concluded that the frequency of PCOS is higher in clinically hyperandrogenic females compared to the general population. According to the findings of this study diabetes does not seem to be a risk factor for developing PCOS.

In our region the prevalence of the metabolic syndrome is high, more data is needed for planning the screening and early diagnosis of PCOS in subjects who are at higher risk.

## REFERENCES

1. Polson DW, Adams J, Wadsworth J, Franks S. Polycystic Ovaries–a common finding in normal women. Lancet. 1988; 870-2.
2. Curcy AH, Chan KL, Short F, White D, Loilliamson R, Rranks S. Evidence for a single gene affect causing polycystic ovaries and male pattern baldness Clin Endocrinol. 1993; 38: 653-8

3. Reaven GM. Role of insulin resistance in human disease (syndrome X): and expanded definition. Annu Rev Med. 1993; 44:121-31.
4. Balen AH, Conway GS, Kaltsas G. Polycystic ovary syndrome: the spectrum of the disorder in 1741 patients. Hum Reprod. 1995; 10: 2705-17.
5. Fauser B, Taratzis B, Chang H, Azziz R, Legro R, Dewailly D at al. 2003 ASRM / ESHRE consensus document. Fertil Sterril. 2004; 18: 19-25.
6. Franks S, Gharani N, McCarthy M. Candidate genes in polycystic ovary syndrome. Human Reprod Update. 2001; 7: 405-10.
7. Adams J, Polson DW, Franks S. Prevalence of polycystic ovaries in women with anovulation and idiopathic hirsuitism. Br Med J Clin Res Ed. 1986; 293:355-9.
8. Gadir AA. Implications of ultrasonically diagnosed polycystic ovaries in correlations with basal hormone profiles. Hum Reprod. 1999;7: 453-7.
9. O Driscoll JB, Mamtora H, Higginson J, A prospective study of the prevalence of clear cut endocrine disorder and polycystic ovaries in 350 women presenting with hirsuitism or androgenic alopecia. Clin Endocrinol Oxf. 1994; 41: 231-6.
10. Peserico A, Angeloni G, Bertoli P. Prevalence of polycystic ovaries in women with acne. Arch Dermatol Res. 2001; 281:502–3.
11. Rodin DA, Bano G, Balnd JM, Taylor K, Nussey SS. Polycystic ovaries and associated metabolic abnormalities in Indian subcontinent Asian women. Clin Endocrinol. 2002; 49: 91-2.
12. Tariq N, Ayub R, Alam A Y, Rahim F, Raees S R. Clinical diagnosis of Polycystic Ovarian syndrome and response to metformin therapy, J Coll Physcians Surg Pak. 2007;17 8: 469-72.