

# Prevalence and Presenting Features of Polycystic Ovarian Syndrome in Iraqi Obese Females

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## **Abstract:**

### **Background:**

Polycystic ovarian syndrome (PCOS) constitutes the most common endocrinopathy of women of reproductive age. Women with PCOS manifest hyperandrogenemia, hyperinsulinemia, and hypothalamic-pituitary-ovarian axis aberrations.

### **Objective:**

The objective of the present study was to find the prevalence and the presenting features of PCO patients and associated manifestations in relation to biochemical and anthropometric parameters in adult obese women attending obesity research and therapy unit.

### **Methods:**

Patients diagnosed as PCOS according to Androgen Excess and PCOS Society/2009 criteria were grouped into two groups: those with BMI less than 30kg/m<sup>2</sup> and those with BMI 30kg/m<sup>2</sup> and more. Blood was drawn for biochemical and hormonal assay. Information tabulated, means and percentages used, and the results were analyzed.

**Results:** The number of adult females 20-40 years of age attending Obesity research and therapy unit (ORTU) during February 2013 to February 2014 was 756, (14.3%) of them had PCOS, (65%) were diagnosed during examination. (94.4%) had menstrual disturbances, (63.8%) had hirsutism and (91.7%) had PCOS ultrasound findings. Mean BMI of the patients with PCOS was 33.62 (SD 4.21). Mean LH exceeded mean FSH in patients with PCOS and it was more evident with increasing BMI where it was doubled in those with BMI more than 30 kg/m<sup>2</sup>. LH/FSH ratio for BMI above 30 was 2.1, and although testosterone level was elevated showed no statistical relation to BMI. The fasting glucose level, cholesterol and triglycerides levels showed the same pattern of elevation that with increasing BMI.

### **Conclusions:**

The prevalence of PCOS in females (20-40y) attending ORTU was 14%, of them 65% were undiagnosed before, 63% had hirsutism, 94% had menstrual disturbances and 90% had ultrasonic features of polycystic ovary. These findings suggest the need to stress on diagnosing PCOS in adult female during management of obesity.

**Key words:** Polycystic Ovarian Syndrome, Iraqi Obese Females.

## Introduction:

Polycystic ovarian syndrome constitutes the most common endocrinopathy of women of reproductive age. Women with polycystic ovary syndrome (PCO) manifest with hyperandrogenemia, hyperinsulinemia, and hypothalamic-pituitary-ovarian axis aberrations, as well as adipose tissue dysfunctional adipokine secretion, all of which interact in different tissues (fat, liver, muscle and ovaries), thus leading to a variety of phenotypes. The definition of Androgen Excess and PCOS Society/2009 Requires the simultaneous presence of: Hyperandrogenism (clinical and/or biochemical), Ovarian dysfunction (ovulatory dysfunction and/or polycystic ovarian morphology). (1)

Obesity is strongly associated with PCOS and may be present in up to 50% of cases. (2) Obese women with PCOS are more likely than thin women with PCOS to suffer from anovulation. (3) This effect on ovulation may be secondary to insulin resistance, which in turn results in hyperinsulinemia and stimulation of excess androgen production from the ovaries. Intraovarian hyperandrogenism in turn inhibits follicular maturation.(4) Weight loss through exercise and diet has been proven effective in restoring ovulatory cycles and achieving pregnancy for many of these patients.(5) In obese, anovulatory women with PCOS, weight loss of even 5% to 10% of body weight often restores ovulatory cycles.(6)

Prevalence of PCO in women in reproductive age in general population is 4-12%, and in those with menstrual disturbances is 37-90%. (7) Clinical features include, in addition to menstrual disturbances, anovulation, hirsutism, acne, obesity, acanthosis nigricance, male type loss of hair, diabetes type2, dyslipidemia, hypertension, and malignancy as a consequence of insulin resistance. (8).

## Methods:

Retrospective descriptive cross sectional study of female adult obese patients attending ORTU in Al-Kindy College of Medicine was performed.

Inclusion criteria

A- All adult obese females with body mass index (BMI) of  $25\text{kg}/\text{m}^2$ , aged 20-40 years from February 2013 to February 2014 not receiving any treatment.

B- Adult obese females with body mass index (BMI)  $25\text{kg}/\text{m}^2$ , aged 20-40 years, diagnosed as PCO according to Androgen Excess and PCOS Society/2009 criteria in the same period, requires the simultaneous presence of:

1. Hyperandrogenism (clinical and/or biochemical), including hirsutism and acne.
2. Ovarian dysfunction (ovulatory dysfunction and/or polycystic ovarian morphology) - including oligo or amenorrhea, infertility, or ultrasonic features of polycystic ovary. (9)

Clinical Hyperandrogenism (Ferriman-Gallwey Score  $>8$ ) or Biochemical Hyperandrogenism (Elevated Total/Free Testosterone), PLUS Either: Oligomenorrhea (Less Than 6-9 Menses per Year) or Oligo-Ovulation OR Polycystic Ovaries on Ultrasound ( $\geq 12$  Antral Follicles in One Ovary or Ovarian Volume  $\geq 10\text{ cm}^3$ ). The Ferriman-Gallwey score is a method of evaluating and quantifying hirsutism in women.

Blood for biochemical and hormonal studies was drawn early in the morning. Hormonal assay was done in the mid-follicular period (normal FSH 3-10 and LH 2-8 IU/L) or randomly in patients with amenorrhea.

Patients were grouped into two groups: those with BMI less than  $30\text{kg}/\text{m}^2$  and those with BMI  $30\text{kg}/\text{m}^2$  and more.

Information was tabulated; means and percentages used; and the results were analyzed using SSPS version 16 to measure significance. P value less than 0.5 was considered significant.

## Results:

The number of adult females 20-40 years of age attending ORTU during February 2013 - February 2014 were 756, 108 (14.3%) of them found to have PCO, 38 (35%) were referred cases and 90 (65%) were diagnosed during examination in the ORTU. 102 (94.4%) had menstrual disturbances, 69 (63.8%) had hirsutism and 99 (91.7%) had ultrasonic findings of polycystic ovary.

The mean BMI of the patients with PCO was 33.62(SD 4.21), 31.52 (3.23) for those less than 30 years age and 35.60 (4.11) for those above 30 years age. The mean waste circumference was 98.5 (SD 7.21), for those less than 30 years age 95.5 (6.21), and 102.0 (SD 7.56) for those more than 30 years age.

Mean LH exceeded mean FSH in patients with PCO and it was more evident with increasing BMI where it was doubled in those with BMI more than 30 kg/m<sup>2</sup> as seen in table 1. LH/FSH for BMI less than 30 was 1.7 and for those with BMI above 30 was 2.1. Although testosterone level was elevated it showed no statistical relation to BMI. Prolactin level was increased, and there was more elevation with increasing BMI.

In PCO patients the fasting glucose level showed elevation which was more in those with BMI more than 30kg/m<sup>2</sup> as shown in table 2, cholesterol and triglycerides level showed the same pattern of elevation with significant difference with increasing BMI, at the same time HDL showed significant decrement with increasing BMI.

**Table 1 changes in hormones level according to BMI in PCO patients**

Hormone parameter	BMI <30		BMI ≥30		P value
	Mean	SD	Mean	SD	
LH/FSH	9.13	3.23	19.90	3.45	<0.5
FSH/FSH	5.33	2.45	6.12	3.65	<0.5
Testosterone nmol	2.11	1.03	2.23	2.98	>0.5
Prolactin	36.67	10.36	41.22	2.65	<0.5

**Table 2 changes in metabolic profile according to BMI in PCO patients**

Biochemical parameter	BMI <30		BMI ≥30		P value
	Mean	SD	Mean	SD	
FBG mg/dl	107	9.56	115	11.55	<0.5
Cholesterol mg/dl	181	22.25	191	24.35	<0.5
Triglyc(rl)	158	11.68	188	14.96	<0.5
HDL mg/dl	57	4.25	32	3.88	<0.5

## Discussion:

March found that the estimated prevalence of PCO in a cohort using the NIH criteria was 8.7 +/- 2.0% (with no need for imputation). Under the Rotterdam criteria, the prevalence was 11.9 +/- 2.4%. Of the women with PCOS, 68-69% did not have a pre-existing diagnosis. (10) The prevalence of PCOS is traditionally estimated at 4% to 8% from studies performed in Greece, Spain and the USA. In this study the prevalence of PCO in females (20-40y) attending ORTU was 14%, of them 65% were undiagnosed before, these results are in concordance with March results.

In PCO, hirsutism was found in (60-83%) of patients. (11) While the present study showed that 63% had hirsutism. The majority of PCOS patients had ovarian dysfunction, with 70% to 80% of women with PCOS presenting with oligomenorrhoea or amenorrhoea. Among those with oligomenorrhoea, 80% to 90% were diagnosed with PCOS. (12) In this study 94% had menstrual disturbances. Although 90% of PCO patients in this study had ultrasonic features of polycystic ovary, still a heightened prevalence of polycystic ovaries have been described in healthy women with regular menstrual cycles, which questioned the accuracy of these criteria and marginalized the specificity

of polycystic ovaries as a diagnostic criterion for PCO. (13)

The mean serum LH and LH/FSH were higher in women with PCOS compared with the normal group, but these two measurements were in the abnormal range for only 35% and 41-44%, respectively. (14) In this study the LH/FSH increased with increasing BMI although both mean ratios (BMI less and more than 30) were high which is the usual pattern of hormonal abnormality in PCO.

Mean serum total testosterone concentration was significantly higher in the PCO group and was the most frequently (70%) abnormal hormonal marker for PCO. (14) In the present study the mean testosterone was high but no significant relation to BMI was found.

Hyperprolactinaemia is a relatively frequent condition which affects almost half the patients suffering from PCO and is probably related to an increase of serum oestrogens. (15) In the present study there was elevation of mean prolactin level that significantly increased with increasing BMI.

IGT and type 2-diabetes occurred more often in PCOS patients. Independent of PCOS phenotype at index assessment and persistence of PCOS symptoms at the follow-up investigation, women with PCOS had lower insulin sensitivity but a well-preserved beta cell function in comparison with control subjects.(16) The results of this study revealed increase fasting glucose level in PCO patients with BMI less than 30 which became higher with increasing BMI.

Women suffering from PCOS are considered to be at high risk for dyslipidemia due to elevated androgen levels and frequent association of this syndrome with obesity.(17) Other study showed that these lipid parameters were associated with the presence of PCO and not with parameters describing body weight, (18) While this study showed

that there was increase in the mean levels of cholesterol and triglycerides in PCO patients even if BMI was less than 30, but cholesterol and triglycerides levels were increased with increasing BMI. In addition there was a significant decline in HDL level with increase in BMI.

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