PREVALENCE OF POLYCYSTIC OVARY SYNDROME AMONG FERTILE AND INFERTILE WOMEN IN MINIA GOVERNORATE, EGYPT

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Abstract

Objective: to demonstrate the prevalence of polycystic ovary syndrome PCOS in fertile andinfertile women in Minia Governorate, Egypt.

Patients and method:1450 patients visiting outpatients' clinics of Minia Maternity University Hospital were classified into two groups; group (I), included 620 fertile women and group (II) included 830 infertile women. All patients were searched for ovulatory disorders and manifestations of hyperandrogenism. Trans-vaginal ultrasound was done for all patients. Free testosterone (free T) was done only for patients with hyperandrogenism (336).

Results:he prevalence of PCOS was 27.4%. The prevalence was 14% and 37.5% in fertile and infertile women respectively. The percentages of ovulatory disorder, hirsutism and PCO in infertile patients with POCS were 73.3%, 60.4% and 79.4% respectively. There was significant correlation between prevalence of PCOS and increased BMI (r=0.221 and P = 0.001).

Conclusion:PCOS repr:esents a major health and reproductive problems in women of the reproductive age.

Key words: prevalence, PCOS, hirsutism, free testosterone and anovulation.

Introduction

PCOS is one of the most common endocrine disorders affecting women of reproductive age. Epidemiological studies have reported that the prevalence ranged from 6.5% to 8% using biochemical and/or clinical criteria, (1, 2) and this prevalence increased to 20% or more in ultrasound-based studies. (3, 4)

There is evidence that the prevalence of PCOS differs in populations with increased risks of insulin resistance and metabolic disease (5, 6). Other studies in Australia have concluded that this prevalence increased in women with obesity, hyperinsulinism, diabetes, dyslipidemia and a history of low birth weight. (7, 8)

The most frequent presentations of women with PCOS are infertility, menstrual irregularity, hirsutism, and/or other outward signs of androgen excess such as acne or alopecia. A guide to the diagnosis also include metabolic disturbances such as obesity insulin resistance, dyslipidemia, and hypertension. Due to these adverse clinical and metabolic complications, considerable effort remains regarding what collection of symptoms constitutes a diagnosis of PCOS. (9)

This condition should promote early diagnosis and management because there is strong evidence that women with PCOS may suffer from infertility, dysfunctional uterine bleeding, metabolic syndrome, type II diabetes, and cardiovascular disease.

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There are also some studies concluded that women with PCOS are at increased risk of obstructive sleep apnea, depression, nonalcoholic fatty liver disease, and certain cancers. (10, 11)

The aim of this study was to demonstrate the prevalence of polycystic ovary syndrome in fertile and infertile women in Minia Governorate, Egypt.

Patients and methods

This cross sectional observational analytic study was conducted on 1450 women visited the out patient clinics of Minia Maternity University Hospital in the period between January 2010 and April 2011. Patients were classified into 2 groups; group I included fertile patients while group II included infertile patients.

Inclusion criteria for fertile group were as follow: middle aged female, on IUCD for contraception and her last delivery was for at least 2 years. An inclusion criterion for group II was primary or secondary infertility for variable periods.

Patients were excluded from the study if they were pregnant or breast-feeders, if they did not accept to complete the study steps, if they reported being menopausal, using hormone replacement therapy or hormonal contraception, if they had a hysterectomy or oophorectomy, presence of any other etiologies of androgen excess, known hypothyroid patients and patients missing information about cycle regularity. Written informed consents were taken from every participant in this study after the approval of the ethical committee of the department of Obstetrics and Gynecology and Faculty of Medicine, Minia University.

Information was collected about age, parity, menstrual cycle frequency and regularity.

For all women, body weight, and height were measured. Body mass index was calculated as weight in kilograms divided by the height in meters squared (kg/m2). Features of hyperandrogenism as hirsutism, acne or androgenic alopecia were searched for. All women (n = 1450) were subjected to trans-vaginal ultrasound scans of the ovaries using 5 MHz intra-cavitary vaginal probe, (Sonoace 9900, Medison, Seoul, Korea) on the second or third day of her spontaneous or progesterone induced menstrual cycles. Venous blood samples were obtained from patients with clinical features of hyperandrogenism (n = 336) at the same day as the ultrasound was performed All sera were stored at -80°C until the time of measurements.

We adopted the Rotterdam diagnostic criteria (9); PCOS was defined by the presence of two or more of the following; clinical and/or biochemical hyperandrogenism, menstrual disorders and polycystic ovaries. The clinical assessment of hirsutism is subjective, and it is important to consider the patient's perception of unwanted hair growth in addition to the perceived rate and timing of hair growth onset. Hirsutism was referred to the growth of course, dark hair in areas without hair at all or where fine hair typically grows or, and takes mern distribution; above the lip and on the chin, chest, abdomen, and back. Free testosterone (free T) was used to assess hyperandrogenism (9). Polycystic ovaries were identified by vaginal ultrasound, conducted in the follicular phase or when hormonal assessment showed no follicular activity. A positive finding of polycystic ovaries required either 12 or more follicles measuring 2–9 mm in diameter, or increased ovarian volume (10 cm) in at least one of the ovaries. (12) Idiopathic hirsutism IH was defined more strictly as diagnosable in women who have 1) hirsutism, 2) normal ovulatory function and 3) normal androgen profile.

Statistical methods:
Statistical analyses were performed using SPSS version 16 (SPSS, Chicago, IL, USA). P value less than 0.05 were considered statistically significant.

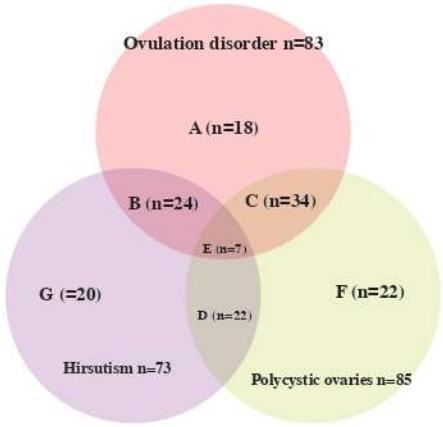
Results:

The current study included 1450 patients, they were classified into 2 groups, group I included 620 fertile women, while group II included 830 women complaining of infertility. Demographic and anthropometric criteria of study populations are summarized

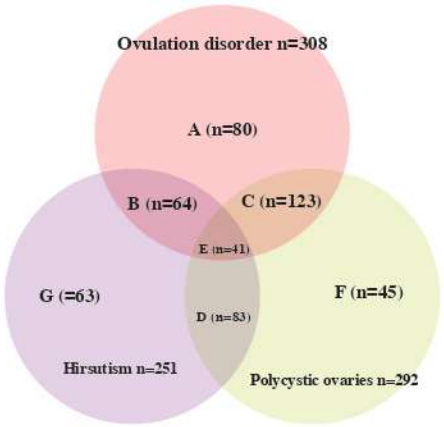
Table (I) :
Demographic and anthropometric data of the study populations:

	Group I (n=620)	Group II (n=830)	P- Value
Age (years)	20-37 (28.2±4.8)	18-35 (25.3±5.1)	< 0.001*
Parity	1-7 (2.5 ± 2)	0-2 (0.8 ± 0.5)	< 0.001*
Wight (kg)	49 -112 (56.31±11.28)	45 -122 (67.43±10.43)	< 0.001*
Height (cm)	140-177 (161.78±6.04)	143-175 (166.23±5.32)	< 0.001*
BMI** (kg/m2)	22.5–36.6 (26.2±3.4)	19.5–37.6 (25±3.95)	< 0.001*

*P values are highly significant
** BMI: body mass index



Group I



Group II

Figure (I): Distribution of the diagnostic criteria in the study population

A= ovulatory disorder alone
B= ovulatory disorder and hirsutism
C= ovulatory disorder and PCO
D= hirsutism and PCO
E= ovulatory disorder, hirsutism and PCO
F= PCO alone
G= hirsutism alone

Table (II):
Distribution of the diagnostic criteria in the study population:

Results	Group I (n=620)	Group II (n=830)	P- Value*
Oligo/ anovulation	83 (13.4%)	308 (37.1%)	< 0.001
Hirsutism Free T (pmol/L)	73 (11.7%) 49 ± 7.7(18-60)	263 (31.7%) 51 ± 9.6 (20-63)	< 0.001 0.0657**
PCO	85 (13.7%)	292 (35.25%)	< 0.001
PCOS	87 (14%)	311 (37.5%)	< 0.001

* p value < 0.05 is significant and p value<0.001 is highly significant
** t-test with unequal variance

From Figure (1), the prevalence of PCOS in fertile group (B+C+D+E) was 87/620 (14%), while in infertile group; the prevalence was 311/830 (37%). Analysis of the data of the infertile group showed that the percentage of ovulation disorders (B+C+E) in patients with PCOS was 73.3% (228/311), while the percentage of hirsutism (B+D+E) was 60.4% (188) and percentage of PCO (C+D+E) was 79.4% (247).

12 Patients (16%) presented with hirsutism only of the fertile group had normal free T they were diagnosed as idiopathic hirsutism IH, while 30 out of 263 patients (11.4%) presented with hirsutism had normal free T in the infertile group and diagnosed as IH.

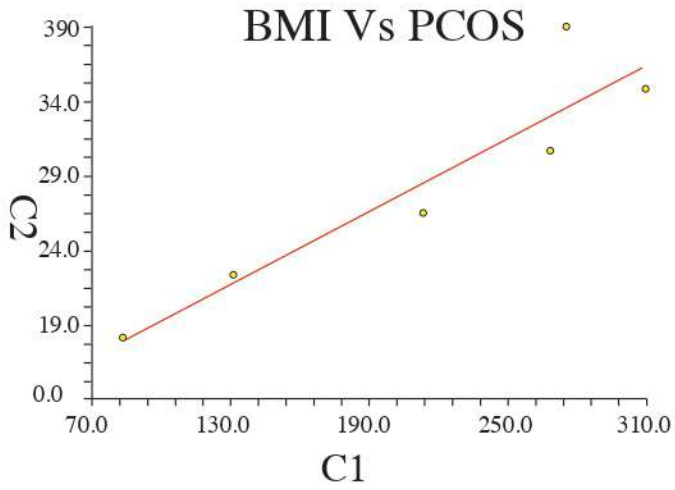


Figure (II): Correlation between BMI and number of patients with PCOS

C1 represent PCOS cases in group II, C2 represent BMI (body mass index) r=0.221 and P = 0.001
The number of women with PCOS increased with higher BMI (correlation coefficient was 0.221 and P = 0.001) as shown in figure 2

Discussion

In the current study the prevalence of PCOS was 14% among fertile women, while in patients complaining of infertility the prevalence was 37% using the Rotterdam diagnostic criteria in a random sample of an Egyptian population.
The reported prevalence of PCOS in various geographic regions varies between 2.2% and 26%. (2, 6, 14-17). The prevalence was 2.4% among 915 Southern Chinese women recruited through the offer of a free medical examination using Rotterdam diagnostic criteria (15); the prevalence was 6.5% in 154 white Spanish women during blood donation using national institute of health (NIH) criteria. (18) The cumulative prevalence of PCOS was 6.6% using the NIH definition among women undergoing pre-employment physical

examinations in the United States, (2); the prevalence of PCOS was reported to be 17.8% among 978 South Australian women, who were recruited in a retrospective birth cohort study using Rotterdam diagnostic criteria (14). Among 157 women with type II diabetes in Esfahan-Iran, the prevalence of PCOS was 8.2%. (19) It was clear that, the PCOS prevalence depends on the recruitment process of the study population and criteria used for its definition; the Rotterdam diagnostic criteria increased its prevalence by 2 times versus NIH criteria, as reported before. (20-22)

The main bewildering questions emerged in the 14 % of fertile group who had full picture of PCOS, were about health complications that may be concealed in those patients, their past reproductive history; pregnancy might occur during episodes of occasional ovulation and their future reproductive performance; they may be the substrate of future secondary infertility.

In the present study, there was significant positive correlation between women with PCOS and their BMI ($r=0.221$ & $P = 0.001$). This is in agreement with previous studies (14, 16, 23) that reported women with PCOS had the highest median BMI.

Hirsutism is the commonest clinical manifestation of androgen excess in PCOS. In the present study, 73 patients (11.7%) of the fertile women had hirsutism, only 32 % of those women (24/73) had cycle irregularities while the rest of them presented with regular cycles. 12 (16%) patients had IH. While in the infertile group, hirsutism was diagnosed in 31.7% and IH was diagnosed in 30 cases out of 263 women. It is important to note that hirsutism was found in 60.9 % (53/87) and 60.4% (188/311) of patients with PCOS in fertile and infertile groups respectively.

The reported prevalence of idiopathic hirsutism IH varies from 5-29%. (24). Overall 60–75% of patients with PCOS will have hirsutism (25) but there is wide variation based on ethnicity and degree of obesity. Its assessment should therefore be ethnic specific. Most studies have examined Caucasian and African-American women.(26) East Asian women have a lower prevalence of hirsutism (27) while the prevalence and severity of hirsutism in women with PCOS of Southern Asian origin is greater when compared to Caucasians. (28) The prevalence of PCOS in women with hirsutism is 75–80%, whereas 20–40% with acne alone have PCOS. About 10% of women with alopecia only will have PCOS.(29, 30)

In the current study, menstrual irregularities were found in 13.4 % in the fertile group compared to 37.1% in the infertile group ($P < 0.001$) but ovulatory disorder constituted 74.7% and 73.3% of patients with PCOS in fertile and infertile groups respectively.

Approximately 75% of women with PCOS have menstrual irregularities suggestive of anovulation. This includes oligomennorhea and amenorrhea. However 20–30% of oligoanovulatory women with PCOS can present with apparent eumenorrhoea (i.e. subclinical oligoanovulation). Therefore eumenorrhoeic women with other features of PCOS should have multiple determinations of serum progesterone (drawn between Day 20–24 of their menstrual cycle) to accurately categorize their ovulatory status. (31)

In the present study PCO morphology (PCOM) was diagnosed in 13.7% and 35.2% of both study groups.

The term polycystic ovary to describe this morphology is a misnomer because there are no dominant cysts or follicles larger than 10 mm because of anovulation. A study from Cape Town demonstrated no correlation between the severity of ovarian morphology and the endocrine or metabolic manifestations of PCOS. (32)

PCOS is a functional disorder that does not depend on the presence of polycystic ovaries, and the absence of PCOM does not exclude the diagnosis. Approximately 20–30% of asymptomatic women < 35 years of age will have PCOM; many studies proved that about 20% of these women will actually have PCOS by NIH definition. Conversely, 10–25% of patients with PCOS by NIH definition will not have PCOM on ultrasonography.(9, 25, 29, 31)

Up to 30% of females with normal androgens and normal menses can have PCOM. (12, 33) It has also been suggested that some women with PCOM and normal ovulatory cycles may have higher LH, androgen and insulin levels as well as lower SHBG levels when compared with control women without PCOM. (34) This phenotype may therefore represent the mildest form of PCOS.

Conclusion: PCOS represents a major health and reproductive problems in women of the reproductive age in Minia Governorate.

Recommendations: we recommend follow up of fertile patients with PCOS to answer the above listed questions.

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