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ORIGINAL ARTICLE

Frequency of Polycystic Ovary Syndrome PCOS and Various Phenotypes of PCOS in a Tertiary Care Hospital

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ABSTRACT

Background: The commonest criteria used for diagnosis of Polycystic ovary syndrome (PCOS) are the "Rotherdam criteria" which includes any two among 1:Oligo/anovulation(O), 2:clinical and/or biochemical hyperandrogenemia (H), and 3:polycystic ovaries on ultrasound (P). Aim of the study was to determine the frequency of PCOS diagnosed on clinical findings and the frequency of phenotypes of PCOS in tertiary care hospital.

Study Setting: This Cross sectional study was conducted in the Department of Gynaecology & Obstetrics, Unit 3, Civil hospital, Karachi from January, 2018 to July, 2018.

Material and Methods: Total 292 patients of age 18-45 years were included. A pelvic ultrasound for status and morphology of ovary was done. After receiving laboratory and ultrasonography results diagnosis for PCOS and phenotypes was made on the basis of different combination of chronic anovulation (O), hyperandrogenism (H) and polycystic ovaries(P). Descriptive statistics were calculated. The stratification was done using chi-square test. P value ≤0.05 was considered as significant.

Results: Mean age of patients was 31.37±5.72 years. 67.3% were multiparous. Mean irregular period days and number of follicles were 152.05±29.11 days and 12.66±2.46 while mean OV and mean testosterone was 11.20±6.86 cm^3 and 4.36±1.51 Nmol/L. 74.3% females were found with PCOS. Among them Oligo-ovulation was 75.1%, Polycystic Ovary was 83.4%, and Hyperandrogenism was 85.35%. Phenotype A was the most common type.

Conclusion: Total 74.3% females were found with PCOS. Hyperandrogenism was the highest followed by Polycystic Ovary and Oligo-ovulation. While Phenotype A was found most common phenotype.

Keywords: Frequency, PCOS, Clinical Findings, Phenotypes

INTRODUCTION

PCOS is one of the commonest endocrine disorder in women, affecting 5–10% of women in the reproductive age worldwide.[1-3] However, epidemiological studies have resulted in estimates of prevalence that range from 6.5% to 8% using biochemical and/or clinical evidence.[3–5] and ultrasound-based studies have reported a prevalence of 20% or more in women of reproductive age.[3,6,7] The prevalence tends to vary depending on ethnicity and the criteria used to define PCOS.[1] PCOS is characterized by increased ovarian and adrenal androgen secretion, hyper androgenic symptoms such as hirsutism, acne, menstrual irregularity, and polycystic ovaries.[8]

Currently, the commonest criteria used for diagnosis of PCOS are the "Rotherdam criteria" which includes any two of the following three features:1) Oligo/anovulation (O), 2) clinical and/or biochemical hyperandrogenemia (H), 3) polycystic ovaries on ultrasound (P), with exclusion of other known disorders of hyperandrogenemia. This generates four different phenotypes: 1) P + H + O (PCOS complete), 2) P + O, 3) H + O, and 4) P + H.[9,10]

Diagnosis of PCOS continues to be controversial primarily because of the heterogeneous nature of the condition which may change during the lifetime of the woman. Diagnosis of PCOS is important, because it is associated with increased risks of insulin resistance (IR), noninsulin dependent diabetes mellitus and metabolic syndrome. All of which have long-term consequences.[10-13]

Polycystic ovary syndrome (PCOS) affects 5–10% of women in reproductive age.[9,14] Phenotype A is the most frequent (44–65%), followed by phenotype B (8–33%), then phenotype C (3–29%), and finally phenotype D (0–23%) [9,15-17]

In study, the prevalence of PCOS was 33%.[18] In a study, the phenotypic distribution in order of decreasing prevalence of PCOS was: P + O + H; P + O; O + H; and P + H (65.6%, 22.2%, 11.2%, and 0.9%, respectively).[10]

PCO complete (P + O + H) was the largest group in most reports. Norm-androgenic phenotype (P + O) comprised a significant proportion of PCOS women. Ovulatory phenotype P + H, was the least common group, possibly because these woman are mostly asymptomatic and unlikely to present in gynecology outpatient.[10]Proper diagnosis and management of PCOS is essential as PCOS has many potential metabolic and cardiovascular risks if not managed appropriately.[10]

Limited literature discusses the frequency of PCOS and its phenotypes diagnosed clinically and ultrasound in Pakistan. Due to this ambiguity, current study is planned. Therefore, purpose of this study is to determine the frequency of PCOS and its phenotypes diagnosed on clinical and ultrasound. This would help to stimulate collaborative efforts to improve the timely diagnosis of PCOS and its phenotypes and facilitate appropriate clinical intervention.

MATERIAL AND METHODS

Settings: This Cross sectional study was conducted in Department of Gynaecology & Obstetrics, Unit 3, Civil hospital, Karachi for the duration of six Months from January 2018 to July 2018. By taken least prevalence of PCOS (P) =5.0%, d=2.5%, and 95% confidence level, the calculated sample size was 292 patients. This was calculated with the help of WHO software for sample size calculation. Non-probability consecutive sampling technique was used for the study.

Inclusion Criteria:

- Women with age 18-45 years.

Exclusion Criteria:

- Patients who were not give consent.
- Women older than 45 years of age
- Amenorrhea of menopause, ling failure, renal failure, anemia and heart failure

Data Collection Procedure: This study was conducted after approval of hospital ethical review committee. The patients with sign and symptoms of PCOS visited to the department of Gynaecology & Obstetrics, Civil hospital, Karachi and fulfilled the inclusion criteria were included in the study. Patient demographics and physical examination were taken by the principal investigator. Each woman undergone detailed clinical examination and ultrasonography. Laboratory and Ultrasound investigations were done for the confirmation of PCOS. Blood sample was taken by the

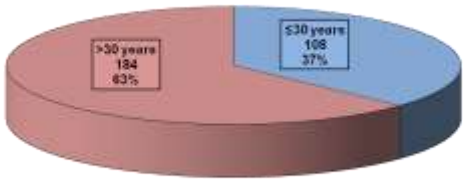
peripheral venipuncture done by expert phlebotomist after aseptic measures and sent to the well-equipped and skilled Laboratory of Civil hospital, Karachi. The results were finalized by the experienced consultant pathologist of more than five years of experience. All included subjects were sent to radiology department for ultrasound. A pelvic ultrasound for status and morphology of ovary were done using a vaginal probe of 6 MHz of a ultrasound machine (TOSHIBA Ultrasound, Osaka, Japan). Ovarian volume measurements were carried out by measuring three perpendicular dimensions (volume for a prolate ellipsoid = 0.5 × length × width × thickness). Follicle numbers were estimated both in longitudinal and antero-posterior cross-sections of the ovaries. Those with a mean diameter of 2–9 mm were counted for defining polycystic ovary morphology. After receiving laboratory and ultrasonography results diagnosis for PCOS and PCOS phenotypes were made as per operational definition. Chronic anovulation (O) was made on the basis history of menstrual cycles <21 days or >38 days. Hyperandrogenism (H) was positive when total testosterone value ≥3.96 nmol/L in blood test. Polycystic ovaries (P) were diagnosed on the basis of ultrasound (P) examination.

Diagnosis of PCOS included either chronic anovulation, hyperandrogenism (clinical/biologic), or polycystic ovaries. Diagnosis of PCOS phenotypes was made on the basis of different combination of chronic anovulation (O), hyperandrogenism (H) and polycystic ovaries (P) as per operational definition. The effect modifiers and biasness were controlled by strictly following the inclusion and exclusion criteria.

Data Analysis Procedure: Patient's data were compiled and analyzed through statistical package for Social Sciences (SPSS) Version 21. Frequency and percentage were computed for qualitative variables like PCOS (Yes/No), Oligo-ovulation, Polycystic Ovary, Hyperandrogenism and PCOS phenotypes. Mean±SD were calculated for quantitative variable i.e. age, parity, gravidity, days of irregular periods, number of follicles, ovarian volume, and total testosterone value. The stratification was done on age and parity to see the effect of these modifiers on outcome using Chi-square test. P value ≤0.05 was considered as significant.

RESULTS

Total 292 females with age between 18 years to 45 years meeting inclusion criteria of study were evaluated to determine the frequency of PCOS diagnosed on clinical finding as well as to determine the frequency of phenotypes of PCOS in tertiary care hospital. Mean age of patients was 31.37±5.72 years. The age was further stratified in two groups. The percentages and frequencies are presented in Graph-1.



Graph 1: Percentage of patients according to age groups

In our study, 74.3% females were found with PCOS among these PCOS positive females, Oligo-ovulation was 75.1%, Polycystic Ovary was 83.4%, and Hyperandrogenism was 85.35%.

Descriptive statistics of age, parity, irregular period days, number of follicles, OV and testosterone according to PCOS are presented from Table-1 to Table 5.

Table 1: Descriptive statistics of age according To PCOS

	Positive (n=217)	Negative (n=75)
Mean	31.66	30.53
Standard Deviation	4.70	7.93
Median	32.00	32.00
Minimum	18	18
Maximum	44	44
Range	26	26

Table 2: Descriptive statistics of parity according to PCOS

	Positive (n=215)	Negative (n=72)
Mean	2.17	2.00
Standard Deviation	1.32	1.70
Median	2.00	2.00
Minimum	0	0
Maximum	5	7
Range	5	7

Table 3: Descriptive statistics of irregular periods days according to PCOS;

	Positive (n=217)	Negative (n=75)
Mean	151.68	153.12
Standard Deviation	29.20	29.03
Median	157.00	157.00
Minimum	75	60
Maximum	190	190
Range	115	130

Table 4: Descriptive statistics of OV according to PCOS;

	Positive (n=217)	Negative (n=75)
Mean	12.02	8.82
Standard Deviation	7.71	1.87
Median	11.50	9.20
Minimum	1.50	6
Maximum	109.00	13.20
Range	107.50	7.20

Table 5: Descriptive statistics of testosterone according to PCOS;

	Positive (n=217)	Negative (n=75)
Mean	4.64	26.17
Standard Deviation	1.64	0.42
Median	4.20	3.50
Minimum	2.90	2.10
Maximum	15.10	4.60
Range	12.20	2.50

Table 6: Frequency and association of PCOS according to age;

	PCOS			P-Value
	Yes	No	Total	
≤30 years	78 (35.9)	30 (40)	108 (37)	0.531**
>30 years	139 (64.1)	45 (60)	184 (63)	
TOTAL	217	75	292	

Chi Square Test was applied.
P-value≤0.05 considered as significant.
**Not Significant at 0.05 levels,

Table 7: Frequency and association of PCOS according to parity;

	PCOS			P-Value
	Yes	No	Total	
Nulliparous	27 (12.6)	23 (31.9)	50 (71.4)	0.000*
Primiparous	39 (18.1)	5 (6.9)	44 (15.3)	
Multiparous	149 (69.3)	44 (61.1)	193 (67.2)	
TOTAL	215	72	287	

Chi Square Test was applied.
P-value≤0.05 considered as significant.
* Significant at 0.05 levels,

Stratification with respect to age and parity was done to observe effect of these modifiers o on PCOS. P-value ≤0.05 was considered as significant. The results showed significant association of PCOS with parity (p=0.000) while no significant association was found with age (p=0.531). The detailed results of associations are presented in Table 6 and Table 7.

DISCUSSION

The prevalence of PCOS in this study population was 74.3%. A study found that frequency of PCOS in women attending infertility clinics was 17.6%. Another study estimated that 40% of women who attend infertility clinics have PCOS. There are distinct national and ethnic differences in the incidence and presentation of PCOS: thus this syndrome varies either in its prevalence or presentation around the world or in different ethnic groups within a country.[19]

The highest reported prevalence of PCOS was 52%, among south Asian immigrants in Britain.[20] Prevalence of PCOS among infertile Kurdish women, attending infertility Care and IVF Center in Erbil was 33%. The results and percentages of the four phenotypes of women with PCOS in our study were in agreement with two studies done by Azziz and Dewailly et al., who also found that highest percentages of women exhibited phenotype A, having all three features of PCOS including menstrual disturbance, hirsutism, and PCO features on ultrasound scans. The least common type is phenotype D, including women with PCOS having only hirsutism, and PCO features on ultrasound scans.[21]

The results in our study were consistent with Alnakash and Al-Taee as they noted that 87.8% of the women with PCOS included in their study were less than 35 years of age.[22] The results agreed with a study conducted in Alabama, USA by Kahsar et al. who found the rates of PCOS in mothers and sisters of patients with PCOS were 24% and 32% respectively, although the risk was higher when considering untreated perimenopausal women only (i.e., 35% of mothers and 40% of sisters).[23] The presence of a high frequency of oligomenorrhea and amenorrhea among the PCOS group in the current study was in consistent with the results in a large series of women diagnosed to have PCOS by Azziz et al, as approximately 75%-85% of women with PCOS had clinical evidence of menstrual dysfunction. Women with PCOS showed hirsutism more than women without PCOS. The prevalence and degree of hirsutism depends on the ethnicity of the patients.[24] Hirsutism is less prevalent in women with PCOS of East Asian ex- traction or Pacific Islanders but is more prevalent in women of Indian origin. Acne was more prevalent among women with PCOS than among women without PCOS.[25]

Another study reported phenotypic distribution in order of decreasing prevalence as follows: P + O + H; P + O; O + H and P + H (65.6, 22.2, 11.2, and 0.9%, respectively). In few similar studies the phenotypic distribution was quite similar. Turkish population reported frequency of 44.09, 14.17, 18.9, and 14.1%; Bulgarian 53.6, 11, 12.8, and 22.6%; United States 58, 13, 14, and 14%; and Iranian 32.1, 46.8, 14.8, and 6.3%, respectively.[21] A study showed, PCO complete (P + O + H) was the largest group in most reports. Normoandrogenic phenotype (P + O) comprised a significant proportion of PCOS women. Ovulatory phenotype P + H, was the least common group, possibly because these woman are mostly asymptomatic and unlikely to present in gynecology outpatient. Also, women with hyper androgenic symptoms like acne and hirsutism are more likely to consult dermatology.[20]

The differences in the above studies may be as a result of different body weights, dietary habits, lifestyle, and genetic factors in different countries and ethnic groups. Besides the above mentioned factors, different criteria for diagnosis of metabolic syndrome like NCEP ATP III and International Diabetic Federation (IDF) criteria could be reasons for the difference in the reported frequencies. A consensus definition incorporating IDF and AHA/NHLB risk factors have been introduced.[25] Kar S et al has used this definition for the definition of metabolic syndrome and his findings were comparable with another Indian study which reported 37.5% prevalence of metabolic syndrome in PCOS women with infertility. [26]

IR, hyperinsulinemia, and hyper androgenemia are likely pathogenic factors in PCOS. Polycystic morphology on ultrasound, its mechanism and importance is not understood. Studies however report lower incidence of metabolic syndrome, IR, lower cholesterol, and low density lipoproteins in women with PCO ovary.[26]

CONCLUSION

Our study results study that 74.3% females were found with PCOS. Hyperandrogenism was the highest followed by Polycystic Ovary and Oligo-ovulation. While Phenotype A was found most common phenotype. The findings concluded that an appropriate diagnosis of PCOS and accurate identification of phenotype is very important as it has long-term health implications for women. These women need to be informed and counseled about their present and long-term risks.

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