ORIGINAL RESEARCH

A Cross-Sectional Analysis of Prevalence of PCOS and Risk Factors Associated with it Among Young Women at a Tertiary Care Hospital

[1]Gupteswar Mishra, [2]Sambit Kumar Mohanty, [3]Prabir Kumar Biswal

[1]Assistant Professor, [3]Junior Resident, Department of Obstetrics and Gynecology, Hi-Tech Medical College & Hospital, Bhubaneswar, Odisha, India
[2]Assistant Professor, Department of Surgery, Hi-Tech Medical College & Hospital, Bhubaneswar, Odisha, India

Corresponding Author
Gupteswar Mishra
Assistant Professor, Department of Obstetrics and Gynecology, Hi-Tech Medical College & Hospital, Bhubaneswar, Odisha, India
Email: drgupteswar.mishra@gmail.com

Abstract
Background: Polycystic ovarian syndrome (PCOS), more commonly known as PCOS, is a gynecological health problem caused by an imbalance of reproductive hormones. The present cross -sectional study was conducted to assess prevalence of PCOS and risk factors associated with it among young women.
Materials & Methods: The present cross -sectional study was conducted to assess prevalence of PCOS and risk factors associated with it among young women among 400 young women in the age group of 17-24 years. A detailed, self-administered questionnaire was prepared. Final diagnosis of PCOS was made. $P< 0.05$ was considered as significant.
Results: According to Rotterdam criteria, PCOS was present in 8% girls. Among all the risk factors, BMI ≥ 25 (P value< 0.0001) and waist hip ratio≥ 0.85 (<0.0001) were strongly associated with the presence of PCOS.
Conclusion: The study concluded that in the present study prevalence of PCOS was 8% and BMI ≥ 25 and waist hip ratio≥ 0.85 were strongly associated with the presence of PCOS.
Keywords: BMI, Waist Hip Ratio, Age, Prevalence, PCOS.

Introduction
Polycystic ovary syndrome (PCOS) is a heterogeneous, chronic endocrine disorder commonly diagnosed in women of reproductive age. It often manifests with some or all of the following symptoms: menstrual dysfunction, infertility, hirsutism, acne, and obesity.[1] Presenting itself as a multifactorial disease, it can be affected by genetic/environmental factors, uncontrolled ovarian steroidogenesis, aberrant insulin signaling and excessive oxidative stress.[2] Family history is found to have the strongest association with the disorder, with a high significance.[3] Globally, prevalence estimates of PCOS are highly variable, ranging from 2.2% to as high as 26% of this age group depending on how it is defined.[4] Three sets of criteria have been created for the identification of PCOS: the National Institutes of Health criteria (1992), Rotterdam criteria (2003), and Androgen Excess Society criteria (2006). All 3 subsets include chronic oligo/anovulation, clinical and/or biochemical hyperandrogenism and polycystic ovarian morphology on transvaginal ultrasound, or various combinations of these conditions. All subsets recognize that other disorders causing anovulation and/or androgen excess should be ruled out before diagnosis of PCOS is confirmed.[5-8] PCOS is associated with a wide spectrum of presenting features, including anovulation, obesity and abnormal facial and skin hair growth (hirsutism).[9,10] Women with PCOS are at an increased risk for infertility, preeclampsia, early pregnancy loss, and endometrial cancer. Moreover, because of the association of PCOS with insulin resistance, evidence suggests that women with PCOS are at an increased risk for developing type-2 diabetes, dyslipidemia, hypertension, and heart disease.[11] The present cross -sectional study was conducted to assess prevalence of PCOS and risk factors associated with it among young women.

Materials & methods
The present cross -sectional study was conducted in Department of Obstetrics and Gynecology, Hi-Tech Medical College & Hospital, Bhubaneswar, Odisha (India) to assess prevalence of PCOS and risk factors associated with it among young women among 400 young women in the age group of 17-24 years. Before the commencement of the study ethical approval was taken from the Ethical Committee of the institute and informed consent was taken from the participants after explaining the study to them. Girls who had attained

menarche more than 2 years before the study and were willing to participate in the study were included in the study. Participants with thyroid disorders, Cushing's syndrome, congenital adrenal hyperplasia, androgen secreting tumour, renal and liver disorders was excluded from the study. Participants were interviewed with their consent by screening questionnaire. After screening for PCOS, all suspected girls were confirmed by USG. A structured self-administrative questionnaire was developed. This tool contained questionnaire includes the following component-knowledge assessment, anthropometric assessment, clinical history, menstrual history, hirsutism/androgen production assessment (skin problems, and hair distribution) and polycystic ovary assessment. Final diagnosis of PCOS was made if all three elements of Rotterdam criteria were present which included presence of oligomenorrhea after two years of menarche or primary amenorrhea at the age of 16 years, and polycystic ovaries on ultrasound along with ovarian size of more than 10 cm and hyperandrogenemia should be present. Hirsutism score of more than 8 was considered positive for hyperandrogenemia. The developed questionnaire was used to length of menstrual cycle, sign of androgen excess (skin problems, hair distribution) and anthropometric measurements such as weight, height, waist circumference, hip circumference, body mass index (BMI). Data were analyzed using excel, windows 2007 and using a software (epi info 7). The Chi-square test was used, the significance of the results was computed at the level of $p<0.05$.

Results

In the present study 400 participants were included in which Irregular mensus/ oligo/ anvoulation only was present in 3.75% girls, Hirsutism only was present in 1.25%, Irregular mensus/ oligo/ anvoulation and hirsutism were present in 5.5% girls. Acne was present in 80.5% girls and Hair loss/alopecia was present in 20.5% girls.

The phenotypes of PCOS observed in this study are as follows:

1. Participants with oligomenorrhoea and polycystic ovaries, 6 (1.5%)
2. Participants with hirsutism and polycystic ovaries, 5(1.25%)
3. Participants with oligomenorrhoea and hirsutism, 21 (5.25%).

According to Rotterdam criteria, PCOS was present in 8% girls.

Among all the risk factors, BMI ≥ 25 (P value< 0.0001) and waist hip ratio≥ 0.85 (<0.0001) were strongly associated with the presence of PCOS.

Table 1: Distribution of respondents according to endocrinological abnormalities

Endocrinological abnormalities	Present (%)	Absent (%)	Total (%)
Irregular mensus/ oligo/ anvoulation only	15(3.75%)	385(96.25%)	400(100%)
Hirsutism only	5(1.25%)	395(98.75%)	400(100%)
Irregular mensus/ oligo/ anvoulation and hirsutism	22(5.5%)	378(94.5%)	400(100%)
Acne	322(80.5%)	78(19.5%)	400(100%)
Hair loss/alopecia	82(20.5%)	318(79.5%)	400(100%)

Table 2: Prevalence of PCOS according to Rotterdam criteria

PCOS variables	PCOS present (according Rotterdam criteria) (%)
Irregular mensus/ oligo/ anvoulation and hirsutism	21(5.25%)
Irregular mensus/ oligo/ anvoulation and multiple cyst in ovary	6(1.5%)
Hirsutism and multiple cyst in ovary	5(1.25%)
Total	32(8%)

Table 3: Association between PCOS and other variables

Variables	PCOS present (%)	PCOS absent (%)	Total (%)	P value
Age (in years)				
<20	29(7.25%)	330(82.5%)	359(89.75%)	NS
>20	3(0.75%)	38(9.5%)	41(10.25%)	
BMI				
<25	2(0.5%)	326(81.5%)	328(82%)	P≤0.0001
≥25	30(7.5%)	42(10.5%)	72(18%)	
Waist/hip ratio				
<0.85	3(0.75%)	341(85.25%)	344(86%)	P≤0.0001
≥0.85	29(7.25%)	27(6.75%)	56(14%)	
Total	32(8%)	368(92%)	400(100%)	

Discussion

PCOS is associated with multiple reproductive, reproductive, and psychological complications which are of serious concern. It was during the mid-nineteenth century that headway was made in the understanding of PCOS by Stein and Leventhal. To address this issue, few nationally representative surveys have been conducted in India from 2010 to 2014, reporting the variation in prevalence rate from 6% to 46.8%. Ganie *et al*. published the first Indian case–control study using Rotterdam criteria in 2010, which reported a high prevalence rate of 46.8% as the study was conducted in 176 chronic lymphocytic thyroiditis (CLT) patients.[12]

According to Rotterdam criteria, PCOS was present in 8% girls. Among all the risk factors, BMI ≥25 (P value< 0.0001) and waist hip ratio≥ 0.85 (<0.0001) were strongly associated with the presence of PCOS.

Gupta M et al found the prevalence of PCOS in the study was 8.20%.[13]

Haq NNU et al observed that irregular cycles, oily skin, acne and hirsutism are symptoms of PCOS.[14]

In a study conducted by Jaya Patel, 78.9% of the subjects complained of acne and 13% had complaint of hirsutism.[15]

A study conducted by Gupta M et al. among young college girls in central India revealed high BMI is strongly associated with PCOS. Prevalence of PCOS among those with BMI more than 25Kg/m² was 7.6% as compared to 0.6% in those with BMI below 25Kg/m².[13]

Obesity could be an important contributor to the development of PCOS. Thus, there is a need to encourage women at the time of diagnosis to engage in a diet and exercise plan that will help them lose weight and regulate their menstrual cycles, improve emotional outcomes and reduce insulin resistance. [16]

Aggarwal M et al found prevalence rate of 21.05 %in the study. Among those with PCOS, the mean age was 21.18 years. 22.22% of the subjects were at high risk and 77.77% were at low risk for PCOS. Most of the ones diagnosed with PCOS had a waist to hip ratio greater than 0.8 (p< 0.05) and were either obese or overweight (BMI>25 kg/m2) (p< 0.01), suffered from menstrual irregularities (P<0.05), hirsutism (P<0.05), and emotional problems like feeling moody and easy fatigability(P<0.05).[17]

Conclusion

The study concluded that in the present study prevalence of PCOS was 8% and BMI ≥25 and waist hip ratio≥ 0.85 were strongly associated with the presence of PCOS.

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