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Original Research Article

Prevalence of polycystic ovarian syndrome among adolescent girls: a prospective study

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ABSTRACT

Background: PCOS is a complex endocrine disorder which is most common in women of reproductive age. PCOS may first present in adolescence, but the incidence of PCOS in adolescence is not known, as diagnostic criteria for PCOS in the adolescent age-group is still not defined, PCOS symptoms tend to overlap with normal pubertal changes making the diagnosis even more challenging. The objective is to study prevalence and symptomatology of polycystic ovary syndrome (PCOS) in adolescent girls.
Methods: Prospective study between November 2017 and March 2018. 117 adolescent girls aged 15 to19 years attending OPD with oligomenorrhea and/or hirsutism were advised for biochemical, hormonal, and ultrasonographic evaluation for diagnosis of PCOS on the basis of Rotterdam's criteria at the Department of Obstetrics and Gynaecology, Government Maternity Hospital, Osmania Medical College, Hyderabad.
Results: Prevalence of PCOS in the study was 11.96% in the study group.
Conclusions: PCOS is increasingly encountered during adolescence, although the overall prevalence is low and evaluation of PCOS in adolescents is challenging. At this age, life style modification is imperative to prevent long-term metabolic and reproductive complications.

Keywords: Adolescence menstrual irregularity, Endocrinopathy, Polycystic ovary syndrome, Prevalence

INTRODUCTION

PCOS is a complex endocrine disorder which is most common in women of reproductive age.[1] The primary underlying defect in PCOS remains unknown, but key features include insulin resistance, impaired gonadotropin dynamics, and androgen excess.

It affects 2.2 to 20% of reproductive-aged women.[2] PCOS may first present in adolescence, but the incidence of PCOS in adolescence is not known, as diagnostic criteria for PCOS in the adolescent age-group are still not defined. Although polycystic ovarian morphology and features of hyperandrogenism are key factors for the diagnosis of PCOS in adults but adolescent girls during the early stages of puberty tend to have anovulatory menstrual cycles, higher androgen levels, and polycystic ovaries. Thus, PCOS symptoms tend to overlap with normal pubertal changes.[3] Due to theses variations, the practice of using adult diagnostic criteria raises the concern for misdiagnosis in adolescent age group.[4] At the same time the diagnosis is important as behavioral modification and life style changes in adolescent age group plays an important role for the prevention of future complications and morbidity.

METHODS

Cross-sectional study between November 2017 and March 2018. 117 adolescent girls aged 15 to19 years

attending OPD with oligomenorrhea and/or hirsutism were advised for biochemical, hormonal, and ultrasonographic evaluation for diagnosis of PCOS on the basis of Rotterdam's criteria. This study was done at the Department of Obstetrics and Gynaecology; Government Maternity Hospital, Sultan Bazaar, Osmania Medical College, Hyderabad.

PCOS was defined by Rotterdam's criteria having presence of any two of the three features:

- Oligo/amenorrhea: Absence of menstruation for 45 days or more and/or less than 8 menses per year.
- Clinical hyperandrogenism: Modified Ferriman and Gallway (mFG) score of 8 or higher.
- Polycystic ovaries: Presence of more than 10 cysts, 2-8 mm in diameter, usually combined with increased ovarian volume of more than 10 cm^3, and an echo-dense stroma in pelvic ultrasound scan.

Inclusion criteria

Adolescents aged 15–19 years, not married, and had menarche more than 2 years before the study.

Exclusion criteria

Those who were known case of thyroid disorders, hyperprolactinemia, Cushing's syndrome, and who were not willing to participate, were excluded from this study.

A structured questionnaire was given to all the participants. Questionnaire included the following components-knowledge assessment, anthropometric assessment, clinical history; menstrual history included irregularity as well as presence of oligomenorrhea after two years of menarche, and hirsutism/ androgen production assessment (skin problems, and hair distribution).

Evidence of ovulatory dysfunction included consecutive menstrual intervals of more than 90 days, 2 years after menstrual onset; menstrual intervals persistently less than 21 days or more than 45 days 2 or more years after menarche. Evidence of androgen excess included moderate to severe hirsutism; persistent acne unresponsive to topical therapy; and persistent elevation of serum total and/or free testosterone. Body mass index of up to 23 was taken as normal, between 23 to 24.9kg/m^2 was taken as overweight, and more than 25kg/m^2 was considered as obese according to the WHO criteria.

Blood samples were collected between 08:00 and 10:00 h with an overnight fasting for following hormonal estimation.

- Prolactin to rule out hyperprolactinemia
- TSH to rule out hypothyroidism
- 17-hydroxyprogesterone to rule out 21-hydroxylase deficiency (CAH)
- LH; FSH; 17-OHP; DHEA-sulfate, Androstenedione.

The study was approved by the institutional ethics committee. Written informed consent was taken. All the data was entered in MS excel for statistical analysis.

RESULTS

Out of 117 adolescent girls 14 girls had PCOS. Thus, the prevalence of PCOS in the study was 11.96%.

Table 1: Distribution according to age group.

Age group	No.	Percentage
Early adolescence	3	21.42
Late adolescence	11	78.58
Total	14	100

When the study group was further subdivided into early and late adolescence, it was observed that PCOS was more prevalent in late adolescence. Age wise distribution of study population shows that the majority, that is 78.58% of adolescents were in their late adolescence.

Table 2: Distribution according to family history.

Family history	Number	Percentage
Yes	6	43
No	8	57

When family history of PCOS was taken it was observed that about 43% had positive family history in first degree relative.

Table 3: Association between PCOS and BMI.

Variables		PCOS present	PCOS absent	%
BMI	Non-obese	7	90 (87%)	50
	Overweight	6	13 (13%)	43
	Obese	1	nil	7
	Total	14	103	
Waist/ hip ratio	<0.85	9	97 (94%)	64
	>0.85	5	6 (6%)	36

Among those diagnosed with PCOS, 50% were non-obese, 43% cases were overweight, and 7% were obese. PCOS cases had higher waist to hip ratio and significantly higher BMI.

Table 4: Distribution of cases with menstrual irregularity.

Menstrual irregularity	Number	Percentage
PCOS	10	71
Non PCOS	12	11

Menstrual irregularity was the most common presentation in the PCOS group. It was observed in 71% cases

including oligomenorrhoea, amenorrhoea and menorrhagia.

Table 5: Other clinical manifestations.

Clinical manifestations	Number	Percentage
Acne/oily skin	9	64
Hirsutism	3	21
Loss of hair/Alopecia	1	7
Pigmentation	5	36
Mood changes/depression	2	14

Acne or oily skin suggestive of androgenic activity was observed in 64 % of adolescent girls. Hirsutism was found in 21 % of cases. Loss of hair was in 7% of girls while pigmentation was in 36% of girls. Mood changes included irritability and depression which was found in 14% girls. Many girls had a combination of symptoms present. Most common being menstrual irregularities and acne.

DISCUSSION

In adolescents, the exact prevalence of PCOS in India is unknown due to paucity of data. Different studies in India on PCOS have reported a prevalence of 3.7% to 22.5% and even up to 36% in adolescents. The significant variation in different studies is due to lack of consensus on diagnostic criteria.

Prevalence of PCOS in this study was found to be 11.96%, while in the study done by Nidhi et al, the prevalence rate was 9.13%.[5] The prevalence was slightly higher than the study done by Nidhi et al which was a community-based study, while the present study was hospital-based study.

When the study group was further subdivided into early and late adolescence it was observed that PCOS was more prevalent in late adolescence. Age wise distribution of study population shows that majority that is 78.58 % were in their late adolescence. In similar study done by Dr. Kalavathi et al, and PCOS was more common in late adolescence.[6] In that study it was observed that about 76.2 % the cases were in late adolescence.

When family history of PCOS was taken it was observed that about 43% had positive family history in first degree relative. In the study done by Kahsar-Miller MD, Nixon C, Boots LR, Go RC, Azziz R, of the 78 mothers and 50 sisters evaluated clinically, 19 (24%) and 16 (32%) were affected with PCOS.[7] This shows that there is genetic predisposition for PCOS.

Among those diagnosed with PCOS, 50% were non-obese, 43% cases were overweight, and 7% were obese. PCOS cases had higher waist to hip ratio and higher BMI. BMI was significantly higher in cases confirmed with PCOS in the study done by Joseph N et al at Karnataka.[8] In a study done by Joshi B et al in Mumbai, among those diagnosed with PCOS, 71.8% were nonobese, 7.5% cases were overweight, and 20.7% were obese.[9]

Menstrual irregularity was the most common presentation in the PCOS group. It was observed in 71% cases including oligomenorrhoea, menorrhagia and amenorrhoea. A recent study found that PCOS was the most common underlying etiology in adolescents hospitalized with abnormal uterine bleeding (AUB) and menorrhagia, accounting for 33% of admissions Maslyanskaya S, Talib HJ, Northridge JL, et al.[10]

Acne or oily skin suggestive of androgenic activity was observed in 64 % of adolescent girls. Hirsutism was found in 21 % of cases. Loss of hair was in 7% of girls while pigmentation was in 36% of girls. Mood changes included irritability and depression which was found in 14% girls. Many girls had a combination of symptoms present. Most common being menstrual irregularities and acne or oily skin suggestive of androgenic activity.

CONCLUSION

Diagnosis of PCOS in adolescence remains a challenge because of overlapping of symptoms of PCOS with normal pubertal changes in adolescents. Although overall incidence of PCOS in adolescents is low but the incidence of PCOS among adolescence has seen an increasing trend. Early diagnosis is important to inculcate early life style modifications which will prevent metabolic and reproductive complications. Lifestyle modifications for weight reduction and dietary modifications and psychological counselling plays important role in these young girls for preventing long term complications.

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