Original Research Article

Study of prevalence and determinants of polycystic ovarian syndrome among adolescent girls in rural area: a prospective study

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ABSTRACT

Background: Polycystic ovarian syndrome (PCOS) is the most frequent endocrinological disorder affecting 5-10% of women in the reproductive age. This prevalence ranging from 2.2% to 26% in adult women from 18-45 year. In a recent study the prevalence of a confirmed diagnosis of PCOS in adolescents aged 10 to 19 years was 5-15%, which increased to 10-22%. When undiagnosed cases with documented symptoms qualifying for PCOS according to NIH (National institute of Health) criteria were included. 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 Cross sectional study between April 2018 and March 2019. 150 adolescent girls aged 10 to 19 years attending OPD with oligomenorrhea, irregular menstrual cycle, obesity 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, Krishna Institute of Medical Sciences, Deemed University, Karad, Maharashtra, India.
Results: Prevalence of PCOS in the study was 17.33% 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, lifestyle modification is imperative to prevent long-term metabolic and reproductive complications.

Keywords: Adolescence, B.M.I, Oligomenorrhea, Hirsutism, PCOS, Waist-Hip ratio

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.[1,2] Polycystic ovarian syndrome (PCOS) is the most frequent endocrinological disorder affecting 5-10% of women in the reproductive age.[1] This prevalence ranging from 2.2% to 26% in adult women from 18-45 year.[2] In a recent study the prevalence of a confirmed diagnosis of PCOS in adolescents aged 10 to 19 years was 5-10%, which increased to 10-22% when undiagnosed cases with documented symptoms qualifying for PCOS according to NIH (National institute of Health) criteria were included.[1,2] 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 lifestyle changes in adolescent age group plays an important role for the prevention of future complications and morbidity.[5]

Why need of study (novelty)

Because of the heterogeneous nature of the disorder, recognizing adolescents with PCOS may be challenging. However, early recognition and management is important to prevent some of the long-term reproductive and metabolic complications associated with this syndrome. Clinical and USG Criteria are gold standard for diagnosis of PCOS but doing assessment of PCOS by using Fasting insulin, fasting sugar, Free testosterone/LH/FSH is an additional novelty in my study which will be help to improves outcome of my study.

To study prevalence of PCOS and its various clinical aspects in them to determine the gravity of the problem among the adolescent girls 10-19 years in rural areas of Karad attending the adolescents OPD of a tertiary care centre, Krishna Institute of Medical Sciences, Deemed University, Karad, Maharashtra, India.

METHODS

It's a Cross-sectional study between April 2018 and March 2019. 150 adolescent girls aged 10 to 19 years attending OPD with oligomenorrhea, irregular menstrual cycle, obesity 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; Krishna Institute of Medical Sciences, Deemed University, Karad, Maharashtra, India.

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 Gall way (mFG) score of 8 or higher
- Polycystic ovaries: Presence of more than 12 follicles, 2-9 mm in diameter arranged peripherally, usually combined with increased ovarian volume of

more than 10 cm^3, and an echo-dense stroma in pelvic ultrasound scan.

Inclusion criteria

- Adolescent girls age group. (10-19years)
- Adolescent girls had attained menarche
- Adolescents girls who have come to seek treatment from obstetrics and gynaecology and adolescent OPD of Krishna hospital.

Exclusion criteria

- Those who were known case of thyroid disorders, hyperprolactinemia, Cushing's syndrome, and who were not willing to participate, married and pregnant adolescents 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 one year of menarche, wait gain and hirsutism/ androgen production assessment (skin problems, and hair distribution).

Evidence of ovulatory dysfunction included consecutive menstrual intervals of more than 90 days, 1 year 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 hours with an overnight fasting for following blood investigation estimation.

- Fasting BSL and fasting insulin for detection of insulin resistant
- T3, T4 and TSH to rule out hypothyroidism
- LH; FSH; Free Testosterone.

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 150 adolescent girls enrolled in my study, it was observed that 26 girls had PCOS (According to by Rotterdams criteria). Thus, the prevalence of PCOS in my study was 17.33%.

Table 1: Distribution according to age group.

Age group	No.	Percentage
Early adolescence (10-14)	7	26.92%
Late adolescence (15-19)	19	73.07%
Total	**26**	**100**

In Table 1, the study group was further subdivided into early adolescents means age group 10-14 year and late adolescents means age group 15-19 adolescence; it was observed that PCOS was more prevalent in late adolescence. Age wise distribution of study population shows that the majority, that is 73.07% of adolescents were in their late adolescence.

Table 2: Distribution according to family history.

Family history	Number	Percentage
Yes	10	38.46%
No	16	61.54%

In Table 2 in my study out of 26 PCOS adolescents after taking family history of PCOS it was observed that about 38.46% had positive family history of PCOS in first degree relative. Four of them gives history of their mother had PCOS in her reproductive life and remaining six gives family history of PCOS in there elder sisters since their adolescent age group. Remaining 16 PCOS means 61.54% adolescents gives no family history of PCOS in first degree relatives.

Table 3: Association between PCOS and BMI.

Variables		PCOS present	PCOS absent	%
BMI	Non-obese	11	94 (75.80%)	42.30
	Overweight	7	28 (22.58%)	26.92
	Obese	8	2 (1.61)	30.76
	Total	**26**	**124**	
Waist/ hip ratio	<0.85	16	116 (93.54%)	61.53
	>0.85	10	8 (6.45%)	38.46

In Table 3, among those diagnosed with PCOS, 42.30% were non-obese, 26.92% cases were overweight, and 30.76% 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	22	84.61
Non PCOS	18	14.51

Table 5: Other clinical manifestations.

Clinical manifestation	Number	Percentage
Acne/oily skin	16	61.53
Hirsutism	5	19.23
Loss of hair/Alopecia	2	7.69
Pigmentation	8	30.76
Mood changes/depression	4	15.38

Menstrual irregularity was the most common presentation in the PCOS group. It was observed in my study total 22 PCOS i.e. 84.61% cases had abnormal menstrual problems in the form of oligomenorrhoea, amenorrhoea and menorrhagia in Table 4. It was also observed that 18 non PCOS cases i.e.14.51% had menstrual complaints may be related to puberty changes, hormonal imbalance and other endocrine abnormality responsible for it other than PCOS.

In Table 5 it was observed that Acne or oily skin suggestive of androgenic activity was observed in 61.53 % of adolescent girls. Hirsutism was found in 19.23% of cases. Loss of hair was in 7.69% of girls while pigmentation was in 30.76% of girls. Mood changes included irritability and depression which was found in 15.38% 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 prevalence of 2.7% to 25.5% and even up to 36% in adolescents.[5] 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 17.33%, while in the study done by Nidhi et al, the prevalence rate was 14.13%.[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 73.07%

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 38.46% 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 in rural areas, 42.30% were non-obese, 26.92% cases were overweight, and 30.76% 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 84.61% 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 61.53 % of adolescent girls. Hirsutism was found in 19.23 % of cases. Loss of hair was in 7.69% of girls while pigmentation was in 30.76% of girls. Mood changes included irritability and depression which was found in 15.38% girls. In Singh A et al, study incidence of mood changes was 14%.[11] Many girls had a combination of symptoms present, same results seen in study done by Pathak G et al.[12] 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 lifestyle 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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