Research Article

# A Study to Assess the Prevalence of Polycystic Ovarian Disease among Girls Aged 15–21 Years from Selected Schools and Colleges in Bhopal City

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## Abstract

*Background:* Polycystic Ovarian Syndrome (PCOS) is the most common endocrine disorder among girls. It is one of the leading causes of female subfertility. It has a heterogeneous presentation which includes hyperandrogenism, hirsutism and ovulatory dysfunction. It is a disorder of peri-pubertal onset, so it is a disorder of significant health concern; this necessitates estimation of proportion of women affected by PCOS in the population. This study was conducted to find out the prevalence of PCOS amongst adolescent girls in Bhopal city.

*Materials and Methods:* A cross-sectional study was conducted for the duration of 4 months from November 2016 to February 2017. 840 girls of age group 15–21 years were interviewed regarding PCOS using Rotterdam criteria in three schools and three colleges in Bhopal city. After screening for PCOS, all suspected girls were confirmed by USG. Data was compiled using MS Excel and analyzed using Epi info 7.

*Result:* Out of 840 girls, 217 (25.5%) complained of irregular menses, out of 217 only 96 (44%) were approached for USG screening. PCOS was present in 77 (80.2%) girls out of 96 girls screened with USG. Also, PCOS was present in 43.2% girls with BMI >25 and 50.8% girls having waist-hip ratio more than 0.96.

*Conclusion:* This study estimated prevalence of about 8.34% in the study population. Lack of awareness (health-seeking behavior) was prominent in the study population. Significant association was found between PCOS and BMI, WAIST-HIP ratio. More education sessions should be held in schools and colleges about PCOS.

**Keywords:** PCOS, Adolescent girls, Risk factors, USG

## Introduction

Polycystic Ovarian Syndrome (PCOS) is the most common endocrine disorder among girls.[1] PCOS remains a syndrome and as such, no single diagnostic feature is sufficient in itself to establish the clinical diagnosis.[2] Clinical presentations of polycystic ovarian syndrome include abnormal facial and skin hair growth (hirsutism), acne, and irregular or absence of menstrual periods. History taking specifically for menstrual pattern, obesity and hirsutism alone has sensitivity of 77.1% and specificity of 93.8%.[3,4]

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The determinants of polycystic ovarian syndrome have been linked to both hereditary and environmental factors. The hereditary factors include early age of sexual maturation, premature fetal development, and family history of PCOS among first-degree relatives.[5] Insulin resistance is central to the pathogenesis of PCOS and Indians are known to have high insulin resistance; this in turn leads to high prevalence of PCOS.

Prevalence of PCOS varies between 2.2% and 26%. A higher prevalence of PCOS (46.8%) was reported among girls aged 13–18 years in a study conducted in New Delhi.[6] In another study, conducted among girls aged 15–18 years in Andhra Pradesh, the prevalence was noted to be 9.13%,[6] while in Kerala, prevalence was found to be 26.4%. The exact prevalence of PCOS is not known as the syndrome is not defined precisely and depends on the choice of diagnostic criteria. The study was planned with the objectives to find out the prevalence of PCOS amongst adolescent girls from selected schools and colleges of Bhopal and to study the association between body mass index (BMI) and PCOS.

## Materials and Methods

The study was a cross-sectional study, conducted on girls aged 15–21 years (9th standard and above) for a duration of 4 months from November 2016 to February 2017. The study was conducted after taking approval of ethical committee of the institute. This study included 840 adolescent girls from three schools and three colleges using purposive sampling. All the girls aged 15–21 years, who had attained menarche more than 2 years before the study, who were unmarried and willing to participate, were included in the study.

Informed verbal consent was taken from all the study participants. Study participants were screened for PCOS using a semi-structured questionnaire using Rotterdam criteria. Rotterdam criteria include presence of two of the following three criteria, i.e., (i) oligo/anovulation, (ii)

hyperandrogenism-clinical (hirsutism or less commonly male pattern alopecia) or biochemical (raised FAI or free testosterone), (iii) polycystic ovaries on ultrasound. Other etiologies must be excluded such as congenital adrenal hyperplasia, androgen secreting tumors, Cushing syndrome, thyroid dysfunction, and hyperprolactinemia.

Data regarding sociodemographic characteristics, detailed menstrual history, acne and facial hair were entered in the questionnaire. Anthropometric assessment was done by using a measuring tape, weighing scale, and stadiometer. The students were sensitized about PCOS and importance of diagnosing PCOS using PowerPoint presentation. Non-invasive sonographic scanning was done to identify polycystic ovaries. Data was compiled using MS Excel and analyzed using appropriate statistical test (chi-square test) using Epi Info 7.

## Results

A total of 840 girls in the area fulfilling the inclusion criteria were interviewed. The mean age of the study group came out to be 18.8 years, out of which 52.1% were above 18 years of age. 74.1% girls attained menarche at the age of 12–13 years and 14.1% attained menarche at an age above 14 years. 80.5% girls were aware of the term PCOS. When asked about the symptoms occurring during menses, out of 840 study participants 474 (57.1%) said they had tolerable pain during menses and 42.5% had intolerable pain followed by acne (32.9%) during menses. 25.8% study participants had complaints of irregular cycles followed by excessive facial hair (24.5%) and excessive weight gain (12.7%)**.**

Out of 840 girls, 217 (25.5%) complained of irregular menses; out of 217 only 96 (44%) were approached for USG screening. PCOS was present in 77 (80.2%) girls out of 96 girls screened with USG. Also, PCOS was present in 43.2% girls with BMI >25 and 50.8% girls having waist-hip ratio more than 0.96.
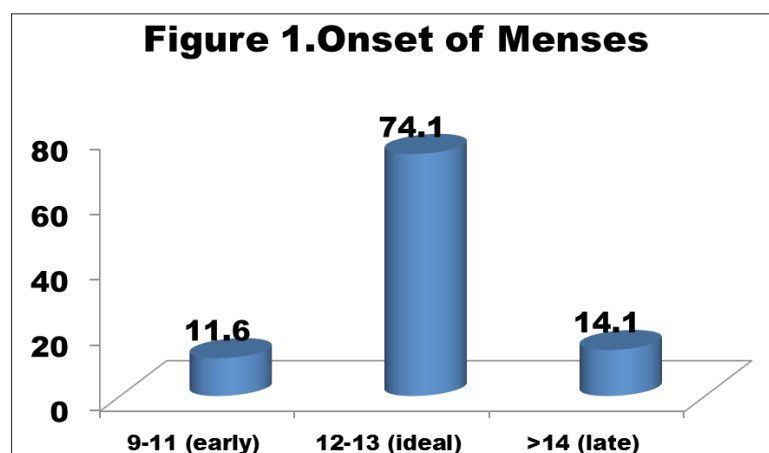


**Figure 1.Shows age of menarche. 74.1% of girls attained menarche at the age of 12–13 years.14.1% and 11.6% of study participants attained menarche at or after 14 years and before 12 years of age respectively. 80.5% girls were aware of the term PCOS**

### Table 1. Distribution according to Symptoms during Menses

| S. No. | Symptoms | Frequency (n=840) | Percent |
|---|---|---|---|
| 1. | Tolerable pain during menses | 479 | 57.1 |
| 2. | Intolerable pain during menses | 361 | 42.9 |
| 3. | Irregular cycles | 217 | 25.8 |
| 4. | Excessive gain in weight | 107 | 12.7 |
| 5. | Excessive facial hair | 206 | 24.5 |
| 6. | Acne | 277 | 32.9 |

Above table shows symptoms during among study participants. 98% complained of pain during menses which may be tolerable or intolerable followed by acne (32.9%). 25.8% of study participants complained of irregular cycles followed by excessive facial hair (24.5%) and excessive weight gain (12.7%)

### Table 2. Classification of Respondents according to Rotterdam Criteria

| S No. | PCOS Suspects Finding | Present | Absent | Total |
|---|---|---|---|---|
| 1 | Irregular menses(>35days) | 217 | 623 | 840 |
| 2 | Hirsutism | 206 | 634 | 840 |
| | *Out of 217 (having irregular menses), only 96 respondents were approached for USG screening | | | |
| 1 | USG finding (multiple cysts) | 77 | 19 | 96 |
| | *Confirmed cases of PCOS found to be 77 | | | |

Table 2 shows 217 (25.8%) and 206 (24.5%) of study participants complained of irregular menses and hirsutism respectively. Out of 217 participants complaining of irregular menses, only 96 turned out for USG screening. USG finding was suggestive of multiple cysts in 77(80.2%) participants.

### Table 3. Association of Various Factors with PCOS

| Age | PCOS Present | PCOS Absent | Total | P value |
|---|---|---|---|---|
| <18 year | 26 | 377 | 403 | NS |
| >18 year | 51 | 386 | 437 | |
| BMI | | | | |
| <25 | 31 | 702 | 733 | P=<0.0001 |
| ≥25 | 46 | 61 | 107 | |
| Waist/Hip Ratio | | | | |
| <0.96 | 23 | 711 | 734 | P=<0.0001 |
| >0.96 | 54 | 52 | 106 | |
| Total | 77 | 763 | 840 | |

Table 3 shows that there was no association between age and presence and absence of PCOS on applying chi-square test. On applying chi-square test, significant association was found between BMI with PCOS as well as waist-hip ratio with PCOS.

## Discussion

Reproductive phase of life brings multiple physiological, anatomical and psychological changes in the life of women. Due to familial, cultural and social restrictions most of the women are not able to share and get right advice for menstrual-related problems. The prevalence of PCOS depends on the recruitment process of the study population, criteria used for its definition, and the screening methods used. PCOS is a condition which is of serious concern. PCOS among adolescents is an emerging problem that needs careful assessment, timely intervention, and appropriate treatment.[9]

In the present study, prevalence of PCOS was found to be 9.1%. In a hospital-based study conducted by Kalavathi et al. in Bangalore, prevalence of PCOS was 23.8%.[10] Williamson et al. in their study reported the prevalence of PCOS between 2.2% and 26%.[11] According to a prospective study conducted by Nidhi et al., on 460 girls aged 15–18 years in a residential college in Andhra Pradesh, South India, the prevalence of PCOS was found to be 9.13% in adolescents.[12]

## Conclusion

This study estimated prevalence of about 9.1% in the study population. Lack of awareness (health-seeking behavior) was prominent in the study population. Significant association (p value <0.0001) was found between BMI with PCOS and waist-hip ratio with PCOS.

Lack of knowledge and lifestyle changes are considered to

be the major factors leading to this phenomenon. There is a need to increase awareness among women so as to avoid major cases of fertility problems in the future.

## Limitations

Since purposive sampling was used, results could not be generalized. The cross-sectional design of this study does not allow causal conclusions, and as such, the interpretability of our findings is limited. Only a limited number of patients turned up for USG. Other blood investigations to diagnose (such as serum testosterone levels) or to rule out (such as serum prolactin) PCOS could not be done due to economic constraints.

## Conflict of Interest: None

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