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ASSESSMENT AND PREVALENCE OF POLYCYSTIC OVARY SYNDROME AMONG COLLEGE GIRLS - A SURVEY BASED CROSS-SECTIONAL STUDY

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ABSTRACT

Polycystic Ovary Syndrome (PCOS) is a complex endocrine and metabolic disorder in young age women. The characteristic features of PCOS include hirsutism, hyperandrogenism, acne, menstrual dysfunction, and oligo-anovulation resulting in infertility. The incidence of PCOS is more common in college girls. This survey-based study is conducted to assess the prevalence and awareness of PCOS among college girls. An offline questionnaire-based cross-sectional study for a period of 4 months from Jan – April 2023 was conducted. The prevalence was calculated using ultrasound scan information by the participants and Rotterdam Criteria. A total of 696 girls of age group from 17-25 years have participated in the study. Out of 696 participants, PCOS was present in 60 (9%) girls. The results of the study revealed that the mean menarche age of the participants was 12.75 years old, 26 (43.3%) of them had irregular menstrual cycles and bleeding and the basal metabolic index (BMI) is >25 in 17 (28%) girls. A strong family history of PCOS was confirmed in 16(26.7%) participants and other disorders which correlate with the genetic influence of PCOS in families. The estimated prevalence in the present survey is 8.6% among the participants. 45% of the participants were not aware of the complications associated with PCOS. Hence awareness programs should be held in colleges on PCOS and health-related practices to improve the quality of life and psychological behavior in women with PCOS.

INTRODUCTION

Polycystic Ovary Syndrome is a common heterogeneous endocrine disorder in women, and it affects women from early puberty to the late reproductive stage. It is characterized by ovarian cysts, hyperandrogenism, oligo- or anovulation, and menstrual dysfunction. Globally the incidence of PCOS has been revealed to exceed over 116 million women.[1] In India, the prevalence rate of PCOS is high, and it was close to 10% using Rotterdam's criteria and AES criteria, and 5.8% using NIH criteria, and adolescents were more affected by PCOS Among them.[2] The etiopathology of PCOS is not clear but the risk factors like genetics, endocrine dysfunction, obesity, lifestyle changes, and exposure to environmental toxins modify the metabolic and reproductive pathways and contribute to the development of PCOS. Women with a genetic predisposition are at higher risk of developing PCOS and androgen overproduction alters the levels of LH: FSH hormones, resulting in follicular arrest and dysplasia.[3] The etiology of PCOS is multifactorial, hence diagnosis and treatment became a challenge. The diagnosis of PCOS was usually done by various criteria like Rotterdam criteria,

Androgen Excess PCOS Society (AE-PCOS) criteria, and the National Institute of Health (NIH). Several studies have recommended the Rotterdam criteria since, it was superior in diagnosis compared to others.[4] Anti-Mullerian hormone (AMH) is an important biomarker in PCOS, this hormone helps in ovarian follicular maturation and development. Abnormal secretion of this hormone interferes with the development and maturation of follicles resulting in infertility. Estimation of Anti- Mullerian hormone levels in the blood helps in the diagnosis of PCOS in women with infertility.[5] Lack of awareness of PCOS among women, many of them were undiagnosed and untreated, especially in rural populations. Early diagnosis of PCOS is difficult until the patient visits the hospital due to physical manifestations like hirsutism, alopecia, acne, menstrual dysfunction, and infertility. Delay in diagnosis and treatment among adolescents with PCOS are at risk of developing comorbid conditions like cardiovascular disorders, type II diabetes, obesity, endometrial cancer, infertility, and psychiatric disorders.[6,7] Changes in physical appearance like obesity, hirsutism, pigmentation, acne, and menstrual irregularity all have a significant impact on psychological behavior in women with PCOS. This contributes to psychological disorders like anxiety and depression.[8] Studies have focused on assessing the impact of PCOS symptoms, and their treatment to improve the quality of life in PCOS by direct or online health-related questionnaire forms (HRQOL). Adolescence is a crucial transition stage from childhood to adulthood, where psychological and physical changes occur. The major risk factor for PCOS is family history, awareness of genetic disorders, and the significance of healthy food habits and exercise at this stage prevents the progress and complications of disorders associated with PCOS. Taking these considerations into mind, the current study was designed to investigate the prevalence and knowledge of PCOS and health-related practices among college girls. It is a cross-sectional survey study planned to compare age, body mass index (BMI), menstrual dysfunction, food habits, psychological changes, and family history in college-going girls with PCOS.

METHODOLOGY

Study design: The study was a cross-sectional and offline questionnaire-based survey conducted for a period of 4 months from Jan 2023 to April 2023 among college girls in Tirupati. The questionnaire was designed based on PCOS-related surveys like demographic details, family history, signs and symptoms, menstrual pattern, diagnosis, food habits, and awareness of PCOS complication

Study Criteria: In this survey, college girls above 17 years and below 25 years of age were included, and college girls who are above 25 and below 16 years of age and who are not willing to participate in the survey are not considered for the study.

Study population: Overall, 696 participants responded well and agreed to participate in the study, and provided the information to the best of their knowledge. Out of 696 participants, 636(91%) were normal and 60 (9%) had PCOS. Further data was analyzed in these 60 subjects with PCOS to correlate the risk factors for PCOS.

Data Analysis: Data was analyzed by using MS Excel and Epi Info 7. Percentages and relationships between categorical variables were analyzed. Mean, standard deviation, and standard error were calculated for all continuous variables with statistical significance set at $P \leq 0.05$.

RESULTS:

Demographic Characteristics of Participants with PCOS: A total of 696 participants actively participated in the survey. The average age group of participants was 22.8 years old (range 17-25). Most of the participants were in the age group of 19-22 years old (n=45, 75%) followed by 17-18 years (n=14, 23%), and only one participant was in the age group of greater than 25 years old (n=01, 2%). Many of the participants were in the normal BMI category (n=31, 52%), followed by participants with overweight (n=17, 28%) and obese (n=03, 5%). Though the BMI in 50% of the participants was found to be normal they have physical characteristics and psychological symptoms of PCOS. Of 60 participants with PCOS, 15 (25%) of them have PCOS symptoms but have not undergone

an ultrasound scan and 45 (75%) participants were aware of PCOS, consulted a doctor, and the diagnosis was confirmed through an ultrasound scan. Of 60 PCOS participants 33 (55%) were aware of complications associated with PCOS and 27 (45%) reported that they have no idea of PCOS complications like diabetes, hypertension, and infertility (Table-1).

Menarche Age and Menstrual Cycle Patterns: In the present survey, the mean menarche age of the participants was 12.75 years old. Of 60 participants with PCOS 34 (56.7%) have regular menstrual cycles and 26 (43.3%) of them have irregular menstrual cycles. The duration of the menstrual period was normal in 31 (51.1%) of the participants followed by 11 (18.3 %) of them had 5-7 days, 07 (11.7%) had for 7-10 days, and 11 (18.3%) of had for more than 10 days. The menstrual bleeding was normal in 20 (33.3%) of the participants, Scanty in 17 (28.3%), and 23 (38.4%) of them had heavy menstrual bleeding (Table-2).

Other physical signs and symptoms: Symptoms like Acne, hirsutism, hair loss, pigmentation, and a combination of these symptoms were reported by the participants with PCOS. Of 60 participants, 8 (13.3%) have acne followed by 04 (6.7%) have hirsutism and a combination of the above was observed in some participants and 38 (63.3%) of them mentioned that have a lack of these symptoms (Table-3).

Psychological symptoms: Participants in this survey reported mood fluctuations as a result of PCOS. Common mood swings include irritability in 18 (30%), 6 (10%) depression, 15 (25%) anxiety, 9 (15%) social withdrawal, and 12 (20%) difficulty in anger management (Fig.1).

Food habits: Many of the participants 40 (66.7%) in the study consume more junk food while 20 (33.3%) of them have carbonated drinks during meals. They consume more of these foods than the normal diet (Fig.2).

Family history: it was observed that 17 (28.3%) of the participants have no family history of PCOS but 16(26.7%) informed that they have a history of PCOS with their parents, siblings, and relatives. 3(5%) have a history of PCOS and obesity, 1 (1.7%) obesity and other disorders in 23 (38.3%) such as hypertension and diabetes run in their family (Fig.3).

DISCUSSION: The prevalence of PCOS has significantly grown globally from a range of 2.2% to 48% in 2020. To screen the prevalence of PCOS, studies have focused on questionnaire-based surveys. [9,10] Based on these studies our survey is focused to explore the prevalence and awareness of PCOS among college-going girls. In the present survey, a total of 696 participants were included after getting their consent to fill out the questionnaire. Among them, 60 participants were found to have PCOS. Further data was focused on these 60 participants to correlate the causes of PCOS. The majority of the responders were in the age group of 19-22 years old and in the study, BMI category of 50% of the participants were normal but had signs and symptoms of PCOS. Besides these, the findings of the study revealed that 55% of the participants have knowledge of PCOS and associated complications with it. A similar study conducted by Ean *et al.* 2020, revealed that knowledge about PCOS is good in the public, especially among students. [11] The prevalence in the present study was 8.6% among 696 participants. However, this prevalence has selection bias since it was conducted among college girls of mean age of 22.8 years, and 75 % of the PCOS was diagnosed by an ultrasound scan, the remaining 25 % of participants were formally diagnosed based on symptoms consistent with the Rotterdam diagnostic criteria for PCOS. In this survey, 26 (43.3%) of the girls have irregular menstrual cycles and abnormal bleeding. For the girls with regular menstruation 34 (56.7%), the menstrual cycle, duration, and bleeding during the menstrual period were found to be normal but show symptoms like acne, hyperandrogenism, and changes in psychological behavior. Psychological behavior changes like irritability in 18 (30%), 6 (10%) depression, 15 (25%) anxiety, 9 (15%) social withdrawal, and 12 (20%) difficulty in anger management were observed among the participants with PCOS.

Table 1. Demographic Characteristics of Participants with PCOS

Variables	**N=60(%)**
Age Category (Years)	
<18 Years	14 (23)
19-22 Years	45 (75)
>23 Years	01 (02)
BMI Category (kg/m^2)	
<18.5 kg/m^2	09 (15)
18.6 kg/m^2 – 24.9 kg/m^2	31 (52)
25.0 kg/m^2 – 29.9 kg/m^2	17 (28)
≥ 30 kg/m^2	03 (5)
PCOS diagnosis (Ultrasound Scan)	
Yes	45 (75)
No	15 (25)
Awareness of Complications of PCOS	
Yes	33 (55)
No	27 (45)

Table 2. Menarche Age and Menstrual Cycle Patterns

Variables	**N=60(%)**
Menarche, Age (Years) mean ± SD	12.75 ± 1.0
Menstrual Cycle	
Regular	34 (56.7)
Irregular	26 (43.3)
Duration of the menstrual period	
5 Days	31 (51.7)
5-7 Days	11 (18.3)
7-10 Days	07 (11.7)
>10 Days	11 (18.3)
Menstrual bleeding	
Normal	20 (33.3)
Scanty	17 (28.3)
Heavy	23 (38.4)

Table 3. Other Signs and Symptoms

Other Signs and Symptoms	**N=60(%)**
No Symptoms	38 (63.3)
Hirsutism	04 (6.7)
Acne	08 (13.3)
Pigmentation	01 (1.7)
Acne & Hair Loss	03 (5.0)
Acne & Pigmentation	03 (5.0)
Hirsutism &Acne	02 (3.3)
All symptoms	01 (1.7)

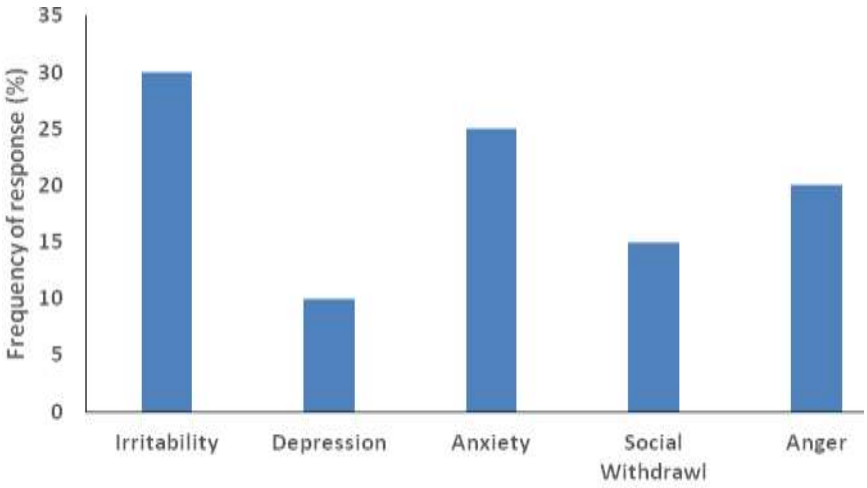


Fig 1: Psychological Symptoms in participants with PCOS

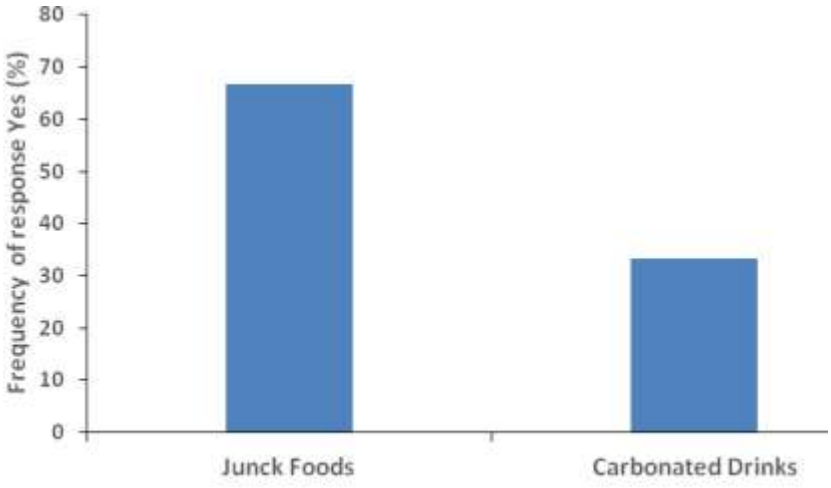
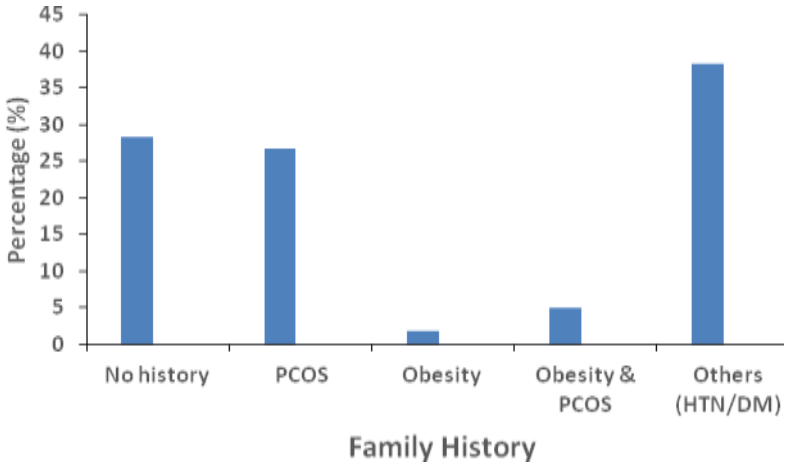


Fig 2: Food Habits among PCOS Participants

Family History



This suggests that they might be in the early stages of diagnosis of PCOS. Also, evidence from the study suggests that family history and food habits were found to have a strong correlation in the development of PCOS among the participants.

CONCLUSION

The findings of our study suggest that the prevalence of PCOS was markedly increasing among college-going girls. Nearly half of the participants do not have knowledge of complications associated with PCOS. Evidence of our study strongly correlates that genetic influence plays a significant contribution in the development of PCOS. Early diagnosis, treatment, and change in lifestyle habits would help to improve the quality of life in PCOS subjects and delay the onset of comorbid diseases associated with PCOS.

Limitations: Our study is solely based on self-reported data provided by the participants and selection bias of the participants has an influence on the prevalence of PCOS. Hence, limited conclusions can be drawn from our results. However, our study shows a significant association between PCOS disorder and our data on family history, lifestyle choices, and psychological characteristics.

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Conflict of Interest: None

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