# A Cross-Sectional Study of PCOS Prevalence and Awareness Among Women in Kakinada and Godavari Districts, Andhra Pradesh, India

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**Abstract:**

Polycystic Ovarian Syndrome (PCOS) is a multifaceted endocrine disorder marked by hormonal imbalance, ovarian cysts, and anovulation—conditions that can profoundly affect a woman's physical, emotional, and reproductive well-being. Globally, more than 116 million women (approximately 3.4%) are affected, as per the World Health Organization (WHO). Symptoms such as hyperandrogenism, irregular menstrual cycles, and polycystic ovaries present variably, making diagnosis and timely intervention challenging. PCOS often manifests during adolescence

and may lead to a spectrum of comorbidities including obesity, insulin resistance, type 2 diabetes, infertility, cardiovascular disease, and mental health concerns. Alarmingly, menstrual irregularities and related symptoms are frequently overlooked or normalized, delaying medical consultation and long-term care.In the context of the Sustainable Development Goals (SDGs)—notably SDG 3 (Good Health and Well-being)**,** SDG 5 (Gender Equality)**,** and SDG 10 (Reduced Inequalities)—addressing PCOS is essential to empowering women with the knowledge, resources, and access to healthcare necessary to manage this lifelong condition. Raising awareness and enhancing early detection strategies can not only reduce the burden of non-communicable diseases but also support gender-equitable healthcare and reproductive autonomy. The present study aims to bridge the awareness gap by assessing knowledge,

perceptions, and experiences related to PCOS among women across various age groups in selected regions of Kakinada and the Godavari districts of Andhra Pradesh**.** Through structured surveys and community engagement, the research seeks to foster informed healthcare-seeking behaviour and promote holistic well-being among women in these localities.

**Keywords:** PCOS,Hormonal imbalance, comorbidities

## 1. Introduction

Polycystic Ovarian Syndrome (PCOS) is a complex and heterogeneous endocrine disorder characterized by ovarian cysts, chronic anovulation, and hormonal imbalances that significantly affect a woman's reproductive and metabolic health. Disruptions in key reproductive hormones such as luteinizing hormone (LH), follicle-stimulating hormone (FSH), estrogen, and testosterone lead to menstrual irregularities, including oligomenorrhea and amenorrhea. According to the World Health Organization (WHO), PCOS affects over 116 million women globally, accounting for approximately 3.4% of the female population. Diagnosis is typically based on the presence of hyperandrogenism, menstrual dysfunction, and polycystic ovarian morphology, although clinical manifestations vary widely among individuals. (1). Often

emerging during adolescence, PCOS is a multifactorial condition associated with an increased risk of obesity, type 2 diabetes, infertility, endometrial hyperplasia, cardiovascular disease, and psychological disorders.The Rotterdam Criteria classify PCOS into three main phenotypes: (i) Classic PCOS, marked by hyperandrogenism and menstrual irregularities with or without polycystic ovaries; (ii) Ovulatory PCOS, featuring hyperandrogenism and polycystic ovaries with preserved ovulation; and (iii) Non-androgenic PCOS, characterized by irregular cycles and polycystic ovaries without excess androgens.(2). Despite its prevalence, many women with menstrual disturbances remain undiagnosed due to societal stigma, lack of awareness, and fear of medical consultation. (3). This highlights the critical need for education and awareness initiatives aimed at informing women across various age groups about PCOS and its health implications, thereby empowering them to seek timely medical care and adopt preventive health practices during their reproductive period.

## 2. Methodology

Required data was collected from selected areas of Kakinada,East and West Godavari districts of Andhra Pradesh by Survey method. A standard questionnaire was prepared to collect the raw data ,which included: Name of the study area,name, age,occupation,height,weight,acne,family history,life style,physical activity if any, children if any ,suffering from which age,menstrual pattern-regular or irregular,over bleeding or under bleeding,emotional changes,weight gain,hair loss or excess of hair on the body, oily skin,diabetes,blood pressure variations,sleeping problems if any,difficulty in getting pregnancy, hormonal imbalances and so on…

The study areas included: Gunupudi, Potavaram, Turangi, Nidadavole, Gantavarigudem of Kakinada and Godavari districts.

The information for the present study has been collected from 100 selected subjects as a primary source and the results are tabulated.

Along with data collection, awareness on personal hygiene, symptoms, basic medical facts about various gynaec problems like Dysmenorrhea, Ovarian cysts, PCOD, UTI, Menorrhagia, Oligomenorrhea, Polymenorrhea, was given to the residents.

## 3. Results

**Table 1 PCOS-Profile of the selected Study areas**

| S.No. | Name of the Study area | Mandal | District |
|---|---|---|---|
| 1 | Gunupudi | Bhimavaram | West Godavari |
| 2 | Potavaram | Nallajerla | East godavari |
| 3 | Turangi | Turangi | Kakinada |
| 4 | Nidadavole | Nidadavole | East godavari |
| 5 | Gantavarigudem | Nallajerla | East godavari |

Table 1 shows the Profile of the selected Study areas.
They included: Gunupudi of W.G.Dt, Potavaram, Turangi, Nidadavole, Gantavarigudem of E.G.Dt.,Turangi of Kakinada Dt.

**Table 2 PCOS-No. of female Subjects surveyed**

| S.No. | Name of the Study area | Number of female Subjects surveyed |
|---|---|---|
| 1 | Gunupudi | 20 |
| 2 | Potavaram | 20 |
| 3 | Turangi | 20 |

| 4 | Nidadavole | 20 |
| 5 | Gantavarigudem | 20 |

Table 2 shows the number of female subjects surveyed. Total number of females was 100.

### Table 3 PCOS- Percentage of Subjects effected

| S.No. | Age | Persons Effected |
|---|---|---|
| 1 | 11-15 | 00 |
| 2 | 16-20 | 18% |
| 3 | 21-25 | 20% |
| 4 | 26-31 | 20% |
| 5 | 32-37 | 12% |
| 6 | 38-43 | 14% |
| 7 | 44 and above | 16% |

Table 3 shows the percentage of the subjects effected.
- Among 11-15 years of age group, no subjects were identified.
- Among 16-20 years of age group,18% of the subjects were identified.
- Among 21-25years of age group,20% of the subjects were identified.
- Among 26-31 years of age group,20% of the subjects were identified.
- Among 32-37 years of age group,12% of the subjects were identified.
- Among 38-43 years of age group,14% of the subjects were identified.
- Among 44 and above years of age group,16% of the subjects were identified.

### Table 4 PCOS-Occupation of the Subjects in %

| S.No. | Age | Students | House wives | Job | Daily laborers |
|---|---|---|---|---|---|
| 1. | 16-20 | 18% | 10% | - | - |
| 2. | 21-25 | 8% | 10% | 2% | - |
| 3. | 26-31 | - | 10% | 10% | - |
| 4. | 32-37 | - | 12% | - | - |
| 5. | 38-43 | - | 12% | - | 2% |
| 6. | 44 and above | - | 10% | 2% | 4% |

Table 4 shows the occupation of the subjects studied.
- Among 16-20 years of age group,18% are students.
- Among 21-25 years of age group,8% are students,10% are house wives, only 2 % are accountants
- Among 26-31years of age group ,10% are doing some job,10% are housewives.
- Among 32-37 years of age group,12% are housewives.
- Among 38-43 years of age group,12% are housewives,12% are daily labourers.
- Among 44 and above years of age group,10% are housewives,2% are doing job,4% are daily labourers.

### Table 5 PCOS-Family History of the Subjects (%)

| S.No. | Age | With Family History | Without Family History |
|---|---|---|---|
| 1. | 16-20 | 4% | 14% |
| 2. | 21-25 | 10% | 10% |
| 3. | 26-31 | 6% | 14% |
| 4. | 32-37 | 2% | 14% |
| 5. | 38-43 | 6% | 8% |
| 6. | 44 and above | 4% | 8% |

Table 5 shows the family history of the subjects.

- Among 16-20 years of age group,4% of the subjects are with family history and 14% are without family history.
- Among 21-25 years of age group,10% of the subjects are with family history and 10% are without family history.
- Among 26-31 years of age group,6% of the subjects are with family history and 14% are without family history.
- Among 32-37 years of age group,2% of the subjects are with family history and 14% are without family history.
- Among 38-43 years of age group,6% of the subjects are with family history and 8% are without family history.
- Among 44 and above years of age group,4% of the subjects are with family history and 8% are without family history.

**Table 6 PCOS-Life Style of the Subjects (%)**

| S.No. | Age | With Physical Activity | Without any Physical Activity /Sedentary |
|---|---|---|---|
| 2 | 16-20 | 10% | 7% |
| 3 | 21-25 | 16% | 4% |
| 4 | 26-31 | 10% | 10% |
| 5 | 32-37 | 10% | 2% |
| 6 | 38-43 | 14% | - |
| 7 | 44 and above | 12% | 4% |

Table 6 shows the life style of the subjects studied.
- Among 16-20 years of age group,10% are having physical activity and 7% are without any physical activity
- Among 21-25 years of age group,16% are having physical activity and 4% are without any physical activity
- Among 26-31 years of age group,10% are having physical activity and 10% are without any physical activity
- Among 32-37 years of age group,10% are having physical activity and 2% are without any physical activity
- Among 38-43 years of age group,14% are having physical activity
- Among 44 and above years of age group,12% are having physical activity and 4% are without any physical activity

**Table 7 PCOS -Percentage of External Disorders Identified**

| Age | Body Hair | Hair Loss | Excess of hair | Acne | Oily Skin | Weight gain | Sleeping Problem |
|---|---|---|---|---|---|---|---|
| 16-20 | 14% | 10% | 14% | 14% | 12% | 12% | 14% |
| 21-25 | 14% | 10% | 8% | 8% | 10% | 12% | 8% |
| 26-31 | 8% | 12% | 10% | 12% | 8% | 12% | 10% |
| 32-37 | 6% | 6% | 4% | 10% | 6% | 12% | 0% |
| 38-43 | 12% | 14% | 8% | 6% | 8% | 12% | 10% |
| 44 and above | 10% | 14% | 12% | 4% | 6% | 12% | 10% |

**Table 7 shows the percentage of external disorders identified.**

1. **Body hair:** Observed in 14% among 16-20 age groups, 14% in 21-25 years of age group,8% in 26-31 years of age group,6% in 32-37 years of age group,12% in 38-43years of age group,10% in 44 and above years of age group.
2. **Hair loss:** It is observed in 10% among 16-20 age groups, 10% in 21-25 years of age group,12% in 26-31 years of age group,6% in 32-37 years of age group,14% in 38-43years of age group,14% in 44 and above years of age group.
3. **Excess of hair (Hirsutism):** It is observed in 14% among 16-20 age groups, 8% in 21-25 years of age group,10% in 26-31 years of age group,6% in 32-37 years of age group,12% in 38-43years of age group,10% in 44 and above years of age group.
4. **Acne:** It is observed in 14% among 16-20 age groups, 8% in 21-25 years of age group,12% in 26-31 years of age group,10% in 32-37 years of age group,6% in 38-43years of age group,4% in 44 and above years of age group.
5. **Oily skin:** It is observed in 12% among 16-20 age groups, 10% in 21-25 years of age group,8% in 26-31 years of age group,6% in 32-37 years of age group,8% in 38-43years of age group,6% in 44 and above years of age group.
6. **Weight gain:** It is observed in 12% among 16-20 age groups, 12% in 21-25 years of age group,12% in 26-31 years of age group,12% in 32-37 years of age group,12% in 38-43years of age group,12% in 44 and above years of age group.
7. **Sleeping Problem (Insomnia):** It is observed in 14% among 16-20 age groups, 8% in 21-25 years of age group,10% in 26-31 years of age group,no cases in 32-37 years of age group,10% in 38-43years of age group,10% in 44 and above years of age group.

### Table 8 PCOS –Percentage of Menstrual Disorders Observed

| Age | Irregular Menstrual Pattern | Over Bleeding | Under bleeding | Difficulty in Pregnancy |
|---|---|---|---|---|
| 16-20 | 18% | 14% | 4% | 6% |
| 21-25 | 16% | 10% | 10% | 10% |
| 26-31 | 16% | 14% | 6% | 8% |
| 32-37 | 6% | 4% | 8% | 2% |
| 38-43 | 12% | 6% | 8% | 00 |
| 44 and above | 14% | 2% | 14% | 00 |

Table 8 shows the Percentage of Menstrual Disorders Observed.

- **Irregular Menstrual Pattern** : It is observed in 18% among 16-20 age groups, 16% in 21-25 years of age group,16% in 26-31 years of age group, 6% in 32-37 years of age group,12% in 38-43years of age group,14% in 44 and above years of age group.
- **Over Bleeding**: It is observed in 14% among 16-20 age groups, 10% in 21-25 years of age group,14% in 26-31 years of age group, 6% in 32-37 years of age group,12% in 38-43years of age group,14% in 44 and above years of age group.

- **Under Bleeding** : It is observed in 4% among 16-20 age groups, 10% in 21-25 years of age group,6% in 26-31 years of age group, 8% in 32-37 years of age group,12% in 38-43years of age group,14% in 44 and above years of age group.
- **Difficulty in Pregnancy** : It is observed in 6% among 16-20 age groups, 10% in 21-25 years of age group,8% in 26-31 years of age group, 2% in 32-37 years of age group, and no cases were observed in 38 years onwards.

**Table 9 PCOS –Percentage of Hormonal Imbalances Observed**

| Age | Thyroid Imbalance | Androgen Imbalance |
|---|---|---|
| 16-20 | 4% | 2% |
| 21-25 | 12% | 14% |
| 26-31 | 12% | 14% |
| 32-37 | 6% | 6% |
| 38-43 | 2% | 4% |
| 44 and above | 16% | 00 |

Table 9 shows Percentage of Hormonal Imbalances Observed :

- **Thyroid Imbalance:** It is observed in 4% among 16-20 age groups, 12% in 21-25 years of age group,12% in 26-31 years of age group, 6% in 32-37 years of age group,2% in 38-43years of age group,16% in 44 and above years of age group.
- **Androgen Imbalance**:It is observed in 2% among 16-20 age groups, 14% in 21-25 years of age group,14% in 26-31 years of age group, 6% in 32-37 years of age group,4% in 38-43years of age group,and no cases were observed in 44 and above years of age group.

**Table 10 PCOS –Psychological  Imbalances**

| Age | Emotional  Imbalance | Depression |
|---|---|---|
| 16-20 | 14% | 6% |
| 21-25 | 10% | 14% |
| 26-31 | 12% | 2% |
| 32-37 | 10% | 12% |
| 38-43 | 10% | 6% |
| 44 and above | 14% | 16% |

Table 10 shows Psychological Imbalances observed:

- **Emotional Imbalance:** It is observed in 6% among 16-20 age groups, 14% in 21-25 years of age group,2% in 26-31 years of age group, 12% in 32-37 years of age group,6% in 38-43years of age group,14% in 44 and above years of age group.
- **Depression:** It is observed in 14% among 16-20 age groups, 10% in 21-25 years of age group,12% in 26-31 years of age group, 10% in 32-37 years of age group,10% in 38-43years of age group,16% in 44 and above years of age group.

**Table 11 PCOS –BMI/Obesity**

| Age | BMI | Obesity |
|---|---|---|
| 16-20 | 30-40=2%<br>< 25=16% | Grade II -2%<br>Not obese- 16% |
| 21-25 | 25-29.9=4%<br>< 25=16% | Grade I -4%<br>Not obese- 16% |
| 26-31 | 25-29.9=4%<br>30-40=4%<br>< 25=12% | Grade I -4%<br>Grade II-4%<br>Not obese- 12% |

| | | |
|---|---|---|
| 32-37 | 25-29.9=6%<br>< 25=6% | Grade I -6%<br>Not obese- 6% |
| 38-43 | 25-29.9=6%<br>< 25=8% | Grade I -6%<br>Not obese- 8% |
| 44 and above | 25-29.9=4%<br>30-40=4%<br>< 25=8% | Grade I -4%<br>Grade II-4%<br>Not obese- 8% |

Table 11 shows BMI/Obesity.
- It is observed that in 16-20 years of age group,Grade II Obesity was observed in 2% and 16% are not obese.
- It is observed that in 21-25 years of age group,Grade I Obesity was observed in 4% and 16% are not obese.
- It is observed that in 26-31 years of age group,Grade I Obesity was observed in 4%,Grade II Obesity was observed in 4% and 12% are not obese.
- It is observed that in 32-37 years of age group,Grade I Obesity was observed in 6% and 6% are not obese.
- It is observed that in 38-43 years of age group,Grade I Obesity was observed in 6% and 8% are not obese.
- It is observed that in 44 and above age group,Grade I Obesity was observed in 4% ,Grade II was observed in 4% and 8% are not obese.

### Table 12 PCOS – Percentage of Incidence of Diabetes

| Age | Diabetes |
|---|---|
| 16-20 | 4% |
| 21-25 | 2% |
| 26-31 | 2% |
| 32-37 | 4% |
| 38-43 | 2% |
| 44 and above | 6% |

Table 12 shows the Incidence of Diabetes
- It is observed that 4% of cases of diabetes were observed in 16-20 years of age group, 2% in 21-25 years of age group,2%in 26-31 years of age group,4% in 32-37 years of age group,2%in 38-43 years of age group and 6% in 44 and above years of age group.

### 4. DISCUSSION
- Required data was collected by students from their places, located in selected areas which included Gunupudi of W.G.Dt Potavaram, Turangi, Nidadavole, Gantavarigudem of E.G.Dt.,Turangi of Kakinada Dt. by Survey method. The data was collected from 50 subjects and results were tabulated.
- Required data was collected by students from their native places, located in selected areas of Eluru Mandal of Eluru district, Andhra Pradesh by Survey method. The data was collected from 50 subjects and results were tabulated.

- More cases of PCOS were observed in subjects of 21-31 years ,followed by 16-20 years of age group.
- Many of the subjects were housewives, followed by students. Daily labourers were less in number.
- Less number of cases were with family history of PCOS.
- The subjects in the age group of 21-25 years, are doing more physical activity,which is very much needed for the management of PCOS.
- Of all the external disorders, occurrence of body hair (Hirsutism) was observed in more number of cases, may be because of overproduction of male hormones,followed by obesity ,which may be corelated to the preference of sedentary mode of life.
- Of all the menstrual disorders, irregular patterns were observed in more number of subjects,followed by over bleeding cases.Subjects in the age group of 21-25 years of age group are facing difficulty in getting pregnancy.
- More number of subjects were suffering from androgen imbalance ,which may be one of the reasons for PCOS
- More number of subjects are suffering from emotional imbalances and less number are suffering from depression.
- Obesity is observed in general in PCOS cases. GradeI Obesity was more prominent, followed by Grade II. Few of the subjects were non obese.
- There is an increased risk of developing diabetes in PCOS cases is of immense public health concern especially in India, which has been tagged as a diabetic capital of the world.  So, there is a need for intensified efforts in early detection of the disorders.
- PCOS effects the quality of life and Adolescents are more susceptible to this ,so they must be taken care of.

## 5.Suggestions

Given the multifaceted nature of Polycystic Ovarian Syndrome (PCOS)—a complex hormonal, metabolic, and psychological disorder with diverse clinical manifestations—its management must be individualized.(5) While there is currently no definitive cure, a strategic combination of lifestyle interventions, medical guidance, and psychosocial support can significantly improve outcomes.

**Weight Management:** In cases where PCOS is linked with overweight or obesity, gradual and sustained weight loss has proven to be one of the most effective ways to restore ovulatory function and regular menstruation.

**Physical Activity:** Regular exercise and increased daily movement are key to improving insulin sensitivity, which may help prevent or manage insulin resistance and reduce the long-term risk of developing type 2 diabetes.

**Nutritional Guidance:** A balanced diet rich in high-fiber whole grains, lean proteins (such as poultry and fish), and low-glycemic index foods—including plenty of vegetables and fruits—can regulate blood sugar levels and support metabolic health. Minimizing the intake of refined sugars and saturated fats is also crucial.

**Emotional Support:** PCOS often leads to psychological distress.(4). Counseling or support groups may provide emotional relief and promote mental well-being.(6) Early psychological intervention should be integrated into treatment strategies.

**Targeted Treatments:** For symptoms like hirsutism and acne, dermatological consultation may be beneficial. Menstrual irregularities, a hallmark feature of PCOS, should be addressed promptly under gynecological care.

**Individualized Medical Approach:** Not all medications yield the same results across individuals. It is advisable to consult a multidisciplinary team—comprising a gynecologist, endocrinologist, and general physician—for personalized care plans.

**Long-term Risk Mitigation:** Beyond reproductive concerns, PCOS is associated with an elevated risk of cardiovascular disease, type 2 diabetes, endometrial hyperplasia, and even endometrial carcinoma.(7) Hence, continuous monitoring and preventive strategies are essential.

**Public Awareness:** Enhancing awareness about PCOS at both community and healthcare levels is critical. Empowering women with knowledge about the condition enables timely diagnosis, early intervention, and improved quality of life.

## 6. Conclusion

Polycystic Ovarian Syndrome (PCOS) is a complex, lifelong condition that extends well beyond reproductive concerns, encompassing metabolic, endocrine, and psychological dimensions.(3). Its strong association with comorbidities such as type 2 diabetes, cardiovascular issues, and mental health disorders calls for comprehensive, sustained, and proactive management strategies. Among these, lifestyle modification—emphasizing balanced nutrition, regular physical activity, and mental resilience—stands out as a cost-effective, scalable intervention to improve both short- and long-term clinical outcomes.Early awareness is pivotal. Promoting menstrual health literacy from adolescence—by encouraging young girls to monitor menstrual regularity from menarche—can lead to earlier detection and intervention. Digital media, community-based education, and interpersonal communication channels are powerful tools to shape positive, informed health-seeking behavior, particularly among young women.Equally critical is the mental health dimension. Women with PCOS face a significantly higher risk of anxiety, depression, and reduced quality of life.(8). Global and national health guidelines now increasingly advocate for the integration of psychological screening and support into standard PCOS care, reflecting a broader shift toward inclusive, person-centered healthcare models.Addressing PCOS through this holistic lens aligns directly with key United Nations Sustainable Development Goals—notably SDG 3 (Good Health and Well-being), SDG 5 (Gender Equality), and SDG 4 (Quality Education). By fostering awareness, ensuring equitable access to care, integrating health education, and prioritizing early and empathetic intervention, we can reduce the stigma surrounding PCOS and empower women to lead healthier, more informed lives.

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