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# Exploring the Influence of PCOD on BMI and Weight

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**Abstract:** As per the global gender distribution, the overall population may be relatively balanced between males and females but regional disparities can significantly impact gender ratios. Polycystic Ovary Syndrome (PCOS) is a common endocrine disorder that affects female individuals at birth. It is a complex condition characterized by elevated androgen levels mostly caused by a combination of hormonal imbalance and genetic tendencies. Research suggests that 6% to 10% of females between 18 to 40 years of age are affected by PCOS, making it the most common endocrine abnormality among women of reproductive age. The purpose of the study was to analyse whether the PCOD has any effect on BMI and weight of female students in the age group ranging from 18-21. Subjects were selected on a random basis from various colleges in the state and the sample is stratified by choosing colleges in urban and rural areas. A validated questionnaire constructed by Pedersen *et al.* (2007 ) was used as a Clinical tool in assessing PCOD of students. BMI and weight were measured. Descriptive statistics were used for analysis of data. The study revealed that the weight is higher with the students having PCOD than those without PCOD whereas the BMI is in normal range.

**Keywords:** PCOD, Hormonal imbalance, BMI, Endocrine abnormality, Androgen

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## Introduction

The estimated global population is around 7.9 billion people. The global sex ratio is approximately 1:1, indicating that there are equal numbers of males and females. As per the global gender distribution, the overall population may be relatively balanced between males and females, regional disparities can significantly impact gender ratios. The specific mention of India and China both of which have higher male population as these two countries together account for a substantial portion of the world's population.

W.H.O. suggests that approximately one in every six people of reproductive age worldwide

experience infertility in their lifetime. Though this could be a male or female reproductive problem, it is always an issue where fingers are pointed towards the female. It is more of a concern for female in a sociologically closed society like India (Sachdeva *et al.*, 2016).

Polycystic Ovary Syndrome (PCOS) is a common endocrine disorder that affects female individuals at birth. It is a complex condition characterized by elevated androgen levels mostly caused by a combination of hormonal imbalance and genetic tendencies. In a standard menstrual cycle, the two ovaries will alternately release mature, ready-to-be-fertilized eggs each month. But in PCOD, the ovaries will often release either immature or only partially mature eggs, which can go on to develop into cysts (sacs filled with liquid). This also leads to the ovaries swelling and becoming enlarged. The ovaries release a limited number of androgens (male hormones) during the cycle, but in this case the ovaries will start producing androgens in excess, which leads to symptoms like male pattern hair loss, abdominal weight gain, irregular periods, and in some extreme cases, even infertility (Saha *et al*., 2014).

Research suggests that 6% to 10% of females 18 to 40 years of age are affected by PCOS, making it the most common endocrine abnormality among women of reproductive age. The purpose of the study was to analyze whether the PCOD has any effect on BMI and weight of female students in the age group ranging from 18-21.

## Materials and Methods

### *Subjects Selection*:

Subjects were selected on a random basis from various colleges in the state and the sample is stratified by choosing colleges in urban and rural areas and from three regions of the state viz Trivandrum, Cochin and Malabar. 115 samples from each region with equal numbers from rural and urban areas were selected for the study. The subjects were motivated to present the facts and in forms and tests, they were identified with the nick name that was used very privately. The clinical tool to identify PCOD by validated questionnaire was used. Overlapping of regions was a practical difficulty while administering the test as many samples in Trivandrum city, Ernakulam city and Kozhikode city were original residents of other regions who were there for studies. This has made the sampling heterogeneous. Consent from the authorities of the colleges was taken in advance.

### *Clinical tool*:

The questionnaire had a sensitivity of 85% and specificity of 85% on multivariate logistic regression and a sensitivity of 77% and a specificity of 94%. This is a tool developed among women who had infertility. This model includes a strong predictor of PCOS. A history of white discharge outside of pregnancy strongly predicted no diagnosis of PCOS. The time between two menses i.e. from first day of one period to the first day of the next period was asked and has five choices (a) less than 25 days (b) 25 – 34 days (c) 35 – 60 days (d) more than 60 days and (e) totally variable (Table1).

A choice of the last three will be given one positive score. The second question is about during the menstruating years whether there was a tendency to grow dark course hair on eight areas of body i.e. upper lip, chin, breasts, chest between the breasts, back, belly, upper arms, upper thighs. If the candidate marks three or more sites, then one positive point will be marked as score. The third question was about being obese or overweight between the ages of 16 and 40. This is a 'yes' or 'no' question and if the answer is yes one positive point is added to the score (Table 1).

The fourth question is about having a milky discharge between the ages of 16 to 40 other than pregnancy or recent childbirth. This is also a 'yes' or 'no' question and the answer of yes gives one negative point. A total score of 2 or more is considered consistent with diagnosis of PCOS. The result will be a 'yes' or 'no' for PCOS.

Table 1: Clinical tool for diagnosis of polycystic ovary syndrome

| **Question** | **Criteria to attain Score Value** | **Score Value** |
|---|---|---|
| Please answer this question, NOT INCLUDING any time spent pregnant, receiving birth control pills or injections, after menopause, or after having both ovaries or the uterus surgically removed:<br>Between the ages of 16 and 40, about how long was your average menstrual cycle (time from first day of one period to the first day of the next period)? (select ONE only)<br>• <25 d • 25-34 d<br>• 35-60 d • More than 60 d<br>• Totally variable | Patient indicates any one of<br>• 35-60 d<br>• more than 60 d<br>• totally variable | 1 |
| During your menstruating years (not including during pregnancy), did you have a tendency to grow dark, coarse hair on your (circle ALL that apply)<br>• upper lip? • chin?<br>• breasts? • chest between the breasts?<br>• back? • belly?<br>• upper arms? • upper thighs? | Patient indicates 3 or more sites | 1 |
| Were you ever obese or overweight between the ages of 16 and 40? (circle ONE)<br>• Yes • No | Patient indicates Yes | 1 |
| Between the ages of 16 and 40, have you ever noticed a milky discharge from your nipples (not including during pregnancy or recent childbirth)? (circle ONE)<br>• Yes • No | Patient indicates Yes<br>Patient indicates No | -1<br>0 |
| If ≥ 2, consistent with diagnosis of PCOS<br>If <2, not consistent with diagnosis of PCOS | **TOTAL** | |

PCOS—polycystic ovary syndrome.

Table 2: Descriptive Statistics Of PCOD

| PCOD | Statistics | Weight (kg) | BMI |
|---|---|---|---|
| NO | Mean | 52.92 | 21.66 |
| | N | 260 | 260 |
| | S.D. | 10.92 | 3.57 |
| | Minimum | 33.00 | 14.43 |
| | Maximum | 86.60 | 33.83 |
| YES | Mean | 56.64 | 22.56 |
| | N | 86 | 86 |
| | S.D. | 14.52 | 4.61 |
| | Minimum | 34.00 | 14.82 |
| | Maximum | 92.20 | 36.47 |

*Body composition*:

Body composition was measured using the Body mass Index. The height was measured in centimeters using a stadiometer and body weight in kilograms was measured using a calibrated weighing machine. The BMI was then calculated using the formula.

$$\text{BMI} = \frac{\text{Weight (in kg)}}{\text{Height (in meters) X Height (in meters)}}$$

The result thus got is used for comparing with the standard norms.

*Body Weight*:

The subjects were asked to stand on the digital weighing machine with bare feet. The score was recorded in kilograms

*Testing schedule*:

All tests were conducted in the afternoon where the objectives and description of tests were administered, first clinical tests were applied followed by weight. The data collected were then sorted and classified for applying statistical techniques.

*Statistical Technique*:

A clinical tool to categorize PCOD and non-PCOD groups is treated with Descriptive analysis, univariate analysis and pair wise comparison statistical analysis and interpretations were made using MANOVA and analysis of variance. Further discussion on findings and hypotheses were elaborated finally based on findings.

## Results and Discussion

Table 2 reveals that mean weight was 52.92 kg, and 56.64 kg, respectively for college students without PCOD and those with PCOD. Those with PCOD weighed heavier than those without PCOD. Concerning BMI the subjects with and without PCOD were found to be in the normal category of between 18.5 and 24.5, even though the highest mean score was for those with PCOD.

The higher weight could be attributed to the eating habits in PCOS as many studies points, Jabeen *et al.* (2022) reported that, emerging evidence suggests that disordered eating, particularly binge-eating symptomatology, is overrepresented within Polycystic Ovary Syndrome (PCOS) populations. This comorbidity presents a clinical dilemma as current treatment approaches for PCOS emphasize the importance of weight management, diet, exercise, and the potential for harm of such treatment approaches in PCOS patients with comorbid disordered

eating.

## Conclusion

On the data of students reported with PCOD compared to those reported without PCOD, on analysis has seen that students with PCOD were heavier than those without PCOD. The BMI of both groups remained at a normal healthy range. The study revealed that the weight is higher with the students having PCOD than those without PCOD. Whereas the BMI is in normal range.

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