



## Original Research Article

## Comparison of dietary pattern and BMI in South Indian women with PCOS and controls

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## ARTICLE INFO

## Article history:

Received 09-11-2020

Accepted 06-01-2021

Available online 13-03-2021

## Keywords:

BMI

Dietary Influences

PCOS

Snacking

## ABSTRACT

**Introduction:** Polycystic ovarian syndrome is the most common endocrine and metabolic heterogeneous disorder among reproductive-aged women. Obesity worsens the metabolic, clinical and endocrine features of PCOS, mainly by increasing insulin resistance and hyperinsulinemia. Obesity rates are increasing due to changing lifestyles, including unhealthy food habits. The objective of this study was to characterize the dietary pattern and BMI of PCOS women and to compare it with healthy controls.

**Materials and Methods:** This study was a case-control study. Study Population was women in the age group 15-45 years with complaints s/o PCOS and age matched control group. PCOS cases were diagnosed using Rotterdam criteria and the controls were age matched women without PCOS. All the women were subjected to a detailed history taking and physical examination. The data was entered in Excel sheet and Statistical analysis was done using SPSS version 23.

**Results:** The average age of PCOS cases was 24.64 years. There was a statistically significant increase in history of snacking with ingestion of high caloric and oily food in PCOS cases compared to control women. PCOS women were more overweight and Obese compared to Control women and this difference was also statistically significant.

**Conclusion:** The results of this study suggests with PCOS is associated with an increased intake of food high in calorie and saturated fat and that women who are obese or overweight are more likely to develop PCOS. Lifestyle modifications like healthy diet and regular exercise should be the front line therapy in PCOS women.

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### 1. Introduction

Polycystic ovarian syndrome is the most common endocrine and metabolic heterogeneous disorder among reproductive-aged women, with a likely genetic origin influenced by environmental factors including diet, lifestyle and social status.<sup>1-5</sup> In addition to reproductive complications including infertility, dysfunctional uterine bleeding, endometrial cancer and late age at menopause, PCOS patients often suffer from depression, poor self esteem, anxiety and metabolic disorders such as obesity, impaired glucose tolerance, type 2 diabetes, dyslipidemia and

hypertension.<sup>6-15</sup> The prevalence of this disorder ranges from 6% to 15% depending on the diagnostic criteria used.<sup>16</sup> The prevalence is as high as 15% when the broader Rotterdam criteria are applied. Obesity worsens the metabolic, clinical and endocrine features of PCOS, mainly by increasing insulin resistance and hyperinsulinemia.<sup>17</sup> More than 50% of PCOS women are obese.<sup>18</sup> This increase in Obesity rates are due to changing lifestyles, including unhealthy food habits like increased consumption of junk and fast food with increasing sedentary lifestyles.<sup>19</sup> Some studies have identified a positive energy balance in women with PCOS secondary to excessive caloric intake and sedentary lifestyle behaviours.<sup>20-23</sup> There is a suggested

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possible association between risk of developing PCOS and diet. But the data on dietary history of PCOS women is very limited.<sup>18</sup>

The objective of this study was to characterize the dietary pattern and BMI of PCOS women and to compare it with healthy controls.

## 2. Materials and Methods

This study was planned as a case-control study. Institute ethical committee approval was obtained. Study Population was women in the age group 15-45 years with complaints s/o PCOS and age matched control group. Source of data was women in the age group 15-45 years attending gynecology OPD at a tertiary care centre. Sample size was calculated as 80 PCOS cases and 80 controls Inclusion criteria was women in the age group 15-45 years. PCOS cases were diagnosed using Rotterdam criteria and the controls were age matched women without PCOS. All of the control women had regular periods, had no clinical or biochemical hyperandrogenemia, no significant background history and none of them were on any medications including oral contraceptive pills. Exclusion criteria was women who were already on treatment for PCOS or on oral contraceptive pills /Hormonal treatment and women who were suffering from any other known medical disease or condition. Informed written consent was taken from all the participants in the study. All the women were subjected to a detailed history taking including age and detailed dietary history. These women underwent a physical examination including height, weight and BMI. The data was entered in Excel sheet. Statistical analysis was done using SPSS version 23 using frequency for age group and chi square test for association between two groups with 5% level of significance and 95% confidence interval.

## 3. Results

Total of 80 PCOS cases and 80 controls were included in the study. The average age of PCOS cases was 24.64.

**Table 1:** Age frequency of PCOS cases

Age in years	Frequency	Percentage
< 15	3	3.8
16-20	20	25
21-25	24	30
26-30	20	25
31-35	10	12.5
> 35	3	3.8

Table 1 shows the age distribution of the 80 PCOS cases. Maximum number of PCOS cases 30 % (24 cases) were in the age group of 21-25 years followed by 25% (20 Cases) in the age group 16-20 years and 31-35 years .

Table 2 shows the relationship between snacking and PCOS and controls. The statistical analysis showed a

**Table 2:** Relationship between snacking and PCOS

	Snacking	No Snacking	Total
Case	45	35	80
Control	14	66	80

Pearson chi-square value of 25.803 with P- value 0.00 which is statistically significant. This shows that history of snacking with ingestion of high caloric and oily food was more in PCOS cases compared to control women.

**Table 3:** Relationship between type of food and PCOS

	Healthy food	Junk Food	Total
Case	67	13	80
Control	71	9	80

Table 3 shows the relationship between type of food, like healthy home cooked food versus outside/ Junk food but the Pearson chi square value was 0.843 with a p-value of 0.358 which was not statistically significant.

Table 4 shows the relationship between BMI and PCOS women. PCOS women were more overweight and Obese compared to Control women. Statistical analysis showed a Pearson Chi-square value of 30.098 with a p value of 0.00 which was statistically significant.

## 4. Discussion

In our study the average age of PCOS cases was 24.64, which is comparable to age group of 25.11 in a study done by Ahmedi A et al,<sup>24</sup> 26.8 by Lin et al.<sup>25</sup> and 26 years by Chen et al.<sup>26</sup> but Shishehgar et al<sup>23</sup> found a mean age of 28.56 in PCOS women and in a study in UK by Barr et al<sup>20</sup> they found the average age to be 32.6 years.

Our study found that there was a statistically significant higher history of snacking in PCOS women compared to controls. Ahmedi A<sup>24</sup> et al. also found higher calories and fat intake and lower dietary fiber intake in PCOS women compared to controls. In their study Barr et al<sup>20</sup> found that percentage energy contribution from fat was significantly higher in women with PCOS. Similar findings were found by Shishehgar et al<sup>23</sup> and Douglas et al<sup>18</sup> while Altieri et al<sup>27</sup> reported a lower percentage energy intake from fat in PCOS women which could be due to the fact that their study population included obese and overweight women.

Our study found that PCOS women were more overweight and obese when compared to controls. Since its original description by Stein and Leventhal in 1935 obesity has been associated as a common finding in women with PCOS. Studies by Sam S<sup>28</sup> report the prevalence of obesity and overweight in PCOS women as high as 80%. Alvarez-Blasco et al<sup>29</sup> found that PCOS was 5-fold more common among overweight or Obese women when compared with general population. On the contrary Ahmedi A et al<sup>24</sup> did not find significant difference in BMI of PCOS and control

**Table 4:** Relationship between BMI and PCOS

BMI	<20 (Underweight)	20-25 (Healthy)	25-30 (Overweight)	> 30 (Obese)	Total
Case	10	23	21	26	80
Control	8	52	17	3	80

women.

## 5. Conclusion

The results of this study suggests with PCOS is associated with an increased intake of food high in calories and saturated fat and that women who are obese or overweight are more likely to develop PCOS. Encouraging PCOS patients to undergo lifestyle modifications like a healthy diet- low in saturated fats and calories and regular exercise leading to a normal BMI will help to avoid most of the complications of PCOS and remains one of the front line therapies.

## 6. Source of Funding

None.

## 7. Conflict of Interest

The authors declare that there is no conflict of interest.

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**Cite this article:** Gopalan U, Ghose S, Karnaboopathy R. Comparison of dietary pattern and BMI in South Indian women with PCOS and controls. *Indian J Obstet Gynecol Res* 2021;8(1):57-60.