

# Difference in Dietary Factors in Young Females with and Without Polycystic Ovarian Disease

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## ABSTRACT

**Background:** Although diet has an important role in blood glucose and insulin regulation, there is little study on dietary therapy of “polycystic ovarian syndrome”, abbreviated as PCOS. So this research work was done to look at some particular dietary components, which may predispose development of PCOS.

**Aim:** To compare the mean value of intake of dietary of daily meal in young females with and without PCOS

**Main outcome measures:** Mean white bread and potatoes servings per last 7 days

**Study design:** Case control study

**Duration of study:** 6 months from January 2022 to June 2022

**Setting:** Study was conducted at Sialkot Medical College Sialkot” affiliated with Imran Idrees Teaching Hospital in Obstetrics /Gynecology department over the period of 6 months from January 2022 to June 2022

**Method:** Total 84 female were included in the study and divided in two equal groups i.e. females with PCOS and females without PCOS. They were asked about their dietary pattern and total intake of potatoes and bread they consume per week was noted. SPSS was used to compare both groups for mean dietary intake

**Results:** In case group, the mean intake of white bread was  $7.55 \pm 1.74$  while in control group was  $5.5 \pm 1.9$  ( $P < 0.05$ ) while mean potato serving in cases was  $6.62 \pm 2.39$  in cases while  $3.48 \pm 1.74$  in controls ( $P < 0.05$ ).

**Practical implication.** All patients with PCOS who are attending the gynec clinics should be counselled about diet and life style modifications that has a crucial role in treating the disease. A diet low in saturated fat and high in fibre from predominantly low-glycaemic-index-carbohydrate foods is recommended for patients with PCOS. The dietary management of women suffering from PCOS should be carried out by registered dietitians, gynecologists, fertility specialists, and endocrinologists from the time of diagnosis to help patients recognize the role of diet and lifestyle changes how these can be altered through nonpharmacological means to improve prognosis.

**Conclusions:** Thus females having PCOS showed more intake of potatoes and breads.

**Keywords:** Polycystic Ovarian Syndrome, Dietary factors, life style, bread, potatoes

## INTRODUCTION

Polycystic ovarian syndrome (PCOS), which affects 3.4% of reproductive-age females, is linked to reproductive, metabolic, and psychological problems. Menstrual irregularities, anovulatory infertility, and clinical hyperandrogenism are the most common symptoms of PCOS<sup>1,2</sup>. In 75% of PCOS patients, anovulatory infertility is prevalent<sup>3</sup>. According to studies, 10-15% cases show insulin resistance, 20-40% show glucose intolerance, and 10-17% may develop overt type II diabetes. Such females constantly have high exposure towards elevated estrogen level, putting them at risk for endometrial cancer.<sup>4</sup> PCOS is more common in particular ethnic groups, such as South Asia (25%), with monthly irregularities being the most common (49.1%). The higher risk of these diseases has necessitated the need for PCOS screening as well as research on ways to prevent the disease. The pathophysiology of PCOS has several non-ovarian components, but ovarian dysfunction is at its core. It is caused by a combination of genetic defects and environmental factors such as nutrition and body weight, which influence the occurrence of PCOS.<sup>5</sup>

Females with polycystic ovarian disease and healthy controls had similar intakes of total energy, micronutrients, macronutrients, and foods enriched with glycemic-index<sup>6</sup>. Patients who are obese should change their lifestyles because even a small amount of weight loss can trigger a spontaneous restart of ovulation<sup>7</sup>. Obesity increases the frequency and severity of all PCOD symptoms, making PCOD a serious medical issue that is challenging to manage<sup>8,9,10</sup>.

Determining the function of specific dietary components in the emergence of PCOS in young females, which is becoming

increasingly common in our region, was the aim of this study. This study set out to identify the function of specific dietary elements in the emergence of PCOS in young females, which is becoming more common in local population, due to increase in obesity, fast food trend and sedentary life-style.

Objective of this study was to compare the mean value of intake of dietary of daily meal in young females with and without PCOS

## MATERIAL AND METHODS

It was a Case-Control Study conducted at Sialkot Medical College Sialkot affiliated with Imran Idrees Teaching Hospital in Obstetrics/ Gynecology Department over a period of 6 months from January 2022 To June 2022. By using the WHO calculator, the sample size was calculated as 84 cases (42 in each group) with significance level at 5%, power of study at 80% and mean dietary intake i.e.  $1.0 \pm 1.5$  vs.  $0.4 \pm 0.7$ . Non-probability, consecutive sampling technique was used.

**Selection of patients:** Females of age between 12-35 years, with normal BMI i.e.  $18.-25$  kg/m<sup>2</sup>, cases with PCOS who fulfilled Rotterdam criteria while controls were females without PCOS were included. The Rotterdam criteria was confirmed when 2 of 3 following features are present: (i) anovulation i.e. irregular menstrual cycles, (ii) follicles > 12 of size 2-9 mm with raised ovarian volume (> 10 cm<sup>3</sup>) and (iii) presence of obesity, hirsutism, alopecia, acne (iv) excessive testosterone >5.63 ng/ml. But females with hirsutism, taking systemic steroids, danazol, testosterone and OCP'S, “anabolic steroids, estrogens, progesterone, chemotherapeutic & immunosuppressant, cardiovascular & dermatological agents,” other causes of irregular menstrual cycles were excluded. Females with thyroid disorders, congenital adrenal hyperplasia, malignancy, anorexia or bulimia,

Received on 07-07-2022

Accepted on 28-09-2022

fibroids, polyps, endometriosis, and tuberculosis were also not included in the study.

**Methodology:** After taking consent form, females attending outpatients department were enrolled for the study. Females were detected for PCOS and two groups were formed i.e. Cases with PCOS and controls without PCOS by using a Doppler ultrasound. They were asked about the dietary pattern and habits. Females were asked about the intake of quantity of potato as well as serving of white-bread per weeks as per their last week diet. All this information was collected in a predesigned questionnaire.

**Dietary factors:** It included the following parameters and was noted in terms of quantity of servings they taken during last week depending on the recall:

- Potatoes: One serving = 1 to 2 medium sized potatoes
- White bread: One serving = One piece of breads from a standard sized bread

**Analysis plan:** SPSS version 25.0 was used to enter and analyze the data. Mean intake of above stated parameters were compared in two groups by using independent samples T-test. P-value  $\leq 0.05$  was taken as significant.

## RESULTS

In case group, the mean age of patients was  $22.69 \pm 6.51$  years. In control group, the mean age of patients was  $25.14 \pm 4.76$  years. The mean BMI of females in case group was  $21.95 \pm 1.68$  Kg/m<sup>2</sup> while in control group, mean BMI of females was  $21.45 \pm 1.83$  Kg/m<sup>2</sup>. In cases, out of 42 females, 22 (52.4%) of females were married. In controls, out of 42 females, 17(40.5%) of females were married. Among cases, 10(23.8%) females were working females. Among controls, all (100%) females were working females. Out of 42 females in case group, 7(16.7%) were middle pass, 10(23.8%) were matric pass, 17(40.5%) were intermediate while 8(19%) had education bachelor or above. In control group, out of 42 females, 3(7.1%) were middle pass, 9(21.4%) were Matric pass, 19(45.2%) were intermediate while 19(26.2%) had education bachelor or above. Table 1

In our study, we compared the two dietary factors i.e. potatoes and bread pieces consumed during last 7 days. The mean potatoes swerving consumed last 7 days was  $6.6 \pm 2.39$  in females in case group while  $3.48 \pm 1.74$  in females in control group. The difference in both groups was significant (p-value  $< 0.05$ ). The mean white bread swerving consumed last 7 days was  $7.55 \pm 1.74$  in females in case group while  $5.5 \pm 1.9$  in females in control group. The difference in both groups was significant (p-value  $< 0.05$ ). Table 2

Table 1: Demographics of females in both groups (n=84)

	PCOS Group	Control Group
n	42	42
Age (Years)	$22.69 \pm 6.51$	$25.14 \pm 4.76$
BMI (Kg/m <sup>2</sup> )	$21.95 \pm 1.68$	$21.45 \pm 1.83$
<b>Marital status</b>		
Married	22 (52.4%)	17 (40.5%)
Unmarried	20 (47.6%)	25 (59.5%)
<b>Occupation</b>		
Housewives	32 (76.2%)	0 (0.0%)
Working	10 (23.8%)	42 (100%)
<b>Education</b>		
Up to Middle	7 (16.7%)	3 (7.1%)
Up to Matric	10 (23.8%)	9 (21.4%)
Intermediate	17 (40.5%)	19 (45.2%)
Bachelor or above	8 (19.0%)	11 (26.2%)

Table 2: Comparison of dietary pattern in both groups

Quantity / week	PCOS	Control	P-value
Potatoes 1-2 piece	$6.26 \pm 2.39$	$3.48 \pm 1.74$	0.000 ( $< 0.05$ )
White bread 1 piece	$7.55 \pm 1.74$	$5.50 \pm 1.90$	0.000 ( $< 0.05$ )

## DISCUSSION

PCOS is a diverse condition with unknown aetiology that affects females and causes ovulatory and menstrual irregularities as well as androgen excess. The symptoms may be ovulatory failure, androgens excess, and polycystic ovaries when completely manifested. It's one of the most frequent endocrine and / or metabolic problems among females<sup>11</sup>. PCOS is one of the most common metabolic illnesses that affects females. The diagnostic criteria used to describe the condition have an impact on its prevalence<sup>12</sup>. Obese patients should make lifestyle modifications because even minor loss in body weight can result in spontaneous reinstatement of process of ovulation.<sup>7</sup> In obese people, all PCOS signs are more common and severe, making it a major public and medical concern that can be difficult to manage<sup>13</sup>.

We observed in our study that during last 7 days, the mean potatoes swerving were consumed as  $6.6 \pm 2.39$  in females in case group while  $3.48 \pm 1.74$  in females in control group. The difference in both groups was significant (p-value  $< 0.05$ ). The mean white bread swerving consumed last 7 days was  $7.55 \pm 1.74$  in females in case group while  $5.5 \pm 1.9$  in females in control group. The difference in both groups was significant (p-value  $< 0.05$ ).

An optimum diet not only eliminates dietary deficiencies by supplying enough nutrition and energy for development and reproduction, but also stimulates health & lifespan while lowering the chances of chronic disease linked to food.<sup>14</sup> The best diet for females with PCOS is unknown, but it must help with weight management, symptoms, and fertility in the near term, as well as long-term risk of type II diabetes, cardiovascular diseases, and some malignancies. Douglas investigated whether the dietary consumption and composition of females with PCOS are related to glycemic status indices. They expected that PCOS females must take diet that has high energy, fat and the diet that contain high glycemic index as camped to non-PCOS females, and that dietary pattern is linked to insulin resistance and secretion in females having PCOS.

Insulin and glucose concentrations in fasting sera were measured, and estimations of insulin resistance were derived. They discovered that both groups consumed similar amounts of total energy, macro- & micro-nutrients, and meals with a high glycemic index. However, PCOS females were taking more white-bread ( $7.9 \pm 4.4$  vs.  $5.5 \pm 2.9$ ) and fried potatoes ( $1.0 \pm 1.5$  vs.  $0.4 \pm 0.7$ ) than non-PCOS females. The PCOS group had a considerably lower glucose-to-insulin ratio ( $4.7 \pm 2.1$  vs.  $7.6 \pm 5.2$ ) and a significantly higher fasting insulin level ( $22.5 \pm 14.9$  vs.  $15.1 \pm 8.3$   $\mu\text{IU/mL}$ ) than non-PCOS females. They concluded that females with PCOS had a dietary pattern that was marked by consumption of a greater amount of specific foods with a high glycemic index when compared to matched control females<sup>6</sup>.

Ahmadi compared anthropometric and nutritional profiles of females with PCOS to those of healthy age-matched females. A total of 65 females with PCOS were used as test subjects. The control group comprised of 65 healthy females of similar ages. Data on demographics, anthropometry, and nutritional intake were collected for each participant and compared between the two groups. They discovered that the mean of the two groups' body mass indexes did not differ significantly. PCOS females consumed more fats and calories than healthy females, according to a dietary analysis (P-value = 0.001 and P-value = 0.019, respectively)<sup>15</sup>

Rodrigues et al., evaluated diet quality and its link with overweight and obesity rates among PCOS patients in a cross-sectional study of 100 females with the condition. Anthropometric

and nutritional information were analysed. The Brazilian Healthy Eating Index - Revised was used to examine dietary habits using data from two 24-hour meal recalls. An anthropometric investigation revealed a significant frequency of overweight, obesity, and increased visceral fat, according to the researchers (30%, 60% and 90% respectively). The average Brazilian Healthy Eating Index- Revised score was  $56.1 \pm 12.0$  (range 34.5-77.5 points). Obesity, as measured by BMI ( $r = -0.248$ ;  $P = 0.013$ ) and waist circumference ( $r = -0.278$ ;  $P = 0.005$ ), was adversely connected with diet quality. They came to the conclusion that nutritional therapies aimed at improving food quality should be addressed at PCOS patients because obesity is linked to poor endocrine, metabolic, and reproductive functioning in these females<sup>16</sup>.

Moran et al evaluated the effectiveness of lifestyle treatment in improving reproductive, anthropometric, metabolic, and quality of life parameters in PCOS patients in a meta-analysis. They came to the conclusion that changing one's lifestyle can help females with PCOS improve their body composition, hyperandrogenism, and insulin resistance. There was no evidence of a lifestyle intervention's effect on glucose tolerance or lipid profiles, and there was no literature evaluating clinical reproductive outcomes, quality of life, or satisfaction with therapy<sup>17</sup>.

Among conclusion, PCOS is the most frequent endocrinopathy in reproductive-aged females, with a wide range of symptoms. Diet plays a function in blood glucose and insulin levels management. Based on current research, a low-saturated-fat, high-fiber diet consisting primarily of low-glycaemic-index-carbohydrate meals, and moderate-intensity exercises, are recommended for females at higher risk of PCOS, which poses considerable metabolic concerns. More large-scale studies are required to be done in females with different characteristics to confirm above stated results and different dietary elements that can affect occurrence of PCOS in females of reproductive age group.

## CONCLUSION

Thus we concluded that the females with PCOS consume more particular items with high calories and fat content as compared to matched controls. According to current data, dietary therapies aimed at improving food quality, such as a low-fat, high-fiber diet, are advised for people at high risk of pcos. There is a need for more large-scale research that takes other anthropometric parameters into account.

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