

INCIDENCE OF POLYCYSTIC OVARIAN SYNDROME RELATED OBESITY AND OVERWEIGHT IN YOUNG FEMALES

Authors

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Abstract

Background: Polycystic ovarian syndrome is manifested by amenorrhoea, hirsutism and obesity associated with enlarged polycystic ovaries characterized by excessive androgen production by the ovaries.

Objective: To study incidence of overweight and obesity in polycystic ovarian syndrome in young adults.

Methods: Girls with menstrual abnormality were approached and then were taken to a gynaecologist to diagnose for polycystic ovarian syn-

drome. All participants were explained about the procedure and a written consent form was taken prior collecting the data. Evaluation of obesity in diagnosed cases of polycystic ovarian syndrome was done. The tools to assess obesity were body mass index, neck circumference and hip waist ratio respectively.

Results: Out of 200, 12 young females were diagnosed for polycystic ovarian syndrome in which 7 were obese (58%) and 2 were over-

weight (16%) with a mean value of 28.92 and 24.05 respectively. Conclusion: There is high incidence of overweight and obesity in young females diagnosed with polycystic ovarian syndrome. Keywords: Polycystic ovarian syndrome, obese, overweight, BMI, NC

Introduction

Polycystic ovarian syndrome is manifested by amenorrhoea, hirsutism and obesity associated with enlarged polycystic ovaries. It is characterized by excessive androgen production by the ovaries.(1) It is a multifactorial and polygenic condition. Most women with PCOS grow many small cysts on their ovaries. That is why it is called polycystic ovarian syndrome. The cysts are not harmful but lead to hormone imbalances.

Obesity increases the risk of comorbidities associated with PCOS. PCOS is encountered in 30-70% of PCOS affected women and its presence significantly modifies both clinical and laboratory expression of syndrome.(2)

Obesity is strongly associated with the PCOS. Although the cause of this association remains unknown but obesity is present in at least 30% of cases in some series the percentage may be as high as 75%.(3) Polycystic ovary syndrome is an insulin resistant state. Visceral fat is independently associated with IR.(4)

Many women with PCOS (between 38% and 88%) are overweight or

obese. Even modest weight loss of 5% body weight has been shown to result in significant improvements in both symptoms of hyperandrogenism and ovulatory function in women with PCOS. There is no doubt, therefore, that adiposity plays a crucial role in the development and maintenance of PCOS and strongly influences the severity of both its clinical and endocrine features in many women with the condition. Obesity per se probably also contributes to features of hyperandrogenism even in women with normal ovaries. Evidence from family-based and association studies suggest that PCOS has a significant genetic basis, although the genes predisposing to PCOS have yet to be clearly defined. Three means by which adiposity may contribute to PCOS: adiposity and the consequences of insulin resistance; adiposity and the consequences of disturbed steroid metabolism; ?adiposity, appetite and the possible roles of leptin and ghrelin. A decrease in the synthesis of SHBG has been found and therefore an increase in free androgens in obese PCOS. PCOS is observed more in monozygotic than dizygotic(5).

Prevalence of obesity in PCOS is increased when compared to general female population(6). In women with polycystic ovarian syndrome, intravisceral adipocytes behave in an abnormal way in terms of their effects of the metabolic and hormonal profile. The adipocytes also

have an effect on steroid metabolism and specifically on androgen metabolism.

The beta subunits of the insulin receptors increase serin phosphorylation, which inhibits the intracellular transmission of the insulin message in the adipocytes and decreases tyrosine phosphorylation. This defect is in turn translated into decreased activity of the P13K (phosphoinositide-3-kinase) enzyme, which is the key enzyme for recruitment of glucose transporter-4. This is responsible for the insulin-dependent glucose uptake by the cells, so the reduction in its activity can therefore result in decreased cellular glucose uptake with an increased cellular glucose intolerance and type 2 diabetes. These concepts illustrate how as the degree of overall and in particular central obesity increases, androgen production increases and fertility decreases. The link of PCOS with insulin resistance was subsequently established by clinical studies characterizing the profound insulin resistance in obese and lean PCOS patients.(8)

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health. There are several different methods for determining excess adipose (fat) tissue; the most common being the Body Mass Index (BMI). Women with PCOS had a greater risk of overweight, obesity and central obesity.(8)

According to Good Housekeeping in

2010, the average neck circumference for women is 13.5 inches. The circumference of the neck can be measured by firmly pulling a tap measure around the neck, just below the Adam's apple. At BMI of 23.0 and 25.0, males had neck circumference 35.7cm and 37.5cm, while females had it at of 32.2cm and 33.5cm respectively.(9) PCOS also leads to metabolic disorders.(10)

Material and Methodology:

Participants

Young adults of diagnosed cases of polycystic ovarian syndrome.

Inclusion criteria

PCOS patients with an age group above 18.

Procedure:

The study was approved by the Institutional Ethical Committee at Tilak Maharashtra Vidyapeeth, Pune. Girls with menstrual abnormalities were approached and then were taken to a gynaecologist to diagnose for polycystic ovarian syndrome. Diagnosed cases of polycystic ovarian syndrome of age group above 18 were included in the study. All participants were explained about the procedure and a written consent form was taken prior collecting the data. Evaluation of obesity in diagnosed cases of polycystic ovarian syndrome was done. The tools to assess obesity were body mass index, neck circumference and hip waist ratio respectively.

Body mass index was calculated by the following formula-

BMI= Weight (kg) / Height (m²)
 Hip waist ratio's formula is as follows:

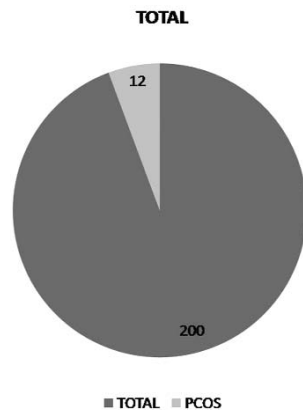
Narrowest part of the waist / Widest part of the hip

The circumference of the neck can be measured by firmly pulling a tap measure around the neck, just

below the Adam's apple. The average neck circumference for women is 13.5 inches.

The participants were made clear that the information gathered would remain confidential and would be only used for research purpose.

Results:



Graph 1: Graphical representation of PCOS amongst 200 individuals.

Out of 200 only 12 were diagnosed for polycystic ovarian syndrome.

Table 1: Classification of patients according to BMI and NC

According to Neck circumference, out of 12 patients 7 were obese, 2 were overweight and 2 were normal and according to body mass index, out of 12 patients 6 were obese, 2

were overweight and 4 were normal.

Discussion:

The purpose of this study was to find incidence of overweight and obese patients in PCOS patients. During this research it was found that out of 200 only 40 had men-

	OBESITY	OVERWEIGHT	NORMAL	UNDERWEIGHT
NC	6	2	4	1
BMI	7	2	2	

strual abnormalities out of which only 12 diagnosed cases of PCOS were present. And out of 12 according to body mass index 7 were obese, 2 were overweight and 2 were normal. According to neck circumference 6 were obese, 2 were overweight and 4 were normal.

Obesity is recognized as an important contributory factor. Apart from excess production of androgens, obesity is also associated with reduced SHBG.(1)

Many women with PCOS (between 38% and 88%) are overweight or obese. There is no doubt, therefore, that adiposity plays a crucial role in the development and maintenance of PCOS and strongly influences the severity of both its clinical and endocrine features in many women with the condition. Obesity per se probably also contributes to features of hyperandrogenism even in women with normal ovaries. In women with polycystic ovarian syndrome, intravisceral adipocytes behave in an abnormal way in terms of their effects of the metabol-

ic and hormonal profile. This abnormal adipocyte behavior is associated with defective insulin activity, leading to impaired glucose intolerance, hyperinsulinemia and insulin resistance. The adipocytes also have an effect on steroid metabolism and specifically on androgen metabolism. These concepts illustrate how as the degree of overall and in particular central obesity increases, androgen production increases and fertility decreases. At the same time, increased lipolysis from adipocytes also contribute to potentiate the degree of insulin resistance, which further enhances the reproductive as well as the adverse metabolic impact and the cardiovascular risks in women with polycystic ovarian syndrome.(5)

As PCOS is a condition associated with (and worsened by) obesity, it is possible that abnormalities in appetite- and weight-regulating hormones may play a role in its etiology. Two such hormones, leptin and ghrelin, have been studied in PCOS and evidence relating to each of these is discussed.(2)

BMI is an acceptable proxy for thinness and fatness, and has been directly related to health risks and death rates in many populations. The risk of presenting HIN and dyslipidemia was higher in PCOS patients than in controls, even in lean subgroups. As the BMI increased, the prevalence of HIN, dyslipidemia and central obesity also increased in PCOS patients. Obesity may have a

marked impact on both the development and progression of the syndrome. A high proportion of women with PCOS are obese. Regardless of the degree of obesity, women with PCOS are more likely to have central (abdominal) distribution of body fat. PCOS is not only a reproductive disorder, but is also associated with significant increase in metabolic aberrations and cardiovascular risk factors. It has been shown that weight loss improves the metabolic and reproductive abnormalities that characterize the syndrome.(7)

Obesity is encountered in 30-70% of PCOS-affected women, and its presence significantly modifies both clinical and laboratory expression of the syndrome. Weight loss is the first recommendation for the treatment of clinical manifestations of PCOS, such as menstrual cycle irregularities, infertility or hirsutism.(2)

Approximately 50% of PCOS women were overweight or obese and most of them had the abdominal phenotype. He thought that obesity may play a pathogenetic role. Obesity, particularly the abdominal phenotype, may be partly responsible for insulin resistance and associated hyperinsulinemia in women with PCOS. Therefore, obesity-related hyperinsulinemia may play a key role in favoring hypoandrogenism in these women. Other factors such as increased estrogen production rate, increased activity of the opioid system and of the hypothalamic-pitu-

itary-adrenal axis, decreased sex hormone binding globulin synthesis and, possibly, high dietary lipid intake, may be additional mechanisms by which obesity favors the development of hyperandrogenism in PCOS. Irrespective of the pathogenetic mechanism involved, obese PCOS women have more severe hyperandrogenism and related clinical features (such as hirsutism, menstrual abnormalities and anovulation) than normal-weight PCOS women. Body weight loss is associated with beneficial effects on hormones, metabolism and clinical features.(10)

Conclusion

There is high incidence of overweight and obesity in young females diagnosed with polycystic ovarian syndrome.

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