

Research Article

Study of the Relationship between Obesity and Infertility in Women with Polycystic Ovary Syndrome

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ABSTRACT

Polycystic ovary syndrome (PCOS) is the most common cause of infertility and endocrine glands disorder among women. The common symptoms are menstrual disorders, acne, hair loss, increased risk of endometrial and breast cancer, increased risk of type 2 diabetes, high blood pressure in pregnancy and high obesity are more prevalent compared with healthy women. In this study, after measuring body mass index (BMI) of the participants, obese infertile women with PCOS were compared with obese infertile women without PCOS. This study was conducted on all infertile women with PCOS, infertile, and healthy individuals referred to infertility clinics in Shariati Hospital, Tehran, Iran during 2014 to 2015. The BMI of the individuals was measured and its relationship with PCOS was studied. The results showed a significant relationship between BMI and PCOS.

Keywords: Polycysticovary syndrome, Body mass index, Infertility, Obesity

INTRODUCTION

Polycystic ovary syndrome (PCOS) is one of the most common reason for infertility and endocrine glands disorder in women in such a way that it is seen in 6% to 10% of all women in the childbearing age. In women with this disease, symptoms and side effects like: menstrual disorders, acne, hair loss, increased risk of endometrial and breast cancer, increased risk of type 2 diabetes, high blood pressure in pregnancy and high obesity are more prevalent compared with healthy women. Forty percent of women with PCOS have high obesity and 75% of them are infertile (1). There is obesity in 50% women with PCOS. Body fat is usually accumulated centrally and increase in waist to Hip Ratio results

in increased risk of Diabetes mellitus and cardiovascular diseases (2-4). A study showed that mothers of women with PCOS also have 40% resistance to insulin. PCOS in European countries are characterized by four signs including: Oligomenorrhea and amenorrhea, infertility, hirsutism and obesity. According to a new definition, diagnosis criteria include: hyperandrogenism and chronic anovulation (5). Symptoms of PCOS usually begin right after the first menstruation period. In some cases, it will occur in later years of fertility due to gradual increase in weight. The symptoms differ in individuals concerning severity and type. Although the reason for PCOS is still unknown

but it is one of the most common endocrine disorders. At one end of the spectrum, this heterogeneous disease is determined with polycystic ovarian morphology appearances in pelvic ultrasound. At the other end of the spectrum, symptoms like: obesity, hyperandrogenism, fertility and menstrual cycle disorder occur individually or in combination with other symptoms. Metabolic disorders including: increased serum level in Luteinizing hormone (LH), testosterone, insulin, and prolactin are common in this disease and women health with PCOS is deeply affected in the long run. This syndrome appears in puberty and it has been assumed that it is related to increased obesity in puberty. Anyway, gene or genes involved have not been identified and role of environmental factors like: weight changes and circulated hormones' concentration and age of the outbreak of the disease are unknown (6). Some of the intervening factors influence the appearance of PCOS. Weight gain intensifies symptoms of the diseases while weight loss improves hormonal and metabolic pattern as well as disease symptoms. It has been shown that individuals with PCOS have disorders in eating and nutritional value. Moreover, it is related with the amount of leptin shown to have an effect on pulsatile secretion of gonadotropin from hypothalamus and have in integral impact on reproduction (7). Obesity affects the amount of Follicle-stimulating hormone (FSH), LH, and GnTR which in turn causes dysfunctions in sex hormones. Obesity can be both a demonstration of hyperandrogenism and be involved in it (8). However, all obese women don't suffer from hyperandrogenism or ovulation disorders. Weight loss is an effective medical method in PCOS but it we can't predict weight loss improves the performance of menstruation in which women (9). Knowing the percentage of infertile obese women with PCOS can be helpful in treating infertility and other

complications of this problem as well as recognizing causes of disease.

MATERIALS AND METHODS

The population of the study included all infertile women suffering from PCOS, infertile, and healthy individuals who had been referred to the infertility clinics in Shariati Hospital, Tehran, Iran during 2014 to 2015. A total of 121 individuals, 52 infertile women with PCOS, 30 infertile patients and 39 healthy subjects were investigated in this project. BMI of the individuals in the study was measured and its relationship with PCOS was studied.

Study of height to weight ratio in infertile patients with PCOS to infertile women (BMI)

Body Mass Index (BMI) is a formula developed by Belgian statistician- Adolphe Quetelet. It is a representation for showing amount of body mass and it is the most accurate universal criteria for measuring obesity. Using this scale, we can understand if we are stricken with weight loss or overweighted.

This scale is accurate and depends solely on two variables: weight and height.

Formula for measuring BMI

$$\text{BMI} \left(\frac{\text{kg}}{\text{m}^2} \right) = \frac{\text{Weight (kg)}}{(\text{Height})^2 (\text{m})}$$
 (Formula for measuring BMI)

Interpretation and meaning of BMI number

Comparison and of the digits yielded from the formula (mentioned in the research method) and interpretation of the results is as follows:

BMI < 18.5 = underweight
 18.5 < BMI < 24.9 = natural
 < 29.9 = overweight
 BMI ≥ 30 = obese

STATISTICAL ANALYSES

In this study, required tests were carried out to study statistical value of the results yielded using statistical package SPSS (version 20). The significance level of p=0.05 was set for all statistical tests.

RESULTS

After so-called evaluations, it was observed through reviewing and determining the number of people with high BMI that 52 individuals were infertile with PCOS and 30 other were infertile without PCOS.

Table 1.Group Statistics

Group	N	Mean	Std. Deviation	Error Mean	
BMI	T	52	27.3083	4.28950	0.59485
	C	30	24.6090	4.11811	0.75186

Table 2. Reviewing BMI between infertile groups (c) and infertile with PCOS (T)

	t-test for Equality of Means			
	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95%
				Lower
Equal variances assumed Equal variances not assumed	0.007	2.69927	0.96939	0.77013
	0.007	2.69927	0.95872	0.78325

Statistical comparison showed that increased BMI in infertile women with PCOS is significantly more than infertile women without PCOS.

DISCUSSION

Gambineri et al. (2002) reported that approximately 50% of PCOS women are overweight or obese and most of them have the abdominal phenotype. They highlighted the role of obesity in the pathophysiology of PCOS (10). Janet et al. (1994) suggested that elevated BMI at age 18 years old, even at levels lower than those considered to be obese, is a risk factor for subsequent ovulatory infertility (11). Pasquali et al. (1997) recommended weight loss as the first-line therapeutic option in all PCOS women with obesity (12). Kiddy et al. (1990) suggested %35 of the women they studied were obese and obese women with PCOS had greater prevalence of hirsutism (13). Hamilton-Fairley et al. (1992) concluded it is important to encourage weight reduction in obese women with PCOS before considering therapy to induce ovulation (14). Kiddy et al. (1992) reported that the improvement in menstrual function and fertility may be consequent upon an increase in insulin sensitivity

which, directly or indirectly, affects ovarian function (15). Our findings support these studies.

CONCLUSION

Comparing BMI between infertile groups with PCOS and infertile without PCOS, P-value= 0.007 showed significant difference between the two groups. Therefore, it can be concluded that increased BMI and as results obesity are related to PCOS. Studied have shown that there is a close relationship between PCOS and resistance to insulin. Moreover, if diet and lifestyle to be corrected, resistance to insulin will decrease in patients. In other words, weight loss can be an effective way to improve the condition of patients with PCOS and it can be effective in treating infertility.

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