

MEDICAL JOURNAL OF BABYLON

Volume 15 | Issue 4 | October - December 2018



COLLEGE OF MEDICINE, UNIVERSITY OF BABYLON

Relation of Visfatin and Polycystic Ovarian Syndrome in Women

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Abstract

Background: Polycystic ovary syndrome (PCOS) is one of the most common endocrinopathies in women of the reproductive age group. **Objective:** The study aimed to assess the relation of serum visfatin level in women with polycystic ovarian syndrome. **Materials and Methods:** A cross-sectional study was carried out in Kirkuk city from January 10, 2018, to June 15, 2018. The number of polycystic ovary syndrome (PCOS) women under study was 60 women whose ages were between 15 and 45 years old. These patients admitted to obstetrics and gynecology unit at Azadi teaching hospital. The control group who were matched to the patients studied included 30 individuals. **Results:** The study showed that there is the significant difference between PCOS women and the control group concerning visfatin level and the highest mean of visfatin was occurred in PCOS women (13.60 ± 7.98 vs. 7.73 ± 1.22). There was significant relation between body mass index and visfatin level among PCOS women in this study. The highest rate of PCOS women had irregular menstrual cycle. The study showed that most PCOS women included in the study had hirsutism. The high rate of acne recorded among PCOS women. **Conclusion:** It was concluded that there was a highly significant relation of visfatin with PCOS.

Keywords: Body mass index, hirsutism, menstrual irregularity, polycystic ovary syndrome, visfatin

INTRODUCTION

Polycystic ovary syndrome (PCOS) is one of the most common endocrinopathies in women of the reproductive age group^[1] with a prevalence rate of nearly 5%–10% among women of the reproductive age.^[2] Chronic anovulation, hyperandrogenism, and multiple small subcapsular cystic follicles in the ovary on ultrasonography^[3] characterize it. Adipose tissue has been proven a very active protein-secreting organ. The secreted proteins are called adipokines. Adipose tissue releases various adipokines such as visfatin, leptin, adiponectin, and resistin.^[4]

Visfatin previously known as pre-B cell colony-enhancing factor, 52 k Dalton protein expressed in a variety of tissues including adiposities, lymphocytes, bone marrow, liver, and muscle.^[5] Visfatin binds to insulin receptor and exhibits insulin-mimetic actions; therefore, it stimulates glucose uptake in adipocytes and muscle cells and suppresses glucose release from hepatocytes.^[6,7] It is now believed that visfatin action can be endocrine, paracrine, and autocrine as well. These autocrine effects of visfatin may play an important role in regulating insulin sensitivity in the liver.^[8] Some studies showed that the increased levels of visfatin in PCOS patients when compared with control subjects.^[9]

MATERIALS AND METHODS

A cross-sectional study was carried out in Kirkuk city from January 10, 2018, to June 15, 2018. The number of PCOS women under study was 60 women whose ages were between 15 and 45 years. PCOS was diagnosed based on the presence of two of following Rotterdam criteria: oligo and/or anovulation, clinical and/or biochemical signs of hyperandrogenism, and polycystic ovaries in ultrasound, meaning presence of 12 or more follicles measuring 2–9 mm in diameter in each ovary and/or ovarian volume more than 10 cm³. In addition, the control group consisted of 30 healthy volunteer females with regular menstrual cycles aged between 15 and 45 years.

A volume of 5 ml of blood sample was taken by vein puncture without using tourniquet from each subject enrolled in this study. Blood samples were placed into sterile test tubes, after blood clotting, centrifuged at 3000 rpm for 15 min then clot removed and remain recentrifuged at 3000 for 10 min, and the

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Access this article online

Quick Response Code:



Website:
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DOI:
10.4103/MJBL.MJBL_63_18

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How to cite this article: Omer ZS, Ahmied MS, Yaqoub NK. Relation of visfatin and polycystic ovarian syndrome in women. Med J Babylon 2018;15:316-9.

obtained serum were aspirated using mechanical micropipette and transferred into clean test tubes which labeled and stored in deep freeze at -20°C for biochemical measurement.

Statistical analysis

The statistical analysis was performed using Statistical Package for the Social Sciences version 23 (SPSS, IBM Company, Chicago, USA).

RESULTS

The study showed that there is the significant difference between PCOS women and the control group concerning visfatin level and the highest mean of visfatin was occurred in PCOS women (13.60 ± 7.98 vs. 7.73 ± 1.22), as shown in Table 1. There was significant relation between body mass index (BMI) and visfatin level among PCOS women in this study Table 2. The highest rate of PCOS women had irregular menstrual cycle (78%) and 22% of them had normal menstrual cycle, as shown in Figure 1. The study showed that most PCOS women included in the study had hirsutism (75%), while only 25% were without hirsutism, as shown in Figure 2. The high rate of acne recorded among PCOS women was 55% and 45% of PCOS women without acne, as shown in Figure 3.

DISCUSSION

PCOS is an endocrine disorder with multifactorial etiology and various clinical manifestations. It is the most common cause of menstrual disorder and an ovulatory infertility in women.^[1] The study showed that there is the significant difference between PCOS women and the control group concerning visfatin level and the highest mean of visfatin was occurred in PCOS women (13.60 ± 7.98 vs. 7.73 ± 1.22), as shown in Table 1. First discovered in 2005 by Japanese scholars Fukuhara *et al.*^[10] in visceral adipose tissue, visfatin is an adipocytokine with insulin-like hypoglycemic effect. Our results showed that serum visfatin levels were significantly higher in PCOS group than in the control group ($P < 0.05$), suggesting the presence of high

blood-visfatin symptom in PCOS patients. Our results were in agreement with Dikmen *et al.*^[11] suggesting that the increase in serum visfatin levels became less obvious when the factors of obesity were excluded from the study. Svendsen *et al.*^[12] have found that obesity itself was related to the increase in adipocytokine expression, whereas PCOS had no independent effect. These data suggested that serum visfatin metabolic abnormalities in PCOS patients may be associated with obesity.

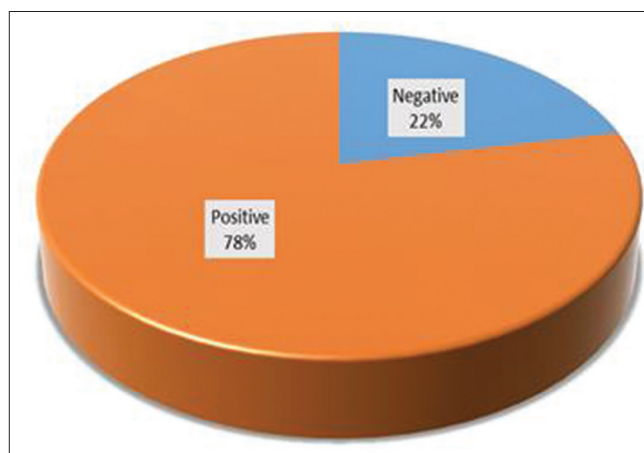


Figure 1: Distribution of polycystic ovary syndrome women according to irregularity of menstrual cycle

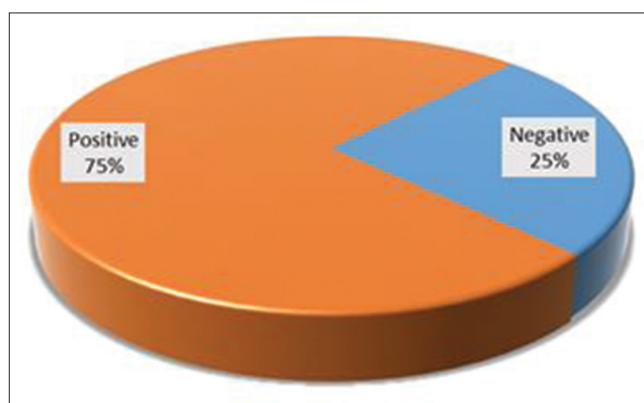


Figure 2: Relation of hirsutism with polycystic ovary syndrome

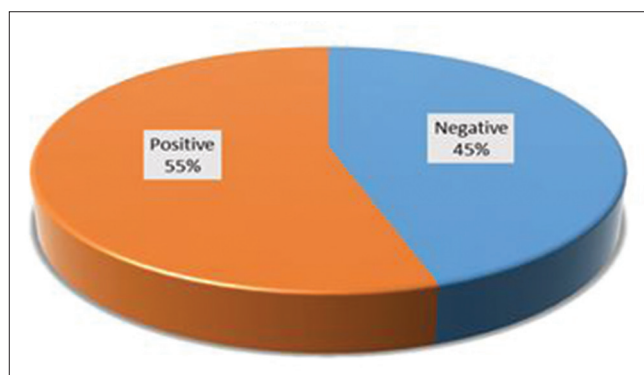


Figure 3: Distribution of polycystic ovary syndrome women according to occurrence of acne

Table 1: Relation of visfatin and polycystic ovary syndrome

Serum visfatin (ng/ml)	PCOS group	Control group
n	60	30
Mean±SD	13.60±7.98	7.73±1.22
P	<0.05 (HS)	

HS: Highly significant, PCOS: Polycystic ovary syndrome, SD: Standard deviation

Table 2: Relation of body mass index with visfatin in polycystic ovary syndrome women

Serum visfatin	Level of BMI	
	Increased (n=43)	Normal (n=17)
Mean±SD	10.5023±5.2419	14.1824±9.2259
T-test, P	2.28, 0.02 (S)	

BMI: Body mass index, SD: Standard deviation, S: Significant

Similar results were described in Lee *et al.* study^[13], the authors found that plasma visfatin is significantly increased in subjects diagnosed with overweight/ obesity. Chang *et al.*^[14] denoted that women with PCOS had significantly higher serum visfatin levels than the healthy controls. The precise mechanism of increased serum visfatin levels in women with PCOS currently is unknown. PCOS is a complex disorder of which the important pathophysiologies are IR and compensatory hyperinsulinemia leading to an increased risk of obesity, type 2 diabetes mellitus, MS, and hyperandrogenemia. Central obesity, IR, and hyperandrogenemia may play roles in the elevation of serum visfatin levels in PCOS women.^[15,16] Our findings are also in accordance with those by Tan *et al.*,^[17] who reported increased visfatin levels in obese and overweight women with PCOS compared to BMI-matched controls [Table 2].

The study showed that the highest rate of PCOS women had irregular menstrual cycle (78%) and 22% of them had normal menstrual cycle, as shown in Figure 1. The study showed that most PCOS women included in the study had hirsutism (75%), while only 25% were without hirsutism, as shown in Figure 2. In the current study, the high rate of acne recorded among PCOS women was 55% and 45% of PCOS women without acne, as shown in Figure 3.

Hirsutism is defined as excessive hair growth in area usually associated with male sexual maturity, that is, on the face, chest, linea alba, lower back, buttocks, and anterior thighs. Hirsutism results from androgen effects on the pilosebaceous unit and is commonly associated with acne and oily skin. It is usually due to increased androgen production from the ovaries or adrenal glands.^[18] The high concentrations of testosterone, one of the factors that contribute to the onset of some symptoms of PCOS such as infertility, polycystic ovaries, hirsutism, and acne.^[19] The results noticed by this study were in agreement with Azziz *et al.*^[20] and Ovalle and Azziz^[21] concluded the source of hyperandrogenism due to the genetic abnormalities in insulin receptor resulting in the thickening of the ovarian theca that increased the androgen production and inhibition of SHBG synthesis. The degree of hirsutism might be influenced by the relative activity of the 5 α reductase that converts testosterone to the more active metabolic dihydrotestosterone.^[22,23]

Gowri *et al.*^[24] showed that the acne was seen in highest percentage (67.5%), followed by hirsutism (62.5%) and fasting insulin levels were the most common hormonal abnormality seen in both acne and hirsutism. Sharma *et al.*,^[25] Majumdar and Singh,^[26] Dramusic *et al.*,^[27] and Bunker *et al.*^[28] also showed that acne was the most common cutaneous manifestation in PCOS group. The pathophysiology of PCOS appears to be multifactorial and polygenic. The main pathophysiology points to the ovary being the source of excess androgens, which appear to result from an abnormal regulation of steroidogenesis.^[29] The excessive secretion of androgens in PCOS patients results in a series of skin changes including hirsutism, acne, seborrhea, and androgenetic alopecia.^[29]

CONCLUSION

There was a highly significant relation of visfatin with PCOS.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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