



RESEARCH ARTICLE

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STATUS OF ADIPONECTIN LEVEL IN PCOS AND ITS RELATIONSHIP WITH BODY MASS INDEX (BMI) IN KANPUR REGION WOMEN WITH PCOS

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ABSTRACT

Objective: Polycystic ovary syndrome (PCOS) is a common endocrine disorder associated with obesity. Earlier, studies showed a direct relationship between Adiponectin level and obesity, however, contrast results were, found in different studies. The present study investigated the status of Adiponectin level in PCOS and its relationship with body mass index (BMI) in Kanpur region women with PCOS. **Methods:** In this cross-sectional study, 80 women in the age group of 20-40 were enrolled, 40 women with PCOS were assigned as study group and 40 healthy women were selected as control groups. Fasting blood samples were then collected during the 2nd or 3rd day of menstruation for measurement of serum blood glucose (fasting blood sugar), and serum adiponectin levels. Anthropometric measurements were noted. **Results:** Mean BMI of the PCOS and control groups were 26.24 ± 1.35 kg/m² and 22.65 ± 1.17 kg/m², respectively ($P < 0.001$). The mean total Adiponectin levels in study group was 11.69 ± 0.63 ng/mL and in the control group it was 14.38 ± 0.98 ng/mL ($P = 0.0001$). A significant relationship was found between Adiponectin level and BMI among women with PCOS ($P < 0.05$). **Conclusion:** Results of the present study indicated serum Adiponectin levels were significantly lower among women with PCOS and it is inversely associated with BMI and FBS.

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INTRODUCTION

Polycystic ovary syndrome (PCOS) is a common endocrine disorder among women. Occurs in 4 to 8 % of women in their reproductive years (Khan, 2006). PCOS is found approximately one in 15 women (Norman, 2007). Diagnosis of PCO is usually based on the presence of at least two of the three following criteria: (1) Ovulatory dysfunction, (2) biochemical or clinical signs of hyperandrogenism, and (3) polycystic ovaries on ultrasonography (USG) (Broekmans, 2006). PCOS is a condition in which woman has an imbalance of female sex hormone which may lead to changes in the menstrual cycle, cyst in the ovaries, trouble getting pregnant and other health problems (Bulun, 2016).

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Adipose tissue is an active endocrine organ that produces a variety of proteins, one being adiponectin. In recent years, role of adipose tissue hormones, particularly adiponectin has been implicated in the pathogenesis of PCOS. Adiponectin has antiatherogenic, anti-diabetic, anti-inflammatory and insulin sensitizing effects, and is negatively related to the degree of adiposity in healthy individuals (Matthew, 1985). According to earlier studies, circulating levels of adiponectin are inversely related to adipocyte mass and visceral adiposity independent of PCOS according to some studies (Plati, 2010 and Tan, 2019). While other studies shown insignificant differences in serum Adiponectin levels in women with PCOS when compared with age- and body mass index (BMI)-matched controls. In the present study, we attempted to investigate the Serum adiponectin level among PCOS along with its relationship with BMI among a group of PCOS women referred to reproductive clinics.

MATERIALS AND METHODS

The present study was conducted 80 women in the age group of 20-40 which include, normal reproductive and fertile women and polycystic ovary syndrome patients attending to the OPD of gynecology of Rama Medical College, Hospital and Research Centre, Mandhana Kanpur U.P. The institute's ethical clearance committee approved the study. Consent letter was taken from all the enrolled subjects. These 80 patients were divided into study group (group-I) containing 40 PCOS patients and 40 normal reproductive and fertile women enrolled as control group (group-II). All subjects underwent a complete screening session-included laboratory, imaging, and physical examination. Patients with adrenal or hypothalamic disorders, Cushing's syndrome, hypothyroidism, and hyperprolactinemia were excluded from the study.

Biochemical Analysis: Blood samples were obtained after an overnight fasting and serum was centrifuged and isolated then used for the measurement of following parameters:

Fasting blood glucose was measured by glucose oxidase-peroxidase method. (Kits were supplied by Erba Diagnostics, using ERBA CHEM 5 semi auto analyzer).

Serum Adiponectin: was measured by ELISA Kit Method (LISAQUANT 3000). BMI value was calculated by measuring Height in Meters and weight in Kilograms.

Statistical analysis: was performed using IBM SPSS software, version 20. The independent *t*-test was used for comparison of means of quantitative variables. Values of continuous variables were expressed as mean \pm standard deviation (SD); *p*-value <0.05 was considered significant. Student's *t*-test was used to assess the relationship between continuous variables.

RESULTS

From the 80 study participants, 40 patients in PCOS group and 40 patients in control group were studied. Both groups were comparable regarding to Age, FBS, Serum Adiponectin and BMI (Table 1).

Parameter	Study Group(n=40)	Control Group (n=40)	P Value
Age	24.21 \pm 4.36	25.03 \pm 5.10	0.44(N.S)
FBS	96.35 \pm 7.4	99.78 \pm 8.5	0.57(N.S)
BMI	22.65 \pm 1.17	26.24 \pm 1.35	0.001*
Serum Adiponectin	11.69 \pm 0.63 ng/mL	14.38 \pm 0.98	0.001*

Values are mean (SD) or percentages, as appropriate, **p*-value for difference between groups by *t*-test or chi-square, as appropriate; FBS: Fasting blood sugar, BMI: Body Mass Index. As shown in Table-1 Age and mean fasting blood sugar (FBS), Levels were not significantly differ between study groups. Mean BMI of the PCOS and control groups were 22.65 \pm 1.17 kg/m² and 26.24 \pm 1.35 kg/m², respectively (*P* = 0.001). The mean Adiponectin levels were 11.69 \pm 0.63 ng/mL and 14.38 \pm 0.98 ng/mL in patients with PCOS and controls, respectively. Highly significant correlation was found between the two groups (*p* < 0.0001).

Table 2. Correlations of Adiponectin and other variables in polycystic ovary syndrome

BMI	FBS	AGE
Adiponectin Correlation coefficient	-0.19	0.26
P	0.07	0.21

When the correlation between serum Adiponectin and other variable study among PCOS patients were analyzed, the Pearson correlation analysis revealed a negative correlation between adiponectin and BMI level. However, there was no significant correlation between Adiponectin and FBS and Age Table 2.

DISCUSSION

PCOS, the common dysovulatory infertility, is characterized by chronic anovulation and hyperandrogenemia. These features manifest with advancement of age and gradual increase of adipose tissue (Arikan, 2010). Adiponectin is probably one of the most important adipocytokines of the adipose tissue (Berg, 2002). It is highly expressed and actively secreted by adipocytes. it is abundantly present in the human circulation and displays a variety of functions, including antiatherogenic, anti-inflammatory, and insulin-sensitizing properties. In the present study, the possibility of a relationship between adiponectin and BMI in women with PCOS was investigated. Our results indicate that serum Adiponectin is significantly lower in PCOS women compared with controls. This finding is comparable with the study of Francesco and Berh, where they confirm that obese women have adiponectin levels significantly lower than normal-weight healthy controls. (Ouchi, 2000 and Berg, 2002). The low adiponectin level in obesity probably is due to its down-regulation by the increased adipose tissue. An amelioration of insulin sensitivity, which occurs during reduction of body weight (Houmard, 2002).

Conclusion

Our results confirm that adiponectin concentrations change according to variations of BMI in PCOS women as well as in healthy women. Moreover, BMI values are inversely correlated with Adiponectin and no significant relation found between Age, FBS with Adiponectin.

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