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# Reproductive and biochemical changes in obese and non obese polycystic ovary syndrome women



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## KEYWORDS

Body mass index;  
Insulin resistance;  
Hyperandrogenism;  
Polycystic ovary syndrome

**Abstract** *Background:* Reproductive, clinical and laboratory implication varies in polycystic ovary syndrome (PCOS) according to body weight.

*Objective:* To compare reproductive, clinical and laboratory data between obese and non obese women with PCOS.

*Methods:* A cohort of 180 women with PCOS who attended outpatient clinic of Taibah University from January to September 2012 was included. Studied women were classified according to body mass index (BMI) into overweight/obese (BMI > 25 kg/m<sup>2</sup>) and normal weight women (BMI ≤ 25 kg/m<sup>2</sup>). Each participant answered a specially designed interviewing format and subjected to medical checkup for signs of hyperandrogenism. Fasting insulin and glucose, follicle stimulating hormone (FSH), luteinizing hormone (LH), estradiol (E<sub>2</sub>), prolactin (PRL), progesterone and testosterone levels were estimated. Statistical analyses were performed as appropriate.

*Results:* Of the studied 180 PCOS women, there were 80 overweight obese women (44.4%) and 100 normal weight women (55.6%). Obese PCOS women were less highly educated, less working and reported low family history rate of PCOS. Compared to non obese PCOS women, obese PCOS women reported higher age of menarche, abortion and menstrual disturbance with statistically significant difference. Signs of hyperandrogenism and acanthosis nigricans were significantly more manifested in obese PCOS women. Mean levels of studied metabolic and sex hormones were significantly higher in obese PCOS women.

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**Conclusions:** Overweight and obese PCOS women had significantly higher age of menarche, abortion and menstrual disturbances. Also, signs of hyperandrogenism, acanthosis nigricans were more encountered among them with higher levels of fasting glucose, fasting insulin, FSH, LH and testosterone.

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## 1. Introduction

Polycystic ovary syndrome (PCOS) is a fairly common disorder of women in reproductive age. It is characterized by hyperandrogenism and chronic anovulation.<sup>1,2</sup> It has a prevalence of 5–10% based upon studies which found that; 20% of self-selected normal women had polycystic ovary morphology on ovarian ultrasound. Many of these studied women had endocrine abnormalities.<sup>3</sup> It was found that 75% of women with secondary amenorrhea fulfilled diagnostic criteria for PCOS.<sup>1,3–5</sup> PCOS was the cause of 82% of hirsutism among Saudi female population.<sup>6</sup> The recent theories of the pathogenesis of polycystic ovary syndrome (PCOS) have focused on the role of insulin resistance and hyperinsulinemia. Irrespective of the pathogenic mechanisms involved, many women with PCOS (between 38% and 88%) have been found to be overweight and obese, and the studies reported that obese PCOS women have more severe hyperandrogenism and related clinical features (such as hirsutism, menstrual abnormalities and anovulation) than normal weight PCOS women.<sup>7</sup> 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.<sup>8,9</sup> There is no doubt, therefore, that adiposity plays a crucial role not only in the development but also in the maintenance of PCOS manifestations and strongly influences the severity of both its clinical and endocrine features in many women with the condition.<sup>10</sup> Despite these reported data, there is still a shortage of studies, particularly in our region, that compare the reproductive, clinical and laboratory data in obese and non obese PCOS women. Therefore, this study was carried out to clarify if there is a difference in reproductive, clinical and laboratory parameters between obese and non obese patients with PCOS.

## 2. Subjects and methods

The study was carried out on a cohort of women with PCOS who attended the outpatient clinics at Taibah University, Female section from January to September 2012. All included women (180 cases) were previously diagnosed to have PCOS (depending on their ultrasound findings by presence of eight or more subcapsular follicular cysts  $\leq 10$  mm and increased ovarian stroma).<sup>2,3</sup> All studied women were not pregnant nor diabetic. The studied women were divided into two groups based upon their BMI: obese PCOS patients (80 cases) with BMI  $\geq 25$  kg/m<sup>2</sup> and non obese patients PCOS (100 cases) with BMI  $< 25$  kg/m<sup>2</sup> (100 cases).

Every participant woman was interviewed and asked to answer a specially designed interviewing format including; socio-demographic data, menstrual, gynecological, obstetric, medical and family histories. Oligomenorrhea was considered

when menses flow every 6 weeks to 6 months.<sup>2,4,5</sup> She was also subjected to medical checkup for signs of hyperandrogenism and polycystic ovary. Anthropometric measurements including weight, height (to calculate BMI), waist and hip measurements (with calculation of waist to hip ratio (WHR)) were performed.

The following laboratory tests were recommended for each participant: fasting insulin level, fasting glucose level, follicle stimulating hormone (FSH), luteinizing hormone (LH), oestradiol (E<sub>2</sub>), progesterone, prolactin (PRL), and testosterone. All laboratory investigations were done in one of the reference labs in Medina. The collected reproductive, clinical and laboratory data were compared between the studied two groups.

Approval of Research Ethics committee for Medical College, Taibah University was considered and official permission was assured. Before inclusion of any participant in this study, an informed written signed consent was obtained after explanation of the objective and methodology of the research. Also, privacy and confidentiality of the participants were assured.

The data were analyzed by using SPSS package version 17. In order to compare the distribution of the studied factors in obese and non obese PCOS women,  $\chi^2$  tests for the categorical variables and *t* test for the continuous variables were used. The level of statistical significance was defined as  $p \leq 0.05$ .

## 3. Results

Of the studied 180 PCOS women, there were 80 (44.4%) overweight and obese women and 100 (55.6%) normal weight women. The mean age of the studied women was  $41.7 \pm 6.8$  years. Table 1 presents the general characteristics of the studied obese and non obese PCOS women. The mean age of obese PCOS women was higher than that of non obese patients with statistically significant difference ( $p = 0.002$ ). Obese women with highly educated level were significantly higher than highly educated non-obese women with PCOS (57.5% compared to 72.0% where  $p = 0.023$ ). The percent of ever married women, however, was significantly highly (67.5%) encountered among obese women compared with non obese patients (58.0%) ( $p = 0.030$ ). Also, positive family history of PCOS was significantly higher among first degree relatives of obese patients (67.5%) compared with non obese patients (52.0%) ( $p = 0.040$ ).

Table 2 shows the reproductive and clinical characteristics of obese and non obese women with PCOS. The mean age of menarche among obese women was significantly higher than that of non obese women ( $16.3 \pm 2.11$  and  $14.5 \pm 3.24$  respectively;  $p = 0.02$ ).

The mean number of reported abortion among non-obese women with PCOS was insignificantly lower than that among obese ones ( $0.9 \pm 0.62$  versus  $1.3 \pm 0.24$ ).

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