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Original Research Article

Study of lipid profiles high and normal body mass index in polycystic ovary syndrome women in Aljouf, Saudi Arabia

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ABSTRACT

Background: For women of reproductive age, polycystic ovary syndrome (PCOS) is the most prevalent endocrinological condition. Hyperandrogenism, persistent ovulatory dysfunction, obesity, and insulin resistance have all been associated with PCOS. However, recently PCOS is detected in high-body weight and normal-body-weight women. No information was available to evaluate specific lipid profiles. The goal of this study is to analyze the lipid profiles of women with polycystic ovarian syndrome who have high or normal body weight.

Methods: This polycystic ovarian syndrome (PCOS) retrospective study was carried out between January 2021 and January 2022 at Sakaka's Maternity and Children Hospital (MCH), Aljouf, Saudi Arabia. A total of 68 PCOS women were included in the study; we divided them into high (n=34) and normal body weight (n=34) according to the calculation of BMI. We obtain the test results of lipid profiles and demographic data from hospital record files.

Results: We noticed changes but no significance in our research of lipid profiles in high and normal PCOS participants. The CHOL, TG, HDL, and LDL, 159.30 ± 4.193 , 97.89 ± 7.140 , 60.91 ± 9.564 , and 99.47 ± 9.22 shown in the high BMI PCOS women respectively. While, 129.28 ± 3.702 , 83.69 ± 4.49 , 46.84 ± 1.68 and 86.53 ± 4.36 were detected in normal BMI PCOS women respectively. There were none that were statistically significant, with the exception of cholesterol $p=0.001$.

Conclusions: Our results show that PCOS women with normal body weight and PCOS women with high BMI have different changes in their lipid profiles, but no significance has been found other than higher cholesterol levels. Therefore, losing weight can stop lipid profiles from altering, which may reduce difficulties in the future.

Keywords: High BMI, Lipid profiles, Normal BMI, PCOS

INTRODUCTION

During reproductive age, polycystic ovarian syndrome frequently manifests itself. Higher androgen hormone levels are the cause of the irregular menstruation patterns observed in PCOS patients. The immature ovum was formed as a result of the ovary's stroma's thickness and immature follicular development. PCOS, however, is an endocrine-diverse illness characterized by persistent ovulation failure and excessive androgen hormone.¹

According to reports, PCOS affects over 25% of fertile women worldwide. A hyperandrogenic hormone, which is connected to other factors like body weight, is the primary cause of PCOS.²⁻⁴ Additionally, in women with PCOS, elevated insulin levels serve as a catalyst for the elevation of the androgen hormone.^{5,6} Some research suggested that the etiology of PCOS includes persistent inflammation.^{7,8} In PCOS women with normal body weight compared to obese women, the value of luteinizing (LH) hormone is higher than that of follicle-stimulating hormones (FSH).⁶

Numerous studies found a strong association between PCOS and obesity.^{9,10} Conversely, the most important abnormalities of the metabolic syndrome that affect PCOS women have increased insulin, obesity, and insulin resistance.^{10,11} While it has been noted that hypertension occurs in obese PCOS women, insulin resistance decreased in both obese and nonobese PCOS women.⁸ Therefore, it is crucial to look at the lipid profiles of PCOS women with high body weights and compare them to PCOS women with normal body weights. Therefore, the purpose of our study was to compare the lipid profiles of PCOS women with high and normal body weight.

METHODS

Design of the study and participants

This polycystic ovarian syndrome (PCOS) retrospective study was carried out between January 2021 and January 2022 at Sakaka's Maternity and Children Hospital (MCH), Aljouf, Saudi Arabia. The inclusion criteria for our study included all women who were diagnosed with PCOS (by Rotterdam criteria (ultrasonography images, clinical features, and laboratory investigation reports), age, BMI, and serum lipid profile. A total of 68 PCOS women were included in the study; we divided them into obese (n=34) and non-obese (n=34) groups. We obtain the test results and all patient demographic data from hospital record files. From our research, we eliminated conditions including hypothyroidism, hyperprolactinemia, adrenal hyperplasia, and ovarian malignancies. Patients' information that was missing or incomplete had been eliminated from the current study. The scientific research committee at Jouf University grants ethical approval.

Calculation of sample size

Use the formula $n = (z)^2 p (1 - p)/d^2$ for the single population proportion to calculate the optimal sample size. This calculation gave a sample size for our experiment 68.

Study groups

Weight (kg) divided by height (m²) to determine body mass index (BMI). Patients were divided into two groups based on their BMIs: the normal BMI group (control), which includes women with BMIs under 25 kg/m², and the high BMI group (cases), which includes women with BMIs greater than 25 kg/m².

Statistic evaluation

The characteristics of the two groups were described using descriptive statistics. For continuous and categorical variables, the data were described as mean (SD) or frequency and percentage, respectively. The student t-test was used to compare the two groups. The Statistical Package for Social Science, SPSS for Windows, version 23, was used to conduct all analyses.

RESULTS

Characteristics of the study's PCOS women

Our study included 68 PCOS-diagnosed women who were split into high and normal body weight groups based on BMI. We also found differences in the serum lipid profiles between the study's two groups. BMI between the two groups was significantly different (p=0.0001) (Table 1, Figure 2). No more importance was found between them. Ultrasound features of PCOS are represented in Figure 1.

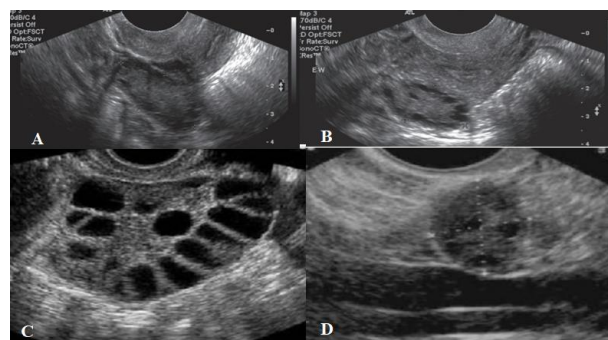


Figure 1: Ultrasonography showing PCOS.^{12,13}

Table 1: Demographic features of study groups.

Items	High BMI (n=34) %	Normal BMI (n=34) %	P value
Age	26.7±8.3	24.7±6.1	0.53
Height	160.3±4.2	160.6±5.4	0.88
Weight	79.2±11.7	54.6±13.4	0.0001
BMI	30.5±5.7	21.2±1.3	0.0001
Amenorrhea	4 (11.7)	5 (14.7)	0.475
Hirsutism	6 (17.6)	1 (2.9)	0.362
Oligomenorrhea	7 (20.5)	9 (26.4)	0.985
Hair loss	1 (2.9)	3 (8.8)	0.709
Infertility	9 (26.4)	7 (20.5)	0.834
Acne	3 (8.8)	4 (11.7)	0.969
Combination of features	4 (11.7)	5 (14.7)	0.475

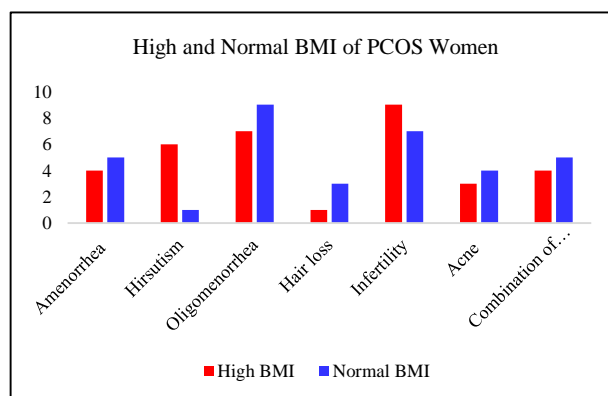


Figure 2: Clinical presentation of study groups.

Table 2: The relationship of lipid profiles between high and normal BMI in the study.

Items	High BMI (n=34) %	Normal BMI (n=34) %	P value
CHOL	159.30±4.193	129.28±3.702	0.001
TG	97.89± 7.140	83.69±4.49	0.791
HDL	60.91±9.564	46.84±1.68	0.077
LDL	99.47±9.22	86.53 ±4.36	0.14

CHOL= Cholesterol, TG= Triglycerides, HDL= High-density lipoprotein, LDL= Low-density lipoprotein.

We noticed changes but no significance in our research of lipid profiles in high and normal PCOS participants. The CHOL, TG, HDL, and LDL, 159.30±4.193, 97.89±7.140, 60.91±9.564, and 99.47±9.22 shown in the high BMI PCOS women respectively. While, 129.28±3.702, 83.69±4.49, 46.84±1.68 and 86.53±4.36 were detected in normal BMI PCOS women respectively. There were none that were statistically significant, with the exception of cholesterol p=0.001 (Table 2).

DISCUSSION

We are the first research on this topic to have been conducted in the Aljouf region. Prior research found a higher prevalence of PCOS associated with obesity, insulin resistance, and hyperandrogenism and found by ultrasonography.¹¹⁻¹³ In the current study, we chose PCOS-diagnosed women and classified them into high- and normal-body-weight categories using height, weight, and BMI calculations. A total of 68 PCOS women participated in the study, and when we compared the demographic features of the two groups, there were only minor differences that were not statistically significant. We examine the lipid profile, including cholesterol, triglycerides, high-density lipoprotein, and low-density lipoprotein, in both groups to determine if there are any lipid profile alterations in PCOS women with high and normal bodies. We discovered subtle variations in the lipid profile in PCOS women who were higher in weight than normal, but there was no statistically significant difference. While only we discovered increased cholesterol levels in the BMI PCOS women and taken into account at p=0.001. Our findings are consistent with earlier reports.¹⁴ In contrast, another study found that obese PCOS women frequently experience infertility.^{15,16} Women with PCOS experience direct or indirect effects from the aberrant hypothalamus hormone on their gonads, which can result in hyperinsulinemia and obesity. It is crucial to assess lipid profiles because obesity can lead to a variety of disorders. Our research showed that higher obese PCOS women had very minor, non-significant changes in their lipid profiles.

CONCLUSION

Our results show that PCOS women with normal body weight and PCOS women with high BMI have different changes in their lipid profiles, but no significant have been

found other than higher cholesterol levels. The results of this discovery have important ramifications for future scientific study and therapeutic practice. Normally, PCOS patients should reduce their weight.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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