

Frequency and Patterns of Fasting Lipid Profile in Polycystic Ovarian Syndrome

Polycystic
Ovarian
SyndromeFatima Zahra¹, Sagheera Anjum², Rashid Naseem¹, Muhammad Athar Khan³

ABSTRACT

Objective: To determine the frequency and patterns of fasting lipid profile in patients presenting with polycystic ovarian syndrome in gynecological and endocrine clinics in a tertiary care hospital

Study Design: A Cross Sectional Survey

Place and Duration of Study: This study was conducted at the Darul Sehat Hospital, Karachi from August 2017 to July 2018.

Materials and Methods: This study was conducted on 110 Female patients who were diagnosed as PCOS on the basis of Rotterdam criteria after taking the history according to predesigned proforma and the required investigations. Lipid profile was analyzed using national lipid association and the national cholesterol education program (NCEP) guidelines for lipids. Postmenopausal, pregnant and patients with diabetes and hypothyroidism were excluded from the study. Informed consent was sought from all patients and collected information was analyzed using the SPSS 21 version.

Results: In our study dyslipidemia was observed in 96.3% of 110 PCOS patients. The mean age was 25.8+5.9 years and mean BMI was 26+4.6 Kg/m². About 80% of PCOS patients had low HDL, 73.5 % have high LDL, 31% have high cholesterol, and 12.7 % have high TG levels.

Conclusion: In conclusion, dyslipidemia is common in women with PCOS so early detection and prompt treatment of dyslipidemia would definitely improve quality of life and reduce the cardiovascular complications and burden of care.

Key Words: Dyslipidemia, insulin resistance, polycystic ovary syndrome, lipid profile, BMI

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INTRODUCTION

In reproductive age group women polycystic ovarian syndrome (PCOS) is one of the most common metabolic disorder.¹ Polycystic ovary syndrome (PCOS) is diagnosed according to Rotterdam Criteria when atleast two of three features of oligo/anovulation, clinical or biochemical hyperandrogenism and polycystic ovaries on ultrasound are found. About 15-30% of women with PCOS also have shown to have regular menstrual cycles.²

Women with polycystic ovarian syndrome commonly have an abnormal lipid profile. In PCOS, an abnormal lipid profile may be related to insulin resistance. The insulin resistance in polycystic ovarian syndrome

presents with hyperinsulinemia which has complex effects on the metabolism of lipids, proteins and production of androgen. It is known that dyslipidemia is observed in a large number of women with PCOS, therefore the risk of cardiac and metabolic risks may also be associated with dyslipidemia.³ Obesity, insulin resistance and hyperandrogenism which commonly coexist in PCOS, have shown to have affect the lipid profile either independently or in combination, but the mechanisms of these interactions are not clearly explained.⁴

Dyslipidemia is one the most persistent and highly prevalent risk factor for cardiovascular disorders.⁵ Although the metabolic changes of lipid profiles in young women with PCOS are not completely understood but metabolic health implications of polycystic ovary syndrome (PCOS) including dyslipidemia have been highlighted by a number of international studies.⁶ We also have many young patients with the PCOS but the local data on frequency of dyslipidemia and cardiovascular risks in PCOS is not enough available especially for our ethnic groups. Additionally, the data on patterns of lipid profile abnormalities in these patients is still scarce to highlight the treatment concerns and complications. Hyperlipidemia is one of the risk factor for cardiovascular diseases and in PCOS too, one can develop cardiac diseases alongwith hormonal issues. We need to observe th relationship and patterns of dyslipidemia in order to prevent and treat cardiac complications in PCOS.

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MATERIALS AND METHODS

After taking informed consent a total of 110 women of reproductive age group presenting to the gynecological and endocrine outpatient departments diagnosed as PCOS on the basis of Rotterdam criteria were included in this study. PCOS was diagnosed by the presence of any of the two features of amenorrhea/oligomenorrhea, clinical features of hyperandrogenism as acne and hirsutism or biochemical hyperandrogenism and ultrasound evidence of polycystic ovaries. Women with diabetes, thyroid disorders and pregnancy were excluded from this study.

The weight, height, BMI, age, and marital status were recorded for every patient. The history was taken according to the preformed proforma. The lipid profile and insulin levels was checked on the second day of menstrual cycle with fasting of twelve hours. Other hormonal investigations including luteinizing hormone, and follicle stimulating hormone, thyroid stimulating hormone, prolactin, and testosterone were also done to support diagnosis. The National Lipid Association and National Cholesterol Education Program (NCEP) guideline for lipids (total cholesterol, triglycerides, HDL cholesterol, LDL cholesterol, and non-HDL cholesterol) was used in all patients with PCOS. The ultra sound pelvis was done on the 5th day of menstrual cycle. The findings of increased ovarian size and/or of at least 12 follicular cysts measuring 2–9 mm were considered indicative of the presence of polycystic ovaries. The data was analyzed by using SPSS version 21. Qualitative variable such as age and BMI categories are presented as frequency (%) while quantitative variables e.g. LDL, HDL, triglycerides, weight, height, cholesterol etc. presented as mean + SD.

RESULTS

Table No.1: Demographic Characteristics of Study Participants (n = 110)

Age in years (Mean + sd)	25.8 + 5.9
Age groups n(%)	
14 – 23	54(49)
24 – 33	42(38)
34 – 43	14(13)
Marital Status n(%)	
Married	42(38)
Unmarried	68(62)
Weight in kg (Mean + sd)	64 + 12.8
Height in meters (Mean + sd)	156 + 6.2
BMI (Mean + sd)	26 + 4.6
BMI Categories n(%)	
Underweight	4 (3.6)
Normal	34 (31)
Overweight	44 (40)
Obese	48 (25.4)

In this study the mean age of patients with PCOS was 25.8 + 5.9 years. The average BMI was 26+4.6 while 34.6% women were normal or low BMI whereas 65.4 % were either overweight or obese. Mostly i.e. 62 % of women were unmarried.

In our study only 3.63 % of patients had normal lipid profile i.e. dyslipidemia was observed in 96.3%. About 80% of PCOS patients had low HDL; 73.5% have high LDL, 31% have high cholesterol, and 12.7 % have high TG.

Table No.2: Values of Total Cholesterol, Triglycerides, HDL Cholesterol, LDL Cholesterol n = 110

Variables*	(Mean + sd)
Total Cholesterol (mg/dL)	186 + 25.5
Total Cholesterol Categories n (%)	
Desirable: <200 mg/dL	76 (69.1)
Borderline high: 200-239 mg/dL	30 (27.3)
High: > or =240 mg/dL	4 (3.6)
Triglycerides (mg/dL)	102 + 37.5
Triglycerides Categories n (%)	
Normal: <150 mg/dL	96 (87.3)
Borderline high: 150-199 mg/dL	12 (10.9)
High: 200-499 mg/dL	2(1.8)
Very high: > or =500 mg/dL	--
HDL Cholesterol (mg/dL)	45 + 6.5
HDL Cholesterol Categories n (%)	
Normal > or =50 mg/dL	22(20)
Abnormal < 50 mg/dL	88 (80)
LDL Cholesterol (mg/dL)	131 + 28.8
LDL Cholesterol Categories n(%)	
Desirable: <100 mg/dL	28 (25.5)
Borderline high: 130-159 mg/dL	60 (54.5)
High: 160-189 mg/dL	14 (12.7)
Very high: > or =190 mg/dL	--

*National Lipid Association and the National Cholesterol Education Program (NCEP) guidelines for lipid. ^{7,8}

Table 2 shows that the mean±sd of total cholesterol level in the study was 186±25.5 mg/dl. Similarly the mean±sd of triglyceride level was 102.38±37.5 mg/dl. In contrast to the above finding though the mean HDL was lower in study group 45+6.5, similarly the increase in mean LDL level in study group 131 + 28.8.

DISCUSSION

We have observed that dyslipidemia is common in PCOS and patterns of dyslipidemia are different in various regions as per studies. In one of the local study, the frequency of single lipid abnormality was seen in

PCOS is 71%⁹ but in our study it has been increased to 96.3% which is an alarming situation. Even one of the international studies of Kim showed prevalence of dyslipidemia in PCOS around 35.7%¹⁰ and another study by Rocha showed 76.1%¹¹. Hongy et al observed the prevalence of dyslipidemia was 24.7% in patients with PCOS.¹² Such a high rate of dyslipidemia in our patients maybe due to the lifestyle, lack of awareness and noncompliance to medical advice. It demands our attention as it is one of the modifiable risk factor for cardiovascular diseases.

Among lipids HDL is used in SCORE risk assessment for CAD and it has also a strong association with ischemic stroke. We found that low HDL was the commonest dyslipidemia in PCOS. Our study reports low HDL in 80% of PCOS. According to Macut's study 15mg/dl increment of HDL can reduce 22% risk of CAD.¹³ Decrease in HDL-C and increase in TG levels are well known lipid profile characteristics in women with PCOS.¹⁷⁻²⁵

Another lipid LDL was observed to be raised in 74.5% patients and it is a part of Framingham scoring used for increased risk of CAD; it has been observed that there was 20% reduction in relative mortality risk for every 1-mmol/L reduction in LDL-C levels.¹⁴ Macut dejuo reported elevated LDL cholesterol predominantly in all PCOS patients. According to Meta analysis by Kim JJ and Robert, raised LDL was also seen in their studies but they didn't measure the prevalence; they also noticed TG levels higher than LDL levels.^{2,10}

There are several international studies done to observe the pathophysiology, clinical manifestations and relation of lipids with PCOS and compared to healthy individuals. As stated in one of the comparative study¹⁶, women with PCOS presented higher total cholesterol levels and LDL-cholesterol whereas HDL-cholesterol was in low in PCOS patients compared with healthy women. We observed raised TG in 12.7% and high cholesterol in 30.9% PCOS patients. Macut's reported that TG started increasing in earlier decade of life as compared to cholesterol which was increased in 3rd decade of life.¹³ According to the study conducted in Rawalpindi, decreased HDL was observed in 58% PCOS although it was the most frequent abnormality.⁹ Moreover this study reported raised LDL in 11% of PCOS patients and raised TG in 21% and cholesterol 12% of PCOS patients. Shoab et al found that the levels of total cholesterol, TG, and LDL-C were statistically higher, and level of HDL-C was lower in PCOS patients, when compared with age-matched healthy females.¹⁵ A study from India also reported the most common type of dyslipidemia in Indian population was decreased HDL level (76%), increase in total cholesterol (52%) and triglyceride levels (38%) and 32% patients had elevated LDL.¹⁷ There are studies available for dyslipidemia and PCOS internationally but extensive local data is not available.

CONCLUSION

In conclusion, dyslipidemia is common in women with PCOS so early detection and prompt treatment of dyslipidemia would definitely improve quality of life and reduce the complications and burden of care.

Limitations of the Study: In this study some patients were lost due to cost issues of the investigations. We didn't exclude the hypertensive patients from the study being unaware of familial hyperlipidemia as one of the cause. We didn't observe the rise in the levels of lipids or compared the age and BMI to the lipid levels and also didn't exclude the hypertensive patients from the study

Author's Contribution:

Concept & Design of Study:	Fatima Zahra, Sagheera Anjum
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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