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# ALTERED LIPID PROFILE ASSOCIATED WITH POLYCYSTIC OVARIAN SYNDROME WOMEN OF TAMILNADU

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**ABSTRACT**
The lipid profile of PCOS women were investigated between the age group of 25 – 37 years who were age, sex matched with 46 control healthy individuals. 10mL of blood was collected from each subject by venipuncture and the lipid profile was estimated. There was a significant ($p < 0.01$) rise in triglyceride, cholesterol, LDL and a significant fall in HDL ($p < 0.01$) levels of PCOS women as compared to the controls. The dyslipidaemia associated in PCOS women may contribute to the risk of cardiovascular diseases reported at later stages in them.

## INTRODUCTION

Polycystic ovary syndrome (PCOS) is a common reproductive endocrine disorder that is characterized by hyperandrogenism and chronic anovulation, affecting upto 10% of reproductive – aged women (Franks, 1995; Knochenhauer *et al*., 1998). Dyslipidaemia is the most common metabolic abnormality in PCOS, although the type and extent of findings have not been defined (Legro *et al*., 2001). The clustering of lipid risk factors identify individuals at increased risk for coronary heart disease (Isomaa *et al*., 2001; Lakka *et al*., 2002; Ford, 2004). In women, cardiovascular disease is the most common cause of death (Bush *et al*., 1988) and those with PCOS have a 7.4 fold relative risk for myocardial infarction calculated by risk factor analysis (Dahlgren *et al*., 1992). The most consistent alterations in lipid metabolism associated with metabolic syndrome are elevated triglyceride and low HDL concentrations (Holvoet *et al*., 2004). According to the National Educational Programme guidelines, prevalence of an abnormal lipid level is either borderline, normal or high approaching 70% (Legro *et al*., 2001). Additionally an increased level of LDL – Cholesterol is also reported in PCOS women (Talbott *et al*., 1998).

The present study was carried out to determine the lipid profile in PCOS women and to compare it with the controls of the similar age group. This study can evaluate the risk factors associated with cardiovascular disease in PCOS women.

## MATERIALS AND METHODS

46 women of age group 23 - 37 years were selected for the study through visits in out - patients unit at Sri Ramachandra Medical College and Research Institute, Porur, Chennai. The patients exhibited signs of spectrum ranging from amenorrhea, oligomenorrhea, scant flow, dysfunctional uterine bleeding with heavy, frequent and painful menstrual cycle, hirsuitism and infertility problems. 10mL of blood was collected from each subject by venipuncture with a disposable syringe. The blood was then transferred into sterilized vials, serum separated and stored at -20ºC until further analysis the subjects were matched with a control group comprising of 46 normal healthy women. The controls were similar to the subjects with regard to their sex and age but reported no polycystic ovaries.

### Determination of lipid profile

#### Cholesterol

Total cholesterol was estimated by the method of Parekh and Jung (1970).

#### Triglycerides

Triglycerides was estimated by the method of Rice (1970) based on the method of Van Handel (1961).

#### Lipoproteins

Lipoproteins were fractionated by a dual precipitation technique as described by Wilson and Spiger (1973).

#### LDL – Cholesterol

1mL of serum is incubated for 2 hrs with 0.15ML SDS. The contents were centrifuged at 10000 rpm for 15 minutes. VLDL aggregates on the top as a pellicle. The subnatant contains HDL and LDL. 0.05mL of subnatant was used for assay of cholesterol.

#### HDL – Cholesterol

Total HDL was separated by the method of Fisenberg *et al*., (1984). The results are expressed as mg/dL.
The statistical analysis was conducted using t - test (2 tailed) and the level of significance was taken as $p < 0.01$.

## RESULTS AND DISCUSSION

The particulars of the lipid profile in PCOS women and the age matched control are presented in Table 1. The development of altered lipid profile is well documented in the literature and it has been established in the present study. The dyslipidaemia in PCOS women has been reported in various literatures (Dahlgren *et al*., 1992; Talbott *et al*., 1995; Robinson *et al*., 1996; Talbott *et al*., 1998 and Gambineri *et al*., 2002). The triglyceride level showed a significant rise in PCOS women. The accumulation of triglyceride could occur due to the increased lipogenesis, decreased clearance or reduced fatty acid oxidation. Over accumulation of triglyceride in the system of such women produces excess of metabolites such as fatty acids, ceramides and diacyl glycerol. These may enter deleterious non oxidative pathway and induce a state of lipotoxicity (Unger, 2002). The level of triglyceride can be a contributory factor for adiposity in PCOS women (Lambrinoudak *et al*., 2006)

**Table 1: Lipid profile of PCOS women**

| S.No | Parameters | Control | Test |
|---|---|---|---|
| 1. | Cholesterol | 174.8022 ± 10.87005 | 212.4630 ± 18.82433 |
| 2. | HDL | 57.4543 ± 5.01437 | 38.5637 ± 7.02422 |
| 3. | LDL | 106.7261 ± 9.84323 | 131.8696 ± 15.62802 |
| 4. | TGL | 108.3022 ± 22.39913 | 177.1304 ± 16.88998 |

The present report is consistent with the findings that triglyceride accumulation leads to disease risk factors (Taponen *et al*., 2004).

The study clearly reveals that the significant rise in LDL may also be a causative agent for cardio vascular diseases (Ferretti *et al*., 2005). The variations in lipoprotein causes a pathological status which may lead to damage of tissues, tissue proliferations and inflammations especially cardiovascular (Blanco - Colio *et al*., 2007). The significant increase in the cholesterol indicates the presence of primary alterations in lipid metabolism in patients with PCOS (Third report of National Cholesterol Education Program expert panel, 2002).

The significant fall of HDL - C in PCOS women clearly suggests an early risk for cardio vascular disease. As HDL removes cholesterol from tissues, the antiatherogenic role of HDL are low in these groups (Mackness *et al*., 2002). The decrease in scavenging activity allows the lipids to get accumulated which in future leads to cardio vascular complications in them (Jialal and Devaraj, 1996).

The present study suggests that the altered lipid profile will have adverse effects in women with PCOS and may increase the risk of cardio vascular problems at later stage. Hence a careful follow - up is required to avoid the complications.

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