

AN OBSERVATIONAL STUDY TO MAGNITUDE OF METABOLIC SYNDROME IN WOMEN WITH POLYCYSTIC OVARIAN SYNDROME IN THE DEPARTMENT OF OBSTETRICS & GYNAECOLOGY, SMS MEDICAL COLLEGE, JAIPUR

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Abstract

Introduction: Polycystic ovarian syndrome (PCOS) is a multisystem endocrinopathy of reproductive age women with metabolic disturbances. The **Rotterdam consensus** workshop concluded that **PCOS** is a syndrome of ovarian dysfunction along with hyperandrogenism and polycystic ovary morphology.

Objective: To find out the proportion of metabolic syndrome using the IDF criteria in women with PCOS.

Methodology: A hospital based descriptive study done over the period of one year. on the basis of the eligibility criteria 100 participants were finally got enrolled for the present study. Hyperandrogenism is assessed by Ferriman-Gallaway score >8 and insulin resistance by acanthosis nigricans. Statistical analysis done by using Medcalc 16.4 version software.

Result; 48.8% cases were from 26-30 Years age group (P<0.005). 87.00% cases were from class IV socio-economic status (p<0.005) The prevalence of metabolic syndrome was 34 % in PCOS cases. Total cholesterol level, HDL, LDL and TG in metabolic syndromic patients was significantly higher than non-metabolic syndrome patients

Conclusions: Despite treating the infertility and menstrual complaints of the PCOS patients, take it as an opportunity to screen for metabolic syndrome and advice on healthy diet, life style modification.

Keywords: MBS, Total Cholesterol, Rotterdam Consensus, Ferriman-Gallaway Score, IDF Criteria

Introduction

Polycystic ovarian syndrome (PCOS) is a multisystem endocrinopathy in women of reproductive age with the ovarian expression of various metabolic disturbances and a wide spectrum of clinical features like infertility, obesity, menstrual abnormalities and hyperandrogenism. The condition is relatively common and affects about 20% of women of reproductive years.¹

Patients are diagnosed to have PCOS according to **Rotterdam ESHRE/ASRM-sponsored PCOS Consensus Workshop Group** (2 out of 3 must be present) (a)Oligoovulation or anovulation (b)Clinical or biochemical signs of hyperandrogenism (c) Polycystic appearance on ultrasonography in atleast one ovary and exclusion of other etiologies (congenital adrenal hyperplasia, androgen-secreting tumours, Cushing's syndrome).²

Globally, the prevalence of PCOS ranges from 2.2% to 26% and PCOS is one of the major risk factor for metabolic syndrome³

About 25 % of the world's population have metabolic syndrome. and the prevalence of metabolic syndrome in PCOS is 40-50%.⁴

These varied data indicate the need for evaluation of metabolic syndrome in different populations, as it would help in planning screening strategies to prevent long-term effects

Hence this study was taken up to find out the the proportion of metabolic syndrome using the IDF criteria in women with PCOS reproductive age group

Material and Methods:

After obtaining the institutional ethical committee approval this hospital based descriptive study done over the period of one year from May 2019 to April 2021 at Department of Obstetrics and Gynaecology, SMS Medical College and attached group of hospitals, Jaipur.

On the basis of the inclusion and exclusion criteria (those who give written informed consent) 100 participants were finally got enrolled for the present study

Detailed history was taken. Patient was clinically assessed to know the height, weight, body mass index, waist circumference, blood pressure and evidence of hyperandrogenism.

Hyperandrogenism is assessed by the presence of acne, hirsutism (Ferriman- Gallaway score >8) and insulin

resistance by acanthosis nigricans. The following biochemical investigations was done in all patients: -

- * Triglyceride levels
- * HDL
- * Fasting glucose

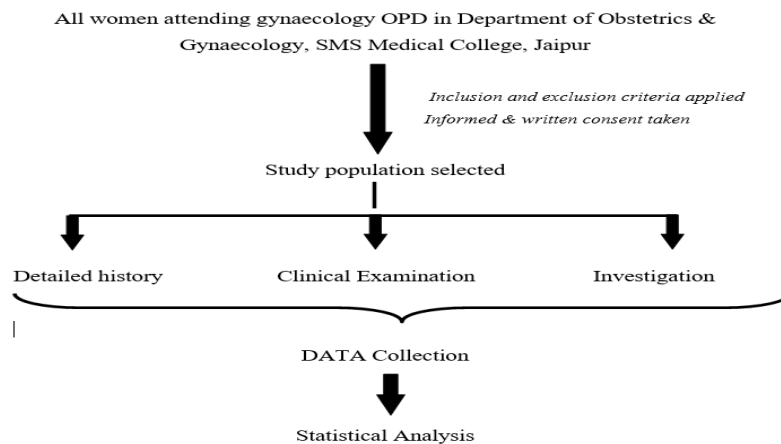
Statistical analysis:

Continuous variable was expressed as Mean and Standard deviation and compared by unpaired ‘t’ test. Nominal /

Categorical variable were summarized as Proportion and compared by chi-square test. p-value < 0.05 was taken as significant. Medcalc 16.4 version software was used for all statistical calculation.

Sample size is calculated at 95% confidence level and power of 80 % , assuming 37.2% prevalence of metabolic syndrome among PCOS patients. (as per seed article: Indu N.R et. al⁵) with 10% precision minimum 90 PCOS patients are required which is increased to 100 patients as final sample size accepting 10% attrition / dropout.

FLOW CHART



Result:

Present study tried to elucidate the various aspects related WITH PCOS, 48.00% cases were from 26-30 Years age group followed by 27.00% cases were 21 to 25 Years and 20.00% cases were from 31- 35 Yrs. Prevalence of metabolic syndrome in PCOS was 34.00%.(Table no.1) .

87.00% cases were from class IV socio-economic status followed by 13.00% cases were from class III socio-economic status. The association between socio-economic status and metabolic syndrome was found statically significant. (table no.2)

Table 1: Age wise distribution of PCOS patients

Age group	Metabolic syndrome absent		Metabolic syndrome present		Total
	No of patients	Percentage	No of patients	Percentage	
15 -20 Yrs	3	60.00	2	40.00	5 (5.00%)
21- 25 Yrs	24	88.88	3	12.12	27 (30.00%)
26-30 Yrs	32	66.66	16	33.33	48 (48.00%)
30 -35 Yrs	7	35.00	13	65.00	20 (20.00%)
Total	66	66.00	34	34.00	100 (100.00%)

Table 2: Socio economic status of study participants.

Socio-economic status	Metabolic syndrome absent		Metabolic syndrome present		Total
	No of patients	Percentage	No of patients	Percentage	
III	4	30.77	9	69.23	13 (13.00%)
IV	62	71.26	25	28.74	87 (87.00%)
Total	66	66.00	34	34.00	100 (100.00%)

Chi-square=6.55, df=1, P-value=0.003

BMI wise distribution of PCOS patients show that 17.00% cases were obese , 40.00% cases were overweight and 43.00% cases were normal. The association between BMI and metabolic syndrome was found statically significant (table No.3)

Table 3: Association of metabolic syndrome with BMI

BMI (kg/mt ²)	Metabolic syndrome absent		Metabolic syndrome present		Total
	No of patients	Percentage	No of patients	Percentage	
Normal (18.5-24.9)	38	88.37	5	11.63	43 (43.00%)
Over weight (25-29.99)	27	67.50	13	32.50	40 (40.00%)
Obese (≥ 30)	1	5.88	16	94.12	17 (17.00%)
Total	66	66.00	34	34.00	100 (100.00%)

Chi-square=32.05, df=2, P-value=0.001

Blood sugar of metabolic syndrome patients (105.20±18.08 mg/dl) was significantly higher than non metabolic syndrome patients (90.50±13.60 mg/dl).(Table No.4)

Table 4:

Age group / Blood sugar	Metabolic syndrome absent		Metabolic syndrome present	
	Mean	SD	Mean	SD
15 -20 Yrs	83.66	11.29	102.21	16.24
21- 25 Yrs	89.65	12.34	103.24	18.24
26-30 Yrs	91.08	13.12	106.35	10.21
30 -35 Yrs	90.02	11.80	108.64	10.08
Total	90.50	13.60	105.20	18.08

f-value=4.56, P-value=0.0001 (S)

Total cholesterol of metabolic syndrome patients (190.23±16.32 mg/dl) was significantly higher than non-metabolic syndrome patients (160.12±14.20 mg/dl).(table No.5).

Table 5: Association of metabolic syndrome with total cholesterol level

Age group / Cholesterol	Metabolic syndrome absent		Metabolic syndrome present	
	Mean	SD	Mean	SD
15 -20 Yrs	158.23	13.68	188.23	13.12
21- 25 Yrs	160.25	14.12	190.21	15.18
26-30 Yrs	160.48	14.08	190.08	15.24
30 -35 Yrs	160.05	14.36	190.12	16.29
Total	160.12	14.20	190.23	16.32

f-value=5.26, P-value=0.01 (S)

HDL cholesterol level of metabolic syndrome patients (46.74 ± 6.01 mg/dl) was significantly lower than non-metabolic syndrome patients (54.94 ± 4.40 mg/dl).(table no.6)

Table 6: Association of metabolic syndrome with total HDL level

Age group HDL	Metabolic syndrome absent		Metabolic syndrome present	
	Mean	SD	Mean	SD
15 -20 Yrs	52.14	4.31	44.12	5.14
21- 25 Yrs	53.24	4.32	46.12	6.04
26-30 Yrs	54.98	4.64	46.87	6.12
30 -35 Yrs	54.69	4.61	46.91	5.98
Total	54.94	4.40	46.74	6.01
f-value=2.13, P-value=0.01 (S)				

LDL cholesterol of metabolic syndrome patients (102.57 ± 18.61 mg/dl) was significantly higher than non-metabolic syndrome patients (91.45 ± 11.02 mg/dl). (table No.7)

Table 7: Association of metabolic syndrome with total LDL level

Age group LDL	Metabolic syndrome absent		Metabolic syndrome present	
	Mean	SD	Mean	SD
15 -20 Yrs	92.12	9.65	102.68	14.56
21- 25 Yrs	91.12	10.08	101.65	16.21
26-30 Yrs	91.54	12.13	102.23	18.65
30 -35 Yrs	91.24	11.09	102.46	18.24
Total	91.45	11.02	102.57	18.61
f-value=5.36, P-value=0.01				

Triglyceride of metabolic syndrome patients (124.00 ± 24.56 mg/dl) was significantly higher than non metabolic syndrome patients (108.36 ± 13.08 mg/dl). (table No.8)

Table 8: Association of metabolic syndrome with total triglyceride level

Age group Triglyceride	Metabolic syndrome absent		Metabolic syndrome present	
	Mean	SD	Mean	SD
15 -20 Yrs	109.56	9.56	121.36	21.56
21- 25 Yrs	108.21	12.80	122.12	23.64
26-30 Yrs	108.64	12.45	123.64	24.12
30 -35 Yrs	108.42	13.12	124.12	24.64
Total	108.36	13.08	124.00	24.56
f-value=4.15, P-value=0.001 (S)				

Discussion

The prevalence of metabolic syndrome in PCOS in Present study was 34.00%. which is similar to the prevalence of MBS in other ethnicities and races diagnosed with PCOS.⁶ Pikee S et al (2016)⁷ and Indu N. R et al (2018)⁵ was found that the prevalence of metabolic syndrome in PCOS was 29.89% & 37.2%. respectively.

In Present study Age of metabolic syndrome patients (29.50±3.50Yrs) was significantly higher than in non metabolic syndrome patients (26.87±2.8 years) similarly Varghese J et al⁸ was found that the subjects ranged in the age from 18-35 years, with a mean age of 26.6 ± 4.6 years

In our study 87.00% cases were from class IV socio-economic status followed by 13.00% cases were from class III socio-economic status. (Statistical significant). Pikee S et al (2016)⁷ and Indu N. R et al⁵ was found that 52.00% and 47.5 % patients were in class IV socio-economic respectively and 38.00% and 35.6 % were in class III socio-economic status as according modified Kuppusamy scale.

Blood sugar of metabolic syndrome patients (105.20±18.08 mg/dl) was significantly higher than non-metabolic syndrome patients (90.50±13.60 mg/dl) in our study. Indu N. R et al (2018)⁵ was found that 87.8% of the cases had fasting level more than 110. Varghese J et al⁸ was found that FBS of metabolic syndrome patients (116.32±18.23 mg/dl) was significantly higher than non-metabolic syndrome patients (90.10±11.23mg/dl)

Total cholesterol of metabolic syndrome patients (190.23±16.32 mg/dl) was significantly higher than non-metabolic syndrome patients (160.12±14.20 mg/dl). HDL cholesterol of metabolic syndrome patients (46.74 ± 6.01 mg/dl) was significantly lower than non-metabolic syndrome patients (54.94 ± 4.40 mg/dl). LDL cholesterol of metabolic syndrome patients (102.57 ± 18.61 mg/dl) was significantly higher than non-metabolic syndrome patients (91.45 ± 11.02 mg/dl).

Triglyceride of metabolic syndrome patients (124.00 ± 24.56 mg/dl) was significantly higher than non-metabolic syndrome patients (108.36 ± 13.08 mg/dl) in our study. (table 11-14) Indu N. R et al (2018)⁵ was found that 84.8% of the cases had HDL50 in control, which shows significant association between HDL with metabolic syndrome (chi sq = 60.36, p = 0.0001). Increased TGL > 150 mg/dl showed a 100% significant association with metabolic syndrome (chi sq = 172.7, p < 0.01). Varghese J et al⁸ was found that was found a significant association between Triglyceride, HDL, LDL, Cholesterol in cases and control.

Based on the results of the present study, the high rate of HDL-C < 50 mg/dl (96.9% of cases) with MBS, and triglycerides ≥ 150 mg/dl manifested a significant abnormal lipid profile in PCOS women. Many studies have shown low HDL-C levels, which is one component of the lipid

profile that indicates which MBS has an important role in the increasing risk of cardiovascular and coronary artery disease.⁹ Therefore it is appropriate to be concerned when HDL-C levels are less than 50 mg/dl, particularly in high-risk populations. Two important factors in the increasing rate of MBS are age and BMI. By categorization of patients by age and BMI, we found increased MBS with age and BMI.

Limitations

The sample size of the study was small for the result to be significant enough to be applicable to the general population, but it was big enough to be significant for the study population.

- The study was done at a Tertiary Care Hospital; thus, it is not representative of the whole population. More multi-centric trials need to be done.
- A number of cases in the community due to lack of awareness and proper guidance, it remains undiagnosed.
- Data regarding the PCOS related complication in this region is also scarce.

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