

Prevalence of Metabolic Syndrome in Women with Polycystic Ovary Syndrome

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Received: 30-01-2023 / Revised: 27-02-2023 / Accepted: 30-03-2023

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Conflict of interest: Nil

Abstract

Background and Aim: Cardiovascular disease and type 2 diabetes risk are both elevated by two and five times, respectively, by metabolic syndrome. This demonstrates the significance of early identification of metabolic syndrome and insulin resistance in women with polycystic ovarian syndrome and the subsequent implementation of preventive therapies. Our study's objective is to assess the prevalence of metabolic syndrome in women with polycystic ovarian syndrome who are in the reproductive age range.

Material and Methods: The present study is the cross sectional analysis done in the department of Obstetrics and Gynaecology in Medical College & Hospital. For the analysis, total of 238 women in the reproductive age group were included in the study. The detailed menstrual history in relation to the age of menarche, menstrual cycle was recorded. The history of diabetes, hypertension drug intake, childhood obesity and hypertensive drugs were recorded. The anthropological examination and clinical examination was done. Hirsutism was graded as per Ferriman-Gallway scoring system.

Results: In the study population, metabolic syndrome was found to be 38.5% prevalent. Patients with metabolic syndrome on average were 30.91 + 7.9 years old, while those without it were 29.4 + 6.5 years old. According to the results of the current study, the metabolic syndrome is more prevalent in the PCOS group as BMI rises. 35% of people had hirsutism or other clinical signs of hyperandrogenism with a Ferriman and Gallway score of 8 or above. Those who experienced hirsutism (35% vs 8%) and acanthosis (35% vs 16%) were substantially more prevalent.

Conclusion: The current study emphasises the necessity of thorough screening for metabolic syndrome in PCO-positive women visiting OPD. One in four patients visiting a gynaecologist have PCOS, a common illness that affects women in the reproductive age group.

Keywords: Diabetes, Metabolic Syndrome, Menstrual Cycle, Polycystic Ovary Syndrome

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Introduction

Dr. Irving Stein and Michael Leventhal first identified the polycystic ovarian syndrome in 1935 in Chicago, referring to a disorder that affects women who have hirsutism, obesity, menstrual abnormalities, and bilateral polycystic ovaries. It was then referred to as Stein-Leventhal syndrome. Given that it affects 6 to 8% of women globally, PCOS is currently recognised as a multidimensional heterogeneous condition and the most prevalent endocrinopathy in women of reproductive age.[1,2]

One of the most prevalent endocrine illnesses in women, polycystic ovarian syndrome (PCOS) affects 5% to 8% of premenopausal women. Chronic anovulation, oligomenorrhea or amenorrhea, hyperandrogenism, and polycystic ovary morphology on pelvic ultrasonography are its distinguishing features. It also has a metabolic component that includes hyperinsulinemia, insulin resistance, and a higher risk of cardiovascular disease. Both lean and obese women who have the illness experience these metabolic symptoms, and there is a clear link between them and metabolic syndrome.[3,4]

An ovary with 12 or more follicles measuring 2 to 9 mm in diameter and/or increased ovarian volume, or more than 10 cm³, is considered to have polycystic ovary morphology on ultrasound. Hyperinsulinemia, insulin resistance, obesity, and an elevated luteinizing hormone: follicle-stimulating hormone ratio greater than 2 or 3 are additional characteristics of PCOS that are not included in the criteria because they are also common in illnesses other than PCOS.[5-7]

Another group of endocrine disorders known as the metabolic syndrome include insulin resistance, dyslipidemia, obesity, and hypertension. It is linked to a five-fold greater risk of type 2 diabetes and a two-fold increased risk of cardiovascular disease. This

demonstrates the significance of early identification of metabolic syndrome and insulin resistance in women with polycystic ovarian syndrome and the subsequent implementation of preventive therapies.[8-10] The indications and symptoms of metabolic syndrome are simple to identify, and it has recently become clear that it has a wide range of metabolic effects. Unfortunately, the exact aetiology is still unknown. Our study's objective is to determine the prevalence and evaluation of metabolic syndrome in women with polycystic ovarian syndrome in the reproductive age group in order to determine the most effective pharmacological and non-pharmacological interventions for treating and preventing major fatal cardiovascular diseases, stroke, and other conditions.

Material and Methods

The present study is the cross sectional analysis done in the department of Obstetrics and Gynaecology in Medical College & Hospital. The ethical committee was informed about the study and the ethical clearance was obtained prior to the start of the study. The study period was of one year. For the analysis, total of 238 women in the reproductive age group were included in the study. All those women who were willing to participate and signed the consent form were included in the study.

These are the inclusion and exclusion criteria used in the study:

The study included women who were diagnosed with Clinical hyperandrogenism, Amenorrhea, Oligomenorrhoea, Biochemical hyperandrogenism, History of infertility, USG polycystic ovarian appearance, and/or at least one ovary with 12 or more follicles, each measuring 2-9 mm in diameter.

The study excluded women with PCOS-mimicking conditions such Cushing syndrome, thyrotoxic dysfunction,

hyperprolactinemia, drug or alcohol addiction, and adrenal hyperplasia as well as those who used oral contraceptives.

The included women's complete histories were documented. Both a clinical and anthropological investigation were conducted. Amenorrhea is described as not having had a period in the previous six months, but oligomenorrhoea is when the menstrual cycle lasts longer than 35 days. Only the women in the study who were married had their cases of infertility evaluated; it was characterised as an evident failure to conceive even after one year of unprotected sexual activity. Individuals with other infertility-related conditions including male factor infertility were eliminated.

A thorough record of menstrual history was made in regard to menarche age and menstrual cycle. Diabetes, drug use for treating hypertension, childhood obesity, and drug use for treating hypertension were all noted. Family medical histories, particularly those pertaining to the mother's health and whether or not she experienced comparable issues, were also noted.

Each patient had a good sexual development and a spontaneous beginning of puberty. For at least three months before to the trial, none of them had taken any medication that was known to influence plasma sex hormones and carbohydrate metabolism. Height was measured using the same ordinary measuring tape, and weight was determined using a conventional digital scale with a precision of 100 g.

BMI: According to modified WHO guidelines for the Indian population, obesity and overweight were defined. The search for hirsutism/Acanthosis Nigricans/acne was prioritised. A criterion for clinical hyperandrogenism was hirsutism. It was scored using the Ferriman-Gallway system. If the patient had moderate to severe acne, which was determined by the presence of

inflammatory lesions and their extent, or if the FG score was 8 or higher, clinical hyperandrogenism was established.

Results

There were 238 consecutive PCOS-positive women in the study overall. In the study population, metabolic syndrome was found to be 38.5% prevalent. Based on the data that was collected, it was discovered that the prevalence of metabolic syndrome increased with age. 69% of patients are between the ages of 31 and 40. It was discovered that the prevalence of the metabolic syndrome rises with age (p value 0.003, statistically significant). Patients with metabolic syndrome on average were 30.91 + 7.9 years old, while those without it were 29.4 + 6.5 years old.

According to the results of the current study, the metabolic syndrome is more prevalent in the PCOS group as BMI rises. The percentage of obese people was 44% in the study by Kalra, *et al.* (39), which is comparable to the current study's 46%. In comparison to white Caucasians, Asian Indians have larger percentages of body fat and abdominal adiposity at lower or equivalent BMI levels. Asians are more likely than other ethnic groups to experience insulin resistance and cardiovascular issues at lower BMI levels.

The results of this study and other investigations provide strong evidence for the relationship between PCOS and obesity. According to Manu *et al.*, there is a rising tendency for lean PCOS patients, and they vary from obese individuals in terms of phenotypic and metabolic traits. 35% of people had hirsutism or other clinical signs of hyperandrogenism with a Ferriman and Gallway score of 8 or above. Those who experienced hirsutism (35% vs 8%) and acanthosis (35% vs 16%) were substantially more prevalent. It was discovered that both hirsutism and acne, a diagnostic of

hyperandrogenism, and acanthosis, a marker of insulin resistance, were closely related to metabolic syndrome. PCOS has a galloping rise alongside type 2 DM due to its straight association with metabolic syndrome. PCOS

is to blame for 80% of ovulatory infertility (38). Alaknanda *et al.* found that 54% of women had primary infertility. In the study by Joshi *et al.* (35b) 46% of patients were married and 43% complained of infertility.

Table 1: Prevalence of metabolic syndrome in the present study

Sr. No.	Metabolic syndrome	No.
1	Present	86
2	Absent	152

Table 2: Description and comparison of frequency distribution BMI category between the groups in the study

S. No.	BMI Category	Metabolic syndrome present	Metabolic syndrome absent	P value
1	Normal	2	72	< 0.0001
2	Overweight	10	14	
3	Pre obese	40	54	
4	Obese	30	10	
5	Morbidly obese	4	2	

Discussion

Elevated blood pressure, dyslipidemia, and elevated plasma glucose are the three main abnormalities that make up the metabolic syndrome. These three factors directly contribute to a pro-thrombotic and pro-inflammatory state that predisposes people to the development of type 2 diabetes mellitus and atherosclerotic cardiovascular disease. The common underlying metabolic abnormalities identified in PCOS and metabolic syndrome include hyperinsulinemia and insulin resistance. High levels of circulating insulin cause insulin resistance, which in turn alters lipid metabolism and boosts androgen synthesis in the theca cells.[11,12] According to our study, menstrual irregularity is the most typical issue causing a PCOS woman to visit a hospital (51% reported monthly irregularity in the form of oligomenorrhea and amenorrhea as their presenting complaint). Primary infertility was the presenting complaint in 45 %, 11.7% had secondary infertility and 3.7% came for hirsutism and acne. According to Alaknanda *et al.* (2013),

54% of women had primary infertility. 46% of patients in the Joshi *et al.* study were married, and 43% of them reported infertility.

In this study, 39.4% of the PCOS study population had metabolic syndrome. The study covered age ranges between 18 and 40. The frequency was 23.11% in the under-25 age group, 42.5% in the 26 to 30 age group, and 68% in the over-31 age group. This demonstrates that growing older is a significant risk factor for metabolic syndrome in people with PCOS. Despite the fact that the prevalence of metabolic syndrome rises with age, the average age of those with the condition is 30.89 years, compared to 29.64 years for people without it.[13,14]

According to our research, the frequency of metabolic syndrome rises with Obesity in the PCOS group. Obese PCOS has a 100% frequency (40 and above). The percentage of pre-obese individuals in the study by Kalra, *et al.* was 47%, which is comparable to the current study's 49%.

Conclusion

The current study emphasises the necessity of thorough screening for metabolic syndrome in PCO-positive women visiting OPD. One in four patients visiting a gynaecologist have PCOS, a common illness that affects women in the reproductive age group. Health education programmes inspire them to alter their lifestyle attitudes in order to delay the start of the disease.

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